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E-commerce Issues Paper

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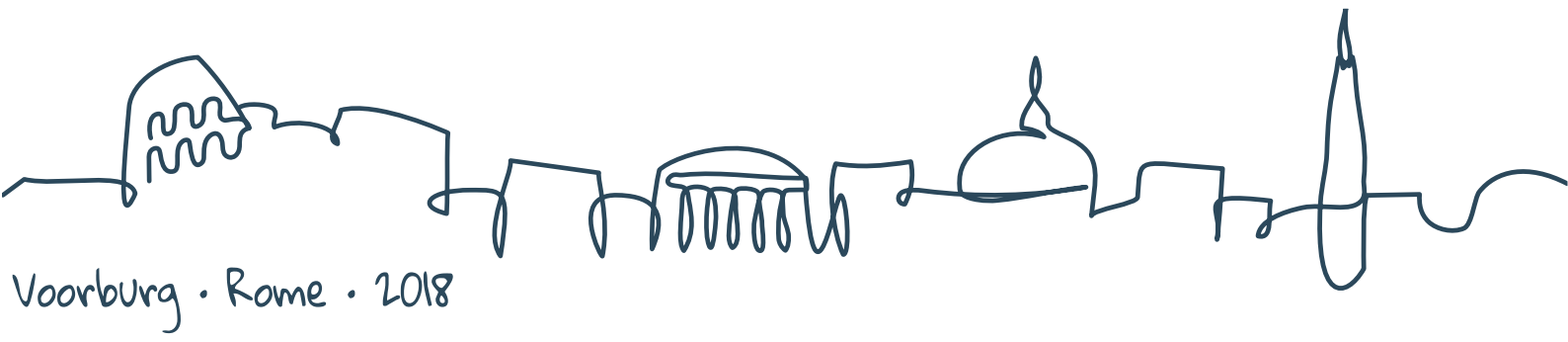
Compiled from the collective experiences shared at the 2017 Voorburg Group meeting in New Delhi, India



E-COMMERCE ISSUES PAPER

Summary of Issues Raised at the 2017 VG Meeting

1. Introduction

During the 2017 meeting of the Voorburg Group in New Delhi, India, a session on E-commerce highlighted country-specific issues and solutions in measurement of services related to e-commerce and the digital economy. Papers were presented by Ramon Bravo (Mexico), Mary Beth Garneau (Canada), Fabrizio Marinucci on behalf of Cristina Cecconi (Italy) and John Murphy (US Census Bureau) in a session chaired by Erika Barrera (Chile). This paper compiles the content of those papers and the meeting notes into a single document of VG experiences measuring e-commerce.

The session also included a presentation by Jennifer Ribarsky of the OECD on international work related to measuring the digital economy. The broader issues of the digital economy are outlined in a second paper, “Measurement challenges of a digital economy” by the same authors as this paper.

Electronic commerce poses a number of challenges to National Statistical Offices (NSOs) trying to measure the phenomenon. E-commerce is often defined and measured differently by firms engaged in the activity making it difficult to compile consistent statistics. The speed of growth of the activity and its evolution across industries make its measurement a bit of a moving target. Finally, many firms will maximize their revenue by simultaneously participating in both electronic commerce as well as by more traditional methods.

The paper is divided into sections covering the definition of e-commerce, how e-commerce is treated in industry and product classifications, and challenges it puts in the measurement of services outputs and prices. The paper includes some unanswered questions for delegates to consider in the 2018 meeting.

2. What is e-commerce?

Concepts and Definitions

Electronic-commerce (E-commerce) is defined in the OECD Guide to Measuring the Information Society, 2011 as:

> *“An e-commerce transaction is the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted on-line. An e-commerce transaction can be between enterprises, households, individuals,*

governments, and other public or private organizations. To be included are orders made over the web, extranet or electronic data interchange. The type is defined by the method of placing the order. To be excluded are orders made by telephone calls, fax or manually typed e-mail."[1]

The United States uses a definition of e-commerce that was created in the 1990s and varies from the OECD definition. The US definition is broader, but paradoxically leads to lower levels of e-commerce reporting. This indicates potential confusion on the part of respondents.

United States Census Bureau defines E-commerce on its questionnaires to retailers follows:

E-commerce is the sale of goods and services where the buyer places an order, or the price and terms of the sale are negotiated, over an Internet, mobile device (M-Commerce), extranet, EDI network, electronic mail, or other comparable on-line system. Payment may or may not be made on-line.[2]

The key difference between the two is that the OECD definition excludes from e-commerce transactions that used phone, fax or e-mail while they were potentially within scope of the Census Bureau. Because separate data are not available by specific method of e-commerce, it is hard to tell what impact the different definitions may have on international comparisons. It is also unclear without specific respondent outreach what is actually included or excluded in response data regardless of the definition presented in the survey instrument.

