



# ***DIGITALISATION IN THE SNA: WHAT DO WE NEED TO DO?***

Third Statistics Conference

## **Measuring the economy in the digital age**

Intercontinental Hotel, Santiago, Chile

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# Background

The  
Economist

*Some optimists argue instead that the problem is one of measurement. Technological progress often raises productivity in ways that statistical agencies struggle to detect*

THE WALL STREET JOURNAL.

Silicon Valley Doesn't Believe U.S. Productivity Is Down



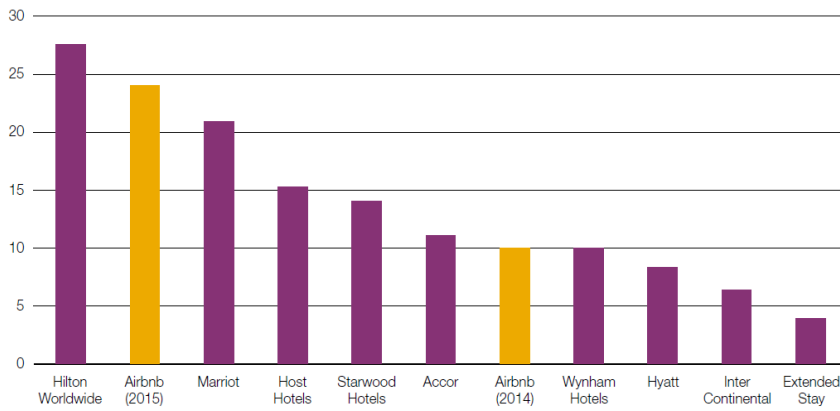
FINANCIAL TIMES

The internet and the productivity slump

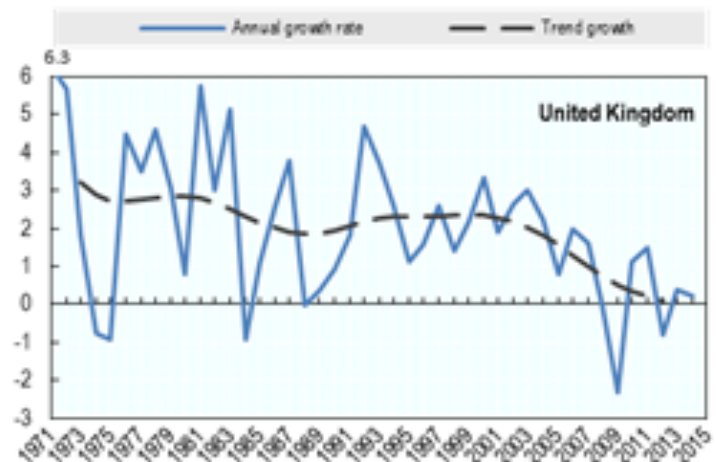
## The **mismeasurement hypothesis**

Significant digital transformation

But low productivity growth



Source: Davidson, L., (2015). 'Airbnb boss calls the UK the "centre of the sharing economy",' The Telegraph.





## What are the criticisms?

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### **You're not capturing:**

- the sharing/gig economy
- participative and displacing production
- free services
- the role of data
- cross-border transactions correctly
- price change



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# 1: The sharing/gig economy: New forms of intermediation services



# Peer-to-Peer Digital Intermediaries..

...have increased the potential to engage in 'informal' activities

Dwelling services,



Transport, Delivery, Business



Distribution



True

but >> also **quasi-formalised** many of the same activities

And, for dwelling services >>>>> **imputed rent**

**Conceptual framework captures all activities....**

And DIPs may also provide a source of information

**However:**

- **Methods to estimate 'informal/self-employed' activities may require strengthening**
- **Cross-border payments for intermediation services for platforms located abroad may not be captured**



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## 2: Consumers as producers – ‘participative and displacing production’



# 'Participative' & 'displacing' production

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Households engaging in the intermediation process

## Household production of services for own-consumption:

Hotels and flight bookings

Supermarket self-service

On-line check-in

Cash-machines

## Not a new phenomena

- Accounting framework excludes many other 'non-market' transactions
- **Current price GDP unaffected**
- **But volume measures may not adequately capture quality changes**



### 3: Free and subsidised consumer products





# Explosion in consumption of free digital services





# Displacing traditional 'paid' services but no increase in consumption

**Yes: But GDP is not a measure of welfare**

**And the issue is not new:**



**Careful what you wish for:**

**Do we really want to increase GDP and measures of inequality because of the amount of time spent watching you-tube or spent on Facebook?**

