The role of the Internet in describing and analysing the economy

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The Internet is a new information channel that has given rise to a wide variety of new services. It is quite challenging to analyse the economic impact of this multifaceted and changing set of activities, since Internet-related services blur traditional boundaries, particularly those between market activity and volunteer and informal activity.

The goal of this study therefore remains modest: to draw up a typology of the main activities that could not have emerged without the Internet; explain how they are traced in the national accounts, which are the frame of reference used to describe the economy; and describe the main findings of economic research into the Internet's impact on business volume, price, and well-being. The analyses presented in this document will obviously need to be supplemented by further studies to evaluate progress in economic research and new categories of services that will surely emerge in the coming years.

Households use the Internet for a variety of reasons *(Figure 1)*. French people go online primarily to (in order): send/receive email, access their bank accounts, search for information about their health, purchase goods/services, plan their vacations, play games or download media, participate in social networks, read newspapers/magazines, auction goods, and look for work. After providing a brief typology of these uses, this document will examine online sales and the collaborative economy in more detail before analysing the Internet's impact on prices and well-being.

A typology of Internet services

Online sales

The simplest case corresponds to companies that sell their own products on a proprietary website (*Air France*, *Apple*, etc.). The Internet enables companies to make significant savings by reducing the number of employees needed to handle transactions or provide information. Similarly, the Internet has led to the development of online sales platforms offering a large number of products at a low price, thanks to centralised storage. For some of these sites, their business model requires such a large quantity of information that it would not be viable without the Internet: for example, *Amazon* has an almost infinite catalogue of products at a very low transaction cost.

Some of these sites are innovative in their introduction of new products that could not exist without the Internet. For example, sites for sharing and printing personal photos (which allow people to share pictures with friends and family), or on-demand music sites (with complete, entirely digitised musical catalogues). However, there is a potential cost to consumers as they must provide these companies with personal information (such as address and banking details) that can leave them vulnerable to spam, fraud, and identity theft.

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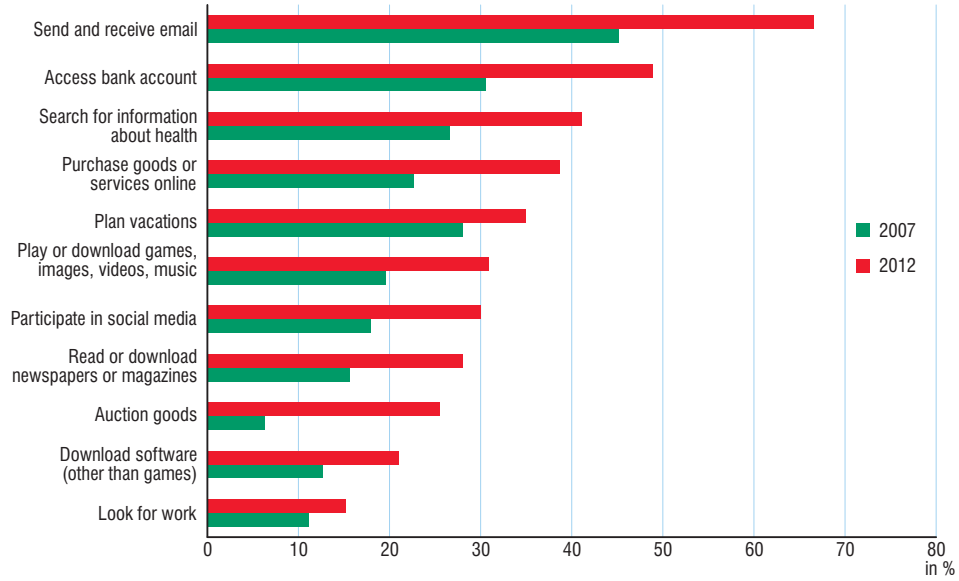
1. The most common Internet activities in the past three months



Scope: People aged 15 or older living in Metropolitan France in ordinary households.
How to read the chart: 25% of the inhabitants of Metropolitan France sold goods on the Internet in 2012 as compared to just 6% in 2007.
Source: INSEE, 2007 and 2012 surveys on Information and Communications Technologies.

Price comparisons

The Internet has also given rise to a new service facilitating comparison of products sold by different online shops. These comparison sites do not sell the products themselves *(Box 1)*, but they do provide links that redirect consumers to the sites which sell the products, or they serve as an intermediary in the transaction. These sites create value for the consumer by increasing competition among products. A consumer can compare product features side-by-side, read reviews or critiques from others on third-party sites, and above all, compare product prices without having to look at each shop separately (physically or online).

Access to information

Other sites allow consumers to access information that is not directly related to a purchase. The Internet thus gives consumers access to timely information that is specific to their location or their interests, such as weather sites, cultural sites, or sites related to a particular sports or leisure activity. A great deal of literature has shown that critiques and comments from other consumers on third-party sites help consumers choose products (Chevalier and Mayzlin 2006, Liu 2006). All or some of the information published on these sites comes from the voluntary contributions of Internet users, sometimes in quite elaborate form in the case of online encyclopaedias. Some of these information sites specifically target particular groups, such as cultural or ethnic groups. And some sites aggregate personalised information for each individual (content aggregators such as *Twitter*, *Facebook*, etc.).

Box 1

Revenue-generation for sites that do not sell products directly

Price comparison sites do not sell the products themselves. Generally, they earn revenue by creating links towards commercial websites, charging a fee for every click for example (most sites comparing the price of physical goods). They can also take a commission on the transaction amount by serving as an interface between the consumer and the commercial site whenever a good or service is purchased (for example, sites that compare airline ticket prices).

Other sites offer consumers information that is indirectly related to a purchase. These information suppliers generally earn money in two ways: via advertising or a subscription service. Sites that earn revenue from advertising can sometimes generate additional income through a subscription service that offers higher-quality content (a premium service, such as the newspaper *Le Monde*'s website, or certain weather sites). It is interesting to note that these sites do not yet make use of the micropayment model. A micropayment standard would be a major innovation since it would provide these sites with a new revenue-generating option.

Lastly, information sites with a primarily non-commercial aim, such as *Wikipedia*, rely mainly on the volunteer work of a community of members, without ever resorting to advertising or charging users for access to information: the fixed costs to develop and maintain the site and pay permanent staff, etc. are covered by voluntary financial contributions (similar to the non-profit sector).

