

**UN-ECLAC,
UNCTAD, and IMF
Webinar
Measurement of the
digital economy and
trade in Latin
America and the
Caribbean**

November 8-11, 2022



STATISTICS

**“The Digital Revolution”
What is it, and what type
of indicators are needed
to understand its
implications**

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Outline

- **The Digital Revolution – How is economic activity changing?**
- **A framework for measuring the economic effects of digitalization.**
- **Some examples**

The Digital Revolution: Widespread economic implications

Data, Artificial Intelligence

Autonomous Vehicles



Farm Hand (+)	Farmer (-)
\$80	\$100
Supplies	
\$20	

✓ Data driven AI is having a significant impact on labor markets and productivity across all sectors of the economy.

APP subscription (-)	Farmer (+)
\$20	\$30
Supplies	
\$10	



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 information is currently not part of the SNA production boundary. Research is currently underway to determine how to capture this activity in the updated SNA/BPM.

The Digital Revolution: Widespread economic implications

Impact on Labor Markets

Ride Services



The Uber App - Today

UBER (+)	Household (-)
\$2	\$10
Household UBER Driver (+)	
\$8	

Hailing a Taxi - Yesterday

Taxi Industry (+)	Household (-)
\$10	\$10
Taxi Driver	
\$8	

✓ Increase in informal work that often falls outside the scope of labor codes.



The Digital Revolution: Widespread economic implications

“Free Digital Products”

Fixing a bike



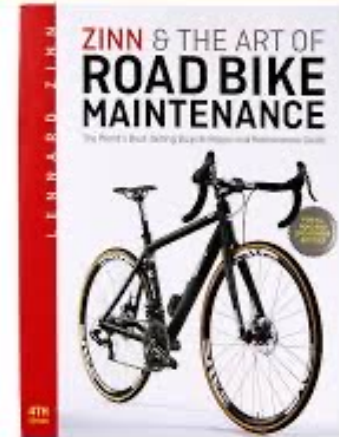
Do it yourself - Yesterday

Book Publisher (+)	Household Consumption (-)
\$10	\$10

Do it yourself - Today

Book Publisher (+)	Household Expenditure (-)
\$0	\$0
YouTube (+)	Advertiser (-)
\$1	\$1

✓ Significant structural changes are occurring – entire industries are disappearing, and others need to reinvent themselves.



The Digital Revolution: Widespread economic implications

Digital Platforms

Travel and Accommodation



Booking online -Today

Travel Agent (+)	Household (-)
B \$0	B \$0
Platform	Advertiser
\$2	\$2

Going to a travel agent – Yesterday

Travel Agent (+)	Household Expenditure (-)
\$20	\$20

TOP 10 REASONS
TO USE OUR
««TRAVEL AGENCY»»

PEACE OF MIND	CUSTOMER SERVICE	MAXIMIZE YOUR BUDGET	BEST RATED CHOICES	SAVE TIME PLANNING
COMPLETE PRICING	TRAVEL DOCUMENTS ASSISTANCE	INSIGHT & EXPERTISE	PERSONAL SERVICE	CLIENT ADVOCATE

The Digital Revolution: Widespread economic implications

Financial Innovation

Financial Services



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

✓ Digitalization has the ability to transform the financial services industry

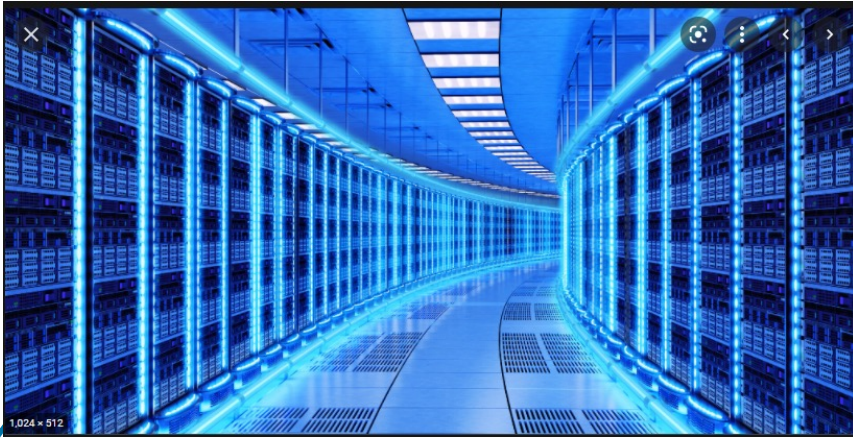
Household (+)	Household (-)
\$?	\$?
Asset (1 Bitcoin)	Liability
38,857.60	?



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.

The Digital Revolution: Widespread economic implications

The metaverse

Digital Universe



Reality - Today	
Travelling to Florida (+)	Cash (-)
\$10,000	\$10,000

Metaverse - Tomorrow	
Travelling to Digital Florida (+)	Cash (-)
\$?	\$?



✓ There is the potential for a significant increase in the worldwide stock of digital (intangible) assets.

