Oxera

What is the economic impact of Geo services?

Summary report

Prepared for Google

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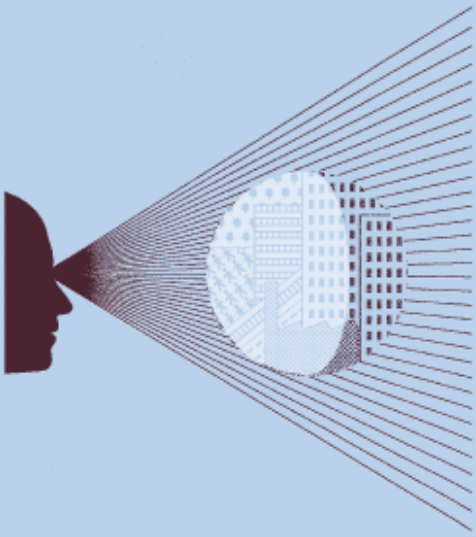

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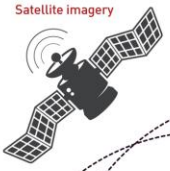
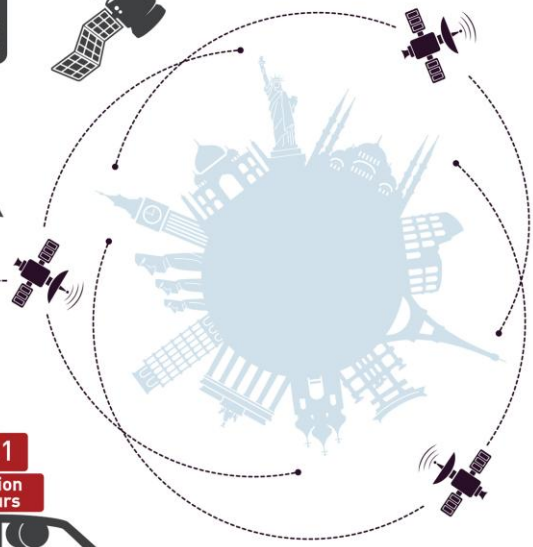
Geo services are:



Geo services global revenues are $150–$270 billion per year



Geo services global added value is around $100 billion per year

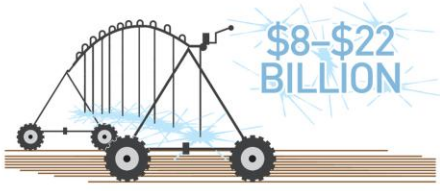
Geo services save:

Geo services save 3.5 billion litres of gasoline per year—approximately 0.1% of the total world production of 5 trillion litres of liquid oil products

Geo services facilitate competition, leading to savings from reduced prices among infrequently bought goods and services of up to:

Geo services aid faster emergency response; for example, in England Geo services may have helped to save at least 152 lives per year

Geo services can improve agricultural irrigation, helping to achieve global cost savings per year of:



Students educated using Geo services can expect

3%

higher average wages five years after graduation than those who weren't

Source: Oxera (2013), analysis.

Executive summary

People are increasingly accessing and using geographic mapping and location-based services ('Geo services'). In the five largest European economies, 50% of Internet users access maps online and 35% of smartphone users do so on their handsets.[1] In addition to this regular use of Geo services, a whole range of systems has been, and is being, designed to put Geo services to use in innovative ways. For example, there are systems that use Geo services to help coordinators of search-and-rescue operations determine which areas rescue dogs have searched; to log the location of ship crew members if they fall overboard; to impose directions on a smartphone video stream; to help predict natural disasters; and to provide feeds-up displays with translucent location guidance.[2]

Some of the more everyday uses for mapping and location-based services include local governments helping residents find their nearest community services, such as leisure facilities, schools, transport and recycling.[3] Spatial information is also increasingly being used to link consumers and businesses through location-based services, which combine geographic data from a mobile device with maps and other data to help link consumers to local services such as dentists, hairdressers and coffee shops. From an economic perspective, these services help businesses and consumers connect with each other more easily, increasing welfare for consumers by reducing the cost of searching, and increasing competition and choice in many markets.

This study aims to quantify the impact of Geo services on the world economy and consumer welfare. For the purposes of the study, this impact has been divided into three broad categories:

– **direct effects**—the footprint of the Geo services measured according to the revenue generated by firms developing and providing Geo services and the value that they add;

– **consumer effects**—the benefits that accrue to consumers, businesses and government from using Geo services, over and above the value that may be paid for any services (ie, the revenue accounted for under the direct effects category); and

– **wider economic effects**—the benefits that accrue from Geo services improving efficiency elsewhere in the economy, by creating new products and services and creating cost savings that cannot be generated by other sectors.