Matching

Some sites have created two-sided markets[1] through platforms that facilitate connections between people looking to exchange goods and services or communicate with each other. The greater the number of users on the site, the higher the probability they will find a perfect match, whether they are looking for a child's toy on *eBay*, where millions of people sell unwanted items; a date on a dating site; an apartment for a stay in a European capital on *AirBnB*; or a car trip between two big cities via *BlaBlaCar*. Armstrong (2006) shows that prices should be higher on the side of the market with the most to gain from the interaction (men on certain dating sites, sellers on *eBay*). Hagiu (2006) demonstrates that a free platform does not necessarily maximise well-being, since it may not have enough people on both "sides" to generate a high number of exchanges. A platform that has a monopoly can subsidise access for the less abundant side by taxing the abundant side, thus generating more exchanges, and potentially more surplus.

E-commerce

E-commerce refers to the purchase of goods and services on commercial websites. Most of these sites belong to companies which also have physical sales outlets in France. But some sites belong to pure players, companies which sell their products exclusively online.

Though online purchases are quite common *(Figure 2)*, it is impossible to quantify the exact share of e-commerce in household consumption expenditure. Indeed, in order to estimate household expenditure in national accounting, INSEE uses data from consumer panels, and particularly distributors that often do not differentiate between online transactions and those in physical stores.

Distributor panels provide information for a given time period (month, quarter or year) on their total sales, and can also breakdown sales per type of product: for example, data collected

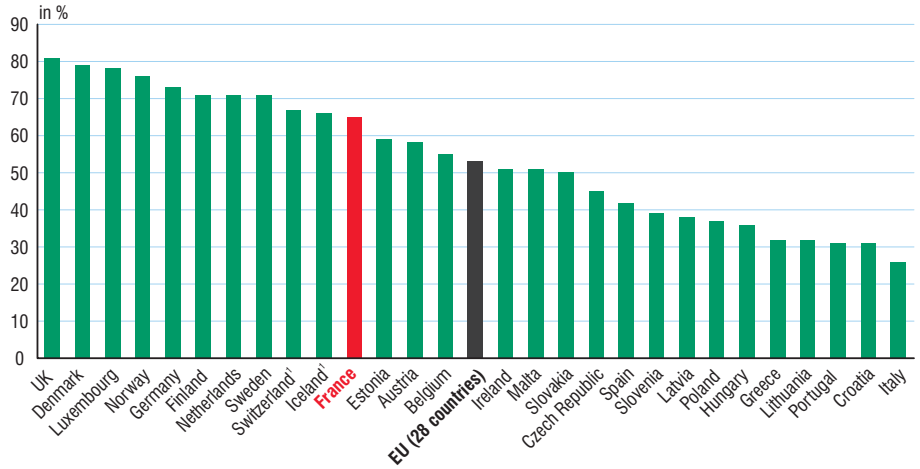
1. Two-sided markets require an interface between two types of clients who are interdependent on one another for the products that are exchanged on the site by providing both with economies of scale.

from large chains that sell computer products, electrical or audio-visual appliances, etc. are broken down into detailed product type (smartphones, tablets, computers, electrical appliances, audio, etc.) and make it possible to estimate changes in different consumption areas to a high degree of detail. On the other hand, data collected from distributors with physical stores cannot be used to isolate the proportion of online sales, particularly since the division between online and in-store sales is somewhat blurred. Many major retailers allow customers to check their website for in-store product availability and reserve the item online: they can then pick up the reserved item in person, with the choice of paying either online or in the store ("click-and-collect" options).

Estimates of consumption via pure players may pose other difficulties. If by definition all the company's sales are made online, these purchases may be hard to identify when their corresponding sites are located abroad. The largest e-commerce sites operating in France usually have subsidiaries that are registered in France, even if they just store the items they sell (books, computer equipment, clothes, etc.). Nevertheless, the sales margin (difference between the resale price and purchase price of marketed goods that generate most of a distributor's profits) can usually be located in parent companies that are based abroad (particularly depending on tax considerations). In these cases, it is hard to evaluate household consumer expenditure via these sites, because they are not considered as part of distributor panels and their French subsidiaries generally do not track purchases by French consumers in their accounts.

This problem, whereby the Internet makes it easy to locate most added value in more lenient tax zones, does not just apply to trade in goods. This is also the case for some transport operators that offer private hire vehicle (PHV) services. For example, the French subsidiary of a major PHV company does not charge a fare to passengers: it only sells promotion and marketing services to a Dutch parent company, which collects payments from riders and then transfers them back to drivers after taking a 20% commission. The margin this company earns by putting French PHV drivers in touch with French consumers is taxed in the Netherlands and thus falls outside French national accounting. On the other hand, the production of services by PHV drivers is included in French national accounting when these drivers declare their activity to the tax authorities.

2. Proportion of people who purchased goods and services online in 2015



1. 2014 data.
Scope: Individuals aged 16-74, purchases during the last 12 months in 2015.
Source: Eurostat.

Surveys conducted among companies, particularly surveys on Information and Communication Technologies (ICT) and e-commerce, nonetheless provide an estimate of sales to households via e-commerce *(Figure 3)*. An INSEE study published two years ago (Bouziani and Ferrante, 2014) determined that in 2012, companies located in France made €53 billion in online sales of goods and services to individuals. This figure includes all orders placed by individuals on these companies' websites, whether the payment was made online or not: it thus includes online sales that are collected in-store. In comparison, household consumption expenditure in national accounting stood at €1,120 billion that same year. However, these amounts are not directly comparable. Indeed, estimates based on the ITC survey include sales to individuals living abroad (recorded as exports by national accountants) and symmetrically leave out purchases that households residing in France make on foreign websites. It is therefore impossible to directly infer the share of online purchases made by French households. Nevertheless, data from ITC surveys do make it possible to identify the preponderance of pure players in terms of online sales to individuals, with e-commerce capturing a 52% market share in 2012 (as compared to just 26% in 2003).