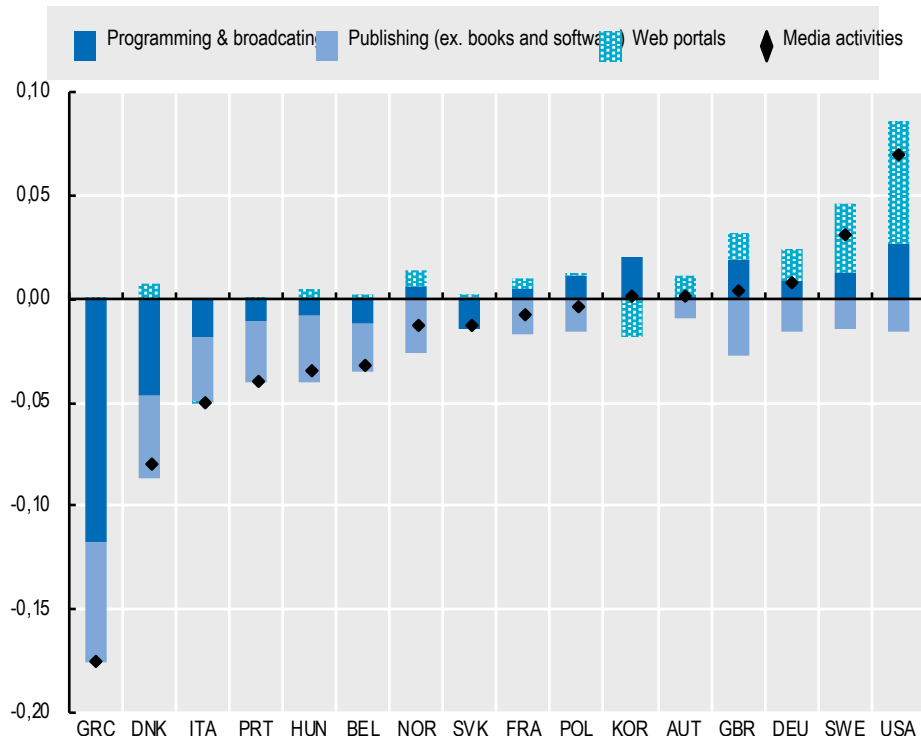


# In any case, current size is unlikely to explain the productivity slowdown

## Households as ‘producers’ of advertising services and Big Data

### Media industries

Estimated impact on GDP growth (2009-2013 average)



### Potential value of data

Share of global GDP

World	2013	2014	2015	2016
Facebook	0.007%	0.008%	0.008%	0.010%
Twitter	0.001%	0.002%	0.002%	0.002%
Instagram	0.001%	0.001%	0.002%	0.003%
LinkedIn	0.000%	0.001%	0.001%	0.001%
Total	0.010%	0.011%	0.013%	0.015%



# Free assets

## Households as ‘producers’ of free assets

### Production of freely available ‘public’ goods:

*Wikipedia, Software*

### Not a new phenomena

*Covered in the Handbook on Deriving Capital Measures of IPPs*

## Wikipedia: Page views and estimated advertising revenue

		2010	2012	2013	2015	2016
<i>Number of page views (millions)</i>		143 397	152 096	160 685	153 330	183 796
<i>World GDP (GDP USD, current prices, constant)</i>		65 058 816	73 355 559	76 787 466	83 300 939	86 905 866
Revenue (USD millions)	Display network					
	CTR = 0.35%					
	CPC = 0.58	291.1	308.8	326.2	311.3	373.1
Value/ World GDP Ratio		0.0004%	0.0004%	0.0004%	0.0004%	0.0004%
Revenue (USD millions)	Search network					
	CTR = 1.91%					
	CPC = 2.32	6 354	6 740	7 120	6 794	8 144
Value/ World GDP Ratio		0.0098%	0.0092%	0.0093%	0.0082%	0.0094%

## Adjusted for PPPs

		2010	2012	2013	2015	% change between 2010 and 2015
Revenue (USD millions)	Display network					
	CTR = 0.35%					
	CPC = 0.58	266.9	274.5	280	240.4	-9.90%
Revenue (USD millions)	Search network					
	CTR = 1.91%					
	CPC = 2.32	5 826.8	5 992.9	6 111.5	5 247.9	-9.90%



## 4:Data as an asset



## No doubt that data is an asset

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- Databases already included in the production boundary
  - **But the underlying ‘value’ of data is not!**
  - **Only the costs of ‘digitisation’ and collection are included.**
- **May need to include new category of ‘non-produced asset’ for data, and improved guidance on monetary transactions for data.**



## 5: Cross-border flows



# Clear that digitalisation has exacerbated globalisation challenges

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## Especially in relation to intellectual property and other knowledge based capital

*Human capital,  
Knowledge in databases,  
Organisational capital,  
Brands*

## Not a new phenomena

*Considered in the 2008 SNA revision process but ruled out on practical grounds.*

**But improved guidance on ‘economic’ versus ‘legal’ ownership is needed.**

**P2P transactions have also created practical difficulties as the platforms are often abroad. Imports, especially of ‘digitised’ products but also DIP fees and ‘de minimis’ trade may be particularly affected. But exports too.**

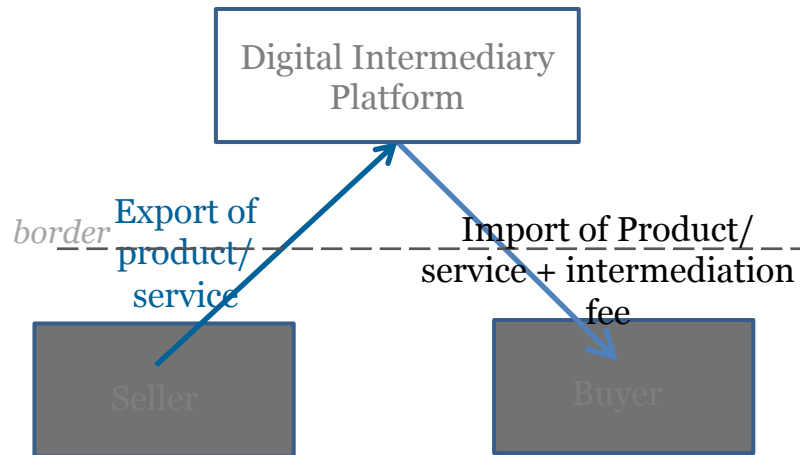
**Scope and coverage of surveys and sources, including on households, requires review but not trivial as consumers don’t always know where the platform is.**



