# GDP and the platform economy

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Date: March 24, 2020

*The research work leading to the results in this report has received funding from the Strategic Research Council at the Academy of Finland under grant agreement no 293446 – Platform Value Now (PVN): Value capturing in the fast emerging platform ecosystems.* http://platformvaluenow.org/

**A measure for the manufacturing age**

Gross Domestic Product was adopted in the 1940s to measure the strength of a country's economy. It's a measure of the monetary value of all goods and services produced by a country. Ensuring steady growth in GDP, GDP per capita and GDP per hour worked (labour productivity) is a key government focus. During this time period, manufacturing made up more than a third of industrialized economies like Britain's. Although it was designed as an indicator of a country's wealth, it became a proxy for well-being. As the industrial revolution increased the wealth of a nation, improvements in transportation, health, education, and safety improved the well-being of their citizens. [Ref 1]

Now, manufacturing is only about 10% of the economy of the industrialized nations and the service sector represents 80%. A rapidly increasing portion of the service sector is technology services, including platforms that offer "free/add-supported" services or act as international online intermediaries to facilitate the exchange of goods, services or information. [Ref 2]

By definition, the GDP doesn't measure "free" goods and services, nor does it measure the value of unpaid labour to create things like Wikipedia content or open-source software. It also struggles to accurately show trends for products and services that used to cost money but are now available through digital platforms for "free" or at a substantially lower cost. Examples of disruptive platforms include e-mail replacing letter mail, skype replacing long-distance calls, Google Maps replacing paper maps and paid-GPS devices, and music streaming offering a nearly infinite supply of music at a very low cost.

When a product's price drops and becomes "free", the GDP includes the costs associated with its production but its consumption costs are no longer part of the GDP. However, the quality of the product may be higher and the value a consumer gets from the "free" product may be much higher than the earlier, paid version of the product. In economic terms, this "value" is measured by utility or consumer surplus, which is also not captured in GDP. [Ref 3]

The mechanics of calculating the GDP are also not well matched to the digital economy. Some of the data come from surveying businesses and industry groups to collect revenue, pricing, cost, and volume data. As is described below, there are a number of unique aspects of the digital economy that make it difficult to collect data from companies that act as intermediaries, like Uber and AirBnB, and companies that operate virtually from another country. [Ref 4]

It's evident that many aspects of the platform economy and the diffusion of Information and Communications Technologies (ICT) are not being accurately captured by GDP. As the rapid growth of the platform economy continues, economists, governments and global organisations such as the OECD and the UN are looking at ways to improve and/or supplement the GDP measure.

**The slowing of GDP growth**

While the GDP of most of the world's economies has been increasing since its inception, the rate of GDP growth has slowed recently. More importantly, the growth rates of GDP per capita and GDP per hour worked (labour productivity) have also slowed. Growth of global GDP per capita averaged 4.0% per year from 1960 to 1980 and has dropped to an annual average of 1.4% from 1980 to 2015. [Ref 5, 6]

While the root cause of the slowdown in GDP growth has been debated for several decades, most economists agree that a portion of the slowdown is real and not solely an issue with capturing the growth of the platform and ICT sector. Particularly with OECD countries, the most common structural causes discussed are: slowdown in population growth rates, falling labour-force participation due to aging populations, increases in regulations, and rising costs for healthcare and education. [Ref 5, 7]

When it comes to the introduction of technology and the impact on GDP and productivity, economists such as Robert Gordon argue that the technological innovations of the past several decades have a much lower impact on a society's productivity than innovations from the 1800s and early 1900s. Steam engines, electricity, electric motors, refrigeration, sanitation, airplanes, and automobiles allowed for large increases in worker output. As a result, the current growth slowdown is a reflection that innovations having a large, general impact on productivity are already accounted for while subsequent innovations are having a smaller, more narrow impact. [Ref 6, 7, 8]

An analysis by Watanabe, et al. (2015), examined the relationship between GDP and digital technology in 100 countries. They used the World Economic Forum's (WEF) Network Readiness Index (NRI) as an indicator of how advanced the digital economy was in each country. Their findings highlight that as a country increases it's NRI, it's rate of growth in GDP per capita declines. There's an inflection point that results in a bi-polarisation of the 100 countries. The 70 countries with the lowest NRI experience material growth in GDP per capita as they invest in their digital economy and further increase their NRI. The top 30 countries are past the inflection point and experience diminishing returns in GDP per capita growth despite increasing research and development (R&D) and investments in their digital economy and NRI. Further study by Watanabe, et al. (2018) illustrates this phenomenon also applies to ICT companies. As companies increase their level of R&D past an inflection point, their marginal sales growth slows (a proxy for marginal productivity). [Ref 9, 10, 11]