It should also be noted that all the purchases households make online are not meant to be recorded as consumption for national accounting purposes, since some sites just match individuals so that they can exchange second-hand goods. Furthermore, more and more traditional retailers are including an online platform for the sale of second-hand goods. Only the profit margin earned by these sites (corresponding to the difference between the price paid by the buyer and the amount the seller receives) is recorded as household consumption expenditure. Incidentally, this treatment is not exclusive to online purchases: the traditional used car market does not generate consumption when the transaction takes place without an intermediary. It is only when a dealership puts individuals in touch that consumption is recorded, equal to the dealership's margin. This treatment is justified by the fact that the good that is exchanged (either online or in a more traditional context) was not produced by the household that is reselling it. This is not in contradiction with the fact that the increase in such transactions between individuals (facilitated by the Internet) has a positive impact on the environment or well-being (money saved by the household).

3. Percentage of online sales in France

in %

	Proportion of online retailers in 2014	Percentage of online sales in turnover of online retailers in 2013		Percentage of online sales in total turnover in 2013	
		Online sales		Online sales	
		Total	B to C[1]	Total	B to C[1]
All sectors	**15**	**13.0**	**6.3**	**3.7**	**1.8**
Commerce	**26**	**13.3**	**4.8**	**4.5**	**1.6**
Retail	32	8.6	7.9	4.7	4.3
Including distance selling	*90*	*76.3*	*72.9*	*70.6*	*67.4*
Wholesale	21	15.8	1.6	3.9	0.4
Automobile sales and repair	22	24.7	3.5	7.0	1.0
Services	**18**	**19.3**	**11.3**	**6.6**	**3.8**
Housing	76	28.8	17.5	19.1	11.6
Transport	6	25.4	14.7	14.0	8.1
Travel	56	45.8	39.9	26.5	23.0
Information and communications	23	14.6	11.5	7.6	6.0
Restaurants	20	6.7	5.6	1.2	1.0
Other market services	**9**	**15.1**	**3.1**	**2.7**	**0.6**
Others (manufacturing industry, electricity, gas, water and sanitation, construction)	6	6.5	3.8	1.3	0.8

1. Business to consumer (online sales to individuals) say B to C.
Scope: Companies with at least 10 employees established in France in primarily commercial sectors not including agriculture, finance, and insurance.
How to read the chart: In 2014, 26% of retailers with at least 10 employees were involved in online sales. Their online sales in 2013 represented 13.3% of turnover and 4.5% of the total turnover of all retailers with at least 10 employees, while online B to C sales represented 4.8% of their turnover and 1.6% of total turnover.
Source: INSEE, 2014 ICT survey.

The collaborative economy

Though the collaborative economy has rapidly expanded in the past several years thanks to the Internet, there is no single definition of what it is. In general, individuals within the collaborative economy provide goods and services to other individuals, none of whom are professionals in that particular activity: transport services, apartment rentals, etc. In many cases, the collaborative economy is based on the notion of sharing goods, in comparison to the standard in which each individual maintains exclusive rights to the goods they own. The purpose of this section is to explain how these activities are traced (or not) in the national accounts, given the scope assigned to production in this context *(Box 2)*.

Box 2

The scope of production in national accounts

In national accounting, production corresponds to activities conducted under the control and responsibility of an institutional unit (household, company, public administration, etc.) that uses labour, capital, and goods and services as inputs to produce goods and services. Conventionally, any activity that produces goods is considered production in the national accounts, even when the producer retains use of this good and there is no transaction with another agent: this is the case for households that produce agricultural goods for their own consumption, or who build their homes themselves. On the other hand, service activities are not considered production when they are produced and consumed within a single household: meal preparation, childcare, etc. However, there is an exception to this rule: owners who occupy their own dwelling are considered producers of housing services (this exception makes it easier to compare aggregates between countries in which the proportion of owner-occupiers varies greatly); allocated production is equal to the rent the owners would receive if they rented out their property on the market.

In general, transactions– including production– are calculated at market price. Production must be evaluated even when the exchange is not monetary, but involves bartering. When production takes place in a non-commercial framework - and reference to a market price is thus not applicable - it is customary to evaluate it as the sum of costs: intermediate consumption, remuneration paid, taxes on production paid minus subsidies received, consumption of fixed capital (which measures wear and obsolescence of productive capital). In particular, when an activity is performed on a volunteer basis for a non-profit organisation, production is obviously valued as zero earnings paid.

GDP – gross domestic product – traces the total added value (production – intermediate consumption) produced in the country during a given time period. It is thus essentially a measure of national production and income that is generated, which could very well be distributed outside of national boundaries. It does not claim to measure well-being.

The roots of the collaborative economy and its current development can be illustrated with car-sharing. Public authorities encouraged car-sharing (under the name carpooling) in the United States in the 1940s in order to reduce the risk of fuel shortages during the Second World War. Car-sharing became popular again when oil prices shot up in the 1970s, before gradually falling out of favour as transport costs went down. The rise of the Internet breathed new life into car-sharing at the end of the 2000s by making it easier to match people who did not know each other but were interested in sharing the use of a vehicle, even though car-sharing historically was organised between people with family or neighbourhood connections. At the same time, designated car-sharing parking areas were created, particularly on the outskirts of cities.

Yet new forms of collaborative economy are developing in which the Internet actually plays an altogether marginal role. CSAs (Community Supported Agriculture) are a good

illustration of this: a group of consumers pledge to purchase a farmer's production at a set price; there is usually a single distribution point (such as the producing farm), and members of the group often take responsibility for distributing shares to all members. In this case, some of the services usually produced by intermediaries (commerce and transport) are performed by the consumers themselves, which is a collaborative form of production. However, the consumers that support a given farmer generally live near each other for practical reasons related to share distribution, and the Internet does not play an essential role in how such organisations operate, since their recent growth is likely more due to environmental motivations (guaranteed access to organic products, reduced waste, etc.) that are increasingly common among consumers.

Even though it is impossible to fully describe the collaborative economy and the role the Internet has played in its growth in just a few paragraphs, it is interesting to note that the collaborative economy can take many different forms. In particular, there is a difference between essentially non-market operations, which rely on voluntary contributions from consumers (either financial or through volunteer work), and more mixed operations, which rely on transactions between individuals who are matched online.

Essentially non-market collaborative models

Wikimedia Foundation, Inc., is perhaps the best example of this type of collaborative model. It is a non-profit organisation subject to Florida laws which oversees the online projects *Wikipedia*, *Wiktionary*, etc. Online content is written by a community of volunteer contributors, and the information published online is accessible to all Internet users free-of-charge, whether or not they contribute. The foundation's expenses, primarily the purchase of new servers and hosting fees, are mainly covered by donations (USD 52 million in 2013) and subsidies.

