Analysing Value Creation and the Value Chain of Data Businesses

ITAXS

INTERNATIONAL TAX STUDIES

2-2021

IBFD

Authors:
Nupur Jalan
Jan Winterhalter

International Tax Studies

International Tax Studies (ITAXS) is a recurring publication in monograph format offering original, ground-breaking studies on paradigm-shifting topics in contemporary tax law. It is published online a minimum of eight times a year.

Editor-in-Chief: Prof. Dr Pasquale Pistone
Adjunct Editor-in-Chief: Dr João Nogueira
Managing Editor: Dr Alessandro Turina
Editorial Coordinator: Cristian San Felipe Maestre
Publisher: Drs Sophie Witteveen
Contact us at ITAXS@ibfd.org

Contribution of articles

The editor welcomes original and previously unpublished contributions which will be of interest to an international readership of tax professionals, lawyers, executives and scholars. Manuscripts will be subject to a review procedure, and the editor reserves the right to make amendments which may be appropriate prior to publication. Manuscripts should be sent with a covering letter submitting biographical data and current affiliation to the editor. The author will be notified of acceptance, rejection or need for revision.

IBFD follows citation guidelines partly based on the internationally recognized standards used in the *Guide to Legal Citation* of the Association of Legal Writing Directors (ALWD). For more information, visit our Journal Contribution page: https://www.ibfd.org/Authors-Correspondents/Journal-Contribution-IBFD.

For purchasing individual studies via pay-per-view or for annual subscriptions to 8-12 studies per annum, please visit our website or contact Customer Support at info@ibfd.org.

ISSN 2590-1117

IBFD
P.O.Box 20237
1000 HE Amsterdam
The Netherlands
Tel.: 31-20-554 0100
info@ibfd.org

Table of Contents

Issue 2 – 2021

Analysing Value Creation and the Value Chain of Data Businesses

Nupur Jalan and Jan Winterhalter*

The notion of value creation is gaining traction. Even the OECD emphasized aligning profit taxation with economic activity and value creation in the BEPS Actions 8-10 Final Reports.[1] Further, the modern innovative business models in this era of the digital/data economy are giving rise to highly integrated value chains. The question arises as to (i) how to accurately describe these value chains in a manner that makes the value creation and value-capturing of data and digital business transparent for tax purposes; and (ii) how to analyse modern businesses acting in their very own and unique data ecosystems. Therefore, this article discusses the value creation and value chain aspects of data-driven businesses. Considering the above, this article first discusses the background of value chain analysis and its commonly used methods for transfer pricing purposes. Second, it attempts to establish a link between the concept of value creation in the data economy and the evolving data-driven business models and examines possible value chain analyses that might be able to describe these models properly. As an interim conclusion, the authors express the need for an adjustment of the current value chain analysis for digital/data-driven businesses, as it fails to integrate the ways in which the digital data ecosystem works. Therefore, for business models that rely heavily on data and for transactions that are data-intense/data-driven, the authors propose a quantitative approach, whereby the residual profit is attributed not only to profit and investment centres, but also to data function. As it is crucial for such a value chain analysis to appropriately reflect value creation, the authors also propose a framework of digital documentation tools to understand the economic reasoning behind those businesses.

1. Setting the Scene: Background of Value Creation and Value Chain Analysis

Value creation is often defined as "the performance of actions that increase the worth of goods, services or even a business"[2] and is one of the most prominent terms that has gained a lot of traction in the current debate on international tax policy.[3] Value chain analysis[4] (VCA) is usually carried out to determine where and how value is created in a group's business operations and involves the weighing of economically significant functions, assets and risks, as well as the people functions that contribute to such value creation. In simple terms, VCA refers to the entire performance process of a company, which begins with research and development and ends with the delivery to the end consumer.[5]

VCA analysis has become a vital part of societal global initiatives. According to OECD Secretary-General Gurría, "[i]nternational trade and investment have undergone accelerated changes with the emergence of global value chains".[6] A global value chain involves the coordination of activities, people and processes in dif-

* **Ms Jalan is tax professional and researcher specializing in corporate tax, international tax and transfer pricing. She can be reached at jalannupur@outlook.com. Mr Winterhalter is a tax lawyer and PhD candidate at the Institute of Tax Law of Leipzig and a research fellow of the Heinrich Böll Foundation. He can be reached at jan.winterhalter@posteo.de.** **The authors would like to thank Suchint Majmudar for his valuable comments and input.**

1. OECD/G20, *Aligning Transfer Pricing Outcomes with Value Creation – Actions 8-10: 2015 Final Reports*, Executive summary (OECD 2015), Primary Sources IBFD [hereinafter *Actions 8-10 Final Reports*].
2. B. McCullough, *Maximize Efficiency: Five Lean Process Improvement Principles*, MTWorks (29 Sept. 2015), available at https://mtworksllc.com/2015/09/29/maximize-efficiency-5-lean-process-improvement-principles/ (accessed 11 Mar. 2021).
3. The OECD clearly aims to tax profits in line with value creation and economic activity. In the BEPS *Actions 8-10 Final Reports*, reference is made to the tax challenges of the digital economy when describing the scope of work for guidance on the transactional profit split method. The OECD thus advocates for greater reliance on value chain analysis (VCA) and the use of the transactional profit split method to properly align profit with value creation if unique intangibles are involved in digital business models. *See* OECD/G20, *Addressing the Tax Challenges of the Digital Economy – Action 1: 2015 Final Report* p. 145, para. 373 (OECD 2015), Primary Sources IBFD [hereinafter *Action 1 Final Report*]; and A. Weisser, *International Taxation of Cloud Computing: Permanent Establishment, Treaty Characterization, and Transfer Pricing* p. 255 (Editions juridiques libres 2020), available at https://ssrn.com/abstract=3708122 (accessed 7 Jan. 2021).
4. The value chain system was first described in Tableau Economique, written in the 18th century by the French economist François Quesnay. Many experts, e.g. Grant (contemporary strategy analysis – *see* R.M.Grant, *Contemporary Strategy Analysis: Text and Cases Edition* (9th ed., John Wiley & Sons 2015)) and Leontief (input-output model – *see* W. Leontief, *Input-Output Economics* pp. i-iv (E. Dietzenbacher & M. Lahr eds., Cambridge University Press 2004) have since expanded on Quesnay's model, as well as on Porter's massively influential model (*see* Porter, *infra* n. 7).
5. Even today, the VCA initiated and illustrated by Porter, *infra* n. 7 remains an indispensable methodology. Having evolved and adapted over the years, companies and industry specialists continue to successfully implement Porter's VCA.
6. For more information, *see* A. Gurría, *The Emergence of Global Value Chains: What Do They Mean for Business?*, G20 Trade and Investment Promotion Summit (5 Nov. 2012), available at https://www.oecd.org/about/secretary-general/theemergenceofglobalvaluechainswhatdotheymeanforbusiness.htm (accessed 7 Jan. 2021).