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

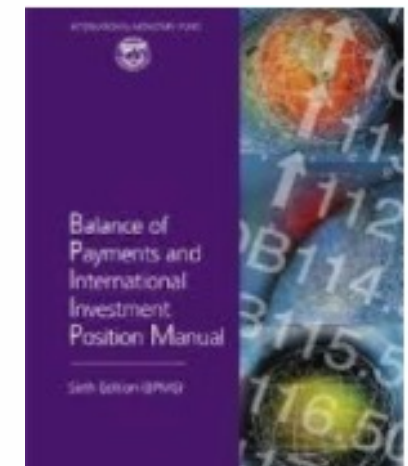
A measurement challenge for macroeconomic accountants

- ❑ 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

A measurement challenge for macroeconomic accountants

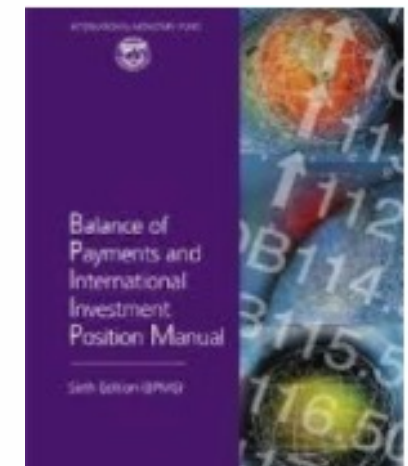
- ❑ The SNA and BPM are being updated with recommendations that will help countries record and present the economic implications of digitalization.
 - ❑ Recording Data (as an asset)
 - ❑ Recording the activities of digital platforms.
 - ❑ Recording Artificial Intelligence
 - ❑ Recording Cloud Computing
 - ❑ Recording Non-fungible Tokens (NFTs)
 - ❑ Recording of CryptoAssets



The Digital Revolution

A measurement challenge for macroeconomic accountants

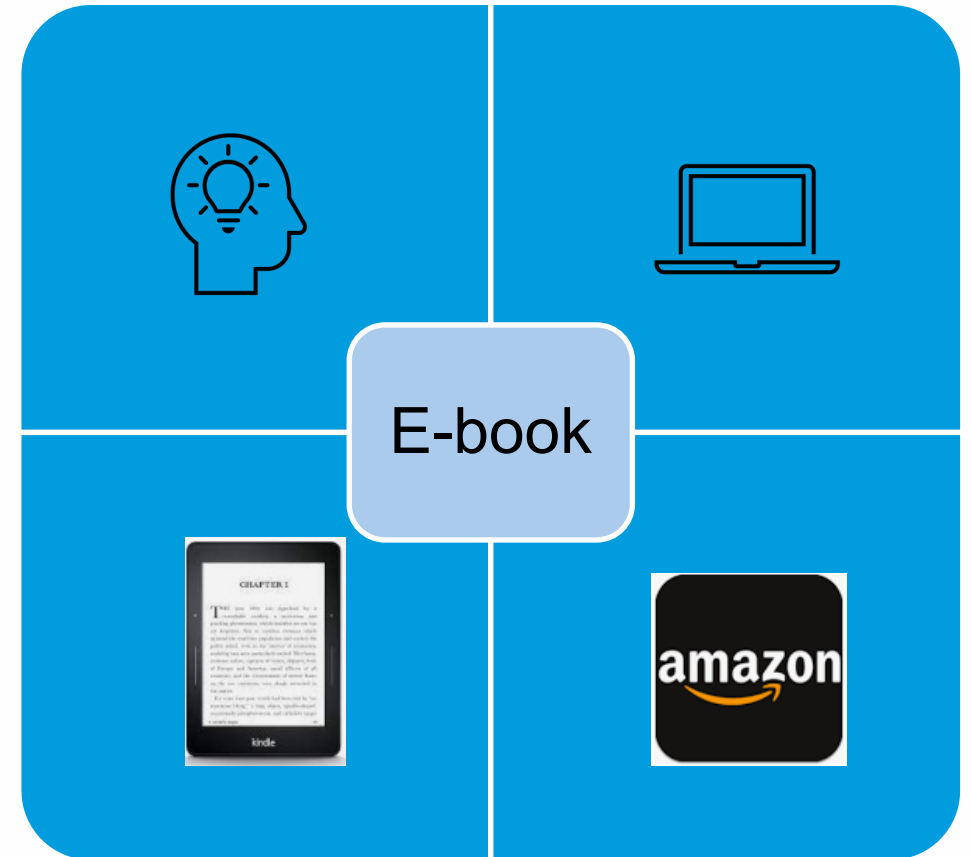
- ❑ In addition to recommendations regarding specific transactions, the updated SNA / BPM will also provide guidance that countries can use to quantify the impact of digitalization on their economies.
- ❑ The guidance is designed to meet a wide range of demands and needs.
- ❑ It recommends countries develop a suite of indicators related to e-commerce, digitally delivered products; digital intermediation platforms', expenditures on information, communication and technology, Artificial intelligence, cloud computing, and even data.



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..).

Emerging guidance

Digital Industries / Digitally facilitated production

Digital Industries	Example of Firms
Digitally enabling industries	Orange, Verizon, BSNL, Dell, Amazon Web Services, Indosat Ooredoo
Data and advertising driven digital platforms	Facebook, Tik Tok, Citymapper, Google, Twitch, Youku
Digital intermediary platforms charging a fee	Uber, OLA, Deliveroo, Booking.com, Didi, Trivago, Mercardo Libre.,
Firms dependent on intermediary platforms	Bicycle couriers, Ghost kitchens, Uber drivers
E-tailers	ISOS, JD.com, Zalando, Sarenza, Yesstyle, Amazon
Digital only firms providing financial and insurance services	Ally financial, Transferwise, Fidor bank, Open bank, Paypal, Directline, Seven Bank
Other producers only operating digitally	Spotify, Netflix, The Independent newspaper, Disney+, Bet365, Showmax, Starz Play

Emerging Digital Transactions

Digital Transactions	Examples
Digitally ordered	Ordering a new shirt on Amazon to be delivered to your home.
Ordered directly from a counterparty	Ordering a new computer from Dell
Ordered via a resident or nonresident digital intermediary platform	Renting a home on VRBO.
Not digitally ordered	Going to The GAP and purchasing a new shirt in person.
Digitally Delivered	Ordering music from Spotify.