Canada and Mexico's definition of e-commerce follows the OECD definition, but like the United States definition, Statistics Canada emphasizes the requirement of a concrete Internet based **commitment** on behalf of both the consuming and producing entities to complete the transaction. If this on-line bilateral commitment occurs, the resulting transaction is counted as an e-commerce sale. By only including commitments, Statistics Canada omits consumers who use the Internet to 'window shop' for a product and price, and then take this price to a vendor to have it matched. But obtaining a price on-line is not in itself a commitment to purchase.

The actual measurement of these activities may not always align with the intended concept. Ultimately, National Statistical Offices are wholly reliant on firms to report data that may not always align perfectly with the statistical concept. The United States summarized a recent meeting with representatives of large US retailers with an e-commerce presence. The group of retailers did not agree on a consensus definition of e-commerce. The US speculated that some of the reporting problems might be related to market metrics based on same store sales and leases based on a fixed charge plus a percentage of sales. This creates very different incentives when defining e-commerce within trade. The US also noted the impression that the industry participants were most interested in timely product data, regardless of sales channel.

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[1] OECD (2011), *OECD Guide to Measuring the Information Society 2011*, OECD Publishing, Paris, https://doi.org/10.1787/9789264113541-en page 72

[2] John Murphy and Andrew Baer (2017) "Overview of E-Commerce Statistics United States Census Bureau" http://voorburggroup.org/Documents/2017%20New%20Delhi/Papers/1011.pdf from https://www2.census.gov/retail/forms_and_letters/arts/sa-44-16.pdf

The use of e-commerce in the Retail Trade sector has evolved over the years since the definition of e-commerce was first conceived. Many retailers offer a fluid blend of in-store and on-line services. If a store does not have the specific inventory required to fill a customer's needs, they may offer to order it on-line from in the store with free delivery to the customer's home. This raised the question of whether e-commerce should include only orders made on-line and shipped door-to-door, or also orders made on-line and picked up in store. What about the rising incidence of orders made in-store using electronic methods such as tablets and smartphones?

To determine what should be included or excluded from the definition of e-commerce requires a clear understanding of why we are measuring e-commerce, or specifically, what questions we are trying to answer with the resulting statistics. Are users interested in the measure of connectedness and digital technology in the delivery of services? If so, you would likely count all of these digital activities in your measure. Or are they interested in understanding the cost of production from the different formats, in which case the purely on-line service differs significantly from the in-store on-line purchase. The costs of the latter include the face-to-face in-store service provided by the sales associate and associated infrastructure of the store display of merchandise in a prime location.

On the topic of why to even collect e-commerce statistics, several potential reasons were expressed by the participants. One country noted that policy makers would be very interested in e-commerce data to understand where tax revenues are being collected now, and where they are being lost. Another remarked that missing data for electronic sales should be imputed differently than brick and mortar sales since prices behave so differently for these types of transactions. Output data would be needed to provide weights for distinct imputation cells. Yet another reason offered by a participant is that productivity statisticians are very interested in getting more and better e-commerce data. Finally, a delegate noted that there is research interest about whether e-commerce lowers the general price level for particular products. This is difficult to measure because we often don't know the quantities transacted at the different prices available on-line at different points in time.

While e-commerce was most often associated with retailers offering on-line storefronts, it is prevalent across the economy. Where business transactions may have once been done through paper order forms and printed contracts, more and more commitments for service are being made via electronic means. This raises the question of whether the definition of e-commerce should be the same across industries, when respondents may perceive it differently in different industries.

For example, the US Census Bureau asks manufacturers to report the level of E-shipments which it defines as follows:

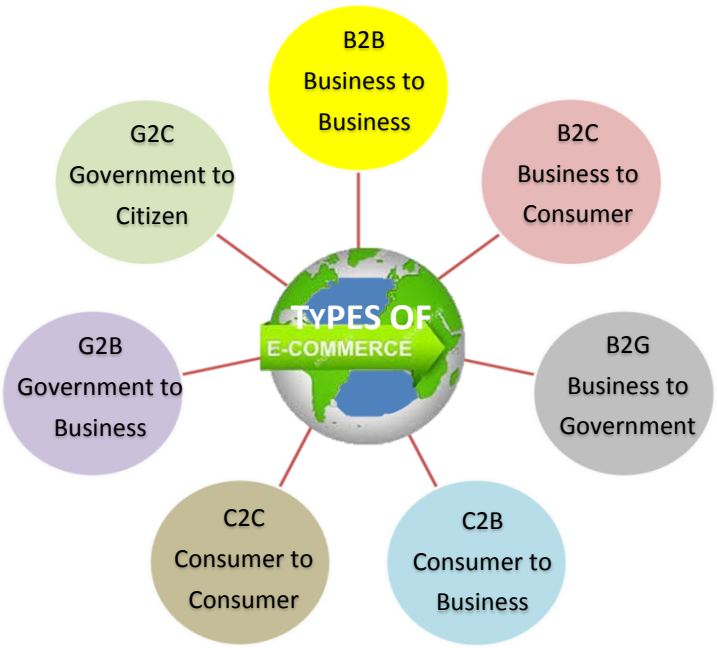
> *"E-shipments are on-line orders accepted for manufactured products from customers. These include shipments to other domestic plants of your own company for further manufacture, assembly, or fabrication. The price and terms of sale for these shipments are*

negotiated over an Internet, Extranet, Electronic Data Interchange (EDI) network, electronic mail, or other on-line system. Payment may or may not be made on-line."[3]