Table 1 – Illustrative list of qualitative versus quantitative VCA approaches

Approach	Working methodology
Qualitative approaches	
Porter's VCA approach	Aims to allocate profits/provide remuneration by identifying the routine and non-routine primary (i.e. key value-contributing) and supporting functions performed within the company. If the allocation of profit/remuneration is not in accordance with the responsibility assignment matrix in respect of the different value drivers and related risks, it is concluded that there is misalignment.
Ratio-based approach	Aims to analyse various ratios to show the division of sales, gross margin, operating margin and number of full-time employees among various companies. The deviation is measured based on the degree of variation (delta) between these ratios. The greater the variation, the higher the degree of misalignment.
Process contribution analysis	Aims to identify key processes based on various reference points (interviews within companies/industry-wide references) and the contributions made by different entities to these processes, visualizing the rating of one or more processes based on their creation of value. The deviation is measured by the degree of variation between the remuneration of entities and the rating given to processes performed with regard to value creation.
Quantitative approaches	
Using proxies to split the residual profit among profit and investment centres	Starts with segregating routine profit from the earnings before interest and taxes (EBIT). The residual profits are then split among profit and investment centres, based on some proxies. The results are checked in terms of whether residual profit was not reasonably attributed to the profit and responsibility centre's roles.
Determining the pre-tax markup on total costs earned by each entity of the group	The premise of this technique is that bearing the high fixed costs and/or assets should lead to a higher pre-tax markup on total costs for entities. This starts by estimating the fixed assets versus variable costs related to the functional, asset and risk profile assumed by each group entity. Next, the same estimation is conducted for fixed assets. After this, the markup on total cost is determined for each entity. Misalignment is indicated if the pre-tax markup on total costs does not resonate with the division of fixed costs and/or assets within the group.
Measuring the level of value creation of the key processes	Aims to identify the key value drivers and allocate percentage weight to each of the processes based on a functional analysis. Next, an interquartile range is calculated per process. The median is the most accurate measure for determining the level of value creation of a process, which should be entitled to remuneration in the same proportion as the value contributed by it. Misalignment is indicated if a value creation process is not entitled to remuneration in proportion to the value it contributes.

ferent geographical areas. From an international taxation perspective, the use of the value creation concept plays a central role in the current OECD/G20 and EU work in determining the taxation rights of countries, especially in the increasingly digitalized economy. To align taxation with value creation, a deeper look at the value drivers, core characteristics and new elements of digital business models is needed. Both revenue and costs should be considered when trying to identify important elements of a value chain.

The increasing transformation of the economy into a digital and data economy and the associated change in value chains is one of the central challenges facing tax law in the 21st century. Section 3. will discuss value creation and the value chain aspect of data businesses/data-driven businesses.

2. Commonly Used Methods of Value Chain Analysis for Tax/Transfer Pricing Purposes

Over time, several methods of VCA have been identified, especially from a transfer pricing perspective. This section discusses some of the commonly used methods of VCA for tax/transfer pricing purposes. Apart from the traditionally understood mechanism of the value chain as conceptualized by Porter[7] (i.e. the primary activities of inbound and outbound logistics, operations, marketing and sales, complemented by supporting activities like infrastructure, human resource management, technology development and procurement), several new ways have been devised to perform VCA, especially in the transfer pricing world (*see* Table 1).[8] Further, conducting both qualitative and quantitative VCA helps taxpayers achieve certainty in respect of the profits allocated to different value drivers across business segments, jurisdictions, legal entities, etc. and provides insight into whether their current transfer pricing models function appropriately. That being said, there is much debate on the best mechanism for conducting VCA.

Based on the above, the authors come to the following interim conclusions:

- each approach described in Table 1 has its own benefits and limitations, and hence, a case-by-case analysis of the business model needs to be undertaken to determine the appropriate VCA method (i.e. there is no one-size-fits-all method);
- BEPS Actions 8-10 advocate the use of VCA[9] for the purpose of determining value creation, but no

7. M.E. Porter, *Competitive Advantage: Creating and sustaining superior performance* (Free Press 1985).

8. *See* S. Huibregtse, M. Menezes & K. Sukmatullahi, *Value Chain Analysis – the BEPS version of Transfer Pricing?* (e-bright 2019) (Table modified by the authors).

9. The OECD acknowledges that the enforcement of the arm's length principle in the digital economy, with its digital products and services, is becoming increasingly difficult, as

guidance had been provided on the mechanics of the value chain to be used; and
- in order to address the tax challenges of the digital/data economy and contribute to the goal of aligning taxation with value creation, a deeper look at the value drivers, core characteristics and new elements of digital business models is needed.

Thus, what is the bigger question: how does data contribute to the value chain of data-based business models, or which values are created in which steps of the data-mining process? Of course, there is no straightforward answer to this, as one needs to first understand data value creation and the data value chain in general.

3. Concept of Value Creation in the Context of the Data Economy

Digitalization – or "datatization" – has raised several tax challenges for policymakers, including in respect of value creation related to data usage.[10] In a data economy, value is not created by a single actor, but by a combination (network) of different actors, some of which may be part of the data ecosystem and its data value chain.[11] On the other hand, if one investigates the role of data in the existing value chain of an organization, one may get surprising results, as data is an increasingly important value driver.[12] Companies can infuse all of the core elements of their current business models with data and analytics to provide completely new solutions, or they can completely reinvent their business models by utilizing existing data in new ways, thereby moving away from their former business models.

The points below represent how the different core elements of value creation operate in data-driven business models:
- data adds to the value creation within a company, increasing efficiency and providing a better foundation for decision-makers;
- the role of data in infusing the value creation process;
- the value proposition can be improved through data-infused value creation that adds new services resulting from data analytics to the current portfolio that is offered to customers; and
- a data-infused value capturing can influence the value proposition as well. This happens, e.g. if individual prices that take special customer needs into account are offered to the customer and add additional value to such needs.

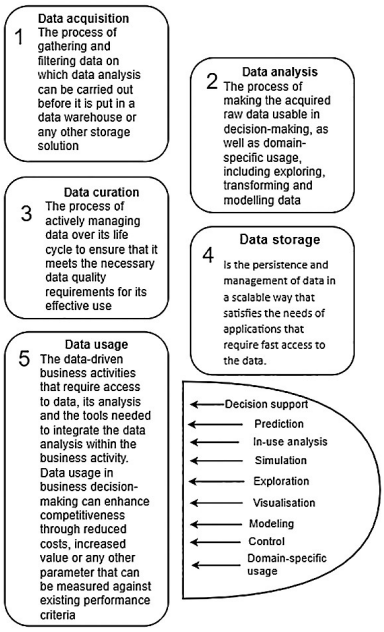
However, entities may differ in their degree of involvement in the process of converting raw data into knowledge[13] and accordingly the role of data in the value creation process may differ.[14] Similarly, it is pertinent to mention that each digital/data-driven business model creates value through data-mining in different ways. A company might not engage in all steps of the outlined data-mining process but either outsource some parts of it or, for example, monetize processed or transformed data by selling it to third parties that then engage in further data-mining activities. Accordingly, different legal entities of the same company can be engaged in different steps of the data-mining process.

Different stages of the data value chain are represented in Figure 1.[15] Different authors may define/name these steps differently, but the rationale remains largely the same.[16]

multinational enterprises (MNEs) employ global and highly integrated supply chains. In this vein, the legal separation of MNEs' affiliates is considered economically less relevant in the digital economy. The OECD thus advocates for greater reliance on VCA and the use of the transactional profit split method to properly align profit with value creation if unique intangibles are involved in digital business models.

10. The OECD, in the *Action 1 Final Report*, at p. 16, notes that "[t]he digital economy is characterised by an unparalleled reliance on intangibles, the massive use of data (notably personal data), the widespread adoption of multi-sided business models capturing value from externalities generated by free products, and the difficulty of determining the jurisdiction in which value creation occurs". It is beyond the scope of this article to elaborate on all of the tax challenges that arise due to digitalization. Nevertheless, the authors think that, in the context of the current debate, data is both a tax challenge and an opportunity.
11. In addition, a value chain consists of different actors conducting one or more activities (e.g. data provision, data curation or data analysis), and each activity can consist of a number of value-creating actions or techniques (e.g. collection, visualization or service creation); *see* https://confluxdata.net/f/series-2--part-1-exploring-data-ecosystem (accessed 4 Feb. 2021).
12. However, the views on what exactly the value of data is and how it should be treated for corporate income tax purposes are divergent and often premature. For a detailed discussion, *see* M. Olbert & C. Spengel, *International Taxation in the Digital Economy: Challenge Accepted?*, 9 World Tax J. 1, p. 3 (2017), Journal Articles & Papers IBFD.
13. On the other hand, Roberto Moro Visconti, A. Larocca & M. Marconi, *Big Data-Driven Value Chains and Digital Platforms* (18 Jan. 2017), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2903799 (accessed 16 Mar. 2021) define the data value chain by the following five stages: (i) data creation and collection; (ii) data storage; (iii) data processing (data fusion and analytics); (iv) data consumption (visualization and sharing); and (v) data monetization (business model). Although different people may assign different names to the various stages of monetization, from raw data to rich data, the broader steps of the value chain remain the same.
14. *See* E. Curry, *The Big Data Value Chain: Definitions, Concepts, and Theoretical Approaches*, in *New Horizons for a Data-Driven Economy: A Roadmap for Usage and Exploitation of Big Data in Europe* (J.M. Cavanillas, E. Curry & W. Wahlster eds., Springer 2016).
15. *See* id. (modified by authors).
16. *See*, e.g. K-L. Du & M.N. Swamy, *Neural Networks and Statistical Learning* p. 871 (Springer 2013), who separate the process of data mining into three phases, namely (i) data pre-processing and exploration; (ii) model selection and validation; and (iii) final deployment. *See further*, e.g. P. Attewell & D. Monaghan, *Data Mining For the Social Sciences: An Introduction* p. 53 (University of California Press 2015), who break the process down into six steps.