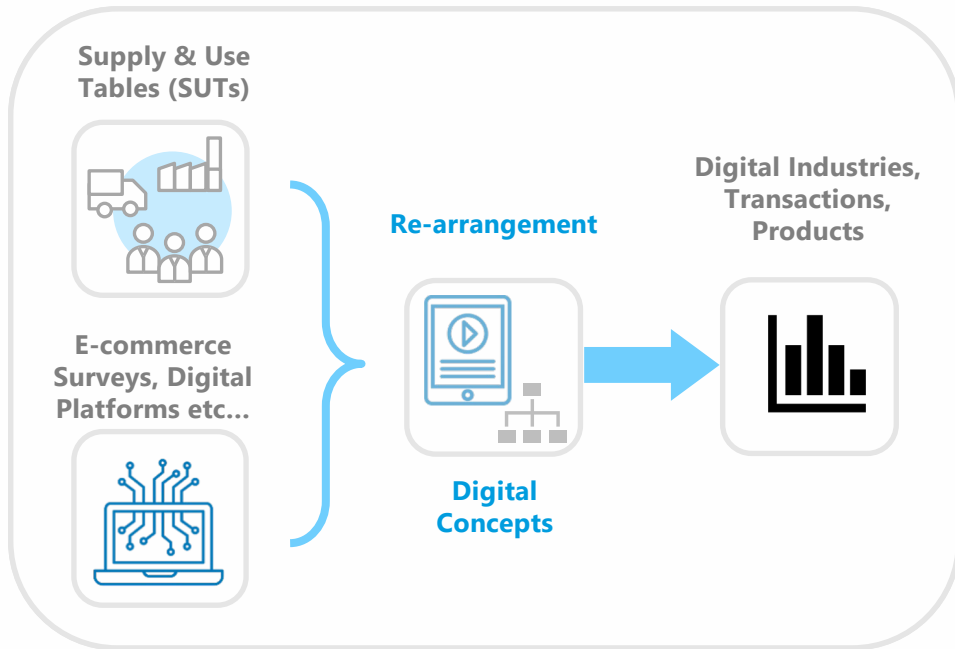
Emerging Guidance Digital Products

Digital Transactions	Definition
ICT Products	Products primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display (e.g. Cellular phones)
Priced Digital services – except cloud computing services and digital intermediary services	e.g. Telecommunication Services
Priced Cloud computing services	Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way
Priced Digital intermediary services	Online fee-based intermediation services (e.g. VRBO and UBER service fees).
Data (Beyond SNA 2008)	e.g. Digitization of paper copies of customer records....
Digital services (beyond 2008 SNA), provided by enterprises	e.g. An employee using free YouTube Video's to learn how to program in R or Python
Digital services (beyond 2008 SNA), provided by communities	e.g. R software

Sources and Methods

Constructing digital economy indicators

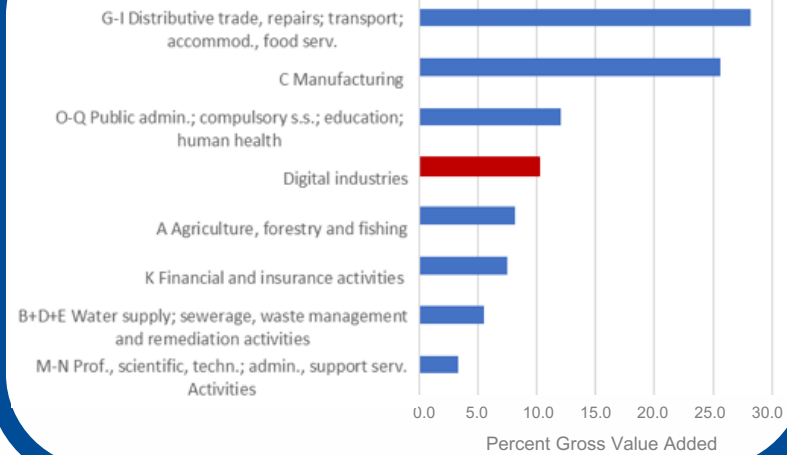
BASIC APPROACH IS TO TAKE EXISTING NATIONAL ACCOUNTS DATA, COMPLEMENT IT WITH SUPPLEMENTARY DATA RELATED TO THE USE OF DIGITAL TECHNOLOGIES AND RE-ARRANGE THE INFORMATION INTO DIGITAL INDUSTRIES, PRODUCTS AND TRANSACTIONS.