Even though these services are intrinsically related to the spread of the Internet, the *Wikimedia Foundation's* economic model does not differ much from that of other non-profit organisations or foundations, particularly charities, whose development pre-dated the rise of the Internet: these non-profit organisations also generally rely on donations and volunteer work, and may receive public subsidies. They are usually classified as Non-Profit Institutions Serving Households (NPISH) by national accountants in the countries where they operate (in the United States, in the case of the *Wikimedia Foundation*). Their production is evaluated on the basis of production costs incurred such that production stemming from volunteer work is not valued *(Box 2)*.

It is also worth noting that certain information sites, though heavily reliant on voluntary contributions from communities of users (weather sites where users can make observations about local weather, or sites that list critiques or ratings for hotels or restaurants), use a more commercial model to cover their costs: for example, by limiting access to all or part of the information to paying subscribers, or through advertising. However, in national accounting these sites are considered non-financial corporations and their market-based production is measured through sales of online advertising space or income from subscriptions. Their activity is therefore taken into account in estimates of GDP.

Mixed collaborative models

This category includes sites that match individuals for transactions in which one person provides a good or service in exchange for a cash or in-kind payment.

The best-known examples of the collaborative economy are probably apartment rentals or exchanges (such as *AirBnB*) and car-sharing services (such as *BlaBlaCar*). In both cases, people

share use of a good in a transaction that is either non-monetary (apartment exchanges), or monetary when one person uses another's good in exchange for monetary compensation (apartment rentals or car-sharing). However, for the purposes of national accounting, these two examples raise questions that are slightly different in so far as:

– The dwelling is a fixed asset, resulting in the production of housing services (with rent as compensation).

– Private vehicles, on the other hand, are everyday consumer objects (the vehicle is only considered a fixed asset if the household is engaged in a professional transport service activity - as in the case of individual entrepreneurs).

The following two subsections will go over these two typical cases in detail.

Apartment rentals or exchanges

When a dwelling is occupied, the occupant consumes a housing service produced by the owner:

– If the occupant is not the owner, production of a housing service is measured by the rent actually paid by the renter *(actual rent)*.

– If the occupant is the owner, production of a housing service is measured by the rent that the owner–occupant would have received had they rented out their property *(imputed rent)*.

Let's imagine a household that owns a dwelling with a market rental value of 120 per year. In all cases, it produces a total housing service (actual rent and imputed rent) of 120. More specifically:

– If the owner occupies the dwelling, they consume this housing service of 120 (imputed rent).

– If the owner rents the dwelling out for the year, the renter consumes this housing service of 120 (actual rent).

– If the owner occupies the dwelling for 11 months and rents it out for one month in the summer, consumption of this housing service is 110 by the owner (imputed rent) and 10 by the renter (actual rent).

– If the owner occupies the dwelling for 11 months and makes it available for one month in the summer as part of an apartment exchange, consumption of this housing service is 110 by the owner (imputed rent) and 10 by the other household (imputed rent as well).

Thus in practice, total production of rent does not depend on how the dwelling is used. The only difference is the split between real and imputed rent. Consequently, the added value created by the use of the dwelling is the same regardless of the situation.

In concrete terms, data provided by national accountants does not make it possible to identify dwellings that have been used for online exchanges or rentals. Nevertheless, total production of housing services (which includes both actual and imputed rent) is measured by national accountants,[2] as is gross domestic product (GDP). However, the breakdown between final consumption and export can be altered, since when a foreign resident occupies a dwelling in France for a few weeks (by renting it or via an exchange), the rent should be counted as export earnings and not final consumption. Which is not currently the case.

2. Weekly rental prices posted on these kinds of sites are sometimes very high, suggesting that actual prices are much higher than the rent imputed in the national accounts. Nevertheless, it is important to note that dwellings that are mainly used for seasonal rentals are rarely rented continuously throughout the year. Given the lack of data, it is difficult to know if the annual rental income in this market is higher than the annual market income imputed in the national accounts.

Car-sharing

In the case of car-sharing, the vehicle owner transports people without a vehicle, in addition to themselves. The owner asks passengers to contribute an amount that covers shared costs related to use of the vehicle. In this context, the vehicle owner provides a transport service to people who are not in their household. In principle, this should be recorded in national accounting as transport service production that is valued as the amount passengers are asked to contribute.

It is illegal to charge passengers a total amount that exceeds the tax rate (around €0.50 per km driven, depending on the vehicle's engine size), plus tolls. The tax rate includes variable costs (petrol) and fixed costs (insurance, maintenance costs, depreciation): asking for an amount higher than the tax rate plus tolls would generate a positive net operating surplus (NOS) and the vehicle owner would thus fall under the category of paid transport services and be required to purchase professional insurance and declare income from this activity (an activity which no longer fall under the collaborative economy).

Specifically, if the owner of a vehicle transports three passengers for 500 kilometres (the distance between Paris-Lyon) and spends €30 on tolls, they cannot ask for more than €280, or €93 per passenger (at a tax rate of €0.50/km). In practice, car-sharing companies recommend charging rates that are much lower than the tax rate. For a Paris-Lyon trip, for example, *BlaBlaCar* recommends charging passengers only for petrol (€60) and tolls (€30), for a suggested rate of €30 per passenger (assuming three passengers); the driver and passengers can negotiate the actual rate, which the site nevertheless limits to 1.5 times the recommended rate (€45 per passenger for three passengers).

The result is that:

– The owner of the vehicle providing a car-sharing service produces a transport service for the purposes of national accounting, which should normally be valued at the requested financial compensation.

– However, if the owner complies with the legal limits to compensation, this amount will at most cover intermediate consumption and fixed capital consumption: since they do not generate a net operating surplus, the added value is zero, but the gross added value can be positive. Yet car-sharing sites recommend rates that are much lower than the tax rate, suggesting that actual compensation does not generally cover more than intermediate consumption, and that gross added value is most often zero in practice.