Figure 1 – The five steps depicting the data value chain



While the concept of data as a contributor to value creation has been established, the question of how to attribute value to the generation, storage and use of data remains unanswered, giving rise to a broader tax challenge. Considering the amount of data in the analysis of functions, assets and risks and having to measure the value of that data, it is a complex task to adequately integrate data into a VCA due to the variety of transactions, the diffusion of data in multifaceted business models and the remote nature of handling data (i.e. the data is handled in a place different from where the data originated).

Some may relate this to the problems surrounding intellectual property and hard-to-value intangibles; however, it is difficult to entirely relate the so-called valuable asset "data" to IP or hard-to-value intangibles. As data might be seen as the backbone of data-driven business models and a crucial factor for competitive advantage in the future, one must ask whether a combination of the hardware and software elements, together with related people functions in the functional analysis, can serve as a proxy that captures the value of data. For that, one needs to understand the evolving data-driven business model.

The diversity of data is a challenge and reward at the same time, the combination of various data sources can lead to the creation of innovative data-driven services that were not possible before Thus, in section 4., the authors illustrate a few data-driven business models and how they can generate value through the use of data.

4. Evolving Data-Driven Business Models

4.1. Background of digital data business models

Various businesses use different forms and amounts of data for their operations,[17] and some businesses also rely heavily on data for decision-making (i.e. data-driven decision-making).[18] The OECD, in its report entitled "Data-driven innovation for growth and well-being", also acknowledged that data-driven innovation forms a key pillar in 21st century sources of growth.[19]

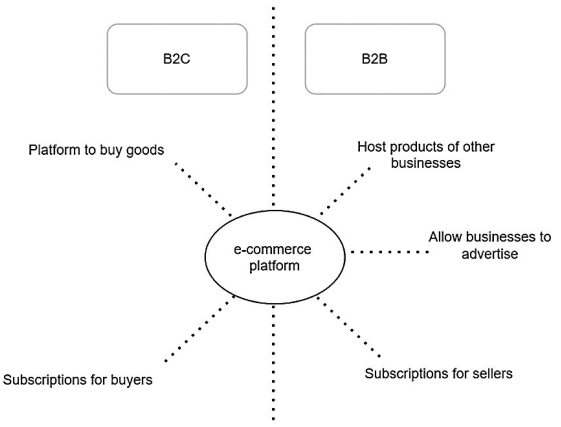
It is pertinent to mention that it is not the quantity of (user) data, but the quality of how the data is used to generate network effects that is crucial for value creation.[20] In order to understand the value chain, a case-by-case analysis will need to be carried out for some of the business models underlying each type of online platform and the data activity associated with each of them, including the data flow, as well as for how an online platform company (or so-called platform ecosystem business models) gains competitive advantages based on its control over data points and the data ecosystem.

For that, it is prudent to start with a broader (and rather traditional) perspective of business-to-consumer (B2C) and business-to-business (B2B) digital data ecosystem business models. However, the specific models discussed here do not represent a pure version of B2C or B2B models, as modern business models can rather be considered a mixture of both B2C and B2B, with a major focus on either one of them. An example would be an e-commerce platform, which may entail both B2B and B2C elements (*see* Figure 2).

This article analyses two specific types of models, namely social networking sites and e-commerce shopping structures, with a specific focus on how they create value out of data. As data plays a central role in these models, the authors broaden the perspective further and describe how a digital data business model looks from a data ecosystem perspective.

17. While businesses have always relied on some form of data, the ongoing discussion refers to businesses using large amounts of data to assist in making better business decisions and shaping entire business models.
18. E. Brynjolfsson, L.M. Hitt & H.H. Kim, *Strength in Numbers: How Does Data-Driven Decision-making Affect Firm Performance?* (22 Apr. 2011), available at http://dx.doi.org/10.2139/ssrn.1819486 (accessed 7 Jan. 2021).
19. For an overview, *see* https://www.oecd.org/sti/ieconomy/data-driven-innovation.htm (accessed 4 Feb. 2021).
20. M. Schrage, *Rethinking the Value of Customers in a Digital Economy*, MIT Sloan Management Review (11 Apr. 2016), available at https://sloanreview.mit.edu/article/rethinking-the-value-of-customers-in-a-digital-economy/ (accessed 7 Jan. 2021).

Figure 2 – Modern e-commerce business platform with B2B and B2C elements



4.2. *Digital data business models: The broad perspective*

4.2.1. *Description of a digital data business model with a major focus B2C*

Broad description[21]

Digital business models can be classified under the B2C sector if end users of the digital goods or services are direct and paying customers. Digital B2C business models often offer extremely targeted and individualized products and services. A good example of such a business model is the so-called "freemium" model.

Key activities

Apart from the focus on the main service offered, the other key activities are platform management and the acquisition of extensive customer information. Maintaining and continuously improving the platform's functionality and usability are derived activities.

The business models' infrastructure relies on a widespread IT infrastructure with its core physical elements at the main location of the parent company and individual parts, such as data centres, located in customer markets.[22]

Taking the example of social media company: in order to be able to produce the most suitable ads for website content and visitor interests, to further optimize its offer portfolio, the platform constantly analyses user data, gaining a clear profile of its users and insight into competitive advertising networks. Information on what customers purchase, how many times they contact customer service and how much time they spend on a given website can create an insightful narrative regarding their buying habits and preferences.

21. *See* Olbert & Spengel, *supra* n. 12, at p. 23.
22. *See* id., at p. 24.

4.2.2. *Description of a digital data business model with a major focus on B2B*

Broad description

Digital business models in the B2B sector offer digital goods or services to commercial clients.[23] These clients include enterprises across all sectors and geographic regions with access to the Internet.

Key activities

A complex combination of hardware and software elements is required in order to build the core infrastructure of digital B2B models. However, many businesses are now moving to cloud storage instead of maintaining massive servers. One example of a digital B2B model is the intermediation platform, which aims to serve commercial clients, and the role of which is simply to route the end customers to the services offered by the commercial clients.

4.3. *Digital data business models: The specific perspective*

4.3.1. *Focus on consumers: Social networking*

Specific description

Social networking sites have been at the forefront of the controversy regarding taxation in the digital environment. They are characterized by user interaction via an online platform, designed to engage people by facilitating the sharing, creation and communication of content and information online. This user interaction provides marketing opportunities to other online businesses and corresponding advertising revenue to the social networking site. User engagement is critical in this model, and market proliferation is achieved with no significant tangible presence in a jurisdiction.

Specific key activities[24]

With regard to consumers, social networking sites provide a platform for the specific needs of and interaction with the consumers. It is important to mention that most of the content here is generated by the users of these platforms themselves, which is what keeps the platform interactive.

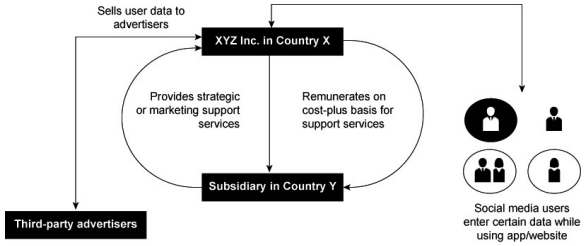
With regard to third parties, social networking sites usually set up a subsidiary to perform strategic or marketing support services for the website's development and receive arm's length remuneration for the services rendered. Based on user interaction in a particular jurisdiction, the platform/intellectual property (IP) owner (which, in most cases, is based outside the market state) analyses user data to reveal patterns,

23. *See* id.
24. W.C.Y. Li et al., *Value of Data: There's No Such Thing as a Free Lunch in the Digital Economy*, Research Institute of Economy, Trade and Industry (RIETI) Discussion paper 19022 (2019), available at https://ideas.repec.org/p/eti/dpaper/19022.html (accessed 4 Feb. 2021).

trends and associations, especially relating to human behaviour and interactions, by using data processing software, like big data. The platform owner sells such data, typically tailored to a specific user's interests, to host advertisements on its website. In return, the website owner receives advertising fees from such third-party advertisers.