Digital Industries

Thailand

Digital industries compared to ISIC Rev. 4 sectors, 2019



USES

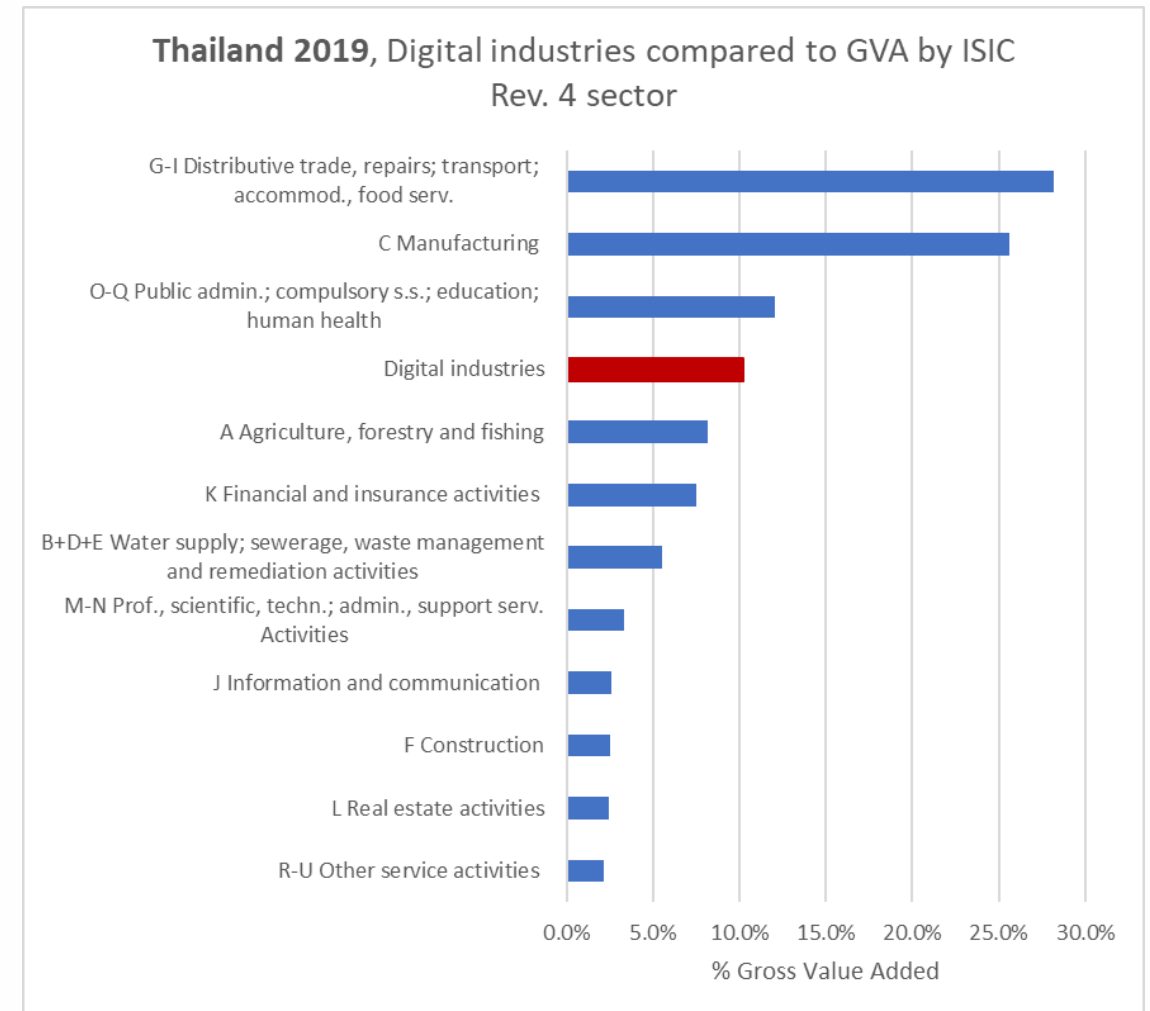
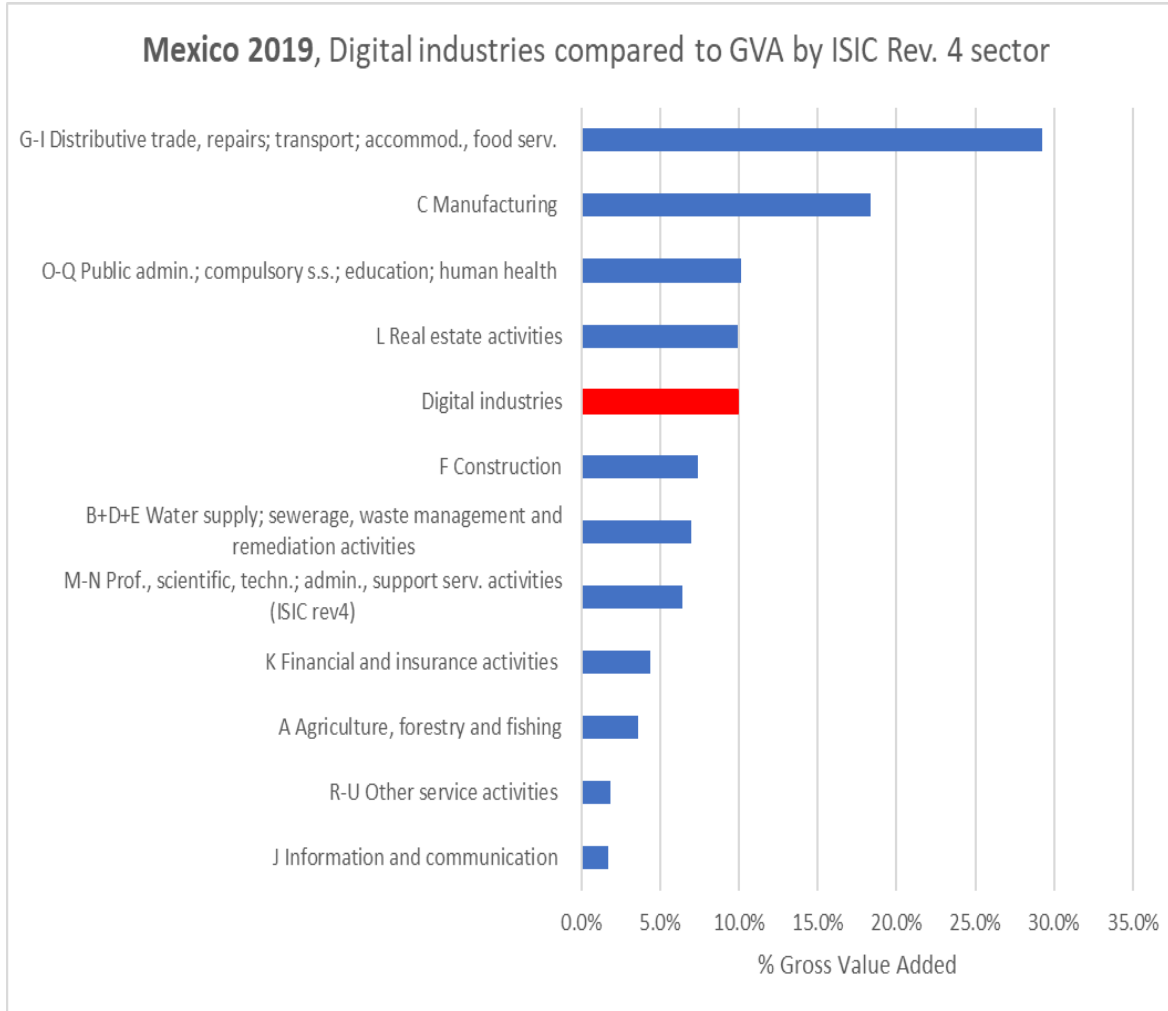
Analytical Work & Policy Advice

