Digital Economy Handbook 2019

Entering the age of digital disruption

e-Bright

Author: Steef Huibregtse
Co-authors for Chapter 5: Vishnu Bagri, L Bharath
Co-authors for Part A + B: Daniel van der Linden, Rico Huijskens
Co-authors for part C: Georgiana Ciocan, Kartika Sukmatullahi, Louan Verdoner
Editors: Steef Huibregtse, Emily Dobbie, Eveline Clement

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I. Introduction

After witnessing the agricultural revolution, the industrial revolution and the services revolution along with free trade and globalization, mankind is now witnessing the IT revolution that has the potential to fundamentally transform every aspect of modern-day life. It is characterized by the emergence of a new economic system i.e. the 'Digital Economy'.

The digital economy is characterised by an unparalleled reliance on intangible assets, the massive use of data (notably personal data), 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. With the rapid growth of the digital sector, the terms of conducting business have witnessed an overhaul, thereby necessitating a similar renovation of tax and other regulations governing such businesses.

The state of Texas in the United States, in the Piedras Negras case[1] in 1942, argued that the radio broadcasting services provided by a Mexican company into the US constitutes a permanent establishment (PE) of that Mexican company and is liable to taxation at source. This was the first such case where non-physical presence was argued to be a PE; at that time, however, it was decided that such activities cannot constitute a PE. With the changing face of the hyperconnected economy, where a multitude of businesses earn their margins solely through the provision of digital goods and/or services, the argument advanced by the IRS in the Piedras Negras case no longer seems far-fetched. In fact, many countries have already allowed source taxation even in cases where there is no physical presence. Examples can be seen in the Spanish court case[2] treating the website of a company engaged in selling goods in Spain to be a PE liable to source taxation and in the Brazilian government's initiative[3] to make companies delivering streaming media services such as Netflix, iTunes etc. liable to source taxation in Brazil. Another example can also be seen in India and Israel where they embedded the concept of Significant Economic Presence (SEP) in their legislation. Regardless the absence of physical presence, to the extent there are enough users and revenue in these countries, the digital activity will constitute a permanent establishment (PE).

The Organisation for Economic Cooperation and Development (OECD) first recognized the need to address the taxation of the digital sector in its Ottawa Conference in 1998 but decided that the existing rules applicable to the traditional businesses are sufficient to deal with their digital counterparts as well. However, more than a decade later when the communication revolution is at its peak and new ways of operating business are being invented every day, the OECD noticed that national tax laws have not kept pace with globalisation of corporations and the digital economy, leaving it open for multinational corporations to exploit those gaps that exist in the domestic systems to artificially reduce their taxes. This led to the formulation of the Action Plan 1 to address the tax challenges of the digital economy' under the base erosion and profit shifting (BEPS) project of the OECD.

Because the BEPS project was originally aimed at addressing BEPS of multinational enterprises (MNEs), the measures proposed by the OECD under this Action Plan appear to fall short of addressing the real concerns raised by digitalisation and are restricted merely to ensuring taxation of e-commerce, which is only a fraction of the overarching digital economy. With the reduced barriers to entry and ease of access to a global customer base, facilitated by the widespread use of the internet, a variety of small and medium sized enterprises (SMEs) have established their stronghold by providing digital services such as an electronic application, online databases, online

[1] US: Piedras Negras Broadcasting Co. v. Commissioner, (1941). Retrieved from http://www.robertsandholland .com/publication-page?itemid=4

[2] SP: Spanish Central Economic Administrative Court, RG 2107-07, Mar., 2012. Retrieved from http://www.bna.com/spanish-court-imposes-n17179871765

[3] *TTV News*, Brazil - Pay TV Not VOD, Says Netflix Brazil. (n.d.). Retrieved October 12, 2015, from http://desarrollo.todotvnews.com/scripts/templates/estilo_nota.asp?nota=10048670

marketplaces, multi-sided platforms (enabling customer-to-customer (C2C) transactions), cloud based storage etc. Some of these businesses operate on wholly virtual platforms to serve customer globally and do not require a physical presence in any jurisdiction (e.g. online databases), thereby escaping taxation in most jurisdictions.

These shortcomings of the measures proposed by the OECD have driven jurisdictions to adopt unilateral measures to preserve their fair share of taxation. The most significant of such measures is the Diverted Profit Tax[4] (or the "Google Tax") issued by the United Kingdom aimed at taxing businesses engaged in diverting profits away from the UK which are earned through activities performed in the UK. Other countries in Europe are also taking a unilateral approach where France and Germany are imposing 3% Digital Service Tax (DST) on the turnover of companies engaged in advertising activity. In addition, countries in Latin America broadened the definition of royalty to withhold the income derived from digital activity. In light of such new initiatives coupled with lack of harmonization at an international level may lead to differing levels of taxation in different countries, which may strengthen the national tax bases of these countries but will impose an additional burden on the digital sector, which is in direct contradiction of the OECD principle of applying the same set of rules to the digital economy as applicable to its traditional counterpart.

With this background in mind, this book analyses the latest trends in the business model configurations and addresses their impact on the existing tax and transfer pricing systems as well as suggests new regulatory mechanisms to ensure appropriate taxation of the businesses operating in the digital sector. This book is divided into three sections, as described below, and contains three sets of illustrations (one in each section) of current practices and business models to provide the reader a comprehensive view of the new and upcoming businesses relying on the digital economy, the concerns they raise and how to address them:

- The first part of the booklet commences with the first set of illustrations i.e. a list of existing companies, sorted by industry, which have arisen as a direct consequence of the digital economy and/or heavily rely on the same for generation of revenue. These examples provide a cursory glance at the number of traditional industries which now have joined the digital tide. This section continues with an outlook of the history and trends of the internet since its inception till the present day and concludes with an outlook for the future suggesting a move from the monopolistic structure of the economy to collaborative commons or a sharing economy, which holds the potential to bring the marginal costs for businesses down to zero.
- The second part of the booklet begins with a description of what constitutes a collaborative network and how are they changing the conduct of businesses in the modern world. This section addresses all aspects of collaboration from simple collaboration as can be seen between Microsoft and Toyota Motors which entered into a collaborative venture to design software providing telematics for electric vehicles to virtual collaboration which can be seen in the Volvo Group's initiative of developing tools for its virtual factories which ensure that nothing is introduced in its final products unless tested and validated in the simulator. Crowdsourcing is yet another example of collaboration, which a direct progeny of the widespread use of the internet is. The next chapter discusses the role of strategic disruption which has brought out a wave of change in the form of multi-sided business models. The analysis in this section is again supported by the second set of illustrations which are used to support our conclusion that in this digital age, monopolies will disappear, and businesses will enjoy a much shorter life span on the market as a leader.
- The final part of this booklet starts with addressing the tax and transfer pricing issues related to the business models discussed in the above sections. It also suggests alternative approaches for ensuring fair and timely taxation of the digital sector. The next chapter discusses other legal concerns such as privacy,

[4] Her Majesty's Revenue & Customs. (2014*). Diverted Profits Tax: Interim Guidance,* United Kingdom. HMRC. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/385741/Diverted_Profits_Tax. pdf

cyber terrorism, protection of intellectual property etc., which need to be revamped to accommodate the concerns raised by the vast and open nature of the unregulated and ungoverned internet and to allow for globally consistent set of rules. The book closes with the final set of illustration in the form of detailed case studies in which an analysis is presented of the giants of the digital world, their strategically employed tax structures and the challenges they are facing due to a global patchwork of inconsistent regulation. A summary of the 2019 tax policy proposals published by OECD puts these case studies in the relevant context of today.

With more and more people connecting to the internet every day and storing their information or conducting their purchases online (which indirectly leads to collection of data by tracking "cookies" on the visited websites), the digital economy is a rapidly broadening phenomenon. The volume of data stored online is growing with each passing day and the digital businesses have realized that it can be managed and analysed to improve their offerings to the market. The OECD has also acknowledged that data-driven innovation forms a key pillar in 21st century sources of growth in its report titled, 'Data Driven Innovation for Growth and Well-being'. This data is spurring the growth of new business models in the digital economy, which are raising novel challenges for regulators in each sector. An attempt has been made through this booklet to provide simplified guidance on the current status of business models and regulations as well as to propose measures to achieve a neutral, efficient, fair and simple set of regulations coordinated at a global level which can effectively address the challenges of the digital economy.

This book effectively caters to the concerns of the following two groups:

- Professionals interested in digital based business models, creating a disruption in almost all industries;
- Tax and legal professionals who want to understand digital economy better; and
- Corporate professionals who want to understand tax legal and TP considerations of their digitalized business models.

II. Abbreviations

- AI Artificial Intelligence
- BEPS Base Erosion and Profit Shifting
- B2B Business to Business
- 5G Fifth generation mobile networks
- B2C Business to Consumer
- C2C Consumer to Consumer
- CERN Conseil Européen pour la Recherche Nucléaire (European Organization for Nuclear Research)
- CJEU Court of Justice of the European Union
- DST Digital Service Tax
- e-commerce Electronic Commerce
- EU European Union
- HR Human Resources
- IaaS Infrastructure as a Service
- ICT Information and Communication Technology
- IOT Internet of Things
- ISP Internet Service Provider
- IT Information Technology
- OECD Organization for Economic Cooperation and Development
- m-commerce Mobile Commerce
- MNE Multinational Enterprise
- MSP Multi-Sided Platform
- NASA National Aeronautics and Space Administration
- NSF National Science Foundation
- NCP Network Control Protocol
- PaaS Platform as a Service
- SaaS Software as a Service
- SE Significant Economic Presence
- S&P Standard & Poor
- SME Small and Medium Size Enterprises
- TaaS Token as a Service
- TAG Technical Advisory Group
- TCP/IP Transmission Control Protocol/ Internet Protocol
- TP Transfer Pricing
- UK United Kingdom
- USD United States Dollar
- US/USA United States of America
- WIPO World Intellectual Property Organisation
- WWW World Wide Web
- XaaS Everything as a service
- 3D Three Dimensional

III. Glossary of terms

a. Digital economy terms

- **5G:** The fifth generation of mobile networks is arriving fast after the introduction of its predecessor, 4G. Characteristic of 5G is the extremely high speed. Much faster than the wireless network in homes and about 50 times faster than the current 4G network. The importance of 5G is growing due to the increasing use of data by consumers and the rising number of connected objects (traffic lights, lampposts, trashcans, cars, wearables bicycle paths to name a few). It is expected that data traffic in 2020 will be thirty times as much as it was in 2010.
- **Artificial intelligence:** Artificial intelligence is intelligence exhibited by machines or software. It is the discipline that aims to understand the nature of human intelligence through the construction of computer programs that imitate intelligent behaviour. AI approaches are useful in the development of B2B and B2C e-commerce systems. In a B2C scenario, AI is used for product recommendation, negotiation, auctions, generating automated responses, etc. In a B2B scenario, AI finds application mainly in supply chain management.
- **Big data:** Big data is, simply put, a wide collection of data sets which are too large to be analysed manually or through the use of traditional data processing applications like Excel. Analysis of big data, especially for e-businesses, is extremely useful because it can provide detailed information about consumer needs and market demands. For example, Google tracks searches made by its users. All searches made by all users when collected together by means of tracking are what we call big data. It would be useful for a business to be able to compare popularity of such search queries to have a general idea about the supply and demand in his business.
- **Bitcoin:** Bitcoin is an open virtual currency that can be used in the real world in exchange for goods and services. It is a decentralised currency based on peer-to-peer networking. It can be used in the same way as traditional currency. More and more web-based marketplaces are accepting this virtual currency. A unique feature of bitcoins is that they are not dependent on a third party (such as banks) for verification. This makes them easier and more cost-efficient to use and makes the transaction as anonymous as the user wants.
- **Broadband:** Broadband internet access is a service that provides higher bit-rates than those available using a traditional 56kb modem, thereby making the end result of accessing the worldwide web for the end user much faster. This technology is based on the fact that the original copper wires that are used for telephone conversations are capable of transmitting much higher bandwidth than necessary. When using broadband technology, a filter is added at both the user's premises and at the telephone exchange, which transmits two separate bandwidths; a lower one for conversations and a higher one for data communication.
- **Blockchain:** Digital ledger that allows for secure, decentralised and disintermediated transactions of information. It relies on automated encryption algorithms that prevent the altering of information using peer-to-peer networks that contain a copy of all historic transactions. Blockchain can therefore be applied as a secure and decentralised store of value, the documentation of legal contracts or even democratic process such as voting.
- **Cloud computing:** Cloud computing is another example of a collaborative network. A large group of remote servers are linked together to allow centralised data storage and online access to computer services or resources.
- **Collaborative networks:** Collaborative networks can be compared to joint ventures where multiple participants come together to better achieve common goals. An example of these networks is a virtual manufacturing system. In this system, multiple manufacturers come together and each concentrates on one part of the manufacturing process. The product is created in a virtual environment which is improved

to behave exactly like the real-world environment necessary for production of the goods. Each member makes their contribution virtually which is, finally, used by other members in a physical environment. For example, a company needs to excavate a certain site, but it does not have the adequate know-how for it. It can make use of a collaborative network where other members would work in a virtual environment set up to resemble the excavation site and would come up with solutions which would ultimately be implemented by the original company. The use of collaborative networks provides access to a wider knowledge bank and companies are no longer restricted to the resources and personnel physically available to them.

- **Collaborative common/sharing economy:** The sharing economy is not just a theoretical concept used by economists but has numerous practical implications as well. It refers to the 'peer-to-peer' sharing of goods and services and provides reduced transaction costs, increased availability of information and greater reliability and security. Amateur providers in the sharing economy tend to share their available resources at a lower cost than a professional company may have billed, thereby bringing down the overall price. The sharing economy has given rise to a number of new business models focusing on sharing of one particular service or product such as cars, spare rooms, food, clothes etc.
- **Cookies:** Cookies are small amounts of data that are sent back to the server from a webpage whenever a user visits it. This is done for the purpose of tracking what the user or the web has done in the past. This is a way of managing and extracting relevant information out of big data. It is mainly used for marketing purposes. However, due to some of the privacy issues attached to them, their acceptance is controversial in nature.
- **Crowdsourcing:** Crowdsourcing is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers. It is another type of collaboration where the masses are involved in contributing to a project. It is similar to two companies collaborating with each other, but crowdsourcing extends this concept to almost innumerable participants. It combines the efforts of numerous self-identified volunteers or part-time workers, where each contributor of their own initiative adds a small portion to the greater result. Crowdsourcing uses the input of individuals external to an organisation to resolve strategic problems or complete tasks once assigned internally to an explicit corporate individual or department. The main difference between crowdsourcing and simple collaboration is that the participants may not benefit as much as they do in normal collaboration as their individual roles tend to be much smaller.
- **Database:** A database is an organised collection of data. It is an extremely useful tool for designing e-commerce websites. Any website that is made for purchasing needs to ensure that customers are able to sort through their products based on various filters such as brand name, colour, size etc. This can be done only if there is ample data available to the website owner and for organising large sized data, databases are crucial. Other than their use in the internal operations of an organisation and to underpin online transactions with customers, databases also find application in holding administrative information. Examples of database applications can be seen in computerised library systems, flight reservation systems, etc. The creation of a database is protected by a sui generis database right which exists to recognise the investment that is made in compiling a database, which is distinct from a copyright.
- **Data factory:** a company which is able to optimize its IT system through AI and at the same time can convert its CRM into "real time economic behavioural data points" is considered a champion in the "data-run economy", i.e. will tend to marginalize the existing players in each and every industry.
- **Digital economy:** The digital economy is characterised by the use of the internet as a medium to trade in goods and services. A significant number of businesses have made a shift towards digitalisation for purposes of increasing their productivity and, subsequently, their profits.
- **Dinosaur companies:** A dinosaur company is one that could not keep up with the pace of technological changes and therefore lost its customers and was forced to vacate the market. This terminology is taken from the model proposed by Harlan D. Platt who divided companies into four sections based on their

financial and industry conditions. In the knowledge era, marked by digitalisation, where innovation is at the core of every successful business, enterprises that are unable to optimise their processes and improve their efficiency based on customer's needs and demands risk are becoming a dinosaur company.

- **Disruptive innovation:** 'disruptive innovation' is to the first decade of the 21st century business world what 'process re-engineering' was to the 1990s. It is the process of changing business strategies to accommodate new and innovative ideas based on digitalisation. It is also sometimes called digital disruption. As digitalisation engulfs existing markets, old business strategies cannot work as efficiently. Therefore, disruption in the routine models is needed to succeed in this (soon to be) wholly digitalised world. The increasing use of knowledge as an intangible asset in the upcoming business models clearly reflects this trend. A digital transformation means that (i) your customers experience is leading, (ii) your customer is one-click away from your competition, (iii) you need to team up with others as a collaborative network to deliver this experience, which (iv) is being facilitated by a digital platform to minimize agency cost of the network.
- **E-Commerce**: 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 online. Orders placed via telephone or e-mails that are written manually are not considered to be a part of e-commerce.
- **Electronic money:** Electronic money is the digital equivalent of cash. Money stored electronically on a technical device which can be used to transfer that money without necessarily involving bank accounts in transactions is electronic money. The technical devices can be of two types: software based, and hardware based. Hardware based devices, such as a chip card, do not need to be connected to any remote server on the internet for carrying out a transfer. However, software-based devices such as mobile phones and computers necessarily need to be connected to a server on the internet to be able to enact a transfer.
- **Electronic payment:** Electronic payment can refer to electronic commerce, i.e., an act of paying electronically for goods and services. It can also refer to any other type of electronic fund transfer as well such as transferring money from one of your accounts into another over the internet.
- **Encryption:** Encryption is the process of encoding messages or information so that only authorised persons can access it. Encrypted messages can still be intercepted but their content cannot be read without decryption. In recent years, due to increasing reports of theft of users' personal records, encryption is being used a safety tool should other physical security measures fail.
- **Extranet:** Extranets are computer networks that allow controlled access to persons outside of an organisation's intranet. They can be used in a business-to-business context where it is seen as an extension of an organisation's intranet to users from another organisation, in isolation from all other internet users. Extranets are different from other communication systems used by institutions for decades because they operate on a shared public network as opposed to physical lines. It can, alternatively, be termed as collaborative software.
- **Fibre optics:** Fibre optic communication is a method of transmitting information from one place to another by sending pulses of light through an optical fibre. It was developed in 1970 and since then it has been used extensively due to its advantages over copper wire communication. It allows much faster and more reliable transmission of data over the internet. However, they are much more expensive than using copper wires for communication but their efficiency, especially for long distance communication, overweighs their cost.
- **Global trade:** Global trade is the exchange of goods and services across international borders. The growth of digitalisation has made the world a smaller place, especially for purposes of trade and commerce. The number of businesses engaged in global trade has risen significantly in the last decade or so. In conventional trade, only large enterprises were engaged in selling their wares outside of national borders, but the ease and convenience offered by the internet has exposed small and medium sized enterprises to a global customer base as well.

- **Hosting information society:** The information society is a society where creation, use, distribution and manipulation of information are the major economic, political and cultural activities. Its aim is to gain competitive advantage through the use of IT. Hosting is a service provided by owners of web servers to their clients which allows clients to make their websites or advertisements available on the worldwide web. Website owners providing the service of storage on their websites to the recipients of the service (for example, for advertisements) become participants in the information society. According to the EU E-Commerce Directive, 2000, a website owner can be held liable for hosting information at the request of the recipient unless he can prove that he had no knowledge of any illegal activity being carried on or, upon receiving such knowledge, he acts expeditiously to remove the same.
- **Hyperlink:** A hyperlink is a reference to data or a webpage that the user can directly access by either clicking on it or by hovering over it. Hyperlinks are useful for creating reference mechanisms. For example, a certain word or phrase may serve as a hyperlink and by clicking on it, the user may be redirected to the definition of that word or phrase. They may be used offline within documents as well. For example, in Microsoft Word, the table of contents can serve as a hyperlink which will direct the user to the correct chapter or sub-chapter. A hyperlink is a very common feature of the worldwide web but some types of hyperlink are contentious in nature. Hyperlinks which refer to content on other websites can be problematic if the other website does not allow content to be linked to it without permission. In certain countries, regulations stipulate that the use of hyperlinks is not merely for referencing but for copying web pages. It is for this reason that certain jurisdictions regard the mere publication of a hyperlink that connects to illegal material to be illegal itself.
- **Hypertext**: Hypertext is text with hyperlinks. It is a type of hyperlink in which the text essentially serves as the link and the user can click on it in order to be redirected to some point in the same document or to another document altogether. These are the most common type of hyperlink. The same kind of security issues arise with the use of hypertext as those associated with other kinds of hyperlinks.
- **Information superhighway:** This is a term that was coined in the United States in the 1990s. It, then, referred to highly sensitive fibre optic cables which would connect various cities in the United States. It has, since then, adopted a wider connotation and the internet itself is sometimes referred to as the information superhighway.
- **Infrastructure-as-a-Service (IaaS):** it is a category of cloud computing offer computers – physical or (more often) virtual machines – and other fundamental computing resources. IaaS clouds often offer additional resources such as a virtual-machine disk image library, raw (block) and file-based storage, firewalls, load balancers, Internet Protocol (IP) addresses, virtual local area networks (VLANs), and software bundles. The customer does not manage or control the underlying cloud infrastructure, but has control over the operating system, storage, and deployed applications, and may be given limited control of select networking components (e.g. host firewalls).
- **Internet of things (IOT):** The internet of things is the network of physical objects or "things" embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and/or other connected devices. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing internet infrastructure.
- **Internet protocol:** It is the primary communications protocol for relaying messages/information in the form of datagrams from the source host to the destination using only IP addresses.
- **Internet service provider:** An ISP is an organisation involved in providing services such as internet access, domain name registration, web hosting, etc. For a monthly fee, an ISP usually provides a software package, username, password and access phone number which can be used to log on to the internet and browse the worldwide web by using a modem.
- **Intranet:** Intranet is a term used to denote a network within an organisation. It can refer to the organisation's website or a more extensive information technology structure. The aim of an intranet is to connect all individuals within an organisation in the most cost-efficient way possible. It has been seen to

boost productivity as it makes it easier to locate and view information. It can also be used as a forum for discussion for employees of the organisation.

- **Knowledge economy:** The knowledge economy is the use of knowledge to generate tangible and intangible values. Technology – and in particular knowledge technology – help to transform a part of human knowledge to machines. This knowledge can be used by decision support systems in various fields and generate economic values. Knowledge economy is also possible without technology. This is a concept of extreme importance in this digital world in a state of constant evolution.
- **MNEs:** Multinational corporations are organisations that control or own production of goods and services in more than one country. Such organisations are subject to the laws of multiple countries due to their vast operations. From a tax perspective, such organisations have to pay corporate income taxes in their home jurisdiction and will also have to pay other kinds of taxes in other locations where they operate. The nature and amount of those taxes varies depending upon the laws of the country they are operating in and on the extent of their activities in that country.
- **Marginal cost:** In economics, marginal cost is the change in the total cost that arises when the quantity produced has an increment by unit. It is the cost of producing one more unit of a good or service. In general terms, marginal cost at each level of production includes any additional costs required to produce the next unit. For example, if producing additional vehicles requires building a new factory, the marginal cost of the *extra* vehicles includes the cost of the new factory. With the introduction of 3D printing, economists believe that producers will soon be able to reduce their marginal costs significantly.
- **Net infrastructure:** Network infrastructure refers to hardware and software resources of an entire network that enables network connectivity, communication, operations and management of an enterprise network. It includes routers, switches, cables, firewalls, security applications, etc. It is a part of the IT infrastructure for most companies and can be used for both external and internal communications.
- **Network operators:** A mobile network operator is a provider of wireless service communication who also owns or controls all the elements necessary to deliver these services to the end user. A network operator must have access to a radio spectrum licence from the government and the entire infrastructure that is essential to provide services over the license's spectrum. However, he/she can outsource these services without relinquishing overall control and will still be considered to be a network operator.
- **Open access:** An open access network is a horizontally layered network in telecommunications where the owner of the network is not the one providing services on the network. It works equally well with fibre and Wi-Fi access networks. It can be a two- or a three-layered model. In a two-layered model, there is a network owner and operator and a second company that provides services on that network, whereas in a three-layered model, the three functions of ownership, operation and provision of services are undertaken by three different entities. These types of arrangement are usually cost effective and are implemented in rural or thinly populated areas where it would not be possible for an ISP to recover all costs if it were to perform all three functions. This, again, reflects a trend towards collaboration which appears to be the future in e-commerce.
- **Packet switching:** It is a concept commonly used for communication today, which allows grouping of all data into suitably sized blocks called packets which are then transmitted onto the attached network link. This was an improvement on its predecessor called circuit switching, which used a chain of interconnected lines stretching from the origin to the destination thereby allowing only a limited number of connections to exist from the point of origin. The packet switching technology overcame this obstruction by breaking the message down into small units which can be transferred individually based on the destination address in each packet and then reassembled at the destination point. Thus, using this technology the ARPANET was able to transmit the first message between academic institutions in 1969.
- **Platform-as-a-Service (PaaS):** A category of cloud computing services that provides a computing platform and programming tools as a service for software developers. Software resources provided by the platform are embedded in the code of software applications meant to be used by end users. The client

does not control or manage the underlying cloud infrastructure, including the network, servers, operating systems, or storage, but has control over the deployed applications.

- **QR (Quick Response) code:** it is a machine-readable optical label that contains information about the item to which it is attached. In practice, QR codes often contain data for a locator, identifier, or tracker that points to a website or application. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to store data efficiently.
- **Radio spectrum license:** A broadcast license is a type of spectrum license granting the licensee permission to use a portion of the radio frequency spectrum in a given geographical area for broadcasting purposes. These spectrums are managed by the government in most countries and there are, usually, three types of allocation:
  - ➢ Some frequencies are reserved for radio astronomy to avoid interference at radio telescopes which are used by astronomers to look at objects in our galaxy and at distant galaxies. No one else can transmit via these frequencies.
  - ➢ Sometimes, the same frequencies are licensed to several users located so far apart that they cannot cause interference to each other. Only licensed users can transmit via this frequency.
  - ➢ Lastly, there are some open spectrum bands which allow everyone to transmit via those frequencies. However, it can cause disturbance for certain sectors such as radio astronomy if all bands are allowed for use by everyone for communication. Traditional users of these bands are cordless telephones and baby monitors. However, they are finding more and more application with new technologies such as Wi-Fi, ISM bands, etc.
- **Router:** Routers are devices that connect two or more computer systems. Such a connection can be between the internet and a personal computer or between the internet and the internal network of an organisation.
- **Software-as-a-Service (SaaS):** A common form of cloud computing in which a provider allows the user to access an application from various devices through a client interface such as a web browser (e.g. web-based email). It can be provided either to business customers (B2B) or individual customers (B2C). Unlike in the old software vendor models, the code is executed remotely on the servers, thereby freeing the user of the necessity to upgrade when a new version is available – the executed version is always the latest, which means that new features go instantaneously to market without friction. The consumer generally does not manage or control the underlying cloud infrastructure, including the network, servers, operating systems, storage, or individual application capabilities, with the possible exception of limited user-specific application configuration settings.
- **Source code:** Source codes are collection of instructions written in a text-based computer language and used by programmers. Source codes are fully executable and readable versions of a software system. Source codes are the commands behind a program that make it work. For example, while designing a computer game, the software engineer first writes down a set of instructions in a computer language such as C, C++, VB, etc. These instructions when entered into the system form the basis for that game. After that a graphic designer works on that set of instructions to add pictures, colours or other visual and audio graphics. The set of instructions written down by the engineer form the source code. These instructions decide what happens when you click on different options/links presented to you in the game.
- **Spider:** A spider (or a crawler) is a tool that is used by a search engine to catalogue web pages so that more accurate results can be displayed over time. It is an improvement software such as a cookie which serves as a tool to sift through big data.
- **Strategic disruption:** 'Disruptive innovation' is to the first decade of the 21st century business world what 'process re-engineering' was to the 1990s. It is the process of changing business strategies to accommodate new and innovative ideas based on digitalisation. It is also sometimes called digital disruption. As digitalisation engulfs existing markets, old business strategies cannot work as efficiently. Therefore, disruption in the routine models is needed to succeed in this (soon to be) wholly digitalised

world. The increasing use of knowledge as an intangible asset in the upcoming business models clearly reflects this trend.

- **Telephone networks:** Telephone networks are the tools used to make telephone calls between two parties. A public switched telephone network is the network maintained by governments or companies in many countries, mainly to allow telephone communication between their customers. However, it is not possible to send digital signals through telephone lines. Another device known as a modem is needed for that. A modem is connected on one end to the PC of the customer and on the other end to the ISP (internet service provider). Modern modems are capable of speeds up to 56 kbps using the same telephone lines but in reality, such speeds may not be possible as the quality of telephone lines in most cities is not very good. It is for this reason that broadband connections are now available for use at the users' premises. This technology uses an ADSL (asymmetric digital subscriber line) to connect the telephone lines at the users' premises to the telephone exchange which is fitted with a filter that allows the faster bandwidth needed for data communication to pass through without affecting telephone conversations.
- **Transmission control protocol:** TCP is similar to IP and is used for purposes of communication. It provides reliable and ordered delivery of a stream of octets (digital files consisting of eight bits) between programs running on a computer connected to a local area network, intranet or public internet. It is used for sending emails and transferring files.
- **Virtual collaboration:** Virtual collaboration is the method of collaboration between virtual team members that is carried out via technology-mediated communication. Virtual collaboration follows the same process as collaboration, but the parties involved in virtual collaboration do not physically interact and communicate exclusively through technological channels. Distributed teams use virtual collaboration to simulate the information transfer present in face-to-face meetings, communicating virtually through verbal, visual, written, and digital means. The advancement in the field of technology has enabled individuals to collaborate even without being physically present with each other. Virtual collaboration, no matter how you look at it, is any process that employs the use of technology to bring people together to achieve their goals.
- **Virtual currency:** Virtual currency is a concept very different from electronic money, despite the similarities in nomenclature. Where electronic money is merely a digital representation of real-world currency backed by a legal tender from the government, virtual currency is a completely new unit of currency which is not backed by any legal tender of any government. Virtual currencies perform the same function as normal currencies but they usually do so within a specific community. However, recent developments have made virtual currencies more acceptable and usable within a wider environment. Initially, virtual currencies were used only within an online gaming environment, but with the development of open virtual currencies such as bitcoins, they can be used in the real world as well to purchase goods and services.
- **Virtual manufacturing:** It is a process where multiple manufacturers come together and each concentrate on one part of the manufacturing process. The product is created in a virtual environment which is improved to behave exactly like the real-world environment necessary for production of the goods. Each member makes their contribution virtually which is, eventually, used by other members in a physical environment. For example, a company needs to excavate a certain site but it doesn't have the adequate know-how for it. It can make use of a collaborative network where other members would work in a virtual environment set-up to resemble the excavation site and would come up with solutions that would ultimately be implemented by the original company.
- **Virtual network operators:** A virtual network operator performs the same functions as a traditional network operator but does not own or control the infrastructure used for provision of those services. It contracts with a traditional operator to obtain bulk access to network services at wholesale rates and then sells it on via retail to end users. The first commercial virtual network operator was Virgin Mobile, UK and it has been adopted by many countries since then, especially the Scandinavian countries. In 2012, there were 634 such operators, the largest being Lycamobile. The major advantage of such network

operators is that they are 3 to 4 times cheaper for end users than traditional networks as they do not need any capital expenditure for spectrum and extensive radio infrastructure. Thus, this is another area in which digitalisation has helped improve efficiency.

- **Wi-Fi:** Wi-Fi is a wireless form of technology that allows electronic devices to connect to the internet using high frequency radio waves. These devices connect to the internet via an access point which has a range of about 20 meters indoors and a greater range outdoors. It is much cheaper and easier to set up than the traditional local area networks. It finds application in outdoor areas such as in a college campus or in other areas where wires can't be run such as historical buildings. But in recent years, it has become more and more common for people to have a Wi-Fi access point in their house so that they can connect multiple devices to the same access point. However, Wi-Fi networks are not as secure as physical ones, although there are various encryption technologies that make it capable of resisting attacks from intruders.
- **Worldwide web:** It was initially developed for purposes of internal communication within the scientific research institute called CERN in Switzerland. However, soon after writing it, Tim Berners Lee, a scientist at CERN, realised its potential for global use. It is a system of interlinked hypertext documents which can be accessed via the internet. The terms internet and worldwide web, although often used synonymously, are not the same. The internet is a collection of connected computer networks whereas the worldwide web is merely one of the services transferred over these networks.

b. Tax/ Transfer Pricing terms

- **Business configurations:** Business configurations are an important tool for the OECD while deciding tax obligations for companies. Traditionally there have been three types of configuration:
  - ➢ **Business to business (B2B):** B2B is used to denote a transaction where a company/business is involved in buying and selling of goods or services to other companies/businesses.
  - ➢ **Business to consumer (B2C):** B2C is used to denote a transaction where a company/business is involved in buying and selling of goods or services to individuals.
  - ➢ **Consumer to consumer (C2C):** C2C is used to denote a transaction where individuals are involved in buying and selling of goods or services to other individuals.

  However, with digitalisation, new types of business configuration have come up which are a combination of these traditional configurations. They are known as multi-sided businesses as they cater to more than one segment of users. This is discussed in detail in later chapters of this book.
- **Classification of income:** Classification of income is a significant part of the taxation of income because it determines the source of the income, which in turn, decides the share of tax a particular country gets to levy. In a traditional business setting, it is comparatively easier to locate the functions generating value and therefore it is easier to decide the correct classification for the generated value. However, in this digital age, where business models are constantly changing and intangibles play roles bigger than ever before in value creation, it is becoming more and more difficult to classify income into pre-determined categories. The emergence and rapid rise of electronic commerce has blurred the distinctions between income classifications. Transactions previously regarded as identifiable among the international tax community are now being debated, discussed, and evaluated in every country with links to the global digital economy. In order to appropriately tax income arising from the extensive use of intangibles or from activities carried out solely on a virtual platform, it is essential that new categories are defined for proper classification of income.
- **Consumer:** A consumer is a person or a group of people who are the final users of products and services offered by suppliers. Consumers are the final holders of the product and they do not make any change/addition to the product. Consumers are the most important part of an economic system because their needs create demands based on which the suppliers generate products or services. For any business to be successful, it needs to identify a target consumer group and keep track of their changing needs in

order to improve upon its own products and services so as to meet those changing needs. This information about consumer needs and demands forms a part of big data and in this digitalised world, there are various methods to sift through that to locate useful information.

- **Dependent agent:** In a tax context, the term 'dependent agent'; is used when referring to a permanent establishment. A dependent agent is one that is under the control of the principal and has no authority to conclude contracts in his own name. He works completely on behalf of the company he represents and has very limited powers and discretion when contracting with customers. He is almost a part of the company and, therefore, a dependent agent may give rise to a permanent establishment of the company in the jurisdiction in which he operates.
- **Destination/source country:** This is the country of location of the end customer. This is extremely important in the case of indirect taxes such as VAT wherein the approach adopted by the OECD in light of BEPS states that VAT should be applied in the country of destination, i.e., VAT will be applied in the country where the end consumer is located and is consuming the product or service.
- **Intangibles:** An intangible asset is an asset that lacks physical substance and usually is hard to value. It includes patents, copyrights, franchises, goodwill, trademarks, and trade names. However, with digitalisation, business models all over the world are changing and the scope of intangibles is increasing. As of now, a lot of organisations derive their value from knowledge in the minds of people and other such means which are hard to place a value on. Therefore, transfer pricing of intangibles is an uncertain area which needs further clarification. From a tax/TP perspective, there can be three types of intangibles:
  1. Product intangibles: An intangible that is used in commercial activities such as the production of goods or provision of a service. It is, as an intangible right, a business asset in itself that can be transferred to consumers or used in the operation of the business.
  2. Process intangibles: If an enterprise has developed a unique method or process of producing a good or a service, it is referred to as a process intangible. They are very similar to product intangibles.
  3. Marketing intangibles: These are intangibles used in business operations that are customer facing. They aid in commercial exploitation of a product or a service. Depending on the context, marketing intangibles may include, for example, trademarks, trade names, customer lists, customer relationships, and proprietary market and customer data used in marketing and selling goods or services to customers.
- **Intermediary:** There are a few situations based on which intermediary could be defined differently. For example, there can be an intermediary between the seller and buyer through which the seller sells his products; there can be an intermediary party for verifying the transaction at the time of payment; there can be an intermediary in the form of an internet service provider or a website manager for companies conducting their business solely over the internet.
- **Multi-sided platform:** Economists have identified a class of businesses that are now generally referred to as "multi-sided platforms." They are another form of collaboration where multiple participants engage in developing a project that is beneficial for all participants. Such benefits are referred to as "network benefits", which means that decisions of users have a direct impact on the benefit received by other users. As recognized by the OECD, a simple example of this is the introduction of the fax machine. While a single fax machine had no utility by itself, users choosing to purchase a fax machine received the benefit of the decisions of earlier users to purchase a fax machine, in the form of the ability to communicate through this new technology with an existing network of potential counterparties. Multi-sided platforms create value by bringing two or more different types of economic agents together and facilitating interactions between them that make both agents better off.
- **Negative externalities**: This is one of the network effects exhibited by multi-sided models. A negative externality from one side for another side (e.g., displays of intrusive and unattractive advertising banners) can be offset by a lower price, no charge or even a reward for users. The classic case in which one side experiences negative externalities from the other side's participation is found in the media industry. In that case, a company attracts users by providing content (television or radio programming, a magazine, a

trade publication, a phonebook, or a newspaper) for free or at a cost less than the cost of production. The media company displays advertisements to its readers/listeners/viewers and earns revenue from advertisers whose ads it displays. Alternatively, it might earn revenue from selling information about its readers/listeners/viewers to interested parties.

- **Permanent establishment (PE):** A permanent establishment is a fixed place of business through which the business of an enterprise is wholly or partly carried on. It includes a place of management, a branch, an office, a factory, a workshop, a mine, a quarry or any other such place which the place of business of an enterprise is. There are certain rules that determine whether or not a place is a PE. They are defined under Article 5 of the Model Tax Convention of the OECD which also provides an elaborate commentary on the subject.
- **Positive externalities**: This is one of the network effects exhibited by multi-sided models. An example of a multi-sided business model involving positive externalities for different sides of the market is a payment card system, which will be more valuable to merchants if more consumers use the card, and more valuable to consumers if more merchants accept the card. Similarly, an operating system is more valuable to end users if more developers write software for it, and more valuable to software developers if more potential software purchasers use the operating system.
- **Significant digital presence (SDP):** The OECD, in its discussion draft on Action Plan 1 of BEPS, talked about the concept of significant digital presence for the first time. This concept has been adopted by the European Union in its long-term proposal to address the digital economy challenge. According to the EU proposal, the SDP will apply to ”digital services”, i.e. means services which are delivered over the internet or an electronic network and the nature of which renders their supply essentially automated and involving minimal human intervention, and impossible to ensure in the absence of information technology. In a recent EU proposal, a company would be considered to have a significant digital presence if one of the following three criteria is met: It exceeds a threshold of €7 million in annual revenues from digital services in a Member State; It has more than 100,000 users who access its digital services in a Member State in a taxable year; Over 3,000 business contracts for digital services are created between the company and business users in a taxable year.
- **Significant economy presence (SEP):** the economic activities carried on in the source jurisdiction evidently reflect a purposeful and sustained interaction with the economy of that country via technology and other automated tools. Such interaction could be proven by these following factors: revenue generated from the source of jurisdiction, participation of users (based on monthly active users, online contract solution, and data collected), and the establishment of local digital features (platform, domain, and payment). OECD launched in 2019 a proposal to address this “threshold” concept.
- **Supplier:** Supplier, in the simplest terms, refers to the person who has a good or a service to offer to another person who has the need for it. Supplier can refer to a manufacturer, processor, packager, distributor, wholesaler or a merchant depending on the functions each of them may be performing for purposes of their business. Any of the aforementioned persons can be a supplier if they are responsible for delivering the goods/services to the customer or if they are performing a significant activity in the chain of activities leading to the delivery of goods/services to the customer.
- **Value chain:** A value chain is a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. The value chain is the representation of different stages and actors which are involved in the creation of something of value. Anyone who contributes to making the end product more appealing and useful to the end customer is a contributor to the value chain. Value chain is very important from a tax perspective because in order to decide what kind of tax to levy, it is essential to take into account the functions performed by the taxpayer and the value of the functions performed can only be measured by calculating the value added by those functions to the end product.

- **Virtual permanent establishment:** Over the years, several potential options for alternative PE thresholds have been proposed. Some of these were discussed by the OECD and three broad alternatives can be proposed:
  - **A "virtual fixed place of business PE",** which would create a permanent establishment when the enterprise maintains a website on a server of another enterprise located in a jurisdiction and carries on business through that website;
  - **A "virtual agency PE",** which would seek to extend the existing dependent agent PE concept to circumstances in which contracts are habitually concluded on behalf of an enterprise with persons located in the jurisdiction through technological means, rather than through a person; and
  - **An "on-site business presence PE",** which would look at the economic presence of an enterprise within a jurisdiction in circumstances in which the foreign enterprise provides on-site services or other business interface at the customer's location.

PART A - HISTORY AND TRENDS OF THE INTERNET

After looking at how the internet has revolutionized every aspect of our lives, including how businesses/MNEs function, it is clear that we will be witnessing some major changes both from the perspective of business configurations and subsequently from legal and tax perspectives. This book has, therefore, been divided into three parts, namely Part A which provides an introduction to the booklet and discusses the history and illustrations of the digital economy based business models; Part B, which discusses various new and upcoming business model configurations based on the digital economy and Part C which discusses legal, tax and TP considerations attached to those business models. This book seeks to capture all of these changes and their impact in order to prepare its readers for the new digital age. With this objective in mind, Part A follows the following thematic structure:

- Chapter 1 starts with examples of new digital economy-based business models that are currently being employed by existing companies or which have led to the formation of new companies.
- Chapter 2 provides an initial introduction to the digital economy as understood in the context of BEPS developed by OECD. It discusses reason behind the rise of digitalisation, provides an insight into this changing trend and discusses options for the future.

1. Illustrations by Industry

1.1 Mobile communication

Tele2: Tele2 was the first virtual network operator. It started in Sweden and later expanded to other European countries. Since it is a virtual network operator, it does not own the infrastructure to provide the services to its clients but contracts with other operators to reach out to its customers. It sells pay-as-you-go and contract airtime services and provides mobile broadband services. The number of such operators is increasing every year. As of December 2018, there were 1,300 active mobile virtual network operators operating in 79 countries. This is yet another example where digitalisation has helped reduce the huge costs associated with owning the spectrum and the infrastructure necessary to provide services.

Liberty Global: Liberty Global became the world's largest international cable company in 2013, providing broadband services to its customers. Through its acquisitions such as Virgin Mobile, it is also acting as a virtual mobile network operator. It has recently entered the market of wireless services to meet the growing demand for television, broadband, mobile and fixed-line services - so-called "quad play". As these services become almost essential for customers around the globe, more and more operators are turning towards providing these services as a whole, which is a direct impact of digitalisation. Liberty Global also acquired the Dutch cable operator, Ziggo, to enable expansion into such services. Using only one operator to satisfy quadruple needs will not only be convenient for end customers but also highly cost-efficient. Increasingly this business model based on "return on investment" is being challenged.

1.2 Recruiters

Indeed Inc.: Indeed Inc. is a company providing recruitment solutions using the internet as the basis for its business model. Indeed has two main categories of clients namely, specialist heads of HR and heads of staffing companies. They have three main value drivers for their organisation: the platform, brand name and a set of skilled employees. The main distinction between Indeed Inc.'s business model and that of its competitors is the platform. Their platform consists of two parts: search algorithm and aggregation software. Both of these components are based on a model similar to that of Google. The search algorithm uses very specific terms to find the most suitable jobs for clients and the aggregation software helps collect job listings from over 10,000 websites then batches them

according to the needs of the clients. It also helps in filtering through the search results and continuously updates the job listings based on changes on the original websites in order to locate the most ideal result for the client. The search algorithm is the newest portion of the technology platform and is considered by Indeed Inc. to be the best available search engine for its purpose.

The platform uses a big data management system to filter through the search results. Management of big data is a relatively new and complex concept but its use in Indeed's everyday performance clearly shows the growing impact of digitalisation in the new and emerging business models.

This business model is completely adapted to the digitalised world we live in. Every component of it is dependent on the internet for its functioning. Such models are those most likely to succeed in this digital age.

RecruitLoop: RecruitLoop offers a new kind of recruitment service online. Most online recruitment platforms merely advertise positions and allow the users to contact the advertiser. However, this platform provides more options to the users. They can post their role and after getting proposals from recruiters seeking that role, they can set up an introductory call and choose the best option. It also provides the option for performing short-term contractual work and allows for all payments to be made through its website using a secure payment system. It works on the principle of virtual manufacturing and supports a simple web interface for collaboration.

LinkedIn: LinkedIn is a multi-sided portal that connects professionals with each other and offers different solutions to different categories of users. LinkedIn revenues come from three key revenue streams: hiring solutions, marketing solutions, and premium subscriptions. Professionals can advertise/upload their profiles for free and connect with other professionals in similar or related fields. It also provides an additional service of connecting recruiters and job seekers. Recruiters can publish job postings on LinkedIn to make them available to a wider audience than advertising solely on their websites.

1.3 Electricity

Wireless electricity: The internet has influenced many inventions and is in the process of influencing many more. One such example is wireless electricity. Some uses of wireless power have been seen in the past, such as in electric toothbrushes, medical implants and to a certain extent in electric cars and Intel PCs. But in 2007 a company 'Witricity' has taken the use of wireless power to a new level by inventing wireless electricity. In providing the wireless electricity, Witricity leverages the well-designed magnetic fields with closely matched resonant frequencies to enable the transfer of power from one device to the other at high efficiency and over a distance range that is useful for real-world applications.

1.4 Payment services

Adyen: Adyen is an international payment facilitating service, founded in 2006 with a single and straightforward proposition - to deliver innovation to the payment industry. Adyen's technology is developed and maintained in house which gives it the control and flexibility necessary to meet the evolving demands of the most innovative businesses and to release new features on an ongoing basis. By offering global acquiring solutions, Adyen makes it possible for its customers to benefit from the best acceptance and authorisation rates whilst optimising costs.

Today it has a presence on six continents and employs more than 880 people, providing advanced payment solutions to more than 3,500 customers including Facebook, Uber, Netflix, Spotify, Mango, KLM, Superdry, TomTom, PhotoBox, Lebara, Indiegogo, Badoo, SoundCloud, Getty Images, Vodafone, Farfetch and Wix. This clearly emphasis the role digitalisation has come to play in our everyday lives.

Klarna: Klarna is an online platform which simplifies buying and selling online. It operates as a connection between online retailers and the customers. It allows the customers to receive their purchases before having to make payments for the same. It operates by taking credit for the time it takes for the customer to receive its order and finalise its purchase. This will make it possible for customers to first get the ordered product at home and then pay via an invoice. This is a first step toward safer and simpler e-commerce.

Virtual currency (Bitcoin): Another area that has been influenced by digitalisation is payment mechanisms. With the advances in technology, first of all physical money was replaced by its electronically stored counterpart, which enabled online transactions and payment through credit cards. However, with the use of an online payment system or a credit card, there needs to be an intermediary to authorize the transaction (for example, the bank) between the transacting parties. The reason for creating an electronic version of cash was to ensure quick and easy transactions. However, the use of an intermediary and lack of adequate protection for transactions conducted over the internet led to the development of alternative ways to transfer money digitally. One such alternate way is the use of a completely decentralised virtual currency such as bitcoins. Using a virtual currency has other benefits such as low/no inflation and collapse risk, cost efficiency and a simple and secure procedure. And the use of a virtual currency completely eliminates the third-party intermediary and uses a peer-to-peer verification system to ensure secure transactions, however the hyped crypto coins have their flaws. One example is the claim that bitcoin is decentralized because of the Blockchain technology it is built on, one of the pillars of Bitcoin's potential. The characteristic of Bitcoin being decentralized is knocked down by looking at the gini-coefficient[5] of the virtual currency, which is 0,88, higher than North Korea (0,86) and the US (0,41).

Nearly half the crypto companies founded in 2017 are belly up by now, reflecting the enormous irrational hype and fraudulent cases. With the outflow of many projects the potential of virtual currencies remained. An interesting development is central banks picking up the baton, evaluating if they should create digital forms of fiat currencies, CBDS's (Central Bank Digital Currencies). Digital fiat currencies would eradicate the crypto coins and its' fraudulent character, but still keep the fees low as the technology intended. No matter what the technologic developments will be, they should result in a stable financial system with low entry barriers to exclude nobody from using financial services.

1.5 Transport/travel

Uber Taxi / Lyft: Uber and Lyft are multi-sided platforms for ride-sharing. Potential passengers connect with taxi drivers using a smartphone app where GPS location sharing, pick-up timing (typically within eight minutes of request), and payment are all executed online. No money changes hands. This works on the same underlying model that brings drivers and customers together. Uber provides multiple incentives for drivers and allows non-professional drivers to be a part of its system. It also advertises in order to reach out to the widest possible consumer base which can then use the services of those drivers. Both Uber and Lyft have gone public (IPO) in 2019 to facilitate the funding it takes to further grow their business with a high growth rate.

Skyscanner: Skyscanner is a travel fare aggregator website and travel meta search engine based in Edinburgh, Scotland. The site is available in over 30 languages and is used by 60 million people per month. The search engine quickly compares more than 1200 partners worldwide and finds cheap airline tickets, hotel offers, car rental, and holiday offers. Skyscanner is a free service; renting a car, comparing airline ticket offers of finding the best hotel is very easy with the handy tools, such as the Price Alert, or the "Anywhere" search function.

TravelBird: TravelBird is an online portal that replicates the services offered by travel agencies. It acts as an intermediary between consumers and travel providers and creates the most competitive deals. The vacation offers with competitive price/performance ratio are always varied and come from approved tourism partners. TravelBird

[5] The gini-coefficient reflects wealth distribution. A gini-coefficient of 1 means 1% of the population owns 100% of the assets.

makes a selection every day of the best new holiday offers, ranging from city breaks and holidays in the sun, to wellness packages, day trips and overnight stays. So, there is always something on offer to suit all customers.

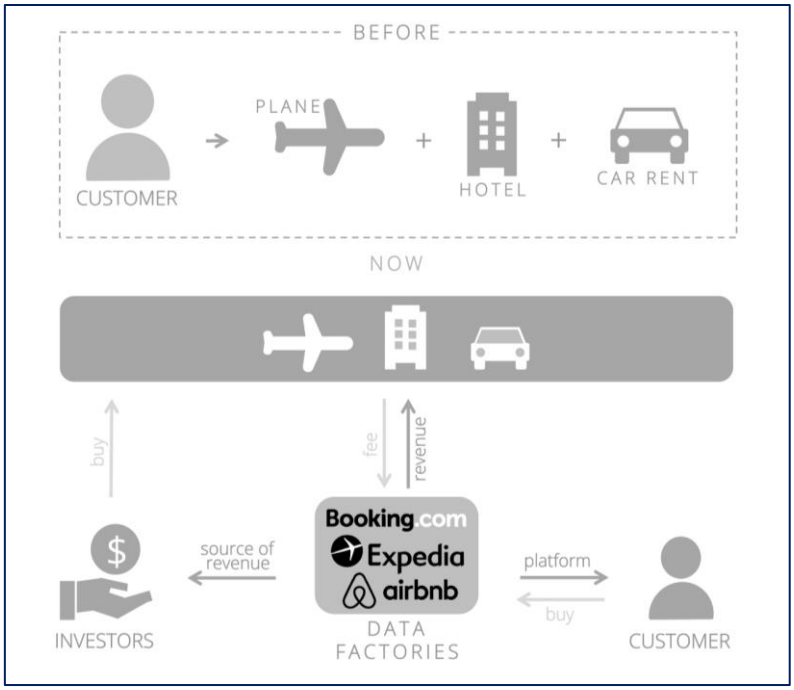
Tesla motors: Tesla Motors is one such company employing digitalised manufacturing processes for its cars. Their cars are equipped with such technology that if they are in need of repairs, they can automatically call for a corrective software download or, if necessary, send a notification to the customer with an invitation for a valet to pick up the car and deliver it to a Tesla facility.

1.6 Hospitality/housing

Airbnb: Airbnb is another collaborative venture for short-term holiday rentals. This service is providing serious competition to the hospitality industry. Using this service, anyone with a spare bed, room or an apartment can advertise the space to people on holiday. Airbnb merely serves as a platform to connect two interdependent groups, i.e., accommodation seekers on holiday and people with a spare room to offer. Airbnb allows a secure and safe way of transacting with and opening your house to unknown tourists. In order to ensure safety, Airbnb follows a strict policy of credit card use only, which makes it possible to track the tenants. An IPO is expected to happen in 2019.

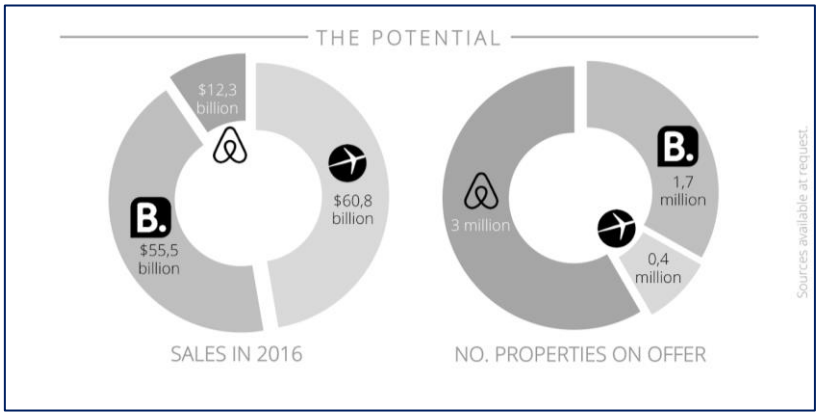
Housing Anywhere: Housing Anywhere is an initiative by students of the University of Rotterdam. This is a portal that was started to put students coming to the Netherlands in touch with other students to help them find accommodation. Soon, many universities started offering this website to its incoming students as a viable way to search for accommodation. The website has now broadened its scope and offers rental options for people other than students. This is another example of a multi-sided model where the portal connects two sides of customers that are in need of each other.

Priceline and Expedia: the following infographic illustrates the impact "data factories" like booking.com have on the facility industry.



Companies like Priceline (booking.com), Expedia (Trivago) and Airbnb have changed the industry. Planning holidays/business trips in far-away countries is a difficult process, where individuals need to book a hotel, rent a car and book a plane ticket. Because of this, especially in the 20th century, physical stores popped up where people could book a fully arranged trip; the travel agencies. These travel agencies would act as a mediator between the customer and various companies in order to create a single travelling package. As a result of the internet, travel agencies started to abandon their physical stores and went online. These companies dominated the market in the early 2000s.

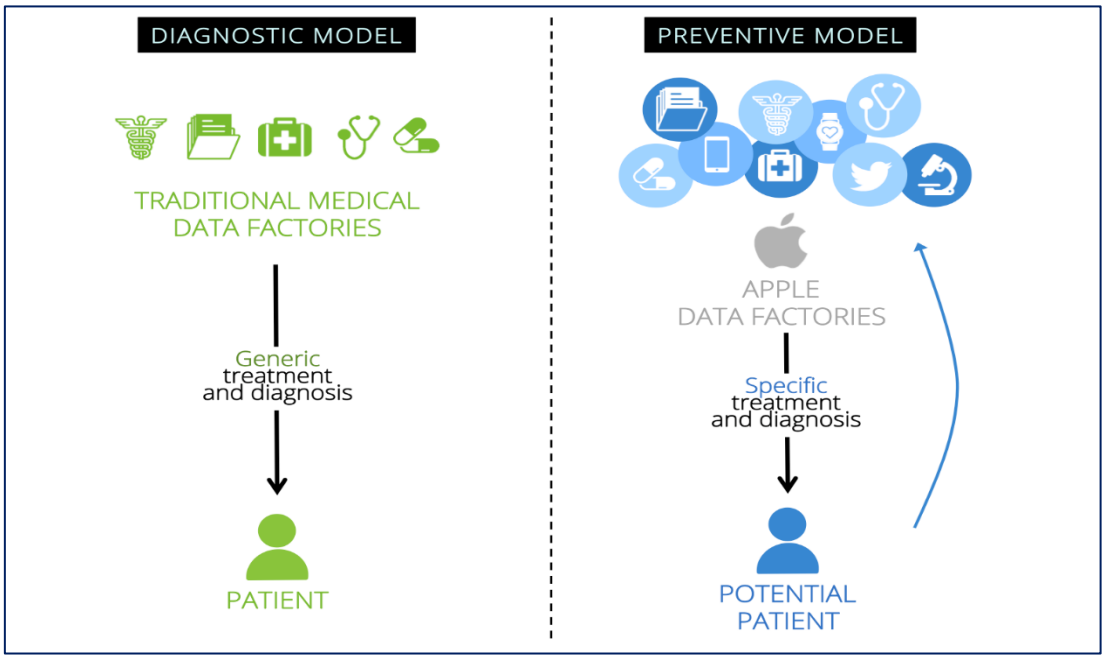
However, due to the ever-increasing access to information, it is becoming easier to book your own fully arranged trip. Airline comparison websites and car rental websites give a quick overview of the best offers that are best suitable for a particular customer. This reduces the need for the mediation by the travel agency, thus making it cheaper for the customer as the mediator, and of course, charging a royal fee. These websites have become large data factories, where offerings are tailored to fit the needs of a wide array of customers. The most notable examples are the Priceline group (with booking.com and rentalcars.com) and Expedia inc. (with Trivago and Carrentals.com). Furthermore, in the last couple of years, Airbnb has even cut out the businesses at the back end by allowing individuals to rent out their own house.



The data factories are capturing the hospitality industry in terms of market share and market cap. With the effective use of the data these major companies gather, the information allows them to further customize their offerings to the consumers, allowing for even more growth. Traditional travel agencies need to adapt this new business model in order to survive, otherwise they too could become a dinosaur.

1.7 Healthcare

The following infographic is providing a “diagnostic” push model and a “preventive” pull model, both under the influence of data factories invading the healthcare industry.

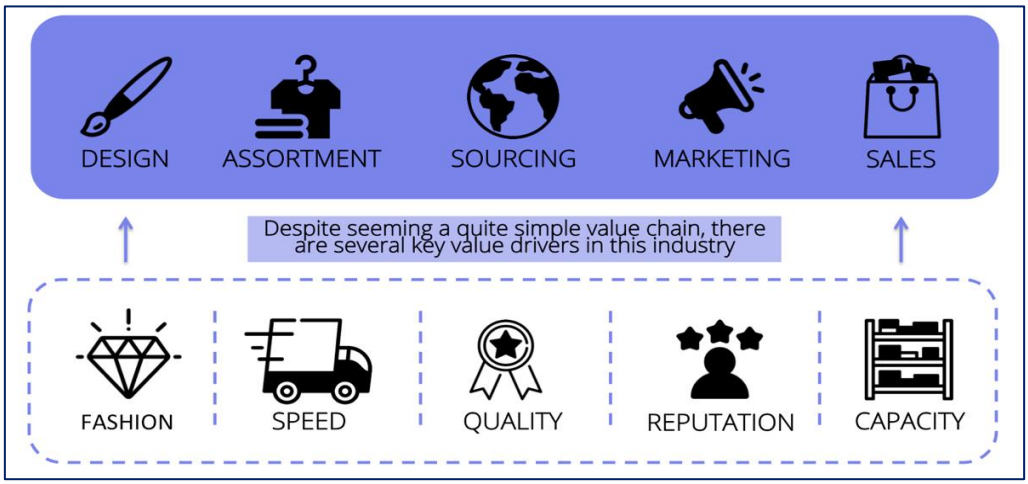


The healthcare industry is exploding with data. The drug-related data available for pharmaceutical manufacturers, research centres, chemists, molecular and cell biologists, and biotech firms has never been higher. In fact, more data is created and used by the healthcare industry than in all of previous recorded history. Now an interesting competitor may lurk around the corner. With the amount of data that people create through their use of their phone or email, Apple could become your new doctor. The medical consultation by an Apple-doctor will be of a more preventive nature, as, through its use of data, it could recognize your symptoms before anyone else can. Within an efficiently running infrastructure backing up the new model, you could receive the appropriate drugs within a day without even having to leave the comfort of your home. Such a business model could radically change the healthcare industry. Even though it looks utopian in nature, it may not be far from reality in a couple of years.

Oakstreet Healthcare: Oakstreet Healthcare revolutionized healthcare because of their VBHC (value-based health care) philosophy. Oakstreet Healthcare was founded in 2012 as a network of primary care clinics, exclusively for the elderly, because research showed that 87% of the healthcare cost was caused by 25% of the elderly, meaning it’s a group with a lot of room for improvement. All the clinics are strategically located near low-income areas. Most primary care practices follow fee-for-service models, which often prioritize volume of patient visits over quality of care. Oak Street Health operates under a values-based managed care model, meaning they take on the full risk of our patients’ health — all primary, specialty, acute and post-acute care. They are able to run a profitable business because their “full-risk”-model incentivizes high-quality healthcare because patient outcomes are tied to their financial success.

1.8 Apparel

The fast fashion industry has been challenged by 100% website-based players entering the market, operating at a lower cost than the established players in the industry.



The use of Big Data has allowed for a complete change of the business models in the Apparel industry. Two main changes can be identified: The insurgence of online shopping and fast fashion.

Shopping online brings customer a new experience: they can receive more information at very low cost (almost zero economic cost with some time cost) and can make a comprehensive comparison on products of different brands and styles. This increase in transparency in the market has resulted in an increase of cheap and high-quality clothing brands on the market, subsequently damaging the reputation of some traditional dominating players. Another consequence of the rise in online shopping is the changing supply chain. It is very common to see that customers try the garments in physical stores to search for their style and correct size, then go back home to make the order online, because the product is cheaper online. Furthermore, a trend can also be observed where people buy 3 different sizes of the same piece of clothing and return the ones that do not fit. Return policies and infrastructure have thus become a major part of the supply chain.

Big Data has also resulted in the creation of the concept Fast Fashion. Due to the efficient use of inventory management and infrastructure, made possible by Big Data being transferred directly from the store/websites to the start of the supply chain, ZARA is rapidly updating its store's content. New collection can be found in these stores every two weeks. In this system, if clothes are not sold within 14 days, they will be driven off by new fashions and will never return to shelves. This model keeps the customer ''addicted'' to the store, making them return on a regular basis. However, concerns have arisen on the environmental impact of this business model, since unsold products often simply become waste or are destroyed.

Zalando is a great example to illustrate how the apparel industry is changing due to the leverage of big data. Zalando, in 2016 entered into partnership agreement with Google on Project Muze, where the aim is to allow consumers to be the muse for their individual 3D fashion designs by applying machine learning in the creative process. Although the project has not embedded as Zalando feature yet, it is expected to be used in near future to bolster the customer experience.

The machine learning also used to aide influence fashion journeys, fuelled by style preferences, trending Zalando styles, and a rich collection of data that customer behaviour provides them with. All of these elements allow machines to recognize and categorize virtually any fashion item, which is then used to form complex article representations that reveal symmetries, structure, and trends from every corner of the industry. In particular, the system enables Zalando to personalized recommendations by analysing the prior purchase and scrutinizing the browsing behaviour such as what consumers look at, how long they look, and what they search for. As such, once the customers open the website Zalando will give well-crafted fashion item recommendation based on their fashion taste.[6]

While Zalando still working on its Project Muze, ZOZO, the Japanese shopping site has launched its latest technology in measurement. The company is expanding its made-to-measure clothes using polka dot bodysuits, called ZOZOsuit, which help customers upload their measurement. The ZOZOsuit has a full body marker recognition system, which consists of 300 to 400 dot markers. The dot markers that cover the entire suit from a 360-degree angle with a smartphone camera enables precise measurements. By this development, customers do not need to buy clothes in three different sizes and return them back.

1.9 Professional services

UpCounsel: UpCounsel is a multi-sided platform that connects people in need of a lawyer to the lawyer ready to provide those services. It was founded in 2012 in the belief that critical services such as 'legal' should not be reserved only for wealthy corporations capable of advertising widely and that everyone should have access to good quality legal advice. This portal allows users to comment on the performance of the lawyer via reviews and they are visible for everyone to make an informed decision. By making legal services high quality, cost-effective and on-demand for every business, they empower business owners and executives to run smarter companies.

VouchedFor: VouchedFor is a UK based multi-sided platform that was founded to help people find reliable independent financial advisers. It is a client review site for independent financial advisers, mortgage advisers, solicitors and accountants. Today there are over 30,000 client reviews on VouchedFor and more than 7,000 professionals. To ensure that consumers receive the best possible advice, it only features professionals who meet certain criteria. First, it checks that professionals are authorised by the relevant regulatory body. In addition, the

[6] Veitch, Martin. Zalando Relies In Technology To Aid Fashionista. Retrieved March 15, 2019 from https://www.idgconnect.com/idgconnect/interviews/1018942/zalando-relies-technology-aid-fashionistas

financial advisers must be independent or 'whole of market' and so are not tied to a particular product or provider. This means they are able to consider and recommend all types of investment products that could meet a consumer's needs and objectives. A similar platform is COMATCH, an initiative from Germany.