Of course, one could object to the previous reasoning that providing a car-sharing service rather than taking the trip alone would generate surplus income for the vehicle owner (who would have been responsible for all the intermediate consumption had they travelled alone). Yet this requires establishing a counterfactual scenario: in this case, the assumption is that the owner would have taken the same trip on their own if they had not car-shared. However, national accountants do not use this approach, because the choice of counter factual scenario is subjective: if the owner had not car-shared, they might have simply cancelled their trip, or used public transport (bus, train, plane). National accountants thus simply describe the situation as it is observed (in this case, not a source of added value), without hypothesising about behaviour.

In practice, national accountants do not currently record the production of transport services by vehicle owners who offer car-sharing services. Nevertheless, insofar as the compensation requested of passengers does not generally cover more than intermediate consumption, the added value generated by car-sharing can be considered zero.

Services provided by matching sites

The two previous sub-sections only addressed the question of how to evaluate the production of non-professional individuals participating in the collaborative economy in the case of housing exchanges or rentals and car-sharing. But alongside this production by non-professionals, companies that own matching sites produce a commercial intermediation service, which must be accounted for in national accounts and valued based on service fees that these sites levy on transactions.

In practice, the service provided by these matching sites is indeed recorded in national accounting, when the owners of these sites are legally represented in France and file accounts with the Public Finances Directorate General (DGFiP). It seems that most of the collaborative economy's biggest players in France have legal units located in France, and their production is indeed counted in French national accounts, which is not the case, as noted above, for all the major e-commerce pure players.

Incidentally, the added value created by these collaborative economy websites is typically very low. An analysis of accounts filed by various apartment rental or a car-sharing sites does show that the profit margin (equal to the ratio between gross operating surplus – GOS – and gross added value) is often quite low or even negative: for several of these sites, gross added value did not even cover payments made, resulting in a negative GOS. One might naturally question the sustainability of such an economic model: perhaps this situation reflects the desire of certain companies to conquer a significant share of a growing market, even if they incur short-term losses, in order to increase prices later once the site becomes a major player in that market.

Another interesting example of the collaborative economy is provided by Internet platforms that allow individuals to resell goods to other individuals. Here again, the service fees collected by the sites are compensation for the intermediation service and must be recorded as commercial production. However, as already noted in the section on e-commerce, the resale of goods between individuals is not a form of production and is therefore described as a simple transfer between households in national accounting. It is only when a professional intermediary gets involved that this production needs to be recorded, equal to the service fee collected by the site.

In general, though these different examples (home rental/exchange, car-sharing, resale of goods between households) all increase household utility by making it possible to intensify the use of goods (productive capital or consumer goods) that are not often or no longer used by their owners, this does not necessarily mean that they should be recorded as production in national accounting, given the scope that is conventionally assigned to them.

"Falsely-collaborative" models, tax evasion and fraud

Still in the case of car-sharing, it is obviously possible that some vehicle owners ask for more than just compensation for variable costs, and are actually providing paid transport services under the guise of the collaborative economy. This situation could be considered as clandestine production of paid transport, a punishable offence. As with all other economic activities, the illegal production of paid transport services is assessed in national accounting, on the basis of expert opinion, and represents a stable percentage of the declared production of paid transport services from one year to the next. As things stand, the national accounts do not measure the potential increase in the production of paid transport services due to the growth of illegal activities in the sector. The same phenomenon can also occur with apartment rentals, as in the case of owners who rent out several properties through collaborative economy websites as a primary source of income that is not declared to tax authorities: but there is no risk of underestimating GDP since production of rent has already been imputed to these people.

More generally, the Internet is likely to encourage the development of undeclared market activity under the guise of the collaborative economy by facilitating connections between people who theoretically do not know each other: for example, if people collect and resell second-hand goods on an "industrial" scale such that that their profit margin generates substantial income. It is therefore possible that the Internet could increase the magnitude of certain illegal activities to an extent that would never have been possible with traditional means of communication. National accounting naturally seeks to trace all activities that are hidden to commit social or tax fraud. But any corrections that are applied are determined by an expert on the basis of given proportions of a declared activity in certain sectors. In construction, any increase in illegal activity related to the growth of the Internet would escape all of national accountants' traditional measurement tools.

Conversely, it is also possible that the Internet will lead to an increase in declarations, even partial ones, that were not declared before, given the greater traceability of Internet transactions, which makes it easier to detect fraud. This could dissuade people engaged in these activities from committing fraud, particularly if the Internet's positive impact on their business volume is such that it makes up for any lost income paid in taxes. The fact that several platforms have chosen to cooperate with public authorities - such as *AirBnB*, which started collecting a tourist tax for the city of Paris in the fall of 2015 - could also set in motion a virtuous process.

The Internet's impact on price

The Internet does not systematically bring about lower prices

As was mentioned in the first part, the Internet saves companies a great deal of money in many cases. Furthermore, the Internet increases competition between sellers via price comparison sites that gather information on the large number of offers and make them easily accessible to consumers (in terms of travel cost and delivery times). In principle, e-commerce should therefore reduce price levels and dispersion.

Consumers should therefore pay lower prices thanks to the rise of the Internet. However, existing analyses offer nuanced conclusions. A number of studies show that prices are lower online, such as Brynjolfsson and Smith (2000) for books, Scott-Morton, Zettelmeyer, and Silva-Risso (2001) for new cars, Brown and Goolsbee (2002) for insurance policies, and Overby and Forman (2014) for used cars. Even so, other studies show no significant price difference between online and physical stores, such as Clay et al. (2002) in regards to books. Furthermore, Cavallo (2015) observes that multi-channel players often provide the same offers regardless of the sales channel.

Price dispersion remains high

In comparison to physical sales, online sales theoretically present the following characteristics: low search costs, low costs to monitor competitor's prices, and low costs for retailers to adjust prices. Nevertheless, an increasing number of studies show that significant price dispersion persists online, even for homogeneous goods. Baye et al. (2004) show that price dispersion on a price comparison site remained stable despite a 13% increase in use of the site. Other studies show similar results, such as Clay et al. (2002) and Clemons, Hann, and Hitt (2002). More recently, Gorodnichenko, Shereminov and Talavera (2015) showed that prices are more flexible online than in conventional stores, but that considerable price friction remains. According to the authors, imperfections in physical markets (price rigidity, weak synchronisation in response to price changes, major price dispersion among sellers, and low sensitivity to both predictable and non-anticipated fluctuations in demand) can also be found online.