Structural Change



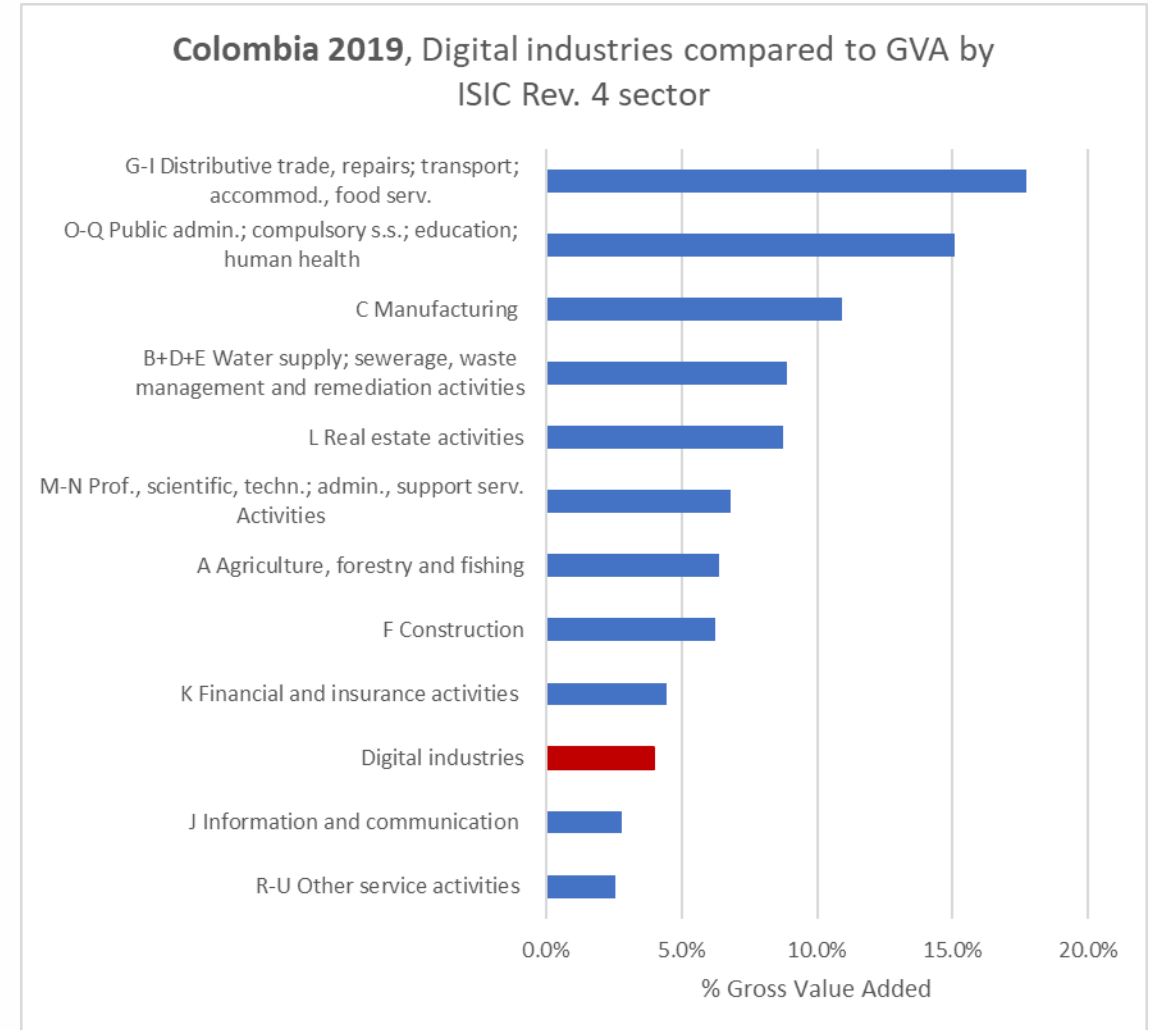
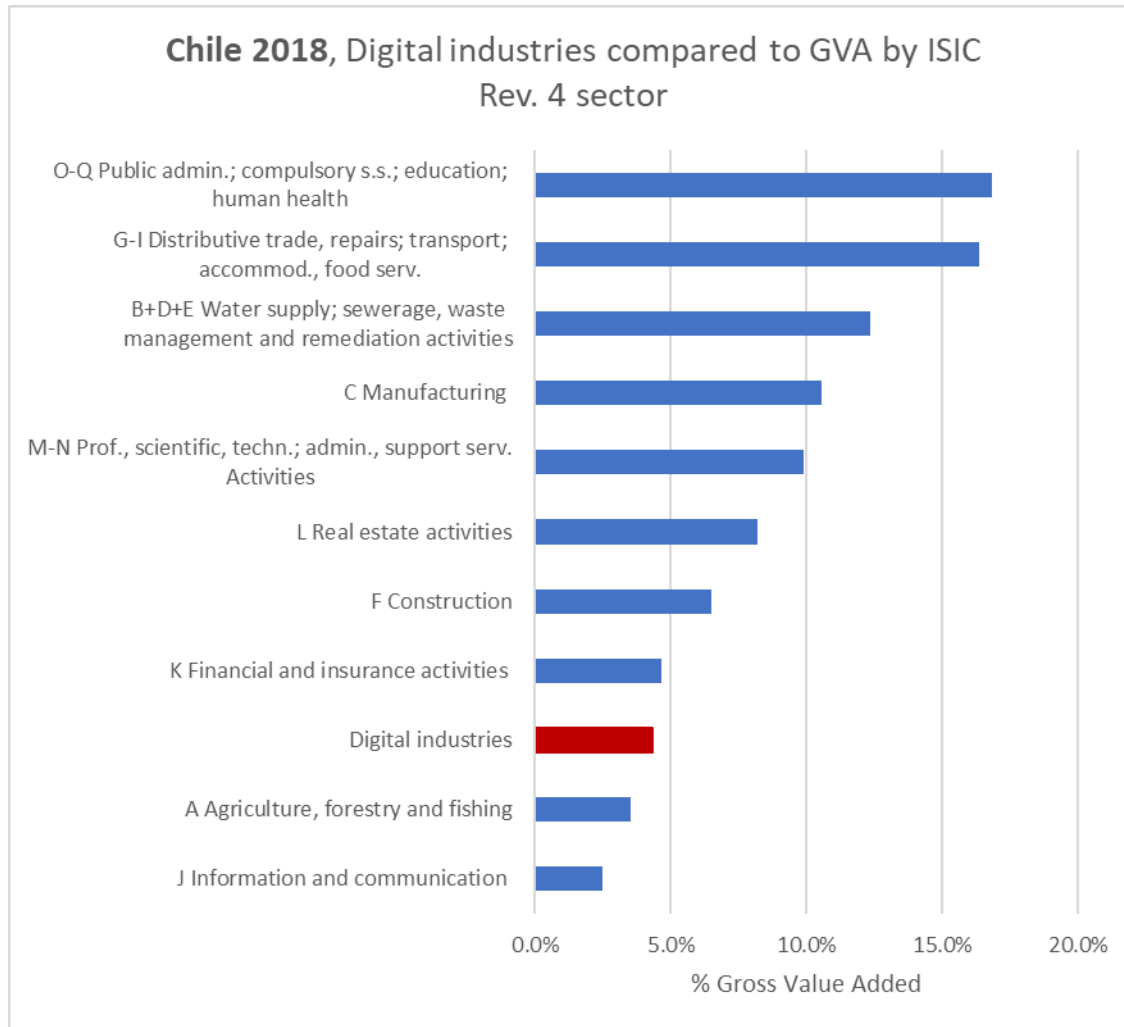
Some examples