Skillbridge / Globility: A startup called Skillbridge is trying to create a new kind of marketplace for freelance work – not for the programming and writing jobs that you find on a site like Elance, but for strategy, finance, marketing and other professional services. Skillbridge focuses on providing white collar professionals with access to consulting projects. Its consultants are a mix of full-time independent consultants, stay-at-home parents, MBA and PhD students. It offers its services in a wide array of sectors such as private equity, media and entertainment, retail and consumer, healthcare, real estate, non-profits, technology and many others including government and public sector. This service allows users to receive high quality services without having to pay for traditional high-cost firms.

Freelancer/ Upwork: These web portals allow users to find software and technology related freelance work. Innovative global enterprises, small businesses, and startups alike can connect with the world's most talented developers, designers, writers, marketers, support reps, administrators, and more. If your job can be done online, you can hire the best person to do it. Freelancers can register on this website to offer their services and users can choose from amongst them based not only on their requirements but also on work history and education, portfolios and work samples, client ratings and reviews, language and communication skills etc.

1.10 Business related services

Quirky: Quirky is a company based purely on innovation. It has a unique business model where anyone can submit an idea and it will be developed in to a usable commodity to be sold in the marketplace. All of its products are developed by the crowd, specifically a community of 550,000 people who actively pitch, refine and vote on ideas. Quirky's basic IT setup is a team of 25 developers and web designers working on four big projects: a Rails app that powers Quirky.com, the Quirky iOS app, a backend that connects to its major retailers and third-party logistics vendor, and a full cloud-delivered ERP package from Netsuite that sucks in all of the operating data. This crowdsourcing is yet another example of a shift towards the collaborative economy as digitalisation spreads its foot.

Elasticsearch: Elastic believes getting immediate, actionable insight from data matters. The company has designed three projects to take data from any source and search, analyse, and visualise it in real time, Elastic is helping people make sense of data. From stock quotes to twitter streams, Apache logs to WordPress blogs, its products are extending what's possible with data, delivering on the promise that good things come from connecting the dots. This is a highly important service in these evolving times. It is these kinds of services that companies such as Google and Facebook use to search through all the available customer information and sort it to sell to relevant companies. With more startups offering services such as these, we may even be able to control multiple privacy violation claims against Facebook and Google.

Mendix: Mendix provides a means for employees of large companies to avoid dealing with the red tape in corporate IT departments every time they want to get a new piece of software or an update to a system needed to do their job. Instead, they just ask Mendix to create it for them.

Customers can log onto the Mendix platform from any location and describe what they're looking for in their new application, in terms of function and features. The Mendix technology pops out a demo version of the app within minutes, which customers can review and suggest tweaks and fixes for right away. A final version of the technology is typically ready for their use in days.

Quiver: Quiver allows users to track and control their information regardless of where it is and actually to share information on their own terms. With this product, the startup has a lot of interest from many companies, for instance in The Netherlands they have almost 70% of the banks as their customers. It allows users to choose a method of encryption and even for how long they want the documents to be encrypted. There are various methods of encryption available; for example, you can choose encryption based on location, time and other similar methods, which makes it extremely convenient to share confidential files.

XebiaLabs: XebiaLabs is a leading provider of continuous delivery tools that reduce the time and cost of bringing applications to market, and bridge the gap between development and operations. Delivering higher quality software faster has become a business imperative. Current software development processes cannot keep pace with the demand for the faster delivery of software. While application development times have accelerated of late due to Agile, Scrum and other methodologies, deployment best practices have not kept pace, resulting in a significant bottleneck at the point of application release.

XebiaLabs helps companies accelerate the rate of innovation and time to market while reducing error and downtime. With XebiaLabs, companies can easily move to continuous deployment and create a fully automated customer feedback loop so they can quickly adapt their applications to the fast-shifting changes in the market.

Companies in the modern age release teams together to accelerate the end-to-end flow of features and applications. These globally distributed teams need integrated, scalable, lightweight tooling to be able to hit the ground running and eliminate manual, time-consuming, error-prone activities and handovers. Nowadays, with the help of XebiaLabs, companies can get new software to roll out in days instead of months.

Sky-futures: Sky-futures is an innovative company that offers an option for unmanned aerial supervision of oil and gas pipelines. Sky-Futures provide safe, cost effective and experienced inspection services, including:

- Offshore and onshore inspections
- HD video, still and thermal imagery
- Technical inspection reports
- Experienced Remote Pilots

Big data services: Companies such as Google and Facebook have relationships with individual customers who use their services of searching and social networking respectively. These relationships are of a B2C configuration. Google/Facebook then collects data from these individual customers. Google does so by tracking user's searches and Facebook does so by accessing user's personal information. This collection of data is termed 'big data' due to its size. Google and Facebook provide another service which their main value driver is, i.e., advertisement. For this purpose, they contract with advertisers based on a B2B configuration. Now, Facebook and Google sell the big data information to these advertisers who benefit greatly from highly detailed user profiles – meaning their adverts can now be targeted precisely at "women over 40 who love science fiction books" or "men under 25 living in New York who love baseball". Thus, this kind of service provided by Google/Facebook to advertisers helps in the interaction of two groups of users, i.e., advertisers and target customers. Thus, this is another example of a multi-sided platform where advertisers are at the front end receiving a service (big data) from Google/Facebook and individual users are at the back end using search and social networking services provided by those companies.

WeWork: WeWork Companies Inc. creates high-energy, inherently collaborative office and residential communities that are responsive to the productivity needs and stylistic preferences of today's mobile, creative workforce. In addition to well-appointed physical space, the company provides accompanying services designed to connect members within the WeWork ecosystem.

1.11 On-demand help

Helpling: Hundreds of thousands of households are constantly seeking good and reliable cleaning help. Started in May 2014, Helpling is there to assist with just such a problem in The Netherlands. Helpling provides a platform for private individuals to legally offer their domestic services. Since then more than 12,000 customers have been served in the 40 largest Dutch cities. Helpling seeks to expand worldwide in less than a year. It offers a very simple procedure including entering your address, selecting a date and time and then simply paying for the service. A similar service is provided in the UK by **Hassle.com.**

TaskRabbit: TaskRabbit is an American multi-sided venture that allows users to outsource small jobs and tasks to people in their neighbourhood. Users name the task they need done, name the price they are willing to pay, and a network of pre-approved, background-checked contractors bid to complete the job. The user then selects the TaskRabbit who is the best match for the task. TaskRabbit has been described as eBay for real-world labour. It is currently available in multiple cities in the United States and will soon be expanded to regions outside. Another website offering exactly the same services is up and running, since 2012, in Sydney by the name Airtasker.

Mad Paws: This is a Sydney based start-up that was created to fill the ever-growing need in the pet boarding market for affordable and local pet accommodation whilst still maintaining the care, love, and attention pets received at high-end, expensive, pet boarding services. It works on the same principle as Airbnb and Uber, etc. where people in need of a dog sitter can sign up and verify their ID and then they can contact and pay for a sitter in their neighbourhood.

1.12 Cloud Storage

WeTransfer: WeTransfer is an online file-transferring platform, similar to an email service but which allows for the transfer of large files, free of stress and charge. It has been based in Amsterdam since 2009 but offers services globally. Users do not even need to register on their website to be able to use this service. They provide this service free of charge and derive their revenue in a fashion similar to Google, i.e., through advertising. The wallpapers on their landing page that change regularly are the advertisements from which they make their profits. Their basic services are free but they levy a charge to users if they want to upgrade their storage space limit or make large file transfers, etc.

1.13 Restaurant business

Just Eat: Just Eat is online service acting as a web based intermediary between independent takeaway food outlets and customers. It is headquartered in the UK and operates in 13 countries around the globe. The platform is an example of multi-sided business models and allows customers to search for local take away restaurants to place orders online, and to choose from pick-up or delivery options.

Takeaway.com: Takeaway.com, officially Takeaway.com BV, and created originally under its Dutch name Thuisbezorgd.nl, is a Dutch dot-com company specialised in online food ordering and home delivery. Takeaway.com is an intermediary online portal between the customer and the restaurants, where customers can order food online from restaurants' menus, and have it delivered by the restaurants directly to their home. It connects restaurants to consumers even if the restaurant itself does not provide a delivery service. The website handles over 800,000 orders per month for 10,000 restaurants.

OpenTable: OpenTable is an American-based company that provides a platform for fine-dining restaurants and consumers in various cities in the United States and other countries. It enables consumers to make and restaurants to accept reservations for tables over the internet. It helped solve a transaction problem for consumers and restaurants. For OpenTable to provide this service it needed to have significant numbers of both consumers and

restaurants using its platform. OpenTable started by providing table management software to restaurants, a one-sided business. Once it had a sufficiently large number of restaurants in some cities, it developed a web-based platform for consumers to make reservations that would be automatically incorporated into its table management software.

1.14 Marketplace

Catawiki: Catawiki is a one-of-a-kind website offering auction services. It has made the arduous process of physically bidding in an auction house much simpler. Part of what makes Catawiki so unique is their online catalogue and community pages. The catalogue provides a user-friendly foundation from which the users can manage their collection. The auctions start every Friday, with each one ending on a particular night of the week. Every auction can be visited by a massive, international audience. The auctions are supervised by specialist auctioneers, guaranteeing varied and high-quality lot listings. Their special payment method allows for secure purchases. With over 100 weekly auctions and 350,000 registered users, Catawiki is Europe's fastest growing auction house.

Alibaba.com: Alibaba provides a B2B trading platform for wholesale buyers and sellers. It acts as the mediator of the deals and keeps a margin of each and every sale/purchase that is being done through the website. Moreover, it offers annual subscriptions to maintain their accounts/online shops. Alibaba.com contracts with seller companies on the back end (clearly B2B) when they register their products for sale on its website and with buyers on the front end when they place an order to purchase. The buyers on Alibaba.com are also businesses since it only allows wholesale trade, therefore the relationship between Alibaba.com and the buyers is also of a B2B nature.

1.15 Entertainment

Netflix: Netflix is one of the companies born out of digitalisation. It provides television and film services over the internet. It is the world's leading internet television network with over 62 million members in over 50 countries enjoying more than 100 million hours of TV shows and movies per day, including original series, documentaries and feature films. Members can watch as much as they want, anytime, anywhere, on nearly any internet-connected screen. Members can play, pause and resume watching, all without commercials or commitments. It has provided a whole new experience to watching TV, without the hassles of dealing with a connection operator, commercials or any other disturbances.

Jukedeck: Jukedeck allows its users to create their own unique tracks to use in videos, games, or anything else in the genre. Jukedeck is based on state-of-the-art technology that brings artificial intelligence to music composition. It is making a system that can write original tracks according to the users' specifications, so that you can have customised music at the touch of a button. The artificial intelligence uses machine learning to understand how to write music, chord by chord and note by note, thereby making each track created via Jukedeck unique.

WeChat: Similar to whatsapp, facebook, and other messaging apps, Wechat allows its user to send message and have list of conversations that they are engaged in. WeChat is one of the main ways people communicate in China. Even when doing business, people prefer WeChat to email. Unlike the aforementioned messaging apps, WeChat offers other features such as mobile payment and mini program. By scanning the unique barcode, customers are able to pay everything from major supermarkets to the smallest of street vendors and taxis as long as they have a Chinese bank account. WeChat also allow companies such as alibaba and other brands to launch mini-programs or apps within WeChat -instead of a standalone app- to send promotional messages directly to the user via WeChat.

Kickstarter: Kickstarter allows its user to enter the bold new world of crowdfunding, where creative people turn to friends, family, and strangers on the internet to provide an initial investment. The users can make a Kickstarter

campaign where they have complete control over on how the product campaign goes. Each Kickstarter project sets its own funding goal and deadline, offering rewards in exchange for pledges. These rewards can be anything from a "thank you" tweet to a copy of the final product or a trip to meet the production crew. In return of the platform provided, Kickstarter applies a 5% fee on the total amount of the funds raise and an additional 3-5% fee for the processor payment.

2. What is the digital economy?

2.1 The emergence of the digital economy

After witnessing the agricultural revolution, the industrial revolution and the service revolution along with free trade and globalisation, mankind is now ready to witness the IT revolution that has the potential to fundamentally transform every aspect of modern-day life. It is characterised by the emergence of a new economic system, i.e., the 'digital economy'.

The OECD has defined the digital economy as being comprised of markets based on digital technologies that facilitate trade of goods and services through e-commerce.[7] The origin of this economy can be traced to the invention of the internet and the impetus provided through information and communication technology (ICT). While the internet began as an important tool for improving communication it quickly transformed into a ubiquitous technology supporting all sectors across the economy. Digitalisation has not only given rise to new kinds of business models and new businesses that are completely dependent on the internet for their functioning but has also transformed the way existing businesses work.

2.2 The evolution and growth of the internet

2.2.1 ARPANET and Packet Switching (1960s-1970s)

In the 1960s, the government of the United States of America commissioned a research project which was funded by the Information Processing Techniques Office[8] which led to the development of ARPANET - the first operational packet switching network. Packet switching, which is a concept commonly used for communication today, allows grouping of all data into suitably sized blocks called packets which are then transmitted onto the attached network link. This was an improvement on its predecessor called circuit switching, which used a chain of interconnected lines stretching from the origin to the destination, thereby allowing only a limited number of connections to exist from the point of origin. The packet switching technology overcame this obstruction by breaking the message down into small units which can be transferred individually based on the destination address in each packet and then reassembled at the destination point. Thus, using this technology, the ARPANET was able to transmit the first message between academic institutions in 1969. After being successfully used to interconnect four university departments, the ARPANET was handed over, in 1975, to the U.S. Department of Defense. The technology behind the ARPANET formed the backbone for how the internet would work.

[7] European Commission. (2014). *Commission expert group on taxation of the digital economy*. Belgium. Tax & Customs Union. Retrieved from http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/good_governance_matters/digital/report_digital_economy.pdf

[8] Taylor, B. (n.d.). IPTO -- Information Processing Techniques Office. Retrieved October 12, 2015 from http://www.livinginternet.com/i/ii_ipto.htm

2.2.2 Internet (1980s)

Although the ARPANET was successful in communicating between several academic institutions, its use was restricted to research and commercial use was forbidden.[9] However, during the 1980s, several other branches of the U.S. government such as the National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), etc., were also getting involved in internet research and their combined efforts led to the formation of the transmission control protocol/ internet protocol (TCP/IP) which forms the backbone of the current state of the internet. ARPANET used the network control protocol (NCP) as a means of transporting data from the original computer to the destination computer but in 1983, this was changed to the standard TCP/IP protocol which is in use even today. The use of TCP/IP reduced the role of the network to a bare minimum and gave more control to the hosts transmitting the information over the network, thereby allowing almost any networks to be joined together. The term internet was first used in the year 1974 in the memo describing the TCP/IP protocol. This transition was also in line with expanding the use of ARPANET beyond research institutions. Initially, its use was extended only to scientists in various parts of the world who wanted to participate in the research programmes carried out by the United States. But it was soon to be seen that the internet would transcend all national boundaries and step in to the everyday lives of the common man. In the year 1990 the ARPANET was decommissioned and by 1995 the network created by the NSF was decommissioned as well, leaving the internet to be operated by several commercial internet service providers who extended its scope worldwide.

2.2.3 Worldwide web (1990s)

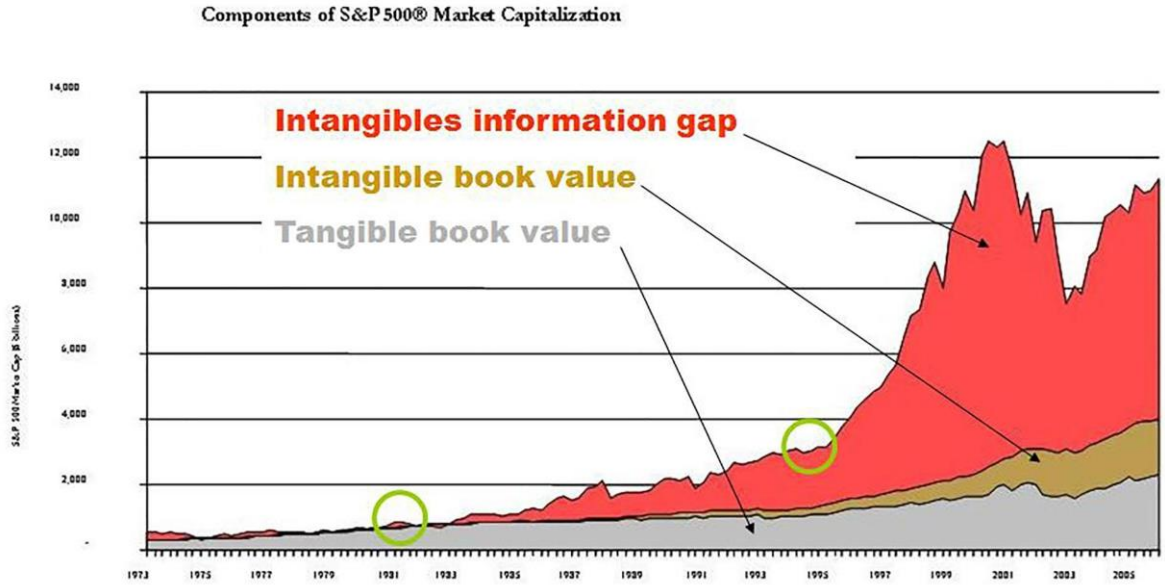
By this time, the internet, as it exists today, had been born. However, its scope was very limited due to the small number of users and limitations to its capability to organise files and information. It is for this reason that the phenomenon of the internet was being dismissed by economists as one of purely academic interest with little or no practical value. A major development at this stage was the invention of network-based implementation of the hypertext concept. This was developed by Tim Berners Lee, a scientist at CERN, Switzerland who changed the face of the internet by adding to it the ability to jump through documents by clicking on a key word or phrase.
Berners Lee used the concept of hypertext to organise online scientific information and to link various sources of information on the internet regardless of its location. Hypertext is a protocol which enables the user to link to information located on a different computer in a different country merely by clicking on a highlighted word/phrase. This concept of hypertext was taken one step further to make it more user-friendly by Marc Andreesen[10] who created the first internet browser and made internet surfing a reality.

2.3 Growing popularity of the internet among businesses

It has been established that the internet was seen as a useful tool by many. However, the expensive and complicated infrastructure related to its use did not allow it to become a widespread phenomenon instantly. By the end of the year 1996, when the internet was fully functional, according to a survey conducted by the U.S. Government, there were only 50 million users in a global population of approximately 5.8 billion. This number was expected to rise to 700 million by the year 2000 but it would still refer to a miniscule percentage of the global population. The reason behind this slow growth was the lack of necessary infrastructure in the developing countries. Therefore, more and more internet users existed in the developed world. The first step in bringing the internet to the people at large was the introduction of personal computers by IBM in 1981. This was followed by the excessive investment in intangibles by corporations in the United States which provided more credibility to the internet phenomenon and led to widening the intangibles information gap (as can be seen in the image below).

[9] History of the Internet. (n.d.). Retrieved October 12, 2015 from http://en.wikipedia.org/wiki/ History_of_the_Internet

[10] Editors, B. (n.d.). Marc Andreessen Biography. Retrieved October 13, 2015, from http://www.biography.com/people/marc-andreessen-9542208#other-ventures



(Source: http://3rdmoment.blogspot.nl/2015/03/whats-driving-trend-towards-intangible.html)

The compact size of these computers was their foremost advantage but the expense element still continued to elude many from enjoying this invention. However, the role of internet was already visible is some businesses since its initiation even though the statistics revealed that the use of internet was not that widespread among individual users.

Since this booklet primarily focuses on the use of the internet by businesses (both large and small), it discusses the use of intranets and extranets as well, which were used largely only by corporations.

2.3.1 Intranet – Networking within an Organisation

Intranet is a term used to denote a network within an organisation. It can refer to the organisation's website or a more extensive information technology structure. The aim of intranet is to connect all individuals within an organisation in the most cost-efficient way possible. It has been seen to boost productivity as it makes it easier to locate and view information. It can also be used as a forum for discussion for employees of the organisation. It can be understood as a private analogy of the internet to be used by members within an organisation. Intranets are based on the same TCP/IP protocols and use the standard and infrastructure of the internet, but they cannot be accessed by unauthorised public users due to implementation of protection systems termed as 'firewalls'. The first example of an intranet became visible as early as 1994 when FedEx put up a server on the worldwide web that allowed its customers to track their packages.[11] This server was only accessible by their customers by entering a security code provided to them, thereby limiting access to unauthorised users. Upon their introduction, intranets were dismissed by critics as irrelevant, but their many advantages did not hide for long. Their ability to organise each individual's desktop with minimal cost, time and effort in order to be more productive, cost efficient, timely, and competitive clearly paves the way for their future.

2.3.2 Extranet – Networking with Organisation's external users

An extranet is an extension of the intranet. Extranets serve the same function within an organisation but they are also accessible by some external users such as business partners, suppliers, vendors etc. They primarily find application in a business-to-business context where controlled access to persons outside the organisation's intranet is provided in isolation from all other internet users. They became commonplace for many businesses in the late

[11] Schneider, G. (2009). *E-business* (8th ed., p. 86). Boston, Mass.: Course Technology/Cengage Learning.

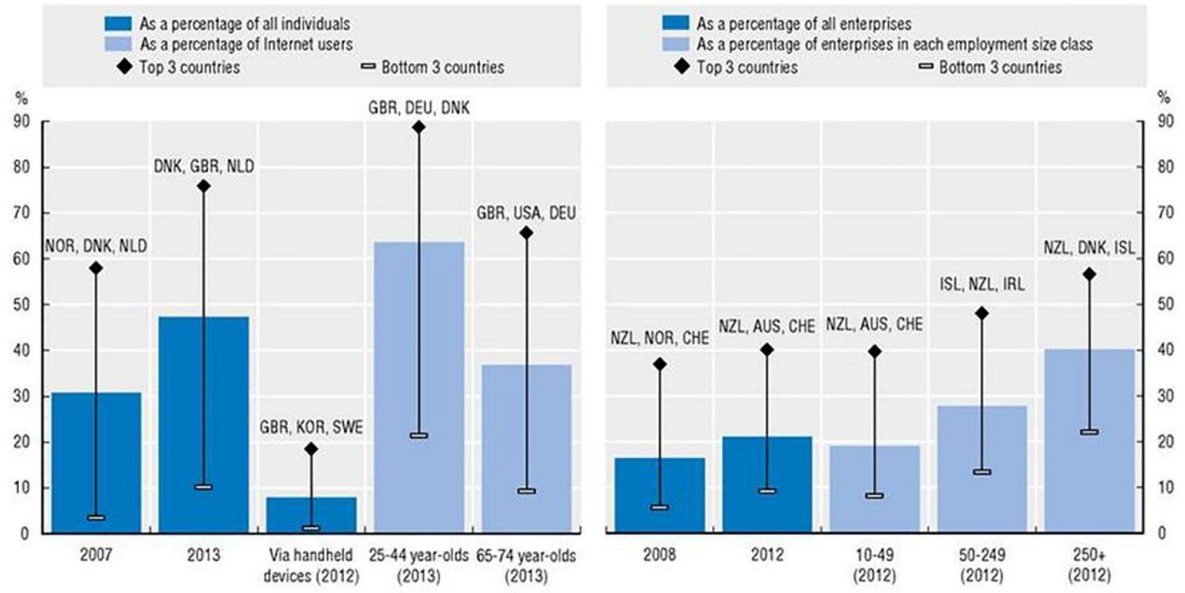
1990s and early 2000s to serve as centralised repositories of shared data made accessible only to authorised groups. Their main advantage is that they allow exchange of large volumes of data and can be used for joint development and training programs. Extranets first appeared within a year of the creation of intranets, but they became publicly visible for the first time in 1996 when IBM used an extranet system to distribute information at the Atlanta Olympic Games.[12]

2.3.3 Internet – A Network of Networks

Apart from the intranets and extranets, businesses all around the world saw a seismic shift almost instantly as the commercialisation of the internet took place in the early 1990s which soon gave rise to the terms such as digital economy, e-commerce, m-commerce, electronic money etc. It was in the early 90s itself that businesses started witnessing a change in their operating mechanisms and by 1998 that growth was exponential. However, at that stage excessive investments were made in this sector without realising its limitations which led to the 'dot-com bubble burst' in 2000. The ICT sector did not take long to recover from the impact and after careful planning and restructuring, an expanding upturn soon became visible.[13] The industries and individuals active in this field are shown below:

Figure 20. Participation in e-commerce by individuals and enterprises, 2007-08 and 2012-13

Individuals who ordered goods or services online, by age (left-hand panel) and enterprises engaged in sales via e-commerce, by employment size (right-hand panel), averages



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 43)

The online shopping system, which later came to be known as e-commerce, was first invented by an English inventor, Michael Aldrich in 1979 and saw its first application in 1981 when *Thomson Holidays UK* became the first company to install an online business-to-business network. Soon after that, in 1984, *Tesco* became the first business-to-consumer online shopping system. At that stage, the growth was slow and not many companies were venturing into this digital field while it was in its nascent stage. With the invention of the worldwide web in 1990,

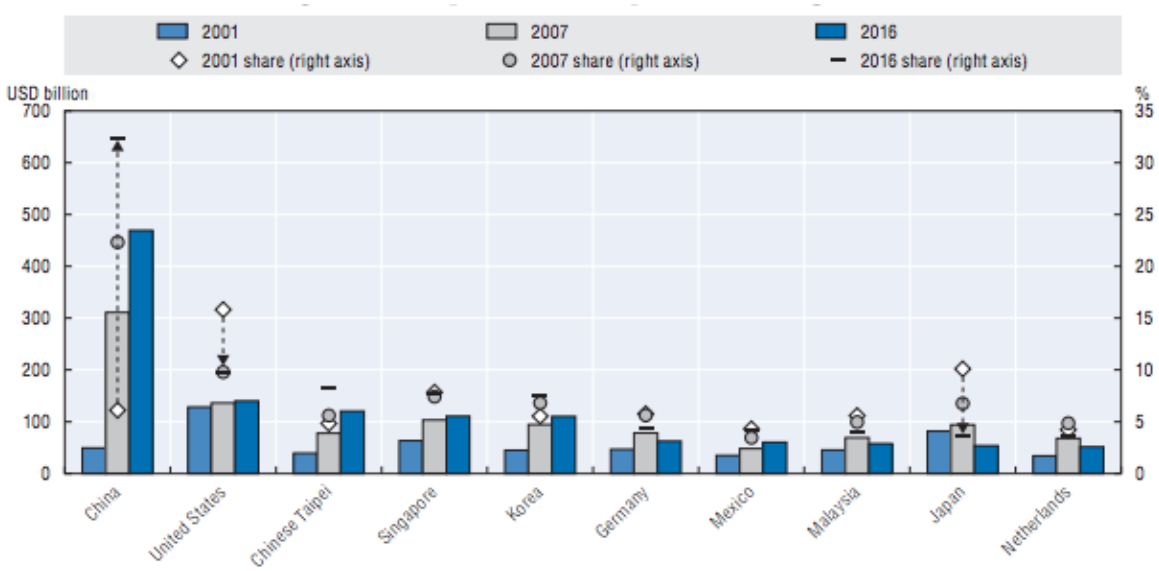
[12] Albarda, E. (1998). *Caught in the Web: The tax and legal implications of electronic commerce* (p. 6). Deventer: FED.

[13] Organisation for Economic Cooperation and Development. (2005). *OECD Input To The United Nations Working Group On Internet Governance*. France. OECD. Retrieved from http://www.oecd.org/sti/ieconomy/e-bookoecdinputtotheunitednationsworkinggrouponinternetgovernance.htm.

however, the situation changed significantly and in 1992, *Books Stacks Unlimited* opened a commercial sales website in Cleveland with an option for payment with credit card online.[14]

It was a time of rapid change and multiple companies were interested in profiting from the internet business boom. It was in 1994 that *Amazon* was founded. Initially started off as an online bookstore, *Amazon* was to become the largest online marketplace with a selection of products wider than any traditional store. The differentiating factor between Amazon and other traditional book sellers was the unique business model of Amazon characterised by convenience, a broad range of products, low prices and added to that the liveliness of a 'cool', yet trustworthy, website with daily changing specials, personal reviews, and electronic shopping cart and an affiliate program to encourage customers to set up their own book sites.[15] The growing worldwide clientele of Amazon goes a long way to show that E-commerce was not just a phenomenon restricted within the United States but had the scope to transcend all geographical boundaries to reach into the homes of customers at the remotest of locations. A recent acquisition by Amazon of Wholefoods signals a next step on these multi-channel "platform-economy" setups.

An e-commerce transaction, which is defined as 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,[16] was considered to have great potential in the coming years. Looking at the success and the potential of e-commerce, Kevin Duffey, as the elected chairman of the Global Mobile Commerce Forum, coined the term mobile commerce or m-commerce as an extension of e-commerce activities falling directly into the hands of the customers through wireless technology. Mobile commerce services were developed by 1997 and customers were provided various options for payments through mobile phones and for booking tickets, etc. Initial payment systems attached to mobile phones used SMS texts to enable payments but with the launch of iPhones and other smartphones, more sophisticated applications suitable for such devices were developed. The figures (top ten world exporters in ICT goods) representing the global trade in ICT goods conducted over the internet make it abundantly clear that the internet was a popular choice of both producers and consumers.



(Source: OECD (2017), Digital Economy Outlook, OECD Publishing, Paris, p. 126)

[14] E-commerce. (n.d.). Retrieved October 14, 2015 from http://en.wikipedia.org/wiki/E-commerce

[15] Baltzan, P. (2014). Chapter 3. In *Business driven information systems* (4th ed.). Boston: McGraw-Hill/Irwin.

[16] Organisation for Economic Cooperation and Development. (n.d.). The OECD Glossary of Statistical Terms. Retrieved October 14, 2015 from http://stats.oecd.org/glossary/detail.asp?ID=4721

With the adoption of e-commerce and m-commerce, where sales were executed completely through digital mechanisms, a need was identified for an electronic payment system or an electronic equivalent of cash. Electronic money (e-money) is an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transaction, but acting as a prepaid bearer instrument.[17] Various systems were put in place to enable the virtual transfer of money as a consideration for goods and services purchased virtually. Internet banking was first introduced in 1981 when four major banks in New York City started offering home banking services.[18] This concept was soon modified and implemented with sophisticated modifications by *PayPal* in 1998 which allowed for more secure transfer through an intermediary (PayPal). There existed programmes such as OpenMarket, which offered secure transactions, but security of payments was always the biggest concern associated with e-commerce transactions. PayPal addressed this concern to a major extent but that made internet banking transactions more expensive. A recent trend is that the platform economy facilitates QR payment options through their own banking license, like Alibaba through Alipay.

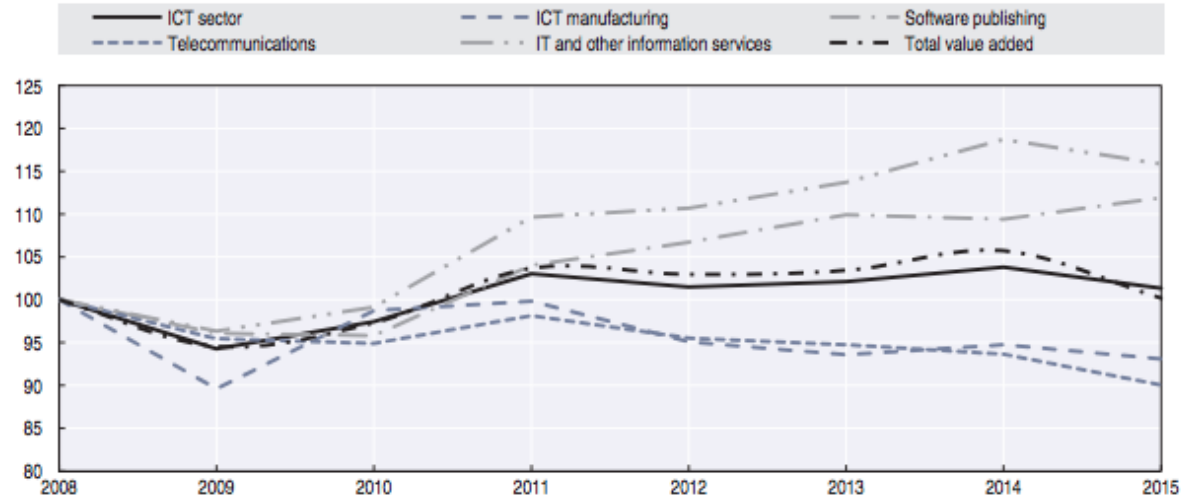
The commercialisation of the internet and the level of growth it has achieved in a short span of time leads us to believe that it will be the future of businesses and global trade, which is analysed in the next two parts.

2.4 Experiencing a shift to a new economic system

An economic system is a system of production and exchange of goods and services as well as the allocation of resources in a society. It includes a combination of the various institutions, agencies, entities and consumers that comprise the economic structure of a given community. It is evident that the advancement in information technology has had an impact on all other industries over the years.

Figure 3.1. **Growth in the value added of the ICT sector and its sub-sectors in the OECD area**

USD current prices (2008 = 100)



(Source: OECD (2017), Digital Economy Outlook, OECD Publishing, Paris, p. 116-118)

In the initial phase, businesses that were active in the digital playground had fairly simple business models compared to the traditional bricks and mortar businesses. They were providing the same type of goods and services as traditional businesses but were doing so via a website which, in itself, was considered to be a massive

[17] Ibid 16

[18] Cronin, M. (1998). *Banking and finance on the Internet* (p. 41). New York: John Wiley & Sons.

advance and many sectors such as retail and marketing witnessed substantial changes. Today we observe new means of production, exchange and the allocation of resources in a society. The sub-sections below discuss some industries that have been completely transformed by the use of digital technologies. These changes are visible in their business model, wider customer base, lower production and marketing costs, etc.

2.4.1 Telecommunications networks

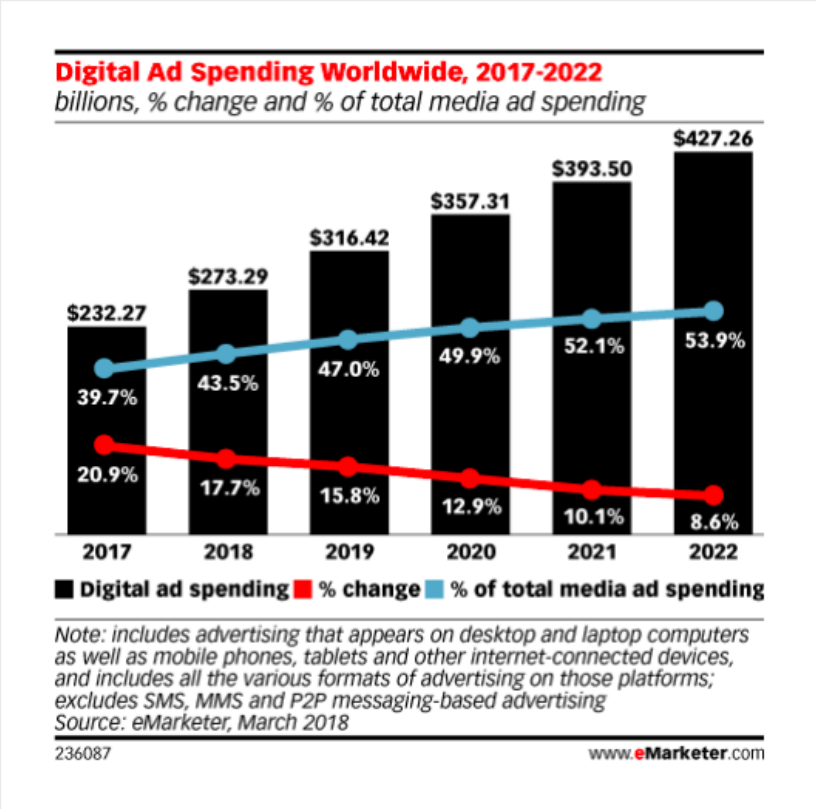
Telecommunications, literally, refers to the ability to share information over distance. Through the 1980s and 1990s the focus of this industry was on the needs of business enterprises rather than those of customers, but it soon changed and customers became the priority in this highly digital world. The first change was observed in the emergence of virtual telecommunication network operators. While the traditional telecom operators owned the entire infrastructure necessary for providing telecommunication services, their virtual counterparts merely leased the infrastructure to provide the same services. The major advantage of such network operators is that they are 3 or 4 times cheaper for end users than traditional networks as they need no capital expenditure for spectrum and extensive radio infrastructure.

The first commercial virtual network operator was Virgin Mobile, UK and it has been adopted by many countries since then, especially the Scandinavian countries. As of December 2018, there were 1,300 active operators, operating in 79 countries, the largest of which is Lycamobile. These models are based on the concept of a 'sharing economy' or 'collaborative economy', which will be discussed in the next segment of this chapter.

2.4.2 Online advertising/marketing

The first form of online advertising was witnessed in the form of an email in the year 1978. However, it has changed its form multiple times with advances in technology before coming to its current style. Online banner advertising began in the early 1990s as a tool for website owners to make some extra money. Companies such as Google earn a significant chunk of their profit from advertisers using space on Google search pages. For a few years now, companies have also started merging their advertisements with their editorial content. Another visible trend in this sector is advertisement through social media websites and mobile advertising. The market for internet advertising is expected to grow steadily at more than 5.0% per year through 2022, thereby reaching a highly profitable U.S.D 427.26 billion mark.[19]

[19] Organisation for Economic Cooperation and Development. (2014). *Addressing the tax challenges of the digital economy* (p. 76). OECD/G20 Base Erosion and Profit Shifting Project. Paris. OECD Publishing. Retrieved October 14 2015 from http://www.keepeek.com/Digital-Asset-Management/oecd/taxation/addressing-the-tax-challenges-of-the-digital-economy_9789264218789-en



2.4.3 Retail

The retail sector has undergone significant transformation after switching to digitalisation. Not only are there various online marketplaces selling nearly endless assortments, sometimes up to 80 times that of traditional retailers but new ways of obtaining customer information have been devised which have helped in the provision of more personalised services and advertising.

Most online marketplaces, such as Amazon, do not stock everything they sell through their website. They merely act as channels for other retailers to sell their products and charge a fee from those retailers for every transaction. This type of business model has only become possible due to widespread use of the internet. Another advantage that has been brought by digitalisation in the retail sector is that the retailers can now use certain programmes (e.g. cookies) designed to track customer data to provide services more efficiently. For example, Amazon can use cookies to track customer searches and then use software to sift through those searches to identify the most successful products or most common complaints, etc. This can assist Amazon in improving its service by recommending products to customers based on their previous searches or based on the searches of similar consumers.

Retail stores still play an important role in the business model of retailers; however, their use is different nowadays. It has become a place where people can pick up the products that have already been marketed to them online or which they already bought. Take the retails stores “to go” concept where a retail customer can enter and shop while the tracking system in the store and the linked payment application on your mobile close the transaction when you leave the store, making the cashier obsolete.

2.4.4 Manufacturing industry

The whole process of carrying out any manufacturing activity has been completely transformed by digitalisation. With the advances in technology, not only has there been an enhancement in design and development but also in the ability to monitor production processes in factories. End products have also become extremely knowledge-intensive.

Another trend which has become recently visible is that of virtual manufacturing. In such a scenario, the actual manufacturer contracts with several companies and each of them takes control of one part of the manufacturing process. All the partners work in an online virtual environment which has been created to resemble a (virtual) workplace where they get the design for the manufacturing ready. This virtual environment is constructed to resemble the physical manufacturing sites. For example, a company needs to excavate a certain site but it doesn't have the adequate know-how for it. It can make use of a collaborative network where other members work in a virtual environment set up to resemble the excavation site and come up with solutions which would ultimately be implemented by the original company. The use of collaborative networks provides access to a wider knowledge bank and the companies are no longer restricted to the resources and personnel physically available to them. This is, however, a growing trend and will be discussed in detail in the next segment.

Tesla Motors is one such company employing digitalised manufacturing processes for its cars. Their cars are equipped with such technology that if they are in need of repairs, they can automatically call for a corrective software download or, if necessary, send a notification to the customer with an invitation for a valet to pick up the car and deliver it to a Tesla facility.

2.4.5 Transport and logistics

According to the BEPS Deliverables Report published in 2014, the logistics sector has been transformed by the digital economy which enables tracking of both vehicles and cargo. The first company to use the tracking system was FedEx in 1994 when they used an intranet system to allow their customers to track their packages at each stage of delivery.

The transport sector has witnessed some changes as well, among which the most prominent are visible in the cab services sector. The first development in this field was the online ordering of cabs by entering all the details in an online form. However, the introduction of the Uber taxi service provided a complete overhaul of this industry by connecting multiple customers to multiple car drivers, rather than being limited to one company. The ease of access by a smartphone app along with reduced waiting times have revolutionised the taxi service. The business model of Uber is discussed in the next segment.

2.4.6 Payment services

'Electronic payment services' is a sector that has come into existence only because of the digitalisation of the economy. When businesses started selling their wares over the internet, a natural extension was to put in place

mechanisms for payments to be made online as well. This led to the inception of mechanisms such as Epay, internet banking and PayPal. However, the issue of most concern regarding online payments is one of trust and security. Consumers became nervous about using internet payment options because of scams being carried out without any obvious preventive mechanism being in place. Open Market issued software that monitors a company's internet commerce with airtight security.

Meanwhile, advanced IT systems have been implemented to increase trust, including the use of Blockchain. In the initial phase of the digital economy, certain bank account or credit card details had to be provided to the vendor. This required a high level of trust in a sometimes-unknown remote vendor, thus limiting the growth of such transactions. To address this, intermediaries have been interposed between the buyer and the seller. The intermediary (usually a bank or global trade platforms such as Tencent) accepts payments from the buyer, verifies them and then deposits them into the seller's account. Examples of such systems include e-wallets which the buyer pre-charges with credit and others such as PayPal.

More recently, another payment system has come into existence, i.e., virtual currencies. Virtual currencies are not merely a digital representation of cash but are whole new currencies in themselves. They are not issued by any government body and are regulated completely through a peer-to-peer mechanism, thereby terminating the role of an intermediary. One example of such a system is Bitcoin. Bitcoins are minted privately and are being accepted by internet-based marketplaces such as Amazon. They can be used as an alternative to traditional currencies and because they do not require an intermediary, they are usually cheaper than using traditional currencies. They are also a growing trend and will be discussed in the next segment.

Nowadays, especially in China, integrated IT systems have started to appear. Two of the most famous payment systems are Alipay by Alibaba and Wechat Pay by Tencent. By simply downloading the app and connecting it with one bank account, there is no longer the need for a consumer to bring bank cards or cash with them. The Chinese consumer can pay at virtually every store with their phone. A QR code can be easily found in many venues, and payment is done through scanning the QR code with a smart phone. No card or cash is needed, no code is needed, and no signature is needed.

2.4.7 Micropayments

Micropayments are payments of very small amounts such as those under one euro. They were initially envisioned to involve payments of very small fractions of a cent, as little as 0.0001 euros. However, the high charges imposed by intermediaries have hampered growth of this concept.

The idea of micropayments seems to be a useful one as it offers scope for various new business models, such as an online newspaper charging small sums to their readers per article or advertisers paying users small sums each time they click on a company's ads. PayPal is one such company offering to transfer small amounts of under USD12 for its customers, but the transaction fee charged by PayPal is still relatively high. An interesting solution to the difficulties in the use of micropayments is the development of virtual currencies. Since these currencies are deregulated and do not require an intermediary to verify their transfer, they offer the enabling of micropayments at very low transaction costs.

Cloud computing

Cloud computing can be defined as the provision of standardised, configurable, on-demand, online computer services including computing, storage, software and data management, using shared physical and virtual resources. The resources to which the cloud customers are granted access are not stored on a single computer but on a collection of networked computers that are available to everyone who has access to that 'cloud'. They can be

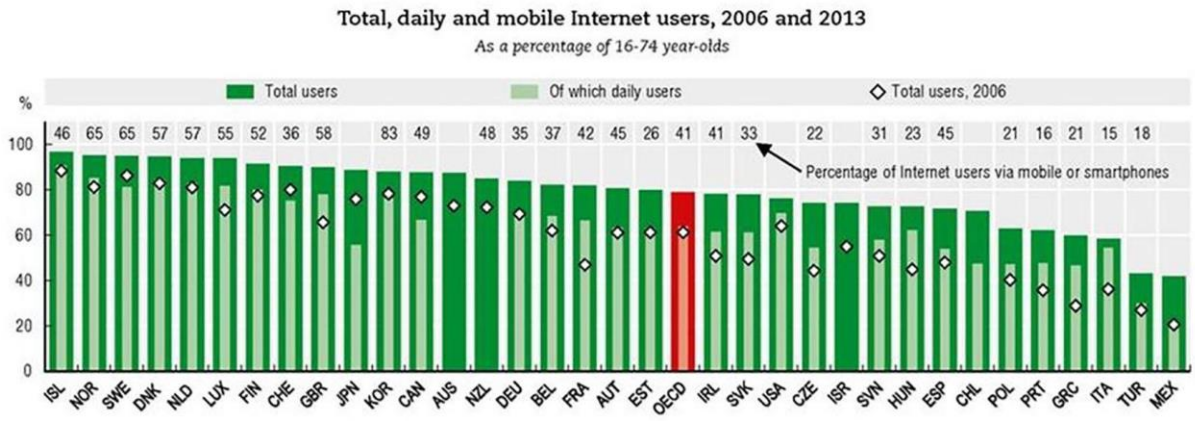
accessed using various devices, as long as they are connected to the internet. The advantages of using the cloud include reduced costs of owning IT infrastructure, easy virtual collaboration, extra processing power and elimination of the need for local storage.

Cloud computing also focuses on maximising the effectiveness of shared resources so that the same facility that, for example, serves one client in the United States in the morning through one application can serve another client in Europe in the evening through a different application. The uses of cloud computing can easily be seen in businesses where users merely 'rent' software instead of buying it or where groups of people working on a project can share their files in a virtual space instead of using flash drives and manually transferring those files to everyone else's computer. This application of the cloud also helps in saving storage space on one's own computer.
OneDrive is Microsoft's popular cloud services. The same way Google has Google Drive and Apple has iCloud, Microsoft provides OneDrive for people to store and exchange data online. Generally speaking, cloud storage was only a method of sharing files with others or transfer them from one device to the other. As storage space becomes more affordable, however, cloud storage is becoming an increasingly attractive backup solution, provided the user is comfortable with someone else is managing their data. OneDrive's major benefit is that it syncs across platforms and integrates with the services and applications you already use, including Windows, Office, Outlook, and more.

Knowledge sharing and problem solving
Leading European institutes are combining their efforts and knowledge to advance research into tumour biology and ultimately establishing and EU-funded network focused on contributing to the development of new treatments, insights and technologies to combat cancer.
It is estimated that cancer affects four out of every 10 Europeans at some point in their life. The RETUBI initiative brings together major cancer research institutes in France, Germany and Portugal to strengthen Europe's capacity for cutting-edge research in tumour biology, laying the foundations for future innovations in treating the disease.
RETUBI is a twinning project under the EU's Horizon 2020 programme. Working with the RETUBI partners – the Institut Curie in Paris, Europe's largest cancer research centre, and the Deutsches Krebsforschungszentrum in Heidelberg, the largest cancer research institute in Germany – the Portuguese institute is setting up a dynamic cluster of excellence in the Lisbon region, focusing on studies of cancer stem cells, cancer signalling, cancer invasion and metastasis, and tumour angiogenesis.
As a result of knowledge exchanges in RETUBI, the institute expects to increase research output across multiple indicators by 30 % by 2020. This includes more publications in top peer-reviewed scientific journals, raising the number of citations and a greater presence at key scientific meetings. The project will therefore bolster the institute's scientific and innovation capacity and increase its international visibility and collaborations.

2.5 Understanding the ICT impetus in shaping the digital economy

The economic shift triggered by the invention of the internet has received significant impetus with the developments in ICT. The growing number of internet users is also conclusive proof that the digital economy is here to stay.



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 77)

The role of ICT in this evolution can be categorised as follows:

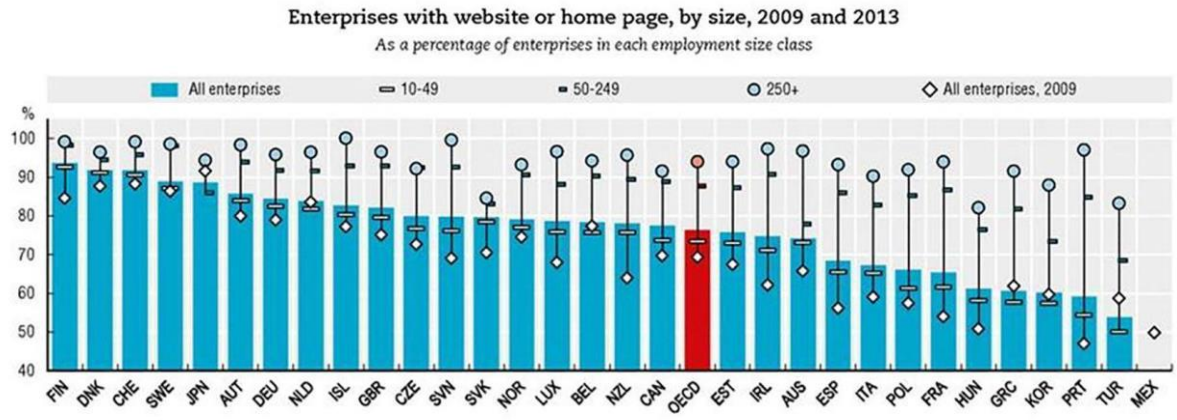
2.5.1 Early phase focused on increasing access

Before the advent of the digital economy, the main focus of manufacturers of computer hardware was on distinguishing their products from the competition and on developing products that would work on unique proprietary standards. Such differentiation was what made their products stand out in the market and appeal to customers. However, changes to this trend were seen in the early phases of the digital economy where the focus soon shifted to standardisation. According to the observation made by the OECD in a paper on digital economy, as products become more successful and reach a wider market, their features have a tendency to solidify, making it difficult for original producers to change those easily and easier for competitors to copy those features. Hence, this process of standardisation has helped bring prices of ICT products down significantly because the most successful products in this age are those which integrate best with other products in the market.

The consumer plays a much more important role in this digital age as it is ultimate customer satisfaction that is targeted by most producers, unlike the early days where the customer had to modify his needs based on the availability of products. Consumers initially accessed the internet solely through fixed personal computers but as the customers become more mobile, they demand mobility of the devices connected to the internet. This has resulted in innovative integrated packages of hardware and software such as smartphones and tablets which provide easier access to the internet on the go.

The two developments which have brought the prices of ICT products down are widespread standardisation of computing hardware and development of products based on consumer demand. The combined decline in prices of ICT products along with an increase in their performance has resulted in increased connectivity which has further contributed to the development of new activities in both public and private sectors. Businesses across all sectors are now able to design and build their operating models around technological capabilities, in order to improve flexibility and efficiency and extend their reach into global markets.

By the end of this phase, it was evident that most profitable enterprises in this era were also operating through a website and more and more businesses were trying to establish an online presence for themselves through a website or a home page. The statistics on this matter speak for themselves:



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 139)

2.5.2 Phase of innovative adaptations

As businesses increasingly look to improve their products to match consumer demands and requirements, new and innovative technologies have developed. Just as commoditisation in the hardware market cut profit margins for traditional manufacturers while creating new opportunities for low-cost low-margin manufacturers, growing competition in the software market has forced software companies to become more creative and more responsive to consumers' needs, all of which benefited the consumer. The phase of innovation is visible across almost all sectors of the economy including online marketing platforms selling goods and services, online intermediaries selling digital goods and services, online advertising and manufacturing etc., where new ways of doing business are being developed every day.

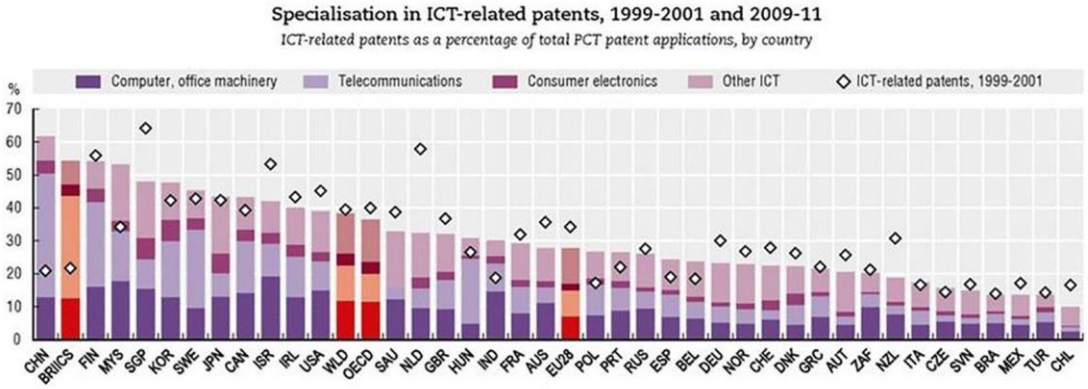
A common trend visible amongst all this innovation is the expanding use of content and data. There are three different types of content: owned, earned and paid. They can be differentiated as follows:

Paid content refers to display ads, television commercials, pay per click search ads etc. i.e. the so called "traditional online advertising";
Owned content refers to the corporate website of a company, Facebook advertising campaigns, blogs, newsletters etc.;
Earned content is the result of public & media relations efforts to gain coverage social media posts, tweets, product reviews, videos, photos, and open dialogue within online communities etc.

The use of content increases interaction between users and more content updated more frequently increases a website's visibility in search results, making content a very useful tool for advertisers. Similarly, the importance of data cannot be overlooked. Data is generated by users of online applications when they provide information to those applications. Or it may be inferred by analysing their online activities and tracking their searches. This data is then used to provide a more customised experience and to generate productivity and increase quality. As the number of users of internet-based applications increase, the data generated by them increases as well, resulting in a massive amount of data available for businesses to analyse. This trend has given rise to a new segment of businesses focusing on processing and analysing the collected data to make it useful for businesses.

The major difference between content and data is that data is mainly user-generated whereas content may also be generated by brand owners and by other media in exchange for payment from brand owners. Content serves the purpose of providing information to customers whereas data serves the same purpose for businesses who want to know about consumer needs and demands.

The growing number of ICT patents captures this phase of innovative adaptations quite accurately:



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 115)

2.5.3 The current phase of cloud-based processes

After witnessing a drive for innovation based on customer needs and requirements, there has been a recent shift towards centralised provision of computer services including computing, storage, and software and data management through shared physical and virtual resources. Cloud computing has become a commonplace term to denote provision of services of this kind to be accessed by customers on a variety of devices connected to the internet. Cloud computing provides a cost-efficient alternative to purchasing and maintaining expensive IT equipment. In this process, the resources that are ultimately provided to customers are stored on many networked computers accessible by a certain group of people. Therefore, each user has access to the computer resources stored online and he/she can access it when needed, without the need to store it on their own devices, overcoming associated concerns about security or even hardware failure.

Cloud computing services can be offered as 'infrastructure-as-a-service' or as 'platform-as-a-service' (PaaS). In the service model based on the provision of infrastructure as a service, an organisation outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis. In a service model based on provision of a computing platform, the customer can rent virtual servers and associated devices for running existing or new applications.[20]

Since cloud computing has become an essential component of this internet driven age and looking at the thriving use of the cloud across the globe, this book discusses the detailed features and along with their tax implications in Chapter 5.

2.5.4 ICT is the backbone of the new economy

The information and communication technology (ICT) sector clearly form the backbone of this new economy. This sub-section analyses the various layers and components that contribute to its functioning in the final form as we see it. The bottommost layer of this multi-layered structure is the infrastructure which consists of all the hardware such as cables, routers, servers, and data centres, etc. Software resources stored in those servers form the second layer of this structure. These software resources are essential for the functioning of the infrastructure. They can be produced both by enterprises for commercial purposes and by individuals for personal use. Next is a layer termed as accessibility which serves to link the first two layers. It provides the software resources with the necessary structure to take advantage of the underlying infrastructure to create applications which are usable by

[20] Rajsingh, E.B., Veerasamy, J., Alavi, A.H., Peter, J.D. (Eds.). (2018). Advances in Big Data and Cloud Computing. Retrieved March 14, 2019 from https://www.springer.com/gp/book/9789811071997

businesses and individual users. These applications form the fourth layer of the digital economy. The last layer between applications and the end users is that of the interface (machine-to-human) which represents users' experience. Any device used to access the internet, such as smartphones, personal computers, etc. form the interface layer. At the end of this structure are the end users who access the applications that are powered by the software resources on their smartphones and tablets.

2.6 What could the future be – looking ahead?

2.6.1 Changing economics

Looking at the benefits of ICT, their widespread use and emerging developments in the field, it can be said that the time for a technology era has arrived. The same is suggested by Jeremy Rifkin in his book, 'The Zero Marginal Cost Society' where he argues that capitalism will come to an end before the middle of the 21st century and will be replaced by a concept he calls 'collaborative commons' which is essentially based on the concept of a sharing economy. He argues that the capitalistic model thrived due to the inherent entrepreneurial dynamism of competitive markets that drove productivity up and marginal costs down, enabling businesses to reduce the price of their products and gain a wider consumer base and market share. Marginal cost is defined as the cost of producing additional units of a good or service, if fixed costs are not counted and a reduction in marginal costs has always been welcomed by economists. Rifkin's theory anticipates the possibility of a technological revolution that could bring marginal costs to near zero. Rifkin proposes that this can be achieved through the formidable structure of the 'Internet of Things'.

The model proposed by Rifkin is based on the idea of collaborative commons where everyone will let go of their private property and turn into agents in a global sharing economy. He proposes an era where machines, equipped with the latest technology, will be capable of producing their own spare parts and will propagate them indefinitely. They will be powered by an alternative energy source that will essentially be produced by people at large and will be networked together through smart devices connected to the 'Internet of Things'. As a result, they will deliver products at virtually no cost, save the minimal one of supplying the basic raw materials.[21]

An example of this theory is already visible in practice in the form of newly developed technology by Tesla Motors. Tesla Motors has designed a new smart car which is capable of automatically downloading corrective software should it need repairs or sending a notification to the customer with an invitation for a valet to pick it up and deliver it to a Tesla facility. Another example supporting smart energy solutions is the use of smart wind turbines which, when networked, can be operated through software that can adjust the blades on each one to minimise the impact on the efficiency of other turbines nearby. The Chief Technology Officer of WiTricity has proposed a new way of transferring power without wires through the use of wireless resonance technology.[22]

These concepts of a wholly shared economy, use of technology to develop fully automated machines and routing energy through smart grids using technology to transfer it wherever needed seem too futuristic, but a large number of people are already becoming a part of this collaborative economy. Consumers are already plugging into the fledgling 'Internet of Things' and making and sharing their own information, entertainment, green energy, and 3D-printed products at near zero marginal cost. They are also sharing cars, homes, clothes, electricity and other items via social media sites, rentals, redistribution clubs, and co-operatives at low or near zero marginal cost. Meanwhile, students are enrolling in free massive open online courses that operate at near zero marginal cost.

[21] Waters, R. (n.d.). The Zero Marginal Cost Society', by Jeremy Rifkin- A Review. *Financial Times*. Retrieved October 14, 2015, from http://www.ft.com/cms/s/2/7713c7fc-b07a-11e3-8efc-00144feab7de.html#axzz3MAUuCSKt

[22] Glass, N., & Ponsford, M. (2014, March 28). Wireless electricity? It's here - CNN.com. Retrieved October 14, 2015 from http://edition.cnn.com/2014/03/14/tech/innovation/wireless-electricity/

Social entrepreneurs are even bypassing the banking establishment and using crowdfunding to finance start-up businesses as well as creating alternative currencies in the fledgling sharing economy. In this new world, social capital is as important as financial capital and co-operation is ousting competition and shareable value of collaborative commons is becoming the driving force behind this economy.[23]

Some of the ideas proposed by Rifkin have also been identified by the OECD as emerging and potential developments in the field of information technology. A brief analysis of such forecasts is presented below.

2.6.2 The sharing economy

The sharing economy is not just a theoretical concept used by economists but has numerous practical implications. It refers to the 'peer-to-peer' sharing of goods and services and provides reduced transaction costs, increased availability of information and greater reliability and security. Amateur providers in the sharing economy tend to share their available resources at a lower cost than a professional company may have billed, thereby bringing down overall prices.

The sharing economy has given rise to a number of new business models focusing on sharing of one particular service or product such as cars, spare rooms, food or clothes, etc. Airbnb is one such service where people can rent a room, part of a house or a whole property from someone who is currently not using it instead of a traditional hotel room or apartment. TaskRabbit is another such application where customers can hire people to do jobs and tasks from delivery to handyman to office help. Similarly, Lyft is a ride sharing service for people to find rides from those individuals who own a car. Fon is another startup that lets people share some of their home Wi-Fi network in exchange for free Wi-Fi from anyone within Fon's network. Uber is a taxi service based on a similar model where drivers drive their own cars to anyone in need within minutes. All of these examples are based on the concept of people sharing things they own, in their idle time, for the benefit of others. This hugely helps in bringing down prices because the providers of the service do not have to invest anything in infrastructure and development.

2.6.3 Big data

Big data is, simply put, a wide collection of datasets which are too large to be analysed manually or through the use of traditional data processing applications like Excel. Big data is a set of techniques and technologies that require new forms of integration to uncover large hidden values from large datasets that are diverse, complex, and on a massive scale.[24] Analysis of big data, especially for e-businesses, is extremely useful because it can provide detailed information about consumer needs and market demands. A report published by the National Institute of Economic and Social Research, in the United Kingdom stated that the current digital economy is poorly served by conventional definitions and datasets and that 'big data' methods can help provide richer, more informative and more up-to-date analysis. The benefits of using big data include cost reductions, time reduction, new product development, optimised offerings and smarter business decision-making.

The uses of big data can be seen in multiple industries, especially for companies involved in marketing and advertising.[25] An example is in the business strategies of Netflix and Amazon. They use cookies or similar devices to track searches made by their users. The collection of those searches forms big data which is then analysed by them to locate current trends based on the type of queries searched by users. These companies use this information

[23] Rifkin, J. (2014). Zero marginal cost society: The rise of the collaborative commons and the end of capitalism (1st ed.). New York: Palgrave Macmillan.

[24] Yaqoob, I., Hashem, I., Khan, S., Anuar, N., Mokhtar, S., & Gani, A. (2015). The rise of "big data" on cloud computing: Review and open research issues. *Information Systems, 47*, 98-115. doi:10.1016/j.is.2014.07.006

[25] SHAW, J. (Ed.). (2014, March 1). Why "big data" is a big deal. *Harvard Magazine***.** Retrieved October 14, 2015 from http://harvardmagazine.com/2014/03/why-big-data-is-a-big-deal

to make purchase suggestions to customers on their websites based on prior interests. Another interesting use of big data is displayed by credit card companies in determining and evaluating risk of default before issuing cards to their customers. They track searches of the applicants and use that data to determine whether or not those applicants are likely to default on credit card payments. For example, people who buy anti-scuff pads for their furniture are supposedly highly likely to make their payments. Another example is Google collecting statements from one local community in its search engine around the theme "fever". Any intensified use of this or related words extracts the message that any time fever is on its way, based upon which a marketing campaign can be kickstarted.

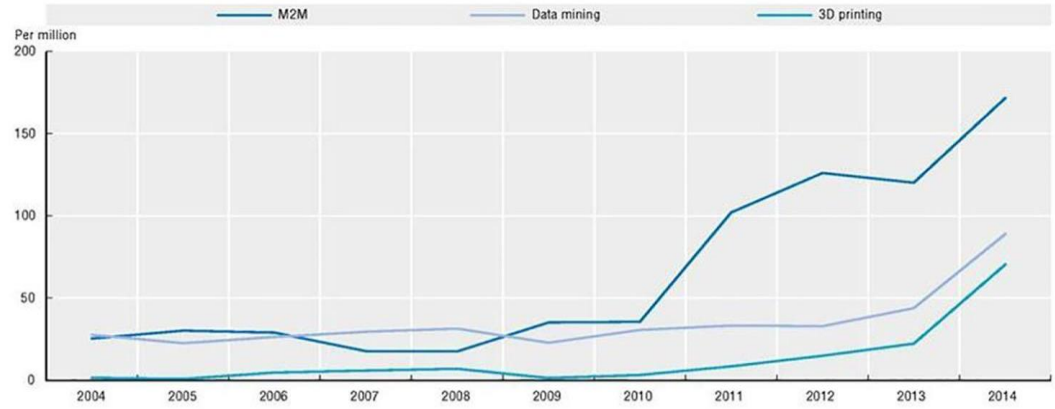
2.6.4 Intangibles

The use of intangibles in businesses is not a new phenomenon in itself but the *dependency* on intangibles has increased significantly in recent years. Forecasts show that development and exploitation of intangibles is a key feature of the digital economy and an even heavier reliance on intangibles is to be expected in the future. In the past businesses thrived on tangible, physical assets. For example, Ford and Rockefeller owned factories and oil respectively that served as their major wealth creators. However, in this internet economy, organisations are succeeding by using assets that have traditionally been considered secondary, such as smart people, good processes, big data, unique designs, strong networks and creative business models, all of which can easily be characterised as intangibles.