The Istat paper further illustrates the variety of e-commerce activities among business, government and the household sector (Figure 1). The nature of e-commerce also makes activities easy across international boundaries.

FIGURE 1

Types of E-commerce by clients[4]



The delegates discussed what the scope of e-commerce should be. For example, should measures of e-commerce be limited to wholesale trade and retail trade activities. The delegate from the OECD noted that there are no final recommendations or guidance on the scope of e-commerce at this time. Roughly, the scope of e-commerce at this time is any good or service that is digitally ordered.

Finally, the digital economy has changed the nature of how goods and services are transacted in the economy. Many of the challenges inherent in collecting and measuring e-commerce have changed and evolved with the growth of IT integration into almost all businesses but have also changed as companies have evolved. There is significant growth – that much is clear. However changing business practices might indicate that a redefinition of e-commerce is needed to more accurately measure the phenomenon of interest to business decision makers and policy makers.

[3] John Murphy, et al, "Overview of E-Commerce Statistics…" from https://www2.census.gov/programs-surveys/asm/technical-documentation/questionnaire/2016/instructions/MA-10000(S)%20Instruction%20Sheet.pdf

[4] Cristina Cecconi, Roberta Cacciaglia and Fabiana Cecconi (2017) "A preliminary analysis on E-commerce in Italy" http://voorburggroup.org/Documents/2017%20New%20Delhi/Papers/1008.pdf

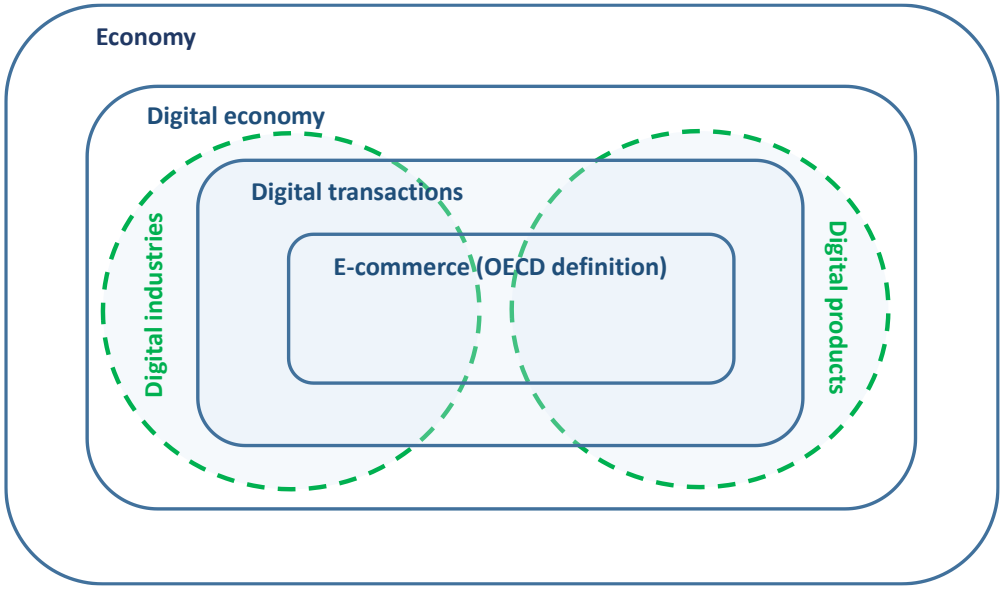
Increasingly, transactions are facilitated through on-line platforms including platform enabled services and crowd sourcing platforms.

As more attention is paid to defining and measuring the digital economy, the OECD's advisory group on measuring GDP in a digitalized economy has opted to focus on **digital transactions**. As noted in the authors' paper on Measurement challenges of a digital economy, "The possible criteria for distinguishing digital transactions include how the transaction is made (digitally ordered, enabled or delivered), what is transacted (goods, services or data), and who is involved (consumer, business or government). The advisory group's current working definition of **digital transactions** includes those that are digitally ordered, digitally delivered, or platform-enabled. This definition of digital transactions relates to, but it is not equivalent to the OECD definition of **e-commerce**, which is determined entirely by the order being made through digital means."[5]

Figure 1, taken from the same paper shows a scheme of the digital economy. The digital economy comprises digital industries (digital sector), digital products and digital transactions. The OECD definition of e-commerce is a subset of all digital transactions.

