

ANALYZING THE EFFECT OF BROADBAND ON GDP

A study on the socioeconomic effects of broadband speed on the economy

The world is changing. Information and Communication Technology is continuously being developed, changing how we live and creating an ICT industry that is key to supporting the Networked Society. Broadband is a core aspect of the Networked Society, enabling increased connectivity across society, spurring innovation and collaboration. These benefits mean broadband has been of significant interest to governments, regulators and policy makers over the past few years, and billions have been spent on ICT investments. We know that these investments have allowed countries worldwide to improve their broadband quality and increase their connections, but what further impacts do they have? Are there specific economic benefits to faster broadband, and how can they be measured? To answer these questions, a new study has been conducted investigating the socioeconomic benefits of faster broadband, looking at various economies around the world.

This report focuses on the results of the study, "Socioeconomic Effects of Broadband Speed: a Macroeconomic Investigation," conducted in 2011 about the effects of broadband speed on Gross Domestic Product (GDP). Ericsson, in co-operation with Arthur D. Little and Chalmers University of Technology, used panel data econometric methods to assess the impact of broadband speed on the global economy, using data from 33 Organization for Economic Co-operation and Development (OECD) countries.

Key findings

- > Doubling broadband speeds for an economy can add 0.3 percent to GDP growth, in a simulation relative to the base year 2008
- > The benefits of faster broadband can be categorized as:
 - Economic effects, including increased innovation and productivity in business
 - Social effects, including better access to services and improved healthcare
 - Environmental effects, including more efficient energy consumption

Previous research

During the past few years, Ericsson and Arthur D. Little have been conducting research into the impacts of broadband upgrades and investments. The first study, "Socioeconomic Impact of Broadband Network Investments," was conducted in 2010. It focused on the impact of increased broadband penetration, exploring the latest global thinking on the economic impact of investment on fixed and mobile broadband. The study outlined in this report was conducted as a follow-up investigation to the 2010 research.

In collaboration with:

Data collection and analysis

This study is the first of its kind in quantifying the economic impact of broadband speed upgrades using a comprehensive scientific method based on empirical data. Data was collected for 33 OECD countries, based on publicly available sources as shown in Figure 1.

The results were derived using panel data econometric models. They showed high statistical significance, were robust to model changes, and passed rigorous statistical testing regarding the direction of causality. The study scientifically confirmed that speed is a highly important factor in spurring economic growth.

Figure 1: Countries included in the study

Countries included in the macroeconomic investigation		Variables investigated			
		Source	Data		
Australia	Japan	OECD	> GDP per capita		
Austria	Korea		> Fixed broadband penetration rate		
Belgium	Mexico		> Average broadband subscription price		
Canada	Netherlands		> Education level		
Chile	New Zealand		> Telecommunication revenue in millions of dollars		
Czech Republic	Norway		World Bank	> Population density	
Denmark	Poland			Ookla	> Average achieved broadband speed
Estonia	Portugal				
Finland	Slovakia				
France	Slovenia				
Germany	Spain				
Greece	Sweden				
Hungary	Switzerland				
Iceland	Turkey				
Israel	UK				
Italy	United States				

How to measure the benefits

The analysis in this macroeconomic study was conducted on a country-wide level, providing a comprehensive view on the benefits of broadband speed, as well as novel insights in the field of research. The study found that the effects of faster broadband depend on a market's ability to adapt to new technologies, with long-term changes in an economy more likely to occur in countries with a competitive and flexible labor market.

However there are two main challenges when measuring benefits: causality and complexity.

Causality refers to the direction of the cause and effect relationship between ICT investments and the potential benefits. Establishing causality is one key step towards ensuring that interpretations of the analysis are relevant. For example one may ask: "Does broadband increase income or does increased

income provide sufficient means to invest in broadband?"

Another common challenge when analyzing the benefits is understanding the complex nature of how broadband speed affects society. This is because an effect on one part of society can impact other parts through a complex web of linkages and interdependencies.