Estimating global impacts is not a precise science and relies on combining data from multiple sources. As such, the estimates should be considered indicative of the likely magnitude of impacts rather than precise estimates of individual effects. Indeed, it is at least as important to understand the mechanisms through which Geo services affect the economy, as the precise estimates themselves.

For this study, Geo services are defined as all interactive digital mapping and location-based services. These include providers of satellite imagery, digital maps, satellite positioning signals, and navigation devices. Digital maps are defined to include both online maps and locally stored digital maps (such as satellite navigation systems used in cars). Traditional

[1] Comscore (2012), 'EU5 Map Usage via smartphone growing 7× faster than classic web', May.

[2] Each of these ideas has been a winner of the European Space Agency's European Satellite Navigation Competition since 2006. See European Satellite Navigation Competition (2011), 'The results 2011'.

[3] See, for example, the London Borough of Camden's service finder, available at http://maps.camden.gov.uk/.

hard-copy map publishers are not included in the estimates, although they may use data from some parts of the Geo value chain.

What are the direct effects of Geo?

Direct effects refer to the economic presence or footprint of those companies directly involved in producing Geo services (eg, companies that are part of the value chain described in section 2, such as Google, Carifact, and Garmin), and the value that they create.

These effects can be measured in various ways: by the revenues that are generated; by market capitalisation; by gross value added (GVA); or by the jobs involved in producing these services.

This report has adopted a number of approaches, and estimates that the Geo services sector generates $150–$270 billion of revenue globally. This range is based on two different forms of calculation that jointly give an indication of the likely order of magnitude estimate rather than a precise value. By way of comparison, this is greater than the $25 billion of revenues generated by the video games industry,[4] broadly equivalent to the $140 billion of revenues from the global security services industry,[5] or around one-third of the global airline industry's revenues of $594 billion.[6]

Revenue estimates provide an indication of the size of the transactions that are occurring, but do not capture the full economic contribution of a sector. An alternative method of quantifying the impact of a sector is to look at its GVA. This accounts for any costs of inputs incurred. GVA can be broken down into the profits accruing to Geo services providers and the wages paid to those working in Geo services.

This report estimates that the Geo services sector has a global GVA of $113 billion. By way of comparison, global GVA is approximately $70 trillion,[7] suggesting that Geo services account for roughly 0.2% of global gross domestic product (GDP). In comparison to other industries, the global airline industry has a GVA of approximately $221 billion[8] and the global video games industry a GVA of approximately $22 billion.[9]

How do consumers benefit from Geo?

Geo services are wide in scope, as reflected in the range of uses that consumers have for these services. All these uses generate benefits for consumers in different ways, and these benefits are in turn partly captured in the revenue impacts illustrated under the direct effects. This shows that consumers are willing to pay to use these services. Moreover, they derive benefits from services that are not captured via revenues. This is apparent when considering that many Geo services are free at the point of use (eg, Michelin maps).

Geo services are typically an intermediate good—ie, they are not normally valuable in themselves, but help consumers engage in other activities. Thus, the consumer benefit from Geo services is derived from the value to the consumer of the activities they facilitate (eg, visiting a new destination). Examples of the consumer welfare benefits that Geo services generate include the following.

[4] Entertainment Software Association (2011), 'Essential facts about the computer and video game industry'.

[5] Central Association of Private Security Industry (2011), 'Security services a sunrise industry'.

[6] International Air Transport Association (2011), 'Weak Economy, Weak Profits—2012 Looking Even Tougher', September.

[7] World Bank Global Development Indicators.

[8] Based on International Air Transport Association (2006), 'The value added by airlines', scaled up to current level by growth in industry revenues as reported in International Air Transport Association (2011), 'The Impact of September 11 2001 on Aviation'.

[9] Based on Entertainment Software Association (2010), 'Video games in the 21st century', scaled up from US to global GVA estimate by ratio of US to global GDP.

– **Journey time and fuel savings from more efficient navigation**—drivers using navigation devices can reduce travel time and fuel consumption on some journeys by optimising their route, reducing the risk of getting lost, and, on occasion, by avoiding congestion. This impact could be worth around $22 billion per year to consumers.

– **Educational benefit**—Geo services can provide users with an educational value beyond their conventional use in navigation. Geographic information systems can be considered a useful information technology tool for promoting higher-order thinking, decision-making and problem-solving skills.[10] Geo services can also provide individuals with better access to information about the location of countries, cities and places of interest, leading to a more informed population. This educational impact could be worth around $12 billion a year.

What are the wider economic effects of Geo?