The possible causes: a form of heterogeneity persists, search costs remain high, and retailers provide more complex offers

Several explanations have been offered to identify what prevents a single price for a given product from emerging despite theoretically strong competition. First of all, even when controlling for product characteristics, a form of heterogeneity remains in terms of sales conditions and the seller's characteristics. If consumers also value these characteristics (such as greater or lesser ease in making exchanges, or the seller's reputation), then price differences can persist.

A number of studies also show that online search costs remain significant. The magnitude of these costs helps explain why a significant number of consumers miss out on substantial savings by not searching for enough information. In the case of hotel search engines, Koulayev (2014) estimates that the median cost of research is around $10 per results page (with 15 offers per page).[3] Cost distribution varies greatly among consumers: 65% of consumers have search costs of around $3 while the remaining 35% have search costs that are between $24 and $30. Jolivet and Turon (2014) studied buying behaviour on *priceminister.com* and showed that high search costs can explain why some purchases are made even though there were cheaper equivalent alternatives to the product that was sold. Furthermore, it seems that consumers who are willing to spend a lot of time on research (thus with high search costs) are not so much interested in finding the lowest price, but rather highly value the quality of the product they are buying, and information on product quality is harder to find than simple price data.

Moreover, though the objective of search platforms is generally to reduce search friction for a well-defined product, this is not necessarily the case for retailers, which have different incentives (see Dinerstein, Einav, Levin and Sundaresan, 2014). In particular, Ellison and Ellison (2009) show that sellers that do not have a comparative price advantage may be tempted to differentiate their offer or make it more complex (more complicated product descriptions, a number of versions of the same product) as compared to cheaper sites, in order to reduce the intensity of price competition. In particular, online vendors attract consumers with very low loss leader prices and then try to convince them to purchase higher quality products at a higher price. Jin and Kato (2006) also show that vendors using eBay's auction service "oversell" the quality of their products and thus fool buyers, primarily those who are less experienced. Lastly, Mayzlin, Dover and Chevalier (2013) show that companies sometimes manipulate information: in particular, some hotels tend to give fake ratings on sites such as *TripAdvisor*, rating themselves highly and giving bad ratings to their competitors.

INSEE measurement of Internet prices

INSEE does take Internet offers into account in its calculation of price indexes, particularly the consumer price index (CPI). Nonetheless, the rise of the Internet may affect the precision of price indexes to the extent that the characteristics of Internet offers are less stable over time than goods and services sold in physical stores.

Measurement of CPI is indeed based on observation of changes in the price of products with given characteristics. Since the point of sale is one of a product's characteristics, changes in price are measured at a fixed point of sale. The increase in online sales weakens this approach since product rotation is much higher on e-commerce sites than in traditional points of sale, and because the sales terms for a given product can easily vary from one month to the next online (inclusion or not of delivery fees in the price, for example).

3. The search cost is estimated by applying an hourly cost to time spent looking for information. More specifically, their method estimates the search cost in the following way: an individual ends their search for information when the expected return from additional research is equal to its cost.

The question of free goods or services deserves particular attention: when the Internet leads to the development of free offers that can substitute at least in part for existing commercial offers, this phenomenon can legitimately be analysed in economic terms as a drastic price reduction. Nevertheless, it will not appear in CPI measurements since the scope of this index includes tradable goods and services consumed in the country; items that are completely free fall outside the commercial sphere by definition.

That being said, even if price indexes included free offers, the impact of the increase of such offers on price indexes would remain ambiguous. Indeed, the CPI measures changes in the price of products with given characteristics over time. In this context, the sudden appearance of a free-of-cost encyclopaedia like *Wikipedia*, even though it obviously competes with traditional paying encyclopaedias, should instead be analysed as a new product at zero cost and would therefore not have any impact on the CPI even if free offers were taken into account. Indeed, online encyclopaedias offer a product with very different characteristics from those of traditional paying encyclopaedias, with advantages (information is updated very quickly online, at least for the most consulted articles) and disadvantages (articles vary greatly in quality, some of which are quite detailed while others are still in draft form).

Does the Internet have a more favourable impact on well-being than GDP?

The rise of e-commerce should have a limited impact on GDP to the extent that it corresponds mainly to the creation of a new sales channel that serves as a substitute for physical sales. Part of the impact on GDP could even be negative when the substitution occurs through foreign operators (tax avoidance on sales margins). In addition to this, the added value of matching sites is limited to margins on transactions. Nevertheless, there should be strong impact on individual well-being[4] through increased variety of products and services on offer, a larger second-hand market and facilitation of daily life. These benefits are not meant to be traced in calculations of GDP - which is essentially a measure of national production - and therefore fall outside of national accounting measurements.

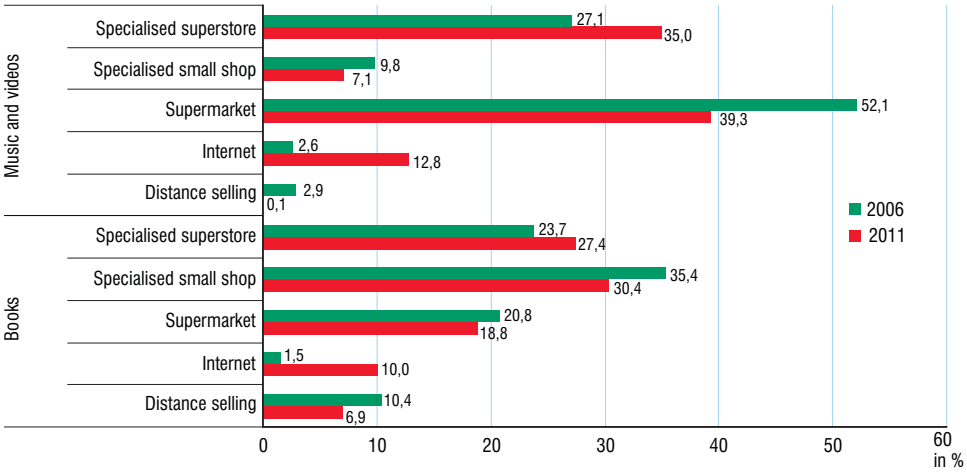
The Internet's direct impact on GDP seems limited

The Internet modifies consumer behaviour through the new services it offers. In turn, the Internet has also changed traditional business activities. Companies in the retail sector have perhaps been the most affected by the rise of the Internet. For some, the Internet serves as a new sales channel that complements their physical commerce, but for others the Internet brings new forms of competition: sales of music, videos, and books have decreased for certain businesses as online sales have increased *(Figure 4)*. Nevertheless, this decline is not widespread, and specialised superstores actually increased their market share between 2006 and 2011.