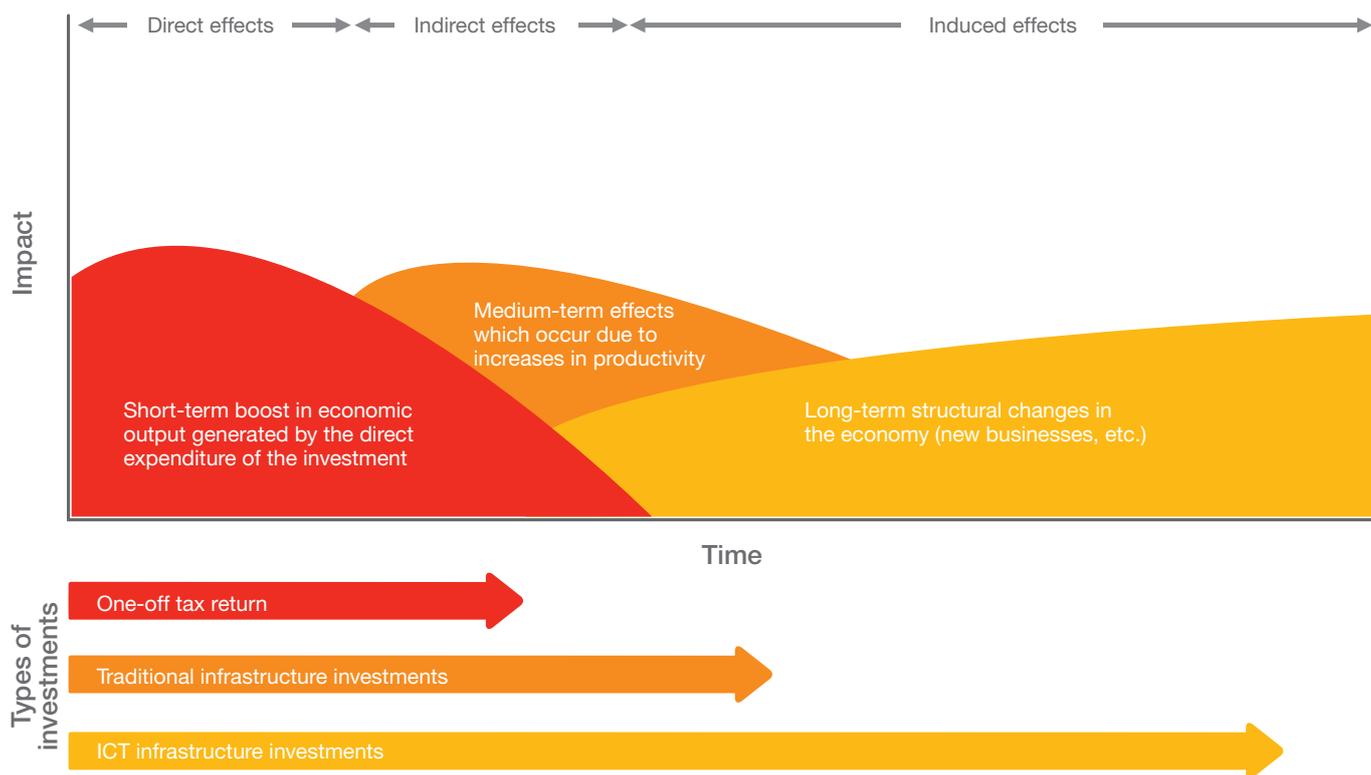
Economic impacts over time

The economic impacts of broadband speed upgrades are spread through the economy via direct, indirect and induced effects, as seen in Figure 2.

Direct effects are changes in employment, economic production and behavior, generated in the short term during the course of deployment of new infrastructure. Indirect effects occur in the medium term and are due to improved productivity.

Induced effects occur over the long term and include transformative impacts on the economy, such as introducing new industries/clusters or new ways of working. This study supports previous 2010 research on the economic impact of investments in broadband penetration, which found that induced effects may constitute a substantial part of the total benefits from ICT infrastructure investments.

Figure 2: Economic impacts of broadband speed upgrades



Source: Arthur D. Little research (covering more than 120 reports from leading research institutes)

How do economies benefit from faster broadband?

The socioeconomic effects of broadband speed have been measured, and the results show that the benefits are diverse. They can be categorized into three main dimensions: economic, social and environmental and are portrayed in Figure 3.

Figure 3: Benefits of faster broadband

Economic	Social	Environmental
<ul style="list-style-type: none">> Rise in GDP as direct economic production increases in the short term thanks to the deployment of network facilities> New jobs created to construct and set up the new infrastructure> Increased productivity in the medium term due to time saved and increased mobility> Increased innovation and new ways of doing business enabled by increased broadband speed, leading to:<ul style="list-style-type: none">– More advanced online services– New utility services– Telecommuting	<ul style="list-style-type: none">> Consumer benefits include better social relations between people regardless of distance, e.g. through social media> Higher broadband speeds also enable:<ul style="list-style-type: none">– Improved services, e.g. video sharing– Enhanced online gaming experiences and higher quality of online media content and HD streaming> Improved education levels through feature-rich e-learning experiences> Improved welfare such as e-health services to improve quality of life	<ul style="list-style-type: none">> Providers will have the capability to deal with larger amounts of digital content online (dematerialization) leading to:<ul style="list-style-type: none">– Video conferencing– Less need for paper– Telecommuting> New types of computer and network services, such as:<ul style="list-style-type: none">– Smart grids– Smart homes– Improved congestion management systems

Implications for stakeholders

Incentives are imperative to unlocking investments in both broadband speed upgrades and broadband penetration. Motivations for operators to build and upgrade broadband vary greatly across the globe depending on the policy decisions of individual countries. Governments in many Asia-Pacific countries are actively financing or subsidizing broadband, either by direct stimulus, tax incentives or other means. In the US, relaxation of broadband regulation has led to an

upswing in the deployment of this technology. In Europe, regulation of broadband, especially the fixed side, has slowed down investments.

This study scientifically confirms that broadband speed is an important factor for regulators, policymakers and operators to consider. It shows authorities that their priority should be to establish a high penetration rate before focusing on upgrading speeds as a way of furthering

economic growth. Although the relationship between broadband penetration rate, speed, benefits and externalities has yet to be modeled, the results of this study should be seen as a starting point for key stakeholders' discussions and an input for investors' cost-benefit analyses. The study also reminds regulators to carefully consider the economic implications of national broadband policy and regulation.

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