United Nations

Economic and Social Council

ECE/CES/GE.20/2019/15

Distr.: General
5 April 2019

Original: English

Economic Commission for Europe

Conference of European Statisticians

Group of Experts on National Accounts

Eighteenth session
Geneva, 10-12 April 2019
Item 7 of the provisional agenda
Current research related to digitalization

International Trade in Digital Products

Prepared by Statistics Canada

Summary

This paper outlines three collection vehicles that Statistics Canada is experimenting with to determine the extent to which the agency can capture the international imports of digital products. The first part of this paper outlines results from a Digital Economy Household Survey that Statistics Canada conducted in the summer of 2018. The second part looks at the use of payments data in measuring international digital transactions. The paper concludes by outlining a set of 'Digital Economy' business reports aimed at acquiring information directly from large digital platforms regardless of their residency.

I. Background

1.   Over the last number of years there has been a marked increase in the number of products offered in digital format available to consumers. Music, videos, and other forms of entertainment such as games of chance are increasingly purchased in digital form and are digitally delivered to the consumer. The digitization of these products has had a significant impact in not only how consumers purchase goods but more importantly from where they purchase goods. Consumers no longer need to leave their home to pick up the latest movie or stand in line to purchase their monthly bus pass. Their choice is no longer limited to the local retailer, they can now purchase products from all over the world as easily, or in many cases, more easily than they can purchase products from a local retailer.

2.   This transformation creates challenges for the National Statistical System. The current design of the statistical system assumes, for example, that music gets recorded and is then embedded on a physical medium by a manufacturer. The physical medium is then sold to a wholesaler who in turn sells it to a retailer who in turn sells it to the consumer.   The current design of our data collection system (at least in the case of Statistics Canada) is not well equipped to capture products in digital form that are transferred from one country to another without the need for a manufacturer, wholesaler and retailer.

3.   Consider figure 1 which shows the value of Canada's imports of packaged software, music and video CDs, and video games. The value has been steadily declining for the last number of years. The statistical system is set up to capture the physical flow of goods across borders but is not structured to capture the digital flow of music, film, video games and software when the Canadian counterparty to the transaction is a Canadian household.

Figure 1
Canadian Customs based - imports of Packaged Software, Music and Video CDs, and video games
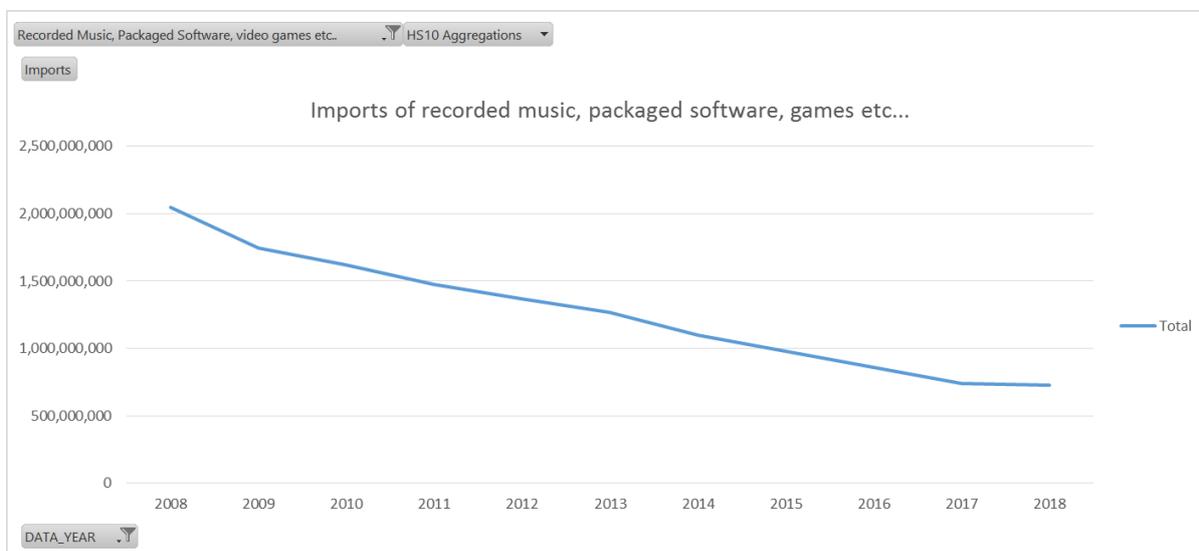
4.   In response to these changes Statistics Canada is updating its economic statistics program to ensure that these activities are accurately and completely captured.

