



EUROPEAN COMMISSION

DIRECTORATE-GENERAL  
TAXATION AND CUSTOMS UNION

Brussels, 4 March 2014  
TAXUD D1/JT

**Digit/008/2014**

**EXPERT GROUP ON  
TAXATION OF THE DIGITAL ECONOMY**

***Working Paper: Digital Economy - Facts & Figures***

**Meeting to be held on 13-14 March 2014**

Berlaymont Building  
rue de la Loi 200, 1049 Brussels

## Contents

WORKING PAPER: DIGITAL ECONOMY - FACTS & FIGURES .....	1
1. MAIN CHARACTERISTICS OF THE DIGITAL ECONOMY .....	3
1.1. Overview.....	3
1.2. Characterization of the digital economy in technological terms.....	3
1.3. The importance of the digital economy .....	3
1.4. Attempts to measure digital economy .....	4
1.5. Digital technology: transformation of economic fundamentals.....	5
1.6. Digital economy - Summary.....	7
2. BUSINESS MODELS AND FEATURES OF THE DIGITAL ECONOMY .....	8
2.1. Outline of the Business models – importance of data.....	8
2.2. Features of the digital economy.....	9
2.2.1. Overview .....	9
2.2.2. The generation of value in the digital economy .....	10
2.2.3. The generation of revenues in the digital economy .....	12
2.2.4. Services offered by digital economy companies .....	13
2.2.5. Micro-multinationals & impact on work patterns .....	13
3. IMPLICATIONS FOR TAXATION.....	13
3.1. Introduction.....	13
3.2. Corporate Income Tax (CIT).....	13
3.2.1. General Key Factors of CIT .....	13
3.2.2. Impact of the Digital Economy on CIT .....	14
3.3. Value Added Tax.....	15
3.3.1. General Key Factors of VAT.....	15
3.3.2. Impact of the Digital Economy on VAT .....	15
ANNEX A: TECHNOLOGICAL TRENDS .....	17
ANNEX B: DIGITAL ENTERTAINMENT BUSINESS PRACTICES .....	19

*Disclaimer: This working paper is draft paper from the Commission services that may be updated in the light of new developments in the field or discussions in and requests from the group. It does not constitute any official positions of the college of commissioners.*

## **1. MAIN CHARACTERISTICS OF THE DIGITAL ECONOMY**

### **1.1. Overview**

This Working Paper provides a descriptive summary on the dynamics of digitalisation. The digital economy is everywhere; it has transformed and will continue to transform the economy, in terms of productivity and connectivity, especially for SMEs. Data and figures are presented where appropriate to illustrate these effects.

### **1.2. Characterization of the digital economy in technological terms**

The digital economy is the result of the transformational effects of new General-Purpose Technologies (GPT) in the fields of information and communication. It has impacted all the sectors of the economy and social activities, for instance: retail, transports, financial services, manufacturing, education, healthcare, media and so on. It has implications much beyond the Information and Communication Technology (ICT) sector. In addition, the internet is empowering people in a new and different way to create and share their ideas, giving rise to new content, entrepreneurs and markets.

The digital economy has built on previous technological innovations (or hardware) such as personal computers (for end users) and telecommunications via fibre, cable or wireless (Internet Services Providers). On the software side, specific software is used and developed at various levels (layers) for resources (raw data, digital content, executable code), accessibility (operating systems, internet protocols, Application Programming Interfaces), applications (software resources creating value), gatekeeping (authentication, payment, geo-location) and finally machine-to-human interface. The integration of activities at various levels (resources, accessibility, applications) generates the value that make specific business models profitable.

In recognition of the important societal and economic benefits that can be derived from ICT and the internet, the Digital Agenda for Europe (DAE)<sup>1</sup> was launched in 2010 as one of the seven flagships of Europe 2020, Europe's growth strategy for the period 2010-2020. The DAE identified a series of actions aimed at placing the EU at the forefront of digital technologies and was reinforced in the DAE Review communication (2012)<sup>2</sup>.

### **1.3. The importance of the digital economy**

Defining what constitutes the digital economy has proven problematic, as it is becoming increasingly difficult to separate the two as the use of technologies becomes more commonplace.

The DAE Review emphasized the influence digital technologies were having on jobs and growth, noting that the internet is empowering people to create and share their ideas, giving rise to new content, entrepreneurs and markets. Half of all productivity growth derives from investment in ICT. Internet traffic is doubling every 2–3 years and mobile internet traffic every year. By 2015 there will be 25 billion wirelessly connected devices globally; doubling to 50 billion in 2020. Mobile data traffic is expected to increase 12-fold between 2012 and 2018, and data traffic on smartphones to increase 14 times by 2018. There are more than 4 million ICT workers across many sectors in Europe and their number is growing by 3 per cent annually despite the crisis.

Because of the ever-changing technologies of the ICT sector and because of the widespread diffusion of the digital economy within the whole economy, it can no longer be described as a

---

<sup>1</sup> <https://ec.europa.eu/digital-agenda/en/digital-agenda-europe>

<sup>2</sup> <http://ec.europa.eu/digital-agenda/en/news/digital-do-list-new-digital-priorities-2013-2014>

separate part, or subset, of the mainstream economy. However, it is possible to characterize it through a set of key features: mobility, use of data and network effects:

- The digital economy enhances mobility in many different dimensions. . For example, intangible property is one of the features of the digital economy- The associated rights are easily transferrable to low-taxation jurisdictions. Users and customers can also perform commercial activities across borders which challenges traditional tax systems.
- Data as a source of value is a key feature of the digital economy. Data are collected from several market players and activities. The increasing capacity to collect, store and treat massive flows of data has led to the concept of "big data" that could generate value either in private (marketing) or public (government) activities.
- Network effects are pervasive in the digital economy. They have allowed private value creation especially through so-called multi-sided business models. In those models, several groups of persons interact through a platform, resulting in positive or negative externalities. If many examples could be quoted of multi-sided business models (e.g. payment card system, operating system, media industry), the most famous one is that of compulsory advertising considered as a negative externality (intrusive, unattractive) which is compensated by the low-cost or even free offer of a service (e.g. search engines).

#### **1.4. Attempts to measure digital economy**

As stated above, given the difficulty in quantifying what constitutes the 'digital economy', attempts to measure the digital economy have proven similarly problematic. Nevertheless, a number of high profile studies - e.g. reports by McKinsey Global Institute<sup>3</sup> and Boston Consulting Group<sup>4</sup> - have attempted to explore this issue, and the various findings have been widely quoted in other media:

- In launching the Digital Agenda for Europe in 2010, the European Commission provided data to indicate that the ICT sector represents 4.8 per cent of the EU economy; generates 25 per cent of total business R&D; and ICT sector and investment in ICT are responsible for 50 per cent of productivity growth.
- McKinsey examined data from the G8 and 5 other countries (Brazil, China, India, South Korea, and Sweden) to determine the impact of the internet on economic performance. They calculated that the internet accounted for 3.4 per cent of GDP, and had fuelled 21 per cent of GDP growth in the preceding five years. Internet usage by SMEs was estimated to create a 10 per cent rise in their productivity.
- Boston Consulting Group estimated that by 2016 the Internet economy in the G-20 economies will be worth USD 4.2 trillion (up from USD 2.3 trillion in 2010)<sup>5</sup> and that the Internet contributes to as much as 8 per cent and over 12 per cent of GDP in South Korean and the United Kingdom, respectively. The study notes that while economic growth as a whole is slow in most of the G-20 countries, the Internet economy will grow at an annual rate of 8 per cent, far outpacing growth in more 'traditional' sectors.