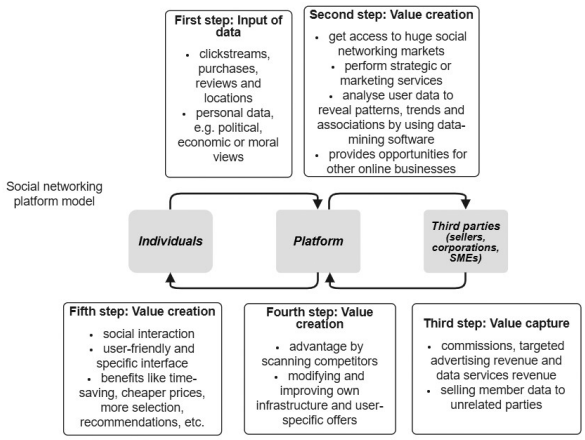
Figure 3 illustrates such a (simplified) model, using a specific country as the market example.[25]

Figure 3 – An example of a digital business model



How do these businesses create value out of data? Figure 4 provides an example, taking a thorough look into the value creation process of an online social networking platform.[26]

Figure 4 – Value creation process of an online social networking platform



4.3.2. *Focus on B2B: E-commerce marketplaces*

Specific description

Another heavily discussed topic in respect of digital marketplaces is e-commerce business models. E-commerce marketplaces are designed in the form of an online platform, facilitating sales between consumers and third-party sellers. Table 2 provides an overview of models under which online shopping structures commonly operate.

Specific key activities[27]

Table 2 – Models under which online shopping structures commonly operate[1]

Model	Description
Inventory-based model	The website assumes responsibility for the entire shopping experience, from product purchase to warehousing and dispatch (e.g. Jabong, Shopclues).
Marketplace e-commerce model	The website is only a meeting place for the buyer and seller. Beyond this, the website assumes no responsibility. The seller of the product is directly responsible for the storage and delivery of products and the after-sales services towards the consumer (e.g. eBay, Craigslist, Snapdeal).
Hybrid model	The website provides the option of either self-fulfilment of the order or allowing for inventory storage with respect to products displayed on the website. The website may also advertise and sell products and/or services under its own label (e.g. Amazon, Flipkart).

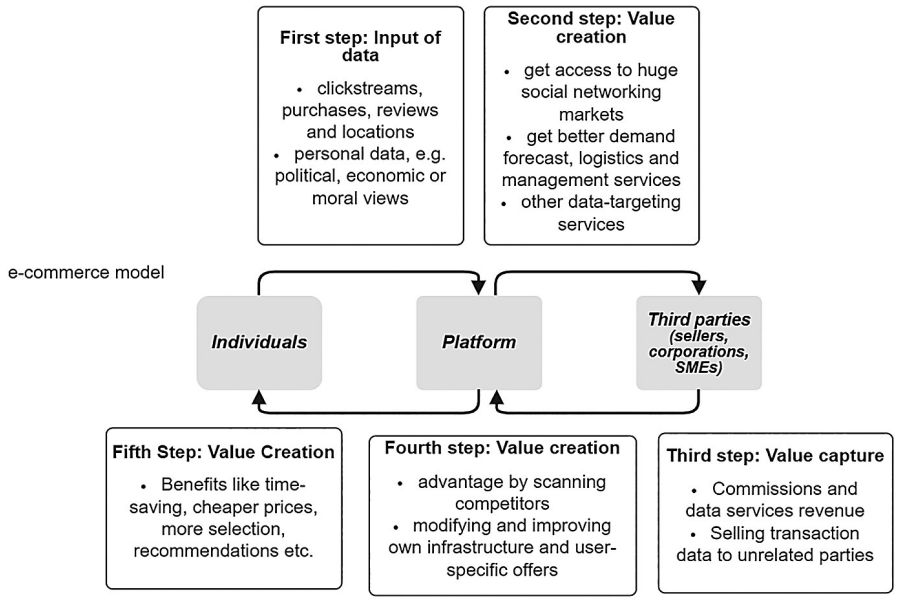
1 R.P. Singh & V. Agarwal, Taxation of Digital Economy in India: The Way Forward (VIDHI Centre for Legal Policy 2019), available at https://vidhilegalpolicy.in/wp-content/uploads/2020/06/DesignedReport_TaxingDigitalEconomyinIndia-TheWayForward.pdf (accessed 20 Oct. 2019).

With regard to consumers, e-commerce business models involve a marketplace or platform for purchasing a wide range of products from a wide range of sellers at affordable prices. With regard to third parties, it involves access to (mostly huge) online platforms in a cost-effective and time-efficient manner. The headquarters of the platform are responsible for infrastructure, technology and other strategic operations and usually own IP related to the use of and access to brands, technology and know-how. In return, third-party sellers pay a fixed commission fee for:

- access to the market;
- a detailed analysis of their customers, based on consumer data;[28] and/or
- the opportunity to purchase the data.

25. S. Majmudar, N. Jalan & E.M. Tigdi, *Digital Economy: New Profit Allocation and Nexus Approach*, 30 Journal of International Taxation 10 (2019).
26. Id.
27. Li et al., *supra* n. 24.
28. S. Bond, *Amazon's ever-increasing power unnerves vendors*, Financial Times (20 Sept. 2018). Bond reports that Amazon offers corporate clients premium data services, which include demand and trend forecasts. By combining this price-sensitivity data with other data, Amazon can conduct detailed profiling of each consumer and provide data-driven pricing strategy services to third-party sellers. Note that online platform companies can also collect data from third-party sellers, such as where they ship the products if the third-party sellers choose to fulfil the orders by themselves.

Figure 5 – Data and value creation in respect of online marketplaces and platforms



There might or might not be a difference in terms of the degree and details of the data. The third-party seller can attain the data from the transaction, but the marketplace can obtain consumer data beyond the transaction data, including browser history and clickstreams. Moreover, the marketplace has all the transaction data related to third-party sellers.

The marketplace collects data on the clickstreams, purchases, reviews and locations of consumers. It then conducts an analysis of those data to provide data-targeting services to third-party sellers. For example, based on the geolocation data of consumers/user click details and the demand forecast, it can provide third-party sellers with various additional analytic services to create a wider reach for their service offerings.[29]

Figure 5 illustrates the data and value creation in respect of online marketplaces and platforms.[30]

4.4. The data ecosystem perspective: Digital businesses with a focus on data

It may be argued that data ecosystems mark the beginning of the end for only using B2C or B2B to describe digital data businesses.

Unlike traditional/pipeline businesses where the value chain used to be linear, digital data business models try to generate revenue not by focusing on B2C or B2B activities alone, but more on a variety of interactions, creating value at several steps of the value chain through the interplay of the different actors in their business systems, making it difficult to describe not only the value creation part but also the value capturing part.

Therefore, using rather traditional business descriptions like B2C or B2B might not be enough to provide a full picture of evolving data/platform ecosystem business models. But, how to describe the role of different actors then? All have the following in common:

- they are all actors in a strong relationship, taking over roles like consumer, provider, developer and intermediary (interconnectivity);
- they contribute to cross-border data flows; and
- they have a strong focus on the generating value out ofdata by transforming raw data into valuable knowledge.[31]

It might be better to refer to these businesses as "data ecosystem business models" rather than B2B or B2C models. For example, Apple's success is linked to a variety of factors (the iPod took off in tandem with

29. Given the fact that the 2017 sales for Amazon Marketplace were USD 139.5 billion and that Amazon charges third-party sellers 30% commission on their sales, Amazon's annual revenue from the commission is estimated to have been around USD 41.8 billion for that year (*see* US Securities and Exchange Commission, Form 10-K for Amazon.com, Inc.: Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2017, Commission File No. 000-22513, available at https://www.sec.gov/Archives/edgar/data/1018724/000101872418000005/amzn-20171231x10k.htm (accessed 15 March 2021). While it is quickly growing, Amazon's annual data-targeted advertising revenue amounted only to USD 3 billion in 2017, or a mere 2.2% of its total revenue for that year. Unlike Facebook and Google, Amazon does not rely on advertising revenue.