The use of intangibles in businesses increased from the 1990s and by 2008, 14% of U.S. GDP was spent on intangible capital investment in stark contrast to 1948 when less than 5% of total GDP was spent on intangibles.[26] Data provided by Ocean Tomo on S&P 500 companies shows that intangibles have become a more important measure of enterprise value in recent decades: the intangible capital share in most S&P 500 businesses has increased from 17% in 1975 to 80% in 2010.[27] These figures clearly indicate the rise of the intangible economy which is set to transform the face of modern day businesses. Data collected by the World Intellectual Property Organisation (WIPO) confirms that the patents on ICT related technologies are one-third of the total number of patent applications.

Figure 10. Patents on M2M, data analytics and 3D printing technologies, 2004-14

Per million PCT patent applications including selected text strings in abstracts or claims



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 36)

[26] Corrado, C., Hulten, C., & Sichel, D. (2009). Intangible Capital and Economic Growth. *Review of Income and Wealth, 55*(3), 661-685. Retrieved October 14, 2015, from https://www.conference-board.org/pdf_free/IntangibleCapital_USEconomy.pdf

[27] Annual Study of Intangible Asset Market Value from Ocean Tomo, LLC. (2015, April 3). Retrieved October 14, 2015, from http://www.oceantomo.com/2015/03/04/2015-intangible-asset-market-value-study/

2.6.5 Blockchain

The sharing economy concept, implications on our daily life and the interconnected technological developments have been discussed before. Blockchain is another technology with features that can support and enrich the roll out of the sharing economy. In essence, Blockchain can lower cost and increase speed due to the diminishing role of a third party, increase security due to the use of complex cryptography and trace ownership because all transactions are stored in an open database open for all participants in the network.

Take the energy market as example, many households these days have a roof full of solar panels. Households having a surplus of energy due to lower use than what has been generated by the solar panels may want to sell that surplus to a neighbour wanting to charge his electric vehicle. The neighbour might be more eager to buy energy knowing it is generated in a sustainable fashion.

In this example the seller and buyer probably are familiar, but in fact the seller doesn't need to know who is buying the energy and the buyer doesn't need to know who is selling, because a validation check is done upon arrival in the platform and a credibility check has been made redundant due to the use of automated smart contracts.

If these concepts keep on developing, the role of the large energy suppliers will diminish or transform into facilitating such local energy trading platforms.

The idea of a sharing economy is out there, the IOT infrastructure and its sensors and smart applications is making great developments as well, Blockchain technology can support the roll out by functioning as administrator to keep track of ownership and guarantee payments between parties.

2.6.6 Virtual currencies

Recent years have seen the appearance and development of virtual currencies. They are digital units of exchange which are not regulated or issued by any government. There are different types of virtual currency, namely closed and open virtual currencies. Closed currencies are for use only within a specified virtual environment such as an online gaming platform where they can be used to purchase items only within the game. However, completely open virtual currencies are the focus of discussion here which can be used to purchase real world goods and services. There are various methods of obtaining open virtual currencies such as mining them by solving a number of complicated equations or purchasing them from a miner. These currencies rely on cryptography and peer-to-peer verification to secure and verify transactions.

Bitcoin is the most popular example of such a currency. In its initial phase, bitcoin was associated with illegal use but in the recent years it has achieved credibility as multiple, internet based and physical, businesses have started accepting payments in bitcoins.[28] Transactions in bitcoins do not need an intermediary to verify and conclude them; therefore, there is little or no additional transaction fee associated with their use. This makes them a viable alternative for many, especially in case of micropayments. The confidentiality associated with bitcoins also makes them a desirable commodity as many consumers are still hesitant about providing their personal information to an unknown website. The unregulated nature of bitcoins and their performance in a completely virtual environment makes them a commodity of the future.

2.6.7 3D printing

3D printing is another service that is the result of the technological revolution that our modern world is witnessing. It is also known as additive manufacturing and can be defined as a process of producing three dimensional solid objects from a digital file. It starts with making a virtual design for the desired product using a 3D modelling programme which uses software that slices the final model into multiple horizontal layers. The 3D printer then creates the object, layer by layer, and then blends them together with no visible sign of layering in the final

[28] What can you buy with bitcoins? (2015, February 17). Retrieved October 14, 2015, from http://www.coindesk.com/information/what-can-you-buy-with-bitcoins/

product.[29] Similarly, for copying an existing object, a 3D scanner can be used to create the digital file which is then printed in the same way as a new object.

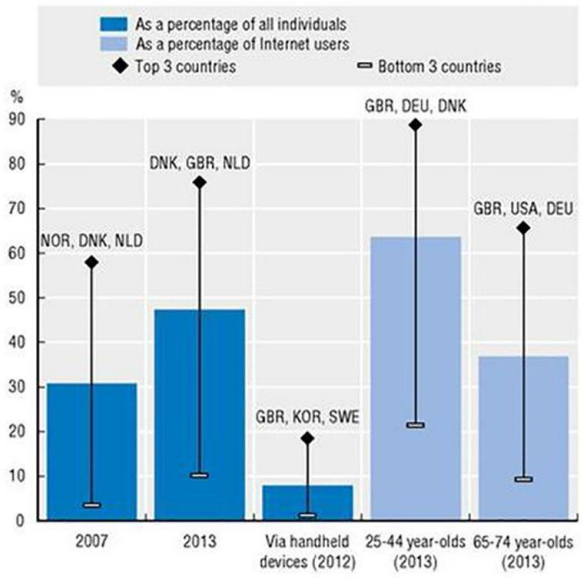
This technology has the advantage of bringing the manufacturing process closer to the customer so that direct interaction with that customer can help improve product features. This could reduce mass manufacturing and lessen the environmental impacts of industry by reducing the number of steps in the process. Its use is already visible in the healthcare industry where 3D printing of hearing aid earpieces is being heavily used.[30] With the advent of the concept of virtual manufacturing where the whole design of the desired product is prepared virtually in collaboration with a group of contributors in different locations, it can be seen that 3D printing of those designs created in a virtual environment would be a very useful tool.

2.7 Profiling the digital economy

2.7.1 Reasons for the increasing dependence on digital technologies

The number of internet users has risen from 50 million in 1990 (less than 1% of the global population) to over 3 billion in 2014 till 4.4 billion in 2019, thereby connecting more than 50% of the global population to the internet.[31] The change in the number of individuals and enterprises participating in e-commerce has changed significantly.

Participation in e-commerce by individuals and enterprises, 2007-2013



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 43)

[29] What is 3D printing? How does 3D printing work? (n.d.). Retrieved October 14, 2015, from http://3dprinting.com/what-is-3d-printing/

[30] ibid 29

[31] Global digital population as of April 2019 (n.d.). Retrieved May 7, 2019, from https://www.statista.com/statistics/617136/digital-population-worldwide/

This rise is not limited to the developed countries but is also apparent in developing countries, especially in Asia and Africa. As more users connect to the internet, so the customer base for companies operating digitally expands. The reasons for and benefits offered by the digital economy, as identified by the OECD, are: [32]

Liberalised regulatory approach: The first reason that spurred the growth of the internet was its completely different organisational structure. There is no membership and no central authority, much to the dismay of various governments who would like to have a greater control over something so massive invading their country. However, governments have realised the need to avoid unnecessary regulatory burdens on the internet and have, in fact, initiated policies for liberalisation of telecommunications, liberalisation of value-added information services using telecommunication facilities, etc. which have enabled growth and competition in internet-based services.

Inter-operability between devices: Another reason is the ease of connecting with almost any device. The internet uses the same TCP/IP protocol to transmit messages and to link all devices together. This protocol is simply a means of specifying how data is broken up into packets with assigned addresses to be transferred over packet switching networks that make up the internet. The protocol specifications are available to anyone, at no cost, thus considerably reducing barriers to entry, and enabling inter-operability.

Inter-connectivity between participants: The internet is made up of tens of thousands of interconnected networks run by internet service providers, individual companies, universities, governments, and others, which can communicate together. The key underlying technical idea is that of open architecture networking in which any type of network anywhere can be included. There is a clear separation between the underlying physical medium, the network transport and inter-connection (internet protocols), and the application technology, which is processed by devices connected at the ends of the network. Many views it as important that the internet remains open and publicly available.

Reduction in costs: One of the major reasons behind the success of digitalisation is the reduction in cost for almost all enterprises. The drop-in prices have been caused by advances in technology and the pressure for constant innovation which has, in turn, led to the emergence of a variety of commodities. Now, as products become successful and reach a greater market (which, in itself, has been enabled by digitalisation) their features run a risk to be copied. This process leads to several competitors selling the same products which helps in bringing the prices down.

2.7.2 Emerging characteristics of the digital economy

In this evolving economy, the most recent change is the increased recognition of the importance of consumers and their changing needs and demands, now a focal point of the manufacturing process.

Traditionally, products were manufactured based on the research and development conducted by the producer. That research process usually included an element of market research but it was not the key driver. The products were ‘made to stock’ and then sent to distributors or affiliates of the producer to push to the end consumer. Since the number of producers who had the resources to push their products down to the consumer in bulk was limited, this model gave rise to a monopolistic structure in the market and owners of those monopolies were able to charge premium pricing for their products. This is clearly depicted in the diagram below.

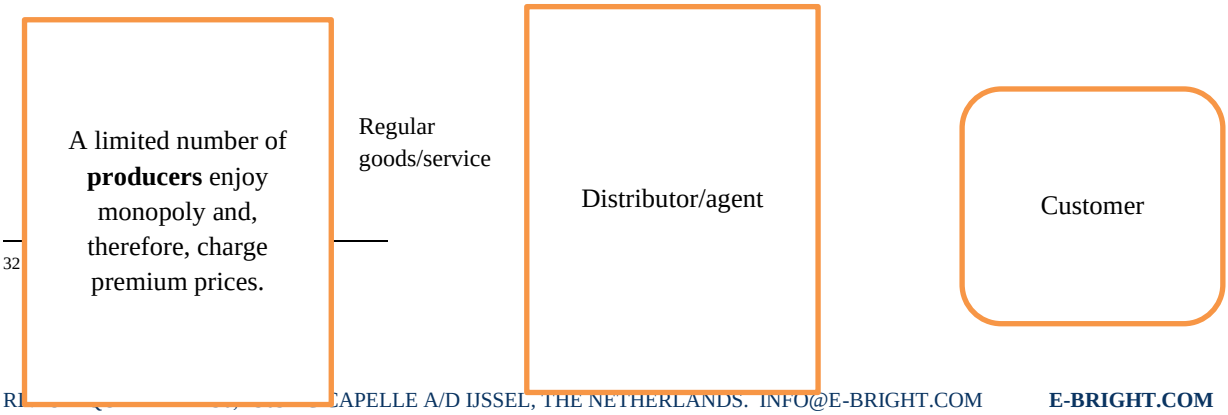


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Fig 1a: Traditional producer-consumer relationship (push model)

With the advent of the digital economy, the way enterprises conducted business was changing but the monopolistic behaviour in those businesses was still visible. The major difference at that stage was that the monopolies were now the internet services providers (ISP) which were increasing in value with increased communication. They were performing the same functions as their traditional counterparts but were providing customers with pre-made digital goods and services and were charging premium pricing for the same. This is clearly depicted in the diagram below.

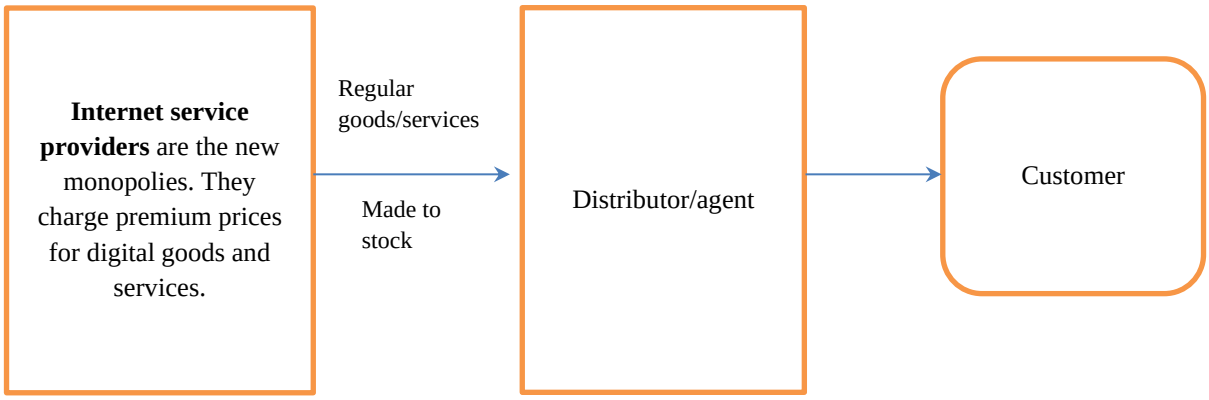


Fig 1b: ISP monopolies (push model)

However, in the modern digital economy, customers are at the heart of product and service offerings. Any successful business needs to first understand the requirements of its target market and then produce goods and/or services based on that demand. A complete reversal of the monopolistic behaviour is seen here. The examples such as Uber taxi, Airbnb etc. are proof that such small-scale businesses are becoming more and more profitable in this age of providing personalized goods and services. Such businesses offer completely customised goods and services tailored to the needs of their customers. However, another reason for their growing popularity is the difference in price or value that they offer compared to traditional businesses. Increased competition puts downward pressure on prices but because they use collaboration as a technique for manufacturing, ensuring minimal marginal costs of production, a low-cost end product results. Thus, consumers attain ‘instant satisfaction’ because not only do they receive goods and services completely tailored to their needs but also at an affordable price. This consumer centric model is depicted hereunder (Fig. 2).

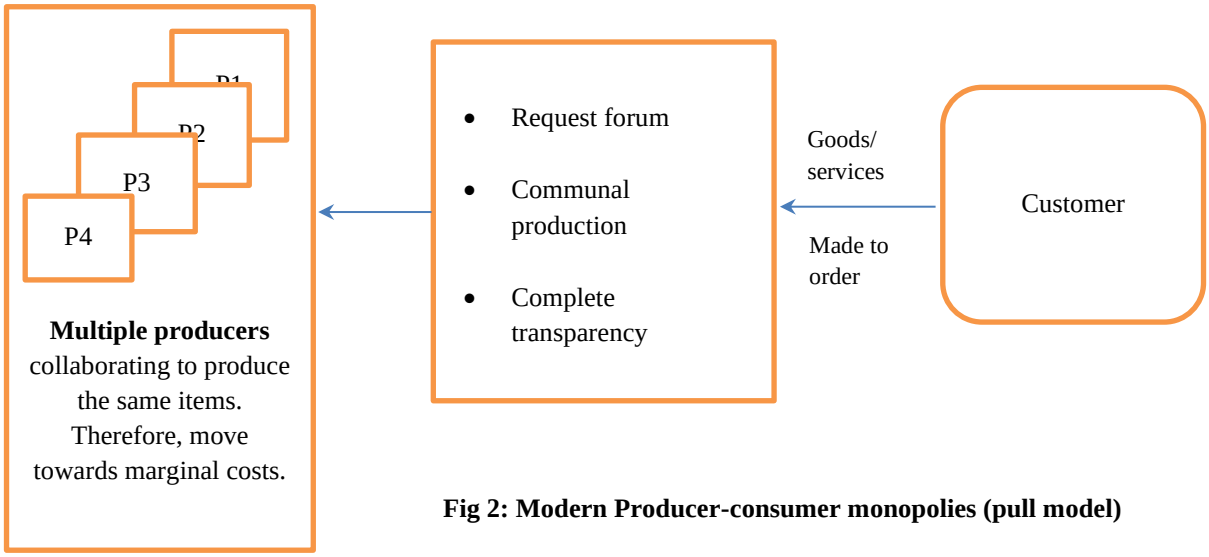


Fig 2: Modern Producer-consumer monopolies (pull model)

This change has been made possible by a few other characteristics of this digital economy such as mobility, reliance on data, volatility and network effects. Volatility, it can be said, has become the norm in this digitalised age. Technological progress and reduction in the cost of cloud computing power combined with increased performance has reduced entry barriers for new internet-based businesses. Only businesses that invest substantially in the development of new and innovative ideas of conducting business (based on the precise needs of their target consumers) can survive. The rest of the key features of this economy are mentioned as below:

Mobility: Mobility, with regard to intangibles, users and business functions is a highly visible feature of the digitalised economy. Intangibles are the most prominent characteristic of the digital economy and they, by their very nature, are movable. Hence, ownership of such assets can easily be separated from the place of their actual use. This, combined with improved telecommunication and improvements in personal computing devices, has made the users/entrepreneurs much more mobile than before, allowing them to reside in one country and still be virtually present in another to conduct their business from a remote location.

Reliance on data: Data is information provided by users when using an online application. Such information may also be inferred or collected by an organisation by tracking searches of their customers. This information is highly useful for businesses in this digital world as it helps them deliver customised services for their clients. This is a clear example of consumers becoming the central part in the manufacturing chain.

Network effects: Network effects refer to the concept of one user's decisions or actions having a direct impact on the benefit received by other users. For example, a single fax machine has no utility by itself, but multiple users choosing fax machines receive benefit in the form of an ability to communicate through this technology. This concept is of even more importance in the sharing economy that we are witnessing today. It finds application in the case of virtual manufacturing where each manufacturer relies on the contribution made by the other manufacturers involved in the process.

PART B - NEW AND UPCOMING DIGITAL ECONOMY BUSINESS MODEL CONFIGURATIONS

Part B comprises of the following chapters:

- Chapter 3 addresses the role collaboration has to play in new and upcoming business models and presents practical examples visible today to showcase the trend.
- Chapter 4 goes more into detail about the new types of business configurations that have come up. It analyses the reasons behind these developments and also addresses the impact they may have if traditional businesses do not adapt to changing surroundings. For this purpose, this book seeks to differentiate between traditional single-sided business models and modern multi-sided business models.

From a business perspective, this section looks at the new types of multi-sided business models that are populating the market currently. The section goes on to highlight the trends that led to this digital transformation and what gave rise to multi-sided business models. It discusses the role of elements such as collaboration, strategic disruption and digitalisation in transforming the business configurations of traditional businesses. The various business configurations discussed in this book can be summarized in the following matrix:

	Value Creation / Unique Proposition	**Demand Side Earnings**	**Supply Side Earnings**	**The new dimension**	**E.g.**
Single Side ***B2B*** ***B2C***	Happens primarily on the "Demand" side e.g. able to provide a consumer reach	End consumers pay per unit of purchase e.g. subscription, downloads	Stronger bargaining power resulting in better sourcing deals e.g. advertising rates, higher discounts on list price	This is more a forward integration of the offline / conventional play	Amazon (early days) Publishing houses e.g. news agencies Tripadvisor.com
Single Side ***B2B*** ***B2C***	Happens primarily on the supply side e.g. Aggregates inventory of tickets, shows, etc.	Premium for convenience	Hedge on volume deals / inventory	This is more a forward integration of the offline / conventional play	Online portals for garments, artworks, etc. Charter flight seats
Two-Dimensional Side (Network Effects) ***B2B*** ***B2C*** ***C2C***	On Supply Side Aggregates the supplies. On Demand Side Increases reach to consumers	Premium for convenience	Access fee for network	Online play	Market places like Amazon eBay Uber Travel portals
Multi-dimensional ***B2B*** ***B2C*** ***C2C***	Brings all supply chain participants together	Free	Free	Online play Monetisation of data e.g. advertiser revenue	Google Facebook InMobi Craiglist

3. How are collaborative networks driving productivity?

3.1 Sharing economy - introductory remarks

The sharing economy, as proposed by Jeremy Rifkin, is a trend to look out for in the future. It is a fast-growing phenomenon as more and more individuals and small and medium enterprises are entering the field of innovation and starting their own digitally sourced businesses. The crowd economy is a dynamic ecosystem of productive people who participate through a platform with the purpose of achieving mutually beneficial goals. Recent years have seen the emergence of numerous innovative sharing applications using different business models and focusing on one particular service or product, such as cars, spare rooms, food, or clothes. Most individuals who participate in the sharing economy do not do so mainly to make a good living, but to entertain relationships with others, to serve a cause that inspires them, or simply to make ends meet. Because the supplementary income is a net benefit and often does not involve much quantitative cost-benefit analysis, amateur providers have a tendency to share their available resources at a lower price than a professional might bill, thus bringing down overall prices – including those charged by the professionals.

Over time, as certain platforms attract a substantial number of individuals, these platforms become the prime access point for customers in the online market and have the potential to provide substantial competition for traditional e-commerce applications operated by professionals, which may have to cut their profit margins further. This chapter explains the components of the sharing economy and collaboration and emphasises the benefits offered by them. It also provides an overview of different types of collaboration systems and lists practical examples of each type. Finally, this chapter focusses on explaining how multi-sided collaborative businesses are the desired business configuration for the future.

The emergence of new solutions that rely on networks and their interdependencies is dependent on collective action. Collective action or the sharing economy, here, refers to more than just a few individuals coming together for the sake of value creation. It is characterised by the following components[33]:

1. People

Human-centric values need to be embedded in applications geared towards the crowd economy where the community is the starting point. The crowd economy or collective action is not about mob behaviour but much targeted co-operative solutions that help communities better their lives. People-powered platforms are forging these interconnections between users and are breaking down the barriers between creators, producers and end users. By empowering people, organisations are finding new, previously unimagined pathways and solutions to complex problems as in the case with NASA. Jeniffer Gustetic, Assistant Director of Open Innovation at the U.S. Government Office of Science and Technology attests that highly technical submissions from aerospace enthusiasts and amateurs matched the quality and accuracy of experienced space scientists. People are at the core of the sharing economy and the success of recent businesses has proven that amateurs can work collectively to produce results of the same quality as their highly trained counterparts. The new economy is all about innovation and creating novel models and this is the reason that newcomers to the business can be as adept at producing such ideas as experienced personnel.

2. Purpose

The crowd economy embodies a culture of shared value creation and social responsibility that distinguishes itself from the traditional one-dimensional thinking and practices of the old economy. People-driven initiatives often embody a larger mission to create solutions that work for, and with, all stakeholders. There is more than one channel of communication and the notion that everyone can further his or her purpose is extremely appealing. Example: Patient innovation is an impressive platform that helps patients drive innovation to find treatment options

[33] 5 P's of the Crowd Economy. (n.d.). Retrieved October 14, 2015, from http://crowdsourcingweek.com/5ps-of-the-crowd-economy/

for their health problems. Patients often develop valuable solutions to help them cope with their disease. In some cases, they can even save their own lives.

3. Platform

This pillar of the crowd economy has manifested itself in the form of technology, connectivity and mobile networks. Soon the Internet of Things will contribute to this medium, amplifying human interactions with powerful data. Platforms like Airbnb and Uber have become synonymous with peer marketplaces and have led to new business paradigms taking shape.

4. Participation

The power of participation to accelerate innovation is best seen through crowd-funding, which has enabled early ideas get a jumpstart. Crowd verdict is critical to validate business plans and ideas as crowd-funded companies are reaching new goals and successes. Crowd-funding is explained in later sections of this chapter.

5. Productivity

The sharing economy contributes significantly to increasing the productivity of businesses. When more and more people participate in producing a particular product, it invariably breeds innovation which leads to newer and better products. It can also be said that participants in a sharing economy agree to contribute to only those projects they are actually interested in, as opposed to employees in a company who are mandated to work on all projects irrespective of their interest, which is another reason for increased productivity in this field.

3.2 What is collaboration?

Collaborative networks have been heralded as the key to success in a knowledge driven society. However, what is meant by collaboration/collaborative networks? Collaboration refers to the act of actively sharing resources to achieve a common aim. It is often confused with terms such as networking, co-ordination and co-operation which form an important component of collaboration but still bear significant differences. Therefore, differentiation can be drawn based on their definitions:[34]

- **Networking:** Networking is the act of exchanging information and communication for mutual benefit. Collaboration and networking are related concepts but they bear certain significant differences. Networking is more individual centric, and collaboration is more group centric. Networking refers to the act of individuals sharing information or resources with others; such information or resources, however, may or may not be used to fulfil a common goal which is an essential prerequisite for collaboration.
- **Co-ordination:** Co-ordination is one step further in the ladder leading to collaboration. It is the act of working together harmoniously where individual entities align their work schedule in order to achieve results at a pre-determined time so that their joint contributions create a bigger impact than their individual contributions collectively would have done.[35] The act of co-ordination involves, in addition to exchanging information, aligning or altering activities to fit a schedule so that more efficient results are achieved.

[34] Camarinha-Matos, L., & Afsarmanesh, H. (2006). Collaborative Networks- Value creation in a knowledge society. *International Federation for Information Processing Knowledge, 207*, 26-40.

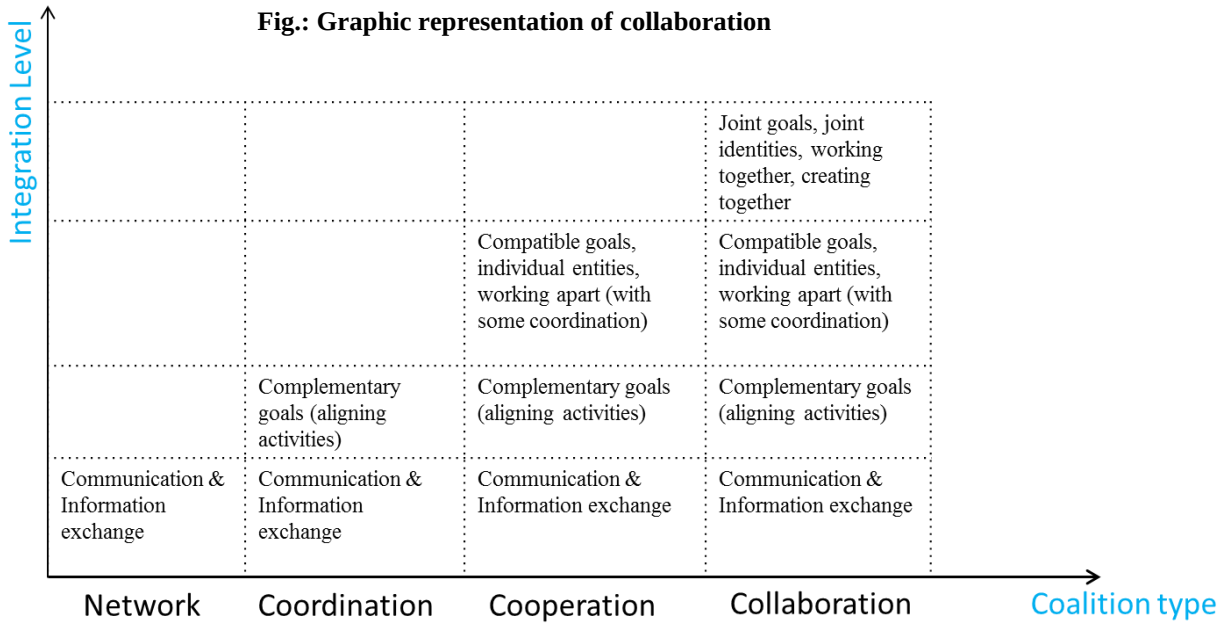
[35] Breanna, W. (2012). Coordination, Cooperation, and Collaboration: Defining the C3 Framework. *Honors Projects in Management.* Paper 13. Retrieved October 14 2015 from

http://digitalcommons.bryant.edu/honors_management/13

- **Co-operation:** Co-operation is an activity that contains an additional requirement of the sharing of resources for achieving compatible goals, along with information exchange and adjustment of activities, as is seen in networking and co-ordination. Co-operation also generally involves the division of labour among participants. *Co-operating* means working with someone in the sense of enabling making them more able to do something by providing assistance or information to which they wouldn't otherwise have access. Here, individual components of the group work in a quasi-independent manner while still in co-ordination with others. The results are achieved by compiling the value generated by those quasi-independent solutions.[36]
- **Collaboration:** Collaboration is the final act in this line which combines the elements of networking, co-operation and co-ordination. Collaboration is a process in which entities share information, resources and also responsibility for planning, implementing and evaluating a set of activities to achieve a common goal. Parties collaborating with each other share risks and responsibilities and mutually engage to solve a problem. The individual component of contributions is much more difficult to determine here. An example of collaboration can be seen in virtual manufacturing where multiple parties collaborate through an online platform for manufacturing the end product. Individual parties take responsibility to complete one part of the manufacturing process and share the resources employed to do that with all other participants. In this process, the involved parties have full ownership for the tasks undertaken which, thereafter, contribute to common value creation.

These differences are graphically represented below:

Fig.: Graphic representation of collaboration

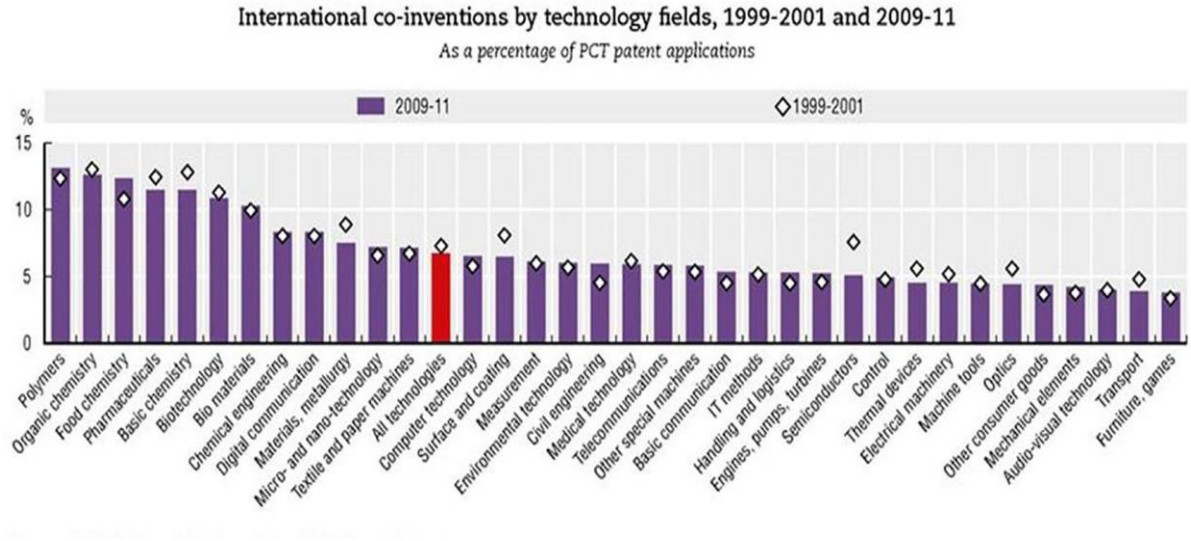


3.3 Benefits of the collaboration in the sharing economy

"Sharing economy" and "collaboration" have become almost synonymous in their use in this highly digitalised world. Co-creation methods are being used internally to build relationships within the organisation. Companies are implementing interactive engagement platforms to collaborate and receive feedback from their employees. Companies are not only asking for feedback, but implementing their ideas which, in turn, contributes to increased

[36] Kozar, O. (2010). *Towards Better Group Work: Seeing the Difference between Cooperation and Collaboration.* English Teaching Forum. Retrieved from ERIC database (EJ 914888)

employee morale and fosters an innovative culture throughout the organisation. Even the most traditional one-directional industries such as the automobile industry are being driven by co-creation. Historically, dealers have had challenges retaining customers who require service and repair work after the vehicle warranty period. Through co-creation methods, there are opportunities to build connectivity with dealers and after-sales providers. For example, the concept of "Connected Cars" works on the principle that when tire pressure is low or oil change is needed, the car would not only alert the driver, but also the dealer. The dealer can then reach out to the customer. The growing number of international co-inventions only stresses more the importance of collaboration in today's world. This can be graphically represented as:



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 121)

Thus, in light of the current changes being seen in the working world, benefits of collaboration are manifold. Some of them are discussed below:

- **Sharing economy is greening society**: The sharing economy or collaborative consumption is allowing people to get back to basics and live in an environmentally friendly way. Sharing, bartering and loaning goods and services rather than purchasing uses fewer natural resources and wastes less. Social networking has played a large role in making connections between like-minded, environmentally conscious people.
- **Socially responsible:** The new generation believes in social equity just as much as reducing environmental impact. Foregoing individual ownership of something in favour of benefiting the greater good resonates with young people, and it is what will make the sharing economy concept work. Not just as a whimsical notion, but as a long-term strategy. This is the trend investors should be tuning into, because it's what turns a start-up concept into a mainstream reality.
- **Cost-effective:** Collaboration has economic benefits too. The sharing economy takes advantage of economies of scale, so businesses that offer shared services tend to grow more organically and their operation cost is more sustainable. And the sharing economy is cost effective for those who use the services. The cost of ownership can be very high for items like cars and homes because of insurance, fees and maintenance. The financial benefits of being part of a network can include an increase in domestic or export sales, submitting a joint tender to win larger contracts or a reduction in costs by sharing resources. Being able to work interactively with suppliers and customers on product requirements, development, packaging and delivery can also eliminate costly production mistakes.
- **Happier employees:** Employees have more flexibility and companies may find stronger, more passionate employees as a result. Companies that have found their purpose treat associates well, and act in a more ethical manner are already finding success over those that are not. The sharing economy could simply

amplify that shift. As an added benefit, companies may find that those employees that have other interests/sources of revenue may be more entrepreneurial, more willing to take calculated risk, and may create more innovative products and services.

- **Increased creativity and innovation:** As everyone is contributing equally to the development of new ideas, it is possible to obtain access to the best minds, experiences and skills in the business. Because of the increased contribution by all employees, irrespective of any hierarchical structure, great ideas are accessible quickly by management and executives. Also, bringing customers into the product/service development and improvement process increases the company's ability to serve its markets and customers through better and innovative products, which ultimately leads to higher customer retention.

3.4 Practical examples

This section contains practical examples that cover the many facets of collaboration.

3.4.1 Simple collaboration

Collaboration has become the norm in this modern age as many major corporations have entered into this sphere to boost productivity and to deal with information and customer overload. A few examples that depict collaboration are described below:

- Microsoft and Toyota Motors entered into a collaborative venture in 2011 to design software providing telematics services for electric vehicles. They propose that this software will enable electric and hybrid Toyota vehicles to connect to the intelligent network and handle their own charging with maximum efficiency, among other services such as maps, social networking and voice-activated modules. This is a clear example of collaboration of two different industries which results in providing improved products to the end customer and maintaining the competitive edge of both industries.[37]
- Another such example can be found in the collaborative endeavour of Evernote and Moleskine to create the 'Evernote smart notebook', a Moleskine notebook with advanced features. This collaboration is a clear example of companies collaborating to manage information overload. It also results in designing new and improved products for the end customer which ultimately is beneficial for the corporations as well.[38]
- Reebok has been known to partner with other major brands to innovate in their products. An example is their venture with Marvel comics where they collaborate to design sports products inspired by superheroes. This is an innovation technique employed by Reebok to appeal to a wider audience and to differentiate their products from the competitors.[39]

3.4.2 Virtual collaboration

Virtual collaboration is the method of collaboration between virtual team members that is carried out via technology-mediated communication. Virtual collaboration follows the same process as collaboration, but the parties involved in virtual collaboration do not physically interact but communicate exclusively through technological channels. Distributed teams use virtual collaboration to simulate the information transfer present in face-to-face meetings, communicating virtually through verbal, visual, written, and digital means. Virtual

[37] Turiera, T., & Cros, S. (2013). *Co Business : 50 examples of business collaboration* (1st ed., p. 35). Barcelona: Infonomia.

[38] Ibid 37, P. 81

[39] Ibid 37, P. 89

collaboration, no matter how you look at it, is any process that employs the use of technology to bring people together to achieve their goals.[40]

An example of virtual collaboration, as mentioned above, can be seen in virtual manufacturing. In this system, multiple manufacturers come together and each concentrates on one part of the manufacturing process. The product is created in a virtual environment which is designed to behave exactly like the real-world environment necessary for production of the goods. Each member makes their contribution virtually which is, eventually, used by other members in a physical environment. For example, company needs to excavate a certain site, but it doesn't have the adequate know-how for it. It can make use of a collaborative network where other members work in a virtual environment set up to resemble the excavation site and come up with solutions to ultimately be implemented by the originating company. The use of collaborative networks provides access to a wider knowledge bank and companies are no longer restricted to the resources and personnel physically available to them.

Examples of such virtual collaboration can be seen in the following corporations:

- Ford Motor Company uses virtual manufacturing technologies in its factories, and it is certainly a big factor behind the company's soaring quality performance. Ford uses digital tools to predict and eliminate on-the-job injuries as well as ensure manufacturing feasibility part by part. For the purpose of virtual manufacturing, all participants in the collaboration venture prepare a virtual ergonomic database based on design specification and customer requirements. As an industry leader in virtual technology, Ford then hands the ergonomic data to the virtual build arena where the programme team – designers, engineers, suppliers and line operators – assemble the vehicle part by part, virtually. This happens long before the first physical parts are produced, and a prototype vehicle is built. In fact, the virtual build event takes place before Ford and its suppliers install tooling and set up workstations.[41]
- Volvo Group has also developed tools for virtual factories, with the goal of never introducing anything into a plant unless validated in a simulator. With virtual plants it becomes possible to make models of the entire production, not just flow. Robotic movements and actual software can be optimised, as well as the ergonomics of the workplaces and even the energy use. This results in more efficient high-quality plants and workplaces that are healthier, safer and more comfortable. By 2020, Volvo will make it possible to simulate complete production systems, with all aspects and constraints taken into account so that the Volvo group can optimise production plants creating a sustainable, competitive and healthy workplace.[42]
- Waymo began as the Google self-driving car project in 2009 and is now a reputed leader in the self-driving car space. Waymo and Jaguar have partnered to develop the world's first fully self-driving Jaguar I-PACE. Testing began in 2018. In the next few years, their mission is to add up to 20,000 I-PACE vehicles to Waymo's fleet. That's enough to drive about a million trips in a typical day. As of 2019, Waymo is also creating a new revenue stream by selling its custom-developed, short-range laser sensors. Waymo won't be selling the technology to rival self-driving outfits, instead indicating that robotics, security, and agriculture tech companies would be potential customers.

[40] Goodwin-Maslach, T. (2006, May 31). Virtual Collaboration: Engaging Learning Through Technology. Retrieved October 14, 2015, from http://www.clomedia.com/articles/virtual_collaboration_engaging_learning_through_technology

[41] *Ford's Virtual Manufacturing*. (n.d.). Retrieved October 14, 2015, from http://www.motionanalysis.com/html/temp/ford.html

[42] *Step into the virtual factory*. (n.d.). Retrieved October 14, 2015, from http://www.volvogroup.com/GROUP/GLOBAL/EN-GB/RESEARCHANDTECHNOLOGY/SUSTAINABLE_PRODUCTION/VIRTUAL_MANUFACTURING/PAGES/VIRTUAL_MANUFACTURING.ASPX

3.4.3 Crowdsourcing

Crowdsourcing is the process of obtaining the necessary services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers. It is another type of collaboration where the masses are involved in contributing to a project. It combines the efforts of numerous self-identified volunteers or part-time workers, where each contributor of their own initiative adds a small portion to the greater result. Crowdsourcing uses the input of individuals external to an organisation to resolve strategic problems or complete tasks once assigned internally to an explicit corporate individual or department. The main difference between crowdsourcing and simple collaboration is that the roles of individual participants tend to be smaller and the resultant benefit to them as individuals may be lower.

Crowdfunding is one example of crowdsourcing where a project can be funded through a multitude of people contributing a small amount towards the desired monetary goal. This is done most commonly via the internet and works on the basis of a reward system. Individuals or businesses seeking crowdfunding usually place a business proposal online along with a list of rewards per donation. Funders may agree to fund the project because of the rewards or because of the potential they may see in the business. However, the funders do not, by virtue of funding, become associated with the business and are not entitled to receive any further remuneration other than the reward.

The following corporations exhibit this model of collaboration:[43]

- PepsiCo has been involved in crowdsourcing in many of its projects. In 2010, it started its Refresh programme where it awarded over $20 million in small sums to individuals, businesses and non-profits that came up with ideas that have a positive impact on the community, state or nation as a whole. Pepsi's Frito-Lay also participated in crowdsourcing when it asked consumers to come up with a new flavour.
- Oreo also participated in crowdsourcing when in honour of its 100th anniversary, it launched a 100-day series of cookie designs and asked its customers to choose the best one.
- Similarly, Budweiser created its newest beer, Black Crown, by using crowdsourcing. Over 25,000 customers voted for Black Crown to be the chosen beer among 12 other options.

3.4.4 Multi-sided business platforms

Economists have identified a class of businesses that are now generally referred to as "multi-sided platforms." They are another form of collaboration where multiple participants engage in developing a project which is beneficial for all participants. Such benefits are referred to as network benefits which mean that decisions of users have a direct impact on the benefit received by other users. These network effects are an important feature of many businesses in the digital economy. Network effects are seen whenever compatibility with other users is important, even where the primary purpose of particular technology may not be to interact with others. As recognised by the OECD, a simple example of this is the introduction of the fax machine. While a single fax machine had no utility by itself, users choosing to purchase a fax machine received the benefit of the decisions of earlier users to purchase a fax machine, in the form of the ability to communicate through this new technology with an existing network of potential counterparts. The two major advantages of using a multi-sided business model are flexibility and a wider reach to the end consumer.

Multi-sided platforms create value by bringing together two or more different types of economic agents and facilitating interaction between them to the advantage of both. These platforms play critical roles in many economically important industries such as payments, mobile phones, financial exchanges, advertising, and various internet-based industries. A multi-sided platform creates value by coordinating the multiple groups of agents and, in particular, ensuring that there are enough agents of each type to make participation worthwhile for all. An example of a multi-sided business model involving positive externalities for different sides of the market is a

[43] Abramovich, G. (2013, March 7). 5 Brands Winning at Crowdsourcing - Digiday. Retrieved October 14, 2015, from http://digiday.com/brands/5-brands-winning-at-crowdsourcing/

payment card system, which will be more valuable to merchants if more consumers use the card, and more valuable to consumers if more merchants accept the card. Similarly, an operating system is more valuable to end users if more developers write software for it, and more valuable to software developers if more potential software purchasers use the operating system.

An overview of some recently set up businesses employing this model is presented below:

- OpenTable is an American-based company that provides a platform for fine-dining restaurants and consumers in various cities in the United States and other countries. It enables consumers to make and restaurants to accept reservations for tables over the internet. It helped solve a transaction problem for consumers and restaurants. For OpenTable to provide this service it needed to have significant numbers of both consumers and restaurants using its platform. OpenTable started by providing table management software to restaurants - a one-sided business. Once it had a sufficiently large number of restaurants in some cities, it developed a web-based platform for consumers to make reservations that would be automatically incorporated into its table management software.[44]
- Amazon, which revolutionised the books and publishing markets through its e-commerce strategy, has since transformed itself into a platform company. The company then started moving toward the MSP end of the continuum, allowing third-party merchants to sell products directly to Amazon users. In 2011 those sellers accounted for 30% of unit sales on Amazon. Amazon acts as a reseller for high-demand products but as a multi-sided platform for long-tail products, which are available on the site from independent sellers.[45]
- WeWork Companies Inc. creates high energy, inherently collaborative office and residential communities that are responsive to the productivity needs and stylistic preferences of today's mobile, creative workforce. In addition to well-appointed physical space, the company provides accompanying services designed to connect members within the WeWork ecosystem and to empower them to lead more satisfying and successful lives.
- Uber is a multi-sided platform for ride-sharing. Potential passengers connect with taxi drivers using a smartphone app where GPS location sharing, pick-up timing (typically within eight minutes of request), and payment are all executed online. No money changes hands. This works on the same underlying model that brings drivers and customers together. Uber provides multiple incentives for drivers and allows non-professional drivers to be a part of its system. It also advertises to reach out to the widest possible consumer base which can, then, use the services of those drivers.

3.5 Strategic disruption, technological innovation and the most desired business configuration

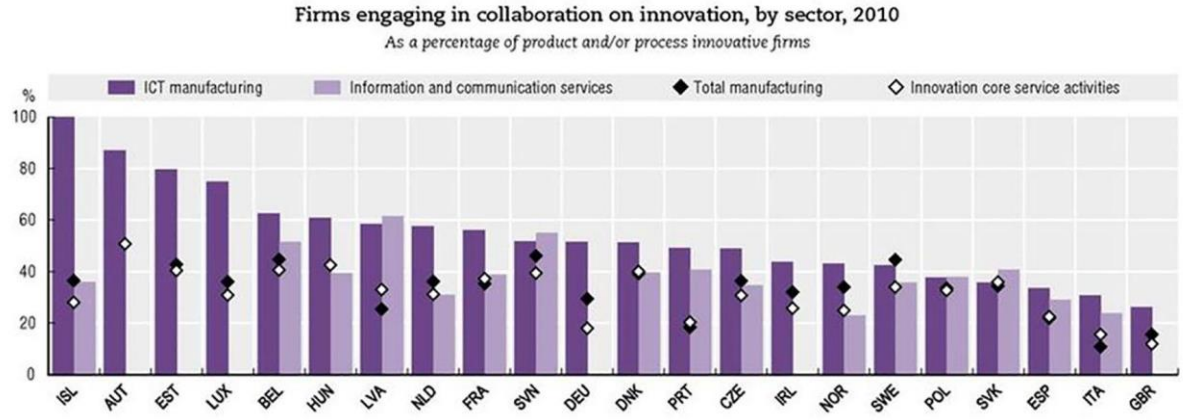
Innovation is acknowledged as an important source of competitiveness for businesses. Innovation can manifest itself in many ways: by reducing production costs, by enhancing existing products and leading to the creation of new ones or by presenting and selling products more effectively. The advancement in technology and the corresponding growth in innovation have altered many existing business models and have given rise to multiple new ones. Mobility, cloud computing, social networking, sensor-nets and big data analytics are some of the most important trends in the digital economy today. Collectively, these trends are making possible the future of 'smart everything' as well as empowering businesses, consumers and society at large. These new and future applications rely on the widespread availability of fixed and wireless broadband networks to meet the growing demands of

[44] Evans, D., & Schmalensee, R. (2014). The Antitrust Analysis of Multi-Sided Platform Businesses. *The Oxford Handbook of International Antitrust Economics, 1*.

[45] Hagiu, A., & Wright, J. (2013, March 1). Do You Really Want to Be an eBay? *Harvard Business Review*. Retrieved from https://hbr.org/2013/03/do-you-really-want-to-be-an-ebay

economies and societies with a concomitant rise in the number of devices connected over the internet. In the OECD area, the number of devices connected over the internet in households is projected to increase an estimated 3 billion today to 14 billion by 2022.[46] The pace at which the internet is growing is expeditious and businesses need to keep up with it in order to be successful. Only in 2013, an idea was presented at a Silicon Valley summer school to build a network of automatically controlled, multi-rotor unnamed aerial vehicles to carry small packages for purposes of delivery. The aim behind this project was to ensure a drone network to deliver products ordered over the internet that are needed immediately. Such advancements in technology clearly demonstrate that in the future there will be few aspects of our lives which will not be governed by the internet. The growing number of e-consumers and e-businesses is conclusive proof of that.

The newest attraction in this evolving digital age is the rise and growth of multi-sided business models. They have come into existence because of increased reliance on collaboration, which has resulted in reduced start-up costs, increased efficiency and productivity and lower running costs. Therefore, most new and innovative businesses are trying to use collaboration in their business model. Sharing has some stark implications for business. Overall demand for first-time purchases may shrink for products that consumers can use communally. The million people carmakers sold to last year can now rent to their neighbours, becoming a de facto million new competitors. Sharing platforms also allow for almost infinite product variation. Hotels, for example, now face hundreds of unique competitors at every price point, offering everything from couches to penthouse suites. The cumulative effect may be to shrink markets and narrow margins. Multi-sided business models fuelled by collaboration, innovative and strategic disruption and advancements in technology are the models of the future. The graph below, which represents the number of firms engaged in collaboration is concrete proof of that.



(Source: OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, p. 121)

Multi-sided markets (markets that link two or more distinct but interdependent groups of customers) have been around for decades, but they are proliferating rapidly today as modern information technology creates more opportunities for organising complex markets. It has been seen that economic theorists have started postulating theories about this growing phenomenon. However, it should be kept in mind that markets hardly ever co-operate by following simple rules derived from economic theory. In traditional markets, however, economic truisms can at least serve as benchmarks and starting points for more nuanced analysis. By contrast, multi-sided platforms often require clean-sheet planning from strategists. With multiple, yet interdependent, customer groups to serve, companies find that direct costs provide little guidance for pricing strategies. By the same token, early entry may yield first-mover advantages, or merely simplify the search for successful strategies by those that follow. Many of

[46] Organisation for Economic Cooperation and Development. (2014). *Measuring the Digital Economy: A New Perspective* (P. 26). Paris. OECD Publishing. Retrieved from http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/measuring-the-digital-economy_9789264221796-en#page1

the great business empires of the modern era – think eBay, American Express, Microsoft, Cisco – have prospered precisely because they have excelled at making multi-sided platforms work to their advantage.

4. Modern business configurations: What makes a business successful in this digital age?

4.1 Disruptive innovation in the digital age

'Disruptive innovation' is to the first decade of the 21st century business world what 'process re-engineering' was to the 1990s.[47] It is the process of changing business strategies to accommodate new and innovative ideas based on digitalisation. It is also sometimes called digital disruption. As digitalisation engulfs existing markets, old business strategies cannot work as efficiently. Therefore, disruption in the routine models is needed to succeed in this (soon to be) wholly digitalised world. The increasing use of knowledge as an intangible asset in the upcoming business models clearly reflects this trend.

Disruption, however, is not a new concept in the business market. Corporations are always wary of and on the lookout for disrupters that have a chance of stealing their clientele or of offering the same or better products at a reduced cost. Many years of research have been undertaken in this sphere to enable businesses to sustain this kind of disruption by acting quickly and either acquiring the disruptors or by incubating a compelling business that embraces their new technology. This advice is based on the assumption that disruptive business models target low-end consumers by offering lower-priced, usually inferior alternatives and then gradually improve their offerings to move upmarket and pick off high-end customers as well. But this premise does not hold true in this digital age fuelled by innovation. The products being offered by disruptive businesses are in no way sub-standard to those offered by traditional, long-established corporations. If anything, they are of a better quality and yet inexpensive compared to the traditional products. An example of this is visible in the navigation-product market where free navigation apps, supported by widely popular platforms such as iOS and Android, are providing better and cheaper services than traditional giants like TomTom, Garmin and Magellan.[48] The disruption here has not come from competitors in the same industry or even from companies with a remotely similar business model. Nor did the new technology enter at the bottom of a mature market and then follow a carefully planned march through larger customer segments. Users made the switch in a matter of weeks. And it was not just the least profitable or "underserved" customers who were lured away. Consumers in every segment defected simultaneously – and in droves.

In this digitally vitalised age, where innovation is at the root of every new start-up, technological updates are being adopted by existing businesses to make them more appealing to their digitally sound customers. But unlike traditional disruption, digital disruption does not allow existing businesses too much of an opportunity to stabilise before it steals away their customers and takes value from their business models. The shock waves from big-bang disruptions emanate far beyond information-based goods and services. Food and cars, for example, cannot be replaced by smartphone apps. But restaurants now depend on online reservations, customer-generated reviews, coupons delivered through mobile devices, and location-based services to drive business. In automobiles, information technology powers sophisticated dashboard systems and, in the not-too-distant future, may control self-driving cars. This is a clear portrayal of digital disruption spreading its foot beyond IT goods and services. All

[47] Harris, C. Strategic Disruption [Web Blog Message] Retrieved from http://chrisharrisfutures.blogspot.nl/p/strategic-disruption.html

[48] Downes, L., & Nunes, P. (2013, March 1). Big-Bang Disruption. *Harvard Business Review. Retrieved from* https://hbr.org/2013/03/big-bang-disruption/

kinds of digital disrupters have three characteristics in common which make it difficult (almost impossible) for traditional businesses to match up to the level and speed of these new models:[49]

- **Unencumbered development**

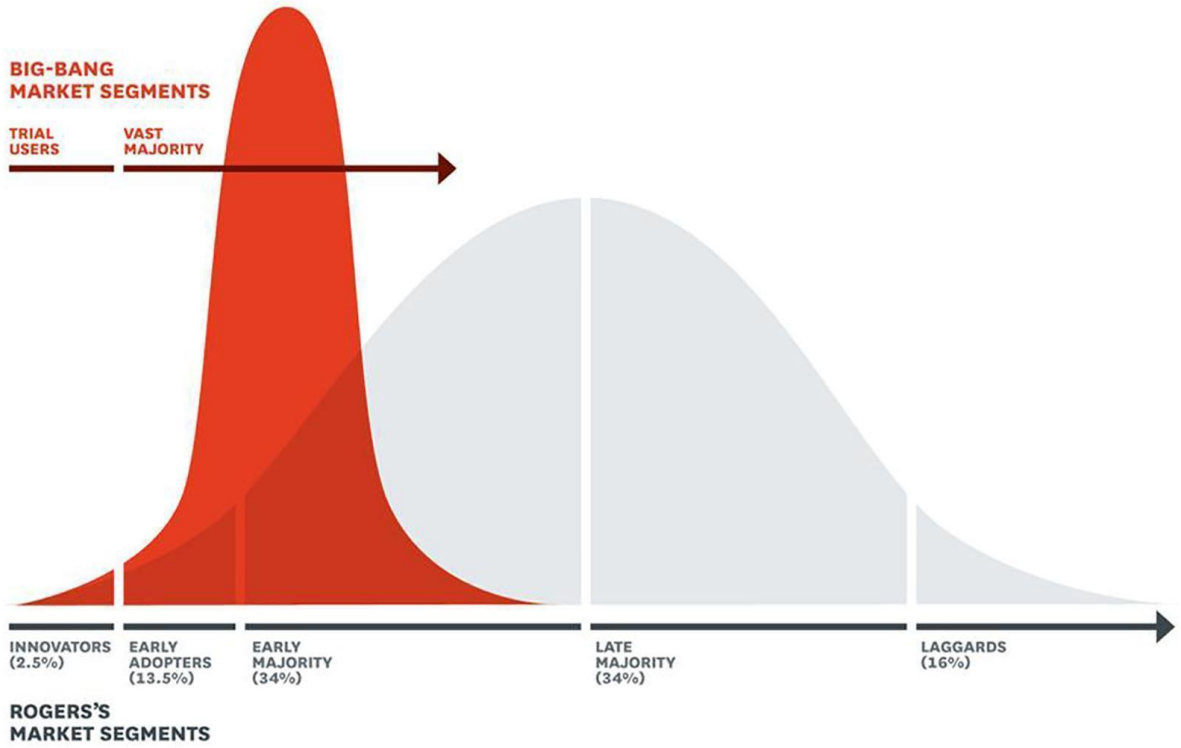
  The new business models of the digital economy do not need a lot of initial financial backing and are rather unencumbered as compared to their traditional counterparts. They are born out of innovative minds, low-cost manufacturing and ubiquitous technology platforms with no need for budget approval or vetting before development begins. Twitter is a perfect example to depict this scenario. The idea of Twitter was born at a hackathon[50] in 2006 and materialised within the next year. Its developers wanted to test sending standard text messages to multiple users simultaneously, an experiment that required almost no new technology. This is an important feature of these new kinds of disrupters. They use existing technologies and apply them in an innovative manner to create new kinds of products and services which are increasingly appreciated by their customers.
  As disruptive technologies become cheaper to manufacture and deploy, innovators can experiment with new applications at little risk to investors, abandoning prototypes that do not quickly prove popular. Generally, these experiments take place directly in the marketplace, using open platforms built on the internet, cloud computing, and fast-cycling mobile devices. This kind of unrestricted potential for development serves as a huge setback for traditional businesses which require substantial costs both for set up and running. Therefore, in this new age it is possible that we will see only those businesses succeed that can apply other people's technologies in the right combination based upon customer needs and requirements.

- **Unconstrained growth**

  Big-bang disruptions do not follow the usual pattern of customer adoption famously described by Everett Rogers. According to his model (shown in grey), new products sequentially gain popularity in five market segments. The big-bang model (shown in red) is taller and much more compressed: In it, new products are perfected with a few trial users and then are embraced quickly by the vast majority of the market.

[49] Ibid 48

[50] Carlson, N. (2011, April 13). The Real History Of Twitter. Retrieved October 14, 2015, from http://www.businessinsider.com/how-twitter-was-founded-2011-4?IR=T



(Source: https://hbr.org/2013/03/big-bang-disruption/)

This change represents the changing dynamics of today's society. Before the disruption brought in by digital technologies was widespread, the profit makers in the field were the early adopters of a trend who gradually increased their customer base. However, with the digital revolution, a new business can become widely popular overnight and, therefore, it starts off with a big customer base. The growth of businesses in this era has proven to be highly disruptive for traditional businesses as it is different from any other kind that has previously presented itself. There is not much that the traditional businesses can do to restrain the growth of these new business models because not only are they offering better products and services but also those products and services are produced in a completely new fashion which is extremely difficult for traditional businesses to adopt.

- **Undisciplined strategy**

  Digital disrupters contradict everything that traditional businesses consider important from a strategic perspective. According to Michael Treacy and Fred Wiersema's classic, 'The Discipline of Market Leaders',[51] businesses should align strategic goals along one, and only one, of three value disciplines: low cost, constant innovation or customised offerings. If they fail to choose, the authors predicted that they would end up in a muddle. Digital disrupters, however, are thoroughly undisciplined. They start life with better performance at a lower price a greater customisation. They compete with mainstream products on all three value disciplines right from the start.
  Another reason why these disrupters are proving to be dangerous is that in addition to being superior to existing products, they are also cheaper. It is because they rely solely on computing power to reach their customers and the advancement in computing speed, and emergence of cloud technology makes it deployable on a global scale. Consider the three major costs in a product or service: parts and

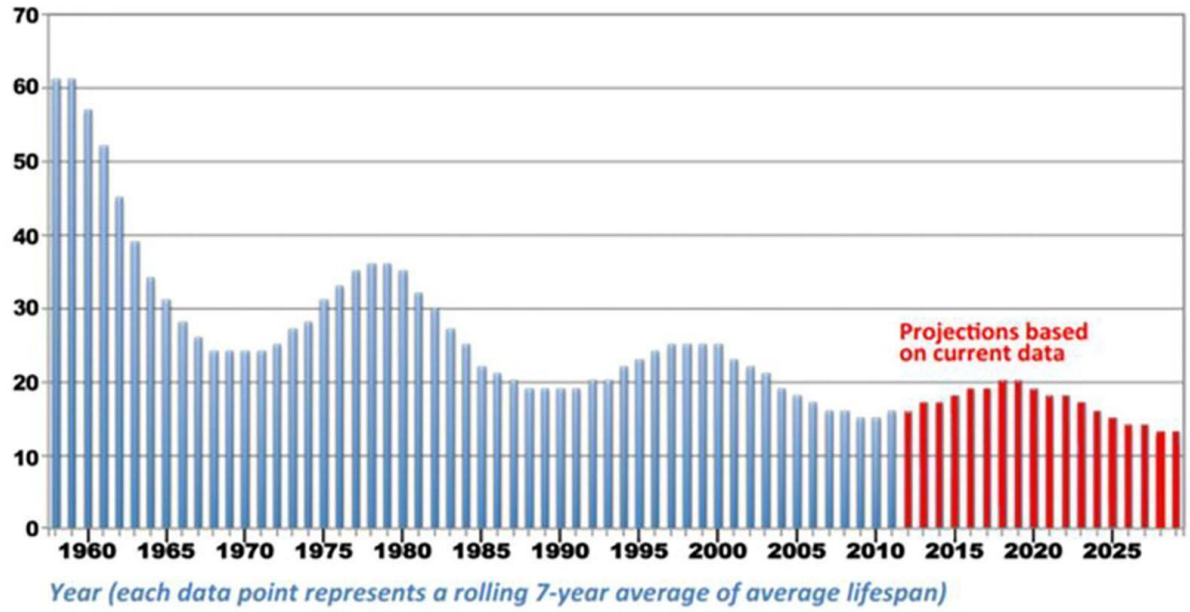
[51] Treacy, M., & Wiersema, F. (1995). The discipline of market leaders: Choose your customers, narrow your focus, dominate your market. Reading, Mass.: Addison-Wesley Pub.

manufacturing, embedded technologies and intellectual property, and a prorated share of development costs. By continually and dramatically lowering all three at once, today's technology makes it possible to sell new products and services more cheaply than the inferior alternatives they displace.

4.2 Impact of strategic disruption

4.2.1 Evolution is indispensable

Charles Darwin portrayed the idea of evolution for the first time in 1859, in his book, On the Origin of Species, where he described that those species that adapt best to their surroundings and changing environment have the best chance of surviving. The same can be said for today's enterprises. Traditional businesses today are like dinosaurs - stubborn, lumbering beasts, fighting adaptation and the 21st century accompanied with advancements in technology is the Mesozoic age where failure to adapt and modify means failure to survive. The need for change has been fairly evident in the recent past and now, with the adoption of new, multi-faceted business models, it is more visible than ever before. According to Professor Richard Foster of Yale University, the average lifespan of a company in the S&P 500 index decreased from 61 years in 1958, to just 18 years in the present day.[52] He estimates that by 2027, over three-quarters of businesses in the index will be brands we have never heard of. Thus, in this fast-paced world, organisations reluctant to change face the danger of extinction.



(Source: http://www.innosight.com/innovation-resources/strategy-innovation/upload/creative-destruction-whips-through-corporate-america_final2012.pdf)

With the increasingly fragmented and multi-faceted digital landscape, businesses need to work harder than ever to remain innovative, evolve quickly, and make the right decisions whilst facing a perplexing array of digital opportunities and media.[53]

[52] Innosight. (2012). *Creative Destruction Whips through Corporate America.* Lexington. Innosight Publishing. Retrieved from http://www.innosight.com/innovation-resources/strategy-innovation/upload/creative-destruction-whips-through-corporate-america_final2015.pdf

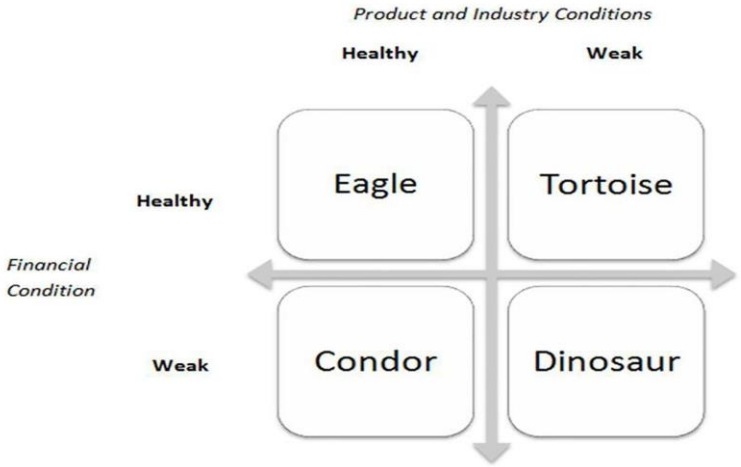
[53] Castleford Staff. (2014, March 20). Are you a digital dinosaur? How technology drives today's most profitable businesses. Retrieved October 14, 2015, from http://www.castleford.com.au/content-marketing-insights/2014/are-you-a-digital-dinosaur-how-technology-drives-todays-most-profitable-businesses

Thus, it can be said that evolution in itself is crucial, but how big a part does the digital technology play in this? According to research conducted by the MIT Center for Digital Business and Capgemini Consulting, "The higher a company's level of digital maturity, the better its financial performance is likely to be".[54] This new breed of businesses have the digital maturity not only to build digital innovations but also to drive enterprise-wide innovation (transformation management intensity) – leaving their dinosaur competitors in the dust. The research looked at 400 businesses over a two-year period finding that, on average, digital businesses are 26% more profitable, yield a 12% higher market valuation, and generate 9% more revenue from their employees and physical assets.

These statistics reveal that digital revolution demands change and adaptation against a very realistic threat of extinction. Traditional businesses need to be ready to change their strategy towards the market and need to involve digital solutions in their products, the details of which are analysed in the next section.