Wider economic (or supply-side) effects are the effects of a sector that are driven by the use of Geo in the economy which help to increase overall productivity and potential output. In the short term, the output of an economy can depend on changes on the demand side—ie, the level of goods and services demanded by consumers and businesses. However, in the long term, the output of an economy—using standard measures of output, such as GVA, or the prosperity of the population living in an economy (eg, measured using GVA per head)—is determined by the underlying productive potential or supply side of the economy.

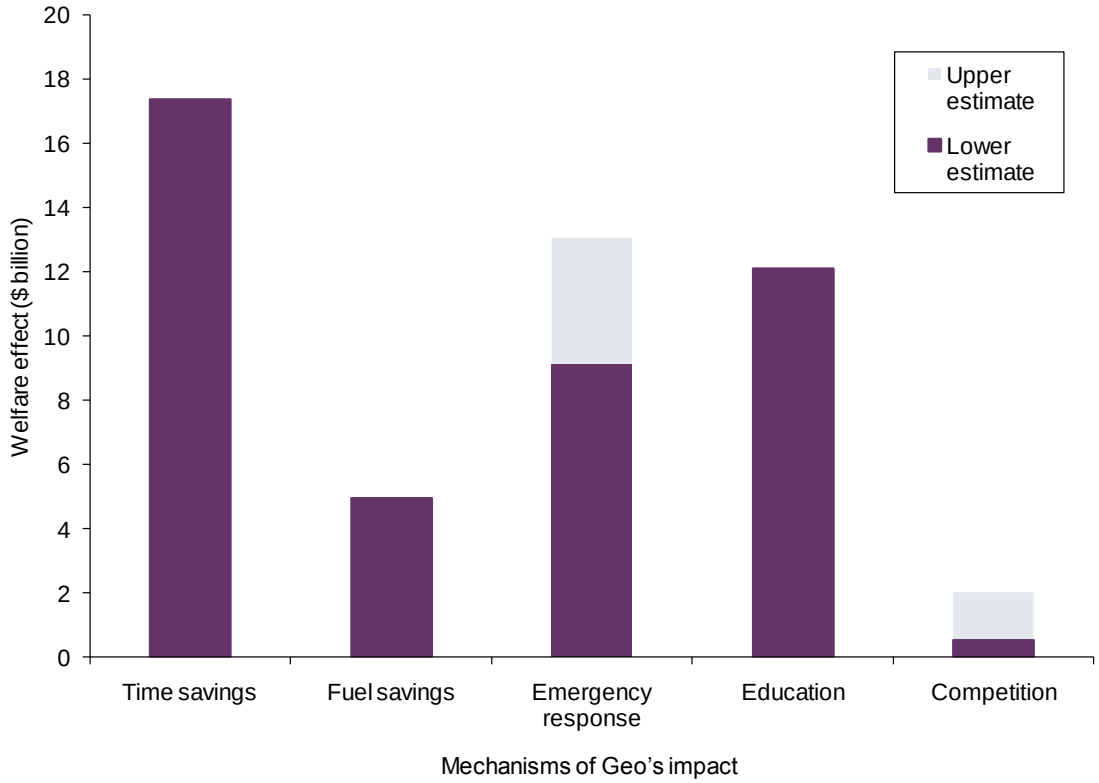
Because Geo services facilitate the functioning of businesses, they help to drive efficiency gains throughout the economy. These can be observed in industries such as logistics, where the Global Positioning System (GPS) has been estimated to generate at least $10 billion in cost savings.

Geo services also affect the wider economy by helping to change the breadth of markets and thereby promote consumer choice. By reducing transport costs and increasing information to consumers, Geo services can broaden both product and geographic markets. Making markets wider is not typically seen as a goal in itself, but it can help to promote efficiency and cost savings through increased competition in many markets. This ultimately drives prices down towards costs, benefiting consumers.

Some of the wider economic and consumer impacts created by Geo are summarised in the figure below. This list of effects is by no means exhaustive, and there will be various interactions between them. Nevertheless, the analysis indicates the magnitude of the value that Geo creates, which is not captured in market and financial transactions.

[10] Yap, L.Y. (2008), 'An Assessment of the Use of Geographical Information Systems (GIS) in Teaching Geography in Singapore Schools', *Journal of Geography*, **107**:2, pp. 52–60.

Estimates of various consumer effects



Source: Oxera.

Overall conclusion

This report presents an estimate of the current impact of Geo. However, it also recognises that the industry is growing rapidly—at a rate of 30% per annum globally. Hence, many of the estimates presented here will quickly become underestimates, as Geo services become more widespread.

Overall, the benefits of Geo services are varied; for some consumers, they can literally be life-saving; while for others, they simply take away some of the hassles of daily life. This report demonstrates that these benefits are real and their order of magnitude can be estimated. Geo services are making an important contribution to the global economy and to future productivity. The efficiency gains they create are helping to facilitate economic activity and generate additional consumer welfare.

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