Digital Supply and Use Tables

Ziad Ghanem

Statistics Canada

May 2021

Delivering insight through data for a better Canada

Overview

1. Framework for Digital Supply and Use Tables
2. Data sources
3. Measurement methods
4. Classification of products

1. Digitally-ordered products
2. Digitally-delivered products
3. Review of results, 2017-2019
4. Looking forward

Digital SUTs framework

Publication of experimental digital Supply and Use Tables (SUTs)

- Reference years: 2017-2019, published in April, 2021
- Canada level SUTs but some provincial aggregates on GDP and jobs based on industry dimension.
- Revisions: experimental product
  - Based on currently available source data
  - Refinement of methods, clarifying data gaps, feedback from users, and international comparisons
- Revisions: advanced SUTs
  - Revisions due to benchmark 2018-2019 SUTs
- Based on advanced Canadian SUTs (2018-2019)
  - Nominal output and GDP by industry not fully integrated with other published industry volume measures.
  - Some digital economy elements may differ from other measures in StatCan (some conceptual, some due to integration framework)

OECD framework for digital economy indicators: digital SUTs

- Advantage of international comparability
- Expanding current detail (in scope for Canadian digital SUTs)
  - Current industry and product classifications do not show relevant details or aggregates for digital economy
  - Requires a breakdown of information already in the SUTs
- Additional information (out of scope for Canadian digital SUTs)
  - Beyond SNA 2008 (current production boundary): value of data and free digital services
  - Work continues on value of data independently of the digital SUTs
- Risks: comparability with the myriad of other measures in the public domain
  - Does not perfectly align with previously released digital economy satellite account

Digital SUTs framework

- Digital industries
  - New statistical unit: digital only firm
- Digital products and products significantly affected by digitalization
  - Mostly a reorganizing of product classification
  - Some minor product splits
- Digitally ordered and digitally delivered products
  - Splitting products, mostly based on e-commerce

Data sources

Surveys

- Annual business surveys: e-commerce modules
- Annual Survey of International Transactions in Commercial Services: digital delivery module
  - Large proportion of services exports are digitally delivered

- Households: Canadian Internet Use Survey, 2018
- Businesses: Survey of Digital Technology and Internet Use, 2019
  - $305 billion in e-commerce sales in a wide range of industries

Administrative data

- Corporate income tax, internet sales forms
  - Information on values but also proportion of online sales (online firms)
- Income tax, unincorporated units
  - Units dependent on intermediary platforms
- Value added tax, remittances by non-resident firms
  - Address data gap of online imports of services
- Customs merchandise imports, low-valued courier shipments
  - Exponential growth
  - Assume e-commerce related

Measurement mehtods

General approach to estimation

- An allocation not a recompilation approach
- Incorporate information where available and use simplifying assumptions for the remainder
- In general output information is available
  - Split inputs based on output (digital units)
  - Proportionally allocate outputs to uses (digitally ordered)

Digital industries

- Digitally enabling industries
  - Information and Communication Technology industries
  - Largest component; mostly a simple mapping from current SUTs industries with some minor industry splits based on survey data
- Digital intermediary platforms charging a fee
  - Mainly in taxi, delivery and short-term accommodation but some unexpected industries (e.g., restaurants, only takeout)
  - Micro records and tax data
- Firms dependent on intermediary platforms
  - Incorporated and unincorporated units
  - Mostly tax data
- Data and advertising driven digital platforms
  - In Canada, small values. Mostly advertising with very little data-driven platforms.
- E-Tailers
  - Online retailers and wholesalers, mostly available from current surveys under current classifications.
  - Some possible misclassifications of online distributors to traditional industries
- Digital only firms providing finance and insurance services
  - Difficulties in distinguishing “purely” digital units.
  - Statistics Canada working on a Fintech frame that may prove useful
- Other producers only operating digitally
  - Gambling, dating sites etc.
  - Excludes goods producers in Canadian tables. Perceived as not essential for their activity.

Digital industries – intermediary platforms

- Split each impacted industry (output and input tables) into:
  - Traditional units
  - Intermediary platforms (resident)
  - Incorporated units dependent on: i) resident platforms ii) non-resident platforms
  - Unincorporated units dependent on: i) resident platforms ii) non-resident platforms

- In the product dimension, delineate detail on platform fees
  - Paid by producers and often consumers as well
- Payments to non-resident platforms based on output by dependent units

Digital industries

- Focus is on splitting main industry outputs
- In general, inputs and GVA components are derived based on average industry coefficients. Refining production functions for future iterations.

Classification of products

Classification of digital products and significantly impacted

- Mostly a reordering based on current classifications
- Cloud computing splits
  - Split output of software and data processing and hosting into cloud vs non-cloud based on review of annual reports of largest firms. Not in current classification.
- Digital intermediary services splits
  - Based on the approach explained previously under the digital industries

Digitally-ordered products

Digitally ordered products

- In the Canadian digital SUTs, goods digitally ordered through domestic distributors are shown as digitally ordered by consumers and their output and imports are shown as digitally ordered through distributors. As distinct from the OECD framework, a new digitally ordered category (a4) is added to identity these products.