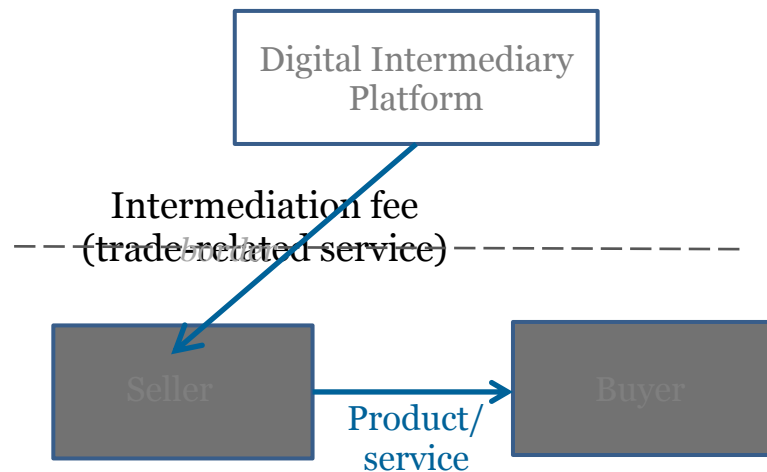


# How should transactions facilitated by platforms be recorded???

## Gross recording (**NOT** proposed)



## Net recording



Important to note that this treatment differs from the recommendations given in BPM6 and the Manual on Statistics of International Trade in Services (2010) for subcontracting, which recommends that the flows are recorded on a gross basis, on the grounds that the arranger (of the subcontracted service) buys and sells the services.

The argument for the net approach is that subcontracted services involve a higher degree of engagement on the part of the intermediary than (typically completely automated) digital intermediation platforms.



## 6: Prices and volumes



# Not new but digitisation is likely to have exacerbated the size of the problem

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## Issue

- Price differences in distribution margins from buying products on-line versus in a store:
- If producer prices of goods that appear identical differ:
- Participative production

## What do OECD countries do?

- **change in price; (16)**  
**change in quality. (9)**
- **Difference in price (18), in quality (5)**
- One country (self-service checkouts)

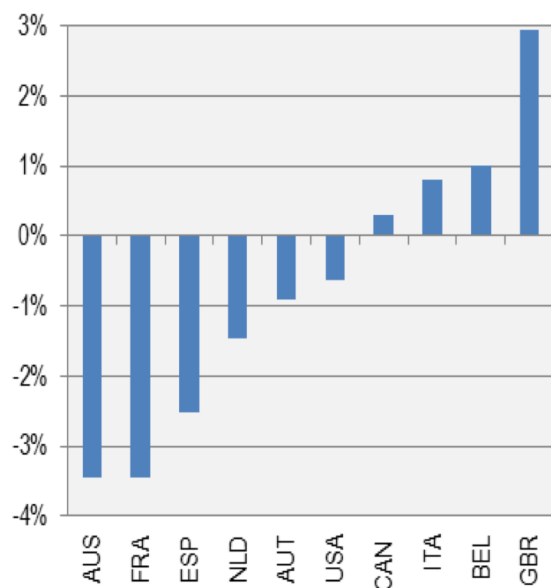
8 countries using or exploring **new data sources**, such as **web-scraping** to deal with **rapid quality changes**. 5 others mention interest for compiling CPI.



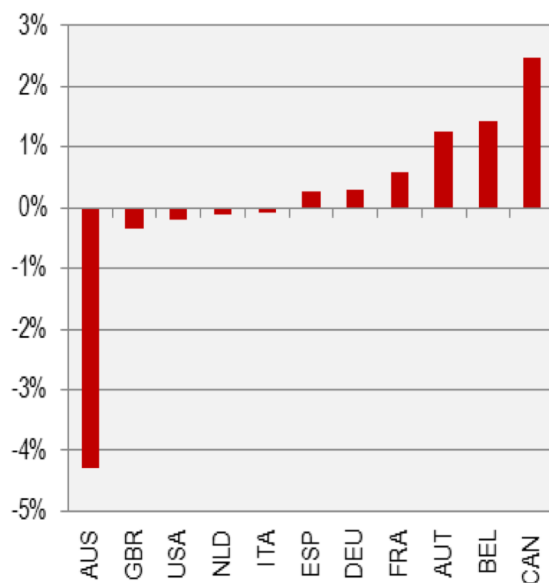
# Price indices for ICT assets and communication services

Average annual growth rate in percentage, 2010-2015 (or latest available year)