30. *See* Li et al., *supra* n. 24.

31. For an overview of the key criteria of data ecosystems, *see* https://confluxdata.net/f/series-2--part-1-exploring-data-ecosystem (accessed 4 Feb. 2021).

iTunes, and the iPhone took off in tandem with the Apple Store). Over time, Apple even started building the various elements of the internal hardware such as computer chips themselves. Hence, it is not a single product, but the ecosystem created around it that makes a company successful. As the number of people/users handling the Apple devices increased, the stronger, and more reliable its ecosystem became.[32] This shows how a user as an actor of the ecosystem can help enhance the value of the company.

This is especially true for the development of the (Industrial) Internet of Things, advanced robotics and 3D printing as emerging developments in the digital economy, all of which rely on the network and the interaction and interplay of each other. As it is expected that the process of value creation will change dramatically and that new products and business models will be established within traditional boundaries, this development should be understood as a business model within the framework of the data ecosystem.[33]

Although data ecosystems usually refer to a set of actors that are partially independent from each other and not to a group of companies, the network effect of major companies (e.g. GAFA)[34] allows them to create their own data ecosystems with an influence even on actors like academia (e.g. Google Campus as an innovation hub for start-ups and own scientific world).[35] Or take for example Facebook or Twitter, which have guidelines that basically serve as laws of their own/for their own data ecosystem.[36]

Online platforms display strong network effects because they connect disparate market segments. For example, e-commerce platforms like Amazon connect buyers and sellers. Just as with social networks, the value of the Amazon marketplace increases as more users – both sellers and buyers – engage within the platform. Similarly, the value of online platforms that facilitate advertising, such as Google, increases with the number of users, as advertisers gain access to a larger consumer base and, therefore, a larger collection of consumer data. Similarly, social networks like Facebook exhibit powerful direct network effects because they become more valuable as more users engage within the network.[37]

This is illustrated by the data ecosystem business model, which includes not only the internal value chain, but also the key players in the data ecosystem, like the data supplier, technology supplier or innovation hub, all benefiting from the interaction of the resource data (*see* Figure 6).[38]

An example of a data ecosystem business model can be an "as-in-service model". In this model (also often described as an "as-a-service" model),[39] a central platform turns a physical or intangible product or bundle of products into a service, e.g. access to the platform or data and software services. This focus on services can be seen in Figure 6, covering all sorts of services. The revolutionary thing about it is that it does not end with intangible products, but accelerates with the Industrial Internet of Things: whereas customers traditionally purchase the means to their desired outcome (like buying a car to get from one place to another or going to the supermarket for food), they often now take a shortcut and buy the outcome (service) itself (like reserving a car online and getting a ride from one place to another or getting food delivered).

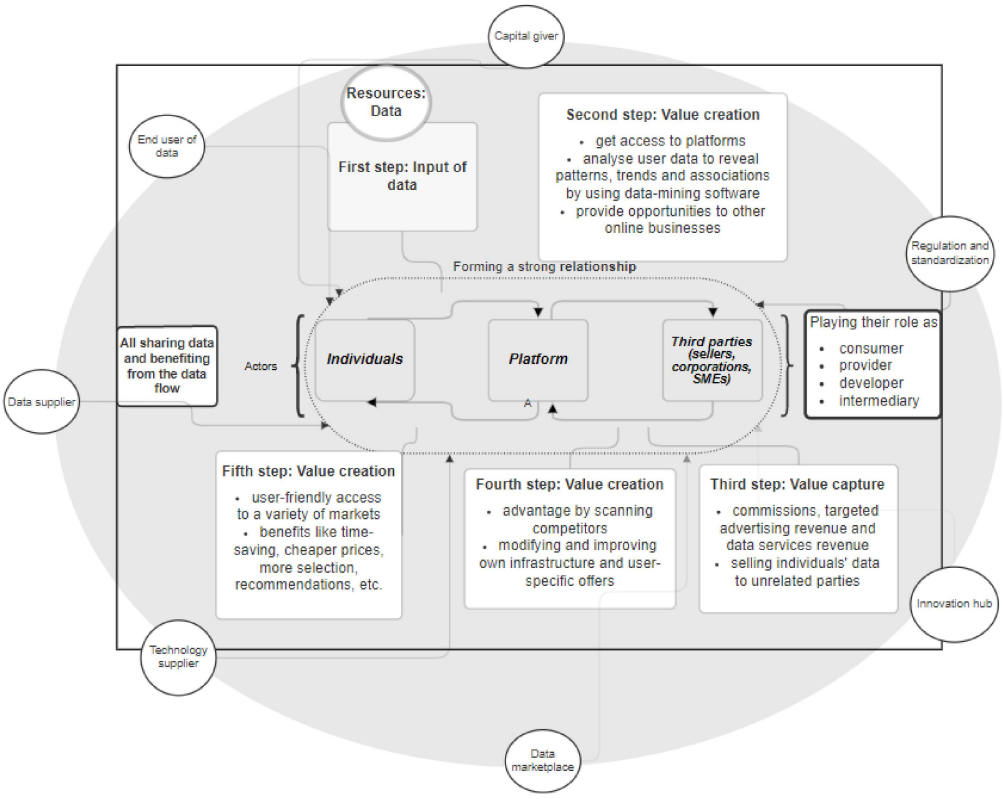
The difficulty of analysing these services properly results from global and highly integrated supply chains, forming a kind of data ecosystem by bundling tangible products, IP and services. As these are typically contributed by more than one entity in the value chain, it is difficult to ascertain the role of each of the actors and, therefore, each entity's contribution to the value created. Further, the bundle created in the data ecosystem includes elements of contributions from third parties as well as intra-group. As a result, the synergies of the decision-making functions, or its effects, make it hard to isolate the specific transactions, as the overall bundle significantly exceeds the value of the individual elements.[40] Additionally, it is difficult to determine the overall contribution of data/data ecosystem actors. Therefore, it is a difficult task to find value chain methods that may work for data businesses.

5. Possible Value Chain Method That May Work in Data Businesses

In sections 5.1.-5.5., the authors elaborate on why relying only on VCA methods from section 2. may not work for data ecosystem business models. Additionally, they analyse the problems of using different VCA methods and combinations thereof, like the merger of quantitative and qualitative methods, both with and without the use of digital documentation tools (e.g. process mining, application programming interfaces (API) and blockchain; *see* section 5.4.). Finally, the authors

32. FourWeekMBA, *100+ Business Models*.
33. *See* https://confluxdata.net/f/series-2--part-1-exploring-data-ecosystem (accessed 4 Feb. 2021).
34. I.e. Google, Apple, Facebook and Amazon.
35. *See* https://www.campus.co/ (accessed 4 Feb. 2021).
36. C. Puschmann & J. Burgess, *The Politics of Twitter Data*, HIIG Discussion Paper No. 2013-01 (2013), available at https://ssrn.com/abstract=2206225 (accessed 7 Jan. 2021).
37. Li et al., *supra* n. 24.
38. For a more detailed explanation of the data ecosystem, *see* https://confluxdata.net/f/series-2--part-1-exploring-data-ecosystem (accessed 7 Jan. 2021).
39. *See*, e.g. T. Sarson, *Outcome based business models: what are they and what do they mean for your TP?* (2020), available at https://www.linkedin.com/pulse/outcome-based-business-models-what-do-mean-your-tp-timothy-sarson/ (accessed 7 Jan. 2021).
40. Id.

Figure 6 – Data ecosystem business model



suggest the quantitative VCA method, with some additional modalities that may work in data-driven business models.