---

<sup>3</sup> [http://www.mckinsey.com/features/sizing\\_the\\_internet\\_economy](http://www.mckinsey.com/features/sizing_the_internet_economy)

<sup>4</sup> [https://www.bcgperspectives.com/content/articles/media\\_entertainment\\_strategic\\_planning\\_4\\_2\\_trillion\\_opportunity\\_internet\\_economy\\_g20/](https://www.bcgperspectives.com/content/articles/media_entertainment_strategic_planning_4_2_trillion_opportunity_internet_economy_g20/)

<sup>5</sup> To put this number into perspective: if the Internet were a country, it would rank 5<sup>th</sup> in the world in terms of its "GDP", after the US, China, Japan and India, but ahead of Germany.

Indeed, they calculated the Internet's contribution to GDP is estimated to increase to 5.7 per cent in the EU and 5.3 per cent for the combined G-20 countries by 2016. Overall, it is estimated that the Internet economy in the G-20 will double in size between 2010 and 2016, with the fastest growth taking place in developing markets hoping the reap the benefits from investments in broadband infrastructure. In most countries, consumption will be the main driver of "Internet GDP".

- The effects of new developments like the App Economy which began with the launch of the Apple App Store just five years ago. Downloads of applications – “apps” – total around 100 billion with nearly 1 million apps available across an increasing number of app stores. The economic impact is significant and growing. A report commissioned by the industry<sup>6</sup> mention revenues of more than €10 billion per annum or jobs in the order of 790.000 across the whole EU economy.

It is difficult to compare the reliability of those measurements as those studies make use of different aggregates and different methodologies. For example the ICT sector considers only ICT producing companies, and ICT investment measures expenditure in ICT capital goods by the rest of the economy including sectors beyond the 'traditional' ICT intensive sectors. The digital economy is, with the words of Negroponte, "about processing bits instead of atoms". The internet economy and the digital economy are two largely overlapping concepts since two characteristics of the digital economy examined above, namely, (digital) data as source of value and pervasive network effects almost always involve data exchange through Internet protocols. To translate the concept of internet economy into measurement practice, some of the above mentioned studies put together ICT producing industries (i.e. the ones providing internet infrastructure) with the ones making use of the infrastructure (e.g. internet services), sometimes including also things like the full value of eCommerce traded goods<sup>7</sup> that are difficult to justify. These measurement issues reflect the conceptual difficulty already signalled in the previous section of clearly separating the digital dimension of the economy from the other dimensions.

### 1.5. Digital technology: transformation of economic fundamentals

Some pioneering studies have provided empirical ground for the quantification of the characteristics of the digital economy. A study by Brynjolfsson, McAfee, Sorell and Zhu<sup>8</sup> shows that in sectors that invested massively in ICT capital the distance (in terms of profitability) between market leaders and competitors has increased greatly after 1995 (a period characterized by the surge in ICT investment), compared a relative stability of the less intensive ICT sectors (Figure 1). The same study also finds that more ICT intensive sectors witness significantly higher turbulence (expressed as average changes in firms' sales rankings) than less ICT intensive sectors.

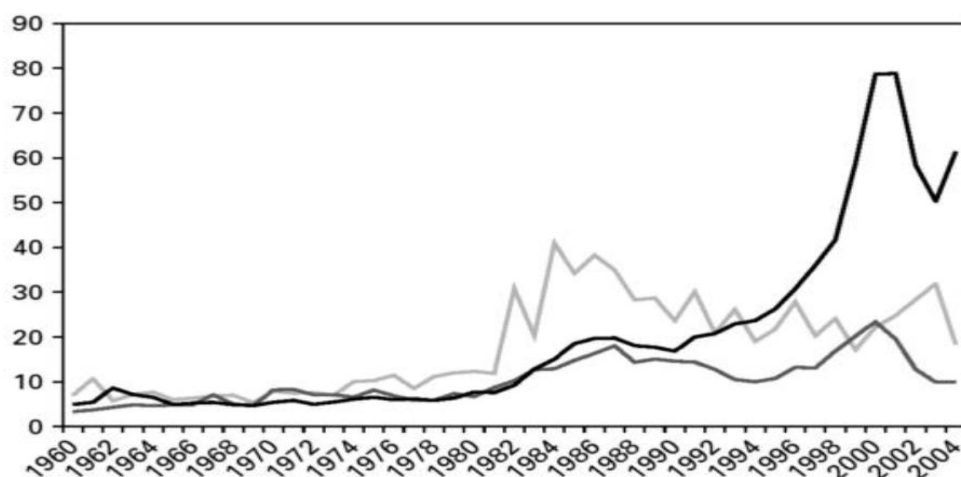
**Figure 1: Profitability in IT intensive industries (profit disparity between most profitable and least profitable companies in segment, as measured by inter-quartile range). Black denotes high IT intensive sectors, dark grey denotes medium IT intensive sectors and light grey denotes low IT intensive sectors.**

---

<sup>6</sup> The European App economy: CREATING JOBS AND DRIVING GROWTH. VisionMobile and Plum Consulting. Sponsored by ACT4Apps. September 2013

<sup>7</sup> As done for example by the McKinsey and Boston Consulting group studies.

<sup>8</sup> Source: Brynjolfsson E. , McAfee J., Sorell M. and Zhu F. (2009), "Scale without mass: Business process replication and industry dynamics", Working Paper, MIT



On the macro side it is more difficult to measure the impact of the digital economy on the whole economy as the two have become more and more entwined. Given that digital business models are present in more and more sectors of the economy it is not possible to come up with the size of the digital economy as a percentage of GDP.

It is possible to estimate the impact that ICT-led innovation has had on growth. Van Ark et al (2014)<sup>9</sup> calculated the direct impact that ICT investment had on growth then the indirect impact, through Multi-Factor Productivity, on both ICT producing and ICT using sectors<sup>10</sup>. The result is that 74 per cent of the growth in market sector labour productivity in the US in the period 1995-2007 was led by ICT (and complementary) investments. The contribution in the EU27 was only of 60 per cent and for a much lower total. Labour productivity figures for the US in recent years are low however (even accounting for the crisis) and have led some authors (e.g. Gordon, 2012<sup>11</sup>) to question the role of GPT that mainstream economists attribute to ICT.

**Table 1: Comparison of EU and US ICT growth impacts<sup>12</sup>**

<sup>9</sup> van Ark B, van Welsum D. and Overmeer W. (2014), "Unlocking the ICT growth potential in Europe: Enabling people and businesses Using Scenarios to Build a New Narrative for the Role of ICT in Growth in Europe", a study prepared for the European Commission (DG CNECT) by The Conference Board.