FIGURE 2

E-commerce in relation to digital transactions[6]



Perhaps e-commerce is too narrow a concept to focus our statistics and our focus should expand to digital transactions. The Voorburg Group should address the classification and measurement not only of the digital industries and products but also the digital transactions, since they may have important effects on prices.

[5]Erika Barrera et al (2018) "Measurement challenges of a digital economy", 33rd Voorburg Group Meeting
[6] Ibid

Questions to Voorburg Group:

Is e-commerce the relevant concept for measuring services outputs and prices across all industries? Or should measures of e-commerce be limited to wholesale and retail trade?
Should VG focus more work on digital transactions?

3. Industry Classification

As noted in the US paper, "The structure of industry classification systems creates some problems with collecting e-commerce data. The continued growth of the Internet and of the application of all types of IT in the business world have opened new doors for many types of businesses. Gone are the days of flipping through a catalog, filling out a paper order form and mailing or faxing the order. This provides an opportunity to outsource parts of the production process to others specialized in particular aspects of transactions. The Expert Group on Classifications is reviewing how these transactions should be handled in ISIC."[7]

Indeed, the largest component of E-commerce in the United States in 2015 was manufacturing, followed by wholesale trade, selected services and retail trade in that order. The value of e-commerce by retailers was only about 1/10 the size of manufacturing e-commerce shipments. Yet much of the focus on e-commerce is on the structural changes to retail trade as consumers shift away from traditional stores towards on-line shopping.

Retail Trade

The International Standard Industrial Classification (ISIC) Rev. 4 includes a distinct industry for on-line retailers – ISIC 4791, Retail sale via mail-order houses or via Internet. As noted in the Canadian paper "These businesses are often referred to as 'pure-play' on-line retailers. There was a time when pure-play retailers were easily distinguishable from those who operated storefronts, but this distinction has become blurred. Many traditional 'brick and mortar' retailers, i.e., those with a storefront, now also sell on-line. And some pure-play retailers have opened storefronts to enhance

Retail formats[8]

Pure play on-line retailers:
A business that solely sells products online, i.e. does not have a storefront.

Brick and mortar / storefront retailers:
Retailer that sells products at a physical location/store.

Bricks and clicks / Clicks and mortar:
Retailer that sells products online and in physical stores.

[7] John Murphy, et al, "Overview of E-Commerce Statistics…"
[8] Mary Beth Garneau (2017), "E-commerce in Canada" Slides from 32nd Meeting of the Voorburg Group on Service Statistics, http://voorburggroup.org/Documents/2017%20New%20Delhi/Papers/1007.pdf

brand recognition and make it easier for consumers to return or exchange products purchased on-line."[9]

The Canadian and US versions of the North American Industrial Classification System (NAICS) include an industry for Electronic Shopping and Mail Order Houses (NAICS 454110). "As a production function based classification, NAICS identifies the difference between the requirements to operate a store and to operate in the retail environment without a store infrastructure. NAICS makes the distinction of operating in a nonstore environment only. If a unit is providing both store and nonstore sales, the unit is classified to store retailing. While that may have made sense in the past, changes in retail create significant problems with showing structural changes between store and nonstore retail – or adequately separating Internet based sales from traditional store sales."[10]

The US paper continues, ""These problems become even more complex as Internet retailing evolves. Many large retailers now allow order via the Internet and pick up in store. Should that be e-commerce? What of the case where a terminal or screen is used to place the order inside the store? If separate units are created to handle e-commerce in omni-channel firms, are these various transactions credited in accounting records as store sale or Internet sales? Should e-commerce only include transactions that do not involve the store infrastructure – delivered directly to the consumer?"[11]

As the distinction between nonstore and store retailers continues to blur, the current classification may need to be revisited. Do we still need the distinction between store and nonstore retail establishments or should the classification be designed according to the types of products sold, regardless of the method used to sell them? If we choose to preserve the distinction, do we restrict the nonstore industry to the "pure-play" retailers, who historically have had a different operational structure than their store-based counterparts? Where do you draw the line as some of these pure-play businesses are opening storefronts and not necessarily the traditional brick and mortar shop? For example, one large on-line retailer has introduced several new store models. One allows shoppers to purchase food products on-line and pick them up at a specific time and pickup location. A second store model allows customers to put items in their bag then walk out of the store while their pre-registered credit card is automatically charged (no pre-order, no clerks, no checkout aisles).

The US paper notes some further shifts in the way retail services are delivered:

> "Another growing trend in Internet retailing is the growth of fulfillment services. Large retailers with significant e-commerce infrastructure are performing the selling activities for other retailers on a commission or fee basis. Known as fulfillment services, this can include all aspects of the retail trade transaction except the actual buying and selling of the goods. A growing percentage of sales through large Internet retailers are actually owned by third party retailers.