II. The Digital Economy Survey

5.   In July 2018 Statistics Canada conducted The Digital Economy Survey. The Digital Economy Survey (DES) was a household survey targeting individuals aged 18 and older. Data was collected from June 15, 2018 to July 12, 2018. Responding to this survey was voluntary and data was collected directly from survey respondents either through an electronic questionnaire (EQ) or through CATI (computer assisted telephone interviewing).

6.   The Digital Economy survey targeted Canadians' use and purchases of digital products, such as music and video streaming services, e-books, online gaming, mobile apps and software. It also collected information on the types of payment methods Canadians use for all their personal spending, as well as ways of making money through digital platforms.

7.   For this survey the term digital product refers to goods and services that were both ordered and delivered online (that is, in digital format). Internet purchases of physical goods and in-store purchases of digitally formatted goods were not in scope for this survey.

8.   The questionnaire underwent cognitive testing in the form of in-depth interviews in both of Canada's official languages, conducted by Canada's Questionnaire Design Resource Centre. The goal of the qualitative study was to test the survey content.

9.   This Digital Economy survey was a sample survey with a cross-sectional design. The DES sample has a two-stage design: the sampling unit for the first stage is the dwelling, and the sampling unit for the second stage is the person. The Digital Economy Survey frame was stratified by geography (province), and a simple random sample of dwellings was selected independently within each geography.   Sufficient sample was allocated to each of the geographic regions so that the survey could produce geographic level estimates. A sample of 12,000 dwellings was selected and a response rate of 50% was achieved.

10.   The survey yielded several interesting (and somewhat expected) results including:

- ✓ ***Younger Canadians are more likely to use or purchase digital products -*** Roughly 90% of people aged 18 to 44 purchased or used free versions of digital products in the 12 months to June 2018. This rate dropped to 51% for those aged 65 and older.
- ✓ ***Two-thirds of Canadians used or purchased video downloads or streaming services -*** Nearly two-thirds of Canadians aged 18 and older reported using free versions or purchasing video downloads or streaming services from July 2017 to June 2018. Purchasers spent $2.0 billion on these digital video products, with the average buyer spending $148 for the year.
- ✓ ***Canadians spend more on average on computer software, mobile apps and other online subscriptions than other digital products -*** Over half (57%) of adults in Canada used free versions or purchased computer software, mobile applications (apps), online courses and other online subscriptions such as fantasy sports leagues or dating sites from July 2017 to June 2018. Those that purchased these products spent $3.1 billion, or an average of $258 per person.
- ✓ ***Younger Canadians are most likely to use or purchase digital music -*** Over half of Canadians aged 18 and older either purchased or used free versions of digital music, including downloads and streaming services from July 2017 to June 2018. This proportion rose to 82% for people aged 18 to 24 and fell to 18% for those aged 65 and older.
- ✓ ***E-books are the most popular digital reading product purchased by Canadians -*** E-books, audiobooks, podcasts, online newspapers and magazines were used for free or purchased by one-third of Canadians 18 years of age and older in the 12 months to June 2018. The most common products purchased were e-books, followed by subscriptions to online newspapers.

✓ ***Online gaming was the most popular among young men -*** Online gaming, including game downloads, subscriptions and in game-purchases, were either used for free or purchased by 31% of Canadians aged 18 and older in the 12 months to June 2018.