A	Digitally ordered
a1	Direct from a counterparty
a2	Via a resident digital intermediary
a3	Via a non-resident digital intermediary
a4	Via a resident retailer or wholesaler
B	Not digitally ordered

- Much simpler to measure the distribution margin only. But analytically limiting.

Digitally ordered – excluding domestic retailers

- Output based on ecommerce modules from annual business surveys.
- Imports based on customs imports for large non-resident ecommerce sites and a proportion of small-valued courier shipments.
- Proportionally allocate outputs and imports to uses. Outputs are apportioned based on class of customer modules from annual business surveys.

Digitally ordered – domestic retailers

- Margin output based on ecommerce modules from business surveys.
- Allocate margin output to uses based on valuation tables. Outputs are apportioned based on class of customer modules from business surveys.
- From margin uses derive consumption expenditures based on survey sales / margin ratios.
- Consumption expenditures are allocated to imports and domestic production where deemed missing

Digitally ordered – difficulties

- Survey modules on e-commerce sales or micro records of online units do not provide information on use categories.

Digitally-delivered products

Digitally delivered products

- No data sources except for module on the survey of commercial services exports

- Based on the characteristics of the products in the SUTs
  - Some splits: books, newspapers, …
  - Missing education (important in 2020), government services (e.g., StatCan)

Results

Digital supply table, 2019

Transaction type	Output, Total digital industries	Output, Total digital industries, digitally delivered	Total output	Total output, industries, digitally delivered	Imports	Imports, digitally delivered	Taxes on products	Total supply at purchasers' prices	Total supply at purchasers' prices, digitally delivered
	millions of dollars								
Total	**204,768**	**76,461**	**4,065,386**	**96,580**	**722,624**	**13,236**	**173,179**	**4,961,189**	**115,527**
Digitally ordered	73,953	50,362	277,933	65,665	51,723	9,144	6,696	336,352	75,019
Direct from a counterparty	59,612	49,658	218,757	64,961	19,588	8,559	1,072	239,416	73,659
Via a resident digital intermediary	1,193	704	1,193	704	0	0	0	1,193	704
Via a non-resident digital intermediary	3,839	0	3,839	0	984	584	70	4,893	606
Via a resident retailer or wholesaler	9,308	0	54,144	0	31,150	0	5,555	90,849	50
Not digitally ordered	130,815	26,098	3,787,453	30,915	670,902	4,092	166,483	4,624,837	40,508

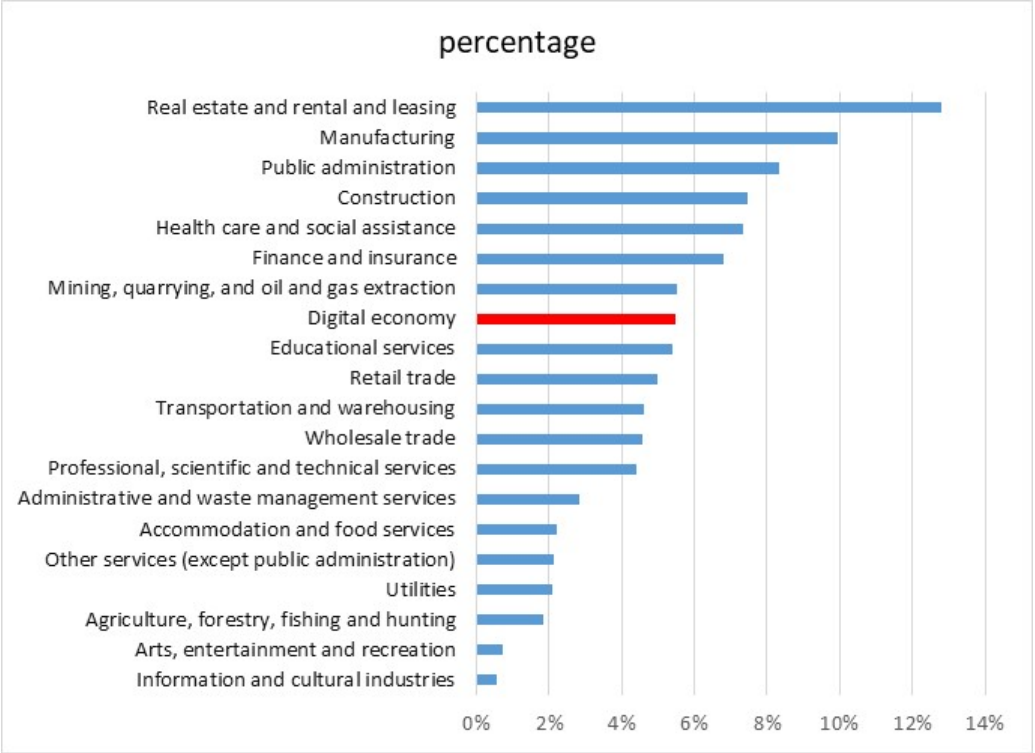
- Digital industries accounted for 5.0% ($205 billion) of total output. Digitally-ordered products represented 6.8% ($336 billion) of total supply and digitally delivered services represented 2.3% ($116 billion) of total supply.
- Most digitally ordered products (71%) were sourced directly from the supplier, whereas 27% were purchased through domestic retailers and wholesalers.
- Approximately 7.2% of imports ($52 billion) were digitally ordered which slightly exceeded the share of digitally ordered from domestic producers, 6.8% ($278 billion).
- The share of digitally delivered products in domestic production (2.4%) was higher than its share in imports (1.8%).