[9] Statistics Canada (2017) "Electronic Commerce – The Canadian experience in measuring electronic commerce in service industries"
http://voorburggroup.org/Documents/2017%20New%20Delhi/Papers/1006.pdf
[10] John Murphy, et al, "Overview of E-Commerce Statistics…"
[11] Ibid

> "Third party merchants outsource a large part of the services that are traditionally part of the retail trade margin. Fulfillment services can include a wide range of activities. In some cases, the e-commerce site is providing only transaction related services. That is they highlight a product on their website, collect and process payment, and forward the information to the third party retailer for actual fulfillment. The third party retailer receives payment (less commission) and then pulls the item, packages the item, and ships the item to the customer.
>
> "In other cases, the e-commerce site undertakes all of the functions except ownership. A third party merchant's goods are housed in the e-commerce distribution center. When an order is received, the item is picked, packed, and shipped by the e-commerce provider. The ownership and obsolescence risk remain with the third party merchant. This is another case where technology has allowed further separation or disaggregation of the production function to specialized units that can take advantage of economies of scale and particular expertise.
>
> "Are these commission services E-commerce? By definition, yes but should they be separately identified or treated as e-commerce sales?" [12]

The challenges in retail classification with the prevalence of e-commerce and new business models is best summarized by the US paper, "The problems of e-commerce in retail trade may require a reconsideration of industry definitions and/or products to identify the areas of importance and allow alternative tabulations to meet a variety of needs for decision makers. A substantial growth in Internet retail with store delivery has much different implications for shipping companies, couriers, and the postal service from a substantial growth in direct delivery to consumer sales. Retail has changed but our definitions have not. There are some fundamental questions that require thought and discussion starting with what are we trying to answer with e-commerce data in retail trade? What is the need and are we meeting it?"[13]

Non-trade Services Sectors

E-commerce services occurring outside of the trade sectors are also challenging to classify. The Canadian paper highlights the classification challenges in the publishing and broadcasting sector. The North American Industrial Classification System includes two distinct industries to classify firms whose activities were exclusive to the Internet:

- 51821 – Data processing, hosting, and related services; or
- 51913 - Internet publishing and broadcasting, and web search portals.

Initially, relatively few businesses were classified in these industry groups. However, as digital technology became increasingly common, more and more businesses were being assigned to these two industries on Statistics Canada's Business Register. With ICT advances across the economy, they became a catch-all for any business with an on-line presence or Internet-related component. The heterogeneity of those industries make the estimates of their combined activity less relevant while the industries affected by the digital transformation were slowly disappearing.

[12] John Murphy, et al, "Overview of E-Commerce Statistics…"
[13] Ibid

For example, a newspaper publisher that once published physical newspapers eventually transformed the business to only publish in a digital format on the Internet. Based on the rules in place, the firm would change industry classification from 51111 – *Newspaper Publishers* to 51913 – *Internet publishing and broadcasting, and web search portals*. Therefore, while this business was inherently producing or providing the same good or service, it would be classified according to the new format of the good or service produced.

The Canadian paper also noted that, "some industries, such as airline booking, hotels and taxis, are being transformed by the proliferation of digital platforms and on-line marketplaces, and it's likely that this transformation will continue to expand to other service industries. The new platforms act as an intermediation service, facilitating on-line transactions and payments between buyers and sellers. These services can be peer-to-peer, imported from platforms operating outside of Canada, or through another service provider. The main challenge is that it is often difficult to distinguish between these and traditional e-commerce, and more than likely these services are not being accurately captured and/or classified in the statistical system."[14]

There was some discussion at the meeting on whether it made sense to maintain separate industries for firms that primarily sold on-line. The United States noted that this is a very typical question for emerging activities, where they are identified separately until they become so common that it no longer makes sense to separate them. The Group pondered whether the Internet is just a different mode of delivery or is it really a different industry concept. One country indicated that they have combined several previously separate Internet activities with their traditional counterparts. The US expressed interest in evaluating the experience and might consider following suit in later years.

The meeting discussion also considered the proper classification for the digital platforms and intermediaries. As summarized in the meeting notes, "The United States indicated that there is no consistent rule in ISIC, sometimes they are classified in an existing agency class in ISIC and sometimes they are not. The US noted that on-line real estate agents and stock brokers are combined with their traditional counterparts, while retailers are mostly separate. It is tricky to combine digital intermediation with other activities since these intermediation services should be measured on a net basis. There has been discussion and guidance on classification of intermediaries in service transactions at the UN Expert Group on Classification at the most recent meeting in New York. That paper should be consulted for guidance." This measurement and classification of intermediary services will be further explored at the 2018 meeting of the Voorburg Group in Rome.