Digital Industries – Mexico / Thailand



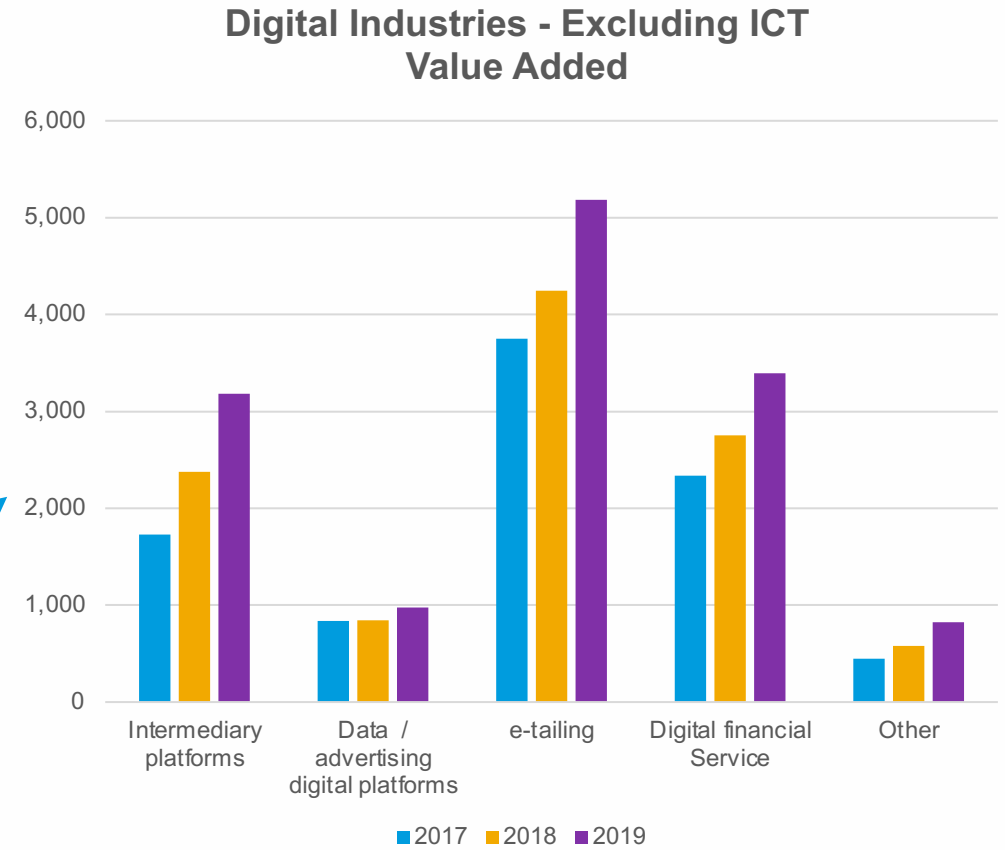
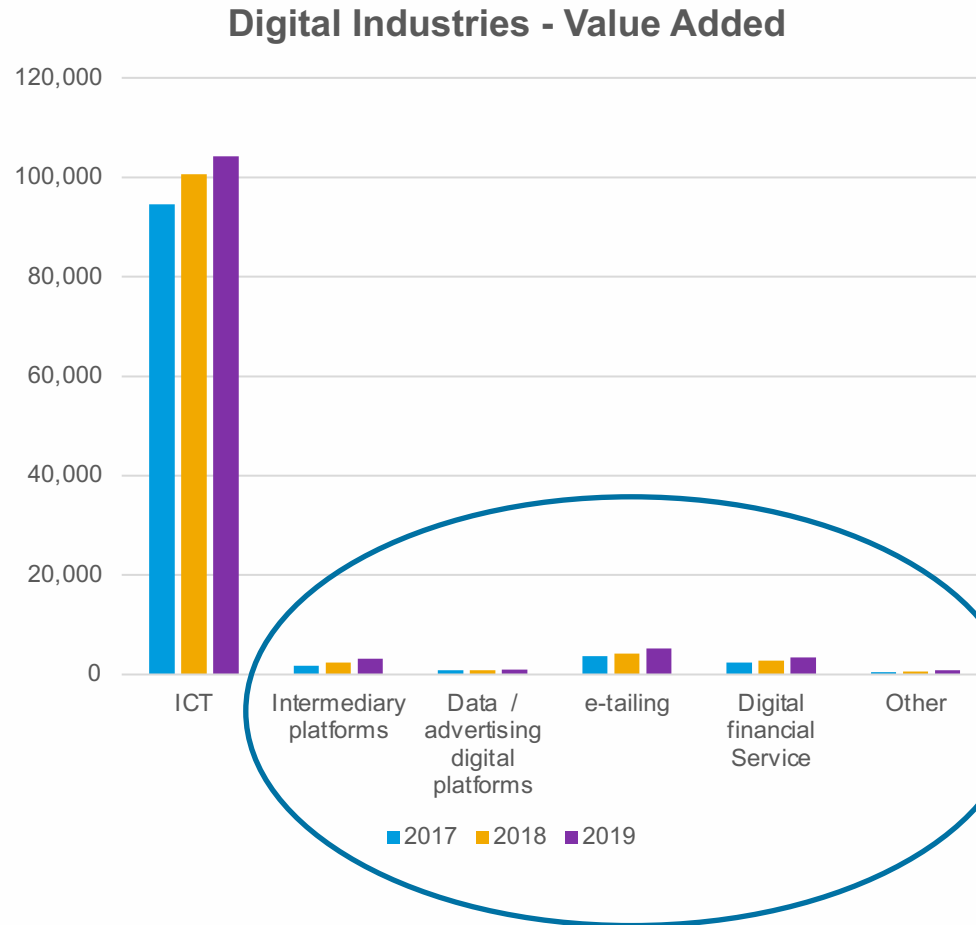
Sources: Instituto Nacional de Estadística y Geografía of Mexico, Office of the National Economic and Social Development Council of Thailand, OECD, and IMF staff estimates.