After Personal Computers were introduced in the 1980s there was an expectation of a large increase in labour productivity. Initially, the productivity increase didn't materialise and came to be known as the Productivity Paradox. By the late-1990s there was a realisation that there wasn't a paradox, but there was a long lag time between the availability of a technology, it's widespread adoption, and productivity increases. A similar phenomenon was observed with the introduction of the internet in the 1990s/2000s and with earlier inventions such as the electric motor. It is highly likely a similar "productivity lag" is occurring in relation to the growth of the platform economy and ICT technologies such as Artificial Intelligence (AI), robotics, and the Industrial Internet of Things (IIoT). [Ref 12, 13, 14, 15]

It is also important to distinguish between leisure and production. GDP and productivity increase when an economy produces more and improves efficiency. For example, ride-sharing, vacation rentals, music streaming, eCommerce, AI, robotics, and IIoT have an impact on production and efficiency, regardless of whether those impacts are accurately captured in GDP. However, some of the most widely used platforms are focused on leisure activities. Using Facebook, playing mobile games, watching YouTube videos, or posting photos to Instagram doesn't materially impact production or efficiency. [Ref 6, 7]

**The uniqueness of the platform economy and ICT**

While the reasons above partially explain the slowdown in GDP growth, many agree there is a growing proportion of the economy that isn't being captured as part of GDP. Below are some of the unique aspects of the platform economy and the ICT sector that make it challenging to measure, manage, and ensure fair taxation:

**Scale:** Internet access is the only requirement to participate in the platform economy. The number of potential consumers, low cost of entry, and the low marginal cost of growth mean platform services can achieve unprecedented scale. [Ref 4]

**Pricing models:** Many platforms offer "free" services that are either ad-supported, data-supported, or subsidised by a small number of users willing to pay for premium services. While this existed in the past (eg. ad-supported TV and Radio), the breadth and scale were limited. Where platform-based services are offered for a subscription, often there are no usage limits. Meaning, there is no marginal usage cost and no reflection of the volume of service consumed. [Ref 4, 16]

**Borderless reach:** The physical location of the consumer and producer are often irrelevant. Cloud computing and globally distributed data centres and warehouses mean consumers may not realise they're using a service or buying a product from another country. Platform companies are also able to set up physical operations, subsidiaries, and register patents in tax favourable jurisdictions. While this maximizes value for shareholders, it results in an impact on local labour markets and an unfair taxation situation because countries may not be able to collect corresponding consumption taxes, corporate income taxes, or postal costs. [Ref 4, 17]

**Consumers that Produce:** The line between consumer and producer is often blurred in the platform economy. Consumers are able to produce content for online encyclopaedias, apps for mobile platforms, and open-source software. They're able to use peer-to-peer intermediaries to monetise things like unused bedrooms (AirBnB), under-utilised vehicles (Uber), or their skillset (Taskrabbit or Etsy). They're able to replace intermediaries such as travel agents, bankers, and librarians by directly booking travel, managing their finances, and using internet search engines. Meaning, consumers are able to substitute non-market (unpaid) activity for market (paid) activity that was previously captured in GDP. [Ref 16]

**Ubiquity now, Revenue Later (URL):** Banks require a clear path to profitability before lending money to traditional "bricks and mortar" businesses. Given many platforms' growth is based on the network effect where the value of the platform grows exponentially with the number of users, venture capital financiers are willing to provide long-term funding in exchange for equity. This allows platforms to disrupt existing business models by operating at a loss while putting all available resources into becoming ubiquitous to maximise the network effect with the promise of future profitability and large market capitalisation. An example: Uber was formed in 2009, has raised USD$25B in equity funding, had USD$50B in global bookings (2018) but posted a USD$1.8B loss, and has a market capitalisation of USD$65B (Jan 2020). The substitution of market capitalisation for profitability is not accurately captured in GDP. [Ref 18, 19, 20]

**Physical becomes digital:** Some physical products have been replaced by digital services that may not be accurately captured in GDP or by tax authorities. For example, it appears that consumers are listening to more music than ever with the introduction of streaming, but the revenue of the music industry has fallen by 30% and music stores have closed. Additionally, consumers may subscribe to a streaming service based in another country and avoid paying consumption taxes. As commerce goes online to platforms like Amazon and Alibaba with large distribution centres, demand has fallen for local shops and the infrastructure that supports them. [Ref 1, 21, 22]