[14] Statistics Canada , "Electronic Commerce…"

Questions to Voorburg Group:

Do we still need the distinction between store and nonstore retail establishments or should the classification be designed according to the types of products sold, regardless of the method used to sell them?. If we choose to preserve the distinction, do we restrict the nonstore industry to the "pure-play" retailers, who historically have had a different operational structure than their store-based counterparts? Where do you draw the line as some of these pure-play businesses are opening storefronts and not necessarily the traditional brick and mortar shop?

Should the Internet be considered as just a different mode of delivery or is it really a different industry concept? Should Internet activities be tracked separately or combined with their traditional counterparts?

How should digital platforms and intermediaries be classified (to be discussed in the Thursday morning session on Intermediaries in the provision of services)?

4. Product Classification

Digital transactions can be complex and the lines between goods and services produced and consumed can be blurred, making it difficult to classify transactions into the existing framework of the System of National Accounts. This is particularly true with the bundling of digital and non-digital products. Transactions can differ with the various methods of payment for digital products, bringing into question whether these activities are being captured correctly. The challenge for NSOs is to find a consistent way to identify and record digital transactions without missing or double counting activities.

The US Census Bureau Retail E-commerce Sales Report attempts to focus more on products rather than industries in supplemental tabulations. To do so, companies operating stores that fall in different industries are asked to report for each industry separately. This allows the company's data to be tabulated in the correct industries. When a company has a large e-commerce segment, typically with separate warehousing facilities, it is considered a separate industry from the company's brick-and-mortar NAICS classifications. In such a case, "the new supplemental e-commerce table reallocates the sales of the NAICS 4541 component to the primary 3-digit NAICS code of the brick-and-mortar component of the company. Companies without a brick-and-mortar component remain classified under NAICS 454."[15]

[15] John Murphy, et al, "Overview of E-Commerce Statistics…"

This US Census tabulation does allow a way to tease out the impact of Internet retailing by product category except in the case of a pure-play e-commerce retailer that has no brick and mortar stores.

Borderless Transactions

The Canadian paper notes some of the challenges of cross-border digital transactions. E-commerce and digital delivery (e.g. downloads, streaming) make it easy to buy and sell goods and services to and from just about anywhere in the world. It can be difficult to capture all economic transactions, particularly those from non-resident sellers. In Canada, the direct import of consumer goods by households usually appears in customs data as 'low value shipments', but these cannot be properly identified and allocated to specific products. The import of services can be even more difficult to detect, particularly with digital delivery since a physical good is not moving across the border. "Although some estimates and allocations are made to account for this activity in international trade, complete data do not currently exist. The digital economy, and e-commerce in particular, make accounting for cross border transactions much more difficult." [16]

Households as Producers

The Canadian paper also notes that "households are using technology and the availability of digital platforms to leverage their knowledge, skills and assets by providing goods and services to the market." Unlike the industry breakdown in the Supply-Use tables, there is no household production account in the Canadian System of Macroeconomic Accounts. The value of household production is traditionally captured as household income reported through tax data. "With the expanding nature, scope and volume of household production, there is likely a growing measurement gap with respect to the output and value added of the household sector – this is an issue because some households do not report the activity through tax, and tax data does not provide any information on the inputs or products produced by the household." Further, some of the outputs may be remunerated by means other than currency (extra points in a game, access to an app, loyalty points, etc.).

Questions to Voorburg Group:

Do the product groupings in the Central Product Classification (CPC) meet the needs of the statistical system in the measurement of the volume of services outputs in light of e-commerce? If not, what changes are needed?

5. Output statistics

The rapid growth in e-commerce was noted by the VG delegates. The United States has noticed that E-commerce is growing and evolving across the economy at different rates. "The business

[16] Statistics Canada , "Electronic Commerce…"

models have changed substantially since the DotCom crash in 2001."[17] In Italy, leisure and tourism represent 75% of Italian e-commerce, with on-line gaming comprising a very large share. On the other hand, on-line sales of goods and apparel is comparatively small in Italy. Private estimates of e-commerce in Italy indicate annual growth rates of 30-40% until 2011, which have since slowed to about a 10% increase per year.[18]

The OECD Guide to Measuring the Information Society references some of the measurement challenges:

> "Measuring electronic commerce is difficult for a number of reasons including defining what constitutes electronic commerce, the speed of its growth and evolution and the fact that in many cases firms conduct both electronic commerce and traditional commerce simultaneously.
>
> Quantifying the value associated with electronic commerce activities can be challenging since many of its key qualities -- convenience, variety and ease of access to information -- are difficult to measure. This leads to a situation where it appears unlikely that official statistical offices will be able to provide accurate statistics on electronic commerce and quantitative insight into the nature of this activity will have to rely on private providers of data which suffer from a number of shortcomings, not the least of which is a transparent definition of what is meant by electronic commerce."[19]