Digital use table, 2019

Transaction type	Input, Total digital industries	Total Input	Final consumption expenditures, households	Final consumption expenditures, government and NPISH	Gross capital formation	Exports	Exports, digitally delivered	Total Use
	millions of dollars							
Total products	**87,424**	**1,927,518**	**1,247,894**	**516,925**	**531,352**	**737,500**	**17,053**	**4,961,189**
Digitally ordered	12,115	165,910	99,273	0	15,061	56,107	13,582	336,352
Direct from a counterparty	10,813	125,805	65,655	0	10,118	37,839	13,511	239,416
Via a resident digital intermediary	56	896	159	0	0	138	63	1,193
Via a non-resident digital intermediary	238	2,829	922	0	0	1,142	0	4,893
From a resident retailer or wholesaler	1,008	36,381	32,537	0	4,944	16,987	8	90,849
Not digitally ordered	75,309	1,761,607	1,148,621	516,925	516,291	681,393	3,471	4,624,837
Subsidies on products	-444	-19,040						
Gross value added	**117,788**	**2,039,564**						

- Households accounted for approximately 30% of digitally ordered products
- The digital industries had the highest proportion of digitally ordered purchases at 14%; for other industries, households, and exports this proportion hovered around 8%.
- Digital delivery covered 2.3% ($17 billion) of total exports.

Industry shares of total gross value added, 2019



- At 5.5% ($118 billion) of Canadian GDP in 2019, the digital economy ranked slightly below mining, quarrying and oil and gas extraction ($119 billion) in relative size.

Digital industries GDP and jobs, 2017-2019

Year	Digitally enabling industries				Digital intemediary platforms			Data and advertising driven digital platforms	E-Tailers	Digital only firms providing finance and insurance services	Other producers only operating digitally	Total digital industries	Total, all industries
	Hardware	Software	Telecommunications	Other services	Digital intermediary platforms charging a fee	Dependent on intermediary platforms, Incorporated	Dependent on intermediary platforms, Unincorporated						
	GDP, in millions of dollars												
2017	6,536	41,891	36,166	9,912	60	1,015	653	835	3,748	2,340	448	103,298	1,991,534
2018	7,012	45,726	37,175	10,669	207	1,117	1,050	846	4,248	2,752	582	111,384	2,079,869
2019	7,243	48,013	37,460	11,511	327	1,399	1,458	979	5,187	3,392	821	117,788	2,157,352
	thousands of jobs												
2017	54	347	130	83	1	16	52	10	52	19	9	772	18,045
2018	55	377	130	85	2	17	61	10	55	21	12	825	18,241
2019	58	405	125	89	3	21	67	12	62	25	16	882	18,562

- The contribution of the digital economy to total GDP trended up from 5.2% ($103 billion) in 2017 to 5.4% ($111 billion) in 2018, and 5.5% ($118 billion) in 2019.
- The share of the sector in overall jobs also followed a similar trend increasing from 4.3% (772,000) of total jobs in 2017 to 4.8% (882,000) in 2019.
- The digitally-enabling industries, traditionally referred to as the information and communication technology sector, dominated production in the digital industries.
- The contributions to jobs differed from the contribution to GDP. Digitally-enabling industries contributed 88.5% of the GDP in the digital sector but 76.7% of jobs in 2019. This was driven mainly by the telecommunications industry

Looking forward

- Differentiating industry production functions: digital vs non-digital
- Refine allocation of digitally-ordered by use category
- Likely some increase to the online activity as ongoing research expands the frame
- Currently focused on business sector market activities.
  - Missing measures of digitalization in public administration, education and health.
  - Missing a conceptual measurement framework and data sources
- Extending the time series back in time may be difficult due to lack of source data and small, diminishing values in some areas. Under experimentation

References

- Statistic Canada (2021). “Digital Supply and Use Tables, 2017 to 2019”. The Daily. https://www150.statcan.gc.ca/n1/daily-quotidien/210420/dq210420a-eng.htm

- OECD. (2019). “Guidelines for Supply-Use Tables for the Digital Economy”, paper presented at Working Party on National Accounts, Paris, 1-2 July 2019.

- Ghanem, Ziad (2021). “Measuring the digital economy: The Canadian digital supply and use tables 2017-2019”, paper presented at the meeting of the Eurostat-OECD-UNECE Group of Experts on National Accounts 2021, 17-25 May 2021.

- OECD, WTO and IMF. (2020). *Handbook on Measuring Digital Trade*, OECD, Paris.

- Statistics Canada. (2020). “Canada’s service exports through the lens of digital trade”, Latest Developments in the Canadian Economic Accounts, Statistics Canada catalogue number 13-605-X.