5.1. Search for a VCA method for data businesses: The problem with the current methods

Which of the VCA methods (either alone or in combination) discussed in section 2. may work for data businesses? The authors lay down some of their thoughts on the approach that may work in most data-driven business models.

As explained, the increasing influence of data on service-level/platform business models has given rise to many new, data-driven solutions. Some of these businesses are so dependent on data that their service offerings cannot be completed without the use of data. The challenge of allocating profits to legal entities within an integrated company according to the arm's length principle (and, presumably, in line with value creation) lies in the identification of which part of the data mining process a legal entity (i.e. taxpayer) is engaged in.

The next question is: What is the value of the specific activities relative to the overall value created through data mining? This transfer pricing challenge could be addressed based on the conceptual analysis of the data mining process and the different business models that exist along the value chain of data mining.

Considering the fact that ecosystems and their actors play an important role and that there is continuous interaction between the actors and the ecosystem, in order for any digital data-driven business model to be successful, VCA must consider the specifics of the data ecosystem[41] and adequately show how actors in a strong relationship (i) take over roles like consumer, provider, developer and intermediary (interconnectivity); (ii) contribute to cross-border data flows (data flow contribution); and (iii) add value by transforming raw data into value. Fulfilling these criteria simultaneously might result in a kind of trilemma with every VCA approach. This trilemma can be described as follows:

– Outlining the data value creation/value chain: the process contribution analysis could be a good starting point for describing the cross-border data flows, but it may lack reliability, as they heavily rely on interviews with different stakeholders of the company, making it subjective and, thus, unsuitable for determining how (and where) or to what extent data is used along the value creation process. The ratio-based model might not help too much, as it only focuses on a small number of key indicators, making it useless for identifying the role of data value creation. The same goes for the "pre-tax mark-up cost" approach because a focus on bare costs might hinder one from understand-

41. *See further* sec. 4.4.

ing the synergies behind the ecosystem, although it could help one broadly understand the interconnectivity.

- Analysing the cross-border data flow: the canvas/intangible approach helps one understand the focus on the intangible data[42] in a better manner. Nevertheless, in the authors' opinion, it might not be possible to adequately track the cross-border flow with this analysis.
- Describing interconnectivity: even with Porter's model, it is hard to imagine the interconnectivity and millions of contributions made by the actors. This might also be the case when using proxies to split the residual profits, as this methodology basically only differentiates between routine and investment centres, not taking into account the interconnectivity of the wide variety of actors and their cross-border data interplay.

A promising approach might be measuring the level of value creation of the key/main processes, as this highlights the relationship between value drivers and processes based on the contribution of each value driver in the industry to the processes identified. However, as mentioned, it is not clear as to whether this weighing of contributions is sufficient if it is based only on company-wide and industry-wide interviews.

5.2. *Implementing the value chain network: A new concept as a long-term solution?*

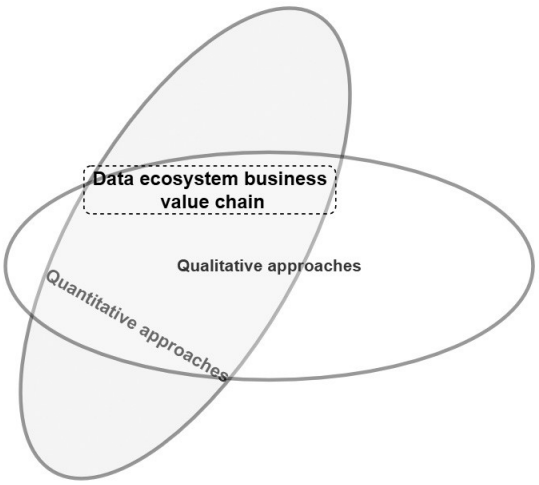
An analysis of various nuances of (global) VCA – namely the "value chain", "value network" and "value shop" – was undertaken by the OECD as part of the 2018 interim Report on Tax Challenges Arising from Digitalisation.[43] The main goal was to understand the interplay of technology, value and intangibles within each of these frameworks, which may be crucial for identifying the source of income of data/digital businesses.

Nevertheless, the value chain network concept is not suitable for analysing the underlying economic reasoning behind the data ecosystem business model. In the authors' opinion, the value chain network analysis describes the characteristics of a data ecosystem business model and gives a broad understanding of how such a model should look, but it does not give a specific idea of how to actually analyse it properly. This might result from the purpose of its introduction by the OECD, which only aimed to broadly describe the "new digital business models"[44] and point out the interconnectivity within the data ecosystem, not really to propose a new VCA method.

5.3. *A merger of qualitative and quantitative VCA: A medium-term solution?*

As explained, it seems that there is no one straightforward VCA method that can capture the data value chain. A combination of qualitative and quantitative methods might resolve the issue, but even if one assumes that such a combination of approaches covers the data ecosystem business value chain, it is difficult to actually control the different VCA mechanics from the tax authorities' perspective, not to mention the high costs arising from using multiple VCA methods, maybe even resulting in a chaotic picture of the business or other undesirable/contradictory outcomes. Additionally, the different approaches might be useless if they cannot adequately capture the cross-border data flow, also regarding the interconnectivity of the actors.[45] A combination of qualitative and quantitative approaches would be feasible for measuring the value chain of data ecosystem business models (*see* Figure 7).

Figure 7 – Merger of quantitative and qualitative methods to describe the data ecosystem business value chain

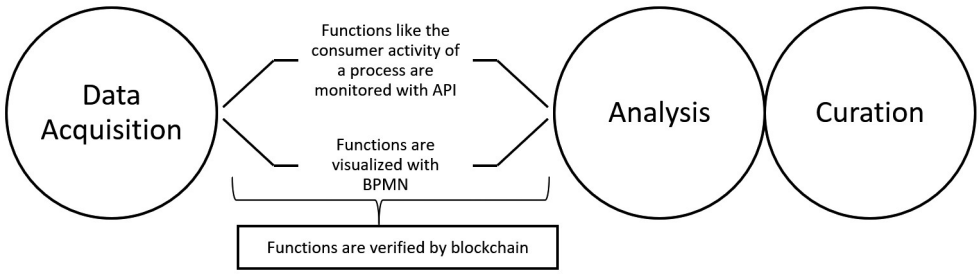


5.4. *A merger of qualitative and quantitative VCA with API, blockchain and process mining: A medium-term solution?*

One possible solution for the problem of cross-border data flow and better control from the tax authorities' perspective is the implementation of digital documentation tools. These tools, such as process mining (e.g. BPMN 2.0), could describe the data-driven func-

42. Some might think that data should be treated as an asset or an intangible, but whether that is indeed the case is highly disputed. Nevertheless, there are good reasons to treat data this way, at least on an abstract level, without concretely focusing on the question of e.g. the marketing intangible approach.
43. OECD, *Report on Tax Challenges Arising from Digitalisation: Three concepts of value creation* p. 43 (OECD 2018).
44. Id.
45. Nevertheless, the more data mining tools become available and easier to access and implement in a business, the more feasible it becomes to use multiple approaches in the medium term.

Figure 8 – An illustration of how API, blockchain and process mining can be integrated with data value chain steps



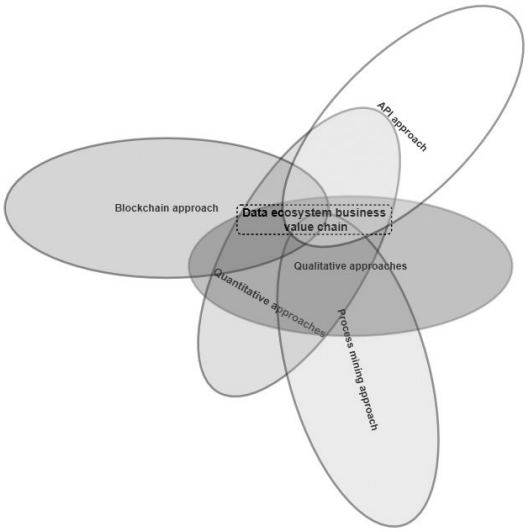
tions.[46] With the use of API as a form of "bits & bytes meters", data, or the specific functions performed along the value creation process, could simply be counted. Process mining or data analytics and API could interact with blockchain approaches to verify the value creation processes, which might establish trust not only between multinational enterprises and tax administrations, but also among tax administrations on a worldwide scale.[47] However, the authors have yet to analyse in more detail how this may be implemented in practice.