✓ ***More than one-quarter of Canadians make money through online platforms -*** From July 2017 to June 2018, 28% of Canadians aged 18 and older reported making money through online platforms. The most common method of earning money was by selling new or used products through online bulletin boards such as Kijiji, eBay and Etsy.

✓ ***Digital payment methods are used for most payments -*** Digitization is affecting the way Canadians pay for the goods and services they buy. In the 12 months to June 2018, the bulk of total personal spending (76%) by Canadians aged 18 and older was done using digital payment methods, including debit and credit cards, preauthorized payments or online banking. At the same time, cash or cheque were used for 21% of all personal spending, while other payment methods, such as reward points and gift cards, accounted for the remainder. On average, Canadians 65 years of age and older used cash for 30% of their total personal spending, while those aged 35 to 44 years used digital methods for 80% of all their spending.

11. The initial design of the survey included a question regarding the origin of the purchase as outlined in figure 2.

Figure 2
International Origin question tested on The Digital Economy Survey

2) What proportion of your total spending on digital products digitally delivered was with Canadian merchants?

12. Testing of the questionnaire revealed that individuals were unable to answer this question. While they purchased digital products online – they were unable to determine if they were purchasing the product from a Canadian entity or a non-resident entity. It was thought that the currency of the transaction would be a good indication of the origin but in many cases the online provider converted the transaction into the local currency. In some cases, some resident Canadian entities charged in US dollars. Attempts were also made to use the .ca domain to indicate the origin of the purchase but it was found that in many cases, while the domain was .ca the purchase was being made with a foreign entity. While the digital economy survey provided some high-level estimates of Canadian's spending on digital products it was not possible to collect information related to international consumption.

13. As a second order method Statistics Canada used the information collected from the Digital Economy Survey along with information about the residency of the main global digital providers to estimate international purchases of digital products. The Digital Economy Survey asked respondents to report the value of their purchases of digital products along six product streams – music, books, video games, video, software, and apps. Statistics Canada then identified the main global providers of these products (such as Spotify, Apple, Amazon, Microsoft, ect). The agency then looked at its business register and other business information to determine if the global provider had a resident entity in Canada selling the products. If the global provider had an entity in Canada It then estimated the entities market share. Next Statistics Canada multiplied this market share by the dollar value of the purchases of digital products to estimate the value of purchases from resident providers with the residual being international purchases of digital products. For example, respondents to the Digital Economy Survey were asked if they purchased music streaming services. Respondents indicated that they spend just over 1 billion in purchases in 2017. Through an examination of Statistics Canada's business register we are able to determine that vast majority of providers of music streaming services are foreign entities. Therefore, the entire 1 billion in music streaming services is assumed to be imported from abroad.

14.	Table 1 provides the results by product stream. Using the results of the survey and the model explained above, it is estimated that of the 8.1 billion purchases of digital products, 6.7 could be international imports. This estimate has a wide variance given the number of assumptions that are made in determining the domestic market share. For example, if Apple sells an "app" via its platform, the app may have been developed by a Canadian, therefore the full value of the "app" should not be included as a domestic import but rather just the "retailing margin" charged by Apple. In addition, many of these multi-national platforms have set up operations in Canada and therefore it is very difficult to determine if the household transaction is with the resident firm or the non-resident firm. While this estimate is subject to a wide variance the number aligns well with the drop in inputs of physical music, videos and software which shows a $4 billion decline between 2008 and 2018.