4.2.2 Dinosaur companies

In the knowledge era, marked by digitalisation, where innovation is at the core of every successful business, enterprises that are unable to optimise their processes and improve their efficiency based on customer's needs and demands risk becoming a dinosaur company. A dinosaur company is one which cannot keep up with the pace of technological changes and therefore loses its customers and is thus forced to vacate the market. This terminology is taken from the model (shown below) proposed by Harlan D. Platt who divided companies into four sections based on their financial and industry conditions.[55]



According to this model, eagles are those that have maintained their competitive edge within changing markets and have managed to stay profitable. Such companies are bound to succeed so long as they keep evolving over time. The tortoises and condors suffer from weak industry and financial conditions respectively but have the ability to push on and stay in the market by being less profitable than the eagles. These are companies that have evolved

[54] Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2012). The Digital Advantage: How digital leaders outperform their peers in every industry. Retrieved October 14, 2015, from https://www.capgemini.com/resource-file-access/resource/pdf/The_Digital_Advantage__How_Digital_Leaders_Outperform_their_Peers_in_Every_Industry.pdf

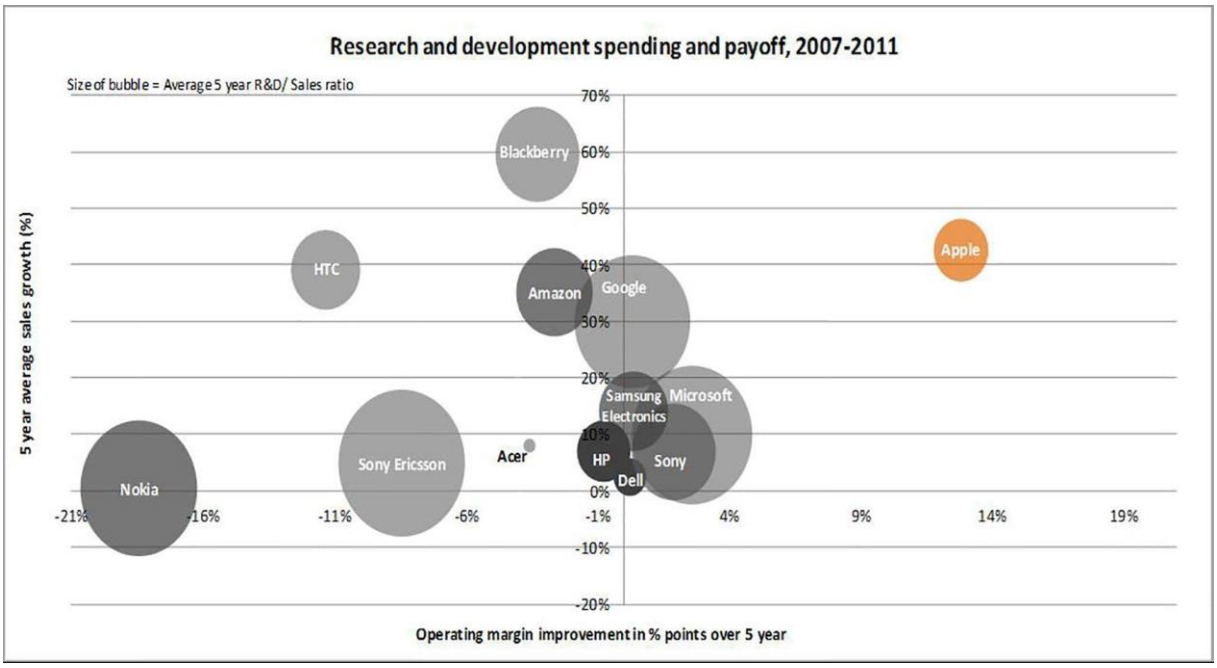
[55] Platt, H. (1999). *Why companies fail: Strategies for detecting, avoiding, and profiting from bankruptcy* (2nd ed.). Washington DC: Beard Books. Retrieved from https://books.google.nl/books?id=GClYwGapF_sC&pg=PA38&lpg=PA38&dq=harlan+d.+platt+why+companies+fail+figures&source=bl&ots=6G7QQORimG&sig=P9w9mQX9wnprbqRO4x7GcLH2t5Y&hl=en&sa=X&ei=DCERVcDdJsvzav_CgpAH&ved=0CCcQ6AEwAQ#v=onepage&q=harlan%20d.%20platt%20why%20companies%20fail%20figures&f=false

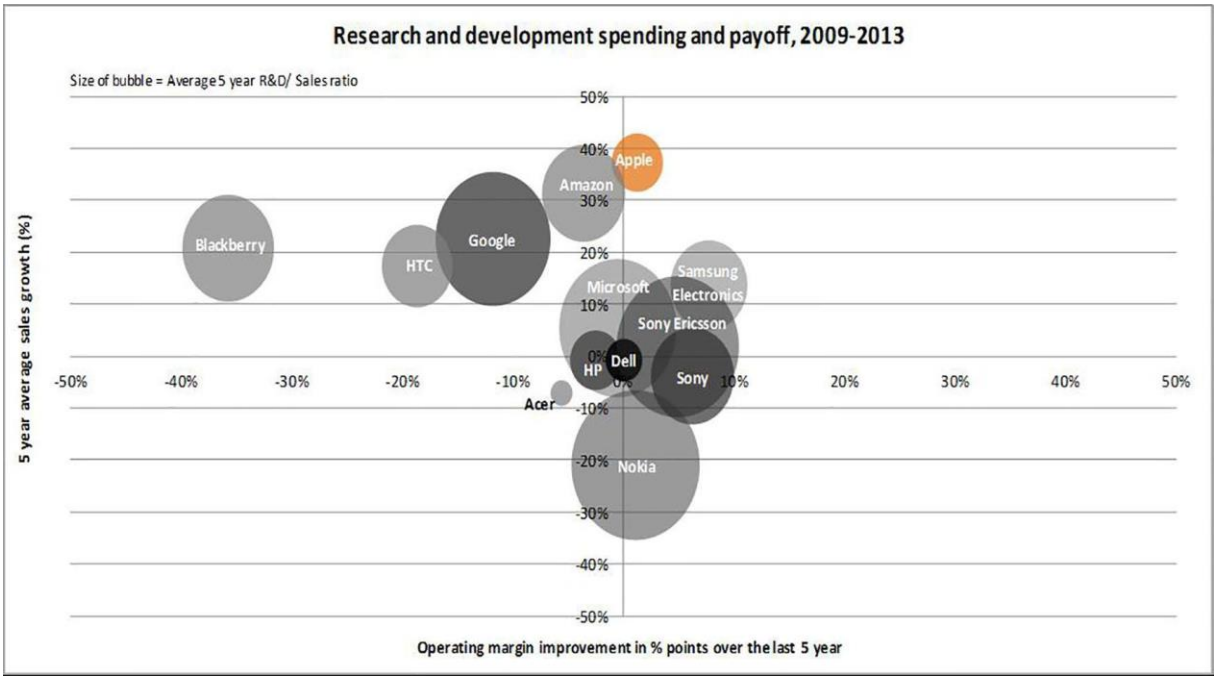
with technology but have not been able to do that very well due either to weak financial situations or because they invested in products that were not completely suitable for a large number of buyers. They have a chance of survival if they modify their business strategies. Lastly, the dinosaurs are those companies that are guaranteed to fail because they have ignored the market trends and let their products become obsolete or have not been able to innovate enough which has led to a deteriorating financial situation. No business is born as a dinosaur; they tend to turn into one due to their oversights. Here are some examples of enterprises that were once an 'eagle' in their field but have now become a 'dinosaur' of the market.

- Motorola started producing car radios and was the first company to sell a mobile phone. The company enjoyed the first mover's advantage and dominated the market until 2003, the year it launched its bestseller phone 'Razr'. However, its market share dwindled, it was no longer profitable and even went bankrupt. This is because it did not invest in the right technology. It did not invest in smartphones when the trend was beginning and subsequently was not able to deliver goods suited to the demands of the market.
- Kodak was the market leader in the film and camera business for decades but it was reluctant to invest in digital cameras, even though their researchers were the first to invent it. Soon, Canon and Nikon entered the market and took over the camera industry almost completely. Kodak is a good example of a company which lacked strategic capital. They could not make the decision to invest in the right direction in their industry and therefore lost their financial and market share and can now be labelled as the dinosaur of the camera industry.

Current trends and these examples show that businesses in the age of digitalisation can be very fragile and may not hold their market position for very long without constant evolution and innovation. Just as we have seen giants reduced to dinosaurs over time, we can speculate as to the dinosaur of the future. Apple is a dominant market player not only in the smartphones market but also in the computer and music player market. Apple iPods revolutionised the way people listen to music and substantially replaced all other devices in the market. The same was true for iPhones, iPads and their other devices. However, many argue that in the recent years Apple has lost its creative edge. The company moved its focus from innovation of new technologies and, hence, new products to improving existing products and associated technology.

There were many products in the pipeline such as Apple TV, iWatch and recent types of iPhones which did not appear to receive much attention while Apple improved its existing products. According to the following three graphs displaying the relationship between R&D spending (size of bubble), margin improvement (X-axis) and sales growth (Y-axis), Apple outperformed its competitors according to a survey conducted in 2007 (forecasting the trends to be seen in the next five years i.e. 2007-2012) but its profit margins went lower than those of its competitors based on the survey conducted in 2009 (forecasting the trends to be seen in the next five years i.e. 2009-2013).

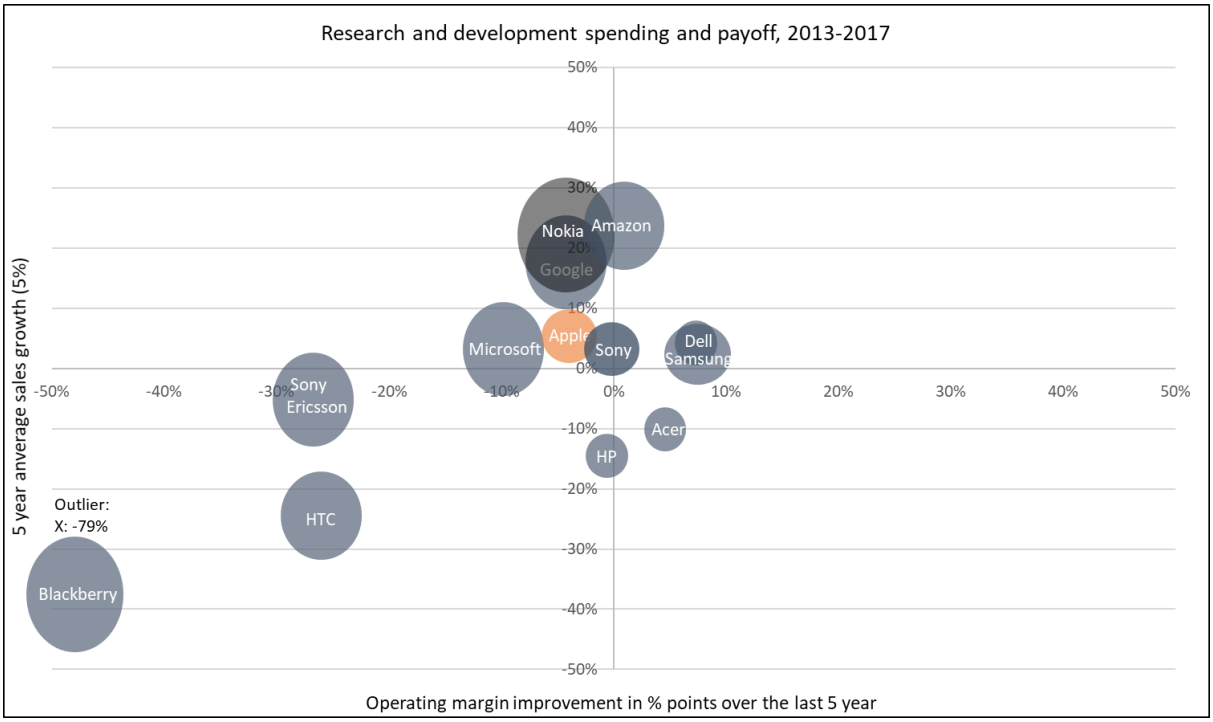




In the previous edition of the Digital Economy Handbook (2016) we said that Apple must stay ahead of the curve and keep up with strategic disruption in order to maintain that position. Since then, Apple has made an attempt to revive its innovative image by investing in iWatch, iTV as well joining the internet music market through Apple Music. However, these innovations are currently in their nascent stages and it is unclear if they will be able to help Apple restore its earlier status of market leader in innovative technology.

What we're noticing in recent years is that Apple has not been evolving their products as disruptive as before and is definitely behind competitors concerning new features on for example the latest iPhone updates. The Apple Earpods are a major success but wireless earphones are no new technology and have no significant effect on their total revenues. Also, Apple's flagship laptop model, the MacBook Air, found itself a predecessor after a long time.

Expectations of investors and users were not met by a long way. The performance improvements were minimal, features like a larger mousepad, retina screen and fingerprint login were added, but Apple didn't hit the market with anything disruptive. The most recent chart in the series (below) may come as no surprise. With Apple's sales growth slowing down, even moving towards the critical flat-growth line, serious disruption needs to take place in Apples creative department to prevent them from sliding towards being a dinosaur.

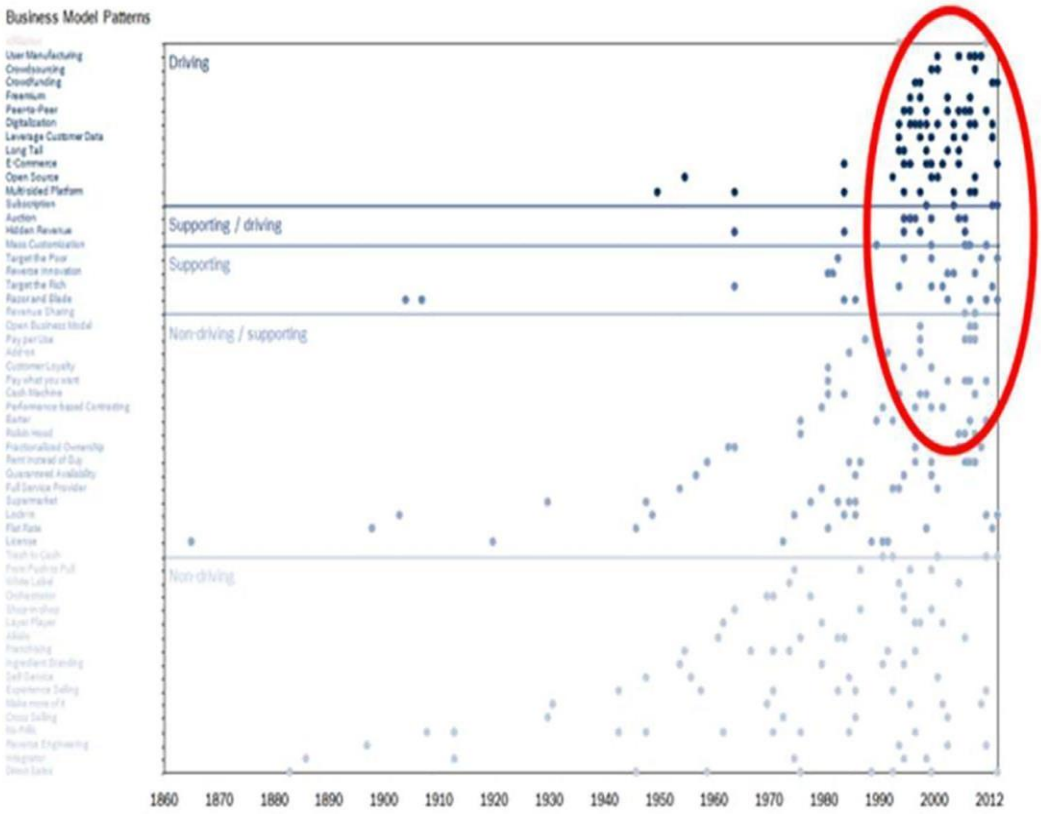


This data proves that no business, however big or small, is immune from evolution. In order to be successful, every enterprise has to keep innovating and improving its products and services to keep up with the evolving needs of its customers. The next section analyses the changes seen in the business models as we have progressed towards a knowledge era marked by innovation. It portrays how we have evolved from one-sided models to multi-sided ones and goes on to showcase the characteristics of multi-sided models along with some examples.

4.3 Changes in business configuration

4.3.1 A wave of change: rise of multi-sided business models

We have seen that each new internet wave has led to new digital business model patterns. We saw the rise of e-commerce businesses when the internet first became popular among the masses in the 1990s. The next impact that the internet had on businesses was when mobile technologies became an integrated part of our everyday lives and digital businesses were forced to design their models around mobile phones as well as PCs. By the year 2013, there were 55 business model patterns in which IT played a driving role and many others in which it played at least a supporting role (see the cluster of 55 companies at the top right corner of the diagram below).



(Source: http://www.iot-lab.ch/wp-content/uploads/2014/11/EN_Bosch-Lab-White-Paper-GM-im-IOT-1_3.pdf)

A similar wave of transformation is now visible with the rise of multi-sided business platforms that bring together the two sides of value creation (supply and demand). These models are a direct result of the increasing importance of services over products. In the current age, successful business platforms provide services to users on both the demand and the supply side by ensuring interaction with each other and they make a profit by charging a fee for this service. They do not always charge a fee for both sets of users. Usually, they select a set that benefits more from such an arrangement. For example, Amazon charges a fee to suppliers wishing to sell/display their products on Amazon's website but does not charge its customers for browsing through or buying those products. However, for another service, i.e. delivery, through Amazon Prime, it charges the customers an annual subscription fee but does not charge the carrier companies with whom it contracts for the actual delivery services.
Amazon is not the only business to employ this double/multi-sided platform as an important component of its model. In this age of digitalisation, user-generated content is gaining importance. Customers are starting to shy away from big multinational corporations and turn to smaller peer-to-peer marketplaces.

Multi-sided models have been in existence for centuries, the likes of village markets and matchmakers which served as platforms to bring together interdependent groups of consumers. However, the prominence of such

models has soared again recently, mostly because of information technology, which has significantly increased the opportunities for building larger, more valuable and powerful platforms.[56] There are other reasons for this change, such as lack of trust in big corporations, existence of cheaper alternatives with the same quality of service, increasing demand for services rather than products, etc. But digitalisation remains the most important and dominant factor. The various online payment and verification mechanisms that customers tend to rely on for dealing with unknown sellers on the internet have come about through digitalization as has the increasing trend for companies to integrate their customers into their value-creation chain. In short, it can be said that the digitally aware customer is no longer satisfied by expensive products offered by 'branded' multinational corporations but wants to be an active participant in the process.

The next section analyses the intricacies of such multi-sided models: how they work, the rationale behind them and what kind of services they offer in this digital age.

4.3.2 What are multi-sided models?

As the OECD stated in the final report on Action Plan 1 of the BEPS project,[57] a multi-sided business model is one that is based on a market in which multiple distinct groups of persons interact through an intermediary or platform, and the decisions of each group of persons affects the outcome for the other groups of persons through a positive or negative externality. In a multi-sided business model, the prices charged to the members of each group reflect the effects of these externalities. If the activities of one side create a positive externality for another side (for example more clicks by users on links sponsored by advertisers), then the prices charged to that other side can be increased.

Positive externalities: An example of a multi-sided business model involving positive externalities for different sides of the market is a payment card system, which will be more valuable to merchants if more consumers use the card, and more valuable to consumers if more merchants accept the card. Similarly, an operating system is more valuable to end users if more developers write software for it, and more valuable to software developers if more potential software purchasers use the operating system.

Negative externalities: A negative externality from one side for another side (e.g., displays of intrusive and unattractive advertising banners) can be offset by a lower price, or even no charge or a reward for users. The classic case in which one side experiences negative externalities from the other side's participation is found in the media industry. In that case, a company attracts users by providing content (television or radio programming, a magazine, a trade publication, a phonebook, or a newspaper) for free or at a cost less than the cost of production. The media company displays advertisements to its readers/listeners/viewers and earns revenue from advertisers whose ads it displays. Alternatively, it might earn revenue from selling information about its readers/listeners/viewers to interested parties.

In a paper written by Jean-Charles Rochet and Jean Tirole in 2000, the concept of a broad class of businesses acting as catalyst for creating value for two or more groups of customers was explained in detail for the first time.[58] They showed that these catalyst businesses had economic characteristics of their own and had the potential to overcome the problem of transaction costs for the two sides. This can be illustrated through the example of

[56] Hagiu, A. 2009. Multi-Sided Platforms: From Microfoundations to Design and Expansion Strategies (Working Paper No. 09-115, P. 2). Harvard Business School Strategy Unit. Retrieved from http://www.hbs.edu/faculty/Publication%20Files/07-094.pdf

[57] Ibid 16. P. 40

[58] Rochet, J. C., Tirole, J. (2004). Two-sided markets: An overview. (2004) (Working paper), Institut d'Economie Industrielle, Retrieved from http://web.mit.edu/14.271/www/rochet_tirole.pdf

OpenTable,[59] an American-based company that acts as a platform for fine-dining restaurants and consumers in various cities in the United States. It allows customers to make and restaurants to accept reservations online. Consumers used to have to call a restaurant and, assuming they reached someone, ask whether a particular time was available for their party. If they were unable to make a reservation, they would repeat the process for another restaurant, perhaps many times. Restaurants used to have to devote resources to taking phone calls, many of which did not result in a reservation, and keeping track of the reservations they did take. This platform has mitigated this problem and the costs associated with it. OpenTable offers this service for free to consumers and charges the restaurants a small fee for registering with them.

OpenTable is just one example of a very basic type of multi-sided business model. The matrix below captures various companies which earn revenue on both the front and the back end and distinguishes them from single-sided businesses which earn revenue only on the front end.

The following matrix captures the new types of multi-sided models that have emerged as a result of widespread digitalisation.

[59] Ibid 46

Back End Configurations

Front End Configurations

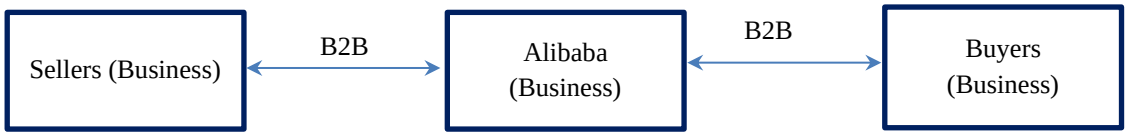
	None (1-sided)	B2B	B2C	C2C
B2B	Boeing	Alibaba	Big data services (Google/Facebook)	N.A.
B2C	Walmart	Amazon	Uber/Airbnb	N.A.
C2C	Craigslist/Internet auctions	N.A.	N.A.	N.A.

It is common knowledge that companies that earn revenue only on the front side (supply side) follow a single-sided business model where they bear the costs of production and earn revenue by selling the manufactured product to the customer. There can be three kinds of relationships in such a scenario: B2B, B2C and C2C. Examples of these kinds of businesses can be seen in the first column of the matrix.

- Boeing, a business entity, provides products (airplanes) to other businesses (airline companies), thereby forming a single-sided B2B company.
- Walmart, a business entity, sells products to individual customers, thereby forming a single-sided B2C company.
- Craigslist and various internet auctions allow individual customers to sell their products to other individual customers, thereby forming a C2C company. Here, craigslist is not a multi-sided platform as it does not form relationships with either category of users, i.e., it does not charge either category any fees for usage but merely facilitates them to form relationships (C2C) with each other.

However, multi-sided business platforms rely on the interaction of two groups for their functioning and value creation. They form B2B or B2C relationships on both sides of the spectrum. As explained earlier, they do not necessarily charge both sides a fee for providing a B2B or a B2C service but may choose to charge one side depending on positive and negative externalities. This can be better explained by using examples from the matrix:

- **Alibaba.com:** The primary company of the Alibaba group. It provides a B2B trading platform for wholesale buyers and sellers. It acts as the mediator of deals and keeps a proportion of each and every sale/purchase made through the website. Moreover, it offers annual subscriptions that are used to maintain their accounts/online shops. Alibaba.com contracts with seller companies at the back end (clearly B2B) when they register their products for sale on its website and with buyers at the front end when they place an order to purchase. The buyers on Alibaba.com are also businesses (since it only allows wholesale trade) therefore the relationship between Alibaba.com and the buyers is also of a B2B nature.

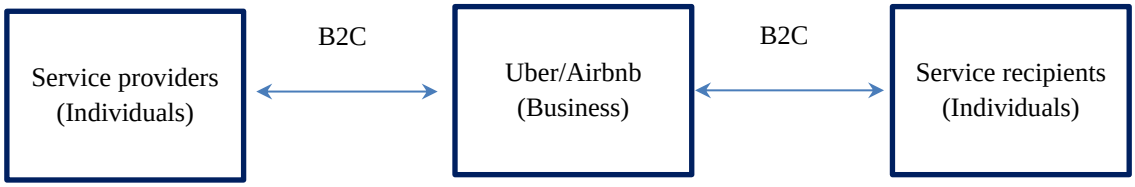


- **Big data services:** Companies such as Google and Facebook have relationships with individual customers who use their services of searching and social networking respectively. These relationships are of a B2C configuration. Google/Facebook then collects data from these individual customers. Google does so by tracking user's searches and Facebook does so by accessing user's personal information. This collection of data is termed 'big data'. Google and Facebook provide another service which their main value driver

is, i.e. advertisements. For this purpose, they contract with advertisers based on a B2B configuration. Facebook and Google sell the big data information to these advertisers who benefit greatly from highly detailed user profiles – meaning their adverts can now be targeted precisely at "women over 40 who love science fiction books" or "men under 25 living in New York who love baseball". Thus, this kind of service provided by Google/Facebook to advertisers plays a part in the interaction of two groups of users, i.e. advertisers and target customers. Thus, it can be said that this is another example of a multi-sided platform where advertisers are at the front end receiving a service (big data) from Google/Facebook and individual users are at the back end using search and social networking services provided by them.

- **Amazon:** This is a classic example of a multi-sided platform. Amazon contracts with businesses willing to sell their products on its website at the back end, thereby forming a B2B relationship. At the front end, it provides a B2C service to its customers who want to buy the products of those businesses. For this purpose, Amazon charges a fee from businesses to display their products on Amazon's website but does not charge customers. This positive externality is created by the fact that the greater the number of users on Amazon, the more profitable it will be for businesses.

- **Uber/Airbnb:** These are one of the most common types of multi-sided platform visible in today's world. They attach high importance to user generated content, work to establish user-to-user relationships and charge a fee for proving the enabling service. Uber and Airbnb are companies that enable provision of taxi and short-term holiday rental services respectively. The unique proposition of their model is that they do not contract with any established businesses for this purpose but use customers themselves for providing the service. They contract with individuals at the back end (B2C) who register on their website to offer their services and also contract with individuals at the front end (B2C) who are in need of those services. For example, any individual willing to offer their house for temporary holiday rental can become a member at Airbnb (after a specific verification procedure) and anyone in need of a house/room temporarily will be able to contact them through Airbnb. Thus, even though Uber and Airbnb are business platforms themselves, they enable direct customer interaction.



As can be seen from the matrix, there are no examples of multi-sided platforms in a C2C configuration. This is because the platform enabling multiple sides to interact is itself a business. Therefore, even if a business platform is enabling C2C relationships, the overall business model of that multi-sided platform is not C2C. This is because, typically, all customer-to-customer economic interactions are routed through a business/corporate set up acting as

the facilitating platform. Some examples of customer-to-customer interaction *without* a corporate intermediary can be seen at a micro-level such as barter trade, micro-level crowdfunding (without the use of a platform to search for a lender) etc. However, individuals can only really interact with other individuals in small vicinity and/or at a small scale without a corporate structure. In order to provide services on an individual basis at a global scale, a corporate platform is essential.

The next section analyses the most successful business configurations in the digital age and explains the reasons behind the success of multi-sided business models. It also predicts future trends in terms of business configurations.

4.4 Towards successful business configurations: the future

Evolution is the inevitable truth of mankind and businesses are not immune from it. Traditional businesses which cannot keep up with the pace of change will be taken out and replaced by new models of business that are easy to operate and are more customer friendly. Therefore, it is time for traditional businesses to change their strategies in this constantly evolving environment. Multi-sided models, empowered by collaboration, appear to be the most successful trend to follow. Multi-sided models are the trendsetters for the digital age for a variety of reasons:

- **Services are becoming more important than products**: One of the most important reasons for the rise of multi-sided models is the increased cost for services. All multi-sided models connect various groups of users in need of each other, finding the best match between providers and receivers. In the modern world, the number of producers has increased rapidly. For every product, there exists a multitude of companies ready to produce it. This has lowered the value of the product itself. However, it has increased the value of the services required to *find* the most suitable and cost-effective product. Those platforms that provide a service of bringing together the best match based on the consumers' requirements are clearly quite successful. They not only allow consumers to access the products offered by all sizes of brands in the market but also allow them to access products and services offered by other consumers. This takes us to the next point where we analyse the importance of consumer generated content.
- **Cheaper and equally good/reliable alternatives**: Many multi-sided platforms exhibit new characteristics previously invisible in traditional models. Companies such as Uber, Airbnb etc. have revolutionised the market completely. Through these platforms, customers can search for private persons near them who are offering the services they need. Airbnb and Uber are replacing hotel rentals and taxi companies in most major cities. Consumers often prefer to use these services because it usually results in a cheaper alternative but with similar quality. Another contributing factor is the growing lack of trust in MNEs due to non-transparent practices and the non-personalised nature of services offered.
- **Reduced search/shared costs:**[60] Search costs are the costs incurred by the various sides before they actually interact. They can also be called shared costs because they are incurred by both sides of the spectrum. For example, buyers and sellers on eBay are looking to, respectively, purchase and sell products, but without such a platform, where they can easily locate each other, they would have to spend a considerable amount of time and perhaps money to locate the best possible match. This is reduced substantially by using a multi-sided platform. Some multi-sided platforms serve both sides equally such as men and women on www.match.com and charge them a nominal fee for registration. However, other multi-sided platforms cater to the needs of one side more than the other. For example, Google allows advertisers to pay for their ads to be displayed but does not charge users. The commonality between the two types of multi-sided platforms is that they provide all sides of users with the most extensive search results based on their requirements and even when they charge a small fee to both sides, they are still considered an economic alternative to the traditional method of accessing those services.

[60] Ibid 57. P. 6

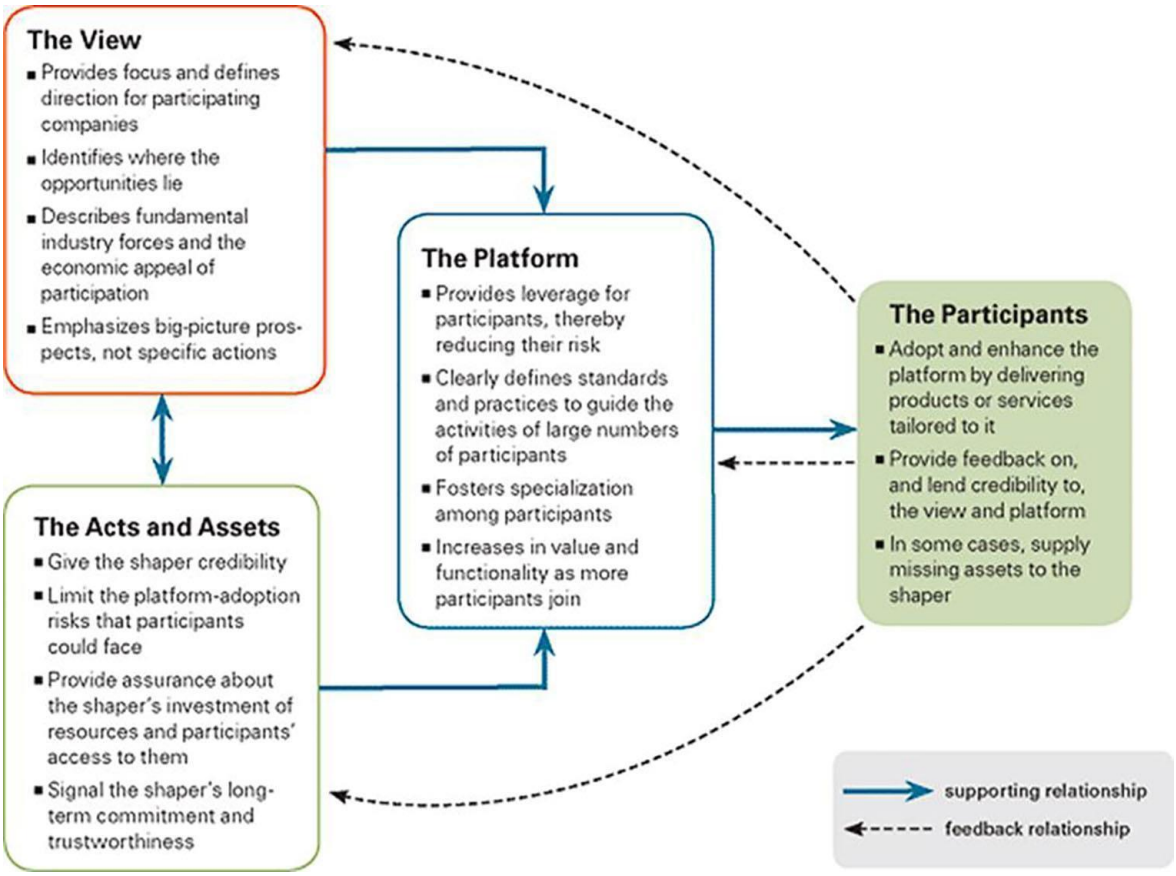
- **Wide array of services offered:** Multi-sided platforms are spreading into most types of services, some offering traditional services but in a new and innovative manner, such as the table reservation service mentioned previously. As multi-sided models grow in number and more businesses are incorporating such a model, ever more types of service are likely to be offered.

4.5 From single-sided businesses to MSPs

There are many products or services that are single-sided, i.e., cater to only one customer group, but which hold the potential to be expanded into an MSP by offering to reduce the costs associated with transactions between their existing customers and new customer groups. One such example is the supermarket chain Tesco which started as just any other convenience store serving one set of consumers but soon it partnered with other companies that could benefit by offering their services through Tesco outlets. Therefore, it soon became possible to send and receive parcels, buy mobile phone network subscriptions, buy insurance, etc., at Tesco outlets. This expansion into serving multiple groups of customers came much before the technological expansion. Once advancements in the field of information and communication technology started giving rise to new digitally based business models, there was a corresponding increase in the number of multi-sided models visible in the market. One clear example of this situation is Google AdSense. Indeed, Google itself started as a single-sided search service but quickly realised that the technology it used to enable consumers to search the web could also be used to reduce search costs between advertisers and consumers, hence the creation of AdWords and AdSense, the programmes that allow it to offer and charge for search-related advertising. This innovation was a quantum leap in advertising efficiency, which many thinks, it has put advertising through traditional media on a path to extinction. A car dealer advertising in the Yellow Pages pays for his ad to go into directories that go to all consumers, whether or not they have an interest in cars. By contrast, by placing a sponsored link with Google, the dealer pays only when users click on his sponsored link, which implicitly means they have a much higher probability of being interested in purchasing a car.[61]

It is expected that in the future we will witness a larger number of multi-sided models that have modified their structure from single-sided models, using their existing strong business relationships to form the entire basis for a multi-sided platform. Thus, it is not enough to merely come up with the idea of a multi-sided model, in order to succeed. Every multi-sided model is a result of a shaping strategy and there are three interrelated elements that are necessary for any new shaping strategy to succeed. They are *a shaping view*, *a shaping platform* and *shaping acts and assets* (see the diagram below).

[61] Ibid 57. P. 10



(**Source**: https://hbr.org/2008/10/shaping-strategy-in-a-world-of-constant-disruption)

PART C - LEGAL, TAX AND TRANSFER PRICING CONSIDERATIONS FOR DIGITAL ECONOMY BUSINESS MODELS

The Organisation for Economic Cooperation and Development has been active in identifying the role digitalisation plays in today's economy and in managing the impact it has in the field of taxation. In 1998, OECD, recognizing the economic potential of e-commerce, organised a ministerial conference on Electronic Commerce jointly with the Government of Canada. In this conference, the OECD was of the view that existing tax principles which guide governments in dealing with conventional commerce are sufficient to deal with electronic commerce as well. At this stage it was decided that taxation of e-commerce shall be based on the five principles of neutrality, efficiency, certainty and simplicity, effectiveness and fairness and flexibility.[62]

After the successful conclusion of the Ottawa Ministerial Conference, the OECD set up a Technical Advisory Group (TAG), in January 1999, to monitor the application of existing treaty rules in the context of electronic commerce and to examine proposals for alternative rules. The TAG met for the first time in September 1999 to agree on a work program to fulfil the OECD's agenda. Work done by the TAG in this sphere resulted in discussion drafts on "Attribution of Profit to a Permanent Establishment Involved in Electronic Commerce Transactions", which was released in February 2001, "The Impact of the Communications Revolution on the Application of 'Place of Effective Management' as a Tie Breaker Rule", also released in February 2001 and "Place of Effective

[62] Organisation for Economic Cooperation and Development. (1998). *Electronic Commerce: Taxation Framework Conditions* (P. 26). Paris. OECD Publishing.

Management Concept: Suggestions for Changes to the OECD Model Tax Convention", released in May 2003.[63] These reports focussed on achieving a common international consensus on taxation of profits arising out of businesses involved in electronic commerce without introducing a different mechanism for their taxation.

However, more than a decade later when the communication revolution is at its peak and new ways of operating business are being invented every day, OECD noticed that national tax laws have not kept pace with globalisation of corporations and the digital economy, leaving it open for multinational corporations to exploit those gaps that exist in the domestic systems to artificially reduce their taxes. Thus, in July, 2013 OECD released the BEPS Action Plan to counter such practices. Based on the Action Plan 1 (Digital Economy), a discussion draft was released in March 2014 in which the OECD identifies certain challenges presented by digital economy in the field of direct and indirect taxation and provides methods for tackling such challenges. After analysing the comments received on the discussion draft, the OECD released a final report in September 2014 addressing the tax challenges of the digital economy.

The OECD is now focussing on researching into measuring the digital economy, understanding the skills and jobs in the digital economy and on understanding the wireless market structures in order to be in a better position for policy making. The details of the work done by the OECD in this field shall be discussed in later chapters focussing on the tax aspects of the digital economy.

With this objective in mind and after analysing the new and upcoming business models arising as a result of digitalization, this part focusses on the various legal, tax and transfer pricing concerns they raise for the business owners, participants and policy makers. Since, the digital economy is still in the phase of developing, the applicable set of laws to this sector is yet to be finalized. In light of the same, this part looks at the existing principles developed by the OECD since 1998 and their application in the constantly evolving digital economy. This part follows the structure as laid out below:

- Chapter 5 delves into the international tax and transfer pricing concerns associated with these newly developed business models. This chapter provides an in-depth analysis about the current tax issues associated with these structures in light of the OECD BEPS Action Plan 1 and existing international tax and TP legislations.
- Chapter 6 aims to lay out the legal concerns and policy considerations associated with business models based on the digital economy and discusses the policy changes that we are already witnessing in some countries and the trend which they are expected to follow. For this purpose, this chapter analyses policy concerns in North America, LATAM, Asia, Africa and Europe.
- The book closes with a chapter on case studies which analyses MNEs from a business, legal, tax and transfer pricing point of view. These case studies highlight the changes that will be mandated after the BEPS Action Plan 1 and also provide a brief overview of what to look out for in the future. In this section, unilateral approaches taken by some countries in light of BEPS are discussed to provide an overview of the latest regulatory framework enveloping the digital economy. This section addresses the 2019 OECDs proposal on taxation of digital economy activities, where OECD for the first time departs from the regular standards of taxation.

[63] Organisation for Economic Cooperation and Development. (2005). *Are the Current Treaty Rules for Taxing Business Profits Appropriate for E-commerce? Final Report*. Paris. OECD Publishing. Retrieved from http://www.oecd.org/tax/treaties/35869032.pdf

5. International Tax and TP Aspects of the Digital Economy[64]

This chapter does not purport to go into the detailing of the framework and merits / demerits but intends to identify the key underlying themes and test their sustainability in the digital economy. In this regard, in Part A of this chapter, we provide a brief backdrop of the international taxation framework and thereafter apply it in the context of Digital Economy. In part B of this chapter we analyse the issues in the application of the specific principles in the context of existing tax treaty models.

5.1 Part a: framework

5.1.1 Framework for International Taxation – a Backdrop

International or cross border taxation refers to global tax systems or rule frameworks that apply to transactions between two or more countries in the world. These systems are governed by:

- Tax equity: which involves the following interpretations: (a) that taxpayers in similar circumstances should bear a similar tax burden; and (b) that taxpayers in better circumstances should bear a larger part of the tax burden as a proportion of their income; and (c) that the tax revenues from international tax economic activities are shared equitably by nations. It also ensures that the taxpayers must neither be discriminated against nor given undue preference in their relative tax burdens; and
- Tax neutrality: as per which tax policies do not influence the economic choices of the taxpayers on cross-border transactions. They may be tax neutral either on capital export or on capital import. The developed countries tend to favour capital export neutrality, under which the taxpayers' choices between investing at home and abroad remain unaffected (i.e. world efficiency). On the other hand, the developing countries generally prefer capital import or competitive neutrality to ensure that the investment decisions of domestic and foreign investors in their country are on par (i.e. national efficiency)[65].
- Efficiency: Compliance costs to business and administration costs for governments should be minimised as far as possible.
- Certainty and simplicity: Tax rules should be clear and simple to understand, so that taxpayers know where they stand. A simple tax system makes it easier for individuals and businesses to understand their obligations and entitlements. As a result, businesses are more likely to make optimal decisions and respond to intended policy choices. Complexity also favours aggressive tax planning, which may trigger deadweight losses for the economy.
- Effectiveness and fairness: Taxation should produce the right amount of tax at the right time, while avoiding both double taxation and unintentional non-taxation. In addition, the potential for evasion and avoidance should be minimised. The practical enforceability of tax rules is an important consideration for policy makers. In addition, because it influences the collectability and the administerability of taxes, enforceability is crucial to ensure efficiency of the tax system.
- Flexibility: Taxation systems should be flexible and dynamic enough to ensure they keep pace with technological and commercial developments[66].

When the design of the international tax framework was first conceptualized by the League of Nations by setting up a team of four economists, the concept of economic allegiance was sought to be considered as a basis. Economic

[64] Co-authored by Vishnu Bagri and Bharath L. Courtesy: Accretive SDU Consulting Private Limited. Bengaluru, India

[65] Rohatgi, R. (2002). An Overview of International Taxation. In *Basic international taxation* (2nd ed., Vol. 1). The Hague: Kluwer Law International.

[66] Organisation for Economic Cooperation and Development. (2001). *Electronic Commerce: Taxation Framework Conditions*. Paris. OECD Publishing. Retrieved from http://www.oecd.org/tax/consumption/1923256.pdf

allegiance is based on factors aimed at measuring the existence and extent of the economic relationships between a particular state and the income or person to be taxed. The economists have identified four factors comprising economic allegiance, namely **origin** of wealth or income, **situs** of wealth or income, **enforcement** of the rights to wealth or income and place of **residence** or domicile of the person entitled to dispose of the wealth or income. Among those factors, the economists concluded that in general, the greatest weight should be given to "the origin of the wealth [i.e. source] and the residence or domicile of the owner who consumes the wealth". Under this approach, in simple situations where all (or a majority of) factors of economic allegiance coincide, jurisdiction to tax would go exclusively with the state where the relevant elements of economic allegiance have been characterised. In more complex situations in which conflicts between the relevant factors of economic allegiance arise, jurisdiction to tax would be shared between the different states on the basis of the relative economic ties the taxpayer and his income have with each of them[67].

Typically, the taxation systems adopted worldwide can be broadly categorized under two systems i.e. Residence based taxation or Source based Taxation. Under the residence-based taxation, the country of residence (or citizenship) may impose its taxes on the worldwide income (including foreign income or capital) on the taxpayer ("Principle of Residence"). While under the source-based taxation, the country of source seeks to apply a tax due to the "economic attachment" of persons that is derived from the economic activities within its territory ("Principle of Source").

International double taxation arises on account of the differing systems of taxation and the manner in which each jurisdiction interprets the principles. The consequence of the conflicts is that on the same activity, same income may be taxed twice or multiple times by two or more countries when on the interplay of the above models, taxing powers are granted to two or more countries on the same income.

At the time the four economists presented their report, various jurisdictions had already started addressing juridical double taxation through bilateral and unilateral measures. Instead, supported by the development of the OECD and UN Model treaties, the international tax framework developed around a vast network of bilateral tax treaties following the so-called "classification and assignment of sources" method, in which different types of income are subject to different distributive rules. This schedular nature of distributive rules entails a preliminary step, whereby the income subject to conflicting claims is first classified into one of the categories of income defined by the treaty. Where an item of income falls under more than one category of income, double tax treaties resolve the conflict through ordering rules.

Once the income is characterised for treaty purposes, the treaty provides distributive rules that generally either grant one contracting state the exclusive right to exercise domestic taxing rights or grant one contracting state priority to exercise its domestic taxing right while reserving a residual taxing right to the other contracting state.

Treaty rules provide that business profits derived by an enterprise are taxable exclusively by the state of residence unless the enterprise carries on business in the other state through a PE situated therein. In the latter situation, the source state may tax only the profits that are attributable to the PE. The PE concept is thus used to determine whether or not a contracting state is entitled to exercise its taxing rights with respect to the business profits of a non-resident taxpayer. Special rules apply, however, to profits falling into certain enumerated categories of income, such as dividends, interest, royalties, and capital gains[68].

[67] Ibid 16. P. 36

[68] Ibid 16. P. 38-39

5.1.2 Economic Allegiance in the Digital Economy

The digital economy has significantly altered means of doing business. The paradigm raises fundamental questions to the present theoretical framework of cross border taxation. Hence, it would be relevant to understand an outline of this theoretical framework of the residency and source-based taxation frameworks so as to appreciate the challenges posed by the digital economy.

Residence-based taxation

The premise underlying the residence-based system of taxation is that anyone having a relation to a society, i.e. anyone receiving benefits from public community should also bear the costs of such public community. A country will usually have the power to impose taxes on resident companies, provided it is able to obtain reliable information on the income derived by them. Residence taxation is a tax on a person and not a tax on the income itself.

Source-based taxation

The principle of 'source' in determining jurisdiction to tax is based on the economic connection an item of income has to a country. The underlying rationale is that income should be treated as having its source in the jurisdiction in which it has a significant economic connection.

Under the benefit principle, the rationale for source taxation is that non-residents receiving income from a source country have benefited from being able to derive income in that country, and accordingly they should be taxed in that country. Conversely, it is viewed that source taxation is not based on benefit theory, but rather on the economic connection between the source country and the income derived within its borders. The appropriate level of source country taxation that should be imposed on income is controversial. Some commentators argue that the benefits provided to resident taxpayers exceed the benefits provided to non-resident taxpayers; and consequently, source country taxes on non-residents should be significantly lower than taxes imposed on residents of the source country. Other commentators argue that the benefits resident taxpayers receive from government operations are similar to those received by non-resident taxpayers and therefore source country taxes should be substantial. The latter argument contends that source taxation is a justified charge for the use by non-resident taxpayers of a jurisdiction's physical, legal and economic infrastructure[69].

The conceptual merits of the source theory are to allow countries to exercise their taxing jurisdiction in respect of activities that produce income on their own territory. It is well recognized that the existence of a genuine link with the taxing jurisdiction of the country where income is sourced and the right of such country to tax business income should never be questioned or put in danger in so far as the presence of a non-resident in the market country is not merely occasional[70]. The principle of origin justifies allocation of tax jurisdiction on income to a state if the income has been created within the territory of that state, i.e. the cause of the income is within the territory of that state. The origin of income is where the intellectual element among the assets is to be found. This intellectual element

[69] Kobetsky, M. (2011). International taxation of permanent establishments: Principles and policy. Cambridge: Cambridge University Press.

[70] Hongler, P., Pistone, P. (2015). Blueprints for a New PE Nexus to Tax Business Income in the Era of the Digital Economy (Working paper). International Bureau of Fiscal Documentation. Retrieved from http://www.ibfd.org/sites/ibfd.org/files/content/pdf/Redefining_the_PE_concept-whitepaper.pdf?utm_source=white-paper&utm_medium=email&utm_campaign=WP10-03-2015&utm_content=Redefining_the_PE_concept-whitepaper.pdf

is provided by the activities of individual human beings. Only individuals can create income and things in themselves cannot[71].

Extra-territoriality

The source-based taxation approaches also lead to the dimension of a country seeking to enforce a tax claim on income beyond its legal and territorial jurisdiction.

While a country's jurisdiction to tax is limited by international law, it is also limited by its ability to enforce its jurisdiction, and by its economic and political relations with other countries. Countries will usually limit their jurisdiction to tax by either bilateral or multilateral measures, such as tax treaties, or unilateral domestic law measures[72]. However, a strict adherence by a jurisdiction to the source rule results in a jurisdiction potentially seeking to venture beyond its jurisdiction, territorially and legally, to enforce the source rule. This is especially seen in capital importing developing economies such as China[73], India[74], UK[75], but more recently in the Italy[76].

Basic source rules for certain incomes

In the above theoretical framework, we could proceed to understand the general source rules as provided under tax treaties, as follows:

[71] Kemmeren, E. (2010). Credit versus Exemption. In M. Lang (Ed.), Tax treaties: Building bridges between law and economics. Amsterdam: IBFD

[72] Ibid 70.

[73] China's State Administration of Taxation. (2015). Several Issues concerning the Enterprise Income Tax ("EIT") on Indirect Asset Transfer by Non-Resident Enterprises. PRC: State Administration of Taxation.

[74] See amendments to the Indian Income-tax Act, 1961 vide Finance Act, 2012 and amendments proposed bide Finance Bill 2015 in the context of indirect transfer of shares.

[75] Ibid 4.

[76] See the law no. 145/2018 in the context of Digital Service Tax on digital business.

Particulars	Source
Immovable property	Situs
Industrial or business profits and professional services	Permanent establishment or fixed base
Shipping and air transport	Place of management
Dividend and interest income and directors' fees	Residence of the payer
Employment services and artistes and sportsmen	Place of work
Government salaries and pensions	Sovereignty
Other income	Residence of recipient

Most tax treaties give prior taxing rights to the source country, but with reduced or nil taxation on certain incomes. Unless the source country agrees to forego or limit its rights under a tax treaty, it exercises its rights as and when the taxable income arises. The country of residence is then obliged to give tax relief to avoid double taxation.

Conflicts in source rules

The most common form of juridical conflict in international taxation relate to[77] the Residence-Source taxation, i.e., the same income is taxed twice, first by the country where it is derived under its 'source rules', and then in the country where the taxpayer resides under its 'residence rules'. The other form of juridical conflict is the income characterization conflict, where two states characterize or classify the same income or capital differently and, therefore, apply differing tax provisions. These conflicts which have presented interesting issues in the traditional economy metamorphose into significant challenges in the digital economy.

Challenges to the source rule from the digital economy

The concepts of source and residence have been well tested in the context of the traditional brick and mortar context. In the context of sale of goods by a non-resident to a tax resident, it is generally acknowledged that merely because the goods are sold in the jurisdiction of a tax resident (source jurisdiction), the proceeds from the sale thereof are not to be taxed in the source jurisdiction. It is however acknowledged that where the non-resident undertakes certain operations in relation to the sale of goods in the source jurisdiction, only profits attributable to the said activity would be taxable in the source jurisdiction.

[77] Other forms of conflict that result in double taxation include source-source conflict; residence-residence conflict; and entity conflicts.

In the traditional brick-and-mortar world, such a distinction was clearer:

- Where transfer of property in goods as well as the payment is carried on outside the source jurisdiction, the transaction would not have any nexus to the source jurisdiction.
- Where merely signing of the contract is undertaken in the source jurisdiction, where all the other activities in relation to the contract are undertaken outside the source jurisdiction, no income can be taxed in the source jurisdiction.

Even in the era of services, these principles were applied accordingly, such that where income from the services would have been outside the purview of tax of the source jurisdiction, if:

- Services were provided from outside the source jurisdiction,
- Contract in relation to the same were also entered into outside the source jurisdiction,
- Payment for the services was also made outside the source jurisdiction.

Here it would be worthwhile to note that issues could arise as to the characterization of the income stream received by the non-resident, whether the payment is received for services or for a royalty income stream.

However, in the context of the digital economy, these principles are witnessing considerable challenge:

- A non-resident company may have and interact with customers in a country remotely through a website or other digital means (e.g. an application on a mobile device) without maintaining a physical presence in the country.
- An enterprise may establish a local subsidiary or a PE, with the local activities structured in a way that generates little taxable profit.

For instance, the following illustration can be considered: A company is engaged in selling interactive entertainment games. It sells games online. The company had 300 million average monthly unique users across web and mobile platforms. Most of the games are available for free; however, players can purchase virtual items priced relative to the entertainment value. Some games, however, are subject to monthly subscription fees. The company operates game studios. The company does not provide physical support services to its customers.

In this example, it can be seen that:

- Since the non-resident company interacts with customers solely through a website or other digital means, it would not have a physical presence in the source country.
- It could have significant revenues from the source country but not have any taxable income despite generating considerable value through the user base in the source country.

Applying the concept of source in the above fact pattern could result in considerable difficulty in that it is unclear under the present rules whether:

- Income arises to the non-resident on placement of the order;
- Since the games developed are supplied electronically, whether the jurisdiction of source is the place from where the games were furnished, which could be: (a) the location of the server where the games are replicated and provided online; (b) the location where the game was developed in a manner that the game could be supplied electronically; (c) the location of the copyright / patent holder of the game.
- Where the game has been developed based on inputs from users and coding from open-source programmers, with the gaming company owning the intangibles underlying the game, the question of where the source is located becomes even more intricate.

Another illustration can be considered: A company derives revenue from advertisement income from the search engine operated by it. Customers can avail of the advertising services by electronically placing their request and

agreeing to the terms of the electronic service. Income is generated for the company when a user clicks the ad appearing on the company's website or views the same or further to viewing and clicking, downloads material (such as an app) from the advertiser's website. As in the previous example, since the company interacts with customers solely through a website or other digital means, it would not have a physical presence in the source country.

In this example, the application of the current source rules presents the following dimensions:

- Whether the source country for the company constitutes the country where the advertiser is located or where the user is located or where the technology infrastructure where the advertising service is provided is located.
- Whether the jurisdiction of source is the place from where the technology infrastructure where the advertising service is provided, which could be: (a) the location of the server where the ad is hosted and provided online; (b) the location where the ad was generated in a manner that the game could be supplied electronically.

The peculiar features of the digital economy and the challenge posed therefrom to the traditional source rules do raise the question of whether there is a need to re-understand the concept of income or redefine the concept of source. Such a redefinition could potentially factor the value chain perspective and concepts of value creation.

The value chain approach - the first step in identifying the source of income

Global value chains (GVCs) have become a dominant feature of the world economy, involving countries at all levels of development, from the poorest to the most advanced. The revolutions in information and communications technology (ICT), coupled with the development of ever more complex goods and production processes, have allowed firms to establish chains that are as intricate as they are efficient. The disaggregation of production into separate stages allows their firms not only to find their place on the ladder, but to move up the rungs as their capabilities improve. GVCs encourage that upward movement by rewarding skills, learning, and innovation[78]. Business have disaggregated and dispersed functions crucial to their business physically and virtually (through data servers and cloud clusters) around the world.

An analysis of various nuances of GVCs was undertaken by the OECD as part of the 2018 Interim Report on 'Tax Challenges Arising from Digitalisation' as a 'value chain', a 'value network' and a 'value shop'[79]. Understanding the interplay of technology, value and intangibles in each of these frameworks would be key in identifying the source of the income for a digital business. The same as expressed by the OECD is reproduced below:

	Value chain	**Value network**	**Value shop**

[78] Organisation for Economic Cooperation and Development, World Trade Organisation, World Bank. (2014, P. 18). *Global Value Chains: Challenges, Opportunities, And Implications for Policy*. Paris. OECD Publishing. Retrieved from http://www.oecd.org/tad/gvc_report_g20_july_2014.pdf

[79] Organisation for Economic Cooperation and Development. (2018, P. 43). *Report on Tax Challenges Arising from Digitalisation: Three concepts of value creation*

General description	A value chain's objective is the conversion of inputs into outputs through discrete but related, sequential activities (each of which can be thought of as a production function). The final goods may be manufactured by the company itself or acquired. In general, the final goods are standardised.	A value network's objective is to serve as an intermediary, facilitating (1) bilateral interactions between itself and its customers, and (2) multilateral interactions between its customers (e.g., buyers/sellers; passengers/drivers). Value creation may be in the formation of direct links between customers (e.g., a telephone call or a friend request) or of indirect links (e.g., a commercial bank can make a loan by virtue of the deposits that customers supply in aggregate).	A value shop's objective is to solve a problem, thereby transforming an existing state to a more desired one. The problems are characterised by information asymmetry (i.e., the shop has more information than its customers). The process to arrive at a solution may be labour intensive with respect to professionals & specialists & may either be standardised or highly customised.
Primary technology	Long-linked: linear process that begins with inputs & proceeds to deliver a finished product to a final consumer	Mediating: used by organisations to link users or customers interested in engaging in a transaction	Intensive: forms of hardware & knowledge used to change some specific object
Value creation logic	Value is created by transferring a product from the firm to its customers	Value is created by organising and facilitating exchange between (linking) customers/suppliers/other stakeholders	Value is created by (re)solving a customer problem or demand
Primary activity categories	Activities organised sequentially: ● Inbound logistics Marketing ● Operations ● Service ● Outbound logistics	Activities organised simultaneously, in parallel: ● Network promotion & contract management ● Service provisioning ● Infrastructure operation	Activities organised as an iterative cycle: ● Problem-finding & acquisition ● Execution ● Problem-solving ● Control/evaluation

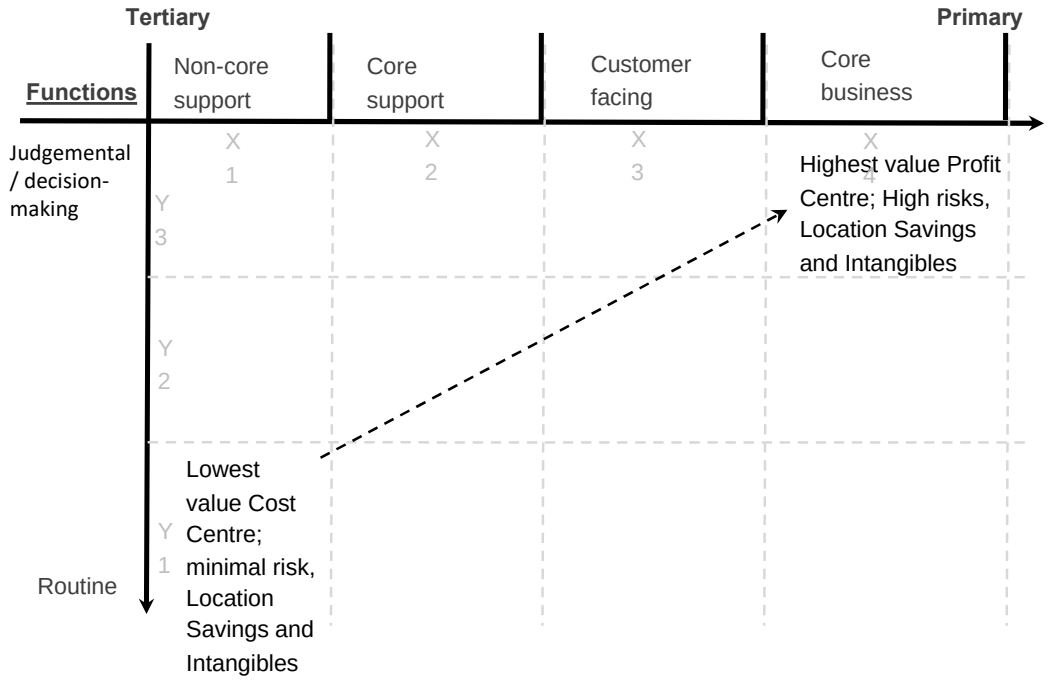
			• Choice of approach to find solution
Traditional business model examples	• Assembly line manufacturing • Wholesale distribution business	• Employment agencies bringing together employers & job seekers • Banks joining investors & borrowers	• Medical technology used to diagnose & treat a disease • Professional services (legal, consulting, financial)
Digital economy business model examples	**<u>Manufacture of goods (vertically-integrated firms)</u>** **Tangible goods:** • Unilever, Coca Cola, GE, Siemens, BMW, IKEA, Microsoft (PCs, tablets, Xbox), Apple (PCs, tablets, iPhone), Huawei (devices), Sony (devices, electronics), Intel, IBM, Cisco, Tsinghua Unigroup (microchips), Xiaomi **Intangible goods & digital content:** • Creative content: Disney, Netflix, Sony • Software (one-time purchase of standard package):	**<u>Multi-sided platforms</u>** **E-commerce intermediary** • Tangible goods: AliExpress, Amazon Marketplace, eBay, Etsy • Intangible goods: Trivago, Booking.com, Hotels.com, Kayak; Google • Play, Apple iTunes store **Service intermediary** • Collaborative consumption / sharing economy: AirBnB; Blablacar, Drivy, Turo, Uber, Didi Chuxing, Ola; Deliveroo, Foodora, TaskRabbit, Upwork • Social networks: Facebook, LinkedIn, Sina Weibo, Tencent Weibo, Twitter, Nice, Kuaishou, Qzone • Online gaming and gambling	**<u>Cloud computing / input suppliers of computing power to other businesses</u>** (X-as-a-Service, potentially completely vertically integrated) IaaS: • AWS, Alibaba, Microsoft, IBM, Huawei, Cisco, Intel PaaS: • AWS, Alibaba, Microsoft, IBM, SAP SaaS : business lines generally fall into the value chain category with the exception of software that is customised for users. **<u>Professional services (vertically-integrated firms)</u>** • IoT consulting: Siemens

	Microsoft, Adobe, SAP, Dassault Systems, Dropbox, Weiyun, Google Drive **<u>Resellers</u>** **Tangible goods:** ● Alibaba, Amazon retail, JD.com, Tencent, Walmart **Intangible goods & digital content:** ● Creative content: Netflix, Sony (films/music), Spotify, Tencent's music distribution business line, Deezer, Amazon Audible ● Software (one-time purchase of standard package): Amazon, Best Buy **<u>Input suppliers</u>** ● Companies that have created goods for sale to resellers: Intel, Tsinghua Unigroup ● Companies that have created apps to supply to app stores	● Search engines: Google, Bing, Yahoo, Baidu, NetEase ● Email: Gmail, Yahoo, Hotmail, NetEase ● Online content: Dailymotion, SoundCloud, TripAdvisor reviews, Vimeo, YouTube ● E-payments: Transferwise, Alipay, Tenpay, Paypal, Worldpay	● Data analyst

Characterizing the business - the second step in identifying the source of income

The above approach to value chain is the first step in the quest to identify the source of the income for a digital business. Thereafter, the business of the group should be categorized into its core business and non-core business functions / entities and activities which involve routine decision making vis-à-vis strategic decision making.

Pursuant to this, the source could be identified to the jurisdiction / entity which undertakes the core business functions which involve strategic decision making. The same is depicted below:



Identifying where the significant value creation is undertaken – the third step in identifying the source of the income

The third step in identifying the source of income would be to identify the jurisdiction where significant value creation is undertaken. The OECD has consistently insisted on the need for a review of the nexus rules for the taxation of digitalized businesses. In that context, value creation emerges as the new paradigm for attributing taxing rights. Digitalization implies that there are elements outside of the enterprise that also create value for the company.

In its recent proposal OECD initiate three types of value creation to tackle the digital economy challenges, participation of users, marketing intangible/market jurisdiction, and significant economic presence. To the extent such three nexuses arise and contribute significant value creation to the company, the jurisdiction where the nexus exist may have the taxing right of the income generated by the company regardless the absence of physical presence.

The user participation leads to value creation as these users contribute to the creation of the brand, the generation of valuable data, and the development of a critical mass of users which helps to establish market power for social media platforms, search engines, and online marketplaces platform business model.

The market jurisdiction is considered as the place where value is being created due to the positive attitude in the minds of customers is created by, and the customer information and data is acquired through, the active intervention of the firm in the market. Unlike the user's participation, it would not be intended to apply only to a subset of highly digitalised businesses. Instead, it would have a wider scope in an effort to respond to the broader impact of the digitalisation on the economy.

The concept of 'significant economic presence' as outlined as the 3rd proposal by the OECD would also be relevant. This outline suggests that enterprises may create value where they have significant economic presence (SEP). SEP is where the economic activity carried on in the source jurisdiction evidently reflects a purposeful and sustained interaction with the economy of that country via technology and other automated tools. Such interaction could be proven by these following factors: revenue generated from the source of jurisdiction, participation of users (based on monthly active users, online contract solution, and data collected), and the establishment of local digital features (platform, domain, and payment).

