

Digital goods generate more than \$2.5 trillion in consumer welfare a year, research finds

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Digital goods are products or services that can only be purchased, transferred, and delivered online (e.g., e-books, downloadable music, online games). Such goods can generate significant benefits for

consumers, but because most of them are free, the benefits are largely unmeasured in national accounts such as gross domestic product (GDP) and productivity.

In a new study, researchers measured consumer [welfare](#) gains from popular digital goods across multiple countries. They found that the goods generated more than \$2.5 trillion in aggregate consumer welfare per year, roughly equivalent to nearly 6% of the countries' combined GDP. The findings suggest that digital goods reduced inequality in consumer welfare in and across countries by disproportionately benefitting lower-income groups.

The study was conducted by researchers at Carnegie Mellon University (CMU), Stanford University, and Meta (which owns and operates Facebook, Instagram, WhatsApp, and other products and services). It is released as [an NBER working paper](#).

"With the spread of the Internet, time spent on digital goods has risen dramatically in the last two decades, and these goods affect more and more aspects of daily life," says Avinash Collis, professor of digital economy at CMU's Heinz College, who co-led the study. "Yet we lack information on how such goods contribute to consumer welfare."

Seeking to create new metrics of economic welfare by measuring the size and value of the digital economy, researchers conducted large-scale incentivized online choice experiments and surveyed nearly 40,000 users of Facebook digital services' internal survey platform in 13 countries. Users were representative of the population of Facebook users who had been active in the last 30 days. Researchers also estimated valuations for ten leading digital goods, including YouTube, WhatsApp, TikTok, and Instagram.

Digital goods generated substantial welfare for consumers, creating

\$2.52 trillion of value across all countries, which corresponds to 5.95% of their aggregate GDP. Lower-income individuals and lower-GDP countries received disproportionately more welfare from these digital goods than did higher-income individuals and higher-GDP countries.

A \$10,000 increase in a country's GDP per capita is associated with a 2.09 percentage point decrease in users' valuation of 10 popular digital goods relative to GDP per capita. Because the digital goods examined were available for free to both higher- and lower-income individuals, they served to reduce welfare inequality both within and across the countries in the study.

"Since none of the digital goods we examined existed a few decades ago, our findings suggest that [economic growth](#) may have been underestimated by conventionally measured GDP," explains Erik Brynjolfsson, professor of economics at Stanford University, who co-authored the study. "Since labor productivity is typically defined as GDP per hour worked, it also fails to reflect the full contribution of [digital goods](#)."

Among the study's limitations, the authors note that compared to GDP, which can be measured precisely, their estimates should be considered less precise and subject to systematic biases and users' irrational choices.

"Since the [digital economy](#) will likely become more significant, it will be increasingly important to explicitly measure the trillions of dollars of value created by these sorts of goods," says Collis. "Our study is a first step toward establishing a reliable baseline to understand the magnitude and nature of future changes in the economy."

More information: Erik Brynjolfsson et al, The Digital Welfare of Nations: New Measures of Welfare Gains and Inequality, (2023). [DOI: 10.3386/w31670](https://doi.org/10.3386/w31670)

Provided by Carnegie Mellon University's Heinz College

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