<sup>10</sup> The latter impact has been taken by separating sectors which made low and high ICT investments and then attributing the MFP- growth differential of the two sets to ICT-led innovation

<sup>11</sup> Gordon R. J. (2012), "Is U.S. economic growth over? Faltering innovation confronts the six headwinds", NBER Working paper 18315. In a more recent paper, Gordon R.J. (2014), "The Demise of US Growth, Restatement, Rebuttal and Reflections", NBER Working Paper, 18895, Gordon deepens this theory.

<sup>12</sup> Byrne D. M., Oliner S.D., and Sichel D. E. (2013), "Is the Information Technology Revolution Over?", International Productivity Monitor, No. 25, Spring.  
 Mas, M. (2012), "Productivity in the Advanced Countries: from Expansion to Crisis," in: Matilde Mas and Robert Stehrer, eds., Industrial Productivity in Europe. Growth and Crisis, Edward Elgar, Cheltenham.  
 Van Ark B. (2013a), "Recent Changes in Europe's Competitive Landscape and Medium Term Perspectives: How the Sources of Demand and Supply Are Shaping Up", The Conference Board Economics Program Working Paper EPWP 13-05, The Conference Board, New York.  
 Van Ark B. (2013b), "Europe's Productivity Performance in Comparative Perspective: Trends, Causes and Recent Developments", in D.S. Prasada Rao and Bart van Ark, eds., World Economic Performance. Past, Present and Future. Edward Elgar Publishing, pp.290-316.

	Europe					United States				
	EU-15		EU-27			total economy	market sector	total economy	total economy	total economy
	total economy	market sector	total economy	total economy	total economy					
1995-07	1995-07	2001-05	2006-11	2001-11	1995-07	1995-07	2001-05	2006-11	2001-11	
GDP growth	2.2	2.5	2.0	1.1	1.5	3.1	3.5	2.4	0.7	1.5
Labour productivity growth	1.3	1.6	1.6	0.9	1.2	2.0	2.6	2.0	1.2	1.5
Contributions to LP growth:										
IT investment/hour	0.4	0.5	0.4	0.3	0.3	0.7	0.9	0.5	0.4	0.5
MFP(ICT-production)	0.3	0.3	0.3	0.1	0.2	0.5	0.5	0.5	0.3	0.4
MFP(ICT-use)	0.1	0.2	0.0	-0.1	-0.1	0.1	0.5	0.1	-0.1	0.0
%-point IT contribution to LP	0.7	1.0	0.7	0.3	0.4	1.3	1.9	1.1	0.5	0.9
Total IT as % of LP growth	57%	60%	43%	32%	36%	64%	74%	54%	46%	55%
Total IT as % of GDP growth	34%	39%	34%	27%	30%	41%	55%	45%	78%	55%

Notes: The effects of multi factor productivity (MFP) from ICT production were obtained from Byrne, Oliner, Sichel (2013) for the U.S.. For Europe we assumed half of the U.S. effects, as was evidenced from the EU KLEMS database. The effects of MFP in ICT- using industries were based on the differential in labour productivity growth in ICT-using and non-ICT using industries from Mas (2012). LP denotes labour productivity.

Market sector equals total economy, excluding the government, education and health care sectors.

EU-27 refers to the 27 Member States prior to the accession of Croatia on 1 July 2013.

Sources: Building on van Ark (2013a, 2013b).

ICT fails to show up in productivity statistics, as the digital economy makes the measurement of outputs increasingly difficult. Costly analogue goods are replaced by cheaper digital alternatives. For example, music and DVDs have quickly been replaced by downloadable media files or streaming services: the quality of the goods has not decreased and on the converse has actually increased by the addition of additional features (e.g. timeliness, ubiquitous access, zero storage space and weight<sup>13</sup>). But on GDP statistics this shows up as a decrease since they are considered different kinds of goods and analogic equivalents are pricier.

The correcting mechanism should be the introduction of hedonic prices<sup>14</sup> for comparisons between analogic and digital versions of products. This distortion is even more pronounced, and corrections even more difficult, in the case of free goods that are abundant in the digital economy (e.g. email accounts, social networks, and search engines). Another aspect that fails to be taken into account is the increased variety of goods made available by the digital revolution<sup>15</sup> which while increasing welfare is not accounted for in GDP measures.

The vast progress in digitalizing processes, in measuring them and in transmitting information has allowed companies to decentralise many functions in distant locations based on their advantages (e.g. low wages, skilled workforce); indeed, global value chains are made possible mainly by ICT-driven innovations. The derived gain from globalization is benefitting advanced economies and developing economies as well (at least those integrated in the value chains) which have experienced tremendous rates of growth in the past 20 years. Although gains from globalization have been substantial for some developing countries not all the merit has been accrued to ICT, at least not quantitatively for the difficulties of such an exercise.

Perhaps the most compelling reason for the low impact of ICT on GDP growth is that it may take decades for the full unfolding of complementary innovations enabled by a GPT. Syverson (2013)<sup>16</sup> made an interesting analysis of labour productivity growth during the electrification era

<sup>13</sup> Not counting the hardware support (e.g. hard disk) for the storage

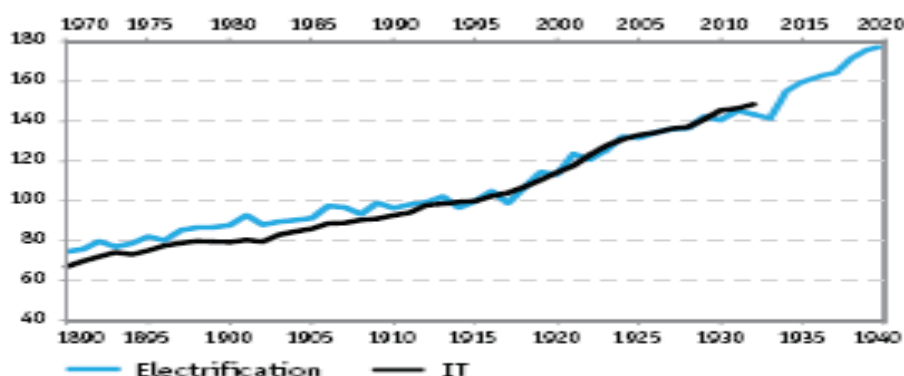
<sup>14</sup> Hedonic pricing is an econometric technique that aims to correct price comparisons between two similar items by taking into account their different features/quality. It does so by attributing, through pricing regressions of many similar items, a value to each feature.

<sup>15</sup> See for example Brynjolfsson E., Hu Y.J. and Smith M.D. (2003), "Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at Online Booksellers", Management Science, Vol 49 Issue 11 pp. 1580-1596

<sup>16</sup> Syverson C. (2013), "Will history repeat itself? Comments on 'Is the Information Technology revolution over?'", International Productivity Monitor, Vol 25, pp. 25-36

and the IT era, shown in Figure 2 with an impressively similar pattern. In particular both Electricity and IT share a second slowdown in productivity (the first in 1924-1932 and the second in 2004-2012).