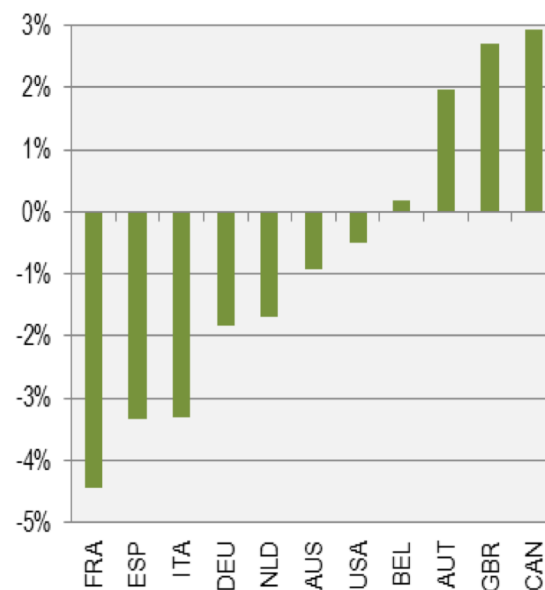
ICT equipment



Computer software and databases



Communication services



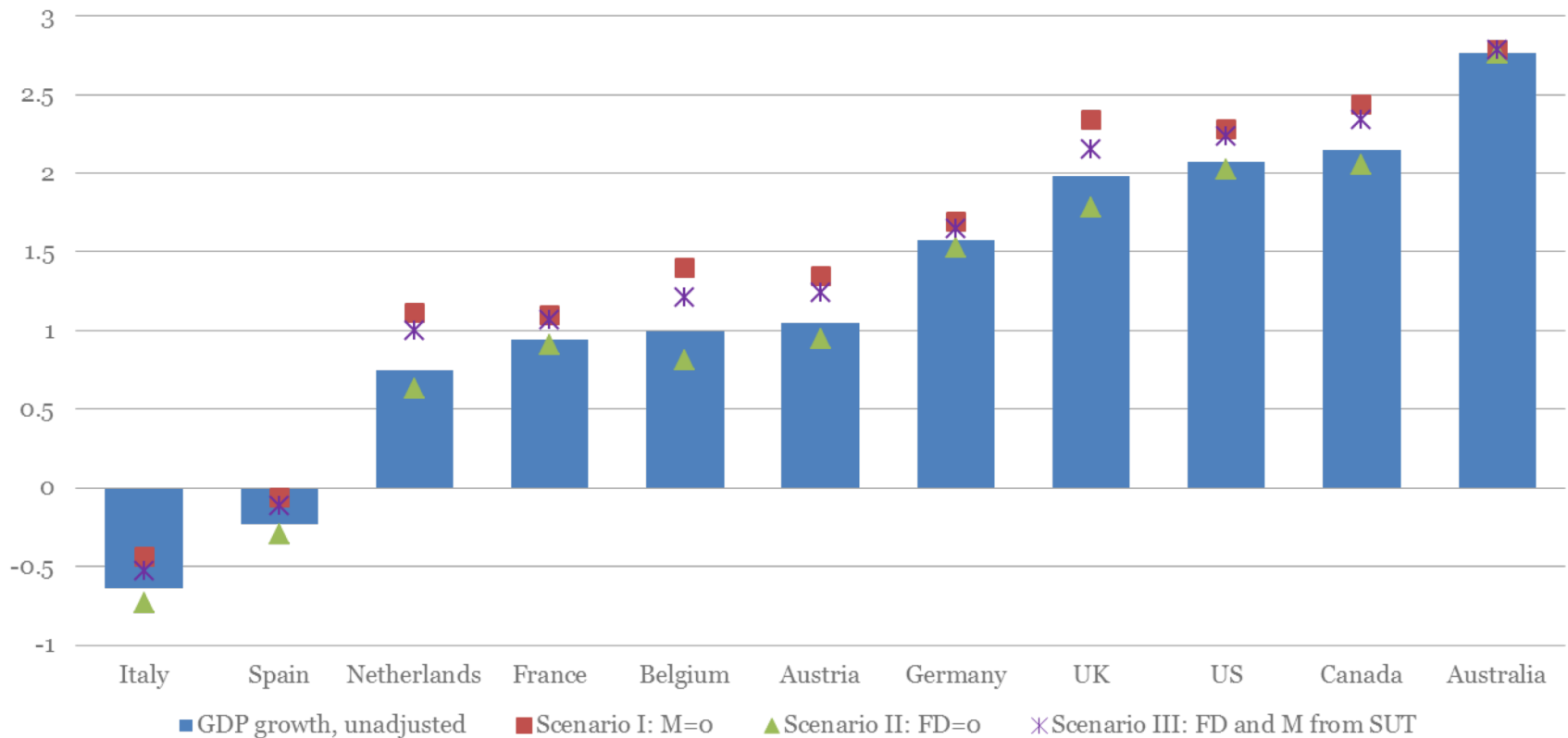
Notes: Data reported for Spain for ICT equipment and Computer software and database correspond to the period 2010-2014. Data reported for Austria for Communication services correspond to the period 2011-2015.

Source: OECD National Accounts Statistics, OECD Productivity Database, OECD Prices and Purchasing Power Parities database, Australian Bureau of Statistics, U.S. Bureau of Economic Analyses and Statistics Canada, February 2017



# Impact on GDP growth, using alternative ICT & communication prices

Average annual growth rate in percentage, 2010-2015 (or latest available year)  
Using lower bound price indices





**So, given the evidence...**

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**Why is the mismeasurement hypothesis so prevalent.**

**Because Users cannot see the digital economy in our current statistics**





# Improving visibility and measurement

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- **What can't users see??**
  - Size of e-commerce
  - Size of transactions delivered digitally
  - Share of value-added provided by 'digital industries'
  - Share of digital goods and services as a share of GDP
  - The value of data?
  - Investment in digital tools?
- **All look at different aspects and cannot be pulled together into a single statistic.**



## A common aspect of what users want however.....

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- ....is information on whether goods/services were
- **Digitally ordered:** The sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders (*follows OECD e-commerce definition*)
  - **Platform enabled:** Transactions that are facilitated via online intermediary platforms that match buyer and supplier (e.g. eBay, Amazon, Uber); platform may be based domestically or abroad, foreign or domestically owned
  - **Digitally delivered:** ‘downloadable’ services and data flows (software, data, database services, etc.)