Apart from defining the source based on OECD value creation nexus, given that technology has enabled dispersion of the value creation process, a new dimension that would be relevant is that an income of the digital business could be traced to sources located in multiple jurisdictions. These could be:

- The jurisdiction where the key personnel such as managers, developers, software architects, and designers are located.
- The jurisdiction where server farms of interconnected computers are located.
- The jurisdiction where the data analysis to develop offerings is undertaken.
- Jurisdiction which has contributed significantly to network effects / benefits derived by the digital offering, namely jurisdiction which has a higher user base.

However, the above approach does raise issues, as can be seen from the illustration below and analysis thereof. A US company operates an online music streaming platform through which artists (worldwide) can offer their songs to users worldwide. The platform was developed by US tax residents initially; however, the subsequent development of the same has been rendered open source such as the same is now collaboratively developed with a peer board vetting the development. Users either pay a monthly fee or they only have access to the free services of the company. The company shares its revenue to the holders of publishing rights, respectively, music labels. The exact amount of remuneration also relates to the particularities of certain jurisdictions. The services of the company are available in approximately 60 countries worldwide. The streaming platform also displays ads which provide the streaming service. Thus, the income streams for the company are: (a) revenue from paid subscriptions; (b) revenue from advertisers.

In the above illustration, applying the value chain, value creation and economic presence concepts outlined above, it can be seen that:

- Since the developers work on a collaborative model which is overseen by a peer review board, based on the value creation and value chain perspectives, the jurisdiction of the peer review board could be said to be a key source jurisdiction. However, a conclusion could be complex where the peer review board reviews the enhancements to the platform online and being physically located around the world. In such a scenario, the jurisdiction of the registered owner of the platform could be considered as the source jurisdiction.
- The jurisdiction which contributes significantly to the user base of the music platform could claim itself as a source jurisdiction given the network effects provided by the user platform. This claim could be on a stronger footing where the US Company has a branch or subsidiary in the jurisdiction with the high user base and such entity undertakes marketing functions in relation to the platform.
- Since data is a key component of the offering of the US Company and server farms play a crucial role in the same, the jurisdiction where a significant proportion of the servers are located could also constitute a key source jurisdiction.

In such a scenario, while 'source' could be dispersed among multiple jurisdictions, the quantum of income that should be attributed to each section would thereby need to be determined. For instance, it would need to be determined as to the percentage of income that could be said to be sourced from the jurisdiction of the platform developers, the jurisdiction where the servers are hosted and the key jurisdiction of users of the music platform.

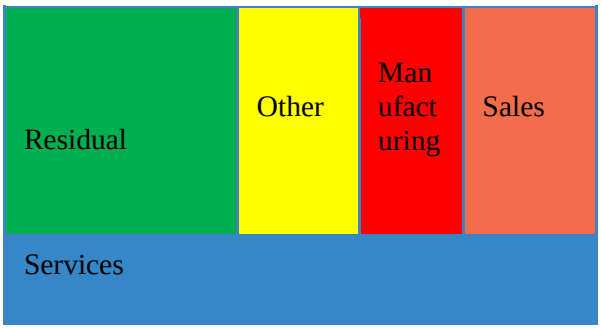
The attribution of an appropriate percentage of income to each jurisdiction would in turn, be a complex and subjective exercise.

Alternative approach

Under the BEPS Project action 8-10, the OECD suggests that functional analysis should explicitly include a value chain analysis which is now widely used in transfer pricing documentation, particularly, Master files. Such analysis would allow considering the whole relationship between related parties including understanding of the overall value creation and, at the same time, contribution of each participating company.

A value chain analysis can be used as a basis for consideration of bargaining positions of the parties concerning allocation of non-intangible premiums. These positions and respective bargaining power arise from contributions, performed functions and owned assets. A result of this analysis will lead to the conclusion whether and to what extent parties can claim related returns. For example, if a Dutch group entity moves its production to Vietnam, location savings will occur due to cheaper workforce. Two questions should be considered for allocating returns in such a scenario i.e., whether a group entity owning/controlling intangible assets has relatively more "bargaining power" than a group entity owning/controlling tangible assets and secondly, which entities are entitled to related returns.

Particularly, a value chain analysis consists of two steps i.e. defining the types of activities performed by MNEs and their added value and secondly, allocating these activities through functions/risks/assets analysis to appropriate entities. The following figure shows the various types of activities that can be performed by the MNEs.



After allocating the usual activities such as manufacturing, sales etc. to the respective entities involved in their performance, the big question that arises (especially in relation to hard to value intangibles) is the allocation of the residual profits. The following table provides an illustration of three entities of an MNE with significant intangibles.

Functions, risks and assets	**Company 1**	**Company 2**	**Company 3**
Functions			
Software development	-	X	X
Brand development / core marketing	-	X	X
Sales activities	X	X	-

Negotiation with suppliers	-	X	X
Assets			
Design and know-how	-	X	X
Methods and procedures	-	X	X
Technology solutions and software	-	-	X
Trademark and brand name	-	-	X
Clients lists and related information	-	X	X
Risks			
Capacity risk	-	X	X
Market risk	X	X	X
Operational risk	X	X	-
IP development risk	-	-	X
IP infringement risk	-	-	X
IP liability/reputational risk	-	x	X

Legend: X – full allocation, x – partly allocated, - not allocated

The table shows that the Company 3 performs intangible-related activities such as software development, owns intangible assets and assumes intangible-related risks. Therefore, it is eligible to returns from intangibles. Company 2 partly participates in development and bears liability risk, which is why it is also eligible to returns from intangibles but only in a small amount. Company 1 is only eligible to returns on sales activities.

5.1.3 Notion of 'territory' for digital economy

The present international rules relating to taxation of a non-resident, at the least, contemplate identification of a source 'within a jurisdiction' and thereafter for the constitution of a PE, a 'fixed place of business'. As such, the current rules contemplate that for income to be taxed, they should be identified to a physical location in a jurisdiction. These rules presently do not appear to acknowledge the increasing commercial importance of virtual worlds or the importance of virtual property such as a website and its increasing monetization through placement of ads on such property.

Virtual worlds offer elaborate and detailed graphics and allow thousands of people worldwide to participate simultaneously, all interacting via the internet with each other and the environment. Some of these worlds, such as City of Heroes, Everquest, and World of Warcraft (WoW), are games that provide structured adventures involving quests, raids, and fights against opposing forces. These are typically known as massive multiplayer online role-playing games (MMORPGs). Others, such as Second Life, the Sims Online, and there, are unscripted virtual environments that lack a set storyline. In Second Life, for example, the world's owner, Linden Lab, provides the basic environment, but users create the vast majority of the world's content[80].

People generally pay to participate in virtual worlds, and many are there solely for the social and entertainment value. However, even in the course of playing structured games, participants often receive items, such as armour, weapons, or virtual currency, that have value within the game. Some participants accept real money in return for transferring such an item in-world. As a result of such real-market trades, many items have ascertainable market values. In this backdrop, the question is whether incomes from the transfer of such property, rights and items is taxable and if yes, which would be the jurisdiction to tax it, whether the jurisdiction where the 'avatar' who has derived the income is tax resident or the jurisdiction where the virtual world operator is incorporated.

Aside from the issue of virtual world transactions, stand-alone virtual currencies, such as Bitcoins, or reward points for frequent flyers or frequent users of credit / debit card also present interesting questions[81], whether the same constitute property, the transfer of which is subject to capital gains tax, or accrual of the same, whether it constitutes taxable income. Even though, the OECD has not released any report yet as guidance to tax the virtual currency, G20 Member during the November 2018 Summit committed to deliberately working on a draft of virtual currency taxation to streamline the tax treatment. Countries like Malta, Germany, Australia, and United States have taken the unilateral action.

Another important dimension to the concept of virtual property is whether websites themselves constitute property, the granting of the use for which, such as for displaying ads, results in taxable income being generated; if yes, what would be the jurisdiction where the tax liability would be enforced. Here, it should be noted that virtual items are rendered only on screen, computer code enables them to resemble real chattels. Current international law does not explicitly provide for the same. However, many commentators have called for treating virtual items that resemble real world property the same way as real-world property is treated[82].

The present rules do not explicitly contemplate the above situations; however, subject to the issue as to treatment of virtual property as real property, the current treaty rules and definitions on royalty and capital gains could capture these transactions; however the question as to which would be the territorial jurisdiction which could claim the taxing rights to these transactions raises interesting questions: (a) whether the jurisdiction of the payer or the recipient should be regarded as the taxing jurisdiction; (b) since with respect to immovable property, the source is the jurisdiction where the property is located, can this principle be extended to virtual property; if yes, which would be the jurisdiction that should then be considered.

The above discussion would also be relevant to understand the concept of intangibles and the situs thereof. The OECD/G20 BEPS Guidance on Transfer Pricing Aspects of Intangibles defines intangibles to address something which is not a physical asset or a financial asset which is capable of being owned or controlled for use in

[80] Lederman, L. (2007). 'Stranger than Fiction': Taxing Virtual Worlds. *New York University Law Review* (82) Retrieved from http://ssrn.com/abstract=969984

[81] Deane, M. (2005). Virtual Economies Virtually Unregulated: How Clear Taxpayer Guidance Can Mitigate Tax Compliance Risks. *Hofstra Law Review, 43*(253), 253-290.

[82] Ibid 70.

commercial activities, and whose use or transfer would be compensated had it occurred in a transaction between independent parties in comparable circumstances.

Intangible property rights generally offer the legal owner of the intangible property a number of alternatives for exploiting the intangible property, which would represent a bargaining advantage in any negotiation with an unrelated person. To the extent, it is the legal owner of the intangible who exercises such rights, the location of the intangible property should be identified with the legal owner of the intangible.

Given the lack of existing guidance, and considering the approaches adopted by the developing countries in respect of taxation of royalties, fee for technical services and PEs, as explained in the following sections, it is likely that whenever the taxpayer is located in a developing country, it is likely that they will claim a share of the income as part of the withholding tax mechanisms and resort to a wide interpretation of the source rules under their domestic tax law.

2019 OECD Proposals: broadened the taxing right not based on the value creation

The concept of value creation is to ensure that profits are taxed where economic activities deriving the profits are performed and their value is created. This concept, under BEPS action 8-10 identified for transfer pricing includes the adoption of transfer pricing rules that inappropriate returns will not accrue to an entity solely because it has contractually assumed risks or has provided capital. The clear intent, as elaborated in the 2015 Final Report, was to exclude mere ownership of intangibles from the calculation, as well as formal acceptance of risks, which really constitutes only funding without other activities (i.e. decision making).

Value creation is not only stipulated under BEPS action 8-10, but also laid out under BEPS action 7 (preventing the artificial avoidance of permanent establishment status) as well as under BEPS action 6 (preventing the granting of treaty benefits in inappropriate circumstances). The overall objective of value creation under BEPS was to align the allocation of income with the economic activity that generates income to ensure that profit associated with the transfer and the use of intangibles are appropriately allocated to the location where value is created. This concept was originally about substance and tax avoidance with the purpose of cutting tax havens out of the international system. Further, Value creation emerges as the new paradigm for attributing taxing rights. In this era of digitalization, there are elements outside of the enterprise that also create value for the company.

With regard to the digital economy, as explained earlier, the OECD released three proposals to broaden the taxing right underlying the value creation concept. However, looking closely at the proposal and comparing it with the universal value creation concept laid out under the BEPS project, there is some deviation. Generally speaking, value creation should be followed by a sufficient function, asset, and risk that is reflected as the economic reality performed by one or more of the group companies. In particular, the entity that has capability to make the decision, assume the associated risk, and is equipped with the asset. In this regard, the proposals are using the concept of value creation but are not taking these considerations into account.

In the first proposal, the OECD assumed that -3rd party- user participation contributes significant value to a highly digitalized business such as social media platforms, search engines, and online marketplaces platform as their users consider to contribute to the creation of the brand, the generation of valuable data, and the development of critical mass which helps to establish market power. However, the OECD did not take into account whether the users have sufficient function, assets and risk to claim the value creation and allocate the non-routine profit to the jurisdiction where the users are located. In addition, in the proposal, the objective of value creation to cut off tax havens from the international system is also biased as the users will most likely be located in populated countries such as Italy, India, and China.

Similar reasoning also applies to the second proposal, in which the market jurisdiction is -by way of fiction- considered as the place where value is being created due to the positive attitude in the minds of customers is created by, and the customer information and data is acquired through, the active intervention of the firm in the market. Furthermore, singling out marketing intangibles and their value may be tough to execute in the practice of developing countries, which often lack capacity and suitable information. The allocation of the value of marketing intangibles to the local market can prove difficult in practice, unless a corresponding change in the OECD Transfer Pricing Guidelines is carried out.

Further, with regard to the significant economic presence proposal, the value creation concept used within the proposal might align with the general concept as the value created in a particular jurisdiction could be valued using the guidance for the attribution of profits to PEs. If the political agreement leads to the approval of a formula (or a formulary apportionment approach), it should be restricted to the cases where the only nexus of the enterprise with a given jurisdiction is created through the significant economic presence PE. It would be cumbersome to distinguish, within the same PE, profits derived from its physical presence and its digital presence.

These new value creation concepts above allow the allocation of profits to tax jurisdictions, where there is no or almost no physical taxpayer presence. Ironically, it originated in some economic powers' dissatisfaction with the huge gap between the effective but minimal presence of taxpayer in a particular jurisdiction and the huge amount of profits realized in that jurisdiction.[83]

The idea was to solve this problem by searching for a certain proportional relationship within a jurisdiction between the taxpayer's economic presence and the amount of income generated. By widening the concept of economic activity beyond the concept of an "establishment," let alone a "permanent establishment,' source-country tax jurisdiction was extended to all significant types of income generating activity performed, even without any tangible presence. The value was to be determined in accordance with the market rules, thereby reducing the contracting parties' discretionary power to distribute profits in accordance with their business objectives.

Even though value creation somehow solves the problem of the reliance upon physical presence to justify the taxing right, the next question is whether such concept aligns with the long standing "source" concept. The requirement of physical presence has undeniably given advantages that contribute success in line with the business models and has operated for several decades and adopted by the OECD Model in the present definition of PE. However, history has thus shown that nobody is convinced that physical presence is a principle of international taxation in which source taxation of business income requires physical presence. As a result, the weakening of physical presence started the idea to shift the importance of physical presences to economic presence and value creation as economic allegiance. This counter argument underlies the OECD proposal in giving the taxing right to so called source country to tax the income associated with the digital business, based on its 2019 proposals, regardless the absence of physical presence.

The overall objective and policy rationale of the "User Participation" Proposal is to identify whether there are significant sources or location-specific rent and, in the affirmative, attribute residual taxing rights to the jurisdiction in which they are established. The underlying key questions to any design attempting to capture location-specific rents are determining the source of the location-specific rents and what might be classified as location-specific rents in an increasingly digitalized economy, and, in the second instance, how such location-specific rents could be measured.

[83] one example of this gap was the case of *Cadbury Shweppes* where the UK tax administration sought to tax all the profits of the Cadbury subsidiary established in the International Financial Services Center in Dublin by applying the controlled foreign corporation legislation in the United Kingdom, because there was a disproportion between the size of the physical presence of the office in Dublin and the amount of profits realized in Ireland.

The proposal requires differentiation between routine and non-routine functions, and user's participation categorizes as non-routine function which is entitled to non-routine profit. The precise identification of non-routine functions in respect of the various business models and functions arising within the digitalized economy, could increase the uncertainty and controversy between states without a meaningful increase in income allocation, or lead businesses to reshape its features in order to circumvent such problems.

Further, with regard to the measurement of the location-specific rents, it would depend on how location-specific rent is understood. In particular, once a platform technology is used in a given country to generate profits, assuming that the deployment of that technology for the users of the concerned country does not exclude the deployment of the same technology elsewhere, the entire economic rent generated by the technology in respect of that country should be attributed to the same country. By contrast, current transfer pricing rules to allocate the profit emphasize significant people functions, ownership of IP rights and the bearing of financial risks.

Vogel justifies the source country's taxation on income derived therein, based on benefit theory.[84] This concept could justify the user participation and the marketing intangible proposal in allocating taxing right to the source country even though the physical presence does not exist. In the market jurisdiction, the taxpayer receives benefits from the source country's legal system in as much as they rely upon it to enforce payment for transactions, uphold intellectual property rights (e.g., trademarks), and maintain a pro-competitive and conducive business environment. Taxpayers also receive benefit from the infrastructure provided, for instance, the company engages in digitized content (including music and computer games) would not have a market in source countries that did not have a suitable telecommunications infrastructure or whose population lacked competency in computers. The provision of these benefits therefore replenishes weight to the case for source-based taxation.

Under the Significant Economic Presence proposal, it would stretch the boundaries of the Permanent Establishment (PE) concept, deeming it to exist insofar as there is a significant economic presence in a territory. In other words, the virtual (or digital) PE is a mere threshold for determining the significant economic presence in the market jurisdiction and thus triggering liability to tax the non-resident on business profits in such a country.

The core rationale of all Proposals is to recognize that a business may create value in a country even in the absence of a physical presence. This constitutes a sort of new dimension of economic allegiance required for triggering source nexus, based on thresholds that rely on the number of users, sales and/or contracts and detected by reference to the various criteria indicated in section 4 of the 2019 OECD Public Consultation Document. These thresholds are suitable to operate regardless of whether and to what extent a business model is digitalized.

Overall these proposals associate with the concept of notion of territory where a country may have the taxing right even though there is no income associated to the company to the extent the significant value creation contributed by the user participation, market intangible, and economic presence.

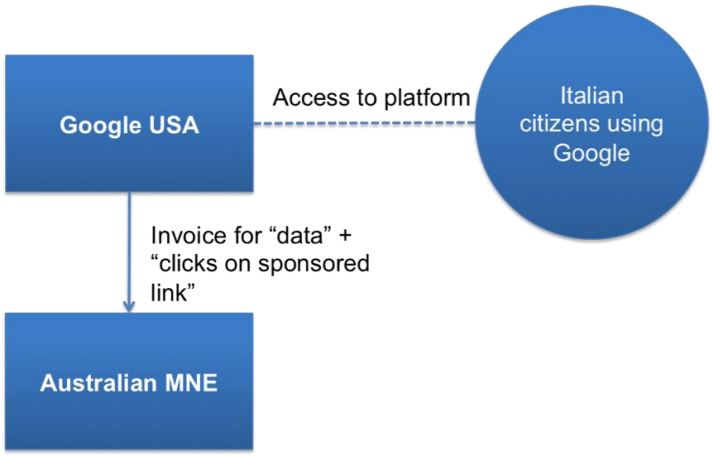
Developing a new non-physical presence nexus rule to allow market jurisdictions to tax the measure of profits allocated to them under the new profit allocation rules would require an evaluation of the relative merits of alternative approaches, including amendments to the definition of a "permanent establishment" in Article 5 of the OECD Model Convention, and potential resulting changes to Article 7 (business profits) and Article 9 (transfer pricing) of the OECD Model Convention, as well as the development of a standalone rule establishing a new and separate nexus, either through a new taxable presence concept or a new concept of source.

[84] Besides benefit theory, Vogel also endorsed sacrifice theory, which is found less relevant for recent development. The details of these theory can be found in Klaus Vogel, 'Worldwide vs Source Taxation of Income – A Review and Revaluation of Arguments (Part III)' 11 *Intertax* (1998) ("Vogel – Part III"), pp 393-394

On May 2019, OECD through its work program report indicates plans to explore options and issues related to modifying existing tax treaties which include examining possibly amending or adding to the Multilateral Convention to Implement Tax Treaty Related Measures to Prevent BEPS or developing a new multilateral instrument. However, considering the used of allocation factor to split revenue, instead of profit, bilateral tax treaty would not solve the problem. A genuine multilateral tax treaty is required to bolster the dispute among market and residence jurisdictions.

The following case studies further illustrate the proposals:

Case study 1: Google 2-sided earnings model



Structure 1, using Google's structure as an example, where user's participation is very significant in its business process. Considering such structure, the first proposal on user's participation will apply to allocate the profit of Google and report this income in Italy. As a result, the non-routine profit should be allocated to Italy where the users are located regardless whether the Italian users bear any risk with regard to the value contributed to Google, who receive the "advertising" income from an Australian MNE.

The profit would be allocated based on modified residual profit split approach, fractional apportionment or distribution approach. A residual profit split approach would appear suitable for integrating the traditional arm's length criteria that would be applied to non-routine activities. A purely fractional apportionment could also be considered, but it would introduce a greater volatility on profit allocation.

Applying Return On Data (ROD) Metrics To Define Value Per Subscriber

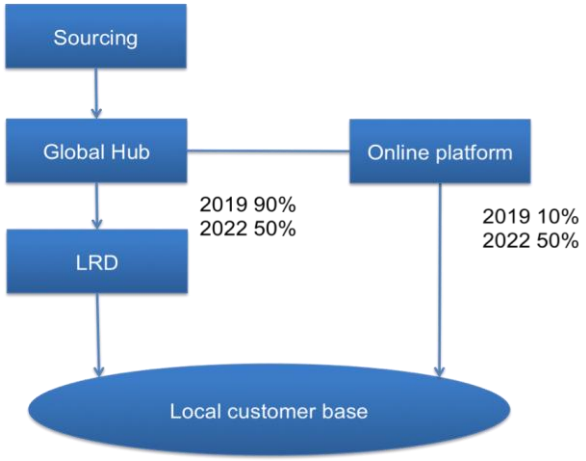
One Trick Ponies	Market cap (USD x billion)	Subscribers (x million)	Value per subscriber (USD)
LinkedIn	25,2	546	46,15
Google	841,29	5.784	145,45
Yahoo	47,26	1319,94	35,81
Airbnb	38	150	253,33

(Source: 2018 e-Bright whitepaper, "Return on Data - What Is the True Value of Spotify?")

By citing the e-Bright white paper, the value mentioned by the OECD for Google per users would be USD 145,45. However, such value per subscriber reflects the revenue for multiple years and therefore to the extent the Italian tax authority follows the OECD's formula, the value of users would not reflect the non-routine profit as it is not the single year value.

The next issue is how to streamline this proposal with the Italian bill on Digital Service Tax (DST). In addition, should Google need to report the return on 3% of its revenue?

Case study 2: Apparel



Looking closely to the structure, the first proposal on user's participation might not be applicable as no users are actively involved. The marketing intangible proposal can be applied to allocate the marketing related profit of such business model. Noted by the OECD, the marketing intangible proposal addresses a situation where an MNE group can essentially "reach into" a jurisdiction, either remotely or through a limited local presence (such as an LRD), to develop a user/customer base and other marketing intangibles.

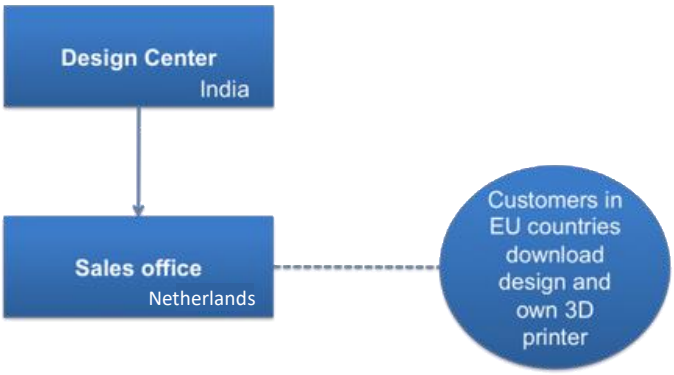
In 2019, the apparel company may not categorize as digital business player considering the small percentage of products that is sold through online platforms. However, in 2020, this company might be subject to this proposal and will be required to allocate the non-routine profit to the jurisdiction where -based on fiction- the marketing intangible is located. The main concern following the business process changes are the uncertainties that would arise for the company's tax policy. If for example, instead of 90%, the company decided to sell its product via online 50%, would the proposal still be applicable? This question remains unclear as the proposal itself does not give a clear-cut answer to what extent the company would be categorized as a digital business player and covered by the proposal.

In the retail industry, there are no material differences between digital and traditional retailers. Retailers having physical presence (shops) that actively gather, process and share the local customer data among their related entities (i.e. provide to the principals). This data encompasses customer's shopping behaviours and can include e.g. structure of shopping baskets, time spent in a shop, number of shop entries, etc. On top of this, in connection with loyalty and bonus programs, customer personal data is also gathered. Locally sourced information could usually be shared on a group-wide level, and after being analysed it is followed-up with tailored local sales and marketing strategies. Within this process, traditional retail chains make use of modern IT or digital means in the same way as digital business. Therefore, with regard to retailers, this proposal should not segregate between traditional and digital player as they employed digital tools and utilized it as the same way to gather, process, and transfer the customer data.

The marketing intangible proposal is similar as China's legislation on intangibles where profit instead of allocated only to the entity where Development, Enhancement, Maintenance, Protection, and Exploitation (DEMPE) carried on, the profit should also allocate to the entity where Promotion is carried on (the DEMPEP alternative). The concept of promotion added to DEMPE function, initiated by China, is similar to the marketing intangible proposal as the remuneration would also be allocated to the market jurisdiction considering the creation of customer data, customer relationships and customer lists in such jurisdiction.

The proposal requires the distinction between routine and non-routine functions. In this regard, each business model could have some deviations whether income could be qualified as routine or non-routine profits.

Case study 3: 3D Printing



Taking the latest OECD proposal into account, which proposals should apply to the jurisdiction of the customers so that the local tax inspector has taxing right? Given the fact that 3D printing is not a type of highly digitalized business, as the users themselves contribute and generate valuable data. Therefore, the first proposal on user participation would not be applicable. However, the OECD countries might justify their taxing right by applying the third proposal on the significant economic presence in other EU countries.

Under the 3D printing business model, the sales office in the market jurisdiction where the customers are located these elements could be found: (1) the existence of a customer; (2) the volume of digital content (design downloaded from the platform) derived from the jurisdiction; (3) billing and collection in local currency or with a local form of payment; (4) the maintenance of a website in a local language; and (5) sustained marketing and sales promotion activities, either online or otherwise, to attract customers. If so, the OECD proposal might apply.

The allocation profit would be based on a fractional apportionment method by following these steps:

1. Define the tax base to be divided applying the global profit rate of MNE group to revenue generated in particular jurisdiction.
2. Determine the allocation keys to divide that tax base by taking into account sales, assets, and employees.
3. Weighting these allocation keys.

Even though the OECD gave a recommendation to use fractional apportionment as the formula in allocating the profit, there was no further explanation on how to apply such formula. How that formula differs from the quantitative method Value Chain Analysis and Common Corporate Tax Base (CCTB) formula initiated by the EU is not clarified. Clearly, this formula goes beyond the arm's length principle and the Authorized OECD Approach (AOA) on permanent establishment.

Further discussion between taxpayers and OECD would be highly recommended, otherwise a total alternative tax concept will be introduced not based on some degree of consensus.

5.2 Part b: application of current tax treaty principles

From the previous discussion, it can be seen that the digital economy would have ramifications primarily from the following perspectives. For instance, for any tax jurisdiction or a taxpayer with operations around the world, the challenge posed by the digital economy would be as summarized below:

1. **Residence –** Any tax jurisdiction / taxpayer would be required to determine whether in respect of any payment from a jurisdiction, the payee is a resident of the said jurisdiction or not. Where the payee is a tax resident of

the jurisdiction, the said jurisdiction would typically have full rights to tax the said income; however, such a right is restricted when the payee is a non-resident. In such a scenario, in order to lay a claim to a share of the income as tax, the jurisdiction would then need to take recourse to its withholding tax provisions or transfer pricing provisions or test whether the non-resident has a permanent establishment in the said jurisdiction.

Here it would also be worthwhile to note that technology has enabled taxpayers to operate seamlessly around the world. Thus, where jurisdictions have different parameters for testing residence (say one places importance on incorporation, while the other on control and management), there could be a situation where in light of the technology, a taxpayer could satisfy each of the different parameters.

2. **Withholding tax –** Payments could be made by customers in a jurisdiction to taxpayers providing digital services without any physical presence completely through cloud platforms either in the taxpayer's or customer's jurisdiction. Where the payee jurisdiction seeks to levy a withholding tax, the question that arises is whether the same has a source or any nexus with the payer jurisdiction, apart from the fact that services are used by the payer whether or not the payer uses the services within his jurisdiction. This also raises the question of characterization of the payment, whether as royalty, fees for technical services or business profits. An example of the application of such local tax can already be seen in Brazil with the imposition of local taxes (WHT) on streaming content through Netflix, Spotify and iTunes.

3. **Permanent establishment –** In the bricks-and-mortar world, provision of services by a taxpayer in the payer / user jurisdiction would have typically required the taxpayer to have a physical place of business in the said jurisdiction. However, technology has enabled business to transact business without the requirement of any physical presence; technology has evolved to make business decisions that though routine do contribute significant value to the business. This raises questions for jurisdictions which contribute substantial revenue to a vendor of digital offerings but who do not have any physical place of business.

4. **Transfer pricing –** Technology has enabled taxpayers operating across the world to function in a manner that the hub entity can bear entrepreneurial risks and derive corresponding rewards without potentially undertaking key functions and owning key assets.

   For instance, a holding company located in a developed economy, for example the US, providing software services to customers around the world, could outsource the software development and customer management to an Indian subsidiary which undertakes the key functions, with the US holding company providing strategic guidance and owning the key intangibles underlying the same. The US holding company would contract with the customers and outsource the project to the Indian subsidiary, which would then liaise with the customers directly, understand their requirements, obtain inputs from the US holding company if required and deliver the project. However, the Indian subsidiary could only be remunerated on an assured and risk mitigated model. In this example, while the functional, asset and risk profile of each entity can be clearly identified, the question that arises is whether on account of the risks and functional profile of the US holding company, it is truly entitled to entrepreneurial profits in light of arm's length principles. Similar issues arise in cases where a US holding company providing data hosting services to clients around the world owns servers also located in various jurisdictions and operates them remotely through technology. In such a scenario, assuming the servers constitute a PE in various jurisdictions, the question that arises is what is the arm's length remuneration attributable to the server-PE which provides the functions wholly automatically?

5. **Indirect Taxes –** Although strictly speaking, indirect taxes are not covered by 'double tax avoidance agreements' (DTAAs) between countries as businesses are usually able to recover the VAT paid by them upon sale of their goods or services and it is the ultimate customer who bears the burden. However, there are certain scenarios identified by OECD in its Action Plan 1 that may raise concern for BEPS:

   a. **Remote digital supplies to exempt businesses**

      Businesses are usually able to get a refund of the input VAT that they have paid. However, when they make cross-border supplies of goods or services to exempt businesses, there is no VAT levied

at the customer level due to the exempt nature of the transaction and the VAT incurred by the provider on its inputs is not deductible.

b. Remote digital supplies to multi-location enterprise:

Another scenario that raises concerns of base erosion and profit shifting is when digital supplies are provided to a multinational corporation which has establishments in various locations. The supplies are usually paid for at the central level and then an appropriate amount is recharged to related parties depending on their usage of those supplies. While the establishments will be charged a fee based upon their share of service, many jurisdictions do not charge VAT on these internal transactions. The central entity, however, will be allowed to deduct any input VAT if it is engaged in taxable business. Thus, it means that the internal establishments receive the service without paying any VAT on them.

6. **Value creation –** The OECD primarily focuses on the ability of digital platforms to create "size without mass" (i.e. business extracted from a territory without any physical connection in the form of a PE) and the exploitation of data as a key component of their activity. The consequence, according to the OECD Report, may be that users can be said to create value for the platform businesses they are using, which may justify taxation in the location where users are located. However, this concept raise issue on how does the allocation of income to the country where users are located fit into a functional model of value creation? Scholars have recently proposed as a solution to consider users as "unconscious employees", thereby attributing their actions as "functions" to the firm. It is uncertain whether this approach can serve as a solution for the future, as it is built around a rather non-traditional but even higher weighted functional analysis on value creation (users' participation).

The following sections provide a contextual analysis of the above dimensions.

5.2.1 Residency

Under the OECD Model Tax Convention, the treaty residence of a person is dependent on the domestic tax laws of each Contracting State, which may result in a person being resident of both States. The concept of Place of Effective Management ('POEM') is found in the commentaries to the OECD MTC and the UN MTC with respect to determining the residence of companies and other bodies of persons, not being individuals. The POEM concept enables the determination of the residence of companies and other bodies of persons where they could be resident in more than one State, if, (a) one State attaches importance to the registration and the other State to 'control and management' or 'effective management'; (b) both states attach importance to 'control and management' or 'effective management'.

The Commentary to the OECD MTC mentions that POEM is the place where key management and commercial decisions that are necessary for the conduct of the enterprise's business are in substance made. The POEM will ordinarily be the jurisdiction where the most senior person or group of persons (for example a board of directors) makes its strategic and/or operational decisions, the place where the actions to be taken by the enterprise as a whole are determined. While an enterprise may have more than one place of management, but it can have only one POEM at any one time. However, the Commentary to the OECD MTC acknowledges that no definitive rule can be given and all relevant facts and circumstances must be examined to determine the POEM.

The OECD Technical Advisory Group ('TAG') in a discussion paper acknowledged that in the absence of any specific definition of "place of effective management", many commentators have been influenced by concepts used in domestic tax law residence rules, such as "central management and control" and "place of management", when considering the meaning of the term "place of effective management". The OECD TAG had concluded that POEM will generally be where key management and commercial decisions necessary for the conduct of a business are in substance made and given. The determination of a POEM is a question of fact and judicial precedents have outlined the following as relevant factors to be taken into account while determining the POEM:

- Where the centre of top-level management is located;
- Where the business operations are actually conducted;
- Legal factors such as the place of incorporation, the location of the registered office, public officer, etc.;
- Where controlling shareholders make key management and commercial decisions in relation to the company; and
- Where the directors reside.

However, the TAG had acknowledged that the availability of advanced and evolving communications technology such as videoconferencing or electronic discussion group applications via the Internet means that it is no longer necessary for a group of persons to be physically located or meet in one place to hold discussions and make decisions. In a modern environment, application of the traditional approach can produce results which do not reflect the intention of the tie-breaker rule.

The TAG had considered an example where senior managers adopt conferencing through the Internet, for example, as a key medium for making management and commercial decisions and those managers are located throughout the world and had noted therefrom that it may be difficult to determine a place of effective management. In such cases, a place of management might be regarded as existing in each jurisdiction where a manager is located at the time of making decisions, but it may be difficult (if not impossible) to point to any particular location as being the one POEM. Given these issues, the TAG had recommended that

A. Replacing the POEM concept with options such as: (a) Place of incorporation or, in the case of an unincorporated association, place where corporate law applies to the establishment of the enterprise; (b) Place where the directors/shareholders reside; and (c) The place where economic nexus is strongest.

B. Refine the POEM test by making a determination on the basis of predominant factor(s) or giving a weighting to various factors: where the key management and commercial decisions are made in substance; where the most senior person or group of persons makes its decisions and where the actions to be taken by the enterprise as a whole are determined. Other facts which may be considered in association with the dominant factors could include: (a) location of and functions performed at the headquarters; (b) information on where central management and control of the company is to be located; (c) the place mentioned within company formation documents (articles of association etc.); (d) place of incorporation or registration; (e) relative importance of the functions performed within the two States; and (f) where the majority of directors reside.

C. Establish a hierarchy of tests, as in the individual tie-breaker so that if one test does not provide an outcome, the next test will apply such as: (a) POEM; (b) place of incorporation; or (c) economic nexus; and (d) mutual agreement.

D. A combination of B and C above.

The OECD in the BEPS report noted that the POEM as a tie-breaker rule for determining treaty residence of dual resident persons (other than individuals) has been a source of treaty abuse. As such, it proposed to eliminate the tie-breaking rule for such persons based on POEM and replace it with a mutual agreement process that takes into account POEM, place of incorporation and any other relevant factors. If an agreement cannot be reached, it proposes to deny treaty relief or exemption except as agreed by the competent authorities[85]. This approach is in light of views of many countries that cases where the POEM rule is invoked to resolve residence of dual resident companies often involve tax avoidance arrangements.

[85] Organisation for Economic Cooperation and Development. (2014). *Neutralizing the Effects of Hybrid Mismatch Arrangements* (Chapter 8). OECD/G20 Base Erosion and Profit Shifting Project. Paris. OECD Publishing. Retrieved October 14 2015 from http://www.oecd-ilibrary.org/docserver/download/2314261e.pdf?expires=1444837656&id=id&accname=guest&checksum=6BF4E7BC10340496854C0D3DD8E0FEC1

It should be clarified that POEM is a functional concept and determination of the jurisdiction where the POEM is situated does not mean that the source of income is identified to the said jurisdiction. The source of the income could still be located in multiple jurisdictions as identified previously.

From a decision-making standpoint, the proposed approach of the OECD leads to a practical difficulty of resolving dual resident issues, since the same is left to the deliberations between competent authorities. Deliberations between competent authorities are known to be time consuming. On a separate note, the OECD does not appear to have addressed the issue relating to technology changing the way decisions are made but presumes that such arrangements could involve tax avoidance. This would result in dual resident companies being taxed on their worldwide income in both the jurisdictions and also not being able to claim credit for taxes paid in either jurisdictions.

In this backdrop, we can consider the following illustration to understand the issues and challenges involved: A UK registered company undertakes high frequency trading (i.e. HFT) on stock and futures markets around the world. The same involves use of sophisticated technological tools and computer algorithms to rapidly trade securities; the traders engaged in HFT provide the decision variables for stock buying and selling based on which the computer algorithms are developed and deployed. The UK registered company has two shareholders who are mainly based outside of the UK. The stock trades are undertaken through brokers and servers located in the relevant jurisdictions. In this backdrop, the question that arises is where the POEM for such a UK registered company is situated: (a) whether in the UK, since the company is registered in the UK and key decisions for the same are also undertaken in physical meetings in the UK; (b) whether in the relevant jurisdiction where the stock trades are undertaken through brokers and servers located therein.

In this backdrop, taxpayers could consider the following to pro-actively resolve issues relating to dual-residence and identify the POEM in their relevant facts:

- Articulate the business of the company in question;
- Identify the management and commercial decisions that are necessary for the conduct of the business as a whole;
- Identify the key decisions of the above;
- Identify the manner in which the above key decisions are made, involving factors such as: (a) who are the personnel involved in the making of these decisions; (b) how do these personnel make the decisions relating to the key management and commercial decisions, such as whether the decision making is undertaken by a Board or Panel; (c) do these personnel meet frequently at a fixed location, or via technological means, such as a video-conference; (d) how are these meetings reported from a local corporate law governance standpoint; and (e) are there ‘key persons’ within the Board or Panel to whom decision making is entrusted by the Board or Panel.

5.2.2 Withholding Tax

Once the residence of a payee is identified, the next question is whether any income derived by the payee is taxable in the source jurisdiction. This triggers the source rules and accordingly the question of characterization of the payments whether as royalty, fee for technical services or business profits. Where the payments are regarded as royalty or fee for technical services, and subject to the said payment having a nexus with the source jurisdiction, a withholding tax is levied.

The digital economy has enabled the delivery of goods and services over the cloud. These electronic transactions have blurred the distinction between income from the sale of goods and income from the provision of services – for instance, Platform as a Service, Infrastructure as a Service, Software as a Service etc. Given the characteristics of these transactions, these transactions also present the questions on characterization of the payments as royalty or fee for technical services.

The key characteristics of cloud computing technologies are:

- Cloud services are provided by a third-party service provider;
- Third party service providers make available hardware (infrastructure), or software, or /and processing tools (platforms) for data storage, application creation and access from anywhere through a connected device;
- The data or applications which are the primary property in the value chain do not change ownership and the cloud service providers merely enable its virtualisation.
- Cloud computing primarily involves the offering of the following services: (a) Infrastructure as a Service ('IaaS'); (b) Software as a Service ('SaaS'); or (c) Platform as a Service ('PaaS'). A summary of the characteristics of these offerings are tabulated below.

Particulars	IaaS	SaaS	PaaS
Brief nature of transaction	IaaS involves offering of computer servers, network infrastructure and other resources.	SaaS involves delivering applications over the Internet as a service. SaaS applications run on a SaaS provider's servers. The provider manages access to the application, including security, availability, and performance[86].	PaaS involves cloud providers who deliver a computing platform, typically including operating system, programming language execution environment, database, and web server[87].
Contractual terms	Customer receives access to server or network infrastructure of vendor	Customer receives the access to the software or database of the vendor, whether owned or obtained on lease from third party	Customer receives the access to the platform of the vendor, whether owned or obtained on lease from third party.
Examples	Amazon Web Services, Google drive	Google Docs	Beanstalk and Heroku

- Network as a service (NaaS) and Communication as a service (CaaS) were also officially included by ITU as part of the basic cloud computing models. The other models prevalent in the market are Anything as a Service (XaaS), Business process as a Service, Database as a Service etc. However, these models have not fully evolved and, hence, the scope of the discussion has been restricted to IaaS, SaaS and PaaS.

The OECD MTC provides that a payment would be considered as royalty if the payments are received as a consideration for the use of, or the right to use, any copyright of literary, artistic or scientific work including cinematograph films, any patent, trade mark, design or model, plan, secret formula or process, or for information concerning industrial, commercial or scientific experience. The Commentary to the 2017 OECD MTC provides

[86] What is Software as a Service (SaaS) - Salesforce.com. (n.d.). Retrieved October 14, 2015, from http://www.salesforce.com/saas/

[87] Cloud computing. (n.d.). Retrieved October 14, 2015, from http://en.wikipedia.org/wiki/Infrastructure_as_a_service#Platform_as_a_service_.28PaaS.29

that royalty payments are typically made under know-how contracts where one of the parties agrees to impart to the other, so that he can use them for his own account, his special knowledge and experience which remain unrevealed to the public. It is recognised that the grantor is not required to play any part himself in the application of the formulas granted to the licensee and that he does not guarantee the result thereof. This type of contract thus differs from contracts for the provision of services, in which one of the parties undertakes to use the customary skills of his calling to execute work himself for the other party. Payments made under the latter contracts generally fall under Article 7.

Examples of payments which should therefore not be considered to be received as consideration for the provision of know-how but, rather, for the provision of services, include:

- payments obtained as consideration for after-sales service,
- payments for services rendered by a seller to the purchaser under a warranty,
- payments for pure technical assistance,
- payments for an opinion given by an engineer, an advocate or an accountant, and
- payments for advice provided electronically, for electronic communications with technicians or for accessing, through computer networks, a trouble-shooting database such as a database that provides users of software with non-confidential information in response to frequently asked questions or common problems that arise frequently.

Provision of IaaS offerings

A typical IaaS arrangement contemplates the vendor providing a pre-agreed amount of space on a network to the customer / server. The customer is given the right and means to access the network / server. The customer uploads data onto the vendor's infrastructure and manages the same remotely. Taxpayers could consider a no-royalty position on the basis that the dominant nature / substance of the arrangement with the vendor is to obtain an over-the-counter service.

Provision of SaaS offerings

Under a typical SaaS arrangement, the taxpayer obtains standard software that is made available over the cloud. A no-royalty position can be explored by taxpayers on the basis that a SaaS is a standard service provided by the vendor and does not result in any software licence being provided, instead, the customer is receiving a service – akin to the use of the telephone or electricity.

Provision of PaaS offerings

Under a typical PaaS arrangement, the vendor provides computing infrastructure and software in the manner outlined for a typical IaaS and SaaS arrangement. The customer provides data for processing by the vendor, as per the pre-agreed specifications / requirements, and the output is generated and provided to the customer. One view that taxpayers could adopt in such a scenario involving bundling of infrastructure and services, is that the payments for these transactions should not constitute royalty since the payments are not solely for the 'use' or 'right to use' industrial, commercial or scientific equipment; the payments are not for information concerning technical, industrial, commercial or scientific knowledge, experience or skill; the payments are not for the use or right to use any IP. However, contrary views of tax authorities, especially in India should also be noted. The Indian Authority for Advance Rulings ('AAR') ruled in a case of a payment by a resident to a non-resident for the use of software on the non-resident's server platform for producing certain software applications constituted

payment for use of scientific equipment[88]. A similar reasoning was adopted by the AAR to conclude that payments made by a resident agent/ subscriber to a non-resident for providing a password to access and use a cargo booking portal hosted from outside India constituted royalty[89].

In the context of cross-border cloud transactions, it would also be worthwhile to note transactions involving web advertising. Indian courts in specific facts have held that payments made by Indian customers to non-resident web search engines for displaying banner / ticker advertisements do not constitute royalty or FTS. The court in the case of Yahoo India Private Limited[90] also held that uploading and display of banner advertisement on its portal was entirely the responsibility of non-resident and the resident had no right to access the non-resident's portal and there was nothing to show any positive act of utilization or employment of the portal of the non-resident by the resident. The tax court also emphasized that the element of service predominated.

Where the payments do not constitute royalty or fee for technical services, the same would be taxable as business profits in the jurisdiction of the payer only if the payee has a PE in the payer jurisdiction.

5.2.3 Permanent Establishment

Tax treaties provide that the business profits of a non-resident enterprise should be taxed in the host country only if there is a permanent establishment ('PE'). The OECD Model treaty defines it as a fixed place of business through which the business is wholly or partly carried out. It also deems a building site or a dependent agent who habitually enters into binding contracts for the foreign principal as a permanent establishment.

The UN Model treaty adds further qualifying activities, such as (i) the furnishing of services, including consultancy services, for more than six months within any 12-month period, (ii) the use of facilities or maintenance of stocks of goods or merchandise belonging to the enterprise solely for delivery, and (iii) a dependent agent who habitually maintains a stock of goods and regularly delivers them on behalf of the enterprise ('stock agent'), in the permanent establishment definition. Both Models exclude an independent agent, and certain defined auxiliary or preparatory services.

Fixed place PE

In this context, it can be seen that the primary conditions under the tax treaties presently is the requirement for a tangible physical presence in a jurisdiction which also has a degree of permanence (time threshold). The OECD commentary recognizes that an Internet web site, which is a combination of software and electronic data, does not in itself constitute tangible property. It therefore does not have a location that can constitute a "place of business" as there is no "facility such as premises or, in certain instances, machinery or equipment" as far as the software and data constituting that web site is concerned. On the other hand, the server on which the web site is stored and through which it is accessible is a piece of equipment having a physical location and such location may thus constitute a "fixed place of business" of the enterprise that operates that server[91]. The OECD commentary

[88] In re. IMT Labs (India) (P.) Ltd. Authority for Advance Rulings, Ministry of Finance Government of India. 2006. (157 Taxman 213).

[89] In re. Cargo Community Network (P.) Ltd. Authority for Advance Rulings, Ministry of Finance Government of India. 2007. (159 Taxman 243).

[90] Yahoo India (P.) Ltd. v. DCIT. Mumbai Income Tax Appellate Tribunal. 2012. (11 taxmann.com 431); Pinstorm Technologies (P.) Ltd. v. ITO. Mumbai Income Tax Appellate Tribunal. 2012. (24 taxmann.com 345); ITO v. Right Florists Pvt. Ltd. Mumbai Income Tax Appellate Tribunal. 2013. (32 taxmann.com 99).

[91] Organisation for Economic Cooperation and Development. 2010. *Commentaries On The Articles Of The Model Tax Convention* (para 42.2). Paris. OECD Publishing. Retrieved from http://www.oecd.org/berlin/publikationen/43324465.pdf

acknowledges that in a case where the enterprise that owns the website does not own the server that hosts it, the enterprise does not even have a physical presence at that location since the web site is not tangible. In these cases, the enterprise cannot be considered to have acquired a place of business by virtue of that hosting arrangement. Under the present rules, if the enterprise carrying on business through a web site has the server at its own disposal, for example it owns (or leases) and operates the server on which the web site is stored and used, the place where that server is located could constitute a permanent establishment of the enterprise if the other requirements of the Article are met[92].

As such, under the present guidance, merely having a website through which goods or services are sold by an enterprise does not result in a PE.

The Commentary to the OECD MTC also recognizes that activities of a preparatory or auxiliary character would not constitute a PE even if carried on through a fixed place of business. The decisive criterion is whether or not the activity of the fixed place of business in itself forms an essential and significant part of the activity of the enterprise as a whole[93]. However, it is recognized that the function of managing an enterprise, even if it only covers a certain area of the operations of the concern, constitutes an essential part of the business operations of the enterprise and therefore can in no way be regarded as an activity which has a preparatory or auxiliary character.

In the context of a digital business, the Commentary to the OECD illustrates an example of an enterprise that carries on the business of selling products through the Internet. In that case, the enterprise is not in the business of operating servers and the mere fact that it may do so at a given location is not enough to conclude that activities performed at that location are more than preparatory and auxiliary. What needs to be done in such a case is to examine the nature of the activities performed at that location in light of the business carried on by the enterprise. If these activities are merely preparatory or auxiliary to the business of selling products on the Internet (for example, the location is used to operate a server that hosts a web site which, as is often the case, is used exclusively for advertising, displaying a catalogue of products or providing information to potential customers), the location will not constitute a permanent establishment. If, however, the typical functions related to a sale are performed at that location (for example, the conclusion of the contract with the customer, the processing of the payment and the delivery of the products are performed automatically through the equipment located there), these activities cannot be considered to be merely preparatory or auxiliary[94].

The 2017 OECD MTC also reiterates that in Business to Consumer (B2C) situation where a large warehouse involved and the warehouse maintained by a non-resident enterprise in a market jurisdiction in which a significant number of employees work for the main purpose of storing and delivering goods owned and sold by the non-resident enterprise, the warehouse constitutes an essential part of the non-resident enterprise's sales/distribution business. Therefore, it will constitute a fixed permanent establishment.

In this backdrop, it should be noted that:

- Brazil has expressed its reservation on the interpretation provided in paragraph 122 to 131 on electronic commerce, especially in view of the principle of taxation at the source of payments in its legislation.
- India has expressed its reservation on the comments in Paragraph 123 to 124 and is of the view that a website may constitute a permanent establishment where it leads to significant economic presence of an enterprise It is also of the view that an enterprise can be considered to have acquired a place of business through a website on any equipment, if opening the website on that equipment includes downloading of automated software,

[92] Ibid 92. Para. 42.3.

[93] Ibid 92. Para. 24.

[94] Ibid 92. Para. 42.9.

such as cookies, which use that equipment to collect data from that equipment, process it in any manner or share it with the enterprise.

- The Diverted Profits Tax ("DPT") issued by the HMRC on March 26, 2015 is an example of the unilateral approach taken by the UK government to combat BEPS. It adds an extra layer of taxation in an attempt to tax large multinationals on those profits arising out of business activity in the UK, which have been diverted away from the UK through contrived arrangements between related parties.
- The unilateral action also taken by Italy and Spain after EU issued its Digital Service Tax (DST) proposal in 2018. The purpose of the DST is to boost a fairer competition of digital business with non-digital business. Both Spain and Italy adopted DST to their national tax law by imposing the 3 percent tax applies to revenue from online advertising, online sales, and data processing, for companies with global annual revenue of at least 750 million euros, at least 5.5 million from digital services provided in Italy or at least €3 million from digital services provided in Spain. Recently, France has launched a similar tax law proposal.

The above reservations are in light of the increasing penetration of digital businesses typically from developed economies into developing economy markets which provide a large user base. As mentioned previously, in the traditional brick-and-mortar world, income generation from a territory required a degree of direct or indirect physical presence. For instance, let us look at the following example: An online retailer of digital products undertakes the functions of sales, order processing, payment verification, and customer service functions via website. In order to attract customers, online retailer also provides related content specifically tailored to the tastes of targeted consumers. Through sales tracking software, companies can establish and execute targeted marketing programs via e-mail or traditional avenues such as targeted mailings or print advertising. Through sophisticated ordering and database systems, the product can be delivered and packaged according to customer tastes and ordering requirements (e.g., a particular musical track with a limited life of 30 days). The retailer has considerable sales from developing economies such as China and India. In this backdrop, the question that arises is that since the website is in itself a virtual storefront, in a brick-and-mortar world, the key activities mentioned above would have required a taxpayer to have a definite and physical presence; however, technology has enabled the retailer to operate without any physical presence. As such, under the current rules, the retailer despite having a wide and deep customer base can potentially escape taxation in the user jurisdiction since he has no physical presence.

Similar issues arise in the following example: An online shipping portal hosts electronic catalogues of multiple vendors on its computer servers. Through this electronic medium, purchasers are exposed to a variety of vendors and their products. Purchasers are provided with the convenience of having to input shipping and payment information only once and the ability to select merchandise from a variety of vendors. Software directs purchasers to vendors with desired products. Through order-processing software, a vendor and a purchaser enter into and complete the sales transaction. The web site operator, however, has no contractual relationship with the purchaser but collects a commission from the vendor on the sale. Vendors without previous Internet experience or significant technology budgets or located in any country can tap new markets through online shopping portals.

Cloud computing (as discussed in the previous section) also raises the question as to whether it could result in a taxable presence for a cloud service provider. Here, internationally, there is a broad consensus on the views in relation to situations where a PE could trigger as provided in the 2017 OECD Commentary to Article 5 of the Model Tax Convention[95]:

- Computer equipment must be fixed to constitute a PE. Servers located in a jurisdiction for a suitably long period may be considered fixed and constitute a PE;
- Servers and computer equipment that can function without any employees involved may give rise to a PE if the servers and computer equipment carry out essential business functions;

[95] Ibid 92. Para. 42.1 and 42.10.

- Business that owns or leases a server will not necessarily have a PE where server is located;
- Website hosting facilities should not produce PEs for the entity carrying on business through the website.

However, countries such as India have expressed its reservations against the above positions evolved by the OECD. For instance, India is of the view that a website may constitute a permanent establishment where it leads to significant economic presence of an enterprise. It is also of the view that an enterprise can be considered to have acquired a place of business through a website on any equipment, if opening the website on that equipment includes downloading of automated software, such as cookies, which use that equipment to collect data from that equipment, process it in any manner or share it with the enterprise.

Service PE

In the context of service PE as is seen in the UN MTC, the Commentary to the UN MTC notes that many developing countries believe that management and consultancy services should be covered because the provision of those services in developing countries by enterprises of industrialized countries can generate large profits. The Commentary to the UN MTC recognizes that it is generally accepted that, if a person acts in a State for an enterprise in such a way as to closely tie up the activity of the enterprise with the economic life of that State, the enterprise should be treated as having a permanent establishment in that State—even if it does not have a fixed place of business in that State.

The service PE rule in the UN MTC provides that a PE also encompasses the furnishing of services, including consultancy services, by an enterprise through employees or other personnel engaged by the enterprise for such purpose, but only if activities of that nature continue (for the same or a connected project) within a State for a period or periods aggregating more than 183 days in any 12-month period commencing or ending in the fiscal year concerned.

The application of the above definition of service PE faces numerous challenges in the context of business models in the digital economy. Where earlier a service required the physical presence of personnel of a foreign enterprise in the jurisdiction of the customer, technology has enabled the service provider to work remotely and provide a seamless experience in relation to the service. For instance, processing of accounting, payroll, and other company information is undertaken electronically by advanced cloud-based software, thereby eliminating the need for significant human resources, including any physical presence. Technologies such as video conferencing and Skype have further negated the requirement of a physical presence of an enterprise's personnel. As such, even where involvement of personnel is required in relation to services, technology has made it possible to avoid a taxable presence under the present rules.

Agency PE

In the context of the agency PE, presently under the OECD MTC, a foreign enterprise is considered to have a PE when the foreign enterprise has a dependent agent who act for or on behalf of the foreign enterprise to habitually concluding contract or habitually plays the principal role leading to the conclusion of contracts that are routinely concluded without material modification by the enterprise. The wording of the article was updated align with BEPS Action 7. Similar to OECD, UN also amended its article 5 (5) following the BEPS recommendation. The UN MTC, in addition to this clause provides that an agency PE would be constituted where the dependent agent habitually maintains a stock of goods or merchandise from which he regularly delivers goods or merchandise on behalf of the enterprise. Some treaties further expand the scope of this provision to provide that an agency PE would be constituted merely by the agent securing orders on behalf of the enterprise.

The Commentary to the OECD MTC mentions that the new wording aimed to address the artificial use of commissionaire structures and offshore rubber-stamping arrangements. A "commissionaire arrangement" may be loosely defined as an arrangement through which a person sells products in a State in its own name but on behalf

of a foreign enterprise that is the owner of these products. Through such an arrangement, a foreign enterprise is able to sell its products in a State without technically having a permanent establishment to which such sales may be attributed for tax purposes and without, therefore, being taxable in that State on the profits derived from such sales. Since the person that concludes the sales does not own the products that it sells, that person cannot be taxed on the profits derived from such sales and may only be taxed on the remuneration that it receives for its services (usually a commission).

In highly digitalized business, the arrangement includes the online provision of advertising services, involved contracts substantially negotiated in a market jurisdiction through a local subsidiary, but not formally concluded in that jurisdiction. Instead, an automated system managed overseas by the parent company could be responsible for the finalization of these contracts. Such arrangements allowed a business to avoid a dependent agent PE under old Article 5(5).

Where the new wordings of article 5 (5) are implemented through the MTC, these structures and arrangements would result in a PE for the foreign parent company if the local sales force habitually plays the principal role leading to the conclusion of contracts in the name of the parent company (or for the transfer of property or provision of services by the parent company), and these contracts are routinely concluded without material modification by the parent company.

Technology and the digital economy have transformed the manner in which customers are identified, business is solicited, marketing pitches are made, and contracts are concluded. From the proliferation of web-based advertising, through to customers being enabled to purchase products electronically from any part of the world, to customers concluding standard contracts by checking the box to the question 'I Agree to the Terms of Service', and digitally signing an online contract, the activities that would have otherwise required the physical presence of an agent are undertaken wholly through technology. Thus, though these activities satisfy one or all of the activity tests for an agency PE, in the absence of a physical agent, none of these activities in isolation or taken as a whole would result in a PE for the non-resident entity.

An example here would highlight this aspect: Electronic marketplaces can be operated by vertical or horizontal content aggregators. A content aggregator provides information for a particular industry (vertical aggregator) or for a particular function applicable across industry lines (horizontal aggregator). Revenues are generated from transaction fees, commissions, referral fees, advertising, or sponsorship. Sales or service transactions occur directly between the customer and the vendor or service provider associated with the marketplace. By associating themselves with content aggregators, small or remote vendors have a greater access to new markets. In this example, it can be seen that neither the content aggregator nor the vendors could trigger a PE in the user jurisdiction, despite such jurisdiction having a high user base accessing the marketplace.

In this context, it is also relevant to note that the implementation of the amendments and revisions proposed to the PE definition in Article 5 of the OECD Model Tax Convention and the OECD Transfer Pricing Guidelines was expected to ensure a better alignment between the location of taxable profits and the underlying economic activity. Pursuant to these actions, some heavily digitalised MNEs have decided to change or begin changing their trade structures (e.g., Amazon, eBay, Facebook, Google), usually by converting from a remote sales model to a commercial model where online sales with in-country customers are recognized in a local entity (such as a buy-sell distributor). Some countries in which these restructurings have occurred have also seen a broadening of their corporate tax base, as the local taxpayer of the MNE group is no longer characterised as a provider of routine services remunerated on a cost-plus basis. Instead, the income from the sales with in-country customers is recognised at the level of the local taxpayer (subsidiary or PE) after deduction of the relevant expenses (e.g., direct cost of goods sold, direct costs of sales and provision of services, local marketing and promotion).

In its 2018 Interim Report, the OECD also mentions that MNEs having highly digitalized businesses have taken steps to align their corporate structures with their real economic activity. These steps include business restructurings or changes to their transfer pricing positions, usually by re-evaluating the location of people functions, and of risk assumption and risk management. This is corroborated by publicly available information on the relocation of valuable assets (such as intangibles) and risks from low-tax jurisdictions to other jurisdictions where substantial business activities take place, notably in terms of people functions (so-called 'on-shoring' of assets).

European Union approaches

On 21 March 2018, the European Commission proposed two proposals to ensure that digital business activities are taxed in a fair and growth-friendly way in the EU. The first proposal (long term solution) is about digital presence or a virtual permanent establishment. This proposal would enable Member States to tax profits that are generated in their territory to the extent a company has digital presence, even if without a physical presence. A digital platform will be deemed to have a taxable 'digital presence' or a virtual permanent establishment in a Member State if it fulfils one of the following criteria:

- It exceeds a threshold of €7 million in annual revenues in a Member State
- It has more than 100,000 users in a Member State in a taxable year
- Over 3000 business contracts for digital services are created between the company and business users in a taxable year.

The second proposal (temporary solution) is about digital service tax (DST). Unlike the first proposal, this indirect tax would apply to revenues created from certain digital activities where the main value is created through user participation such as online placement of advertising, sale of collected user data and digital platforms that facilitate interaction between users. To the extent, the company engage in such activity and the total annual worldwide revenue above €750 million and EU revenues of €50 million, the company will be subject to a 3% of digital service tax.

As the DST proposal levied in gross receipts rather than on income or capital, it would cause double taxation of profits: once when the services are subject to the DST and again when income is recorded and taxed under an income tax in the country of residence. Unlike existing VATs, the EC's proposed DST does not include an offset for input charges (a process designed to avoid imposing VAT at multiple stages and only imposing it on the ultimate sale transaction), and thus the DST and similar turnover taxes are not functionally equivalent to a VAT.

Since a turnover tax is not an income tax, typical relief from double taxation (such as foreign tax credits or exemptions) is unlikely available from the taxpayer's country of residence. The absence of input charge relief commonly provided for in VAT systems and other indirect-type taxes, and the absence of foreign tax credits or exemptions provided for in corporate income tax-type taxes, means that a turnover-type digital tax will result in double taxation.

In addition, the DST proposal will lead to a complex type of source taxation. For example, assume an American resident plans and travels to Europe using the following services: (a) pre-trip, while at home in US, flights are booked on Google Flights and lodging is reserved via Airbnb; and (b) during the trip, while in Europe, the individual uses Uber from their phone to travel locally. All (except the point of departure and arrival at the beginning and end of the trip) of the economic activity takes place in Europe, but only local Uber travel is likely subject to the DST due to the user's location at the time the reservation was booked.

Sourcing is further complicated if the user's phone, for security purposes, is connecting through a virtual private network (VPN) based in US while making the Uber reservation, in which case none of the user's activity is subject to the tax despite all the consumption of the goods and services occurring within the EU. Note that the opposite case would occur if a European resident plans a trip to US, in that digital taxes are imposed on the European resident despite the consumption of those services occurring in the US.

Further, determining the IP addresses of users with enough certainty to determine their precise location would entail the voluntary elimination of privacy by the user, or a mandate by legislative authorities, which is counter to current EU privacy directives as well as those of most non-EU countries.

Despite the difficulties that might hinder the implementation of DST, within EU, Italy, Spain, and Austria enacted or proposed law based on the EU proposal. Differ from other Member States German and France deviate from the EU proposal as they apply the DST only for advertising activity. At the moment of this publication, those laws have not entered into force yet. As the EU proposal failed to reach an agreement among EU members in November 2018, several EU Member States share the desire to take unilateral action despite the absence of global consensus on EU or OECD level.

Suggestions for a new PE nexus

In accordance with the changing landscape of the digital economy, many countries have designed or are in the process of designing their own rules to combat the challenges posed by digitalisation on their economy. One example in this regard is the 'Diverted Profit Tax' initiative of the UK government which aims to tax businesses avoiding a PE in the UK through contrived arrangements. Another example can be seen in the decision of a Spanish Court which in 2013 held that a website of a company selling goods or services in a jurisdiction (Spain) shall be treated as a PE of that company liable to source taxation. These unilateral rules have come up in the absence of a global standard which is equipped to deal with all aspects of the changing economy. With the OECD highlighting the impact of the latest developments in this field without providing adequate guidance on how to address them leaves countries with no other option. However, it is disadvantageous for businesses already operating in this sector as they are met with differing requirements in different jurisdictions.

The OECD, in its BEPS final report action 1, proposed the use of significant economic presence as nexus for permanent establishment. Instead of using physical presence as used in the current nexus, OECD suggested to broaden the nexus by relying on economic presence. The significant economic presence defines as the economic activities carried on in the source jurisdiction evidently reflect a purposeful and sustained interaction with the economy of that country via technology and other automated tools. Such interaction could be proven by these following factors: revenue generated from the source of jurisdiction, participation of users (based on monthly active users, online contract solution, and data collected), and the establishment of local digital features (platform, domain, and payment).

Long before the OECD published its final report, , the International Bureau of Fiscal Documentation ("IBFD") has issued two working papers[96] proposing a new PE nexus to tax business income in the era of digital economy and a new approach to withholding taxes in the digital sector in order to appropriately and consistently capture the base eroding payments left untaxed due to insufficient regulations. These papers offer an alternative approach to taxing payments for digital goods and services which can be applied globally in a consistent manner.

The first paper discusses a new nexus approach based on digital presence that can be applied to determination of a PE of a company for allocating taxing rights on cross-border business income in the era of the digital economy.