Nevertheless, particularly with data being the tax connecting factor, i.e. the nexus that gives rise to taxation, locating, valuing and controlling functions that are primarily driven by data is a tricky task. It just does not seem possible to simultaneously meet essential criteria like clear localization, distribution oriented towards value adding, and proper control – another trilemma.[48]

Therefore, quantitative as well as qualitative VCA approaches could rely on this form of data documentation analysis to prove their analysis in an audit scenario by transparently showing how cross-border data is exchanged among the different actors within a data ecosystem.

Nevertheless, using a combination of all VCA methods might face the same obstacles, as there is still a lack of digital documentations tools, although in this case, the increasing use of understandable documentation could hinder the chaotic interplay of different VCA approaches.[49] Well-structured digital documentation tools (e.g. a combination of process-mining tools, data analytics tools, API and blockchain technologies) would help in undertaking qualitative and quantitative analysis for data ecosystem business models in a more efficient manner (*see* Figure 9).

Figure 9 – Merger of quantitative and qualitative methods with API, blockchain and process mining to describe the data ecosystem business value chain



5.5. *Quantitative VCA for data businesses: A short-term solution?*

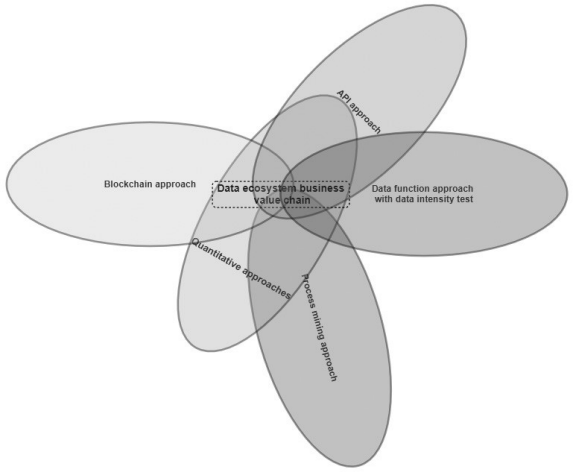
The authors suggest a merger of a qualitative VCA with a modified quantitative VCA, adding a data function approach in cases in which digital businesses pass the "data intensity test" (e.g. by categorizing the

46. BPMN is a business analysis tool that provides a graphical notation for specific business processes. In other words, you can transpose your business framework into figures and diagrams for the use of everyone.
47. J. Winterhalter & A. Niekler, *Das Trilemma datenbasierter Besteuerungsansätze und seine Lösung durch digitale Dokumentation mithilfe von Process-Mining- und Blockchain-Verfahren*, 1 Beck.Digitax 1, pp. 49-53 (2020), and J. Winterhalter & A. Niekler, *Die Dokumentation datenbasierter Geschäftsmodelle und sein Trilemma -wo das Anknüpfen an Bits, Bytes und Algorithmen an seine Grenzen stößt*, 1 Beck.Digitax 5, pp. 277-285 (2020).
48. *See further* J. Winterhalter & A. Nikler, *How to tax data in the context of international taxation, Part 2*, Kluwer International Tax Blog (14 Aug. 2020), available at http://kluwertaxblog.com/2020/08/14/how-to-tax-data-in-the-context-of-international-taxation-part-2/ (accessed 7 Jan. 2021).
49. Also, if we were to talk about applicable transfer pricing method in such models, the transactional profit split method seems to be the more appropriate method. Even foror intangibles, the transactional profit split method is, together with the comparable uncontrolled price method, preferred over other methods. Since comparables are, by definition, not available for hard-to-value intangibles, the transactional profit split method is the preferred method to determine the transfer price for such intangibles. *See OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations* ch. VI, para. 6.145 (10 July 2017), Primary Sources IBFD [hereinafter *OECD Guidelines* (2017)].

residual profit in accordance with the different stages of the value creation process *and* with key actors in the data ecosystem).

However, the practical workability of such a hybrid method has yet to be analysed in respect of the complexities that it may entail in reality. As the data ecosystem business model is still a concept of the future, digital documentation tools may be required in order to make it reality. Well-structured digital documentation tools and a combination of qualitative and quantitative approaches will help with carving out some portion for data function (*see* Figure 10).

Figure 10 – Adjustment of quantitative analysis with API, blockchain, process mining and data functions to describe the data ecosystem business value chain



First, a qualitative analysis needs to be undertaken. Porter's VCA method, supported by a responsibility assignment matrix, may be a suitable qualitative value chain analysis. Once the qualitative analysis is undertaken, the focus is shifted onto the quantitative analysis.[50] The residual profit under this approach may be divided not only between the profit and investment centre, but also according to the data centre (i.e. the key actors in the data ecosystem and the different steps of the data value creation process).

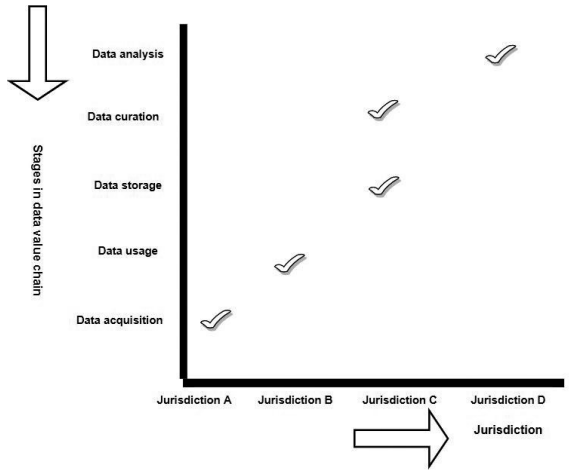
A more detailed, step-by-step description of the approach is as follows:

– Step 1: To determine in which situations or which businesses need to attribute excessive residual profit to data functions, the data intensity test can be performed. Broadly, a data intensity test can be set up based on various macroeconomic and microeconomic factors. Macroeconomic factors might be the data maturity of the industry in terms of raw data and enriched data or the data maturity of competitors, while microeconomic factors can be the provision or use of technology, investment in IT assets, advertisement, marketing and promotion expenses, research and development expenses or digital content and services. Needless to say, in today's world, enterprises are likely to incur expenses in respect of these micro factors, so it would be useful to have a percentage threshold in place to determine whether the data intensity test is met.

– Step 2: Various tools, including sensitivity analysis and peer review, can be utilized to determine the excessive non-routine/residual profit (i.e. the amount left over after distribution to the profit and investment centre).

– Step 3: The excessive residual portion determined in Step 2 is required to be allocated to the different jurisdictions involved, meeting essential conditions like clear localization of the data centre, feasible control from the perspective of the tax administration and an overall balanced reflection of the value creation contributed by each data centre. An example could be the allocation of profit to different jurisdictions based on the involvement of key actors in the data ecosystem (as shown in the diagrams in section 4.) and the different stages in the data value chain[51] (as shown in Figure 1). However, there are arguments for why one should not solely rely on either the data value chain or the key actors in the data ecosystem, as shown in Figures 11 and 12.

Figure 11 – Model that relies only on the steps of the data value chain



50. When both parties involved make unique contributions, such as intangibles, this method is the most applicable. Specific guidance on the transactional profit split method is revisited under BEPS Action 10. *See OECD Guidelines* (2017), at p. 133 et seq.

51. In light of the value creation process, even the end user of the data, given its provision of raw personal data, might be considered a key player, although this involves sidestepping the Authorized OECD Approach and its reliance on significant people functions. Nevertheless, even if the end user of the data is not technically employed by the group of companies, he still contributes to the value creation, making him a necessary part of the data ecosystem business model.

