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### **Growth through digitisation requires more than faster broadband connections**

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DO DIGITAL economies grow faster than analogue ones? Rich-country leaders seem to think so. G7 and European Union governments are committed to a variety of digital stimulus packages; Australia, the biggest spender, has promised broadband investment of \$33.4 billion (or 3% of GDP) to connect 90% of homes at ultra-fast speeds.

“Digitisation” involves adopting technologies like wireless phones and internet access to generate, process and share information. It seems to make sense that replacing slow technologies with faster ones might speed up sluggish economies. But does the case for investment stack up?

Economic theory supports digitisation. There is a deeply held belief among economists that better technology and cleverer ideas provide the best explanation of why economies grow. Ideas and information are all-important in growth theory, as is the distribution of cutting-edge knowledge among workers. Investments in computers, broadband and the like—things that help spread ideas quickly and cheaply—should generate growth.

Digitisation and growth are also highly correlated. The 15-year period between 1995 and 2010 was one of strong economic growth and of a global boom in digitisation. A new index\* built by Raul Katz of Columbia Business School and Pantelis Koutroumpis of Imperial College London tracks the effects of this boom across countries. The index adds a wider mix of digitisation metrics than previous rankings, using 21 measures including broadband speed, coverage and reliability, and the cost and use of mobile telephones. It also adds to existing indices by measuring the many ways digital networks can be used, from the availability of online shopping to the provision of e-government services like road taxes for cars. Finally, it measures the ability of workers to use new digital technologies.

Digitisation varies hugely by country and region (see chart). Norway leads the pack, closely followed by other advanced economies. Emerging-market digitisation has started to catch up, though in some countries like India and Indonesia the pace of progress is decidedly dial-up. The data also show that there is much further to go on the road to full digitisation. Globally there are fewer than ten fixed broadband connections per 100 people; the range runs from close to 40 per 100 people in Hong Kong to below one in Kenya. In some countries, a huge gap exists between availability and usage. Senegal, for example, has mobile-broadband coverage for 30% of the population, but only 1% use it.

Establishing a link between digitisation and growth is one thing; proving which way causality runs quite another. Growth could be making consumers richer, so that they buy and use more digital technology. Or it could be that richer governments are able to invest more. In these cases growth is causing digitisation, not the other way round. A 2011 paper by Nina Czernich, Oliver Falck, Tobias Kretschmer and Ludger Wössmann of the University of Munich gets round this problem. The paper looks at broadband adoption for a group of 25 OECD countries for the years 1996-2007. The researchers first collect data on the telephone and cable networks on which broadband depends. Because these

networks predate broadband, any relationship between them and broadband uptake is independent of current growth and investment. This allows the authors to create a stripped-down measure of broadband penetration, which can then be tested to see how it affects economic expansion. The findings are striking: a ten-percentage-point increase in broadband penetration results in an increase in annual per-head growth of 0.9-1.5 percentage points. At an aggregate level, digitisation boosts growth rates.



That suggests the greatest gains from going digital will come in emerging economies, given their lowly starting-points. Many are acting accordingly. Brazil has cut taxes, both for firms making digital technology and for shoppers buying tablet computers. South Korea has invested hugely in broadband, jumping from 11th to 2nd in the digitisation rankings. For the growth-hungry policymaker, however, digital stimulus is not the end of the story.

Analysis that looks more deeply at individual industries finds that digitisation on its own is not enough. Faster information boosts output only when matched with more astute ways of interpreting and acting on new data. American policing is one example: in the late 1980s less than 20% of police forces used computers, but by the early 2000s over 90% did. Recent analysis by Luis Garicano and Paul Heaton of the London School of Economics shows that digitisation alone did not improve policing outcomes. But some forces matched the new computers and data with better ways of working: more accurate mapping of crime, daily adjustment of officer deployment to crime hotspots and regular evaluation of results. Productivity was boosted.

## Digitally enhanced

Similarly, some firms are better than others at marrying new digital technology to fresh ways of operating. A new study by Nicholas Bloom of Stanford University, Raffaella Sadun of Harvard Business School and John Van Reenen of the London School of Economics supports the idea that digitisation alone is not enough to drive growth. Their data show that American firms tend to have more information technology than comparable European ones, and are better at squeezing productivity out of it.

This finding is explained largely by management practices. American firms are more aggressive in promoting and rewarding high-performing staff, for instance; they are also quicker to remove underperformers. Since the ability to monitor and measure performance is improved by having better technologies, digitisation seems to complement the American way of managing. This may be one reason why American productivity growth—concentrated in sectors that use information technology intensively—has outstripped that in the EU over the past 15 years. The machines matter, in other words, but so do the men.

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