**Dual nature of ICT:** Typically, when a sector of the economy experiences sustained year-over-year growth, that sector's rate of contribution to GDP growth relative to the rate of growth of the sector increases. Meaning, productivity improvements result in an increasing marginal contribution to GDP growth. Watanabe, et al. postulate that the opposite occurs in the ICT sector. A duality results where, as the ICT sector grows it's (A) relative contribution to GDP growth is overpowered by (B) the unique aspects outlined above that drive towards the provision of "free" services and the disruption of existing factors of production. As a result, there is a decreasing marginal contribution to GDP growth as the ICT sector grows. [Ref 9]

**Uncaptured GDP**

Given the unique aspects of the platform economy and ICT sector described above, it is possible that some aspects are having a negative influence on GDP growth while other aspects are having a positive influence that is difficult to capture using the current definition of GDP. The growth of the platform economy has been partially based on a culture of "free/low cost" products and services that provide utility and happiness to people beyond their economic value. This is also known as consumer surplus, which is an indicator of well-being and is not captured by GDP. [Ref 23]

In the past, products were typically priced based on the theory of supply and demand and the costs, benefits, and changes in quality were reflected in the price. Hence, it made sense not to include consumer surplus in GDP. In a culture of "free/low cost" products nearly all the benefits to a consumer are in the form of consumer surplus. In aggregate, this adds up to substantial uncaptured GDP, as described by Watanabe, et al. [Ref 7, 23]

This additional utility and happiness creates a positive feedback loop that drives growth in the internet/ICT sector and the platform economy. As people seek to increase utility and happiness, they consume more in the platform economy which drives growth in the internet/ICT sector and the expansion of the platform economy, as well as an increase in uncaptured GDP. This has been described as a desire for supra-functionality or a desire for benefits over and above the cost of a product or service. While this desire has driven consumer behaviour in the past, it is more easily fulfilled at a larger scale in the platform economy. [Ref 23]

**Soft Innovation Resources**

Regardless of how the GDP measurement evolves and improves, the platform economy is a growing part of the overall economy. Understanding how to encourage the expansion of the platform economy may be key to increasing the rate of GDP growth. [Ref 23]

As noted above, once an economy has reached a certain level of maturity, further investments in R&D and improvements in NRI have diminishing returns. Watanabe, et al., postulate that countries (and companies) can increase their rate of growth by diverting a portion of their resources away from traditional R&D and towards enabling Soft Innovation Resources (SIRs) as a complement to R&D. These are soft resources that can be harnessed to drive innovation and growth at individual companies, which rolls up to growth at the country level. [Ref 24]

Enablers and examples of Soft Innovation Resources are listed below [Ref 24]:

**Supra-Functionality:** People seek out products and services where they experience satisfaction beyond utilitarian functional needs. They desire social, cultural, aspirational, tribal, and emotional benefits. Examples: Co-creation of content (Blogging, TripAdvisor user-reviews, YouTubers), participating in product design (Hack-a-thons, feedback via social media/reviews, brand ambassadors), creation of user-specific products (Maker movement).

**Sleeping or Untapped Resources:** These are existing resources that are under-utilized resulting in an unused capacity that may be spread sparsely. The high reach and low marginal cost of digital platforms can be effective at identifying and utilizing the unused capacity. Examples: personal vehicles (Uber, Lyft, UberEats), private residences (AirBnB, VRBO), under-employed individuals (UberEats, Uber, Fiverr, Etsy), under-utilised infrastructure (Amazon server farms), and participation of women and seniors in the labour market.

**Trust:** People's level of trust in various aspects of their lives, society, and the economy can affect their participation and contribution to innovation and the creation of economic value. Examples: participation in eCommerce (PKI, HTTPS, blockchain), labour participation (stable employment contracts, worker protections, and wage increases), entrepreneurship (legal framework and protection of intellectual property), platforms that enforce standards and ensure a reliable experience (Amazon, Apple).

**Maximizing Gratification:** Seeking gratification of needs is a key pillar of Maslow's theories about motivation and human behaviour. As increasingly sophisticated needs are gratified, there is a desire to maintain and build upon the increased level of gratification. This affects people's consumption of goods and services. Examples: Moviegoers desire for service and amenities, Consumers' desire for convenience with the delivery of groceries, meals, and other goods (Grocery Gateway, UberEats, Amazon), Desire for "pampering" (nail care salons, massage/spa, barber/beard care products).