Table 1
Modelled Estimates of the international imports of digital products using data obtained from The Digital Economy Survey

Digital Product	Total Purchases (millions of CAD dollars)	Domestic Market Share	Domestic Purchases (millions of CAD dollars)	International Imports (millions of CAD dollars)
Music streaming and downloads	1,070	5%	53	1017
Video streaming and downloads	1,955	20%	391	1,564
Online video game downloads and streaming	668	5%	33	635
E-books, audiobooks, and online newspapers, periodicals	1,354	10%	135	1,219
Mobile apps, computer software and other online subscriptions	3,072	25%	768	2,304
Total	8,119	17%	1,380	6,739

## III.	Payments Data

15.	A second source of information the agency is exploring to measure international trade in digital products is aggregate credit card transactions. Statistics Canada is testing using aggregated data (with no link to the cardholder information other than the type of card i.e. personal, business or other) from a sample of credit card companies. The data acquired consists of aggregate monthly or quarterly estimates of goods and services purchased on credit by both international visitors to Canada as well as domestic residents of Canada. A summary of the type of information acquired is presented in table 2. Domestic data related to the purchases of resident credit card holders purchased in the geographic boundaries of Canada. Inbound data relates to the credit card purchases made by non-residents while in Canada or the purchases made online by non-resident from Canadian resident merchants. The outbound data relates to the purchases made by resident Canadian credit card holders while abroad or made online from non-resident merchants.

Table 2
Sample of the type of information acquired from credit card providers

Domestic	Inbound	Outbound
Card member Forward Sortation Address (FSA)	Card member country name	Merchant country name
Merchant Forward Sortation Address (FSA)	Merchant Forward Sortation Address (FSA)	Card member Forward Sortation Address (FSA)
Merchant Class Description	Merchant Class Description	Merchant Class Description
Card type (Business, Personal, Other)	Card type (Business, Personal, Other)	Card type (Business, Personal, Other)
Transaction type (Online, POS, other)	Transaction type (Online, POS, other)	Transaction type (Online, POS, other)
Merchant Class Code (57 groupings)	Merchant Class Code (57 groupings)	Merchant Class Code (57 groupings)
Total net spending	Total spending amount	Total net spending
Number of transactions	Number of transactions	Number of transactions
Card member Tourism region	Merchant province code	Card member tourism region
Card member province/territory	Card member country code	Card member province/territory code
Merchant province/territory	Card member country group code	Merchant country code
Spending category	Card member country group name	Merchant Country group
Quarter of transactions		Merchant Country group name
Year of transactions		Year of transactions

16. The key classification that could provide an indication of international purchases of digital products across all data streams is what is referred to as the MCC class. The MCC class is a classification system used by credit card companies to identify the merchant who is party to the transaction. Credit card transactions have been aggregated into one of 57 merchant classes. The merchant classes range from restaurants, to clothing to footwear to professional services. A few of the merchant classes could be considered predominately digital products such as professional services, digital goods and electronic stores. Additionally, there are several classes where it can be assumed that no purchases of digital products occur such as transportation and clothing and footwear.

17. Since purchases of digital goods can occur across a number of the different merchant classes and digital products are not separately identified in the data, assumption need to be developed regarding the share of digital products sold for each merchant class. As noted above, for the majority of merchant classes the share will be zero (i.e. it is not yet possible to purchase a digital car). It is also assumed that digital products are all purchased online so only the value of online purchases will be considered when building the estimate. The following table shows the value of outbound aggregate credit card purchases (weighted) by merchant class, the assumed share of digital product sales as a percent of total sales and the

resulting estimate for digital products for the third quarter of 2018. For example, to arrive at international imports of digital products for gambling we took the online purchases (90), multiplied it by the assumed digital product share (100%) to derive the estimate for international imports of gambling (90 million).