Overall, an increasing number of studies show that there is high substitution of Internet sales for physical sales. For example, Gentzkow (2007) shows that online newspapers are clearly substitutes for their print versions. Likewise, Hong (2007) shows that music sales decreased significantly between 1996 and 2002 because of increased Internet penetration. Hong and Wolak (2008) also found that the penetration of computers alongside the rise of the Internet could account for close to half of the decline in the use of physical postal services between 1986 and 2004 in the United States. Lastly, according to Liebowitz and Zentner (2010), expansion of the Internet reduces time spent watching TV and this is even more true for young people than it is for older people.

4. In the economic sense of the term and in the short-term. This analysis of effect on well-being does not claim to be exhaustive.

4. Change in sales of music, videos, and books per sales channel



Scope: Metropolitan France.
How to read the graph: In 2011, 12.8% of music and video purchases were made online, and 10% of book purchases were made online. In 2006, these figures were 2.6% and 1.5%, respectively.
Note: The total is not 100%; purchases made abroad, in the major non-specialized stores with food predominance in small areas, home sales, etc., are not shown on this graph.
Sources: INSEE, Family budget surveys, 2011 and 2006.

Furthermore, the added value generated by mixed collaborative sites and matching sites remains low for now, as mentioned above. In the end, the impact these sites have on GDP will be limited to commissions on intermediation services. Likewise, non-commercial collaborative websites generally make a limited contribution to GDP through the remuneration of permanent employees who work for the sites, and depreciation (consumption of fixed capital) of fixed capital. This contribution is only made in the organisation's country of residence, making no contribution to the GDP of other countries even if they house many users.

Lastly, by contributing to the growth of the second-hand market (extending the life span of products, *Box 3*) and facilitating more intensive use of certain goods (particularly in the case of the collaborative economy), the Internet could ultimately have a measured impact on GDP, though it is hard to identify precisely. For example, the increase in apartment exchanges:

– could lead to a reduction in the production of accommodation under the assumption that people who use apartment exchanges would otherwise have gone to a hotel;

– could lead to an increase in the production of transport services or fuel if more households go on holiday thanks to the reduction in the cost of accommodation made possible by the collaborative economy;

– could lead to an increase in the consumption of cleaning services for households that exchange their apartments.

The same kind of reasoning could apply to car-sharing. More generally, households could allocate purchasing power that is liberated by access to certain services at a lower cost than a traditional business exchange to other consumption areas, investments, or savings. Depending on the situation, the economic impact of the growth in the collaborative economy will not be the same. National accounts use their regular measurement tools to calculate the indirect impact of the development of the collaborative economy on the "traditional" economy.

Box 3

The increase in the lifespan of products on the Internet

As the second-hand market grows it could become a substitute for transactions involving new products. Chevalier and Goolsbee (2009) show that consumers pay a higher price for new products in the textbook market, expecting to resell the product online. As a result, companies can decide to sell their products at higher prices to consumers that value the goods most, leaving room for the second-hand market to expand for lower-value consumers. Companies could also react by reducing the lifespan of their product, as was shown in theory by Bulow (1986).

More generally, the development of these platforms can in many cases be analysed economically as an increase in competition between vendors that allows consumers to access a good or service of a quality that is better adapted to their needs for an appropriate price. The increase in and diversification of offers makes it possible to differentiate more effectively between consumers based on price, which is more likely to lead to long-term increases in overall demand and production.

The Internet primarily improves the well-being of individuals

In general, the increase in variety of products and services available online improves the utility consumers obtain from these transactions. Brynjolfsson, Hu, and Smith (2003) estimate that consumers derive significant gains from *Amazon*'s very large and varied catalogue of books: the impact on consumer well-being is 7-10 times higher than gains in well-being from lower prices online. For example, e-commerce sites make it easier for consumers to buy the ideal gift for their spouse with a larger product offering than nearby stores. This suggests that transaction quality is higher on the Internet, which increases consumer utility.

The Internet has also allowed the second-hand market to grow substantially through the development of quality certification systems, since quality is the main issue in this kind of market, as Jin and Kato (2007) demonstrated for *eBay*. In the used books market, Ellison and Ellison (2014) showed that online used booksellers are able to sell books that are rarer and can wait for high-value consumers by setting higher prices than in physical markets, since the Internet is a more liquid market that aggregates and centralises demand. This increase in the use and lifespan of goods, via the second-hand market and collaborative sites, improves household utility: it increases the income of seller-households and saves buyer-households money.

The Internet also improves the well-being of Internet users by facilitating connections to other people with the same interests. In this regard, certain studies indicate that minorities of all kinds seem to benefit more from these gains because the Internet compensates in part for their geographic isolation (*Box 4)*. Similarly, the Internet makes it possible for individuals to receive various information flows that interest them and send flows that allow them to maintain their networks (content aggregators, *Twitter, LinkedIn, Facebook, WhatsApp,* etc.)

Next, the fact that volunteer contributions to non-commercial collaborative sites only have a limited direct impact on GDP does not mean they have no economic significance, since they can have a substantial impact on well-being. In the case of the *Wikimedia Foundation*, the availability of free encyclopaedic tools greatly facilitates access to knowledge (quick and free access to information) and has a positive direct impact on the well-being of Internet users. It can also have indirect economic impact: Internet users can save money, and there are positive externalities in terms of overall productivity resulting from easier access to information.

Box 4

The distribution of gains from Internet use

Gains from Internet use are not uniformly distributed throughout the population, with studies showing that certain groups benefit more. In the United States, Scott-Morton, Zettelemeyer and Silva-Risso (2003) find that minorities (of African or Hispanic origin) benefit more from online information gains. Likewise, according to Zettelemeyer, Scott-Morton and Silva-Risso (2006), consumers who do not know how to negotiate prices benefit most from the Internet since they are able to collect information more easily. Sinai and Waldfogel (2004) also show that cultural or ethnic minorities in a city are able to interact with similar individuals online, which can compensate for their geographic location. Lastly, very busy individuals use the Internet to relieve themselves of daily tasks (Lohse et al. 2000). Thus minorities of all kinds seem to benefit more from gains afforded by the Internet.