The US Census Bureau paper provides some concrete examples of these measurement challenges:

> "Many U.S. services firms do not recognize their electronic sales activity as e-commerce, which some consider as a retail concept exclusively. For example, virtually all orders to buy or sell commodity future contracts are transmitted through electronic networks, but almost no U.S. commodity contract dealers reported revenues generated from executing these transactions as e-commerce. In addition, many businesses were recording only sales on their own websites as e-commerce, excluding sales on the sites of third party sellers. For example, some U.S. airlines failed to include ticket sales that occurred on on-line travel agent sites in their e-commerce reports. These issues may have resulted in significant underreporting of Services e-commerce. When looking at the distribution of e-commerce revenue by sector, the U.S. recorded a lower proportion from Services industries than was observed in the UK and Canada."[20]

The U.S. Census Bureau modified the wording of its questionnaires to be used in calendar year 2018 following consultation with survey respondents and an evaluation of British and Canadian questionnaires. The new questions are:

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[17] John Murphy, et al, "Overview of E-Commerce Statistics…"
[18] Cristina Cecconi et al(2017) "… E-commerce in Italy"
[19] OECD (2011), *OECD Guide to Measuring the Information Society 2011*, OECD Publishing, Paris, https://doi.org/10.1787/9789264113541-en. (cited from the OECD Glossary of statistical terms https://stats.oecd.org/glossary/detail.asp?ID=4721)
[20] John Murphy, et al, "Overview of E-Commerce Statistics…"

"Revenues from Electronic Sources[21]
A. Did this firm have any revenues from customers entering orders directly on the firm's websites or mobile applications in 2017? Yes/No
B. Did this firm have any revenues from customers entering orders directly on third-party websites or mobile applications in 2017? Yes/No
C. Did this firm have any revenues from customers entering orders via any other electronic systems (such as private networks, dedicated lines, kiosks, etc.) in 2017? Yes/No
D. Of the total 2017 revenues reported, what was the dollar amount (or percentage) that was from the revenues identified in A-C above? Please provide an estimate if exact figures are not available.
$_____ OR _____%

The new questions eliminate the use of the phrase "e-commerce" on the questionnaire, and provide descriptive phrases describing the various activities. "The Census Bureau will conduct respondent debriefing interviews and evaluate the results of these modified questions in 2018."[22]

Canada recently added e-commerce questions to their periodic retail trade and services output surveys. Identifying where sales should be recorded can be a challenge. For example, some sales generated from websites with a .ca web address may be booked internationally. Canada proposed asking about the locations of customers to better understand international trade flows for electronic transactions.

One country asked if figures exist for comparing the increase of e-commerce with the decline in brick-and-mortar retail sales. VG participants were not aware of any such data produced by national statistical agencies. Indeed, definitional inconsistency would make such a measure difficult. In the United States, there is a bit of a conundrum because retail sales are going up and at the same time, the proportion of e-commerce sales to total sales is increasing. That raises the question about jobs – how are they changing and where are they going? Output and prices alone might not be sufficient to answer some questions. Jobs, occupational statistics, and even a review of land use and real estate changes might be needed to shed light on some of the questions.

6. SPPIs

E-commerce results in a variety of challenges in the measurement of SPPIs. Is the service related to orders placed on-line the same as the service provided face-to-face in a retail store? Both Canada and Italy noted the challenges of dynamic pricing and price discrimination that is prevalent with e-commerce. Sellers can quickly respond to changes in either supply or demand and can use technology to discriminate between buyers.

On a positive note, electronic sales also provide greater opportunities for gathering non-survey data, such as through web scraping, access to APIs, or the acquisition of data from digital intermediaries.

[21] John Murphy, et al, "Overview of E-Commerce Statistics…"
[22] Ibid

E-commerce vs. In-store Prices

One of the most important elements of price indexes is that they measure price changes over time for the same quality of good or service. There are different pricing mechanisms at play in e-commerce from what is possible in a store. These differences can be seen in some of the key price determinants, notably costs, competition (i.e. price comparisons) and knowledge of the customer (price discrimination).

The cost structure in a store will differ from the cost incurred by a pure-play on-line retailer. The on-line retailer may incur platform costs, server costs, shipping, packaging, and so on while a bricks and mortar retail chain will pay higher rates for the retail space and may take on greater risk related to a geographically dispersed inventory.

Competition in the world of e-commerce knows no boundaries geographically. While a brick and mortar store used to have to worry only about other retailers in close geographic proximity, today's digital world allows constant monitoring of on-line market conditions with automated price tracking and analysis tools. Companies can automatically monitor market data and respond immediately with price change. This is particularly easy in on-line stores although some brick and mortar stores have adopted digital price displays that can also be updated remotely at any time.