**Figure 2: Labour productivity Growth during the Electrification Era (1890-1940) and the IT Era (1970-2012) in the United States (1915=100 and 1995=100)**



Source: Kendrick (1961); Byrne, Oliner, and Sichel (2013).

Some economists and technology experts (Kurzweil, 2005; Brynjolfsson, 2014 among others<sup>17</sup>) argue that we are only "in the first half of the chess board<sup>18</sup>" and that the exponential rise in computing power will lead not only to quantitative changes in the capabilities of computing devices but, most importantly, to qualitative changes, enabling them to do things that were not deemed possible a few years ago.

### 1.6. Digital economy - Summary

- Digitisation has had a major transformative effect, and has impacted upon every sector of the economy. Business models have emerged demonstrating common features – mobility, use of data to generate value and network effects. These trends show no signs of decreasing.
- Digital technologies will increase competitiveness in the economy; this is likely to be global in scale, given that geographical barriers are becoming increasingly irrelevant.
- If the framework conditions are met, ICT could lead to increases in productivity and innovation, contributing to GDP growth in much the same way as electrification in the 19<sup>th</sup> and 20<sup>th</sup> centuries.

<sup>17</sup> Kurzweil R. (2005), "The singularity is near: when humans transcend biology", Penguin Books. Brynjolfsson E. and McAfee J. (2014), "The second machine age. Work progress and prosperity in a time of brilliant technologies", Norton & Company, New York

<sup>18</sup> As an analogy between Moore's law of exponential computing power and the legend of the game of chess where, according to it, its inventor asked his king a reward in grains of rice equal to the doubling of quantities for each square (i.e. one for the first, two for the second, four for the third and so on). The king soon realised that the power of  $2^{32}$  and above were giving quantities of rice beyond the imaginable.



## 2. BUSINESS MODELS AND FEATURES OF THE DIGITAL ECONOMY

### 2.1. Outline of the Business models – importance of data

This section provides concrete implications of how and where emerging technologies in ICT may change our landscape.

The digital economy has also led to innovation in business models: how goods and services are produced, how value is generated (e.g. users as a source of value) and how value is monetized (the respective place of free and pay services). The digital economy has given rise to certain forms of business model which are able to thrive in the new environment. There is some debate over whether the business models are strictly 'new', or whether they are merely logical extensions of existing business models - but there is little doubt that the companies that have adapted to new technologies have some characteristics in common:

- A propensity for intensive innovation.
- A tendency to make greater use of new sources of finance, e.g. venture capital, crowd-funding, etc.
- Emphasis on the importance of intangible assets rather than (traditional) fixed assets e.g. patents, trademarks, copyrights, franchises, licences, etc., in the value creation and of electronic services as final products.
- Base their business model on network effects, user generated contents, collection and exploitation of personal data, etc.
- Significant cross-border E-commerce including the delivery of traditional forms of commerce through new channels.

ICT helps digital firms to make innovations that are much more successful because it dramatically lowers the costs associated with four essential dimensions of innovation: measurement, experimentation, sharing and replication. It does so by digitizing these dimensions into bits of information and therefore making it possible to create, store and transmit them at virtually no-cost. With the decreasing costs of ICT (thanks to Moore's law<sup>19</sup>), the digitization of these four dimensions will become possible in a growing number of sectors of economic activity spreading from initial ICT intensive sectors where this transformation was easier (e.g. music, publishing, audio-visual, press, advertising, finance, travel) to other, 'less obvious' sectors.

The one constant that links the various digital economy models is the importance of the value of data and, increasingly, personal data. Much value is attached to the data that is generated by digital economy companies, or via the public sector. When the scale of these data is such that ordinary means of data collection and analysis are inadequate then we refer to Big Data; and it has become one of the key features of the digital economy. Value can be derived from its use and as such, companies have gone to great lengths to create goods and services that make maximum use of data available, in order to meet consumer demand.

Yet the existence of data *alone* is not sufficient to generate value; the value comes from maximising the efficacy of use from the actual data; but the challenge is deciding at which point and where the value is created. Furthermore, the data that is the lifeblood of the digital economy is increasingly being generated by users, rather than the companies themselves.

---

<sup>19</sup> That the number of transistors on a chip will double approximately every two years - <http://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html>

It is thus difficult to judge where the data is based and where it acquires value – and to where taxation should apply, particularly given that the universal principle for taxation is territoriality. In the digital world, such concepts are becoming increasingly redundant – the rise of cloud is likely to accelerate this trend. The OECD summarises the situation as follows: *the fact that data, including location-specific data may be collected from customers or devices located in location, then processed in a second location and used to improve product offerings in the first location raises questions about how much value is created through the collection of data, and how much is created through the analysis and use of that data.* (par. 196, p.60)

This data can be classified three ways. Firstly, collected data, whereby data entered by a user is tracked; secondly, submitted data, i.e. data that is specifically entered by a user, e.g. on a search engine; thirdly, inferred data, data that is compiled via pooling together various strands of data from a variety of sources.

## **2.2. Features of the digital economy**

### *2.2.1. Overview*

The digitization of products and processes has made a huge and exponentially increasing amount of data available in various forms; examples include users' web-clicks and machine-to-machine interactions.

This increased data availability has made it possible to measure and analyse phenomena to an extent never reached before. This, in turn, makes it easier to run controlled experiments and to measure the success of them with great precision.

Amazon and Google run hundreds of controlled experiment on their customers' web interactions each and every day. Once an individual creates an innovation it can be more easily shared within an organization or a group through various e-channels: emails, wikis, social media, online fora etc., making them potentially more and more useful. Since products, services and even business processes can be digitalized, once experiments show that an approach works, this can be replicated at a marginal cost close to zero, at any distance for the desired amount.

The digitization of a growing number of goods, services and processes, accompanied by a huge access to information (often crowd-sourced) is quickly removing barriers. As a result, the economic rents of previous incumbents in many local markets are quickly disappearing and giving huge advantages to the best product, service or process in the market.

More and more markets are therefore becoming a '*winner-takes-all market*' where even small differences in quality between the best producer and the second best producer translate into huge differences in market share. Competition in this kind of market is based on innovation rather than price, resulting in high turbulence in the market; with incumbents quickly being displaced by more successful innovators - e.g. Facebook vs. MySpace - in a way that sounds very much like the model of 'creative destruction' presented by Joseph Schumpeter 60 years ago<sup>20</sup>.

This mechanism is accentuated for digital services where the value of the service provided increases with the number of users of that service, i.e. what economists call network effects. A classic example of service exhibiting network effects is the telephone network; a digital one is Facebook<sup>21</sup>. Network effects can be indirect (or exhibit two-sidedness) - that is, one population of

---

<sup>20</sup> Schumpeter J., (1942), "Capitalism, Socialism and Democracy", book.