Lastly, the Internet helps consumers optimise their leisure time. According to Lohse et al. (2000), consumers who are very busy use the Internet more to relieve themselves of routine tasks. The Internet also helps consumers optimise their choices. For example, they can decide to go skiing or play tennis based on weather forecasts that are easily available online. Nevertheless, it remains difficult to measure the surplus generated by Internet use in this particular case. For now, in the absence of more precise data, it is difficult to measure whether a person prefers eating lunch with their colleagues more often rather than spending part of their lunch break going to the bank. At best, these gains can be observed in changes to consumer choices when the Internet offers meaningful alternatives. This notion of revealed preference was developed by Goolsbee and Klenow (2006), who provide a method to measure the value of the Internet according to the time spent using it. ■

Further reading

Armstrong, "Competition in two-sided markets." *RAND Journal of Economics*, 2006.

Baye, Morgan, et Scholten, "Price Dispersion in the Small and in the Large: Evidence from an Internet Price Comparison Site." *Journal of Industrial Economics*, 2004.

Bouziani Z., Ferrante A., « Le commerce électronique en 2012 » ; *Insee Première* n° 1489, février 2014.

Brown, et Goolsbee, "Does the Internet Make Markets More Competitive? Evidence from the Life Insurance Industry." *Journal of Political Economy*, 2002.

Brynjolfsson, Smith, "Frictionless Commerce, A Comparison of Internet and Conventional Retailers." *Management Science*, 2000.

Brynjolfsson, Hu, Smith, "Consumer Surplus in the Digital Economy, Estimating the Value of Increased Product Variety at Online Booksellers." *Management Science*, 2003.

Bulow, "An Economic Theory of Planned Obsolescence." *The Quarterly Journal of Economics*, 1986.

Cavallo N., « Vers une meilleure articulation avec les points de vente physiques » ; *Insee Première* n°1547, mai 2015.

Chevalier, Mayzlin, "The Effects of Word of Mouth on Sales: Online Book Reviews." *Journal of Marketing Research*, 2006.

Chevalier, Goolsbee, "Are Durable Goods Consumers Forward-Looking, Evidence from College Textbooks." *The Quarterly Journal of Economics*, 2009.

Clay, Krishnan, Wolff, Fernandes, "Retail strategies on the web price and non price competition in the online book industry." *Journal of Industrial Economics*, 2002.

Clemons, Hann, Hitt, "Price Dispersion and Differentiation in Online Travel, An Empirical Investigation." *Management Science*, 2002.

Dinerstein, Einav, Levin, Sundaresan, "Consumer Price Search and Platform Design in Internet Commerce". *Stanford Working Paper*, 2014.

Ellison, Ellison,"Search, Obfuscation, and Price Elasticities on the Internet." *Econometrica*, 2009.

Ellison, Ellison , "Match Quality, Search, and the Internet Market for Used Books." *MIT Working Paper*, 2014.

Forman, Ghose, Goldfarb, "Competition Between Local and Electronic Markets : How the Benefit of Buying Online Depends on Where You Live." *Management Science*, 2009.

Gallino, Moreno, "Integration of Online and Offline Channels in Retail: The Impact of Sharing Reliable Inventory Availability Information." *Management Science*, 2014.

Gentzkow, "Valuing New Goods in a Model with Complementarity Online Newspapers." *American Economic Review*, 2007.

Goolsbee, Klenow, "Valuing Consumer Products by the Time Spent Using Them, An Application to the Internet." *American Economic Review*, 2006.

Gorodnichenko, Sheremirov, Talavera, "Price Setting in Online Markets: Does IT Click." *NBER Working Paper*, 2015.

Hagiu, "Merchant or Two-Sided Platform?" *Review of Network Economics*, 2006.

Hong, "The recent growth of the internet and changes in household-level demand for entertainment." *Information Economics and Policy*, 2007.

Hong, Wolak, "Relative prices and electronic substitution: Changes in household-level demand for postal delivery services from 1986 to 2004." *Journal of Econometrics*, 2008.

Jin, Kato, "Price, Quality, and Reputation, Evidence from an Online Field Experiment." *RAND Journal of Economics*, 2006.

Jin, Kato, "Dividing Online and Offline, A Case Study." *Review of Economic Studies*, 2007.

Jolivet, Turon, "Consumer Search Costs and Preferences on the Internet." *IZA Working Paper*, 2014.

Koulayev, "Search for differentiated products, identification and estimation." *RAND Journal of Economics*, 2014.

Liebowtiz, Zentner, "Clash of the Titans: Does Internet Use Reduce Television Viewing?" *The Review of Economics and Statistics*, 2010.

Liu, "Word of Mouth for Movies: Its Dynamics and Impact on Box Office Revenue." *Journal of Marketing*, 2006.

Lohse, Bellman, Johnson, "Consumer buying behavior on the Internet." *Journal of Interactive Marketing*, 2000.

Mayzlin, Dover, et Chevalier, "Promotional Reviews: An Empirical Investigation of Online Review Manipulation." *American Economic Review*, 2014.

Overby, Forman, "The Effect of Electronic Commerce on Geographic Purchasing Patterns and Price Dispersion." *Management Science*, 2014.

Pozzi, "The effect of Internet distribution on brick-and-mortar sales." *RAND Journal of Economics*, 2013.

Sinai, Waldfogel, "Geography and the Internet, Is the Internet a Substitute or a Complement for Cities." *Journal of Urban Economics*, 2004.

Scott-Morton, Zettelmeyer, Silva-Risso,"Internet Car Retailing." *Journal of Industrial Economics*, 2001.

Scott Morton, Zettelmeyer, et Silva-Risso, "Consumer Information and Discrimination: Does the Internet Affect the Pricing of New Cars to Woman and Minorities?" *Quantitative Marketing and Economics*, 2003.

Zettelmeyer, Scott Morton, et Silva-Risso, "How the Internet Lowers Prices: Evidence from Matched Survey and Auto Transaction Data." *Journal of Marketing Research*, 2006.