On-line retailers may have an extra advantage in its knowledge of customers. They can target specific customers based on their on-line profile and can discriminate based on the technological platform the customer is using (e.g. laptop, tablet, even if on an IOS device). Stores generally display a single price to all customers although they may offer discounts or extra services (such as a longer return period) to customers in its loyalty programs.

It is clear the production function and pricing mechanisms will differ between pure-play on-line retailers and bricks and mortar stores. Looking at quality differences between the two services from a consumer perspective is not any easier than considering the different production functions. The Canadian paper provides an example of airfare purchased through a travel agent vs on-line direct from the airline's own on-line platform. Access to booking a ticket directly on-line 24 hours a day, 7 days a week may be a quality improvement for a computer literate customer but a reduction in utility to someone with limited access to the Internet.

Ideally, both on-line and in-store transactions need to be measured separately and weighted by prevalence in a given industry. This can be problematic in terms of resources, response burden and access to weights. In fact, Canada currently excludes e-commerce prices from its Retail Services Price Index (RSPI) while relying solely on Internet prices for traveler accommodation. Further complicating SPPI measurement is that e-commerce may result in different products produced by different industries thus making the productivity changes impossible to measure.

Dynamic Pricing

Dynamic pricing is prevalent in the e-commerce market. As noted above, on-line traders are able to change prices in real time or through structured pricing strategies to gain market share. The Istat paper describes this well:

"In dynamic pricing, price changes depend on subjective and objective parameters. In fact, on e-commerce sites algorithms perform adaptive controls of different factors, such as competition and demand, for a particular product on the on-line market. The same article is then offered at different prices to different groups or categories of customers. Therefore dynamic pricing is a type of price discrimination and its application, although generally admissible, may raise some legal issues and some criticisms come from both consumer associations and on-line shop managers.

"Some examples of on-line application of dynamic pricing are described below:

- In air transport price dynamics based on clusters of customers or on customers' needs are used. Airlines change their prices according to a multiple factors, such as time, the day of the week the search is conducted, the number of days left on departure, etc. For example, discrimination is applied on being a business customer or a family member. Usually, excluding promotions, the business class flight ticket is more expensive than the same flight ticket sold for the cluster family; they differ for the airplane seat and the market demand. The reason is that the business cluster has a higher budget - and therefore a higher purchase price - to get the specific good or service." [23]
- Price discrimination can be significant on some e-commerce sites. One company "uses its database to create clusters of well-targeted users to increase the competitiveness of its on-line shop. Knowledge of customers spending is a key factor in increasing profit through price discrimination strategies applying dynamic pricing strategies."[24]
- "Purchasing Groups are used to differentiate prices: different types of user groups pay different prices for the same product (for example: associations, non-profit organizations, simple users, etc.)."[25]
- "Geo-localization: some e-commerce sites are configured to recognize the origin of the IP (Internet Protocol address) to geo-localize specific customers and so discriminating prices."[26]

Customization and New Products

The Canadian paper notes the increasing customization of new products that are offered to customers on-line. It is difficult to measure price change while controlling for quality differences. "This issue is made more challenging by the extent of the options and number of different pricing models offered. In addition, the number of new products and services coming to market, particularly software and technology, make it increasingly difficult to track the same products/services over time. This 'new product' bias is further exacerbated by digitalization, requiring more frequent linking between new and discontinued products, as well as new approaches to quality adjustment."[27]

[23] Cristina Cecconi et al(2017) "… E-commerce in Italy"
[24] Ibid
[25] Ibid
[26] Ibid
[27] Statistics Canada , "Electronic Commerce…"

Access to New Data Sources

The impact in measuring prices in a digital world includes frequent changes to Internet pricing, based on consumer preferences and browsing history, time of day, day of week, and even the platform used to make the e-commerce purchase. Statistics Canada notes they are increasingly relying on alternative and administrative data sources to acquire more robust price observations for more products and services. “These data sources have been critical to the development of price indexes for a few financial services, as well as services with more on-line prevalence (i.e. traveler accommodations, where prices are collected directly from hotel websites, and commercial software and computer peripherals, where prices are obtained from a third-party data source).Web scraping is another method that can be used to start collecting on-line prices in service industries where they are currently excluded from the calculation of the price index (i.e. retail services).”[28]

7. Conclusion

The challenges of e-commerce are not new to the Voorburg Group but the need to develop consistent approaches to the phenomenon are more important now than ever giving the continued growth in this method of sale. The questions raised in this paper need to be answered, if not by the Group then by those that are defining the concepts and measures. It is clear that there are some distinct differences in the pricing and quality of the service based on the type of transaction. Is e-commerce too narrow a concept? Should we instead focus on digital transactions? Do these transactions warrant distinct categories in the industry or product classifications? If not, how should SPPI programs account for the quality differences?

[28]Statistics Canada , “Electronic Commerce…”

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