<sup>21</sup> Facebook quickly took Friendster customer's base to become the dominant social media service in the world. Given the existence of network effects the transition of the customer's base from Facebook to its next competitor could be very quick even if Facebook's customer's base amounts to 900+ million users.

users obtains benefits from the size of another population of users. An example of that is given by the app stores of Google and Apple where users are attracted to smart phone ecosystems that offer a large range of applications and developers are willing to write applications for operating systems with a large customer base.

While the digitization of products and the enlarging of their market has greatly increased competition on the vertical dimension of quality - creating 'winner-takes-all' markets and exacerbating the phenomenon of superstars<sup>22</sup> in various fields (e.g. the media, sports, finance, corporate positions and growingly other sectors like health and higher education) - it has also allowed increased competition on the horizontal dimension of quality, increasing variety. While digitization has not only lowered the marginal costs of producing digital products but also fixed costs as well, the progress of telecommunications has made the market for digital products truly global increasing the economic viability for a growing number of actors to enter the markets for digital content, greatly increasing the available variety to levels unimaginable before the digital revolution<sup>23</sup>. This has resulted in the widely observed phenomenon of the long tail<sup>24</sup> where the majority of sales for a particular category of products (e.g. books, songs) are made by a handful of producers, but where a large population of producers exist that sell only a few copies.

Given the low barriers to the production and worldwide distribution of digital content, not only large players have a role but also very small producers. Individual persons can thrive in these digital business models - giving rise to the growing phenomenon of the so called micro-multinationals. This large growth of customer's base and even revenue without need of a large workforce thanks to the digitization of many business processes has been observed at all scales of activities even the largest ones<sup>25</sup>. This phenomenon - known as scale without mass - is another key feature of the digital revolution (i.e. ICT enabled innovation).

### 2.2.2. *The generation of value in the digital economy*

Figure 3 (below) illustrates the various ways in which data is generated and transformed into value in the digital economy.

#### **Figure 3: The generation of value from data in the digital economy<sup>26</sup>**

---

<sup>22</sup> We mean here by superstars those people that excel in their fields and as a consequently get large rewards based not on their absolute performance.

<sup>23</sup> For example Amazon.com can offer over five millions volumes while the largest retailer stores don't reach half a million volumes

<sup>24</sup> See for example Anderson C., "The long tail: Why the Future of Business is Selling Less of More", book, Hyperion editions, July 2006.

<sup>25</sup> For example Dropbox has US\$ 400 million of revenues, US\$ 4 billion market value and 150 employees (2012); Facebook has US\$ 7.87 billion of revenues and 5800 employees (2013)

<sup>26</sup> <https://cde.catapult.org.uk/data-value-chain>



Across the value chain, several sources of value can be identified. As with other sectors, the digital economy has followed an innovation-commoditisation cycle; therefore as commoditisation makes profit margins shrink and as value mainly derives from innovation, the source of value has evolved over time.

The technologies of the emerging times of the digital economy have been commoditized:

- Personal computers: this sector has experienced a sharp drop in prices and is now widely commoditized.
- Telecommunication networks: the services offered by the traditional Internet Service Providers (ISP) have been largely commoditized; on the contrary, over-the-top (OTT) providers can deliver content (audio and video) directly to the end-user across all networks.
- Software: software has been largely commoditized: the standards of Internet (HTTP protocol, HTML and XML data formats, email protocols such as SMTP, POP and IMAP), but also Operating Systems, databases, web servers and browsers.

In the most recent times, new sources of value have emerged:

- Devices: integrated packages of hardware and software such as smartphones and tablets have constituted a new source of value; those devices are now increasingly diversified (internet access is not only through personal computers but also smartphones, tablets, connected TVs). Moreover, some companies are now diversifying to hardware which is regaining pace as a source of value; presently the digital economy is experiencing some return to a hardware-centric value generation.
- Content: it may be copyrighted or not copyrighted, produced by professionals or by users; it is a factor of attraction of users and updating contents increases the visibility of websites through search engines; so-called earned contents are directly produced by users.

- Users: they have become a major source of value in the production of contents: internet encyclopaedia (e.g. Wikipedia), online video-sharing websites (e.g. YouTube), online social networks (e.g. Facebook); added to that they also provide digital businesses with many personal data that can be used to customize services (e.g. cookies) or to increase the productivity. Those personal data can be either submitted by users, observed or inferred; this phenomenon has attracted the attention of management science which has derived the concepts of "co-creation", "crowdsourcing" or the more comprehensive concept of "Web 2.0". However, it should be noted that raw data has no value in itself and that some value could only be extracted through sophisticated tools.
- Cloud-computing: is based on the idea that given the commoditization of many individual sources of value, only the combination of those sources could generate value. A new class of providers called Application Service Providers (ASP) has emerged; the services that they deliver are: infrastructure, computing platform (hardware, operating system, libraries, etc.), software, content and data.

Future technological developments will lead to new sources of value. A recent report by McKinsey Global Institute (MGI)<sup>27</sup> identified 12 emerging technology trends that are expected to have large disruptive effects on the economy and provide new sources of growth. Unsurprisingly, a large number of them are ICT based.

The report also attempted to quantify the projected economic impacts of these technology trends, which include: Big Data, Cloud technology, autonomous vehicles, 3D printing, The Internet of Things and advanced robotics. Many of these trends were also identified as the main drivers of ICT growth impacts in a study recently completed on behalf of DG CONNECT into Europe's ICT growth potential<sup>28</sup>.

Generally speaking, both technological (miniaturisation) and business innovations (low marginal price of networks) have led to a reduction of barriers to entry in the Internet sector. As a consequence, companies that have been willing to maintain their market position have struggled to innovate (products, processes and business models). Therefore value creation has moved speedily from one sector to another and to one company to another.

### 2.2.3. *The generation of revenues in the digital economy*

The digital economy could be characterized by a combination of for-profit and not-for-profit activities (this is not specific to the digital economy e.g. free press, classified ads). Many sectors such as retailers and advertising have first adapted the traditional business models to digital technologies before developing specific business models.

Revenue generation on the digital economy derives from both direct payment (e.g. e-commerce) and indirect payment through the generation of value in one activity and its monetization through another activity (e.g. search engines).

Several sources of revenues can be identified:

1. indirect payment: advertising (the provider offers free digital content in exchange to compulsory advertising viewing), "hidden" fees (online operations subsidized by physical operations e.g. banks).

---

<sup>27</sup> [http://www.mckinsey.com/insights/business\\_technology/disruptive\\_technologies](http://www.mckinsey.com/insights/business_technology/disruptive_technologies)

<sup>28</sup> See annex A .

2. direct payments: digital content purchase or rentals, selling of goods, subscriptions (digital contents, software services e.g. anti-virus), selling of services, licensing, selling of data.

#### 2.2.4. *Services offered by digital economy companies*

Although the actual product or service offered by the many digital economy companies may differ greatly, there are many common features.

Many are based on what, on the surface, appear to be 'free' products – e.g. users of a search engine are not charged every time they make a search (for example: Skype offer a communication service that users can utilise for free; YouTube enables users to post and access content for free; Spotify enables users to access music for free. Facebook members are able to interact with one another, again free of charge. (In certain cases, users are able to pay a subscription in order to access premium services). Email accounts with whichever provider are free to open.