[96] Ibid 71.

This approach suggests inclusion of a new Article 5(8) to the OECD Model Tax Convention along the following lines:

"If an enterprise resident in one Contracting State provides access to (or offers) an electronic application, database, online marketplace or storage room or offers advertising services on a website or in an electronic application used by more than 1,000 individual users per month domiciled in the other Contracting State, such enterprise shall be deemed to have a permanent establishment in the other Contracting State if the total amount of revenue of the enterprise due to the aforementioned services in the other Contracting State exceeds XXX (EUR, USD, GBP, CNY, CHF, etc.) per annum."

As agreed by the OECD[97], the existing PE definition in the Model Tax Convention is no longer fit to operate in the scenario of the digital economy. Through the BEPS Action 7 OECD proposes certain changes to the PE definition by modifying the following features of Article 5(4):

- the exceptions are not restricted to preparatory or auxiliary activities;
- the word "delivery" in subparagraphs a) and b) of paragraph 4;
- the exception for purchasing goods or merchandise or collecting information;
- fragmentation of activities between related parties; and
- splitting-up contracts.

However, even after these amendments, taxation of most businesses operating solely through a digital presence will remain unaffected because these amendments address the issues posed by e-commerce and not the digital economy as a whole. Hence, the new approach suggested here has been derived from interpreting the 'sourcing theory' which postulates a link between sourcing and taxing rights on income in close collaboration with the 'benefit theory' which suggest allocation of taxing rights to a jurisdiction based on the benefits enjoyed by the taxpayer in that jurisdiction. The following suggestion for a modified PE nexus more closely reflects value creation in respect of business income in the era of the digital economy.

The new Article 5(8) suggested here shall rely on four main elements or requirements: (i) digital services; (ii) user threshold; (iii) a certain time threshold and (iv) a de minimum revenue threshold.

1. The inclusion of an electronic application, database, online marketplace, storage room to users domiciled in the other contracting state or offering advertising services on a website or in an electronic application used by users domiciled in the other contracting state in the PE definition will allow it to capture the latest trends of the digital economy.
2. Applying a user threshold of 1000 users per month allows for a closer link to the benefit theory as the more users a company has, the more significant is its digital presence. Furthermore, the more users there are in a certain jurisdiction, the higher is the value creation there and, as a consequence, considering the sourcing theory, the justification for taxation is higher.
3. Considering the detrimental consequences of non-compliance in certain jurisdictions and also the fast-growing potential of certain online business, it is worthwhile to include a minimum time threshold for penalizing companies in breach of the user threshold mentioned above.
4. The setting of a minimum yearly amount of revenue linked specifically to the digital services should also be included, since otherwise the tax liability, in particular of SMEs, could be too fragmented.

[97] Brauner, Y., Baez, A. (2015). Withholding Taxes in the Service of BEPS Action 1: Address the Tax Challenges of the Digital Economy (White Paper). International Bureau of Fiscal Documentation. Retrieved from http://www.ibfd.org/sites/ibfd.org/files/content/WithholdingTaxesintheServiceofBEPSAction1-whitepaper.pdf?utm_source=white-paper&utm_medium=email&utm_campaign=WP10-03-2015&utm_content=WithholdingTaxesintheServiceofBEPSAction1-whitepaper.pdf

This approach suggests a move from the OECD suggestion which talks about taxing businesses only if the digital activity is fully dematerialized i.e. when the company is operating fully in the digital sector and no physical elements are involved in the creation of goods or services offered by the company. The approach suggested here, however, takes a more realistic and practical approach to taxation of the digital economy based not on the size of the company but on the number of users of the services offered by the company. It can also be consistently applied to a wider array of businesses (such as multi-sided platforms) than those covered by the OECD (mainly only e-commerce transactions).

In the context of transfer pricing, this paper suggests the potential application of a modified profit split method with an upfront income allocation of a partial profit to the market jurisdiction in order to determine the taxable income to be allocated to the PE jurisdiction. This approach is not to be confused with formulary apportionment as it merely introduces some formula-based calculations in addition to the existing arm's length principle. In the paper, an approach is presented regarding allocation of profits which is yet open to further discussion and negotiation between countries. It works on the assumption that one third of the profit of an enterprise within the digital economy is created by the market jurisdictions. Therefore, the market jurisdictions (fulfilling the new PE nexus) will split a third of the profit among themselves following the relation between domestic revenues and overall revenues. The other residual two thirds of the profit shall be split in accordance to the already existing principles of transfer pricing.

Although the proposed nexus theory conforms to the five principles of taxing the digital economy developed by the OECD in 1998 in the Ottawa conference, the fundamental question that still needs to be answered is its implementation. As can be deciphered from the text of this approach, there are many elements that will need to be negotiated between countries before it can be applied at an international standard.

A second paper published by the IBFD discusses the impact and significance of withholding taxes in the digital economy. This paper offers an approach of installing a withholding tax mechanism as the primary response to the digital economy challenges as an alternative to the option of using withholding taxes in support of a nexus-based solution in respect of the PE as discussed above. It is suggested that withholding taxes applied in collaboration with the new nexus approach should be the preferred option but in case that appears difficult to implement and in order to avoid a scenario of no regulation, another response to the digital challenges could be imposition of withholding tax as a primary means of taxation.

The approach developed by the IBFD proposes the design of a globally standard 10% final withholding tax on all base-eroding business payments to registered non-residents and a higher 15% withholding tax on payments to unregistered non-residents, with specific, globally standard, exemptions to payees registered to be taxed under a net taxation scheme. Such net taxation scheme may be a nexus-based solution or an elective scheme to avoid the withholding tax proposed here. Exemptions may also be standardized for payments subject to in-place withholding schemes (e.g. employment), to non-base-eroding payments (e.g. dividends) and to non-digital goods and services (e.g. material, rents and services performed by humans on the ground). Payments to unregistered payees could include payments to accounts in or owned by low- or no-tax jurisdictions.

The proposed withholding tax applies primarily to B2B transactions and to a limited extent to B2C transactions. C2C transactions which are commonplace in the digital economy through the use of multi-sided models are not covered by the scope of this proposal per se. However, it is to be noted that multi-sided models facilitate C2C transactions by conducting B2C or B2B transactions on the front and the back end of the value chain and such B2C and B2B transactions are covered under the scope of this proposal.

This type of withholding tax may operate as a collection mechanism for the nexus-based solution explained above as a complementary measure or a backstop to such a solution, or as a stand-alone solution. However, this proposal depends on a reliable, globally standard, quick, cheap and automatically shared registration system shared by at

least the major economies, such as the BEPS countries, which in itself may be impractical and far-reaching to implement.

Countries Initiatives

In the context of taxing profits from digital activities, many countries worldwide have been proactive in introducing measures to include such activities within the scope of their tax systems. While some countries have gone ahead and introduced these measures based on the draft and/or Final Reports published in the context of the OECD/G20 BEPS initiative, i.e. even before the "Multilateral Convention to Implement Tax Treaty Related Measures to Prevent Base Erosion and Profit Shifting" (the "Multilateral Instrument" or MLI) was opened for signature, others have adopted their own course of action.

India introduces the concept of Significant Economic Presence (SEP) as endorsed by OECD in its final report. The country expands the scope of income of a non-resident which accrues or arises in India that results in a 'business connection' in India for that non-resident. The resulting income, attributable to the SEP, is taxable in India. This concept could not be applicable unless the existing treaties are amended.

SEP is defined to mean:

- Transaction in respect of any goods, services or property carried out by a non-resident in India, including the provision of download of data or software in India, subject to payment threshold to be prescribed; or
- Systematic and continuous soliciting of business activities or engaging in interaction with such number of users as may be prescribed, in India through digital means.

Similar as India, Israel introduced the SEP concept in 2016 (applicable for non-treaty countries) to tax services relating to conclusion of online contracts, use of digital products, etc., provided by non-residents to Israeli customers, from remote locations.

In December 2018, Turkey introduced a digital tax on the cross-border online advertising services by a Presidential Decree. The decree brings a withholding tax liability for payments made for cross-border online advertising services. The non-resident providers of cross-border online advertising services or to those who act as an intermediary for the provision of such services will fall within the scope of new withholding tax liability, regardless of whether the payee is a taxpayer. The Presidential Decree will be applicable to payments made as of 1 January 2019. How this new legislation will interact with tax treaties concluded by Turkey, remains to be seen.

Besides the unilateral action taken by the previous countries, Latin America is also enacting law to address taxation for digital business model in different ways. Their initiatives are tabulated below:

Countries	Initiative	Applicable legislation
Peru	• Applying 30% withholding tax for digital service. Such service defines very broadly as services that are rendered through internet or other networks. Digital services are considered as Peruvian sourced "when the service is economically used or consumed within the country". (Market use). • Business to customer operation (B2C) are not regulated	Legislative Decree 945 (2004) and Legislative Decree 970 (2006)

Chile	• Digital services can be driven to the rules of VAT or Income Tax. • August, 2018: Bill that introduces a tax on Digital Services (3%) in operations B2C • The Tax will be withheld by debit and credit card issuers	
Argentina	• The system provides, as a new taxable fact, the importation of digital services if the actual use or exploitation of the product is carried out in the territory. • Different provisions in Argentina are referred to taxes for royalties and other services that in practice cover many digital services	Law 27,430, Decree 354 of April 23, 2018 and the General resolution 4240 Federal Public Revenue Administration.
Mexico	• A bill that introduces a tax on digital services, at a rate of 3%, no matter where they are generated, is being discussed. The main target is advertising services.	
Costa Rica	• Bill aiming at enforcing VAT on digital services.	
Colombia	• Last two tax reforms included provisions for VAT on digital services in B2C operations • Foreign providers should register before DIAN or being subject to withholdings by debit, credit and other card issuers (if appointed by the tax administration)	

On a related note, the OECD in its 2018 Interim Report has also acknowledged that on the one hand, there is broad acknowledgement of the continuing evolution of digital technologies and the need for further consideration and monitoring of how these changes are impacting value creation across the economy. On the other hand, there is not yet agreement amongst countries over the tax implications of scale without mass and a greater reliance on intangibles. Further, while data and user participation are recognized as not being present in all highly digitalised business models, where they are present, there is currently no consensus on whether, and the extent to which, they should be considered as contributing to a firm's value creation, and therefore, there is no agreement as to whether they require changes to the international tax rules.

The OECD also acknowledges that a broad group of countries support further exploration of potential changes to the nexus and profit allocation rules that would consider the impacts of digitalisation on the economy. Further, members agreed that they share a common interest in maintaining a relevant and coherent set of international rules to address the cross-border taxation of business profits in a way that improves, inter alia, economic efficiency and global welfare, particularly where the alternative is likely to be unilateral approaches with all of their associated adverse impacts. It was also acknowledged that a multilateral approach is important to reduce the distortions to investment and growth, while reducing complexity, minimising double taxation, supporting innovation and achieving a fairer, more efficient and simpler tax system for firms operating across the globe.

5.2.4 Transfer Pricing Outcomes

In January 2013, a report dealing with taxation of the digital economy that was commissioned by the French Government was issued. The report takes a novel approach by focusing on data collection that provides value for many businesses. The Report's particular focus is on information gathered through web sites that monitor the responses of users of the web sites. To the extent the aggregation of this information provides significant value to those running the web sites, the line between consumers and producers is blurred—the sites create value by gathering information from users of the sites. The main actor benefitting from this model is the so-called "data-factory", like Facebook and Google.

The digital economy and the growing importance of multi-sided platforms throw up interesting issues from a transfer pricing perspective. This was recognized by the Sub-group of Working Party No. 6 on E-commerce of the OECD in 2001 when it noted that the increased speed and mobility of business activities and cross-border transactions may raise further difficulties in the application of transfer pricing methods[98]. The said OECD report analysed fact patterns of four e-commerce business models and concluded that the existing OECD guidance on transfer pricing appears capable of dealing with the transfer pricing issues raised by e-commerce. However, e-commerce business models have significantly evolved since then and it is now recognized that the increasing importance of intangibles, the use of data and the spread of global value chains would significantly affect transfer pricing outcomes[99].

The Sub-group of Working Party No. 6 on E-commerce of the OECD had recognized the difficulty involved in resolving transfer pricing concerns when it had noted that in light of the speed, frequency, anonymity and integration of exchanges over the Internet and the development of intranets within MNE's, it becomes more difficult to determine what the transaction actually is, and even greater difficulties are seen in finding third party transactions about which enough is known to conclude that they are comparable. It also acknowledges that transactions can be hard to discover and trace, particularly those which take place in private networks.

In light of the above, the following can be identified as resulting in challenges in applying the traditional transfer pricing principles to transactions in the digital economy.

1. Identification of the international transaction of one entity since the transaction is closely integrated with many other transactions / activities of other related entities.

2. Undertaking a functional analysis of the international transaction.

3. Identifying whether the transactions involve use of intangibles.

4. Identification of the most appropriate method to determine the arm's length price.

5. Identification of comparable uncontrolled transactions.

Identification of the international transaction

The OECD recognized that:

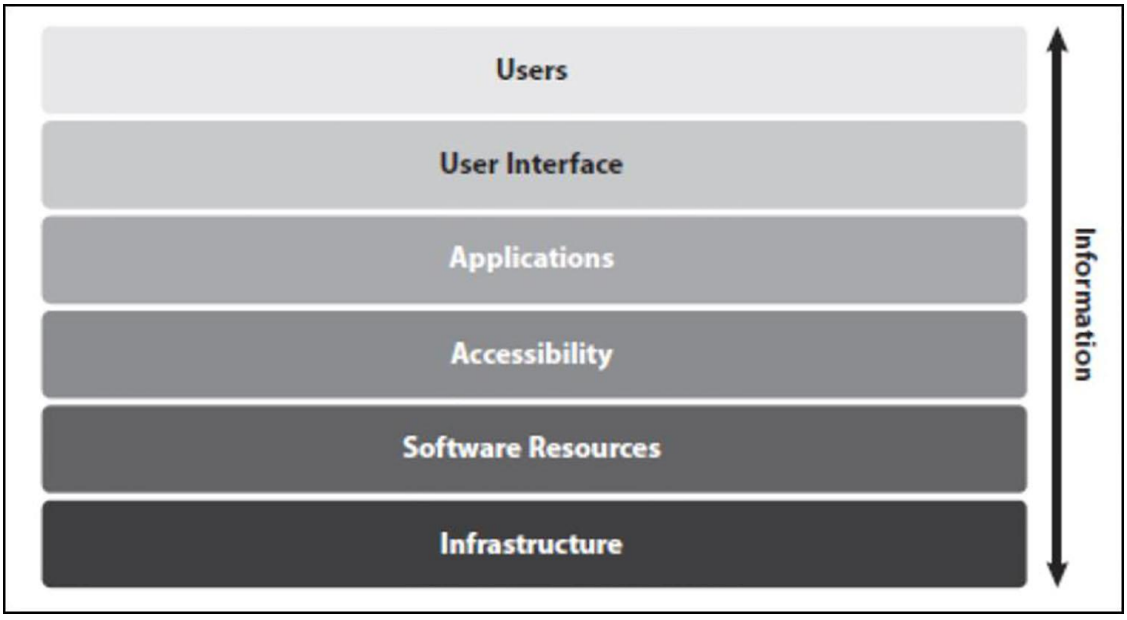
[98] Organisation for Economic Cooperation and Development. (2014). *E-Commerce: Transfer Pricing and Business Profits Taxation No. 10* (P. 10). Paris. OECD Publishing. Retrieved October 14 2015 from http://www.keepeek.com/Digital-Asset-Management/oecd/taxation/e-commerce-transfer-pricing-and-business-profits-taxation_9789264007222-en#page3

[99] Ibid 20. P. 15.

The speed, frequency, anonymity and integration of exchanges over the Internet and the development of intranets within MNE's may well make it harder to apply a separate transaction analysis. The greater integration of business activities may mean there is a greater need to consider sets of related party transactions rather than to consider each transaction separately.

To illustrate, consider the way the internet could be used in a furniture design business. No longer is the choice of a customer restricted to what is in a retail shop. Instead the customer may be able to convey his or her exact requirements over the internet to a marketing specialist who is able to convey them electronically to a furniture designer. The designer would design furniture specifically to the customer's expressed requirements but would be helped in this task by accessing the company's own designer software on its mainframe. When finished, the design could be transmitted to manufacturing craftsmen who would draw up the necessary specifications so that the design could be manufactured in the company's factory. In order to successfully produce the finished customized product the various people involved may consistently keep in touch by e-mail and occasional video conference. In such an example, can the furniture designer's work be analyzed separately from the computer server transaction, from the development of the computer software which assists the designer, from the participation of the craftsmen, even from the manufacture of the furniture itself? As transactions become more and more complex by back and forth movements among the MNE group, separate identification and analysis of transactions could become increasingly burdensome[100].

The above issues can be more vividly seen in the business configurations illustrations discussed previously and in light of developments in information and communication technology that provide the value to users. This aspect is further reflected in the interactions between various layers in the ICT that enable an e-commerce enterprise to provide value to clients[101]:



- *Infrastructure* – Consists of the cables, tubes, routers, switches, and data centres that are designed and manufactured by firms specialised in network interconnection, and operated by ISPs, carriers, and network operators.

[100] Ibid 98. P. 60.

[101] Ibid 20. P. 64.

- *Software resources* – enable organizations to create applications, which can consist of raw data, digital content, or executable code. These can include both resources produced by organisations and resources derived from individual users and collected and stored by organisations for later use.

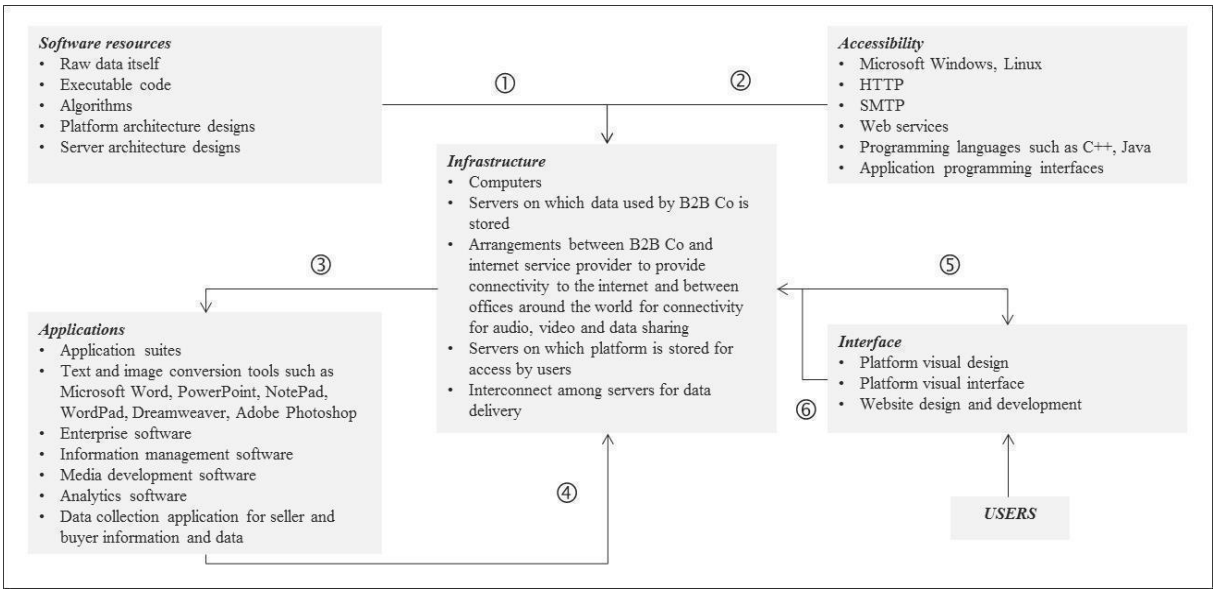
- *Accessibility* – necessary to allow software resources to be combined on top of the infrastructure to create applications usable by individual or business end users. Operating systems, core higher-level protocols that allow communication of data between applications, such as the Hypertext Transfer Protocol (HTTP), SMTP that provides a standard for email transmission, web services, application programming interfaces (API), and software development kits (SDKs), all of which provide ways for applications usable by end users to connect with the resources necessary to connect to underlying resources.

- *Applications* – An application is a combination of software resources creating value for the end user through the provision of goods or services. Applications can fit together or link to one another: for instance, a web browser is an application, and it gives access to websites that are web-based applications; an app store is also an application with a value proposal that is to allow users to discover and purchase other applications.

- *Interface* – An interface represents the user experience. The interface is displayed through a physical point of contact that can be either a device or a whole place (such as a store)[102].

In today's digital business, all of the above activities interact with each other and integrate to provide the seamless experience and value to the user. For instance, an example of a provider of a B2B platform / website ('B2B Co') for wholesale buyers and sellers can be considered. The B2B seller would act as the mediator of the deals and keep a margin for every sale / purchase undertaken through the website. The B2B seller would offer, in return of a subscription fee, a facility to display a virtual shopfront.

The provision of the platform would involve many activities that culminate in the B2B platform for which the B2B Co would be undertaking various interconnecting activities possibly distributed among various group companies around the world. These are depicted below:



[102] Ibid 20. P. 64-66.

All of the above involve intensive interaction of all of the six layers described previously. For instance, for the seller's digital shopfront to be displayed on the interface, the same should first be requested by the user on the interface by way of a search query. Thereafter, the search query is interpreted by the search algorithms which then place the request for the relevant data through the infrastructure, software applications, which then again ping the relevant web page in the web server for the final display on the interface; as the request is made, there is intensive interaction between the software resources, accessibility resources and external and internal (i.e., those developed by the B2B Co) applications.

However, each or a combination of each of the above activities could be undertaken by distinct entities in the B2B Co group. For example,

- Strategic direction would be given by one particular entity in the Group; market inputs could be derived by this entity from entities located around the world or from third party data aggregators. Users themselves could be key sources of inputs.

- The data required to be used by the B2B Co group could be stored on servers around the world. Such servers could be owned or leased by a specific B2B Co in the group or several entities in the group. Given that data constantly flows into and from the various data servers within the group itself as part of the interactions required for delivering the end services to the customers, data servers owned / leased by one entity could, in effect, be used by another entity or such other entity could benefit from such data servers. Data management decisions could be potentially undertaken by a dedicated entity in a Group.

- The Group could engage a common data interconnect service provider or telecom service provider to connect the hardware and software resources of the Group.

- The activity / function of development of applications that would be used to deliver to the end-user the user experience could be shared amongst entities – they could be consolidated and integrated for the end-use by another entity. Algorithm development, coding, reviews and testing of the applications developed could be undertaken by another distinct entity in the Group. Maintenance of each section of the website / platform could be distributed among multiple entities in the Group or even outsourced to a third-party service provider.

- User inputs and inputs from the sellers gathered from the interface would be stored on the data servers for use and analysis by different entities in the Group. Decision making from the same, such as enhancing applications, or the interface could be undertaken by a different entity and the execution of such decisions could be driven by another entity.

- Providing customer support services would be undertaken by one entity which would have all of the above ICT layers at its disposal to seamlessly address customer queries.

As described by the above illustrative scenario, the user experience is provided by instantaneous interaction among the ICT layers distributed among various entities of a Group. Given that a particular function could be distributed among different entities, distinctly identifying which transaction is provided by which entity and attaching value to such transaction in the supply chain would be a challenge. Further as identified by the OECD, the mobility of functions (e.g., through the use of server arrays or mirror servers) adds to the difficulty of attaching particular transactions to particular jurisdictions[103]. While the OECD Guidelines permit aggregation of these transactions since they are so 'closely linked or continuous that they cannot be evaluated adequately on a separate basis', it

[103] Ibid 98. P. 61.

would be challenging to identify and characterize the transaction in a scenario where multiple entities contribute to a portion of each of the activities outlined above. These difficulties are aggravated in the context of value shops.

Undertaking the functional analysis

The OECD recognized that as the communications revolution makes related party transactions more complex and unique, implementing functional analysis becomes more difficult, not only in the assessment of function but also in the making of adjustments that account for differences[104].

For instance, in the activities described for the B2B Co previously, the development of algorithms and codes could be undertaken by technical teams with extensive support from automated software development platforms. Further, many of the services of the website / platform itself, such as collection of vendor information and entering into 'free-service' agreements could be undertaken completely by the platform itself without any human / entity intervention. In this backdrop, the issue is on the manner of allocating functions to the entity that develops the algorithm / code vis-à-vis the entity that owns the algorithm / code development platforms that support the algorithm / code development. In addition, given that provision of the free services helps in development of the user base which in itself is a key intangible, the issue remains of how to allocate the functions performed by a computer. For example, how much of the function can be attributed to the ownership of the computer server and software, the development and adaptation of the original software, or the programming of the computer etc.; is a server merely a database or does it co-relate programmatically and enable the delivery of the output to the end-user such that this is the prime asset for the B2B Co. It often is difficult to assess the key functions in such a scenario i.e. is it to be allocated significantly to the entity that owns the servers and runs the program codes; or the entity that drove the decisions on the logical conditions and algorithms which were adopted to develop the codes.

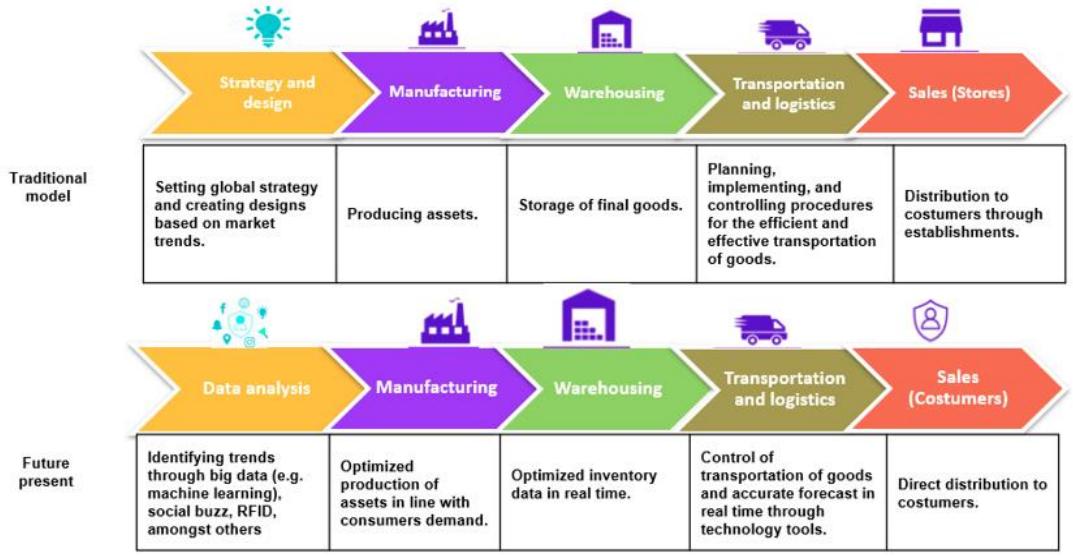
Undertaking the Value Chain Analysis

Besides undertaking functional analysis as laid out in the chapter 1 of OECD TP Guideline, OECD recommends for MNEs to perform Value Chain Analysis (VCA). According to the BEPS initiative, compensation in transactions between two associated enterprises should reflect the functions performed, assets used, and risk assumed ("FAR analysis") by each party, these being indicators of the real substance of a company and its operations determined by performing a functional analysis. For this purpose, a VCA assists in achieving an understanding of the structure and organization of an MNE group and how these factors influence the industry in which the MNE operates. Consequently, a VCA facilitates the detailed FAR analysis. Here, the 3-step approach as discussed in 'Part A Framework' in identifying the source of income for a digital business could be suitably used to even undertake the FAR analysis.

In the context of digital economy, a VCA is needed, as the supply chain of digital business is more scattered than the traditional business. It leads to the difficulties in identifying the value creation as mandated by BEPS action 8 to 10. A business model that could serve as an example is Uber. It is critical to identify where value is created through the action of linking two passengers to share the same transport. In this case, platforms are made using data volunteered by the users (i.e., mobile phone or social network usernames). A ride-for-hire company will store a vast amount of data, such as ride history, including the origination and destination that will serve as an input into the company's surge pricing algorithm besides. This will allow quality control, customer satisfaction and improvement of the network through drivers and passengers reviews aggregated into a rating.

[104] Ibid 98. P. 62.

In the retail industry, platforms that connect customers can collect and interpret data in real-time, delivering personalized pricing, promotions and recommendations. Based on the collected data retailers can then optimize their services. The example below shows how the business model has changed.

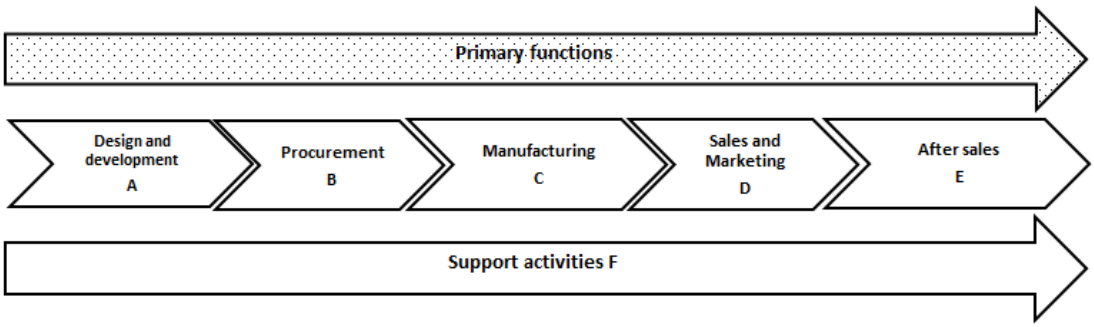


To perform a VCA using this technique, the MNE needs to perform the following steps:

a) Identify the primary functions and the support functions in the global value chain, taking into account the people functions and significant people functions (SPF) contributing to the business of the MNE group.
b) Conduct a detailed functional analysis taking into account the following aspects:

- Functions performed;
- Risks assumed (taking into account the specific industry and the business model);
- Assets used: tangible assets and DEMPE (development, enhancement, maintenance, protection, and exploitation) of intangible.

c) Identify the non-intangibles premium - e.g., group synergies, location savings, etc. - per each primary and support function.
d) Assess the responsibility profile of each group entity and identify where the value is created by each group entity.
e) Based on the outcome of the assessment above, allocate the appropriate profit to the group entities.



	A	B	C	D	E	F
People functions	5%	30%	20%	10%	15%	20%
Significant people function	1	1	2	4		
Risks	High	Medium	High	High	Low	Low
Assets	Tangible assets, technology intangibles		Tangible assets, technology intangibles	Marketing intangibles		
Non-intangible premiums	Assembled workforce	Centralized procurement synergy	Location savings	Market premium/Consumer preference		

Source: Article "How to align the Value Creation Factors on the Rubik's Cube: Techniques to Excel in Value Chain Analysis", TPA Global.

Identifying whether the transactions involve the use of intangibles

With the development of communication technologies, MNEs can more readily use intangibles (such as production technologies and marketing databases) whose usage in the brick-and mortar world was constrained by distance and location between the intangible and the user. Separately, the digital economy has resulted in the development of a new breed of intangibles to specially fit the Internet market place such that there is a blurring of the distinction between transactions involving intangibles and those involving tangibles or services[105]. In the example of the B2B Co discussed previously, it could be noted that:

- The automated technology on the website that enables the collection of vendor information, setting-up of the digital shopfront electronically is in parallel developing an intangible of the user database.

- One group entity could develop applications and software tool-kits as a service to another entity which would commercially exploit the same (by providing the same as a feature of the paid service); however, the intellectual property in the applications would be owned by different entity, such as a dedicated IP-holding company of the Group.

- The collection of user feedback and the provision of technical and market inputs by local teams would also constitute key intangibles contributing to the further improvement of the applications.

- Processes developed by the group for collection, analysis and management of data, development and maintenance of the platform would be disseminated through-out the key entities in the group for use and

[105] Ibid 98. P. 64.

further development; given that all entities contribute and use the processes, no inter-company charges may be levied, even for the reason of difficulty of identification of benefits derived by each entity.

- Access to proprietary data management and analytics platforms could be provided to the technology support and customer support teams.

- Development, enhancement, management and protection of the algorithms underlying the platform would be undertaken by an entity as a service provider under the guidance of another entity, which could potentially also be the entity which funds the activities of the former entity.

- A group entity could be identified as being primarily responsible for development of the brand name / trademark / trade name. Customer contracts and goodwill related intangibles could be owned by a regional headquarter entity or local entities (which would have entered into contracts). Contracts entered into with data aggregators could also contribute value to the supply chain. These intangibles could be developed by different entities but would also be employed by the group to develop global relationships (for example, a customer in Korea could have affiliates in Brazil and the entity which has entered into a contract with the Korean customer could share details of the Korean customer with its Brazilian counterpart).

Thus, while the intangibles of the group as a whole can potentially be identified, it is challenging to identify the specific intangible that is owned by a specific entity. For example, inputs for the development of certain applications could be provided by entities A, B and C in the group, the high level design of the same could be provided by entity D, the low level design, coding, testing could be done by entity E, the standards for the design and development could have been set by entity F, the entire activity would have been funded by entity G, while the legal owner could be entity H, with all of such entities being located around the world. Similar examples can be seen with respect to the other intangibles' dimensions described previously. In addition to the above, given the dispersed nature of the intangible development function, it is a challenge to identify the contribution made by each entity in the development, enhancement, maintenance, protection and exploitation (DEMPE) of the intangible to the overall intangible in the supply chain. This also results in a challenge in identifying the exact nature of the inter-company transaction.

Following the difficulties in functional analysis, the remuneration for each entity is also going to be the next hurdle. In its recent interim report on tax challenge arising from digitalisation, OECD emphasize that the legal ownership of an intangible by an associated enterprise alone does not determine entitlement to returns from the exploitation of this intangible. As such, despite the disperse DEMPE function, the group should run proper functional analysis showing the entity responsible for DEMPE to determine the remuneration for each entity.

In this context, apart from the difficulty involved in identifying the transaction, undertaking its functional analysis and determining the remuneration, the issue is whether the transaction itself involves the transfer or use of intangibles. For instance, where entity A provides software development services (doing most of DEMPE function) that would be used by group entity B, as per the current authorized OECD position that risk follows function[106], the risks and the economic ownership thereof would be required to be allocated to the entity that develops the intangible, i.e., entity A.

Identification of the most appropriate method to determine the arm's length price

[106] Organisation for Economic Cooperation and Development. (2010). 2010 *Report on the Attribution of Profits to Permanent Establishments* (para. 15). Paris. OECD Publishing. Retrieved October 14 2015 from http://www.oecd.org/ctp/transfer-pricing/45689524.pdf

Once the transaction is identified, a functional analysis thereof is undertaken, the next step is to determine the most appropriate method to determine the arm's length price. The traditional ALP methods of comparable uncontrolled price ('CUP'), cost-plus method and resale price method are typically considered to rely heavily on transactional similarity and are viewed as inappropriate to address complex cases including those with intangible property. In this backdrop new methods such as the profit split method and the transactional net profit method were developed. These methods addressed the issue of absence of lack of third-party data or such data not being sufficiently similar to the transactional elements and were regarded as useful to factor out some of these differences. However, it was recognized that these methods dilute the importance accorded to transactional comparability, which was imperative to maintain the sanctity of the arm's length standard[107].

The dynamic business models of the digital economy in light of the factors discussed previously are challenging the appropriateness of these new methods as well, especially since a variety of circumstances can influence operating expenses and net profits. For instance, questions on the appropriateness of the net profit methods when the enterprise is in the early stages of functioning or when there is significant flux in the market (especially given the transient nature of modern technology vis-à-vis the traditional industries, when such issues could have been addressed by way of adjustments such as the capacity utilization adjustment). In March 2019, the EU Joint Transfer Pricing Forum issued a publication on the application of the profit split methods.

In the example described previously of the B2B Co., once the transactions are identified, where the most appropriate method is to be identified, the challenge on application of either of the two profit based methods is as follows: (a) if the profit split method is to be applied, the question is to determine the allocation factors for splitting the residual profit is at the heart of transfer pricing digital business models; (b) if the TNMM is adopted, the question is whether the net profit correctly factors out the differences in products / services involved and / or the functions being performed.

Identify comparables

The concept of establishing comparability is central to the application of the arm's length principle. The objective of comparability analysis is always to seek the highest practicable degree of comparability, recognizing that there will be unique situations (which could be a result of business complexity) and cases involving valuable intangibles where traditional methods cannot reliably be applied alone or exceptionally cannot be applied at all.

In the context of electronic commerce, it becomes more difficult to determine what the transaction actually is, and even more difficult to find out enough about a third-party transaction to conclude that they are comparable. The concern is whether the standard of comparability can be met. The arm's length standard is not likely to permit the application of a traditional method to determine the computer server revenues, based upon profit margins or prices from third party information providers, unless those third parties, like the MNE, also had developed the information database and equally reliable software. Moreover, the comparability of dealings on the internet with those conducted through more traditional technologies may be debatable[108]. In addition to the above, comparable transactions can be hard to discover and trace, particularly those which take place in private networks. The following table suggests a few approaches that could ease the process of identifying and allocating returns to intangibles in the digital economy.

Approach	Criteria for allocation of intangible related returns	Comments

[107] Ibid 98. P. 59.

[108] Ibid 98. P. 63.

A/B/C – categories of assets	Control over certain category of (fixed/intangible) assets, which defines claims on non-intangible premium	• Holistic and very broad approach. • Though it refers to quality criteria, it does not provide precise requirements. Thus, it can be used as a starting point for further analysis. • It can be used for tax policy considerations.
Value chain	Residual profit split where residual is allocated based on functions, risks and assets.	• Comprehensive approach as it includes analysis of all types of company's activities • Practical as it depicts relations between affiliated companies. • Useful as it takes company's conditions into account
Chapter VI of the OECD TPG (determining intangible related profit allocation)	Functions performed and controlled, risks borne and controlled, expenses borne, contractual rights possessed and "people's functions" – meaning sufficient number of properly qualified full-time employees for performing functions	• This approach focuses only on intangible portion of income • It ignores IP law and accounting realities. • The concept of control over risk is not worked out for intangibles.
CCCTB	Three equally-weighted factors: value of assets, number of full-time employees and value of sales	• This approach focuses only on tangible activities such as sales which triggers subsequent problems e.g. how to apply it in case of significant amount of company's intangible assets. • It ignores intangible related premiums • It is unacceptable in modern digital economy where value drivers are IT-platforms and high-value services
IP law infringement cases	15 Georgia-Pacific factors and profit split approaches (Rule of thumb, Nash Bargaining Solution)	• This approach is only suitable for IP law intangibles (not all types of intangibles) such as licenses or patents for which returns constitute royalties or profit splits. Therefore, it is a complementary and corroborative approach. • Though IP law infringement cases are often global disputes, the sufficient amount of case law in public domain exists only in the USA.

Co-relating the 'value assessment' and the arm's length price – The road to the 2019 OECD proposals

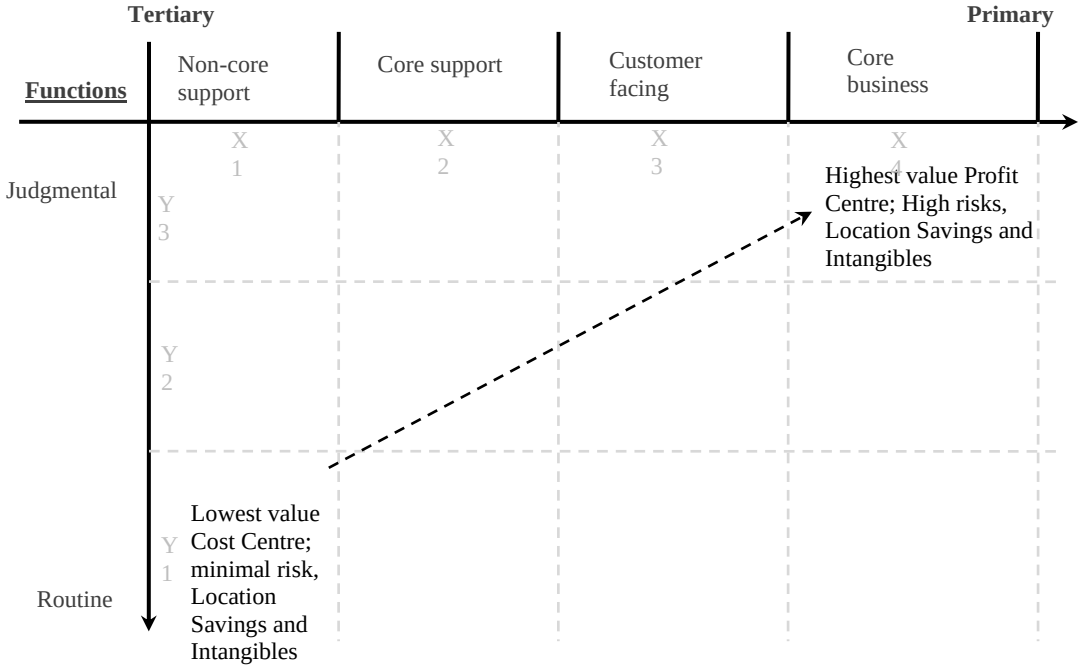
Underlying all of the above steps and the end-result to be achieved is which activities and revenues related to electronic commerce should be taken into account – whether activities that have a remote connection with the electronic commerce activities should share in the profits and what are the revenues that should be included in the profits derived by the MNE group from electronic commerce activities.

The above issues are particularly relevant since a fee calculated on the basis of a separation between the members of an MNE group may not fully reflect the degree of co-operation between those members which is essential in order to produce the profits of the MNE group from its electronic commerce activities. The cooperation and

synergy between the various members of the MNE group may itself produce additional profits – the whole may be greater than the sum of its parts. This raises the question of identifying the profits produced by such synergies and also, once identified, how to attribute them to the various contributors. Similar issues also arise if the effects of co-operation are negative and the whole is less than the sum of its parts.

In this backdrop, in the absence of clear guidance on the application of the arm's length principle to the challenges thrown up by the transactions of the digital economy, source countries are inclined to adopt the global formulary apportionment approach. Since this is regarded as resulting in a highly arbitrary allocation of the tax base, the more appropriate approach would be to focus on value chains and profit split methods[109]. The idea of moving beyond the arm's length principle seems to be supported by the Inclusive Framework (IF) BEPS Project. As in 29 January 2019, The IF is exploring proposals to allocate more taxing rights to market or user jurisdictions, in situations where value may be perceived as being created through user participation and this is not currently recognized in the framework for allocating profits. Such proposals would go beyond the current "arm's length" principle of profit allocation that currently underpin transfer pricing rules. The implementation of the proposal remains to be seen and the further discussion of the proposals in transfer pricing can be seen in the next sub-heading.

The authors believe that the additional dimension in applying the existing methods to the new world is the ability to factor the "cooperation and synergy effect" described above and in earlier chapters referring to the shared economy. In this regard the weightage of the functions performed by the respective group entities could be determined using the value chain framework below:



The above framework could be used to determine whether the role of each entity in the supply chain vis-à-vis the group's supply chain involves (a) non-core support functions; (b) core support functions; (c) customer facing functions; and (d) core business functions. Economically, the non-core support functions entail low value routine

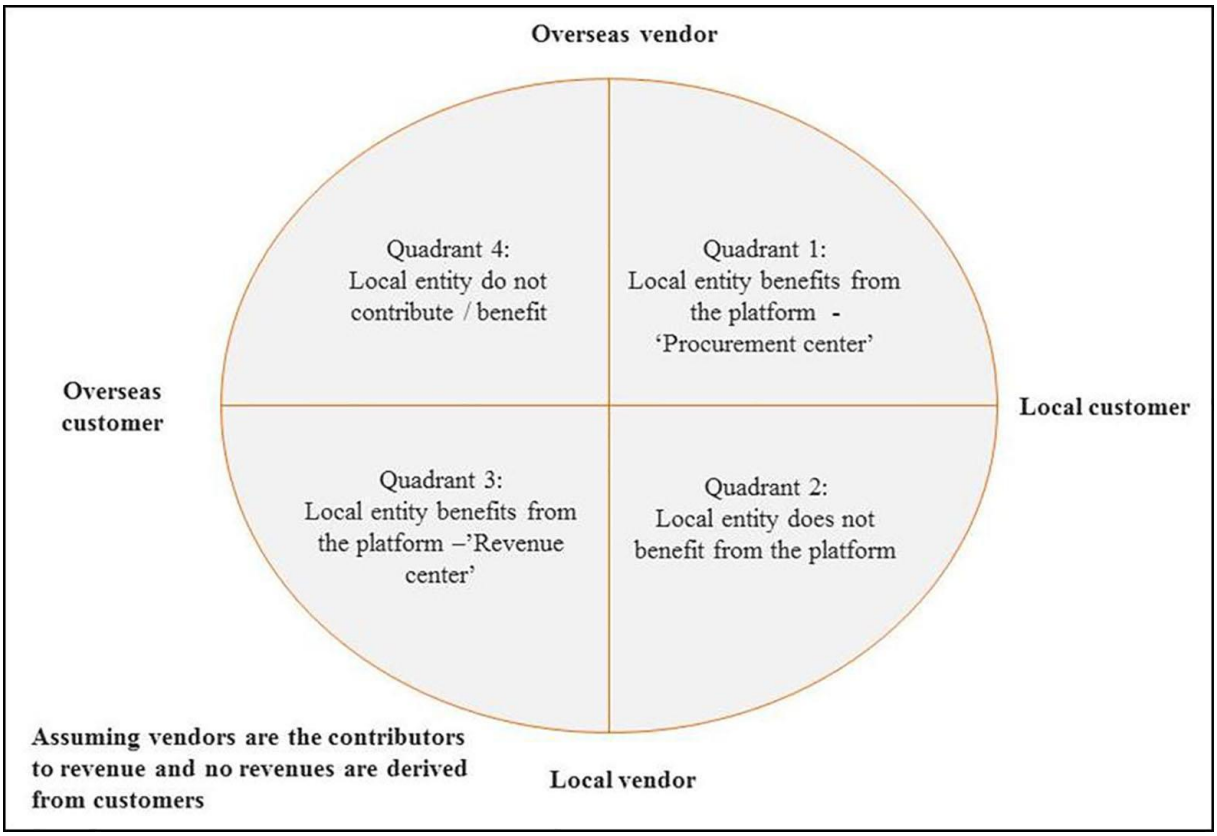
[109] Ibid 20. P. 119.

services and the service provider typically bears minimum risks. The nature of functions and the degree of risk borne by the service provider increases higher up the supply chain, such as when the service provider provides core support services, customer facing services and core business services (such as product / offerings development).

The above could then be supplemented by an analysis of the key variables / contributions to the supply chain, such as a wide user base or a wide vendor base that has strengthened / would sustain the platform.

Here we could consider looking at determining the economic pull underlying the model, whether it is a demand side (pull model) or supply side (push model). For instance, a platform that aggregates inventory of goods from various vendors could be classified as a supply side platform. On the other hand, Google's search offerings are more of a demand side platform which enables Google's customers (namely advertisers) to reach a wide audience. The functions closer to the economic pull effect could be provided a higher relative weightage in the contribution analysis.

Finally, in order to assess the collaboration / synergy / network effect, a quadrant approach could be considered to assess the role of the group entity in the synergy. Illustratively, in the B2B Co case where users and vendors are key contributors to value in the B2B Co value chain, the entities which contribute value to the supply chain should be identified, either by way of number of users (demand side) or number of vendors (supply side) or both. This would potentially be required to be undertaken at the level / jurisdiction of each local entity. For illustrative purposes, an analysis is undertaken below where the B2B Co has an entity in India which contributes a significant number of users and vendors.



Thus, after an initial value chain framework analysis, assuming it is concluded that the Indian entity provides non-routine core support functions (such as brand development and marketing), the Indian entity should be compensated for such activities in light of the arm's length principle.

Following this, the next issue to be determined is the allocation of the combined profit of the group from a particular jurisdiction. This can be achieved by application of the profit split method using the outcome of the quadrant approach above. For this purpose, the relative value of the functions performed by each of the associated enterprises participating in the controlled transactions, taking account of their assets used and risks assumed is to be determined. The determination might be made by comparing the nature and degree of each party's contribution of differing types (for example, provision of services, development expenses incurred, capital invested) and assigning a percentage based upon the relative comparison and external market data. Here the methodology prescribed in the OECD Transfer Pricing Guidelines[110] should be considered. This methodology should factor the results of the quadrant approach as illustrated below.

Assuming that the Indian entity (based on vendor and customer traffic data) fits in Quadrant 3, higher remuneration (i.e., profits derived by the group from the Indian jurisdiction) vis-à-vis other group entities should be provided to the Indian entity for the value contributed to it to the group (i.e., through increased vendors who are the sources of revenue for the group). On the other hand, assuming that the Indian entity fits in Quadrant 1, a charge should be levied on the Indian entity.

In this context, it should be noted that users / customers provide important value to the supply chain. As such, the determination of a charge from / to the Indian entity should be determined based on whether the B2B Co is a demand side platform or a supply side platform. Where the same is a demand side platform, users would play an important role and the Indian entity, if fitting in Quadrant 1, should be compensated while the converse would apply if it were to fit in Quadrant 3. The remuneration should also factor the impact of shared functions, shared contributions and multiple value centres sharing inputs with group entities. To present an illustration, a Dutch regional headquarter provides inputs to the Indian entity of the B2B group on how to market the product offerings of the B2B Co group.

To present another illustration, Company A acting as a platform for authors to publish their academic work digitally, poses challenges for pricing that platform from a transfer pricing perspective. A company acts as an open access platform which provides the content for free to users but charges the authors and owners of the work a set fee for publication. In such a case, three approaches could be presented to allocate the value to the platform, namely:

1. Cost Plus return to the platform based on the calculation of operating expenses (OPEX);
2. Payment of royalty to the platform since it provides a subscription/license to use which can be classified as an IP; and
3. Return based on an enhanced allocation key which allocates returns based on the size and volume of the data downloaded.

Option 3 could be related to the 'benefit theory' as described above in the new nexus approach for PE and could be the fairest way to allocate returns to the business platforms. However, such allocation is highly complex and requires detailed analysis of all downloads made from that platform.

[110] Organisation for Economic Cooperation and Development. (2010). *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations* (P. 100-103). Paris. OECD Publishing. Retrieved October 14 2015 from http://www.keepeek.com/Digital-Asset-Management/oecd/taxation/oecd-transfer-pricing-guidelines-for-multinational-enterprises-and-tax-administrations-2010_tpg-2010-en#page1

While the above approach is indeed complex, the same does tend to reduce the arbitrariness that could otherwise prevail in alternate approaches such as global formulary apportionment approach. The same also does entail greater compliance burdens for digital businesses. However, with all such businesses today being armed with sophisticated data analytics tools, gathering the data for the price determination as explained previously should not be construed as cumbersome. While there could be fears that developing economies such as China and India who are known to contribute significantly to user bases for global digital businesses could claim an excessive share of the tax base from cross-border transactions, the approach suggested above would certainly enable taxpayers to determine the reasonableness / arbitrariness of the approach of the respective tax authorities.

The digital economy poses challenges to the application of the arm's length principle. The need of the ALP concept is to preserve its integrity, since it is still the most effective means for dealing with transfer pricing.

Go beyond the arm's length price under new 2019 OECD approach

As explained previously, OECD recently issued three proposals on digital economy to address the allocation profit for digital business activity in the market jurisdiction. Even though the proposal claimed that the proposals underlie the concept of value creation and the existing arm's length principle in transfer pricing, however the details show otherwise. The following details explain how the proposals deviate from the arm's length principle followed by the associate consequences to the extent the proposals are implemented:

User participation

- The value created by user activities can be determined on the assumption participation of users would attract a non-routine or residual profit split;
- The reallocation of the non-routine profits of the business could rely on formulas that would approximate the value of the users, and the users of each country to a business. The difficulties on how to use the approximate value of the users may arise as it may lead to different values per countries;
- The proposal differs from the current arm's length principle as the non-routine profits allocated on the basis of active-user contribution regardless of the absence of risk assumed by the users.

Marketing intangible

- The proposal would modify existing rules, i.e. to allocate marketing intangibles and risks associated with such intangibles to be allocated to the market jurisdiction;
- The allocation of the non-routine function could be determined by calculating the delta between marketing intangibles allocated based on current rules on the basis of Development, Enhancement, Maintenance, Protection, and Exploitation (DEMPE) versus 100% or less of the marketing intangibles allocated to the market jurisdiction;
- This proposal deviates from the arm's length principle as the residual profit applies to marketing intangibles.

Significant economic presence (SEP)

- A taxable presence in a jurisdiction would originate when a non-resident enterprise has a significant economic presence on the basis of factors that show a purposeful and sustained interaction with the jurisdiction via digital technology (i.e. number of users, volume of digital content, billing in local currency, maintenance of a website in a local language, responsibility for the final delivery of goods to customers, or sustained marketing and sales promotion activities);
- This proposal may require an explicit deviation from the arm's length principle as existing profit allocation rules would be unable to allocate meaningful profit to a SEP permanent establishment.

The OECD explained in more detail how the principles of taxation will have to be adapted to satisfy both the OECD members as well as the inclusive members to the BEPS project in their latest work program which is released on 31 May 2019.[111] According to OECD the profit could be allocated using the following methods among the market jurisdictions entitled to tax under the new taxing right.

- The modified residual profit split method (MRPS) aims to allocate part of the non-routine profit of a group to relevant market jurisdictions by using allocation key. This method is similar to the current profit split method but instead of allocating all non-routine profit to the location of DEMPE function, MRPS will allocate part of such profit to the market jurisdiction. The distinction between routine and non-routine requires a simplified and fast transfer pricing dispute resolution as the computation routine and non-routine profit would be different between one and another jurisdiction.
- Different from MRPS, the fractional apportionment method does not differentiate between routine and non-routine profit to determine the allocation of profit subject to the new taxing right. The overall profitability of the group would be split based on the key allocation such as employees, assets, sales and users. The issues of this method include the way to coordinate the effect of the fractional apportionment method and the current transfer pricing system, without giving rise to double taxation or double non-taxation. This would include, for example, rules related to how the burden of the new taxing right might be shared with other entities in the MNE group where the profits of a non-resident entity take into account the overall profitability of the group.
- The distribution-based approach seeks to determine the" new taxing right" in a simple and administrative manner. No distinction is made between routine and non-routine profits. Also, the profits allocated are not linked to a total amount of profits for a certain activity that has been identified. One option for this approach would be to assert a baseline profitability for the market jurisdiction, possibly increasing (note: not decreasing) based on the group's overall profitability or other variables to reflect market and industry specificities.

The methods raised issues on whether the new taxing right would replace or be a floor for the current transfer pricing rules, how such adjusted profits could be applied when the group has no presence in the specific jurisdiction and whether remote activities should be allocated a lower return than locally-based marketing and distribution activities.

The application of all three of these methods would lead to a deviation from the arm's-length principle. The selected method would only apply to the profits in scope for re-allocation, however OECD does not define which profits would be in scope for such re-allocation and thus it may cause the dispute between the taxpayer and market jurisdictions. Further, as traditional method would be retained to remunerate routine profit, it raises question on the interaction between the different rules applicable to these two pools of profits (routine and non-routine profit).

The OECD will be discussing these "new taxing rights" during 2020.

Consequences

The aforementioned proposals will lead to the following consequences:

[111] Organisation for Economic Cooperation and Development. (2019). Program of Work to Develop a Consensus Solution To The Tax Challenges Arising From The DIgitalisation of Economy. France. OECD. Retrieved from https://www.oecd.org/tax/beps/programme-of-work-to-develop-a-consensus-solution-to-the-tax-challenges-arising-from-the-digitalisation-of-the-economy.pdf

1. The proposals lower the threshold of permanent establishments, as physical presence is no longer needed to justify the taxing right of the jurisdiction;
2. The transaction-by-transaction approach as set out in the current guidelines phases out, since OECD proposals initiate to tax the MNE group on a consolidated basis by endorsing the use of fractional apportionment approach and residual profit split approaches to allocate the profit; and
3. A result could be that quantitative Value Chain Analysis and/or Profit split based on fixed formulas (i.e. Common Consolidated Corporate Base) are taking over.

Taking into account the proposals' deviation on arm's length principle and its consequences, what do you think of the proposals at first glance? Here are the first responses by the authors:

1. As the whole economy is digitalizing, it is not possible to segregate the digital business;
2. The proposals imposing tax on revenue rather than on profit seems unfair in situation with losses; and
3. Through the use of conflicting tax policy, double/triple/quadruple taxation may arise with no adequate resolution of multiple levels of taxation.

6. Legal and Policy Considerations related to the digital economy

This chapter focuses on identifying and analysing the legal issues associated with the digital economy business models. The existing rules and regulations were codified, both at the national and supranational level, at a time when digitalisation, as we know it now, was an unforeseeable reality; this is why they seem inept to accommodate the concerns arising with the upcoming business model configurations.

This chapter, at first, glances at the legal issues that are surfacing in light of digitalisation; it then analyses the policy objectives which the policy makers need to consider while designing rules applicable to businesses operating in a digital environment; and finally assesses the policies/initiatives coming in force in selected geographic regions and their impact on the future of innovation and, consequently, digitalisation.

6.1 Privacy

The concept of "privacy" is a symbol of the growing gap between the on-going changes in our environment and our capability to understand and integrate them. The seamless connection of citizens' on- and off-line lives is an increasingly important issue facing our society. Privacy has become an important concern especially in light of digitalisation with people declaring that too much surveillance, especially in the form of wearable cameras and computers, is detrimental and leaves individuals without any privacy. In May 2018, the General Data Protection Regulation (GDPR)[112] was introduced set of data protection rules for all companies operating in the EU, wherever they are based. Regulation (EU) 2016/6791, the European Union's ('EU') new General Data Protection Regulation ('GDPR'), regulates the processing by an individual, a company or an organization of personal data relating to individuals in the EU.
The rules do not apply to data processed by an individual for purely personal reasons or for activities carried out in one's home, provided there is no connection to a professional or commercial activity. When an individual uses personal data outside the personal sphere, for socio-cultural or financial activities, for example, then the data protection law has to be respected.
The GDPR reshaped the way in which sectors manage data, as well as redefines the roles for key leaders in businesses, from CIOs to CMOs. CIOs must ensure that they have watertight consent management processes in

[112] Regulation (EU) 2016/679

place, whilst CMOs require effective data rights management systems to ensure they don't lose their most valuable asset – data.[113]
The most notable changes adopted by the GDPR are:

a) Increased Territorial Scope (extraterritorial applicability)

Arguably the biggest change to the regulatory landscape of data privacy comes with the extended jurisdiction of the GDPR, as it applies to all companies processing the personal data of data subjects residing in the Union, regardless of the company's location. Previously, territorial applicability of the directive was ambiguous and referred to data process 'in context of an establishment'.

b) Penalties

Organizations in breach of GDPR can be fined up to 4% of annual global turnover or €20 Million (whichever is greater). This is the maximum fine that can be imposed for the most serious infringements e.g. not having sufficient customer consent to process data or violating the core of Privacy by Design concepts. There is a tiered approach to fines e.g. a company can be fined 2% for not having their records in order (article 28), not notifying the supervising authority and data subject about a breach or not conducting impact assessment. It is important to note that these rules apply to both controllers and processors – meaning 'clouds' are not exempt from GDPR enforcement.

c) Consent

The conditions for consent have been strengthened, and companies are no longer able to use long illegible terms and conditions full of legalese. The request for consent must be given in an intelligible and easily accessible form, with the purpose for data processing attached to that consent. Consent must be clear and distinguishable from other matters and provided in an intelligible and easily accessible form, using clear and plain language. It must be as easy to withdraw consent as it is to give it.

The rights for data subjects are also now provided under the new regulation:

a) Data breach

Under the GDPR, breach notifications are now mandatory in all member states where a data breach is likely to "result in a risk for the rights and freedoms of individuals". This must be done within 72 hours of first having become aware of the breach. Data processors are also required to notify their customers, the controllers, "without undue delay" after first becoming aware of a data breach.

b) Right to Access

Part of the expanded rights of data subjects outlined by the GDPR is the right for data subjects to obtain confirmation from the data controller as to whether or not personal data concerning them is being processed, where and for what purpose. Further, the controller shall provide a copy of the personal data, free of charge, in an electronic format. This change is a dramatic shift to data transparency and empowerment of data subjects.

c) Right to be forgotten

Also known as Data Erasure, the right to be forgotten entitles the data subject to have the data controller erase his/her personal data, cease further dissemination of the data, and potentially have third parties halt processing of the data. The conditions for erasure, as outlined in article 17, include the data no longer being relevant to original purposes for processing, or a data subject withdrawing consent. It should also be noted that this right requires controllers to compare the subjects' rights to "the public interest in the availability of the data" when considering such requests.

[113] EU GDPR

d) Data portability

GDPR introduces data portability – the right for a data subject to receive the personal data concerning them – which they have previously provided in a 'commonly use and machine-readable format' and have the right to transmit that data to another controller.

e) Privacy by design

Privacy by design as a concept has existed for years, but it is only just becoming part of a legal requirement with the GDPR. At its core, privacy by design calls for the inclusion of data protection from the onset of the designing of systems, rather than an addition. More specifically, 'The controller shall… implement appropriate technical and organizational measures… in an effective way… in order to meet the requirements of this Regulation and protect the rights of data subjects'. Article 23 calls for controllers to hold and process only the data absolutely necessary for the completion of its duties (data minimization), as well as limiting the access to personal data to those needing to act out the processing.

The approaches adopted by different countries around the globe are, however, not necessarily in line with the recommendation contained in the aforementioned report of the EU (which considers that collection of personal information from individuals could ultimately be beneficial to the individuals themselves). In the U.S., for example, many web browsers let users enable a 'Do Not Track' option that tells advertisers not to set the cookies through which those advertisers track their web use.

One approach to tackle this challenge could be to treat individuals' personal data as their intellectual property. The big data referred to earlier is essentially a database of personal information of various users which enables companies to identify upcoming trends relating to their products and services. Such databases which add value to the business of a company could be labelled as intellectual property but then the question arises as to whose intellectual property it is. Does that database comprise the intellectual property of the individuals whose data has been collected or does the company collecting the information have IP rights over it? Since, it appears that this data collection is to be an important factor in innovation in the digital sector, the answer to the question of ownership could lead us to defining the privacy laws across the globe in a more efficient manner.

6.2 Competition Law/Anti-trust

The fast developments in the digital economy challenge existing policy frameworks. This includes competition policy, but also policies with respect to consumer protection, privacy, taxation, and intellectual property rights. While current policies are being challenged, the public values they primarily aim to preserve may be at stake. In addition, these fast developments may result in competition problems.

The European Commission recently charged Google with anti-competitive practices on account of favouring results from its own specialist search engine, Google Shopping, over competitors like Amazon and eBay. Given Google's large market share in the search engine market, the Directorate-General for Competition, headed by Margrethe Vestager, believes that such preferential treatment has an adverse impact on competition and consumer well-being. However, the question to be considered here is whether the actions of Google are actually undermining competition online?

Uber also was under investigation by the European Court of Justice, after lawyers for Barcelona's Asociación Profesional Elite Taxi claimed that Uber was directly involved in carrying passengers. EU rules on the freedom to provide services expressly exclude transport. The tech giant had denied it was a transport company, arguing instead it was a computer services business with operations that should be subject to an EU directive governing e-commerce and prohibiting restrictions on the establishment of such organizations. The ECJ ruled in Luxembourg that Uber is in fact a transport services company and requires it to accept stricter regulations and licensing within the EU as a taxi operator. The decision will apply across the whole EU, including the UK. Raising the same

question as before (whether the actions of Uber are actually undermining competition), in this case, it would qualify as disrupting competition among the transportation services.
A third and last case to mention is the one of Airbnb disrupting the real estate market around the world, compelling hotel owners to consider invoking anti-competitive measures against them. The last development of this matter is Airbnb welcoming the European Commission's paper on Collaborative Short-term Accommodation Services as a balanced set of principles and recommendations to support the sustainable growth of home sharing and short-term rentals in Europe - for governments, industry, and the European citizens who benefit from it.

The test for any antitrust investigation must be whether competition, not individual competitors, is being harmed. And by any available measure, competition and specialisation in online search services is thriving. New players focusing on specific market niches, from SkyScanner for flights to DuckDuckGo for greater privacy, have emerged in recent years.

Competition authorities and policy makers should focus on preventing the creation of entry barriers, facilitate entry into markets, and foster innovation. Competition authorities should have a cautious attitude towards actual competition problems and to rely on the self-correcting powers of the market, provided that certain public values such as taxation, privacy and security are protected by appropriate (other) policy frameworks.