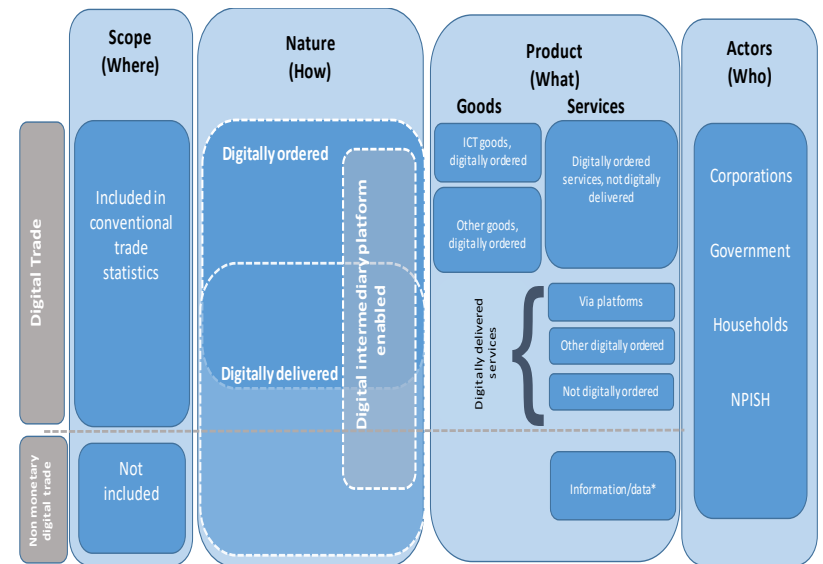
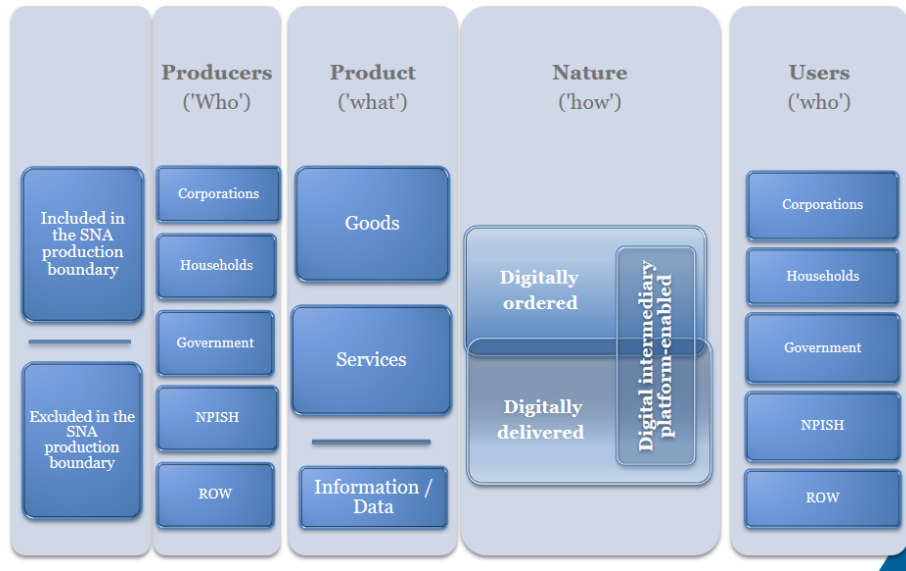
## And...

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- Users also want to know **who** is producing and **who** is consuming (actors) and they also want to know **what** is being produced and consumed (the product)



# In other words, they want/need:






# Digital Supply-Use tables

- Provide the ideal accounting tool to bring this information together.
- The starting point is the conventional SUT framework – linking producers (the **who**) to consumers (**who**) and the products (**what**) they purchase...

		Products				Industries				Final uses			Total
		Agriculture, forestry, etc.	Ores and minerals; etc.	...	Services	Agriculture, forestry, etc.	Mining and quarrying	...	Services	Final consumption	Gross capital formation	Exports	
Products	Agriculture, forestry, etc.					Intermediate consumption by product and by industry				Final uses by product and by category			Total use by product
	Ores and minerals; etc.												
	...												
	Services												
Industries	Agriculture, forestry, etc.	Output by product by industry											Total output by industry
	Mining and quarrying												
	...												
	Services												
Value added						Value added by component and by industry							Value added
Imports		Total imports by product											Total Imports
Total		Total supply by product				Total output by industry				Total final uses by category			

 Empty cells by definition

- What's missing is the **how**.



# PRODUCT BREAKDOWNS – THE ROWS IN DIGITAL SUTS



## To integrate the ‘how’

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- For each product (row) in a conventional SUT, we add the following product breakdowns, based on whether the product was digitally ordered or not (and from whom)

Accommodation services		
A	Digitally ordered	
a_i	Direct from a counterparty	
a_ii	Via a resident digital intermediary platform	
a_iii	Via a non-resident digital intermediary platform	
B	Not Digitally ordered	



# Product breakdowns

In principle the breakdown should be done for all rows but the priority is:

For transactions within the GDP production boundary

- *Digital goods (ICT); non-digital goods;*
- *Digital services ex cloud services and intermediation;*
- *cloud services;*
- *digital intermediation platform services (DIPs),*
- *non-digital services significantly affected by digitalisation;*
- *other services*

For 'transactions' outside the GDP production boundary

- *Data,*
- *free digital services provided by businesses;*
- *free digital services provided by communities (i.e. from assets which have collective ownership)*

(i) Manufacturing services for ICT equipment; (ii) Business and productivity software and licensing services; (iii) Information technology consultancy and services; (iv) Telecommunications services; (v) Leasing or rental services for ICT equipment; and (vi) Other ICT services

Land transport services and transport services via pipelines, CPA division 49.