Apple's modus operandi differs slightly; their products are often priced at a premium, but the additional products (e.g. apps) that enable enhanced use of the product are often free – a reversal of a typical business model, whereby the equipment is often priced relatively lowly to attract buyers, but the add-ons are relatively more costly (e.g. traditional console game format).

It could be queried as to whether some business models are truly 'new'. For example, Amazon, although an online service, is arguably just the equivalent of a traditional store (albeit on a grander scale and without need to physically have a store). Moreover, the generation of income via advertisements arguably replicates the selling of advertisement space on television or radio.

What does make a difference, however, is the unique, almost personalised manner in which advertisements track the user – by responding directly to their search-engine searches or direct clicks on to adverts.

#### 2.2.5. *Micro-multinationals & impact on work patterns*

As observed by, amongst others, the Lisbon Council<sup>29</sup>, the digital economy has led to the phenomena of the micro-multinational – small firms with a global reach, unthinkable in the pre-digital age. Many of the leading digital economy companies started off in this way. The long term implications for working patterns of future generations could be profound.

In an era where larger corporations and governments are downsizing, individual working habits are changing with it. Individuals are increasingly opting to work for themselves, or as part of a smaller, more flexible and less hierarchical organisations. People will have multiple careers, in different fields. The conceptual norm of the workplace and working hours are adjusting; people can work from home, with colleagues and collaborators in separate continents, in a twenty-four/seven environment.

### **3. IMPLICATIONS FOR TAXATION**

#### **3.1. Introduction**

The increasing digitisation of traditionally businesses as well as the appearance of purely digitally operating companies has an impact on the functioning of national and international tax systems, both direct and indirect. Do the new ways of interacting with customers, of marketing

---

<sup>29</sup> <http://www.lisboncouncil.net/publication/publication/81-the-rise-of-the-micro-multinational-how-freelancers-and-technology-savvy-start-ups-are-driving-growth-jobs-and-innovation.html>

products and services and of generating income have an impact on the factors and features that determine where income tax is levied and how much income tax is due? How do new ways of interacting with customers and delivering products impact the levy and collection of consumption taxes such as VAT?

When discussing this impact, it is necessary to clarify the factors and elements that are relevant in determining liability to tax and taxable base, as well as of some the principles that govern these factors. This concerns both direct and indirect taxation.

### **3.2. Corporate Income Tax (CIT)**

#### *3.2.1. General Key factors of CIT*

Corporate Income Tax is levied on the annual profits realized by individual tax payers per year, whereby the expression 'individual taxpayers' generally means individual companies. Each country levies CIT from the companies that are resident in its territory. Multinationals are typically organized as one parent company holding a large number of subsidiaries and sub-subsidiaries in different countries around the world. It is important to understand that not the multinational's overall profits that are subject to CIT, but the separate profits of each individual subsidiary in its country of residence.

International corporate income tax rules are mainly about ensuring that corporate profits are equitably allocated among the different jurisdictions where a corporation is active.

This is done in a two-step approach in which two questions are consecutively addressed:

1. When does a company operating in a foreign market become liable to CIT in that foreign market? and
2. If it becomes liable to CIT, how much profit must be allocated to it?

The first question is about the *jurisdiction to tax*, the second is about the international sharing of the relevant tax base. Currently the latter concentrates on *transfer pricing*. *Formula apportionment (FA)* is currently not in operation in the EU but the Commission's proposal for the Common Consolidated Corporate Tax Base (CCCTB) which is being discussed in Council uses FA as an alternative to transfer pricing.

#### *3.2.2. Impact of the Digital Economy on CIT*

As described in paragraph 2.1 and 2.2, common characteristics of businesses thriving in the digital economy is the larger reliance on electronic services as final products and on Intellectual Property in a multinational's value chain. The latter typically related to user generated contents, to the collection and exploitation of personal data often combined with network effects.

This development has direct implications for the two abovementioned fundamental questions in international company tax. In the first place it raises the question whether a multinational's digital presence in a foreign country should give that country the jurisdiction to levy company taxes from that non-resident company. And secondly, the heavy reliance on new types of IP specifically related to the collection, processing and exploitation of personal data has not only complicated the application of traditional transfer pricing rules but has also put more weight on it as the value of some digital companies is almost exclusively vested in its IP.

One could also say that these characteristics of companies operating digital business models have as their ultimate effect that they essentially run their business over the internet which essentially is a borderless world. The mobility of especially assets, capital and to a lesser extent labour within multinational groups has traditionally been a point of concern for tax policy makers given the implications that this mobility has for related shift of the taxable profits. Within the

essentially borderless digital economy, however, these concerns are felt even stronger: the main assets of digital companies are highly mobile IP and capital whereas they require only minimum staff that is generally mobile as well.

### Jurisdiction to tax and the digital economy

In most jurisdictions the world-wide profits of an entity are taxable in its country of residence - i.e. on the residence principle as opposed to the lesser used territoriality principle. However, many countries also levy tax on the profits realized in its territory by a non-resident entity that has a *taxable presence* on its territory. To avoid that foreign source profits of a company are taxed both by its state of residence and by the state where the profits are realized (source state); the state of residence will typically provide relief for double taxation. This is done either by exempting foreign profits (exemption method) or by crediting foreign taxes paid against domestic taxes due (credit system). This principle and the rules implementing it have been laid down in a network of bilateral double tax conventions that are based on internationally agreed guidelines.

They determine that a foreign enterprise operating in a country must have an agreed minimum form of physical presence in that country in order to create a taxable presence. This minimum physical presence is defined under the concepts of a 'permanent establishment'<sup>30</sup>. It is based firstly on the assumption that any economic activity of a foreign entity in another country will necessarily require the physical establishment of persons or tangible assets in that country. And secondly on the international agreement that only in case such establishment has a (semi)-permanent nature, the country concerned is granted corporate tax jurisdiction over that entity.

The rise of the digital economy has had an impact especially on the first assumption: the need to have some physical establishment in a country where business is done. The larger reliance of many companies operating in the digital economy on electronic services as final products means that they do not any longer need physical establishment in the foreign countries where they are active. This applies partly to businesses that sell mainly traditional tangible products but rely entirely on the internet to promote and sell their products, e.g. Amazon as far as the sales of books is concerned. It applies fully to businesses that mainly or exclusively sell digital products or services over the internet, be in one-sided business models e.g. the sale of digital music to customers by Apple, or in multi-sided business models e.g. the offering of free digital search engine services to customers by Google combined with selling advertisements on the webpage concerned.

The fundamental question therefore is whether the requirement of a minimum physical presence in order to allocate tax jurisdiction can be maintained in an economy that relies more and more on digital rather than physical presence.

