



Policy Brief

ICT_No.
03/
July
2013

Relationship Between Investment in ICT and Growth and Employment in Senegal

By Latif Dramani and Oumy Laye

1. Section 1: Problem statement and justification of the study

Solow's productivity paradox has to do with the fact that the development of new technologies was supposed to give a boost to productivity and thus increase growth. However, empirical research (Jorgenson et al., 2003 and Timmer et al., 2003) has shown that the development of new technologies did not necessarily lead to an improvement in productivity, hence the paradox. So, it is essential to ask the question of whether the development of the information and communication technology (ICT) in Senegal has led to an improvement in productivity and, hence, economic growth.

The use of new technology in a production process has positive and negative effects on employment. The new technology entails a reorganization of work which can cause the creation or loss of jobs. That is why the present study sought to investigate the effect of using ICT on employment in Senegal. The question to address was: Is the massive investment in ICT in Senegal an obstacle to or a catalyst for growth and employment in Senegal?

Investment, as a flow of capital, has a direct impact on the growth of the national product not only as a factor of production but also by its multiplier and accelerator effects.

The new theories of growth extend the definition of investment to include human capital, especially when it comes to the money spent on education, training and health, all of which produce positive externalities and thus contribute to economic growth. For all these reasons, investment is considered by most decision-makers as one of the key drivers of economic growth.

With a very young population in working age, 56.9% of whom were aged between 10 and 30 in 2005, the labour market in Senegal is typically characterized by

seasonal jobs and permanent ones, with the former representing 44.20% and the latter 43.8% of the total working population.

The trends in Senegal's growth rate show that this has been erratic (0.7% in 2002 and 2.3% in 2006) and not enough to enable the country fight poverty in accordance with the objectives it set for itself in its PRSP-II and with the MDGs. For instance, underemployment is still very high in the country (21.8%) and is typically higher in the rural area (25.1%) than in the urban (21.4%). It is thus desirable for Senegal to aim at achieving a high, sustainable and lasting growth.

2. Section 2: Method of analysis

A general equilibrium method based on the model of the social accounting matrix multiplier was used. This approach makes it possible to measure the direct and spin-off effects of a specific investment on different markets and in particular the labour market, in line with the functioning of the economy.

The methodology used in the present study was based on the model of the social accounting matrix multiplier (see Pyatt and Round (1979) and Defourny and Thorbecke (1984), as well as on a derivation of multipliers first proposed by Thorbecke et al. (1996), aimed at measuring the possible externalities generated by investment in ICT on poverty. The effect of ICT investment on employment was measured by first using a sector-based approach based on household microeconomic behaviour and then a mesoeconomic approach base on the structure of household surveys.

Section 3: Key findings

The results of our simulations based on investment decisions made by economic players enabled us to measure the impact of a wide range of possible channels of transmission of ICT investments on the fundamentals of the economy.

The impact of a 10% rise in ICT investment on the fundamentals of the economy of the various economic players (households, formal sector, informal sector, firms, and government) was found to directly lead to the following effects:

- a rise in the GDP at a 0.14% cost of factors, with a 0.09% increase in income from labour, 1,178 new jobs created and a 0.01% increase in the poor populations' income;
- a 4.12% surge in the GDP, including a 2.55% increase in income from labour; these estimations enabled us to derive an increase by 33,364 in new jobs created, with a 0.30% decrease in the impact on the poor populations' income;
- a 0.15% increase in the poor populations' income, resulting from the creation of 16,486 new jobs generated by a 1.26% rise in income from labour, with this rise in labour income being attributable to a 2.04% increase in the GDP at the cost of factors;

- an increase in 20,018 new jobs created arising from the virtuous circle brought about by the government's investment in ICT; this investment also has a catalyst effect on the GDP growth which rises by 2.47% and trickles down to poor households' income, which in turn rises by 0.18%;
- finally, a 2.26% rise in the GDP at the cost of factors, with a 1.62% increase in income from labour, which causes the creation of 21,196 new jobs; this improvement in the economy leads to a 0.19% increase in the poor populations' income.