Table 3
Estimates of international imports of digital products – third quarter 2018

Merchant Class	Online Purchases	Point of Sale / Other Purchases	Total	Digital Product Share	Estimated international imports of Digital Products
Books, Stationery, Jewelry, Tobacco, Pharmaceuticals	142	49	191	30%	42
Clothing and Footwear	283	290	573	0%	-
Direct Marketing	400	119	519	0%	-
Gambling	90	-	90	100%	90
General Merchandise	630	820	1,450	15%	94
Hobby, novelty, souvenir, and toy shops	180	81	261	50%	90
Hotels, other accommodation, restaurants and drinking places	350	1,797	2,147	0%	-
Other	918	93	1,011	0%	-
Professional Services, Telecommunication Services, Digital Goods and Electronic Stores	789	337	1,126	75%	592
Recreation and Entertainment	41	23	63	75%	30
Transfers	9	59	68	0%	-
Transportation	466	469	935	0%	-
Total	4,296	4,136	8,432		939

18.   While the data seem promising in their ability to measure international purchases of digital products there are several challenges that need to be addressed. First, the data acquired by Statistics Canada, up to this point, is a sample of credit card companies operating in Canada. It remains to be determined whether inferences regarding the population can be made using this non-scientific sample. Second, credit card purchases are only one means by which individuals can pay for digital products. Any estimate needs to take this into account. Third, the highly aggregated MCC classification system means that certain assumptions will need to be made about the share of digital products embedded in a merchant class. For example, one merchant class is cultural services. Some of these cultural services can related to the purchase of video streaming services, while some can related to the purchase of

museum or other cultural attraction admissions while travelling. More work will need to be undertaken to determine the proportion of each merchant class that consists of digital products. While challenges exist, credit card data and payments data in general appear to be a potential source of information to measure international trade in digital products and should continue to be explored.

IV. Survey of Digital Platforms

19.   The previous two examples of collection instruments propose to obtain data from the purchaser, namely Canadian households, either through a survey vehicle or the use of payments information. An alternative approach would be to obtain the required information from the seller and ask the seller to provide aggregate estimates of the activity carried out on their platforms. While this may seem to be the most straightforward approach given the concentrated nature of these platforms, the complicating factor for most national statistical organizations is that these platforms are generally multinational enterprises that often operate outside the jurisdiction of the NSO.

20.   While the collection of this information falls outside it business universe, Statistics Canada is proposing to work with a select set of multinational corporations and request that they provide information about Canadian's activity on their platforms. As such, Statistics Canada has designed a report that it is requesting companies operating platforms in Canada to complete. Examples include:

Table 4

Proposed report to be provided to Peer to Peer Accommodation Service Platforms

	Number of active listings	Total host revenue ($)	Total guest fees collected by Airbnb ($)	Total host fees collected by Airbnb ($)
Geography				
Canada				
Newfoundland and Labrador				
Prince Edward Island				
Nova Scotia				
New Brunswick				
Quebec				
Ontario				
Manitoba				
Saskatchewan				
Alberta				
British Columbia				
Yukon				
Northwest Territories				
Nunavut				

Table 5
Proposed report to be requested from Streaming Service Providers

	Total Sales ($)	Sales of physical goods online ($)	Sales of movie or music streaming services/downloads ($)	Total sales of mobile apps ($)	Commission from sales of mobile apps ($)	Sales of other digital products ($)
Geography						
Canada						
Newfoundland and Labrador						
Prince Edward Island						
Nova Scotia						
New Brunswick						
Quebec						
Ontario						
Manitoba						
Saskatchewan						
Alberta						
British Columbia						
Yukon						
Northwest Territories						
Nunavut						

21.   Statistics Canada is not yet at the point where it has been able to approach these companies to determine their willingness to provide these reports. Given several countries are in the same situation as Canada, where the platforms people interact with are predominately outside their economic territory, it may be appropriate for countries to work together to see if these large platform companies can provide multi-country reports. This approach could help to limit the response burden on the company as well as ensure coherent estimates across jurisdictions.

V.   Conclusion

22.   This paper highlights three approaches to acquiring information to measure Canada's international trade in digital products. It is clear that traditional sources of information are no longer sufficient and new approaches need to be developed. Obtaining data via a household survey appears to be expensive and, in many cases, the required detail cannot be provided. Payments data and supply side date appear far more promising will constitute the majority of the agency's focus over the next few years.