### Transfer pricing and the digital economy

Only a few group companies within a multinational's group structure engage directly with third parties, either customers or suppliers. Many of them have an internal group function and engage solely with other group companies. For example, they own certain assets (capital, IP or real estate) and rent, license or lease these to group companies around the world. The prices charged between group companies within one and the same multinational business effectively determine the amount of profit realized by each separate entity. The absence of any regulations in this area would enable multinationals to drastically reducing their exposure to CIT by locating internal group companies that realize substantial profits with internal transactions primarily in jurisdictions with favorable tax rates. Therefore, many countries have included rules on this in their domestic tax legislation and guidelines have been agreed at international level (OECD and UN) to coordinate the interaction between these rules.

---

<sup>30</sup> Or the connected concepts 'permanent representative' or '(in)dependent agent'.



The degree of presence is not only relevant to determine the existence of a taxable presence (a 'permanent establishment'), it indirectly also determines how much profit can be attributed to each individual entity or permanent establishment. Essentially, this 'attribution exercise' looks at the people working for the company/PE, the functions undertaken by it and the assets it owns. The profit share that can be attributed essentially depends on the relevance of its people, the importance of its functions and the value of its assets. The rise of the digital economy has had an impact on all of these elements. For example, where all or most of the business processes of a company are IT-based, their physical location becomes very hard to determine. Several important business functions can be exercised digitally by people from anywhere in the world, which makes it hard to fix the precise location of functions and gives businesses the better opportunities to locate functions where it is most favorable from a tax point of view.

Most relevant in the context of the rising digital economy, however, is the growing role of intellectual property (IP). For many businesses in the digital economy their IP is what makes them unique and valuable. Under current transfer pricing rules this makes the location of IP an extremely important factor when determining where profits should be attributed. IP may in some cases be developed and owned by one distinct entity and therefore be clearly identifiable. In other cases, determining the owner of IP becomes increasingly problematic, for example for IP of which the value is jointly created within highly integrated groups. In both cases, however, the mobility of IP – the opportunity for businesses to locate their most valuable IP in entities resident in tax friendly jurisdictions – is a serious concern for tax administrations around the world. The heavy reliance of digital businesses on IP as the primary source of their value makes this an issue that is particularly relevant, though not necessarily unique for the 'digital economy'<sup>31</sup>.

Current transfer pricing rules aim to attribute a multinational's overall profit to the various taxable presences in the world based on a division of functions, assets and risks. For the digital economy that operates largely in a borderless world, however, such a division is almost by definition arbitrary and hence prone to manipulation. The second fundamental question therefore is whether such a system is sustainable in the medium and long term especially in view of the expected future expansion of digital means.

### **3.3. Value Added Tax (VAT)**

#### *3.3.1. General Key factors of VAT*

VAT legislation makes a distinction between the supply of goods (“the transfer of the right to dispose of tangible property as owner”) and the supply of services (“any transaction which does not constitute a supply of goods”). Different rules apply for the supply of goods and the supply of services, e.g. for place of taxation, chargeable event and chargeability of VAT, administrative obligations and VAT rates. The VAT system also distinguishes between intra-EU supplies and supplies from outside the EU.

The rise of the digital economy has seen new types of transactions and new ways of effecting more traditional transactions for both goods and services. Increased mobility and permeability of borders creates challenges for the VAT system. These factors together with the ease with which suppliers from one country interact with customers in another country may need to be reflected in the VAT system to ensure equitable distribution of revenue (tax revenues for the state of consumption) and facilitate compliance and administration of the tax for both businesses and revenue authorities.

---

<sup>31</sup> In response to these concerns the possibility of attributing profit to the state of the provider of the data that is the source of the value is also being considered by some states – i.e. the users of a 'free' service such as Facebook would be considered to have generated some of the revenues accruing to Facebook from selling advertising.

### 3.3.2. *Impact of the Digital Economy on VAT*

For VAT purposes, digital economy operations may lead to either supplies of services or supplies of goods. Services include telecommunications, broadcasting and electronic services such as downloads. Typically, and contrary to the purchase of goods, the purchaser of such digital services – despite the perception of the opposite – cannot dispose of the acquired digital rights as an owner but only as a user. Detailed definitions can be found in EU VAT legislation as well as explanatory notes from the Commission. Internet related transactions which lead to the delivery of tangible goods (via *e.g.* a web shop or other on-line access) are subject to existing provisions on taxation of goods.

Until the end of 2014, some residual differences will persist in the supply of services to final consumers in the EU (B2C) between EU suppliers and non-EU suppliers. For the former, VAT is due in the MS where the EU supplier is established and for the latter VAT is due in the customer MS. From 2015 however all B2C telecommunications, broadcasting and electronic services will be taxed where the customer is located.

This will remove any incentive for suppliers to locate in Member States with lower VAT rates. Regarding rates, the VAT rate of the Member State of consumption determines the tax charge.

Non-EU e-commerce suppliers of on-line B2C services have been liable for collecting VAT on supplies to EU consumers since 2003. In general, this system has achieved a reasonably high level of compliance. The evolving of new business models (including new forms of intermediation and of dis-intermediation) in e-commerce may mean that the sustainability of the current system should be monitored. Concerns have been identified in *e.g.* sectors such as on-line travel agents and on-line gaming. Other issues for attention include compliance (and eventually enforcement) vis-à-vis non-EU suppliers.

## ANNEX A: TECHNOLOGICAL TRENDS

Future technological trends and potential impact on the digital economy are detailed below.

### (1) Cloud Technology

Cloud technology creates value for consumers and businesses by making the digital world simpler, faster, more powerful, and more efficient. By delivering Internet-based services and applications, it provides a more productive and flexible way for companies to manage their IT. This has the potential to disrupt entire business models, giving rise to new approaches that are asset-light, highly mobile, and flexible. Furthermore, Cloud technology is an enabler of other highly impactful emerging technologies, such as Big Data or the Internet of Things. MGI estimates that the total potential economic impact for Cloud technology could be \$1.7 to \$6.2 trillion in 2025, with \$1.2 to \$5.5 trillion in the form of surplus from use of cloud-enabled Internet services and \$500 to \$700 billion from productivity improvements for enterprise IT. Cloud technology can reduce the up-front capital spending (CAPEX) and turn part of it into operational spending (OPEX). The majority of organisations adopting Cloud technology can reduce costs by around 20 per cent.

### (2) Big Data

Big Data has been at the core of ICT-led innovation based on measurement, experimentation, sharing and scaling up. Recent research shows that firms using Data-Driven Decision making (DDD) are 5-6% more productive with respect to other firms (Brynjolfsson, Hitt and Kim; 2011<sup>32</sup>). Therefore, the economic impact of Big Data can already be noticed and will take very significant proportions in the near future. Worldwide Big Data technology and services are expected to grow from \$6 billion in 2011 to \$23.8 billion in 2016<sup>33</sup>. This represents a compound annual growth rate of 31.7 per cent, or about seven times that of the overall ICT market. In the labour market, Big Data's impact will manifest itself via the creation of data analytics and related jobs. For instance, estimates indicate that, in the UK alone, the number of specialist Big Data staff working in larger firms should increase by 243 percent to approximately 69,000 people by 2017.