6.3 Neutrality of the internet

The Net Neutrality debate has recently come to the forefront of Internet governance discussions and as with any Internet-related discussion, this one may have considerable global consequences as well. The Net Neutrality debate is particularly important for developing countries, for several reasons:

1. Rising or prohibitive costs of Internet access, caused by a multi-tiered Internet, could slow the implementation of universal access.
2. The probability of subtle manipulation of unseen technical factors such as speed can affect information flow, prioritizing some information over others, in hidden, almost subliminal layers.
3. Voice over Internet Protocol (VoIP) and other innovative applications offering new technologies at accessible costs have immediate applications for improving services that will directly help bridge the digital divide as they improve communications. The establishment of such services in developing countries can be severely limited if Net Neutrality is not explicitly protected in these countries and around the world.

Several telecoms companies are expressing increasing frustration over the mechanics of how the internet works.[114] They feel they undertake the hard work of laying the physical infrastructure but are being left out of the digital gold rush that has built the fortunes of companies such as Google. In the analogy of one telecoms executive, they have carried the cost of building the roads so need to see some return on their investment. In the meantime, the "carmakers" want the network to be free.

Some telecoms companies are seeking the right to charge highly profitable content providers in return for guarantees the infrastructure will work smoothly. Many western politicians and internet activists are hostile to the idea of charges, viewing it as a "tax" on the internet. The implicit threat is that telecoms companies could slow down websites, raising the prospect of second-class citizens in the new digital world.

In 2017, the FCC in the US voted to repeal the 2015 net neutrality regulations, meaning that today there are no rules that prevent broadband providers from slowing or blocking the citizens' access to the internet. The reasoning

[114] Thomas, D., Waters, R., & Fontanella-Khan, J. (2012, August 27). The internet: Command and control. Retrieved October 14, 2015, from http://www.ft.com/intl/cms/s/2/fab58818-e63a-11e1-ac5f-00144feab49a.html

behind the repeal was to boost broadband industry investment, create new job opportunities and drive broadband into underserved areas at an unprecedented rate. The base of the repeal was to revamp a decades-old regulatory clause under which internet service providers (ISPs) have been ruled telecommunications companies and subject to the same regulations that other telecommunication companies — classified as utilities — must abide by. Seeing as internet qualifies as a telecommunication and not as data transfer, raises concern on whether delivering is still an obligation or can people "squeeze" a broadband connection in small location?

6.4 Internet Governance

Internet governance is the development and application of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet. The concept of net neutrality is a segment of the overall internet governance. On March 23, 2018, the World Summit on the Information Society (WSIS) Forum 2018, established ICTs as the means of accomplishing Sustainable Development Goals, making them a critical driver of global development. The outcomes of the summit on internet governance were related to debates on monetization of data and trade related issues.

"Data is the new oil. Nobody would give away their oil for free. So why data should be given away in exchange for services whose value is much lower than the value of the data?," says Richard Hill from the Association for Proper Internet Governance. There is a clear need for a global data protection regime, and for global action to maintain competition in Internet services at the international level.

6.5 IP law issues

The rapid growth of the digital economy, enabled by broadband penetration, and coupled with increases in computing power and storage, creates global markets for content and rights holders. But it also creates a threat that — without adequate controls — piracy will damage the creative industries. Intellectual property rights provide the foundation upon which innovation is shared, creativity encouraged and consumer trust reinforced. But the digital world poses a new challenge — how to manage the balance when the consumer is the creator, when the marginal cost of copying is zero, when enforcement of existing law is extremely difficult, and when "free" access to information and content is considered by many to be a right.

Another issue in the field of IP law is the rapid growth in the volume of patent applications, which is creating patent "thickets".[115] These occur where interrelated and overlapping patents result in a lack of clarity of who owns the patent and, as a consequence, where to go for the licence. The technology sector has become increasingly litigious, which becomes a problem when it stifles innovation or acts as a barrier to new market entrants.

The growth of social networking sites which are widely used for publishing and sharing user-generated content create multiple opportunities for users to post copyrighted material, whether inadvertently or intentionally.
Endemic levels of piracy on the Internet are placing significant pressures on existing business models, legal frameworks and regulatory environments but varying approaches are being seen in different countries which are all at different levels of development and are motivated by different factors. This has led to a global patchwork of inconsistent regulations which are inept to deal with the greater issue of the digital economy.

Some sectors of IP laws also merge with other legal aspects such as protection of trade secrets. A trade secret is a formula, practice, process, design, instrument, pattern, commercial method, or compilation

[115]. Hall, B., Helmers, C., Graevenitz, G., Rosazza-Bondibene, C. (2012) A Study of Patent Thickets. National Institute of Economic and Social Research. Retrieved from http://eml.berkeley.edu//~bhhall/papers/HHvGR_ Patent_Thickets_ FIN_29Oct12.pdf

of information which is not generally known or reasonably ascertainable by others, and by which a business can obtain an economic advantage over competitors or customers. Trade secrets are an important, but an invisible component of a company's intellectual property.

An example can be seen in the painstaking efforts Coca Cola has undertaken to protect its recipe. The protection of trade secret becomes even more important in the digital economy. The digital information age has changed the dynamics of trade secret theft. Theft of proprietary information is no longer only physical misappropriation, but now may include hundreds of files downloaded onto a flash drive or sent around the world instantaneously. The current patchwork of laws is simply not enough to combat organized trade secret theft. All other forms of intellectual property – patents, copyrights, and trademarks – are afforded a civil cause of action in local laws. It is time we confer trade secrets with a similar level of protection to substantially mitigate the billions of dollars lost annually through theft of our intellectual property.

With the OECD's report on 'Data Driven Innovation for Growth and Well Being' highlighting the importance of big data (which in itself could be considered as an IP) in today's digital world, an overhaul of existing IP laws becomes essential. Currently, most jurisdictions have local IP laws but they have not been able to appropriately deal with the impact of digitalisation. An example can be seen in the European E-Commerce Directive which states that an Internet Service Provider that only provides the technical facilities for the transmission of information to other people without being involved in the content of the information shall be liable only if he does not take appropriate measures to terminate the infringement after being informed of such infringement. Such laws, however, do not adequately represent the issues posed by the latest business configurations of the digital businesses.

In 2018, the European Directive on Copyright in the Digital Single Market was introduced as an update to EU copyright rules which were frozen in time since 2001. Article 11, the so-called "link tax" intends to give publishers the right to ask for money through paid licenses when companies link to their stories. One could point out that the obvious target here are companies like Google News, who massively distribute press releases. Critics, however, worry that Article 11 will have broader applications. Article 13, the so-called "upload filter" reads that online platforms are liable for content uploaded by users that infringes copyright; "storing and giving access to large amounts of works and other subject-matter uploaded by their users are liable for copyright infringement committed by users." In short, the new directive aims to block the supremacy of big tech giants while protecting the privacy of citizens at the same time. In March 2019 the EU parliament voted for the Copyright Directive, the results of the final vote were 348 in favour vs 274 against, meaning that the reform of online copyright rules has been accepted.

6.6 Cyber Terrorism

Cyberterrorism is the act of Internet terrorism in terrorist activities, including acts of deliberate, large-scale disruption of computer networks, especially of personal computers attached to the Internet, by the means of tools such as computer viruses. It is a fast-growing area of crime with more and more criminals exploiting the speed, convenience and anonymity of the Internet to commit a diverse range of criminal activities that know no borders, either physical or virtual.

These crimes can be divided into two broad areas:

- **Attacks against computer hardware and software**, for example, botnets, malware and network intrusion;
- **Financial crimes and corruption**, such as online fraud, penetration of online financial services and phishing.

Cyber terrorism is also becoming a realistic threat in this digital age of hyper-connectivity. The Internet remains an uncharted, fast-evolving territory. Current generations are able to communicate and share information

instantaneously and at a scale larger than ever before. Social media increasingly allows information to spread around the world at breakneck speed. While the benefits of this are obvious and well documented, our hyper-connected world could also enable the rapid viral spread of information that is either intentionally or unintentionally misleading or provocative, with serious consequences.

With companies such as Ziggo (with its quad play venture) and Comcast (with its now failed merger with Time Warner and Charter Communications) trying to gain a stronghold over all components of the internet such as broadband internet, digital TV, fixed telephone lines and mobile internet leads to yet another potential threat from hyper-connectivity. With these deals going through, such companies will be controlling the central dashboard of all internet-based platforms. This unquestioned control over all things digital will not only lead to unfair competition but also poses a serious threat of cybercrime.

Some of the attacks of cyber terrorism have been alleged to be backed by governments with an intention not just to disrupt but destroy massive collections of data, which is the fuel for today's digital economy. An example in this regard was seen in March 2013 when American Express customers trying to gain access to their online accounts were met with blank screens or an ominous ancient type face. The company confirmed that its Web site had come under attack. The assault, which took American Express offline for two hours, was merely one of such attacks in an intensifying campaign of unusually powerful attacks on American financial institutions that began in 2013 and has taken dozens of them offline intermittently, costing millions of dollars. Similarly, a separate, aggressive attack incapacitated 32,000 computers at South Korea's banks and television networks.

Another type of attack of cyber terrorism is carried out by allegedly-activist groups who pose themselves as revealing truths hiding behind the closed walls of digital security. Hacktivist groups such as Anonymous undertake protests and commit computer crimes as a collective unit. Anonymous does not have a leader or a controlling party, but instead relies on the collective power of individual participants. Its members utilize the Internet to communicate, advertise, and coordinate their actions. An example portraying this situation is that of the WikiLeaks scandal where Julian Assange hacked into the computer systems at places like the Defense Department and the Los Alamos nuclear weapons facility. Since 2007, his website has published formerly secret documents ranging from Scientology manuals to Sarah Palin's hacked E-mails to the so-called Climategate memos to classified military videos from Baghdad. The biggest concern is that there is no official WikiLeaks headquarters, no office for the FBI to raid, nothing to seize. It exists on a large number of computer servers all around the world and has hundreds of domain names. So, you could attack one WikiLeaks website but not shut them all down.

In order to effectively address this issue of cybercrime, governments have to come together to tackle it jointly because of the vast nature of the internet, this issue is not limited to a single jurisdiction. To address the mounting skills gap that is evident between government and cybercriminals, a new cadre of technologically savvy analysts is needed to press the case for deeper understanding of today's challenges and tomorrow's looming surprises. This cadre should not be made up of primarily technical people, but rather should be representative of a mix of disciplines to help keep minds open to the possibilities of strategic surprise and to help alert those in power in government and in the corporate boardroom.

6.7 Policy challenges

With multiple initiatives being taken at the supranational level (i.e. by the OECD/UN etc.), there still exists confusion in dealing with issues that have been given birth to by digitalization. This has led to varying approaches being adopted by different countries in their treatment of individuals and businesses associated with the digital economy; some favouring innovation while others clearly curbing it.

The main questions that need to be considered by these policy makers while designing regulations to govern this digitally dependent world are:

1. Does digital economy stimulate a country's innovation?
2. Does digital economy hurt existing businesses in a country?
3. How flexible are a country's tax and other laws in promoting and not restricting digital economy growth?
4. How does a government actively promote its large MNEs and start-ups?
5. How much strategic disruption a local economy can absorb i.e. at what pace can existing business configurations be restyled to digital economy-based business configurations?
6. How to protect its citizens through proper and timely implementation of regulations such as privacy laws?

The answers to these questions are important in determining a country's view on designing policies that not only protect its citizens but also boost its economic growth (which, in this era of digitalisation, is strongly correlated to digital/innovative growth). The sections below showcase the conflict of interest that has motivated different countries to deal with the problem of digitalisation uncooperatively.

6.7.1 North America

In 2018, the Donald Trump administration has withdrawn net neutrality protection. This was executed at the proposal of the Federal Communications Commission chairman Ajit Pai. The Trump administration rules were a win for providers like Comcast Corp, AT&T Inc and Verizon Communications Inc, but the net neutrality repeal was opposed by internet companies like Facebook Inc, Amazon.com Inc and Alphabet Inc.

These developments pose a slight contradiction to the view adopted by the USA. On the one hand the government portrays its support for monopolies as evidenced by the appointment of Lawrence Summers as the director of the National Economic Council (who is an adamant lobbyist for the cable and the wireless industry) and on the other hand the enactment of the net neutrality rules allows for furthering competition in this sector more than ever. Hence, it is hereby concluded that the focus in the North American region, dominated by the United States of America, is on competition and innovation which could lead to a fall in monopolies.

6.7.2 South America

In Latin America 92% of business leaders want to see updated tax rules for a modern, digital economy.[116] Almost three-fourths of Latin America's Internet users come from just four countries: Argentina, Brazil, Colombia, and Mexico. One of the cornerstones of Internet policy is net neutrality—a concept for which several countries in Latin America are acting as leaders. Chile and Peru were among the first countries in the world to ban arbitrary Internet blocks and speed limits, a model then emulated in several European countries. In 2010, Chile passed the first net neutrality law in the world, explicitly prohibiting Internet service providers (ISPs) from blocking, interfering with, and discriminating against any Internet users. And in 2014, Brazil passed its Marco Civil, a civil rights framework for the Internet, which seeks to legislate upon the nexus between net neutrality and cybersecurity.

The region has made great strides in terms of Internet policy, innovation, and technological penetration. But there's still much to be desired. Despite progress in expanding Internet penetration, Latin America suffers from what the World Bank has called an "innovation gap." On average, the region's entrepreneurs introduce new products less frequently, invest less in research and development, and hold fewer patents than their counterparts in other parts of the world.

Another concern in this region is the levy of local taxes on streaming content such as through Netflix, Spotify, iTunes music etc., which is bound to curb innovation. Although this is a move backed by public interest in

[116] Labelle, E. (2014, September 15). Tax planning: Businesses calling for global agreement. Retrieved October 14, 2015, from http://www.rcgt.com/en/news/global-business-survey-businesses-global-agreement-tax-planning/

generating more revenue for the country and ensuring that these digital providers are taxed at the same level as local cable operators but in light of the rapid growth of digitalisation, imposing a heavier burden of tax on the digital economy in this region will invariably lead to fall in the level of innovation. One such example can be seen in Brazil with the imposition of local taxes[117] on streaming content through Netflix, Spotify and iTunes. With mixed views being expressed by the governments in this region, the future of the digital economy in the Latin American countries rests in uncertainty.

6.7.3 Europe

Similar to the approach adopted by the USA, in 2017 the European Commission, the EU executive, abolished roaming charges for all the Member States, an ambitious overhaul of the continent's telecoms market. The European Commission has been working since 2007 to end roaming charges in the European Union. The Eurotariff capped prices for the whole EU as a first step. The tariffs were then gradually reduced and roaming charges were completely eliminated. As of 15 June 2017, people pay national prices for calls, SMS and surfing while travelling to other EU countries.

(Image obtained from EU Commission)

Another example of holding on to the traditional models of conducting business can be seen in the opposition to concepts such as Uber by multiple European countries such as France, UK, and Netherlands etc. on the grounds of protecting the interests of national taxi businesses.

Falling in the same category is the example of opposition from Germany of the privacy standards applied by Facebook. Under the currently underway trade partnership between EU and the USA (Transatlantic Trade and Investment Partnership) the aim is to remove regulatory barriers and standardise rules so that companies can access each other's market more easily. This will mean that Facebook will be able to operate in the German market without having to comply with strict privacy rules of Germany, which has led to strong opposition of the concept of this trade partnership.

Most recently, with the news of Google paying GBP 130 million in back taxes in the UK has spurred a debate on whether US multinational pay enough tax on their overseas earnings anywhere in the world. [118] France and Italy are reinterpreting their laws to make US multinationals pay more tax before local profits escape to Ireland and then, via the Netherlands, to Bermuda. These will surely fracture over EU cases against Apple and Amazon since the

[117] International Intellectual Property Alliance. (2015) *Brazil- Report On Copyright Protection And Enforcement. Brazil.* IIPA Publishing. Retrieved from http://www.iipa.com/rbc/2015/2015SPEC301BRAZIL.pdf.

[118] Gapper, J. (2016, January 27). Alphabet and Apple spell global tax war. *Financial Times*. Retrieved February 02, 2016, from http://www.ft.com/cms/s/0/7414a126-c41d-11e5-b3b1-7b2481276e45.html#axzz3zCIyLFKy

US has facilitated their cash came home end of 2017 to be taxed. The EU seems to be strengthening its tax laws to tax, especially, the overseas earnings of US-based multinationals, which being subjected to America's dysfunctional tax laws, have stretched rules to the point where the result appals taxpayers. They have done so with the acquiescence of offshore havens and countries such as Ireland and Luxembourg. With support from the OECD's BEPS project and similar reforms in Asia-Pacific, EU has decided to, in stark contrast form the US, tighten its tax laws and the multinationals such as Apple, Amazon and Alphabet will be forced to embrace a tax liability in the European region.

6.7.4 Asia

The digital economy sector in the Asian region is still in its developmental phase where the focus is on increasing access than regulating it. However, many countries have started initiating policies to that effect while others are still contemplating. Since, the development is still in its nascent phase, there are differing approaches that can be seen across countries, with each focussing on its own national interest. China and India will soon have more people online than Europe and America have citizens. Neither Asian country has yet passed formal national legislation, but both are considering it—with every indication that their new laws will outdo even Europe in their severity.

India is showing promising developments in the area of technology, e-commerce and overall growth. Data shows that in 2018, India has the third largest economy in the world with USD 10,340 Bn in GDP (in PPP) having a growth rate of 6,6% compared to 1991 when it showed 5,3% and is expected to rise to a 7,4% in 2019. In terms of data protection, the long-awaited Personal Data Protection Bill 2018 is likely to be introduced in the Indian Parliament in June 2019 after general elections get over, as per a leading daily. The proposed Data Protection Bill 2018 puts individual consent imperative to data sharing. The bill asserts the right to privacy is a fundamental right and unless the users have given their explicit consent, their personal data will not be shared or processed. The bill's mandate on data localisation is one of the most awaited and watched provisions by tech companies in abroad.[119]

The panel on data protection which prepared its report and the drafted bill, recommended that a copy of all personal data must be stored in India, while all information of a critical nature is kept at the local level.
In China, the Cyber Security Law came into effect on 1 June 2017 and for the first time it included a comprehensive set of data protection provisions in the form of national-level legislation. The law is of general application to personal data collected over information networks. Numerous regulations, guidelines and other subsidiary measures remained to be adopted under the umbrella of the law when it came into effect. Drafts of many of these have now been published, and the entire package, including the controversial provisions affecting transfers of certain data, including personal data, out of China are expected to be brought into force in 2019.

In Australia, the government has been more forward in proposing legislations covering the digital economy trade. It has issued a draft proposal[120] for applying GST on digital economy transactions and has also adopted a provision similar in nature to the Diverted Profits Tax adopted by the UK which imposes a tax on companies engaging in business with Australia even without having a physical presence in Australia.

6.7.5 Africa

Ecommerce is at the epicentre of Africa's thriving economy. With internet penetration rapidly spreading across the region, this represents huge potential which has hitherto been untapped. Ecommerce is at the epicentre of Africa's thriving economy. With internet penetration rapidly spreading across the region, this represents huge potential which has hitherto been untapped. Evidence of what is to come can already be seen in Africa's major countries, where consumers have greater disposable income, more than half have Internet-capable devices, and 3G

[119] Indian Government, "The Personal Data Protection Bill 2018". Retrieved February 7, 2019 from https://meity.gov.in/writereaddata/files/Personal_Data_Protection_Bill%2C2018_0.pdf
[120] Australia's 2015-16 Budget. (n.d.). Retrieved October 14, 2015 from http://www.greenwoods.com.au/insights/tax-brief/13-may-2015-australia-s-2015-16-budget/

networks are up and running. Significant infrastructure investment—for example, increased access to mobile broadband, fibre-optic cable connections to households, and power-supply expansion—combined with the rapid spread of low-cost smartphones and tablets, has enabled millions of Africans to connect for the first time. There is a growing wave of innovation as entrepreneurs and large corporations alike launch new web-based ventures.

The lack of regulation in this region has, in fact, contributed to the growth of businesses providing goods or services through a digital medium. The African region is predominant in accepting digital payments and is equally big on promoting private initiatives in the digital field.[121]

It is, however, a growing concern that the African laws have not kept pace with the growth of the digital economy and has resulted in playing fields which are not levelled for local businesses and digital economy based MNEs entering the African region. An example of the same is evident in the fact that foreign entities are only subject to tax in South Africa on income derived from a source in South Africa. However, the source rules were developed a century ago before the digital economy existed and do not take into account the way in which the modern economy operates. As a result, multinationals can avoid paying tax in South Africa because the source of their income is not in South Africa, notwithstanding that they operate in the local economy.

South Africa as an observer of the OECD has begun to consider its place in the digital economy and the issues of neutrality associated with it. With this in mind, National Treasury implemented legislation[122] in June 2014 which seeks to levy Value-Added Tax (VAT) on foreign entities providing electronic services to local consumers within the South African market place. Hence, it appears that the South African government has the intention of bringing the internet to all its citizens as well as to protect its national tax base.

Following the VAT initiative of South Africa, many other African countries have started making a move in the same direction. With Kenya, Senegal, Morocco, Mozambique, Ghana and Nigeria inviting more and more digital-economy-based MNEs, it will not be long before they enact laws to regulate this sector.

In the summer of 2018, Nigeria's central bank (CBN) ordered MTN, Africa's leading cellular telecommunications company, to "refund a total of $8.134 billion moved out of the country" for breaching the country's forex regulations. The CBN also slammed a huge N5.8 billion fine on the banks for allegedly aiding MTN in the illegal capital repatriation. The bank had since deducted the fines from the banks' accounts. The fine plunged MTN shares into all-time low in September 2018 until the Nigerian regulator asked authorities of the telecommunication firm to settle the case amicably. In December 2018, MTN agreed to make an almost USD 53 million payment to resolve the dispute. At the time, it said MTN Nigeria and the CBN had agreed it would pay a notional reversal amount of USD 52.6 million, without admission of liability.

As the CBN and MTN agreed on a settlement out of court on forex repatriation issue, its case on tax demands by the Attorney General of Federation will continue.

[121] Levin, P. (n.d.). Big ambition meets effective execution: How EcoCash is altering Zimbabwe's financial landscape. Retrieved October 14, 2015, from http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/07/EcoCash-Zimbabwe.pdf

[122] WYNGAARDT, M. (2015, May 29). SA tax laws failing to keep pace with digital economy developments It is our preference that if you wish to share this article with others you should please use the following link: Http://www.engineeringnews.co.za/article/sa-tax-laws-failing-to-keep-pac. Retrieved October 14, 2015, from http://www.engineeringnews.co.za/article/sa-tax-laws-failing-to-keep-pace-with-digital-economy-developments-2015-05-29

7. Case Studies

7.1 Apple

7.1.1 Company overview

Apple is a multinational company headquartered in California, US, and is one of the market leaders in the field of designing and selling consumer electronics, computer software, online services and personal computers. Its main products are the Mac range of computers, iPod media player, iPhone smartphone, and iPad tablet computer. It also offers cloud services through iCloud which provides synchronization of mail, contacts, calendars, apps, music, photos, documents and more, across users' devices. The company also offers other services through various applications which are available for use on all Apple devices and these applications offer services in the fields of education, games, graphics and design, lifestyle, productivity, utilities and other categories. It is also in the process of launching new products such as iWatch, Apple TV etc.

Apple became the first U.S. company to be valued at over $1000 billion.[123] Apple Inc. is an innovative market leader in the field of technology and is currently the second largest IT Company by revenue. It employs quite an interesting business model and company structure, both of which shall be discussed below.

7.1.2 Business model and strategy

Apple, just like any other retailer, makes profit from selling its products and services. In this section, we analyse the model it follows to maximize its profits and lower its costs. It employs the following elements to stand out in the market:

- Offer a small number of products
- Focus on high-end customers
- Give priority to profits over market share
- Create a halo effect that makes people want more and more Apple products

Apple increases the demand for its products in the market by making its products unique and attractive to its customers. This is done by employing the latest technology which is always evolving in Apple's think tank and has been designed to ensure that Apple stays ahead of the curve compared to its peers. Apple also focuses on only the higher-end segment of the market which allows its products to maintain their exclusivity and retain the element of superiority attached to them.

Another factor at play in ensuring this objective is Apple's retail strategy which is termed as 'minimum advertised price'. Minimum advertised pricing policies prohibit resellers or dealers from advertising a manufacturer's products below a certain minimum price. MAP is usually enforced through marketing subsidies offered by a manufacturer to its resellers. This price strategy is effective insofar as it prevents retailers from competing directly with Apple's own stores, and it also ensures that no one reseller has an advantage over another.[124] This strategy allows Apple to maintain its premium pricing in all markets which gives it an edge over its competitors who sell at lower prices in developing countries markets.

Apple's business model thrives on exclusivity as much as it does on innovation. There is no doubt that developers at Apple are constantly coming up with the latest technology and applying it to produce more and more innovative products. But a lot is to be attributed to their advertising campaigns which instil the essence of exclusivity attached

[123] Apple reaches $1,000,000,000,000 value. (2018, August 2). Retrieved March 7 2019, from https://money.cnn.com/2018/08/02/investing/apple-one-trillion-market-value/index.html

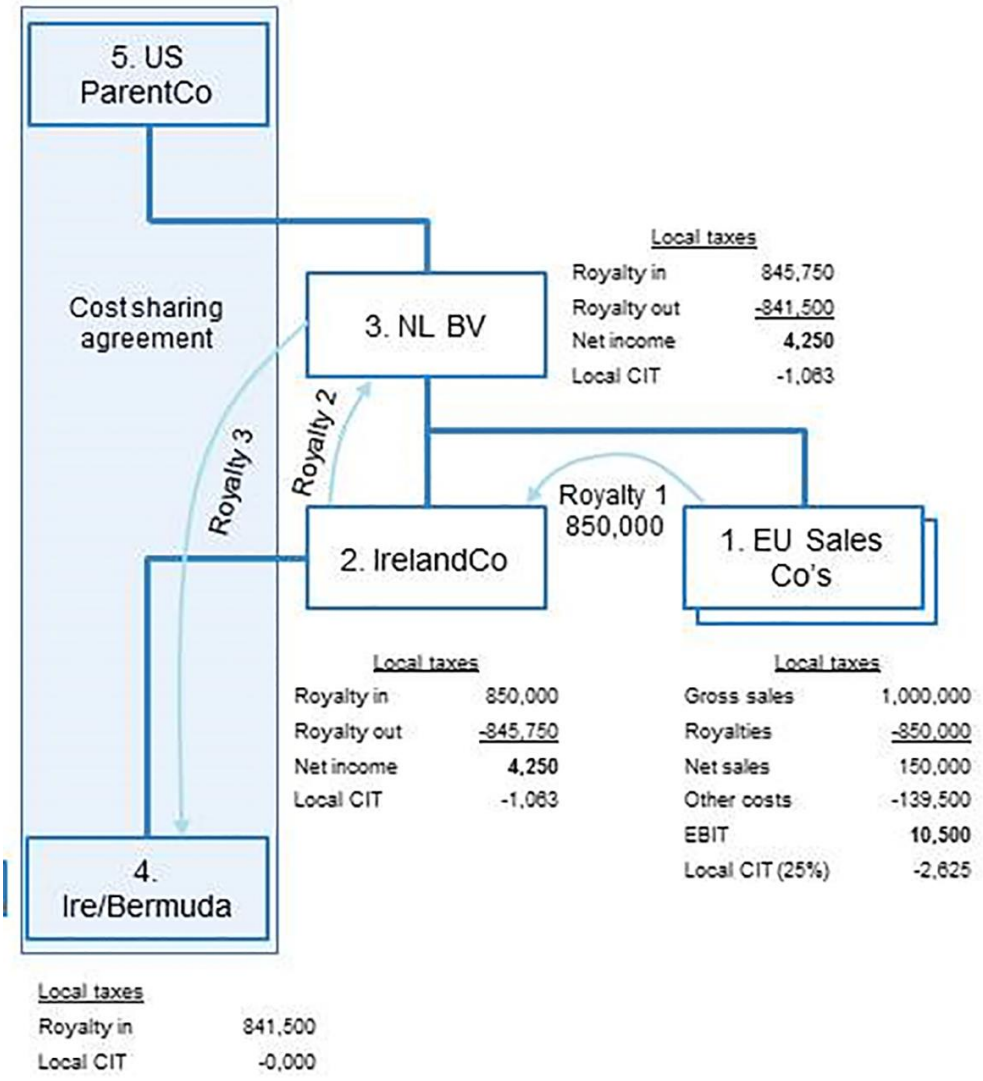
[124] Nielson, S. (2014, February 7). Apple's premium pricing strategy and product differentiation. Retrieved October 14, 2015, from https://www.yahoo.com/tech/s/apple-premium-pricing-strategy-product-191247308.html

to Apple's products in the minds of the customer. As a computer and consumer electronics giant, Apple expands itself with four core philosophies, which are "Think Different" (continuous innovation spirit), direct sale business model, customer-focused services and Apple brand power. With "Think Different" spirit, Apple innovates and upgrades its products inexhaustibly. As a successful imitation, Apple sells the products directly to customers over the web, by phone, and Apple stores in an endless stream. Implementing the customer-focused services and "Switcher" campaign, the population of Apple World and even People's Republic of Mac (Feng, 2009) is proliferating day after day. Apple is not only an illustrious innovator and inventor, but also a successful imitator and strategist.[125]

7.1.3 Tax structure

This part looks at the tax structure of Apple Inc. and analyses the reasons behind the double non-taxation that it has enjoyed at a result. It also identifies the impact that the OECD's BEPS project may have on this structure. Apple follows the 'double Irish Dutch sandwich' structure which prior to the 2017 US tax reforms was very commonly used by US multinationals to reduce their effective tax burden in the US. Other companies following such a model are Google, Amazon, and Microsoft etc. Before analysing thepre-2018 tax structure of Apple, it is to be kept in mind that the main value driver of Apple's revenues is its innovation R&D. In order to optimize its taxes paid, Apple has placed the actual ownership of this R&D in the US with Bermuda as the intermediate.

[125] Jinjin, T. (2013). A Strategic Analysis of Apple Computer Inc. & Recommendations for the Future Direction. *Management Science and Engineering, 7*(2), 94-103. doi:10.3968/j.mse.1913035X20130702.Z001



The reduction of the effective tax burden (for illustration purposes only)	
1. IrelandCo receives royalties assumed	850,000
Assumption: 0.5% remains in Ireland based on an APA	-4,250
2. The Netherlands receives royalties	845,750
Assumption: 0.5% is paid in The Netherlands	-4,250
3. Net to Ireland/Bermuda	841,521
4. Tax paid to taxable basis equals 19,000 / 1,000,000 *100% =	1.9%

This is the corporate tax structure employed by Apple Inc. which has supported the company in saving or delaying millions of US dollars in taxes. A parliamentary hearing in the US revealed that Apple has successfully sheltered

US $44 billion from taxation anywhere in the world.[126] Apple has achieved this due to the combined effect of the following:

- The definition of a resident company in Ireland and in the US is based on place of incorporation and place of central management and control respectively. This allows Apple's subsidiaries, which are incorporated in Ireland but centrally managed from the US, to be a non-resident in both countries and pay taxes only on the income sourced in these countries.
- Since the cost sharing regime was introduced by the US Treasury in the early 1990s, the transfer pricing regime in the US has been ineffective to enforce the arm's length principle on the transfer. This has allowed Apple to transfer the economic rights to all its intellectual property to its Irish subsidiary which shares the cost of developing the R&D. Even the monetary contribution made by the subsidiary in the cost sharing agreement comes from the parent company and the US transfer pricing rules are in apt at catching the resulting avoidance.
- Another reason behind this tax avoidance was the check the box regime and the CFC regime active in the US. Apple checked the box to treat all its distribution subsidiaries, in various countries in Europe, as transparent entities, which makes them disappear for US tax purposes and be a part of Apple Operations International (AOI- the Irish subsidiary). Now, because of this arrangement it appears that AOI is deriving sales income directly from customers and for US tax purposes, it is exempted from taxation under the 'active business exception' of the CFC regime.
- Ireland is preferred by Apple because it has a very low corporate income tax rate (12.5%) and because of being an EU member, it can serve as a gateway to Europe and EU laws.

Due to the existing structure, in 2016, the European Commission concluded that Ireland's tax benefits in allowing such structure for Apple were illegal under EU State aid rules. As consequence, Ireland should have to recover the unpaid taxes in Ireland from Apple for the years 2003 to 2014 of up to €13 billion, plus interest. In this regard, the Irish finance department filed an appeal to annul the EU decision.

In 2018, The EU's highest court rejected the U.S. request to help Apple Inc.'s court fight against the European Union. A lower court in December 2017 also dismissed the request, saying the American government failed to show it had a direct interest in the result of the state-aid case. The U.S. is disappointed in the decision to deny its participation in litigation concerning the tax treatment of U.S. companies, a DOJ official said. The U.S. has a clear and direct interest in the treatment of Apple's offshore profits, as confirmed in the tax legislation enacted within days of the lower court's order denying intervention, the official said.

In May 2018, Ireland's finance ministry began collecting back the taxes in a series of payments, estimating that the total amount could have reached €15bn including EU interest. Ireland has appointed investment managers to oversee the disputed cash, whom Donohoe said would make low-risk investment decisions and the Irish taxpayer would be protected from any losses.

7.1.4 Conclusion

From a business perspective, it appears that Apple is still the market leader in terms of innovation and product differentiation. The success of the Californian multinational Apple is evident everywhere. In recent years Apple devices became the coolest on the market. In fact, the company reached its maximum success after 2007 when the first iPhone was launched. The rise of iPhones, iPads, iPods and Mac computers revolutionized and completely transformed the markets of mobile phones, computers and music players. Although, it was seen that after the demise of its founder, Steve Jobs, the innovation at Apple went down. The same was reflected in its revenues and market position as compared to its competitors and the company started focusing more on improving its existing products than developing new ones.

[126] Ting, Antony, (2014). iTax - Apple's International Tax Structure and the Double Non-Taxation Issue. *British Tax Review* (1). Retrieved from http://ssrn.com/abstract=2411297

In the current age, Apple is still a dominant player in the market but as we have analysed in previous chapter, it does not take long for a company to become a 'dinosaur', especially in this digital age. However, as Apple has come up with new products such as the iPhone 6, iWatch and Apple TV, it seems that it has realized the importance of disruption and constant innovation but a lot more is required from Apple innovative task force if it wishes to retain its status as a market leader.

From an international tax perspective, however, there are multiple concerns that have come up, especially in light of the OECD BEPS project. Apple's R&D forms the core of its business and is the most important value driver, which is to be kept in mind while analysing the tax concerns. These concerns and their potential impacts are described as follows:

- The OECD is seeking to move away from a separate entity approach which is embedded in the transfer pricing guidelines. The OECD is turning towards the opinion that an enterprise approach could be adopted instead of a separate entity approach according to which a corporate group under the control of the same parent company should be treated as one single enterprise. This will attack structures such as Apple's which relies heavily on the separate entity principle. This will make it difficult for Apple to 'check the box' for each individual subsidiary because for all transfer pricing purposes, the group will be analysed as a whole. Thus, the non-taxation of income from distribution subsidiaries could be avoided.[127]
- Secondly, the OECD is also seeking to implement the concept of economic substance with more importance than contractual arrangements. This could attack Apple's transfer of economic ownership to its Irish subsidiary under the cost-sharing agreement. The OECD is stressing more than ever on contractual arrangements to reflect economic reality.
- Thirdly, the importance of transparency has increased significantly in the last decade. OECD's detailed guidelines for country-by-country reporting are an example of the same. Tax avoidance by Apple and other MNEs has also been the result of lack of information with the tax authorities. The action plan discussing CbC reporting discusses in detail the information that needs to be submitted by MNEs to the tax authorities without exception. Even for this purpose, the OECD is willing to look at the MNE group as a whole, thereby making it the responsibility of the parent to ensure furnishing of information. This could potentially harm Apple's tax structure as this will allow jurisdictions to require, in a timely manner, CbC reporting from **ultimate parent** entities of MNE groups resident in their country.

7.2 Google

7.2.1 Company overview

Google is an American multinational company headquartered in the Silicon Valley in California. It specializes in internet-related services and products such as online search, advertising technologies, cloud computing and software solutions. It also offers hardware products such as Chromebook, Nexus 5 and Nexus 7 (smartphones) etc. but they are not its main value drivers. Google derives most of its revenue from advertising services. The company provides its products and services in more than 100 languages across over 50 countries. Its technologies and offerings primarily facilitate online advertising. The company recorded total revenues of $136,22 billion at the end of fiscal year 2018, in which advertising revenues accounted for approximately 85%.[128] Google bought YouTube in the year 2006 which allows it to offer video advertising, which contributes highly to its revenue generation.

[127] Sheppard, L.A. The OECD's Special Measures. *Tax Notes International* 71(10).

[128] Google: annual advertising revenue 2001-2018 (n.d.). Retrieved May 7, 2019, from https://www.statista.com/statistics/266249/advertising-revenue-of-google/

7.2.2 Business model and services

Google's business model is driven completely by innovation. Google follows a multi-sided business model when it comes to its advertising services which are its main revenue drivers. It collects information from its users to whom it provides search services for free. This collected data is then used to display relevant ads to the customers based on their recent searches etc. According to Google, the services they offer can be categorized into two segments, based on the categories of users:

1. Services for individual web users

The most common service of Google used by individual users is its search engine and since the day of its inception, Google has worked towards developing mechanisms to make searching easier and smarter. Google describes a perfect search engine as something that 'understands exactly what you mean and gives you back exactly what you want'.

Keeping this objective in mind, Google has diversified from offering search services into other categories of products such as Google chrome (web browser) which remembers your routinely visited URLs and shows you options just like the search on Google. Another smart service is Gmail (email service) which started as an only 'by invitation' service but soon was made available to everyone. It includes features such as speedy search, huge amounts of storage and threaded messages, which were not available in most other email services. In the year 2007, Google ventured into mobile platforms as well by launching Android, which is an open platform for mobile devices on which any independent programmer or developer can work to produce applications for all users. All of these services ultimately contribute to making search process through Google a more comfortable experience. Google can now collect user data from Android phone users, Gmail users, Chrome users etc. to power its search engine algorithms, which ultimately impacts both businesses and end users (further explanation in the next sub-heading).

Google also offers an array of online products and services which are aimed at both users and businesses equally such as Google drive (cloud storage space), Google maps and Google earth (navigation/exploration tools), Google + (social networking website) and online editing tools for documents resembling Word, Excel, PowerPoint etc. All of these services allow Google to offer a wholesome experience to its users.

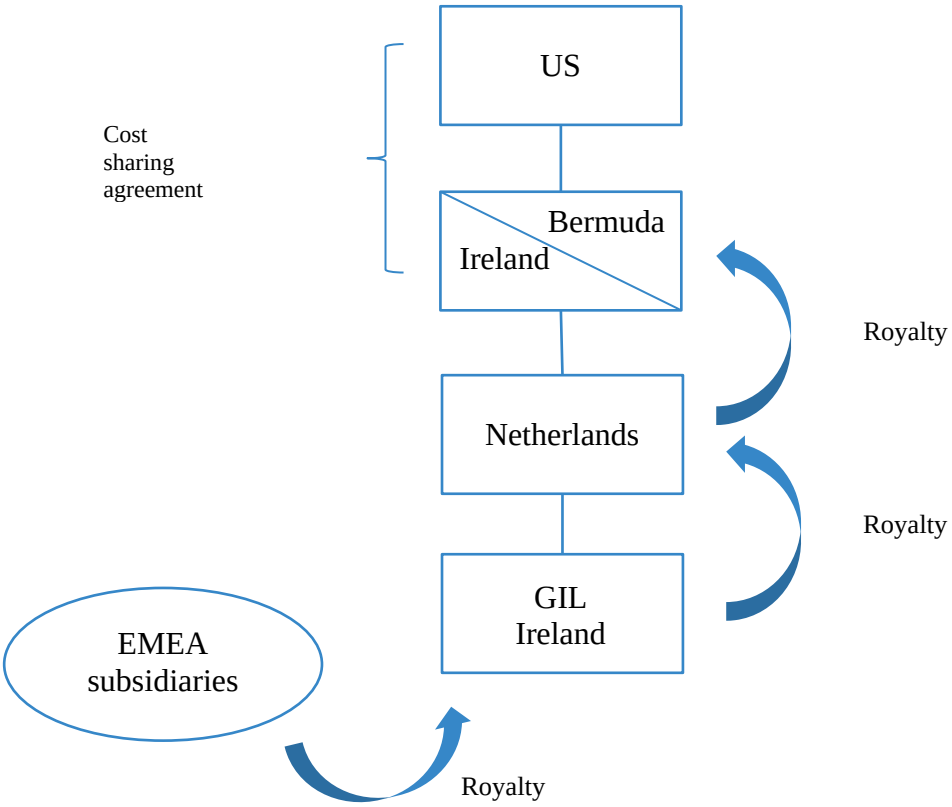
2. Services for businesses

Other than online editing tools for documents and online storage space, Google primarily offers advertising services for its business customers through its tools, AdWords and AdSense. The advertisements can be of various types such as display Ads, Image Ads, Banner Ads and Local Ads. Google lets businesses advertise through Google's search website where it displays the Ads next to relevant searches made by the users. This is done through its contextual targeting technology which scans the text of a website for keywords and returns advertisements to the webpage based on those keywords. Google derives most of its revenue through advertising services for which it charges businesses on a pay-per-click basis. In order to keep at pace with changing technology, Google has also started offering Display Ads through YouTube, Google Finance and Google network member sites.

7.2.3 Tax Structure

Google follows what is commonly known as the 'double Irish Dutch sandwich' structure to plan its international taxes. It is fairly common for many US multinationals to invest in structures such as these which help them in reducing their effective tax burden to a great extent. It has been alleged that the US government is partially responsible for allowing for loopholes to exist within its pre-2018 tax system which allowed for such models to flourish. This allegation is based on the US rule to tax non-resident companies only on income repatriated to the US. US has put CFC (Controlled Foreign Corporation) rules in place with the intention to catch the income belonging to a US based multinational even if it is not repatriated to the US. However, with the introduction of the 'check the box' regime, it had become relatively easy pre-2018 to avoid the CFC rules, which has made room for MNEs to come up with these inventive tax structures.

Google tax structure can be represented as the following figure:



The reduction of the effective tax burden, theoretically	
Google Ireland Limited revenues assumed	1,000.00
Assumption: 2% remains in Ireland	-20.00
The Netherlands receives	980.00
Assumption: 0.2% paid in The Netherlands	-1.96
Net royalty income to Bermuda	978.04
Tax paid to basis to 21.96 /1,000 * 100% =	2.2%

In the case of Google, these are the following steps which, together, helped Google in delaying payments on millions of US dollars in taxes:

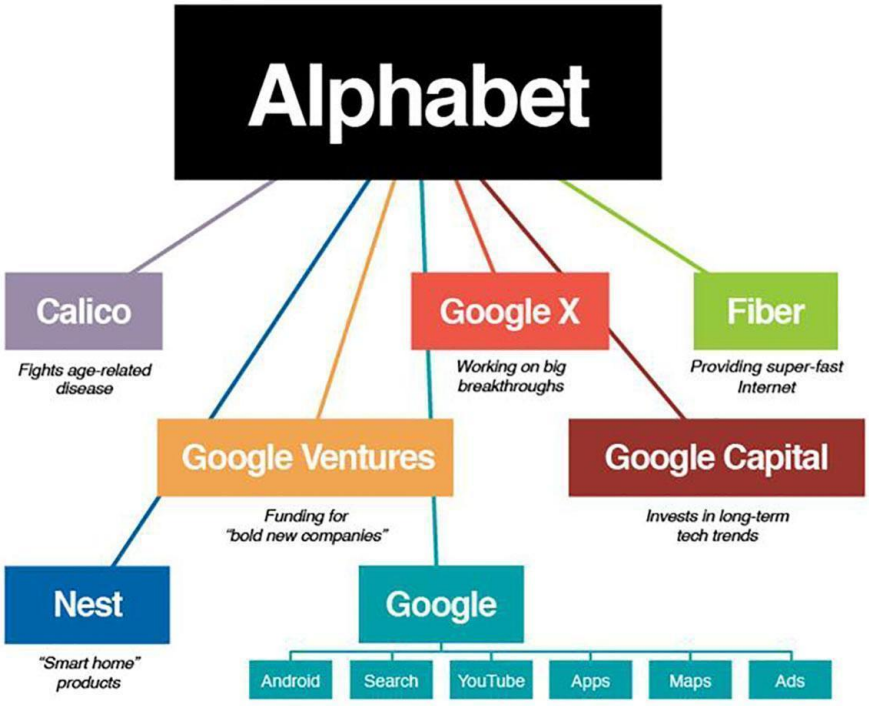
- First of all, Google transfers the economic ownership of all its IP related rights, exploiting which in the US would lead to a very heavy tax burden, to its subsidiary in Ireland (Ireland Holdings Limited, IHL) under a cost sharing arrangement. Thus, this subsidiary now has the right to exploit these IP

rights and it does so in the EMEA region. All the income earned from exploiting the IP rights remains to be taxed in Ireland (at around 12%) and not in the US (at around 35%), unless repatriated.

- Next, the double Irish structure, under which Google has opened another Irish subsidiary (Google Ireland Limited, GIL) to manage royalties earned in the EMEA region which is held by a Dutch intermediate holding company. IHL, which holds the intellectual property right, granted the Dutch intermediate holding company a licence and, in turn, this company granted Google Ireland Limited a sub-licence. Here the fiscal relationship between Netherlands and Ireland comes into play. IHL is treated as a non-resident by both US and Ireland under their domestic law. Ireland does not have a treaty with Bermuda so there is a chance that in absence of the Dutch and the second Irish subsidiary, there would be a 20% withholding tax on royalties coming to IHL. But, because of the Dutch intermediary company, when EMEA entities pay royalties to GIL for using the IP, they flow through to the Netherlands without any withholding tax (due to EU Interest and Royalties directive) and then because Netherlands does not levy a withholding tax on outgoing royalties, these payments enter Bermuda tax free.
- Lastly, the company in Bermuda is an unlimited liability company and, therefore, it does not need to publish any of its financial statements.

7.2.4 Google-Changes in structure

In 2015, Google introduced a new 'Alphabet' structure to separate its most profit generating activities from its research driven activities, which currently do not prove to be economically beneficial for Google. Through this restructuring, Google itself becomes a wholly-owned subsidiary of the newly created holding company called Alphabet. The following picture shows Google in its restructured form:



The creation of Alphabet is driven by the need to simplify the current operational structure of Google which has become understandably complex over the years with Google's acquisition of dozens of companies to expand its vast empire far beyond search. Through this structure, Alphabet will become the primary holding company of the group with Google being a subsidiary of it. All profit generating sectors such as Google search, YouTube, Google Ads etc. will be streamlined under Google (subsidiary of Alphabet) while the other research driven (moonshot) initiatives of Google which still require further development before they can contribute to the profit value chain will be aligned under and managed through Alphabet.

7.2.5 Conclusion

From a business perspective, Google's revenues make it one of the market leaders in its industry. It offers the majority of its products for free for individual users, i.e. it runs a multi-sided business model. Google uses its innovative technology, creative thinking and open corporate culture to satisfy its users. This way Google reassures the return of its users, moreover, it made sure its products are used daily and became irreplaceable.

It gained the trust of its users and can use its large user base to attract advertisers. Google managed to grasp revenues greater than its competitors through its innovative thinking, viewing advertisers as its source of revenue rather than average users. Google's business model fosters trust and innovation that attracts customers of all types. This innovative thinking of Google has allowed it to become the multi-sided platform it is, for advertisers, which is the most successful way to exist in this digital age.

From a tax perspective, it is structures such as these, employed mainly by US based multinationals, that are under the microscope of the BEPS project. Impact of the BEPS project can already be seen in the UK government's effort to introduce the diverted profits tax system with the intention of taxing profits of large multinational enterprises with business activities in the UK who enter into contrived arrangements to divert profits from the UK by avoiding a UK taxable presence and/or by other contrived arrangements between connected entities.[129] They have even called it 'the Google tax'. The draft legislation of this bill clearly states, under Section 2(c), that a diverted profits tax will be levied on a company in the UK if it is reasonable to assume that its activities are designed specifically to avoid the PE status.

The main action plans and initiatives of the OECD that are likely to hit such structures are the ones dealing with strict information exchange requirements, treatment of MNE groups as a whole instead of looking at separate entity approach and those dealing with attaching more importance to economic substance than contractual arrangements. All of these concepts have been discussed in detail in the Apple case study. Since the model followed by Apple and Google is very similar, it is likely that they will suffer from similar hardships resulting from the BEPS action plans.

7.2.6 Unilateral approaches in light of BEPS - "the Google tax"

The Diverted Profits Tax ("DPT") issued and updated by the HMRC in 2018 is an example of the unilateral approach taken by the UK government to combat BEPS. It adds an extra layer of taxation in an attempt to tax large multinationals on those profits arising out of business activity in the UK, which have been diverted away from the UK through contrived arrangements between related parties.

The Diverted Profits Tax (also known as the Google Tax) was introduced as a draft legislation in December 2014 which has now become a law. It was developed with the intention of taxing profits of large multinational enterprises with business activities in the UK who enter into contrived arrangements to divert profits from the UK resulting in the erosion of the UK tax base.[130] For this purpose, it is designed to operate on two main rules, namely:

1. To counteract arrangements by which foreign companies exploit the UK PE rules.
2. To prevent companies from creating tax advantages by using transactions or entities that lack economic substance.

The first case is designed to address arrangements which avoid a UK permanent establishment (PE). It comes into effect if a person is carrying on activity in the UK in connection with supplies of goods and services by a non-UK resident company to customers in the UK, provided that the detailed conditions are met. This rule is supplemented by the "mismatch condition" to address the effect of contrived arrangements that exploit tax differentials and involve transactions or entities that lack economic substance. The second case will apply to certain arrangements

[129] Ibid 4.

[130] Ibid 4.

which lack economic substance involving entities with an existing UK taxable presence. Its primary function is to counteract arrangements that exploit tax differentials. It will apply where the detailed conditions, including those on an "effective tax mismatch outcome" are met. This rule is effectively a free-standing version of the mismatch condition, but applicable to arrangements already within the scope of UK CT.

The final DPT legislation clearly states, under Section 2(c), that a diverted profits tax will be levied on a company in the UK if it is reasonable to assume that its activities are designed specifically to avoid PE status. Other than that, the bill lays down a variety of conditions/situations under sections 2, 3 and 4 which will be covered under the scope of this Act and also lays down a well-defined structure to calculate the amount of tax due, if any.

This legislation has been issued to counter schemes such as the 'double Irish structure' which is currently being used by many US based MNEs. For the first time, companies outside the UK will be subject to a UK tax merely for doing business with the UK, which is a radical departure from the principle that UK will not tax profits of foreign companies unless they have a UK-based PE. All OECD countries have abided by this principle since the inception of the OECD model treaty but were expecting that the BEPS project would suggest a gradual move away from this principle, in light of new methods of doing business. However, in the absence of any such direct recommendations from the OECD, member countries are forced to take such radical unilateral stances on issues that have a direct impact on their economy. Especially with the digitalisation of the economy, the PE rules need an overhaul and the BEPS initiative of the OECD seems to fall short in this regard.

Under the new regime, which is also sometimes termed as the 'Google tax', companies with an annual turnover of £10m will have to report to HM Revenue & Customs (HMRC) if they think their company structure could make them liable for diverted profit tax. Once HMRC has assessed the structures, and decided how much profit has been artificially diverted from the UK, multinationals will have only 30 days to object to the 25% tax.

This legislation is likely to hit the businesses operating in the digital sector (Cloud-based, borderless business models etc.). The increase in newly developed business models, e.g. through the use of a two-sided business model facilitated by the digital economy, allowed the MNEs from the developed countries to even reduce their physical presence in the countries where their goods and services were being consumed.

However, an area not currently covered under the application of UK DPT is the provision of some digital services which are dependent on previously collected user data. The data that has been collected usually in a multi-sided business model can be traced back to a certain jurisdiction where it has been collected. However, does the mere collection of data within a certain jurisdiction justify the presumption of a nexus amounting to a permanent establishment? Or is it rather the processing of the data that enables companies to put the data to use in new products and services, thereby creating value?

Besides DPT, UK and other European countries, such as France, Spain, German, and Austria, are trying to embed Digital Service Tax (DST) in their legislation. France and German will implement the DST on revenues from the supply of advertising space only, meanwhile other countries will apply DST similar with the EU proposal, in which consensus among Member State has not reached yet. In light of such new local initiatives coupled with lack of harmonization at an international level may lead to differing levels of taxation in different countries, which may strengthen the national tax bases of these countries but will impose an additional burden on the digital sector, which is in direct contradiction of the OECD principle of applying the same set of rules to the digital economy as applicable to its traditional counterpart.

Recently, OECD released a proposal to categorize google as highly digitalized business model where its user participation could create significant value to the business process. As consequences, the non-routine profit would be allocated to the location of the users. However, the implementation of this 2019 proposal is remained to be seen as OECD still analysing the feasibility based on the collected public comments.

7.3 Amazon

7.3.1 Company overview

Amazon.com Inc. is an e-commerce company headquartered in Seattle, Washington, U.S. It started off as an online bookstore but soon went on to become the largest internet-based retailer in the United States with its product offerings expanding into almost all retail sectors. It also produces several consumer electronics of its own such as Amazon Kindle e-book reader, Fire tablets, Fire TV and Fire Phone. Amazon had its major operation in the North American region, but it is expanded substantially internationally due to advancements in technology. Currently, it earns 68,76% of its revenues from its US segment and the other 31,24% of its net revenues from the international segment.

Amazon has employed one of the most innovative business strategies and has been quick to identify the technology curve and mould its business model accordingly. It went from being an online bookstore in the North American region to an international retailer within a few years. Amazon acts as a platform to enable sales between other retailers and customers and also facilitates sales between customer and customer. This is possible because Amazon allows anyone to sell anything using its platform for a fee. Thus, in this digital age where customers are relying more and more on peer-to-peer interaction, Amazon has the capability to lead the trend by offering a multi-sided platform.

7.3.2 Business model and strategy

Amazon is one of the most technologically advanced companies which saw the turning of the technology curve in time to align its business model along with the curve. It went from being an online book-seller to a multi-sided online retailer for consumer goods and a producer of its own category of consumer goods. Its services can be divided into the following groups:

1. Consumers & Sellers

Amazon is one of the most consumer centric companies in the world, i.e. acts as a data factory. It is constantly in a process of evolving its business strategy to offer customers more types of products, more conveniently and at lower prices. Amazon offers everything from books, toys and videogames to MPA downloads and collectible items through its retail websites. For this purpose, Amazon doesn't stock everything that it sells. In order to provide the best services to its customers, Amazon contracts with other retailers to sell their products through its platform website and charges a fee from the retailers for every purchase. Amazon maintains its status as a destination website but does not have to maintain inventory on slower-selling products. This strategy has made Amazon a leading long-tail retailer, expanding its available selection without a corresponding increase in overhead costs.[131]

Amazon also acts as a marketplace for second-hand goods where independent sellers can advertise and sell their used products through Amazon's platform. This provides another stream of revenue for Amazon as it takes a cut of every sale for providing the platform. Lastly, Amazon also acts as a manufacturer and distributor of Kindle (e-book reader) which has evolved over time to become the world's most advanced e-reader.

2. Amazon's internet services

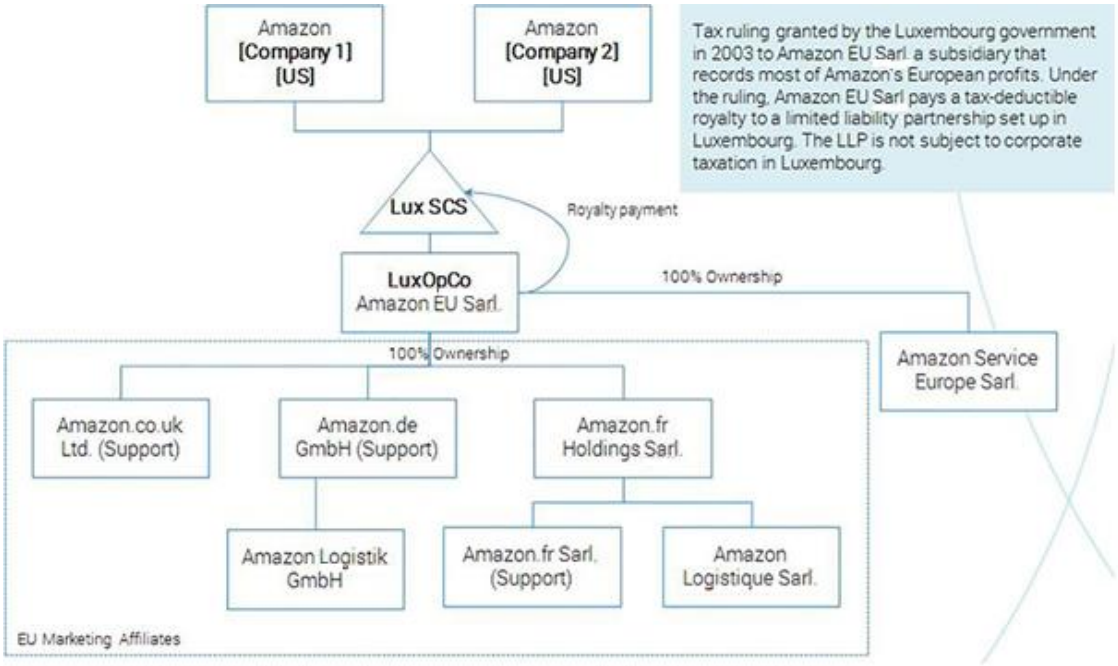
For its customers, Amazon provides online services such as Amazon Prime through which customers can enjoy, for an annual fee, free two-day delivery, on-demand video streaming and free access to the Kindle library. However, Amazon's internet services extend far beyond these. Originally developed as a side business, Amazon decided to lease out its own server space to other companies and individuals. While not a core part of the company's strategy, Amazon found itself managing a large number of servers and internet services, and it was a fairly small effort to manage those services for others. Individual developers can use these in-the-cloud services to virtually enable any type of business. Some examples of the services offered by Amazon Web Services are: Amazon Elastic Compute Cloud (Amazon EC2) • Amazon Simple Storage Service (Amazon S3) • Amazon SimpleDB • Amazon

[131] Noren, E. (2013, July 8). Digital Business Models: Analysis of the Amazon Business Model. Retrieved October 14, 2015, from http://www.digitalbusinessmodelguru.com/2013/07/analysis-of-amazon-business-model.html

Simple Queue Service (Amazon SQS) • Amazon Flexible Payments Service (Amazon FPS) • Amazon Mechanical Turk • Amazon CloudFront.

7.3.3 Tax Structure

Amazon follows a similar tax saving structure as Apple and Google. However, it invests into Europe through Luxembourg instead of using the double Irish structure. This structure is still based on the same principle as that of Apple and Google. Amazon seeks to establish a subsidiary in a low tax country in Europe so that it can take the advantages of EU directives that apply on transactions between member states. Amazon claims that all its UK affiliate does is order-fulfilment, deliveries and logistics; sales are actually made by its Luxembourg operation, where most of its profits are booked. Amazon's tax structure can be depicted as follows:



Amazon has sheltered about 2 billion dollars from tax in both Europe and the US by using the Luxembourg arrangements. Amazon used inter-company payments to shift income multiple times which helped in forming a tax shield for the group. It is yet another example of the way multinationals reduce their taxes by parking intellectual property in tax havens and charging affiliates big fees for using it.

The following steps reflect how Amazon used this structure to save taxes[132]:

- Amazon bought online retailers in the UK, France and Germany and created local websites in those countries which were responsible for selling and marketing via the internet. However, it soon changed their principal activity to merely provision of support services to other group entities so that people purchasing on those websites were not doing business with a US unit registered in Delaware. This allowed Amazon to attribute all foreign profits to its loss-making US parent company which was beneficial for Amazon in two ways, namely: they didn't have to pay any taxes in European locations; and they could set those profits off against US losses so that the company did not have to pay any taxes at all on the overseas profit.

[132] Bergin, T. (2012, December 6). Special Report: Amazon's billion-dollar tax shield. Retrieved October 14, 2015, from http://www.reuters.com/article/2012/12/06/us-tax-amazon-idUSBRE8B50AR20121206

- Soon after that, the US parent started making profits and it wasn't advantageous anymore to bring overseas profits to the US. It was then that Amazon set up the Luxembourg subsidiary. Luxembourg had a headline charge on corporate income of 29 percent, but under certain circumstances it will exempt income a company earns through intellectual property by up to 80 percent, which cuts the effective tax rate to below 6 percent. This new company took over the role the Delaware Company was playing and people in Europe using Amazon's website to purchase items were now dealing with the Luxembourg entity.
- In June 2004, Amazon established another Luxembourg entity - Amazon Europe Holding Technologies - whose purpose was to hold shares in Amazon group companies and act as the parent company of the other two Luxembourg subsidiaries. This group was set up as a "Societe en Commandite Simple" or SCS, a type of limited partnership that is exempt from income taxes
- A month later, this company established a third Luxembourg company, Amazon EU SARL, whose principal purpose was to "sell, auction, rent or otherwise distribute products or services of all types" via Amazon websites. It was to serve as the supplier of all goods and services to Amazon's European customers.
- Amazon, then, had an inter-company contract to transfer the economic ownership of IP rights to Amazon Europe Holding Technologies, the untaxed parent from an intra-group company established in Nevada. The details of this transaction have never been made available. Company accounts show that since 2005, Amazon Europe Holding Technologies started to make payments to Amazon Technologies Inc in Nevada of up to 230 million euros ($300 million) each year. At the same time, it received up to 583 million euros each year from its European affiliates. The difference stayed in Luxembourg and escaped the high tax rate of the US.

As consequences of the structure, in 2018 the European Commission concluded that the tax benefit received by Amazon from its structures in Luxembourg constitute illegal state aid. Therefore, amazon has been ordered to pay 250 million euros ($294 million) to Luxembourg. In this regard, Luxembourg filed an appeal to annul the decision.

In addition, US also questioned the transfer pricing method used by Amazon when transferring the intangible from US to Luxembourg entity. Therefore, the IRS had adjusted Amazon's tax liability for 2005 and 2006 by $2.2 billion, arguing that Amazon undervalued the assets. That adjustment would result in a tax bill of about $230 million. Even though US tax court rejected the calculation, in 2019, IRS filed an appeal to retain the calculation.

7.3.4 Conclusion

From a business perspective, Amazon seems to be doing very well as an online retailer and a multi-sided platform for individuals and businesses. Amazon, under the guidance of its CEO, Jeff Bezos, has always been quick to adapt to changing scenarios. In almost no time, it went from being an online book-seller to an online platform for all retailers to advertise and sell their wares.

From a tax perspective, the structure used by Amazon was hiding the profits behind multiple layers of inter-company transactions without providing any details about most of those transactions. These kinds of arrangements might not stand in light of OECD's recent plans to establish strict information exchange requirements.

The main action plans and initiatives of the OECD that are likely to hit such structures are the ones dealing with strict information exchange requirements, treatment of MNE groups as a whole instead of looking at separate entity approach and those dealing with attaching more importance to economic substance than contractual arrangements. All of these concepts have been discussed in detail in the Apple case study. Since, the model followed by Apple and Google is very similar to the one followed by Amazon in terms of the principle behind it, it is likely that they will, have to deal with the BEPS actions as well.

7.4 Impact of BEPS Action Plan and 2019 OECD Proposal on Digital Economy

Action Plan 1 of the BEPS project addresses the tax challenges of the digital economy. In its final report, the OECD has proposed some solutions which can be used to prevent avoidance of high amounts of tax as has been seen in the cases studied above. The OECD considers that these should deal with most of the cases which have given rise to public concern, relating to large internet-based companies. The OECD has proposed solutions in many areas such as:

- Characterisation of income from digital transactions
- Tax nexus in cases of very limited physical presence
- Broader definition of PE and the concept of significant economic presence
- Data collection from customers

Although the solutions laid out in the report address many of the concerns that have been raised by companies active in the field of digital economy, but it remains to be said that there are many other issues that still need to be addressed. An example of this, as has been identified by the BEPS monitoring group, is the changing nature of producer-consumer relationships. With the introduction of companies like Uber, Airbnb etc., which rely heavily on consumer to consumer interaction, the dynamics have completely changed. The OECD has addressed the issue of data collection from customers (which is done by companies such as Google, Facebook etc.) but this new type of producer-consumer relationship requires a re-evaluation of the traditional residence and source concepts and income attribution between them. The EU supplemented another area which needs further regulation is provision of digital services. Digitalization has significantly increased the ability of firms to shift from discrete sales of physical commodities to more long-term relationships with customers in the form of services, and hence often with little or no physical presence. It is this underlying change that leads to both the problem of characterization and the lack of direct physical presence. For example, an internet-based publisher can service subscribers all over the world using freelance authors in each country to supply local content. It is nevertheless characteristic of services that they generally entail close relationships with clients, often indeed a two-way relationship with significant input from the client. Services firms operating digitally also generally require other local inputs to support their relations with customers, such as payment facilities, business agents and consultants with local knowledge, which may be done by third parties contractually.