**Assimilation and Self-Propagation:** Sustainable growth can be obtained when past innovations are assimilated into future innovations, effectively creating a self-propagating cycle of innovation. Example: The music industry assimilating the digitalization of music and Compact Discs (CDs) to innovate and offer song downloads which then led to further innovation to create music streaming.

**Co-Evolution:** The coupling of two or more items which then innovate and evolve along a common path. Example: Music industry co-evolving music streaming and live concert performances to drive revenues.

**The future of GDP measurement**

Although the GDP measure has been revised over time, there is widespread recognition that more changes are needed if it's to remain relevant as the digital economy grows. As mentioned above, there are a number of things that influence individuals' standard of living and well-being that were not historically part of the GDP measure, such as: non-market activities (eg. household production), non-monetary transactions (eg. bartering and "free" products), products that improve quality (especially while lowering price), consumer surplus or utility, and negative externalities (resource depletion, pollution, and inequality). These areas are difficult to measure and track, however, they are becoming more important as our economy changes and governments look for accurate measures to inform public policy. [Ref 3]

There is debate about how platforms and the digital economy are contributing to GDP and the amount of uncaptured GDP. As a result, there is a debate about how the GDP measure should be revised. The US Bureau of Economic Analysis (BEA) conducted an analysis based predominantly on the costs platforms incur to offer their services and concluded the uncaptured GDP would increase the rate of GDP growth by less than 0.01% per year. [Ref 18] Brynjolfsson, et al. developed a measure they call GDP-B that's based on the

consumer surplus derived from using platforms. They concluded the consumer surplus associated with Facebook alone would increase the rate of US GDP growth by 0.1% per year and platforms such as internet search, e-mail, and maps would contribute significantly more than Facebook to GDP growth. [Ref 3] An independent study commissioned by the UK government concluded that annual GDP growth is understated by 0.3% to 0.6% and recommended changes to better capture the contribution of the platform economy. [Ref 4]

It is important to note that if GDP is revised to include consumer surplus, historical GDP figures will need to be revised to include an estimate for past consumer surplus. Economists such as Gordon highlight that consumer surplus from the introduction of technologies such as electricity, refrigeration, and automobiles was significant and potentially larger than the consumer surplus associated with the digital economy. [Ref 7]

It is clear there are wide-ranging opinions on the magnitude of uncaptured GDP. International organisations are also trying to bring clarity to the situation. The OECD's Going Digital project is an example of a broad initiative that is researching the growth of the digital economy and developing a set of measurement recommendations as well as government policy changes to ensure countries can foster growth and innovation. The World Economic Forum (WEF) is advocating for a GDP measure that includes well-being/welfare as well as the development of a new theory of productivity, labour, and consumption as the world transitions towards a more digital economy. [Ref 12, 25]

Additionally, a number of measures are being developed with a focus on well-being to augment GDP. These include: United Nations' Human Development Index [Ref 26], OECD Better Life Index [Ref 27], Welfare Index by Jones et al. [Ref 28], Social Progress Index [Ref 29], Bhutan's Gross National Happiness [Ref 30], and The Well Being initiative announced by Iceland, Scotland, and New Zealand [Ref 31].

**Strategies for future growth**

The slowdown in GDP growth is complicated and multi-faceted. Perhaps some of the structural impediments to growth are inevitable and can't be mitigated. Perhaps because digital platforms and their ecosystems function as highly efficient intermediaries that increase the flow of goods and services at substantially lower costs, we're experiencing a temporary downward adjustment and growth will resume from a new baseline. As a result of this complexity, strategies to encourage future growth are challenging and diverse. [Ref 32]

At the country level, the literature suggests strategies such as: developing economic measures to supplement GDP and better inform public policy in the digital age [Ref 3], create policies to increase skills training and corporate technology purchases to increase adoption of new technologies [Ref 13], develop policies to encourage experimentation in new technologies and business models [Ref 12], focus on improving the quality and lowering the cost of healthcare and education [Ref 5], increase immigration [Ref 7], enable Soft Innovation Resources [Ref 24], and refine international taxation and shipping practices to increase fairness in the shipping and taxation of digital goods and services. [Ref 21, 22, 17]

At the company level, the literature suggests strategies such as: lagging firms should invest in skills training and increase the adoption of new technologies [Ref 13, 15], leading firms should include the enablement of Soft Innovation Resources into their R&D and product development activities [Ref 24, 33], and expand current products and services into platforms and expand platforms into platform ecosystems.

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