4. Section: Policy implications and recommendations

The analysis in the present study of the impact of investment in ICT on the fundamentals of the economy has shown that this type of investment has a greater effect and reach on the informal sector than on the other sectors. Our study found a 10% increase in ICT investment enabled households operating in the informal sector to generate a higher income. On the basis of this observation, it would be wiser to promote such investment in the informal sector, if one took into account the country's strategies for poverty reduction and its strategy for accelerated growth.

1. A comparative analysis of simulations done and involving the different economic agents has shown that informal-sector households' investment in ICT would lead to a 4.12% increase in the GDP at the cost of factors, that the same type of investment would lead to a 2.62% growth if it was made by the RDM, to a 2.47% increase if by the government, a 2.04% increase if by enterprises, and a 0.14% increase if by formal-sector households.
2. The magnitude of the impact on the GDP, employment and poverty reduction, indicates that there is plenty of room for manoeuvre in terms of setting economic priorities. So, while the impact of investments coming from the rest of the world is of high magnitude (2.62% on the GDP at the cost of factors), it can still be observed that the magnitude of the impact of the investment made by the government and that by enterprises is not far away from the 2.62%: it is 2.47% and 2.04%, respectively. Thus, based on these different percentage figures of the impact on the GDP, the country's economic policy could rest on the following measures:
 - a) promoting massive foreign direct investment in the ICT sector;
 - b) promoting a policy aimed at stimulating economic activity through government investment in ICT;
 - c) setting up a framework of incentives that would enable a considerable ICT investment in the economic and industrial fabric;
 - d) focusing on a policy mix that would combine the previous three measures.
3. The simulations done in this study indicated that the structure of employment was more beneficial for the service sector than the primary sector. It follows from this observation that this latter sector should be given priority, as it employs more than half of the country's active population, by investing in new

farming techniques that are more cost-effective and more likely to contribute to the improvement of farmers' living standards, considering the fact that poverty is highest in the rural area.

4. Some sub-sectors of the industrial sector (paper making, printing and publishing, manufacturing of chemical products, manufacturing and servicing of machines and metal appliances) and the service sector (commercial services) have experienced job losses as a result of various economic players investing in ICT. This means that measures must be taken to restructure those sub-sectors in order for them to better benefit from the new dynamic which ICT brings to any economy.
5. The derivation done in the present study of the impact of investment in ICT on poverty reduction showed that overall this impact was positive and significant. However, the simulations, for their part, showed that it was the non-poor households that benefited most from the virtuous circle generated by the investment in ICT, with the exception of public sector and NGO employees. So, measures must be taken to achieve a better wealth redistribution for employees. Specifically, a pro-poor policy must be put in place targeting the people working for semi-public institutions, private companies, embassies and other diplomatic missions, and private individuals and/or households.
6. A strong political impetus is vital to ensure the opening, liberalization and efficiency of ICT markets. A lasting political commitment aimed at ensuring that regulations are put in place that promote the use of ICT, together with increased investment, is indispensable for effective economic growth and poverty reduction.
7. It is important to see to it that the government fosters a conducive environment for private enterprise and risk taking. A guaranteed, adequate financial support is thus essential for the development and dissemination of ICT. Multilateral partnership around ICT is therefore one of the means for accelerating growth and poverty reduction.

For more than a decade now, the information and communication technology (ICT) has played a vital role both in economic growth and fight against poverty. Indeed, ICT improves efficiency, enables access to new markets and services, creates new income-generating opportunities, and allows the poor to have a say. And while Africa have experienced substantial improvement in certain ICT sectors — such as the use of the mobile phone and the widespread dissemination of national strategies and regional ICT-related initiatives, improvement is still needed in several other sectors before the entire continent can fully enjoy ICT benefits .