Accommodation services, CPA division 55.

Food and Beverage serving services, CPA division 56.

Motion picture, video and television programme production services, sound recording and music publishing, CPA division 59.

Financial and insurance services, CPA section K  
Advertising and market research services, CPA division 73.

Travel agency, tour operator and other reservation services, CPA division 79.

Education services, CPA section P

Gambling and betting services, CPA division 92.

Publishing services, CPA division 58



# Digitally delivered.....

For ‘**parsimony**’, added only as a column and not a row.

So, possible to identify its importance for each product but **not differences in the propensity to consume digitally delivered products across users**

YEAR		Total supply at purchasers' prices		Total supply at purchasers' prices of which, were digitally delivered		Total supply at purchasers' prices of which, were non digitally delivered	
Transaction type							
Products							
Digitally ordered							
Direct from a counterparty							
Via a resident digital intermediary platform							
Via a non-resident digital intermediary platform							
Not Digitally ordered							
Total of ICT goods and digital services							
Digitally ordered							
Direct from a counterparty							
Via a resident digital intermediary platform							
Via a non-resident digital intermediary platform							
Not Digitally ordered							
Total of Non-Digital Products, significantly affected							
Digitally ordered							
Direct from a counterparty							
Via a resident digital intermediary platform							
Via a non-resident digital intermediary platform							
Not Digitally ordered							

Note that by definition only services can be digitally delivered...typically only those identified as being digitisable in UNCTAD's work on ICT-enabled services



# UNCTAD's 'potentially ICT enabled services

## 1.1 ICT services - Telecommunications

- 841 Telephony and other telecommunications services
- 842 Internet telecommunications services
- 84631 Broadcasting services

## 1.2 ICT services - Computer services (including computer software)

- 8313 IT consulting and support services
- 8315 Hosting and IT infrastructure provisioning services
- 8316 IT infrastructure and network management services
- 8434 Software downloads
- 8713 Maintenance and repair services of computers and peripheral equipment
- 73311 Licensing services for the right to use computer software
- 83141 IT design and development services for applications
- 83142 IT design and development services for networks and systems
- 83143 Software originals
- 84391 On-line games
- 84392 On-line software
- 92919\* Other education and training services, n.e.c.

## 1.3 Sales and marketing services, not including trade and leasing services

- 836 Advertising services and provision of advertising space or time
- 837 Market research and public opinion polling services
- 8596 Convention and trade show assistance and organization services
- 83812 Advertising and related photography services

## 1.4 Information services

- 844 News agency services
- 845 Library and archive services
- 931 Human health services
- 961 Audiovisual and related services
- 8394 Original compilations of facts/information
- 8432 On-line audio content
- 8433 On-line video content
- 8461 Radio and television broadcast originals
- 84311 On-line books
- 84312 On-line newspapers and periodicals
- 84313 On-line directories and mailing lists
- 84393 On-line adult content
- 84394 Web search portal content
- 84399 Other on-line content n.e.c.
- 84632 Home programme distribution services, basic programming package
- 84633 Home programme distribution services, discretionary programming package
- 84634 Home programme distribution services, pay-per-view
- 96921 On-line gambling services
- 8399\* All other professional, technical and business services, n.e.c.
- 8462\* Radio and television channel programmes

## 1.5 Insurance and financial services

- 712 Investment banking services
- 714 Reinsurance services
- 715 Services auxiliary to financial services other than to insurance and pensions
- 717 Services of holding financial assets
- 7119 Other financial services, except investment banking, insurance services and p
- 7132 Accident and health insurance services
- 7161 Insurance brokerage and agency services
- 7162 Insurance claims adjustment services
- 7163 Actuarial services
- 7164 Pension fund management services
- 7169 Other services auxiliary to insurance and pensions
- 71311 Life insurance services
- 71312 Individual pension services
- 71313 Group pension services
- 71331 Motor vehicle insurance services
- 71332 Marine, aviation, and other transport insurance services
- 71333 Freight insurance services
- 71334 Other property insurance services
- 71335 General liability insurance services
- 71337 Travel insurance services
- 7111\* Central Banking services
- 7112\* Deposit services
- 7113\* Credit-granting services
- 7114\* Financial leasing services
- 71336\* Credit and surety insurance services
- 71339\* Other non-life insurance services

## 1.6 Management, administration, and back office services

- 821 Legal services
- 822 Accounting, auditing and bookkeeping services
- 823 Tax consultancy and preparation services
- 824 Insolvency and receivership services
- 851 Employment services
- 852 Investigation and security services
- 855 Travel arrangements, tour operator and related services
- 8311 Management consulting and management services
- 8312 Business consulting services
- 8319 Other management services, except construction project management services
- 8591 Credit reporting services
- 8592 Collection agency services
- 8593 Telephone-based support services
- 8594 Combined office administrative services
- 8595 Specialized office support services
- 8599 Other information and support services n.e.c.