It is situations such as these and a few more which need further attention from an international perspective. In the final report, OECD recognizes certain scenarios as ‘emerging and potential future developments’. It includes situations dealing with virtual currencies, advanced robotics, 3D printing, the sharing economy and the internet of things. These concepts may have been in their nascent stage when OECD started its project to address them but by now these concepts are becoming increasingly visible in the market through the eyes of multiple collaborative endeavours such as Uber, crowdfunding, 3D printing etc. Therefore, even though they were outside the scope of OECD’s current project, they need to be addressed expeditiously. There are some tax concerns that are already being raised by these new companies which thrive only on the digital economy. Some of them are presented here:

- Uber/Airbnb
- Bitcoins
- Netflix
- 3D printing

These are just some examples of what can be the concerns that we will have to deal with in the near future. The OECD has succeeded in identifying the loopholes being used by the companies presented in the case studies and has tried to address them through the Action Plan 1 of its BEPS project. Another initiative that may be of assistance in addressing tax concerns raised by companies such as Google, Apple, Amazon, and Facebook, is the most recent proposal released by OECD to supplement the work of OECD BEPS action 1.

Under the 2019 OECD proposal, the income of digital business would be allocated to the market jurisdiction where the users, marketing intangible, and significant economic presence are located depends on how the value are created. As a result, the current international tax and transfer pricing principle need to be modified as the remuneration will not be based on the function, asset, and risk associated to the entity. the proposals will lead to these following consequences: (a) The proposals lower the threshold of permanent establishments, as physical presence is no longer needed to justify the taxing right of the jurisdiction; (b) The transaction-by-transaction approach as set out in the current guidelines phases out, since OECD proposals initiate to tax the MNE group on a consolidated basis by endorsing the use of fractional apportionment approach and residual profit split approaches to allocate the profit; (c) As result could be that quantitative Value Chain Analysis and/or Profit split based on fixed formulas (i.e. Common Consolidated Corporate Base) are taking over.

Furthermore, the proposals will face the following challenges:

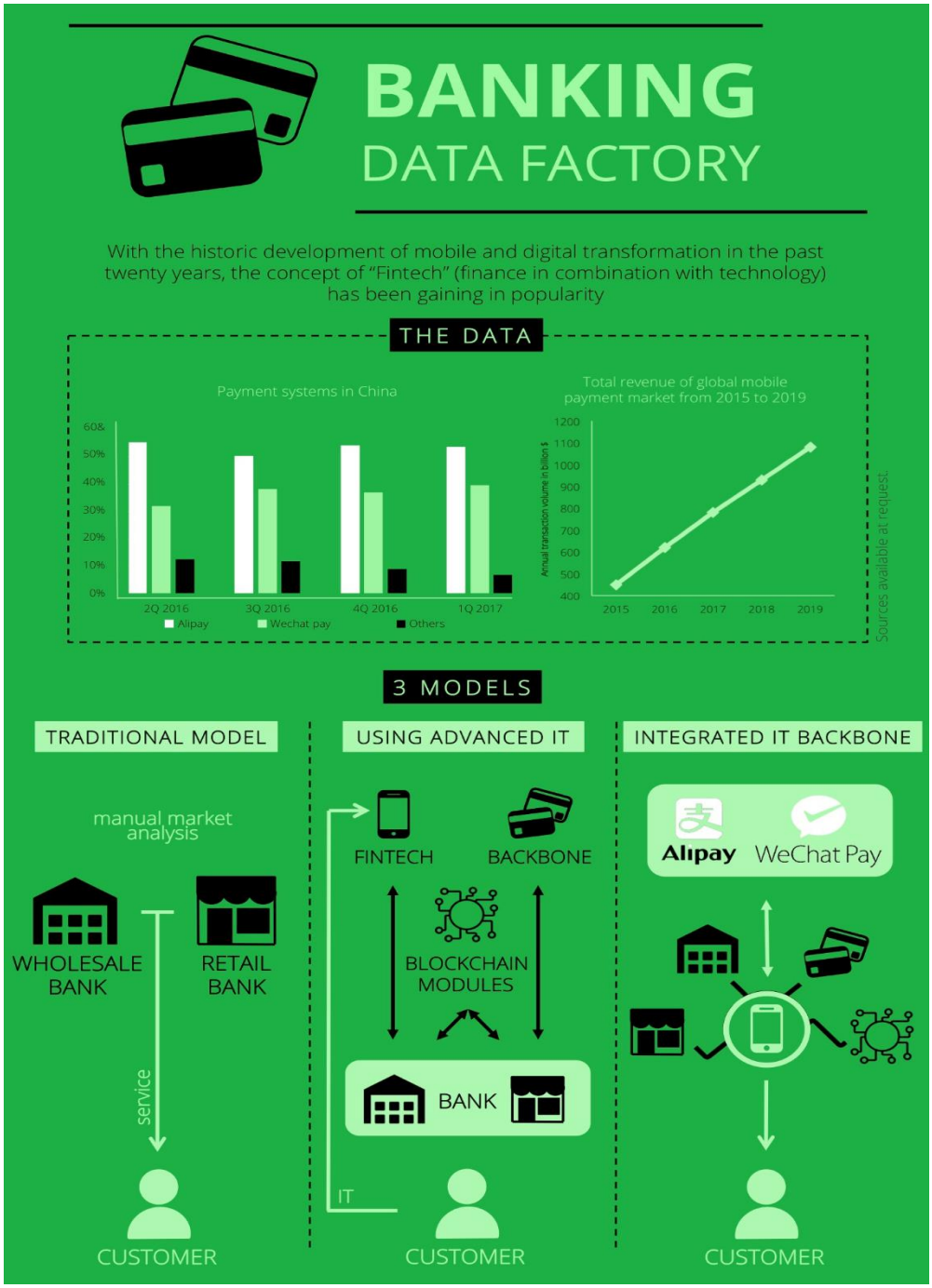
- As the whole economy is digitalizing, it is not possible to segregate the digital business;
- The proposals imposing tax on revenue rather than on profit seems unfair in situation with losses;
- Through the use of conflicting tax policy, double/triple/quadruple taxation may arise with no adequate resolution of multiple levels of taxation;

Even though the implementation of these proposals as from 2020 is yet to be seen as OECD is recently seeking for feedback, however, digital business player like Google, Amazon, Apple, and Facebook may need to rethink their tax policy.

Appendix

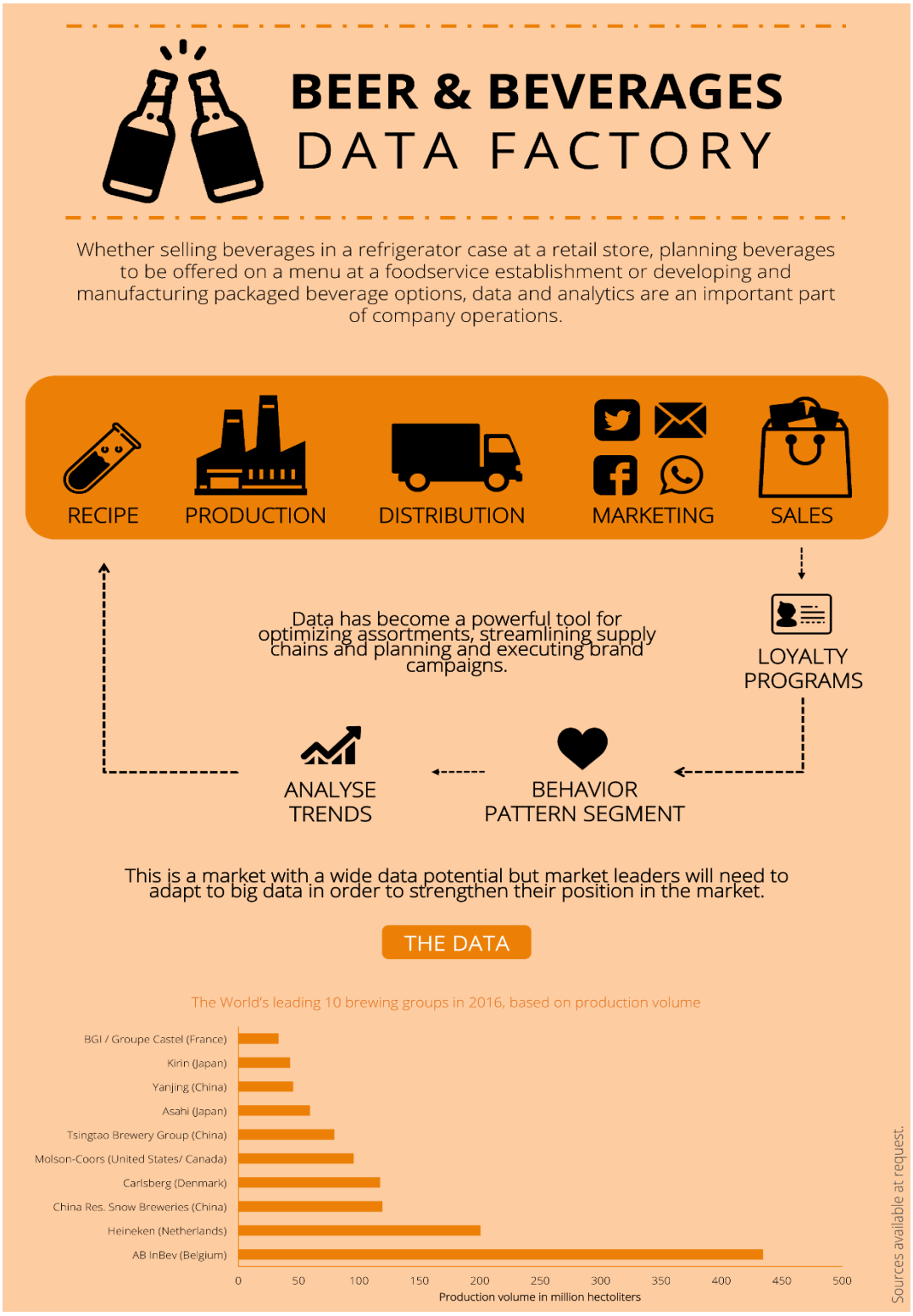
Appendix A – Infographic Banking industry

Current banks are challenged by either fintech companies offering a significant cheaper backbone on specific services or new players with a “banking license” like Amazon. The infographic below illustrates 3 new business models, in which banks need to win a market share.



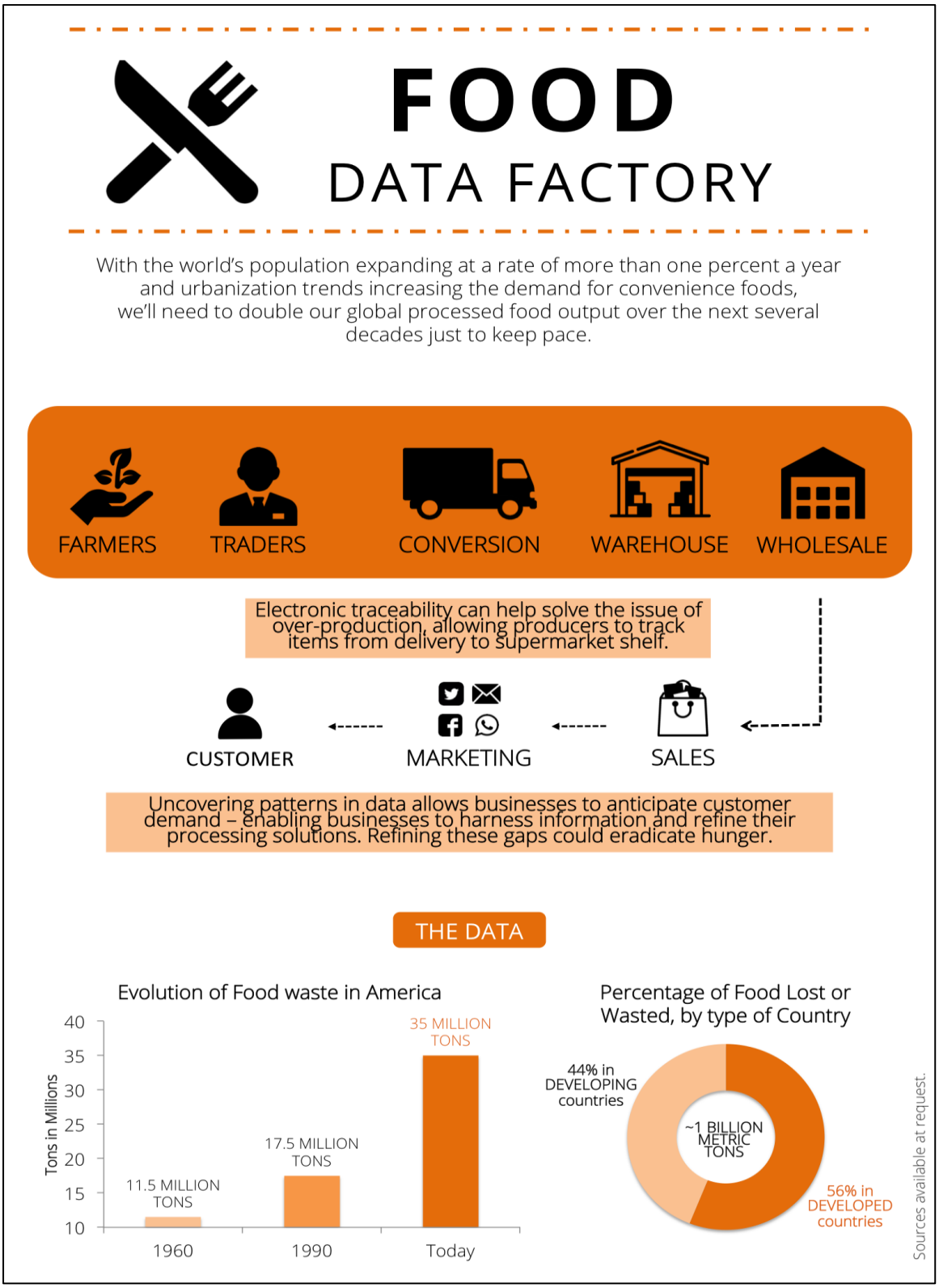
Appendix B – Infographic Beer & Beverages industry

How will companies selling beer collect data on consumers and use this to optimize their sales? The infographic below indicates some of the relevant factors.



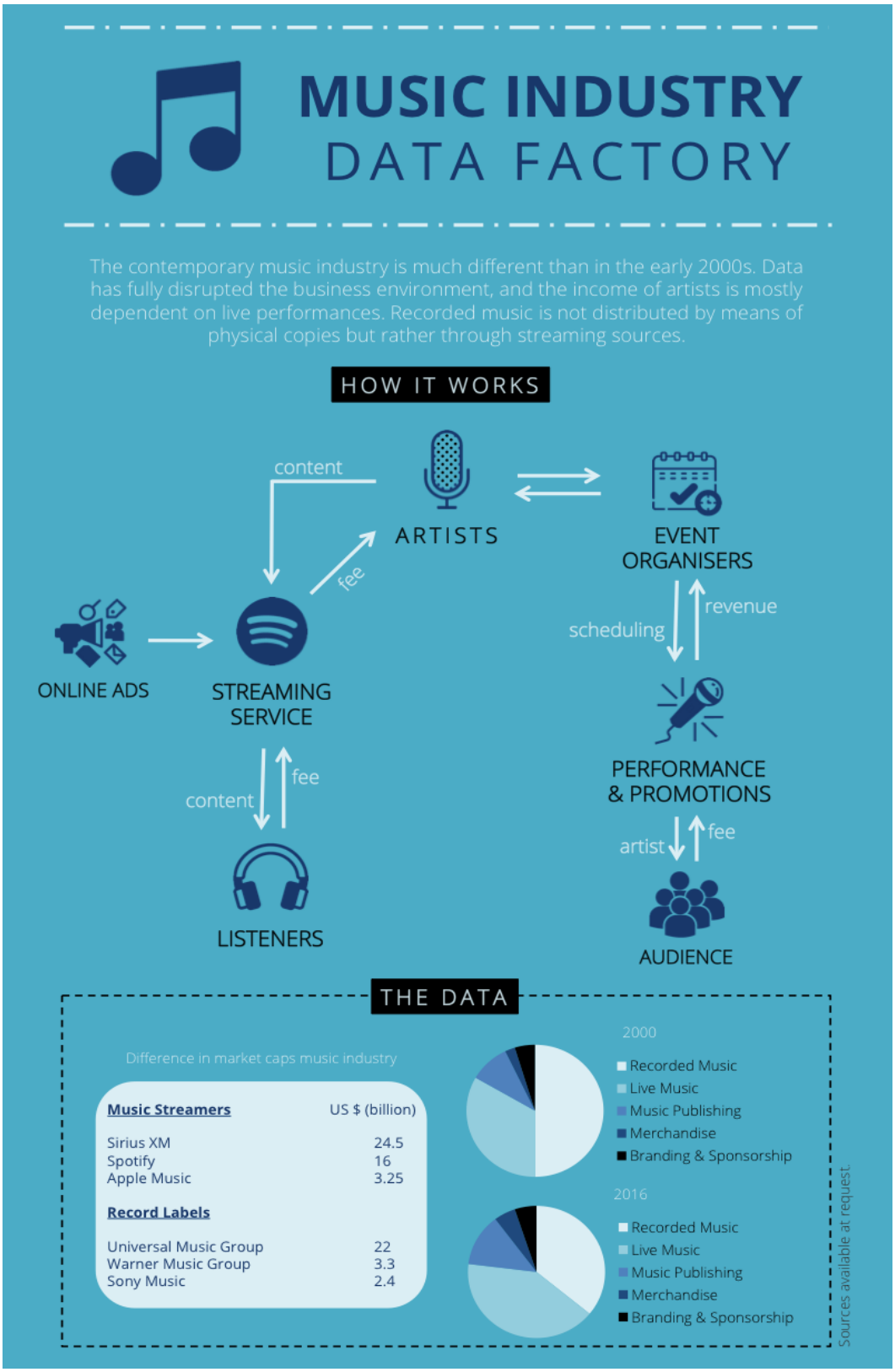
Appendix C – Infographic Food industry

Although the food production is not synchronized with our demand for food products, we should expect "data factories" in this industry will start tracking food products from origin to destination to make our "food footprint" more sustainable given the growing global population



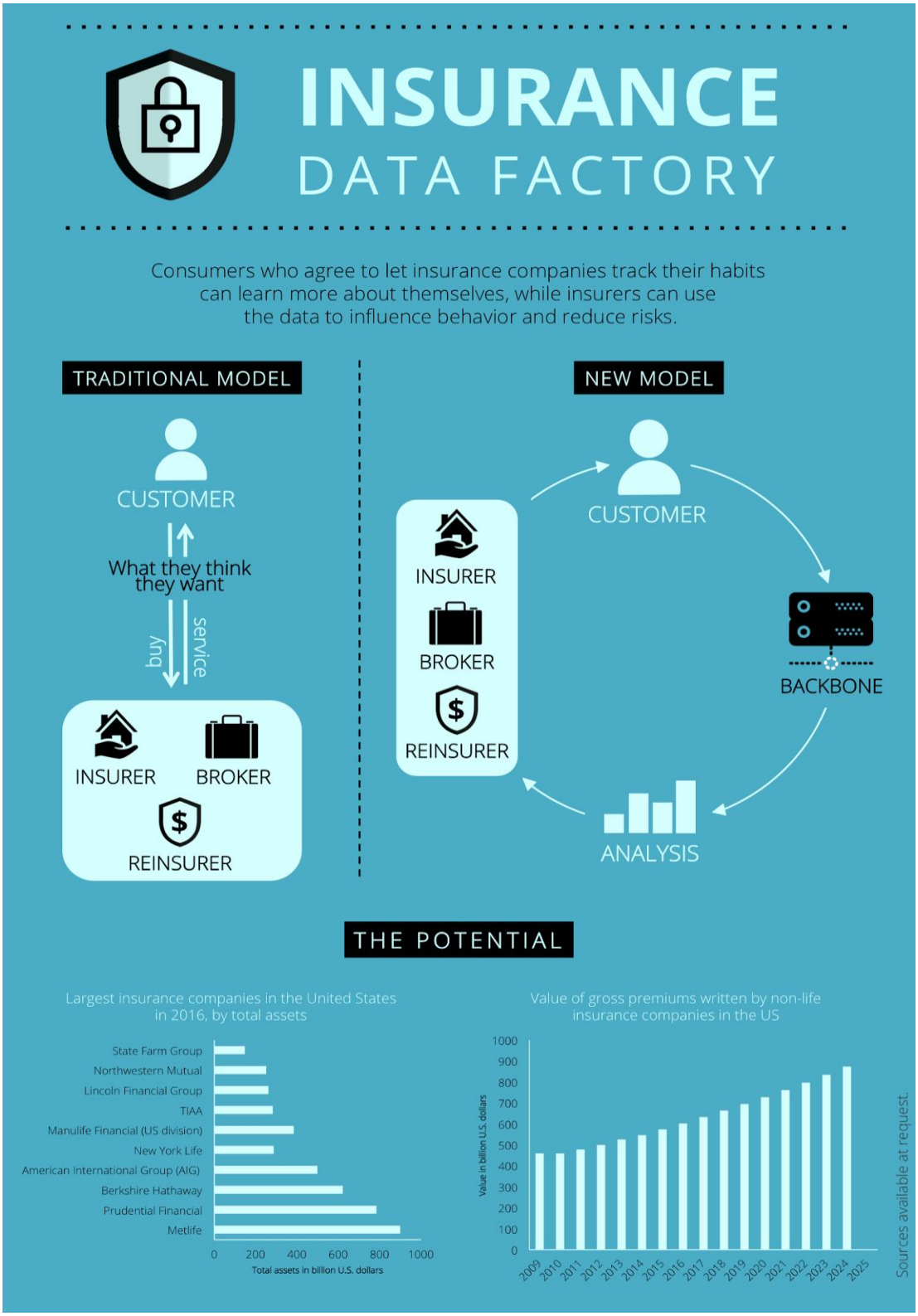
Appendix D – Infographic Music industry

This industry is already disrupted by players like Apple and Spotify, i.e. the lucky disruptors of a "data factory" concept. A consequence has been that the record companies/artists have been challenged on their traditional earnings model, which is visualized below.



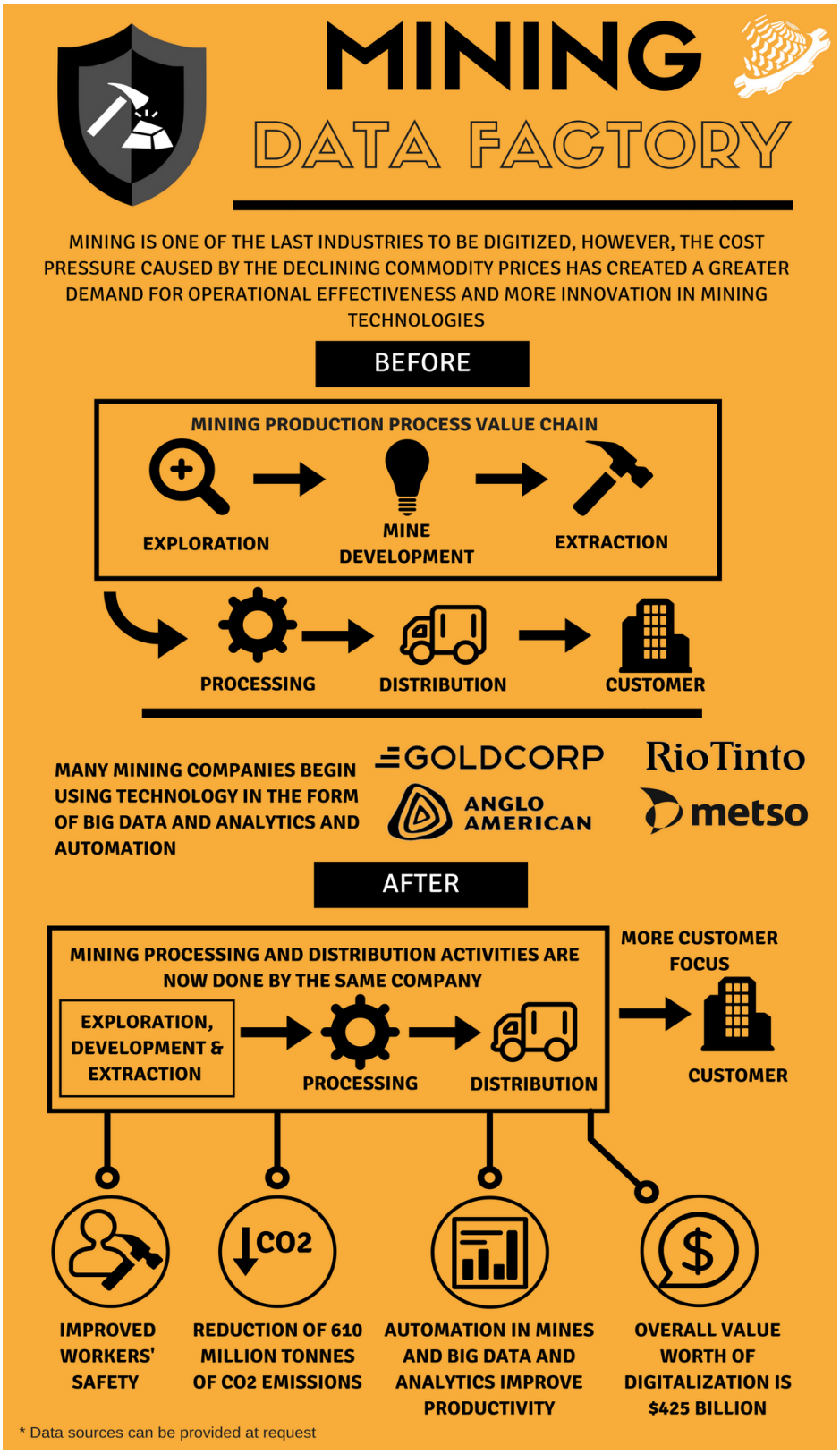
Appendix E – Infographic Insurance industry

The insurance industry has traditionally been occupied by lots of stakeholders and middlemen. Once the industry will start creating “data factories”, a whole host of disintermediation is expected. Already today some insurance players are approaching “end consumers of insurance services” directly through mobile applications.



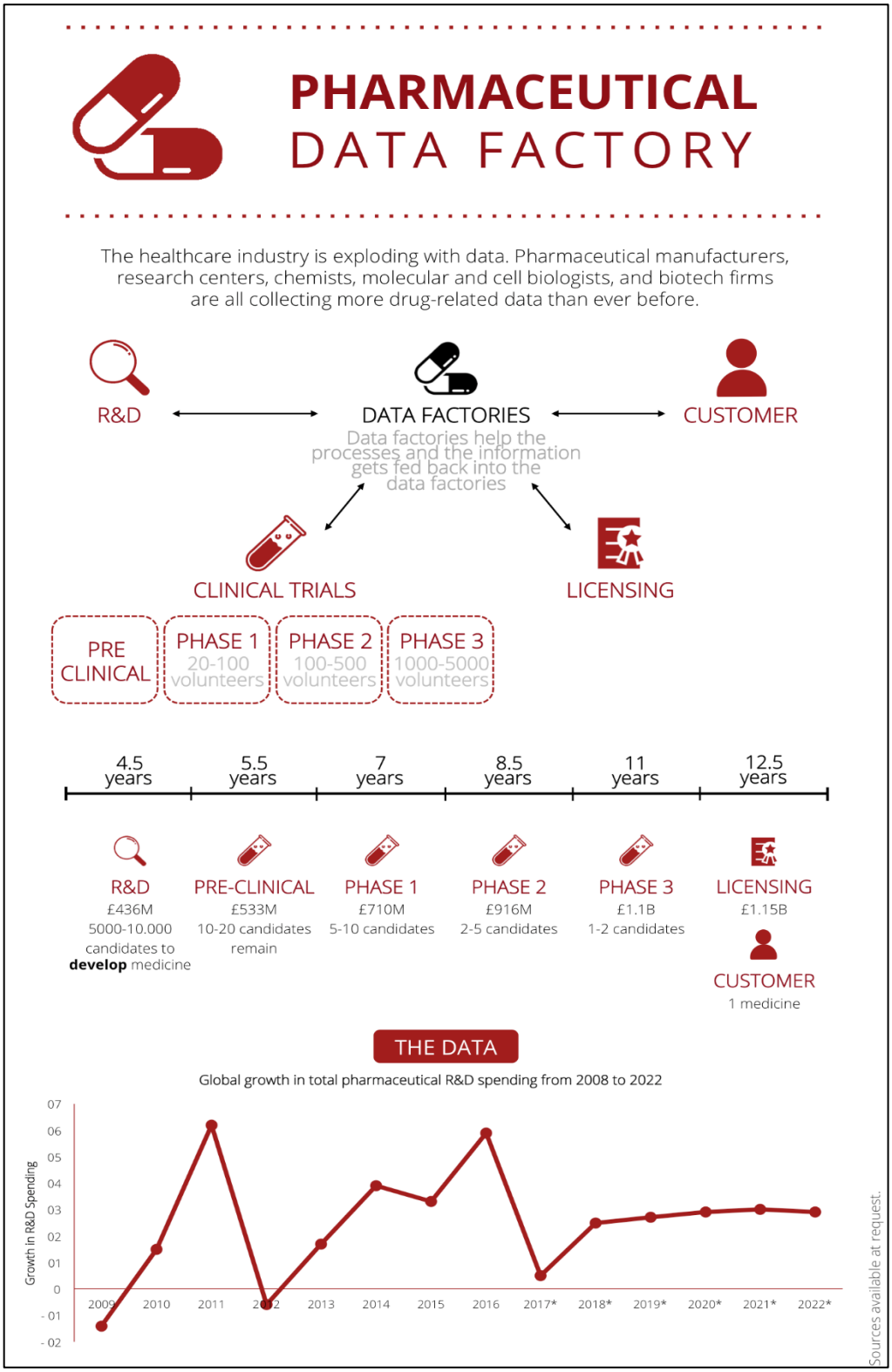
Appendix F – Infographic Mining industry

This industry has been using data analysis already as part of the features of the mining industry but the creation of a data factory has to rive much more of the process on “data analytics”.



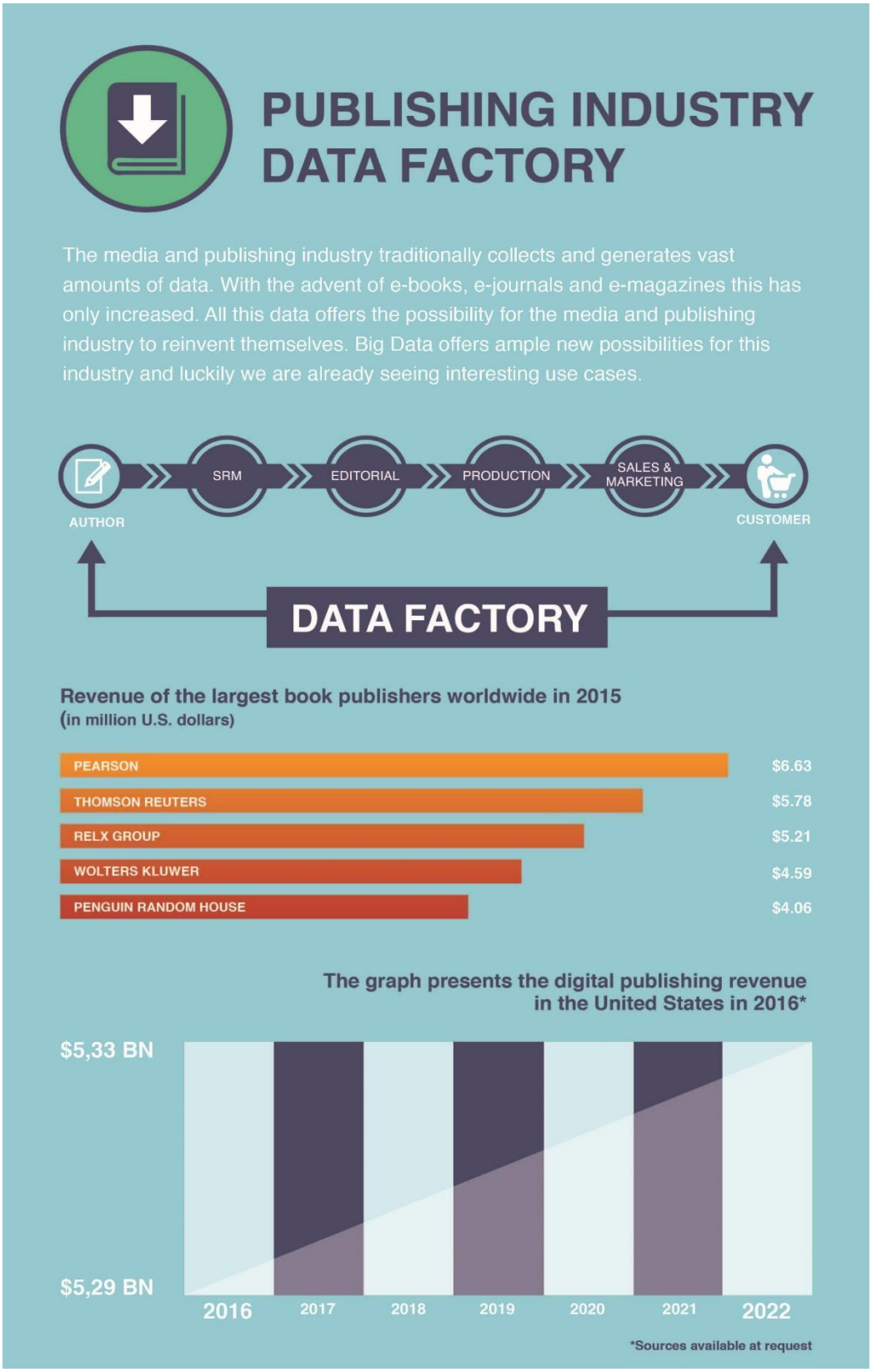
Appendix G – Infographic Pharmaceutical industry

As shown already in section 1.7 there is a "data factory" revolution happening in the healthcare industry, which will start impacting the pharmaceutical industry as well, i.e. the game of (1) chemical compound/chemical drugs, (ii) generic pharma and (iii) customized pharma/gene therapy together with data factories will significantly change the face of this industry.



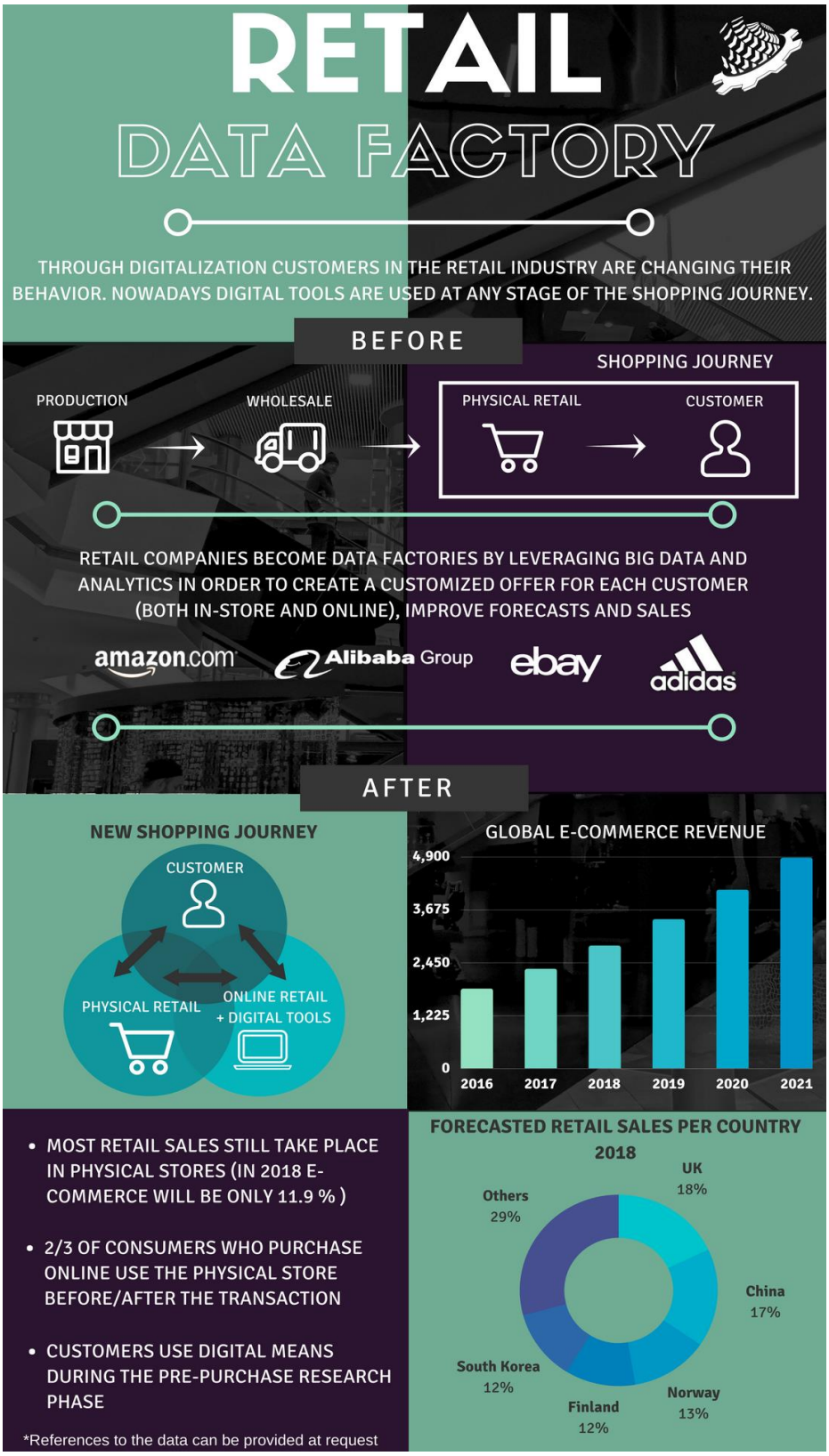
Appendix H – Infographic Publishing industry

As more and more data can be obtained through free and public domain sources, this industry will need to reinvent itself into a “data factory” type of operations which needs to be combined with a multi-sided earnings model. For example: sometimes the reader will pay, sometimes the authors (so called “open access”).



Appendix I – Infographic Retail industry

The retail industry has suffered from data factory and digital based sales, i.e. the future data factory in this industry knows their customers' flavours and preferences "the best". One leading example is how Amazon reshapes this B2C industry.



Appendix J – Infographic Wholesale industry

The same way the retail industry has been impacting the wholesale industry will see wholesale activities being picked up by “data factories” with a much more efficient supply chains organization as a challenge to todays’ wholesalers.

Appendix K – Other illustrations of Digital Transformation

Accent Jobs: Accent Jobs focuses on the higher segment of the temporary employment market and offers temporary jobs with the prospect of a permanent contract. Their mission is to combine the flexibility of an employment agency with the quality of a selection office. Due to the flexibility of the deployment system, they can propose the most suitable candidate, while according to the 'first cure then pay' formula, the employer only pays the hours worked when the new employee begins working. Through the Digital Talent Hunter Team, they actively search for talent on LinkedIn, through which the first phase of recruitment takes place online. In this way, the first point of contact is made in an environment that the candidate chooses, allowing for the review by the Digital Talent Hunter via email or skype, before bringing them into contact with companies.

Alert Innovation: Alert Innovation, an automation start-up, developed Alphabot, a robot that can fill online grocery orders more quickly for dispatch from its retail outlets. This bot automates specific steps of online grocery pickup process by using autonomous mobile carts to gather shelf-stable, refrigerated, and frozen items from a high-density storage system. Alphabot's robotic carts retrieve and deliver these items to store associates to quickly fulfill online orders. Making the job of the customer and the associate easier, it aims to allow associates to complete more orders faster than they would by simply walking up and down the aisles in search of goods. It also frees up time for associates to carefully select fresh produce and meat while the robots do the other work behind the scenes. The key problem Alphabot will solve is achieving a level of efficiency and cost-effectiveness to make it feasible and profitable for retailers to offer online groceries.

Amazon: Amazon wants to control every link in the supply chain, from sourcing the product to warehousing and now, delivery to the doorstep. The e-retail giant has built up its logistics infrastructure over the years, as part of an effort to control more deliveries. By employing predictive models, the firm works out where orders are likely to come from. Using its intimate knowledge of consumers to manage capacity, place products closer to them and determine delivery routes. The last mile delivery gets customer packages from delivery stations to a customer's doorstep. Amazon has grown its Last Mile delivery efforts helping to speed up customer delivery times and provide new innovations to customers. Amazon's delivery drones promise deliveries in just thirty minutes, leaving the current delivery methods in the past. Combining their e-commerce and delivery with drones to create a state-of-the-art delivery and management system. The plan is to use drones to replace standard delivery options available today, in turn reducing costs and removing the most expensive part of the delivery system, humans.

AT&T: The AT&T Workforce 2020 initiative is taking on the ambitious task of retraining 100,000 members of its workforce that may require training or be displaced by 2023. Lacking sufficient talent in areas such as cloud-based computing and data science, rather than looking outside their company, they decided to invest toward building new learning resources, new facilities and a dedicated team to lead workers retraining.

Bidfood: Bidfood is the largest online marketplace for food professionals, and acts as an online wholesaler for catering and total supplier in the food service market, thus creating a transparent food chain in a digital world.

Bookaroo: Bookaroo is an online service site by local bookstores in the Netherlands. The idea behind it is simple: people place an order for a book, then bookshops in the neighborhood check to see if they have the title to send it the same day - a similar strategy to the one of Bol.com. However, the difference with the web bookshops is that the orders are sent from the physical bookshop itself instead of via book distributors. Due to the disappearance of physical bookshops, the site aims to bring back the emergence of local bookstores. The advantage of Bookaroo is that small, local bookstores that have little reach with their site (or have no site at all) can participate and thus earn extra income.

Bossa Nova: Bossa Nova, a Californian start-up, created a robot that roams up and down store aisles checking for pricing issues, out-of-stocks, and shelf irregularities. This advances the way retail store can account for their merchandise. It can do this far more efficiently and regularly than a human taking stock by hand can, providing retailers with valuable real-time data. Walmart recently expanded a pilot program involving Bossa Nova's shelf-scanning robot as part of a larger push into robotics.

Cainiao: Cainiao operates a logistics platform which provides real-time access to information for both buyers and sellers. It connects couriers and warehouses, helping reduce the shipping and delivery time from more than four days to two and a half days. Together with Alibaba, they plan on building a national smart logistics network, which provides vigorous logistics expansion plans at home and abroad. The logistics firm runs warehouses and works with delivery companies to get packages to customers, by using technology to make the process more efficient and with the ultimate goal of next-day delivery within China and three-day delivery worldwide.

Capital One DevExchange: DevExchange is a repository for developing tools and APIs to enable developers to use the financial institution's software building resources to create better customer experience. With their open banking platform, they are opening up opportunities outside of traditional banking applications, by providing a single point of reference for the bank's engagement with developers. The portal contains all the features that are now considered best practice for developer engagement including easy-to-integrate APIs, a robust testing environment, great documentation that is comprehensive and simple, and sample code and reference applications. Capital One's attempt into open source demonstrates both the company's internal reliance on APIs, and their willingness to share dev tools with the community.

Carbon: Founded in 2013, Carbon is one of a number of startups developing 3D printing technology to open up digital manufacturing to more creators and companies. It operates at the intersection of 'hardware, software, and material science', with specialized 'Digital Light Synthesis' technology that combines light projection with programmable resins to transform the liquids into solid materials. Carbon is revolutionizing 3D printing and manufacturing with breakthrough technologies that enable the creation of end use parts with unique properties. In 2017, Adidas announced it was mass producing a 3D-printed shoe courtesy of Carbon technology. And recently, Ford digitally manufactured polymer parts for its F-150 and Mustang vehicles using Carbon.

Decide.com: An online shopping portal that analyses web data points to generate price predictions that help consumers save on their purchases. Decide.com has become a consumer-facing solution for product research, aggregating data across hundreds of sources to tell consumers if they should buy or wait for a new product release or for the price to drop, for example. Big data analysis has created more opportunities, whereby the service can normalize the user reviews, and allows this to be done with more products, becoming more precise about these recommendations. The search engine was acquired by eBay, and ceased operation as of September 30th, 2013. However, this brings the opportunity to bring Decide.com's expertise in data and predictive analytics to the worldwide commerce leader, empowering 25 million eBay sellers, and allows eBay to build an improved pricing tool for sellers.

Fast Radius: A leading provider of comprehensive additive manufacturing solutions, Fast Radius is able to help from application discovery, to optimizing product designs and testing, to industrial-grade production and global fulfillment. Their technology platform and manufacturing footprint help customers bring new products and supply chain models to market that are uniquely enabled by additive manufacturing (3D printing). Their software platform supports customers across the product lifecycle, from identifying potential applications, conduct engineering and economic evaluation, accelerating new product development and manufacturing industrial-grade parts in Fast Radius factories.

Flex Port: Flexport is a licensed customers brokerage and freight forwarder built around an online dashboard. They are leveraging software and industry expertise to provide more visibility and control, at a lower transaction cost in

order to create the new operating system for global trade. They coordinate complexity across a range of asset owners to move product across international borders. Flexport structures all the data in their customers supply chain, reinforcing automation of information as part of their freight service.

Flex Pulse: Flex Pulse is a cloud-based visibility platform dedicated to coordinating everything in the supply chain. It stretches across all 12 industry segments the company services ranging from automotive to digital health with high tech devices and energy in between. It is a software-based real time mobile collaboration tool providing unprecedented levels of connected intelligence for managing global supply chains. The comprehensive customer supply chain view integrates demand, inventory monitoring, manufacturing, quality, outbound transportation and delivery.

Ford: Ford's rapid manufacturing processes, better known as 3D printing, are changing the way engineers develop and test cars. The process of creating prototype components have increased significantly, has more flexibility and is more affordable. By having a dedicated 3D workshop, Ford is able to produce all the right designs before a new car goes into mass production. 3D printing could be used for much more than just prototypes. Their advanced manufacturing has integrated 3D printing, collaborative robots (cobots), digital manufacturing and augmented reality to push the automotive industry into a new era.

Google DeepMind: DeepMind is the world leader in artificial intelligence research. As a subsidiary of Google, it focuses on the development of artificial intelligence and deep reinforcement machine learning. DeepMind's goal is to "solve intelligence", which they are trying to achieve by combining the best techniques from machine learning and systems neuroscience to build powerful general-purpose learning algorithms. They are trying to formalize intelligence in order to not implement it into machines, but to be able to read and copy the human brain.

Hackathon by Microsoft: Microsoft's Hackathon brings together hundreds of employees' ideas and gives them the opportunity to turn these ideas into something more. Microsoft holds the largest private annual hackathon in the world, combining a science fair, nonprofit fair and question-and-answer session with Microsoft's leadership. Participates in the hackathon work on problem statements that impact either business or society, along with working on big ideas added during the year.

Hello Bank!: Started in 2013, Hello Bank! Is the first 100% digital mobile bank owned by BNP Paribas. This new generation of an online bank is grounded in four key values: simple, smart, human and safe. Providing customers with a full range of solutions, including payments, credit facilities, savings and investment accounts, and insurance cover. With the target audience being those between the ages of 18 and 28, it is an incentive to bind the younger generation to a bank. As customers grow older, the philosophy is that their need for financial solutions becomes more complex. Hello bank! is intended as a portal to accounts at BNP.

Hema Xiansheng: Visually similar to a conventional supermarket, but on closer inspection, many shoppers appear to be leaving without proffering cash, card or mobile payments. Alibaba is expanding into physical retail through investments in a variety of product categories to push its "new retail" strategy of combining online and offline shopping. This futuristic supermarket offers 30-minute delivery and payment using facial-recognition technology. At its core, it's about making it convenient to buy what you need or want in whatever way is most convenient to you – whether at the store or online, delivered to your home or picked up at a nearby store location. By integrating online and offline, Alibaba thinks it can radically change customers' shopping experiences for the better while boosting business for its partners. This means that the whole inventory and supply chain is in one solution for whatever your needs are.

Huawei: Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. Organized around three core business segments: telecom carrier networks, enterprise business and devices; the Chinese company is focusing on accelerating the digital transformation for a better-connected world. As digital transformation presents many opportunities, Huawei stays customer-centric and strives to help customers succeed and achieve shared success. Huawei has had to overcome multiple challenges on their way to success, and digital transformation is simply the next step in the company's mission to improve its complex business environment. Committed to bringing digital transformation to every person, home, and organization to create a fully connected, intelligent world. By accomplishing 'Digital First' - the process of becoming fully connected and smart through use of the 5G network - Huawei hopes to create new industry benchmarks for efficiency, effectiveness and customer satisfaction. With the fourth industrial revolution upon us, digital production using data processing tools such as ICT platforms, software and services is becoming a common practice across all businesses.

Huistenbosch.co.jp: Only at Huistenbosch, will one encounter the only restaurant in the world where one can meet incredible cooking robots. The robots undertake a variety of tasks which include mixing and serving cocktails. The hotel insists on using robots as an effort to use technology to achieve efficiency, as labor-saving innovation keeps prices low and guests amused. They hope to inspire for a more advanced future where technology can be further used for efficiency, convenience and better functioning services.

IBM: IBM is reinventing itself by working in new ways, with IBMers acquiring new skills, adopting new habits and applying new practices. With a new program, introduced in 2015, it makes it easier for current employees to discover and navigate the opportunities at IBM to further build their career. IBMers played an integral role in Blue Matching development through their participation and feedback in beta tests, focus groups and community collaboration discussions. Using analytics, Blue Matching surfaces jobs that fit employee's experience, role, performance and location. This cognitive tool is used to assist in locating different roles that might be a good fit for current employees. It is most helpful for lateral or other internal moves and might include positions they haven't thought of. Blue Matching technology serves up job openings to employees based on their AI-inferred skills data. Employees opt into the service.

IBM and Maersk: A global trade platform that uses blockchain technology directed toward improving the cost of transportation, lack of visibility and inefficiencies with paper-based processes. The aim is to bring together in an open blockchain platform that offers a suite of digital products and integration services. It is about reducing global trade barriers and increasing efficiency across international supply chains, and bringing to market a trade platform for containerized shipping - connecting the entire supply chain ecosystem. The two main capabilities at launch will address current visibility and documentation challenges. They will provide an end-to-end supply chain visibility that enables all actors involved in a global shipping transaction to securely and seamlessly exchange shipment events in real time. Digitize and automate paperwork filings for the import and export goods by enabling end users to securely submit, stamp and approve documents across national and organizational boundaries.

IBM and Sigfox: Together, IBM and Sigfox, an internet of things (IoT) service provider, have launched a digital "Track and Trace" solution, for the digitization of package (container) tracking suppliers and manufacturers for Group PSA. They have optimized container rotation between the various PSA supplier sites and factories. With "Track and Trace", and thanks to IBM Watson IoT' solution, Group PSA is able to track its sensor-equipped containers in real time through Sigfox' network. The solution, easy to deploy, offer simple and efficient services to reduce production line breakdowns and eliminate packaging waste in order to prevent incidents.

ING: Nowadays, more and more customers do their banking online via the website or the app, which has substantially changed the contact with the bank and the role of the banker. This makes it both a data mecca and a gigantic stage on which IT staff can show their innovations. Nowadays, ING is primarily an 'agile tech company'. Despite banking becoming increasingly digital, many customers still prefer personal contact when it

comes to making important financial decisions. ING has made a few changes to its branches, making them more personal, while equipping them to meet today's digital needs. Investing in digital leadership to deliver a universal customer experience that is best-in-class, with one integrated banking platform and a harmonized business model. New technology is transforming the way one makes payments, improving convenience, visibility and security. Not only are the payment tools and processes evolving, but the nature of the payment industry itself as well. ING's mission is to enable customers to stay a step ahead in life and in business, making payments faster, safer and more straightforward is a key concern. For example, ING introduced the Apple Pay functionality for its clients.

Intel: In today's fast-paced business world, making rapid, data-driven decisions is crucial to maintaining a competitive edge. These decisions are especially important for Intel's supply chain, which spans order taking, resource procurement, manufacturing, testing, and final delivery of products. Intel is transforming the supply chain into a modern pipeline that improves the decision-making capabilities and business agility. Reports that used to take hours to generate can now be created in real time as a result of faster access to data. Supply chain planners and experts are more efficient and effective at optimizing business processes, driving operational excellence, and providing higher levels of customer satisfaction. As digital transformation has evolved into something bigger, the work force is changing as artificial intelligence is opening up possibilitiess. Intel has developed worker robots that have taken over tasks often unsafe or physically difficult for humans to perform, this in turn provides more opportunities for people to shift to different roles which they can then grow into. In this way, they are developing new proficiencies and ways of looking into operation that increases productivity and open new windows for growth.

James: BNP Paribas Fortis has developed 'James', an online and personal investment advisory service that combines human contact with digital capabilities. Launched in 2009, James is a unique investment portfolio advisor service that substitutes web conferring technology for a face-to-face interaction between advisors and private clients. The most important feature of James is that each client interacts with the same advisor and is able to do so from virtually any location, outside of office hours, providing greater accessibility and convenience for private clients. The use of technology to build stronger customer relationships from a distance proves beneficial for both the customers and the bank.

JDA AI's System: With the acquisition of Blue Yonder, JDA hopes to unleash tremendous value locked in the data sets of customers by delivering the first productized artificial intelligence (AI) solution in the supply chain marketplace. With JDA's end-to-end supply chain solutions, the new AI-based solutions will add a new dimension of dynamic decision-making. Together they provide artificial intelligence and machine learning (ML) capabilities, whereby allowing to make intelligent, automated decisions based on real-time data. With AI and ML embedded into their core supply chain and merchandising processes, companies can respond more quickly to dynamic market conditions and evolving customer preferences, for greater profit. Together, JDA and Blue Yonder develop cognitive and connected solutions to power digital transformation for companies seeking to create a competitive advantage for their supply chains.

Jill Watson: Jill Watson is a graduate-level teaching assistant who can hold office hours 24/7/365. Built on IBM's Watson platform, Jill is the world's first artificially intelligent TA. Jill was developed specifically to handle the influx of questions by students enrolled in an online course, whereby the professor and human TA's handle the more creative and complex questions. With Jill being easily accessible at all times to students all over the world, it changes the way we provide online education.

Kinly: Kinly is the market leader in the field of video conferencing and distinguishes itself by specialization, extensive knowledge, innovation and rapid implementation. As a provider of managed video conferencing services with a strong focus on innovating the primary business processes of their customers and prospects with the use of videoconferencing. With their brand promise of working together, everywhere, their role is to provide a seamless and reliable experience that enables people to work together, in different spaces and places.

Kndrd CoLiving + Mela: Kndrd was created to intercept problems in a sustainable, mindful way built on its core pillars, using their software housing management system as a platform that offers housing as a service. It serves as a modern form of housing, whereby residents share values, interests, aspirations and living spaces. By establishing a balance in which members feel there is no compromise between space, privacy, location, productivity and fulfillment. Focusing on property owners and building portfolio managers who may want to adopt their existing properties to accommodate the growing short-stay housing needs of business travelers.

Li & Fung: Li & Fung does product design and development, raw materials and factory sourcing and capacity building, vendor compliance and distribution. As a global sourcing company that connects global retailers and brands with worldwide factories, they create customized, end-to-end supply chain and logistics solutions for brands and retailers. The tangible goal of digitalization is that it's supposed to increase the speed of fulfillment in a supply chain. Li & Fung coordinates the production of goods via a vast global network of providers to arrange for private-label manufacturing. They connect its providers, which handle product development, sourcing, production, and shipping. Li & Fung are working on a supply chain model "from design to high street" in 20 weeks (used to be 40 weeks).

Libiao: Libiao is a local Chinese start-up that has 700 robots working through the night sorting packages for delivery across China. Workers scan packages and place them on the devices. These robots then make their way to the chute for the destination city among scores of opening and drop the packages in. On the floor below, the packages are whisked away from the chutes to the waiting lorries. In order to keep these robots affordable, the company avoids using complex AI and navigation systems that would have made each robot autonomous.

Libra: Created by Facebook, Libra is a cryptocurrency designed to make it easier and cheaper for people to transfer money online. The project, currency and transactions are to be managed and cryptographically entrusted to the Libra Association - a membership organization founded by Facebook's subsidiary Calibra. The plan is for the Libra token to be backed by financial assets such as a basket of currencies and the US treasury securities in an attempt to avoid volatility. Libra service partners, within the Libra Association, will create new Libra currency units based on demand.

Matilda the Hiring Robot: Developed at La Trobe University in Australia, Matilda is able to read human emotions and while the potential applications are endless, she is currently being deployed as a job interviewer for sales positions. With an arsenal of 76 questions at her disposal, she is capable of assessing candidates and is programmed to execute a 25-minute interview. Designed to shortlist job applicants and interview them, what sets her apart is her ability to form decisions free of biases and prejudice, and is able to profile the candidate's personality. The social bot compares what it has learnt with the traits of successful employees at the company that is doing the hiring. It is based on how the emotional responses and cognitive responses benchmark against their most successful candidates in their culture.

Meet Mya: The leading conversational AI platform for hiring teams that transforms the recruitment process by automating outreach and communication across the end-to-end candidate lifecycle. Founded in 2012, Mya systems brings deep AI and NLP expertise together with recruiting domain to disrupt the recruiting operational model as we know it. Mya's proprietary conversational AI platform uses state-of-the-art natural language processing and machine learning techniques to automate outreach and communication with job candidates. Mya builds trust and confidence with candidates through open-ended, natural and dynamic conversations. The vision is to create a solution where job seekers are able to get jobs quicker and hiring teams get the most qualified candidates by eliminating frictional unemployment.

Patagonia: Widely known as an outdoor and adventure brand, Patagonia leads the way on taking care of the earth. As a leader in sustainable business, Patagonia's digital strategy is to use the full range of tools available to ensure that their customers and communities can interact with Patagonia in ways most convenient to them – whether this be communicating, taking action on issues important to them or shopping. Their mission is to "Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis."

Pawan Joshi of E2Open: At E2Open, using their software, they are able to send and respond to real-time demand supply and delivery constraints; creating a more connected, intelligent supply chain. Bringing together data from customers, distribution channels, suppliers, contract manufacturers and logistics partners, and combining it with their supply chain platform enables companies to use data in real time, with artificial intelligence and machine learning to drive smarter decisions. All this complex information is delivered in a single view Harmony that encompasses the demand, supply and logistics ecosystems. Harmony enables better planning, optimization and execution, all of which are further enhanced by end-to-end supply chain visibility and collaboration. Harmony empowers customers to build a truly digital supply chain, running a seamless, efficient supply chain across all applications.

Roblox: Roblox is a massive multiplayer online and game creation system platform that allows users to design their own games and play a wide variety of different types of games created by other users. Advertising itself as an 'Imagination Platform' that allows its users to develop or play millions of 3D online games. The other main function of the platform is socializing, as users are encouraged to make friends with other online players. The Roblox Suite allows gamers to create their own game or create one with friends or 'virtual explorers'. The site can, therefore, be used in a creative and fun way to build or explore other online 3D worlds. This game creation platform allows players to create their own games using its proprietary engine, Roblox Studio. There are three main components to Roblox: the games, the catalog of virtual items for sale, and the design studio for creating and uploading the content created.

Solaris Bank: As a technology company with a banking license, Solaris Bank provides a banking platform, which is said to allow its users (mostly digital companies and financial services startups) to access various banking services modules, which then can be integrated into their processes, websites or mobile applications. The company is able to passport the license to other EEA countries in order to serve business partners in nearly any European country. Their goal is to accelerate the transformation of financial services industry. By making possibly every company worldwide a provider of financial services, banks will act solely as the providers of infrastructure and become mostly invisible to the consumer. Thus, their platform will become a global digital ecosystem for financial services: a place where any company can build its own, modern and scalable banking products – to enable the future of financial services.

Slack: Slack stands for *Searchable Log or All Conversation and Knowledge* and distinguishes itself from other chat services such as WhatsApp, Skype and Messenger. As a collaboration hub, they provide, in addition to one-on-one chatting, the possibility to communicate with different groups of colleagues simultaneously, to share data and to search in previous conversations. Slack also 'talks' easily with software from other providers, such as Dropbox and Google Docs, making a lot of information accessible from one location. Slack offers many internet relay chat – features include persistent chat rooms (channels) organized by topic, private groups, and direct messaging. Content, including files, conversations, and people, are all searchable within Slack. From project kickoffs to budget discussions, and everything in between. Small to medium-sized companies will typically share on workspace. Larger enterprises may have an Enterprise Grid organization containing multiple interconnected workspaces.

Spark Delivery: Spark Delivery is Walmart's crowdsourcing grocery delivery solution to fulfill the 'last-mile' delivery process. Customers can buy groceries online to be delivered to them at their home or work. Walmart associates shop the order and Spark Delivery contractor drivers deliver. The program is Walmart's latest attempt

to build out a more robust delivery network so it can get online orders delivered even faster to customer's homes. Deliveries are handled like rides in a ride-hailing network, with algorithms determining how to best route drivers and orders to customer's homes. This delivery platform allows anyone who owns a car to become a courier.

Takeaway.com: Started in 1999, the Dutch company specializes in online food catering and home delivery, currently active in 11 European countries and has supplied nearly 17 million customers with food in the last 6 months. In the beginning, it did not focus solely on food delivery, but also offered to deliver furniture and groceries. The company wanted to connect all 'retailers at your corner' on the internet. With the introduction of broadband internet in 2013, there came the turning point for the company. It was no longer needed to pay per minute for the web, and they increasingly used the medium as a marketplace. In the Netherlands, the company has since been the largest ordering site for meals.

Talent recruitment by Unilever: Unilever finds top talent faster by transforming their recruiting process with Hirevue Assessments. The new digital journey for candidates allows for a higher level of candidate self-selection and job fit along with fast decision making and deeper levels of candidate engagement. Candidates are introduced to Unilever through various channels and apply for a position through the digital application form, whereby information from their LinkedIn profile is easily added. Candidates are then informed of the next selection stage via email or text. The candidates start their journey by completing a profile of assessment consisting of a series of 12 online games assessing cognitive, emotional and social traits, following which they receive immediate feedback. If they move forward, they then go through a digital interview. This 4-month recruiting process is cut down to 2 weeks, whereby it improves the candidates' experience, reduces recruiters' screening time and ensures the hiring of a truly diverse set of candidates that will be able to thrive.

Tompkins: A US supply chain that was acquired by Libiao, created t-Sort, the world's first portable automated sortation system. The design can accomplish volumes ranging from millions of units a day from a small operation in the backroom, at lower capital and greater performance. This independent robot performs similarly to a traditional conveyor-belt tray; however, it uses individual robots with no track, allowing each robot to travel independently along the shortest route during sorting. The system can also be added to on an as-needed basis and is designed for purchase on a seasonal or annual basis.

TOON: Toon is the smart thermostat from energy supplier Eneco. With this device, customers of the company can see exactly how much energy is being used and what it costs. Toon is a 'smart home platform' that can be used to connect smart plugs and home lighting too. Toon customers can monitor their electricity and gas consumption closely on the display screen, which makes it easier for them to save energy and heating. Also, the lighting can be operated remotely with the free Toon app for smartphones and tablets. Furthermore, Toon gives more detailed insight into energy consumption as well as tips for saving energy.

Topcoder: Topcoder is a crowdsourcing company with an open global community of designers, developers, data scientists and competitive programmers. Topcoder pays community members for their work on projects and sells community services to corporate, mid-size and small business clients. The community is the primary source of the workforce behind all Topcoder projects. But unlike freelance websites that require a search through member profiles for an individual with the right skills and hourly rate, Topcoder uses competition to produce creative, code, algorithms, and solutions. With this model, clients only pay for results and not time.

Ware2Go: It is a platform that connects firms with warehouse space, inventory management and other logistics services. Ware2Go uses innovative online technology to match excess warehouse and fulfilment capacity with merchant demand to provide transparent inventory, order fulfilment and final delivery. They recruit and certify warehouses in strategic locations, establishing a network of vetted fulfilment partners. Merchants can then position products closer to their customers without the need for researching or vetting providers.

Watson IBM: Watson is a question-answering computing system capable of answering questions posed in natural language by applying advanced natural language processing, information retrieval, knowledge representation, automated reasoning and machine learning technologies. For example, it is useful for recruiters to use Watson as it prioritizes the candidates and helps to see which candidates will be successful. However, it is a tool that makes recommendations rather than taking over the recruiting function.

Wonolo: Wonolo, which stands for ‘work now locally’, is an on-demand staffing platform that is changing the way businesses find talent for their immediate labor needs. Built around one simple principle - matching companies with effective, on-demand, temporary workers so that they are able to meet business needs. It is designed around providing companies with pre-vetted, motivated workers. Their technology platform creates more flexibility for underemployed workers and fills hiring needs for understaffed companies instantaneously and at a considerably lower cost.