### (3) The Internet of Things

Over 9 billion devices are currently connected to the Internet, and this number is expected to increase dramatically within the next decade to an estimated 50 billion to 1 trillion devices. This is the expanding Internet of Things, where nearly every aspect of human life and economic activity is being equipped with networked sensors and actuators that monitor the surrounding environment, report their status, receive instructions, and even take action based on received information. Different estimates of the economic impact of the Internet of Things report numbers in the same order of magnitude. According to MGI, potential impact will be between \$2.7 trillion and \$6.2 trillion annually by 2025<sup>34</sup>.

### (4) Advanced Robotics

Robotics is seeing major advances that could result in the substitution of human labour by machines in an increasing number of manufacturing and service applications, as well as in

---

<sup>32</sup> [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1819486](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1819486)

<sup>33</sup> <http://laser.inf.ethz.ch/2013/material/breitman/additional%20reading/Worldwide%20Big%20Data%20Technology%20and%20Services%202012-2016%20Forecast.pdf>

<sup>34</sup> [http://www.mckinsey.com/insights/business\\_technology/disruptive\\_technologies](http://www.mckinsey.com/insights/business_technology/disruptive_technologies)

extremely valuable activities such as robotic surgery and human augmentation. Robots are becoming capable of performing more delicate and intricate tasks and becoming more adaptable and able to operate alongside humans in chaotic conditions, while at the same time declining in cost. MGI estimates that the application of advanced robotics in health care, manufacturing, and services could result in significant impact, from saving and extending lives, to transforming both product creation and service delivery. This could generate an economic impact of \$1.7 trillion to \$4.5 trillion per year by 2025, about half of which from health-care uses.

(5) Autonomous Vehicles

Autonomous Vehicles could potentially reduce the number of motor vehicle accidents and CO2 emissions. Computer-controlled vehicles with coordinated acceleration, braking and steering can safely travel at higher speeds, and since most driving accidents are caused by human error, they can increase traffic safety and reduce deaths, injuries, and property losses. Furthermore, drivers could be free to use their time to work, relax, or socialize while being transported. The introduction of self-driving autonomous vehicles could have a total economic impact of \$200 billion to \$1.9 trillion per year by 2025 from improved safety, time savings, productivity increases, and lower fuel consumption and emissions, provided that regulators approve autonomous driving and the public accepts the concept.

(6) 3D Printing

3D printing has the potential for disruptive impact on how products are designed, built, distributed, and sold. 3D printers are commonplace for designers, engineers, and architects, who use them to create product designs and prototypes, they are becoming popular for personal use (sales of personal 3D printers grew 200 to 400 percent per year between 2007 and 2011), and also gaining traction for direct production of tools, moulds, and even final products. Such uses could enable unprecedented levels of mass customization, smaller and cheaper supply chains, and even the “democratization” of manufacturing by allowing consumers or entrepreneurs to print their own products. In the long term (beyond 2025) 3D printing could even enable bio-printing of living organs, with the potential to save or extend many lives. MGI estimates that 3D printing could generate economic impact of \$230 billion to \$550 billion per year by 2025, with the largest source of potential impact from consumer uses, followed by direct manufacturing and the use of 3D printing to create tools and moulds.

(7) Automation of knowledge work

Advances in artificial intelligence, machine learning, and natural user interfaces (e.g., voice recognition) are making it possible to automate many knowledge worker tasks that have long been regarded as impossible or impractical for machines to perform. This opens up possibilities for sweeping change in how knowledge work is organized and performed. Sophisticated analytics tools can be used to augment the talents of highly skilled employees: some examples already in development concern expert systems assisting physicians with diagnoses and lawyers with legal search. MGI estimates that by replacing routine knowledge work amounting to 110 to 140 million full-time equivalents (FTE) with machines could have as much as \$5.2 trillion to \$6.7 trillion in economic impact annually by 2025.

## ANNEX B: DIGITAL ENTERTAINMENT BUSINESS PRACTICES

This section provides data to illustrate how various entertainment industries are changing as a consequence of digitalisation.

### (1) Digital music

Digital sales grew by 8 per cent globally to \$5.8 billion and accounted for more than 35 per cent of global recorded music sales in 2012. Although download sales continue to account for a large part of global digital revenues (71 per cent), the number of subscribers globally grew in 2012 by 44 per cent to 20 million and in Europe subscription streams already account for 23 per cent of digital revenues (91 per cent in Sweden but only 12 per cent in UK where downloading is still the dominant form of digital music consumption).

### (2) Audio-visual services & Video on Demand (VoD)

The number of on-demand audio-visual services available in Europe grew from 142 in 2006 to 4,400 in 2013 (2,900 of them established in the EU). VoD film online accounted for 0.15 per cent of the EU audio-visual market in 2011, growing by more than 60 per cent compared to 2010. With regard to the TV distribution platforms, the number of IPTV platforms in the EU27 has increased steadily (from 66 in 2008 to 142 in 2012).<sup>[2]</sup> In 2011, consumers spent around €600 million on TV and film on demand in Europe<sup>[3]</sup> (€ 1.6 billion in 2012 + 50 per cent vs. 2011 source IVF).

Spending on physical video media (DVD/Blue-ray Disc) amounted to €8.3 billion, down 7.7 per cent compared to 2010 (€7.7 in 2012 - 7.5 per cent vs. 2011 source IVF). Digital delivery over the internet is still generating fairly small revenues but is growing fast. However, broadcasters remain the major distributor of audio-visual content, with 10,000 TV channels available in Europe. Broadcasters' net revenues totalled over €73 billion in 2011.<sup>[4]</sup>

### (3) Online games

The online games market is one of the fastest growing markets in recent years and it is expected to grow further. Spending on games online accounted for approximately €4 billion in the UK, Germany, France, Italy, Spain, Netherlands and Belgium in 2011.<sup>[5]</sup> In Europe the online games market grew from \$3.5 billion in 2010 to almost \$4 billion in 2011 and is expected to exceed \$6.5 billion in 2016<sup>[6]</sup>. (according to the HIS ScreenDigest the digital and online market was €4.6 billion, €3.6 billion in 2011 and it is expected to reach €6.9 billion in 2017).

### (4) E-books

The e-book market within the EU countries was estimated in 2011 to account for not more than 1 per cent to 3 per cent of the book market (with the exception of the UK where e-book sales are around 10 per cent of the book market). By 2013 e-book sales were estimated to have grown to 5

---

<sup>[2]</sup> MAVISE/European Audiovisual Observatory, Yearbook 2011, <http://www.obs.coe.int>.

<sup>[3]</sup> European Audiovisual Observatory

<sup>[4]</sup> European Audiovisual Observatory

<sup>[5]</sup> Newzoo, <http://www.newzoo.com>, Infographics/ Keynotes.

<sup>[6]</sup> PWC, Global entertainment and media outlook: 2012-2016 (PWC 2012)

per cent in Germany and almost 13 per cent in the UK<sup>[7]</sup>. According to BOOZ, digital book publishing in the EU27 was €600 million in 2011.

---

<sup>[7]</sup> Rudiger Wischenbart, The Global eBook Report, 2013