## 1.7 Licensing services

- 7333 Licensing services for the right to use R&D products
- 7335 Licensing services for the right to use mineral exploration and evaluation
- 7339 Licensing services for the right to use other intellectual property products
- 73312 73312 - Licensing services for the right to use databases
- 73340 Licensing services for the right to use trademarks and franchises
- 7332\* Licensing services for the right to use entertainment, literary or artistic originals

## 1.8 Engineering, related technical services and R&D

- 811 Research and experimental development services in natural sciences and engineering
- 812 Research and experimental development services in social sciences and humanities
- 813 Interdisciplinary research and experimental development services
- 832 Architectural services, urban and land planning and landscape architectural services
- 833 Engineering services
- 891 Publishing, printing and reproduction services
- 8342 Surface surveying and map-making services
- 8343 Weather forecasting and meteorological services
- 8382 Photographic processing services
- 8392 Design originals
- 8393 Scientific and technical consulting services n.e.c.
- 8395 Translation and interpretation services
- 83815 Restoration and retouching services of photography
- 83819 Other photography services
- 83911 Interior design services
- 83912 Industrial design services
- 83919 Other specialty design services
- 814\* Research and development originals
- 8344\* Technical testing and analysis services
- 8399\* All other professional, technical and business services, n.e.c.

## 1.9 Education and training services

- 921 Pre-primary education services
- 922 Primary education services
- 923 Secondary education services
- 924 Post-secondary non-tertiary education services
- 925 Tertiary education services
- 9292 Educational support services
- 92911 Cultural education services
- 92912 Sports and recreation education services





# Why do we need a separate breakdown for transactions with DIPs?

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- Twofold:
  - (i) **Significant measurement challenges** (and policy interest – e.g. BEPS, gig economy), notably for household-to-household transactions, but in particular concerning transactions that pass through ‘national’ domain names.
  - (ii) But also because the **transactions facilitated by DIPs cannot be treated in the same way as distribution (margin) services**, as the platform never takes ownership of the good or service being intermediated.



# INDUSTRY BREAKDOWNS – THE COLUMNS IN DIGITAL SUTS



# How should firms be aggregated?

## Digitally enabling industries

industries engaging in production primarily “intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display”. Equivalent to (ICT): ISIC categories: 261, 262, 263, 264, 268, 4651, 4652, 5820, 61, 62, 631 and 951.

## Data & advertising driven digital platforms

Includes all units operating exclusively online that predominately generate revenue via selling data or advertising space (e.g. social media platforms, search engines). The majority of these units will ALSO be producing *digital services (beyond 2008 SNA)*, *provided by enterprises*

## Other producers only operating digitally

Likely includes businesses that produce their own services for sale, but operate exclusively digitally, i.e. products are digitally ordered and delivered, e.g. digital content on a subscriptions basis, online gaming and streaming services.

## DIPs charging a fee

facilitate interactions between two or more distinct but independent sets of users (whether firms or individuals) who interact via the DIP for a fee. DIPs intermediating goods will be classified to ISIC rev. 4, Category 4799 “*Country practices for DIPs differ but current view is that they should be classified to the service they intermediate.*”

## Firms dependent on DIPs

units whose main demand is via DIPs. Ideally, estimates would be split between incorporated and unincorporated.

## E-tailers

retailers and wholesalers who receive a majority of their orders digitally. It excludes producers who sell and deliver their products digitally, which should be classified as other producers only operating digitally

## Digital only firms providing financial and insurance services

Includes only units (within ISIC rev.5 Div K) operating exclusively digitally.



Excel interface showing the "Digital SUTs Template - Final version - June 2019.xlsx" file. The ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Tell me what you want to do... The Home ribbon is active, showing options for Font, Alignment, Number, Styles, Cells, and Editing.

The main data area displays a table titled "SNA08 Questionnaire 1600' - Use table at purchasers' prices". The table is organized into columns for various categories and rows for different product types and transaction types. The table structure is as follows:

Column Number	1	2	3	4=5+6	5	6	7	8	9	10=1+2+3+	
PRODUCT	YEAR	Digitally enabling industries	Digital intermediary platforms charging a fee	Data and advertising driven digital platforms	Total	Incorporated	Unincorporated	E-Tailers	Digital only firms providing finance and insurance services	Other producers only operating digitally	Intermediary digital i
Row Number	Code category of product	Code product category	Code product and transaction	Transaction Type							
1=7-13-19	TP	CPA_T	T. Total products								
2=8-14-20	TP	CPA_T_a	a Digitally ordered								
3=9-15-21	TP	CPA_T_a_i	a_i Direct from a counterparty								
4=10-16-22	TP	CPA_T_a_ii	a_ii Via a resident digital intermediary platform								
5=11-17-23	TP	CPA_T_a_iii	a_iii Via a non-resident digital intermediary platform								
6=12-18-24	TP	CPA_T_b	b Not Digitally ordered								
7=25-31-37	TDP	CPA_TD	TD. Sub-Total of ICT goods and digital services								
8=26-32-38	TDP	CPA_TD_a	a Digitally ordered								
9=27-33-39	TDP	CPA_TD_a_i	a_i Direct from a counterparty								
10=28-34-40	TDP	CPA_TD_a_ii	a_ii Via a resident digital intermediary platform								
11=29-35-41	TDP	CPA_TD_a_iii	a_iii Via a non-resident digital intermediary platform								
12=30-36-42	TDP	CPA_TD_b	b Not Digitally ordered								
13=49-55-6	TNDP	CPA_TNDP	TNDP Sub-Total of Non-Digital Products, significantly affected by digitalisation								
14=50-56-6	TNDP	CPA_TNDP_a	a Digitally ordered								
15=51-57-6	TNDP	CPA_TNDP_a_i	a_i Direct from a counterparty								
16=52-58-6	TNDP	CPA_TNDP_a_ii	a_ii Via a resident digital intermediary platform								
17=53-59-6	TNDP	CPA_TNDP_a_iii	a_iii Via a non-resident digital intermediary platform								

The bottom of the interface shows the "Template Information" tab selected, with sub-tabs for "Supply 1", "Supply 2", "Use", and "metadata". The status bar at the bottom indicates the file is "Ready" and the zoom level is "80%".