Figure 12 – Model that relies on key actors in the data ecosystem

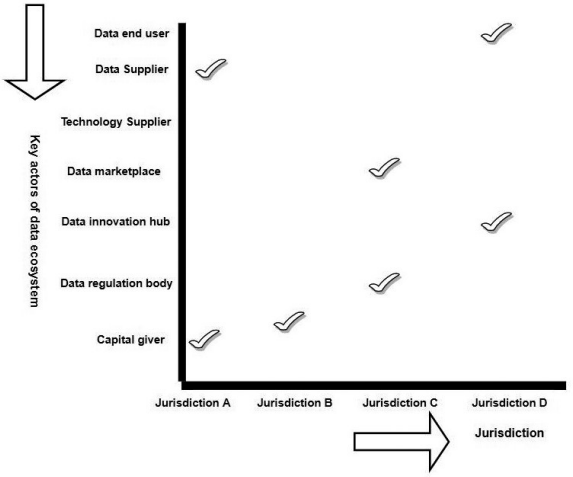
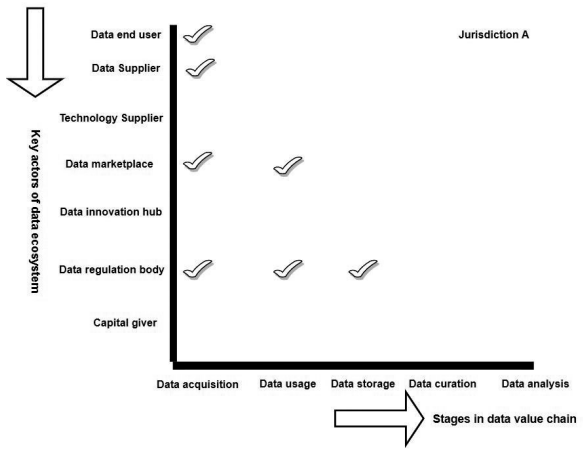


Figure 13 – Model that takes into account both key actors and various stages of data value chain



However, if one of the models described in Figures 11 and 12 is chosen and the other is not considered, the distribution may be skewed/unbalanced and, hence, not optimal. Although using the different steps of the data value creation process might be a too-narrow/incomplete concept and might not fully cover the interconnectivity of the actors, it could help trace the data processes of a company. Relying only on the key players might have the same effect, but in reverse, as this approach only covers the key players in a modern business and not the different processes involved in value creation. It is essential to say that these are two building blocks that cater to two different facets, i.e. internal (e.g. the functions involved in the value creation process) and external (the key actors), that need to be operated in tandem, reflecting a rotation (VCA) and revolution (data ecosystem). The limitation of the key players could also prevent the implementation of an overly sophisticated system with too many jurisdictions involved. Hence, one needs to consider both the data value chain and the actors in the ecosystem, illustrated by Figure 13.

Figure 13 represents how values can be allocated to Jurisdiction A based on the involvement of the key actors in the data value creation process.

Due to the highly integrated value chains, a realistic overview of the different data centres aligned with the jurisdictions according to the key actors and the stages in the value chain is presented in Figure 14.

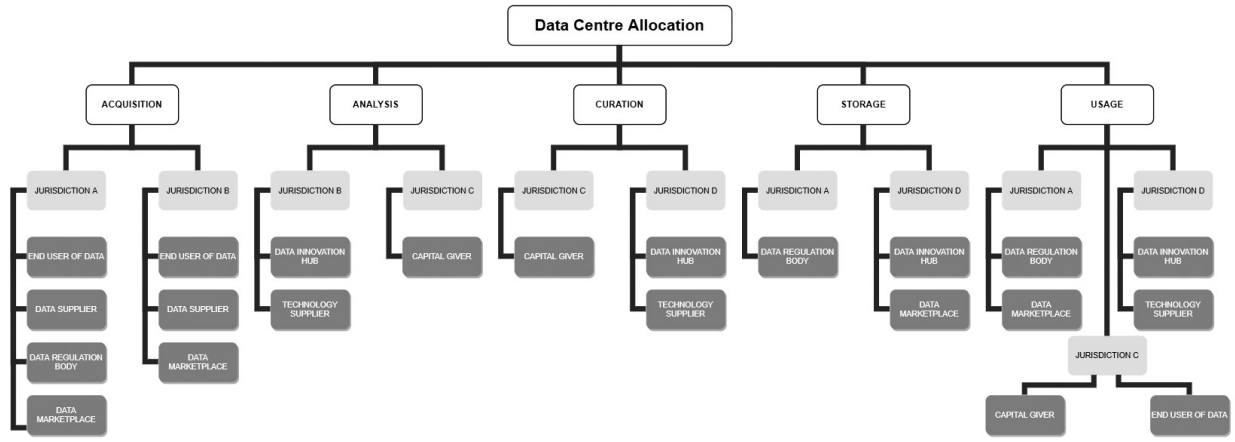
Nevertheless, the above steps are only broad thoughts. To finalize the proxies or to find out the appropriate allocation by using the above model, proper empirical research needs to be carried out, which can be corroborated by digital documentation tools to know the exact amount that can be allocated to different jurisdictions.

The authors denote three key challenges to make the model work:

- The data intensity test: First, realistic and universally acknowledged macro and microeconomic factors need to be determined. For instance, in order to determine the maturity of the data, a data analysis may be required.
- Allocation to different jurisdictions: The key actors in the data ecosystem and the underlying key data functions have to be clearly identified in order to split the profit in the likely event of there being more than one cross-border function or actor. Thus, the question is: When does an actor fulfil the requirement of a key function or become a key player? This question is especially crucial for the "key player approach", as it decides whether to (i) stay with the Authorized OECD Approach and its focus on significant people functions as the baseline for establishing a right to tax; or (ii) to try a different approach and establish a kind of digital permanent establishment. As it seems implausible (and, regarding the implementation costs, inefficient) to become a key actor by relying only on a small number of factors, there might be a need to rely on a more substantive economic presence, as mentioned in section 4.4., represented by the technical infrastructure (server), a certain amount of users, etc.[52]
- Cross-border data interconnectivity: From the tax administrations' point of view, the cross-border flow of data between the different actors needs to be controllable, also for tax administrations

52. For instance, from a quantitative point of view, the concept of economic value added can serve as a numeric proxy for value creation. It captures both sales and related current costs, as well as the opportunity costs of the employed assets within a business model. As a result, one should analyse at what point in time (and, for international tax purposes, in which location) (i) revenue is generated by sales on the market; (ii) costs are incurred through relevant activities (performed anywhere); and (iii) assets are employed within digital business models.

Figure 14 – Data centre allocation



from developing countries, without providing new opportunities for BEPS[53] and – perhaps most importantly – without giving away consumers' personal data or business secrets, especially on an international level. There is research going on to address this with digital documentation tools.[54]

6. Conclusion and Outlook

Because of the emerging innovative trend of undertaking data-driven business models and the variation in the degree of involvement of an entity, it is hard to define a straightforward value chain that may universally apply to all businesses. Accordingly, a single VCA method may not work for all data-driven business models, especially the increasingly important data ecosystem business model. However, a combination of qualitative and quantitative VCA (with some additional modalities) to capture the data function, as discussed in section 5.5., may be a workable option, as this approach analyses the highly integrated value chain with its interconnected actors and cross-border data flow more effectively.

Such an approach to a value chain review will need to provide the information that the management, tax authorities and other stakeholders need in order to understand how the value creation is aligned with the tax profile of a group. This may help in better matching the economic, financial and business reality and might even be used as a technical blueprint of how a modern business should be structured. However, its practical implementation still needs to be evaluated in greater detail, as well as the valuation of data within those data ecosystems.

53. *See* https://confluxdata.net/f/part-2what-is-data-approach-to-define-data-from-different-angles (accessed 7 Jan. 2021).
54. J. Winterhalter & A. Niekler, *How to tax data in the context of international taxation, Part 1*, Kluwer International Tax Blog (13 Aug. 2020), available at http://kluwertaxblog.com/2020/08/13/how-to-tax-data-in-the-context-of-international-taxation-part-1/ (accessed 4 Feb 2021). *See also* Winterhalter & Niekler, *Die Dokumentation datenbasierter Geschäftsmodelle und ihr Trilemma*, *supra* n. 48, at pp. 277-285.