Some examples Digital Industries – Chile / Colombia



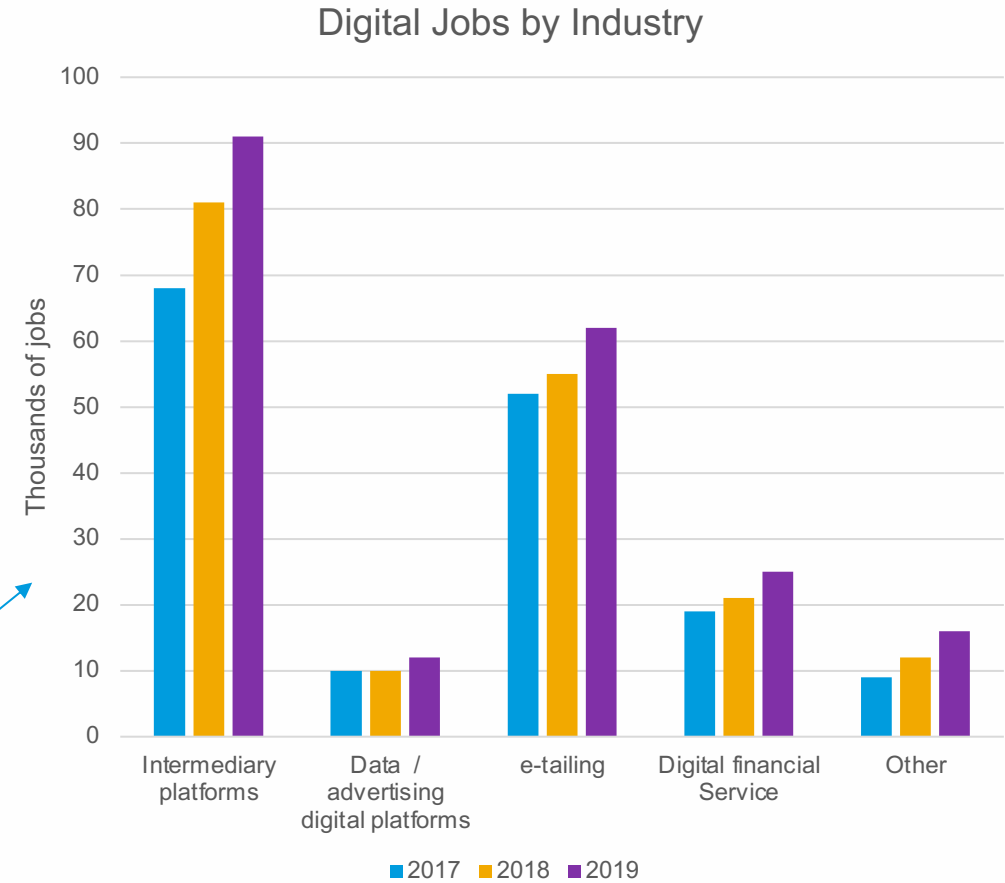
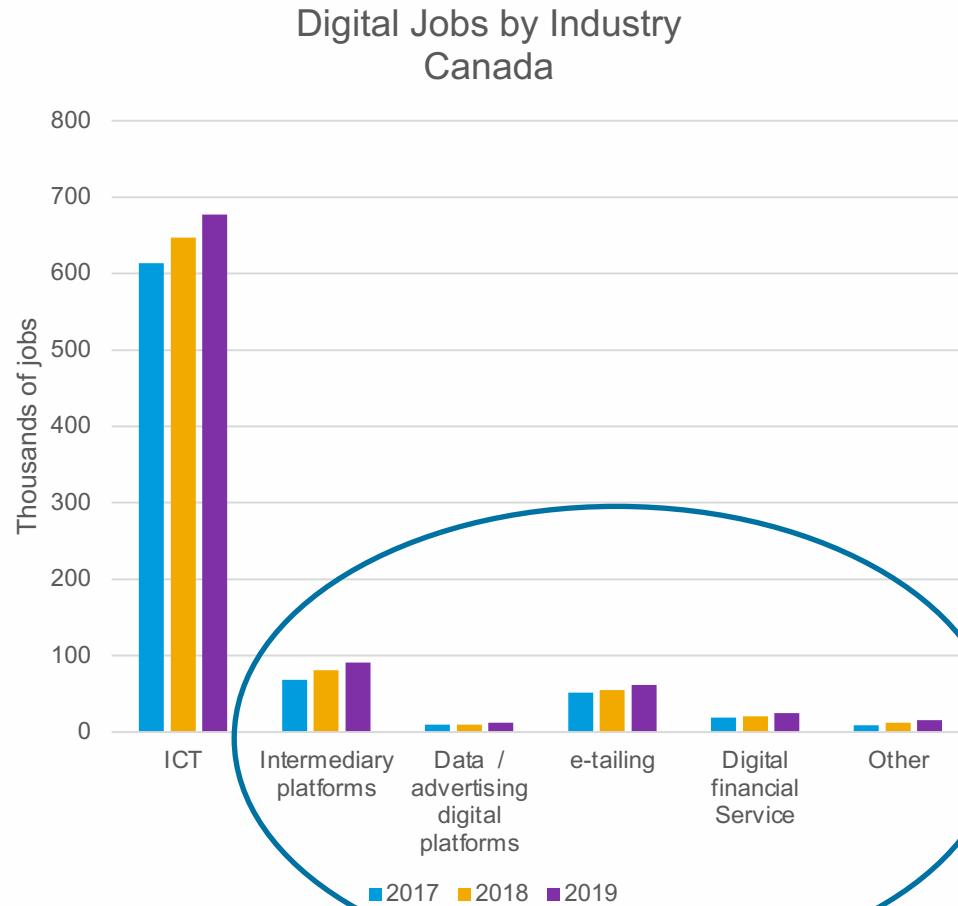
Sources: Central Bank of Chile and National Statistical Office of Chile, Departamento Administrativo Nacional de Estadística de Colombia, OECD, and IMF staff estimates.

Some examples Canada – Value Added



Statistics Canada Source: <https://www150.statcan.gc.ca/n1/daily-quotidien/210420/t001a-eng.htm>

Some examples Canada – Digital Jobs



Source Statistics Canada: <https://www150.statcan.gc.ca/n1/daily-quotidien/210420/t001a-eng.htm>