# Decision tree for units





## Current status of Digital SUTS

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- Circulated (following significant discussion) to member countries of the OECD Advisory Group on Measuring GDP in a Digital Economy
  - Results expected in the next few months, after which refinements may be introduced and country experiences shared.



# Digital Trade

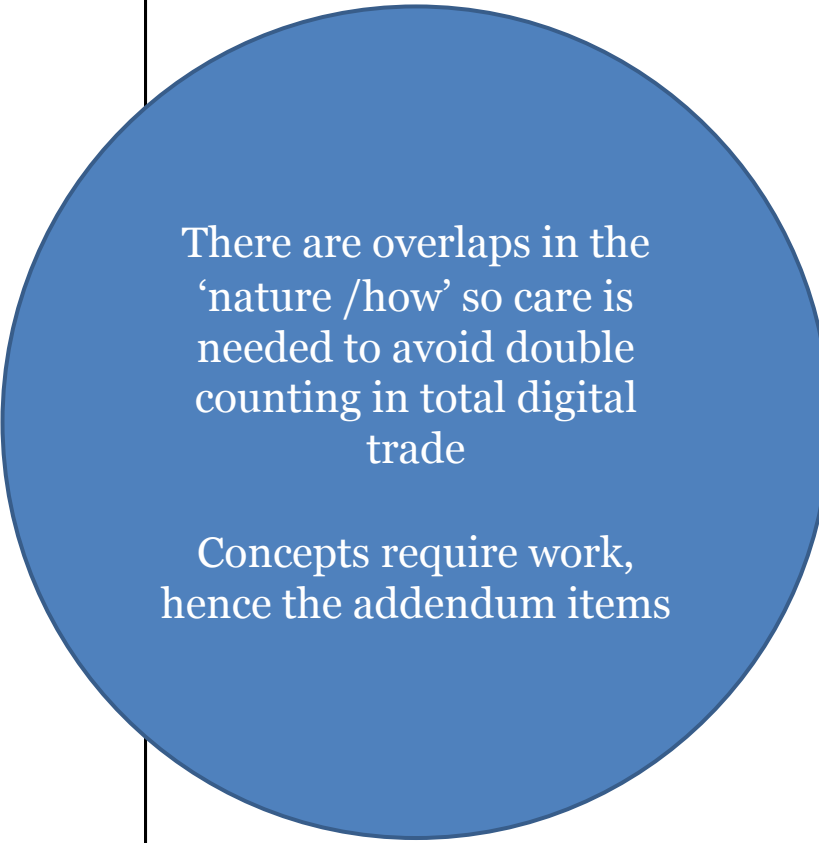
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Based on the same organising principle as digital SUTs and defined as:

*all trade that is digitally ordered and/or digitally delivered.*



# Reporting template

		Total	By Exporter/Importer		
			Corporations (by industry)	Government	Households/ NPISH
(i)	<b>Digital Trade</b> (ii+iv+vi+ix)		 <p>There are overlaps in the ‘nature /how’ so care is needed to avoid double counting in total digital trade</p> <p>Concepts require work, hence the addendum items</p>		
(ii)	Digitally ordered ICT goods				
(iii)	<i>of which via DIPs</i>				
(iv)	Digitally ordered goods (other)				
(v)	<i>of which via DIPs</i>				
(vi)	Digitally delivered Services				
(vii)	<i>of which via DIPs</i>				
(viii)	<i>of which digitally ordered (including via DIPs)</i>				
(ix)	Digitally ordered services (not delivered digitally)				
(x)	<i>of which via DIPs</i>				
<i>Addendum items</i>					
(xi)	Digitally ordered total (ii+iv+viii+ix)				
(xii)	ICT goods total (digitally and non-digitally ordered)				
(xiii)	Potentially ICT enabled services				
(xiv)	Non-monetary transactions in information/data (imputed)				
(xv)	Broad Digital Trade (i+xv)				





# A Handbook to guide compilation- ‘A living document’

Chapter 1. Introduction

Chapter 2. Conceptual framework for digital trade

Chapter 3. Compiling digitally ordered goods and services

Chapter 4. Compiling digitally delivered transactions

Chapter 5. Compiling transactions facilitated by digital intermediary platforms

Chapter 6. Complementary measures

Chapter 7. Conclusions and next steps

## Appendices:

1: Extract from OECD “Measuring the Digital Transformation” The digital transformation and economic statistics

2: Recommendations from the OECD Informal Reflection Group on the Impact of Globalisation on the Measurement of GDP

3: Extract from OECD “Measuring the Digital Transformation” Measuring Cloud Computing Services

4: A Toolkit for Measuring the Digital Economy: Extract from the 2018 G20 Ministerial Declaration

5: Recommendations from the US Department of Commerce report: Measuring the Value of Cross-Border Data Flows (2016)

6: OECD-IMF Stocktaking Survey on Measuring Digital Trade

7: Product and Industry Classifications



## Wrap-up

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**Mismeasurement unlikely to explain productivity slowdown**

**Significant efforts to improve visibility**

**Conceptual framework robust**

- But need to step-up efforts to estimate value of services outside of GDP production boundary...especially for data.

**Many traditional sources of data may need reviewing**

- especially for cross-border trade and sharing/gig economy
- And prices

**And other data sources should be exploited**

DIPs provide scope for much data but many are non-resident

- **Can data be shared across borders or collected at a global level?**



*Thank you*

