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The economic contribution of the information and communication technology sector in Ethiopia

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- After the 2018 reform, Ethiopia placed Information and Communication Technology (ICT) at the core of its development plan and prioritised it as a potential growth strategy. However, the contribution of the ICT sector to GDP is not yet known or monitored.
- This study uses the Ethiopia Social Accounting Matrix 2015/15 from the Policy Studies Institute to analyse the contribution of the ICT sector as a producer of final products.
- The research finds that the ICT sector has contributed above 4% to the GDP and has become increasingly integrated into the international market, contributing to expanding and diversified export. The urban-rural divide has also come down over time.
- This brief concludes that the ICT sector gives a big boost to non-ICT domestic production, which indicates that investments in the ICT sector trigger a chain of actions and reactions that significantly increase the national output.

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Policy motivation for research

Information and communication technology (ICT) has significantly contributed to the growth of gross domestic product (GDP) and labour productivity in both developed and developing countries since the 1990s. The rapid expansion of ICT has played a crucial role in economic growth by allowing users to have quick and easy access to information and knowledge.

At the aggregate level, ICT contributes to economic growth through capital deepening, establishment of ICT networks, and productivity growth in ICT-producing sectors. It also contributes to economic growth in sectors that are intensive users of ICT. The ICT sector is a dynamic sector with new products and services appearing frequently. It is also a critical enabler for other sectors.

After the 2018 reform, Ethiopia placed ICT at the core of its development plan and prioritised it as a potential growth strategy. However, as the estimation of GDP does not cover ICT as a separate sector, the contribution of the ICT sector to GDP is not known or monitored. Moreover, the contribution the sector to the non-ICT sectors is now well understood. This has made it difficult to make policy decisions with significant economic implications.

The paper addresses these two gaps and outcome of this study will be an important input in the policy formulation and budget allocation to the ICT sector by the Ministry of Finance and Economic Cooperation.

Definitions

The Organisation for Economic Co-operation and Development (OECD) member countries defined the ICT sector in 1998 as a combination of manufacturing and services industries that electronically capture, transmit, and display data and information. This definition was later revised in 2002 to reflect more detailed International Standard Industrial Classification (ISIC) classifications. The OECD ICT sector definition was again revised in 2007 to exclude products that use electronic processing to detect, measure, and/or record physical phenomena or control a physical process. This narrowed the scope of the ICT sector. The 2007 definition of the ICT sector by the OECD includes the production, publishing, and/or electronic distribution of content products.

Ethiopia's policy and the ICT sector

Information and communication technology (ICT) has been increasingly used as a key enabler and transformational tool to foster economic growth, accelerate knowledge transfer, develop local capacities, and raise productivity in many sectors of both developed and developing countries. The Government of Ethiopia gave due emphasis to ICT in its socio-economic development plan. The first Growth and Transformation Plan (GTP I) of Ethiopia focused on upgrading the already built ICT network and expanding services to ensure all-inclusive telecommunication service delivery and ICT assisted development. The ICT sector was given due attention in the second Growth and Transformation Plan (GTP II) 2015/16-2019/20, but the performance was not as expected. In 2019, Ethiopia's Home-Grown Economic Reform (HGER) envisaged promoting the use of ICT for modernising the civil and public services, promoting e-commerce and digitisation of the financial and logistic sectors, expanding ICT infrastructure throughout the country, and promoting the export of IT-enabled services.

Data and methodology

This study used the Ethiopia Social Accounting Matrix 2015/15 of Policy Studies Institute to analyse the contribution of the ICT sector as a producer of final products. In Ethiopia, the Information and Communication sector is not available in the Official National Account statistical system nor in the social Account Matrix 2015/16 of the Ethiopian Policy Studies Institute as a sector. A new account is created by using the OECD's definition of the ICT sector in a broad sense. The SAM accounts are grouped to form new accounts in the modified or aggregated Input-Output table. ICT products are mapped by merging the accounts of products or commodities that belong to the ICT products consistent with the definition of OECD (2009). There are three major ICT products created from the existing SAM accounts: ICT Equipment, ICT Services and Content and Media. After concordances based on the above classifications, we can have the following structure of the input-output table (IOT) or Supply and Use table (SUT).

The proposed work aims to measure the contribution of the ICT sector as a producer of final goods and services and as enablers for other sectors using Social Accounting Matrices (SAM). SAM multiplier models are well suited to measuring the short-term direct and indirect impacts of interventions. They take into account the forward and backward linkages in an economy, as well as consumption linkages as household income increases. In SAM multiplier analysis, the government, the rest of the world, and investment demands are

considered exogenous. We follow the same procedure and make the three accounts the exogenous account. The SAM multiplier is used to quantify the direct and indirect effects of shocks on the system. The assumptions behind the model are that the input-output relationships will remain the same before and after the intervention. The input-output table shows how the output of each sector is distributed among other sectors, and how each sector obtains intermediate inputs from other sectors. The input-output multiplier is used to estimate the production linkage.

Results and discussions

ICT as a final good producer

The value-added in the ICT sector declined from 77.36% in 2010/11 to 73.47% in 2015/16, as the production technology in 2015/16 was more input-intensive than the production technology in 2010/11. The ICT sector contributed 5.82% of GDP in 2011 but declined to 4.07% in 2015/16. The ICT services subsector has the highest value-added to the gross value of production ratio, while the ICT manufacturing sector has the lowest value-added to gross value of production ratio. Non-agricultural capital contributed the largest share in value addition in 2010/11 and 2015/16. The value-added share of unskilled labour in the ICT sector is higher than the value-added share of skilled labour in both 2010/11 and 2015/16. Unskilled labour is highly in demand in ICT investment-infrastructure development.

In 2015/16, the share of expenditure on ICT goods and services among rural households approached urban households. Rural rich households spent 4.57% of their total expenditure on ICT goods and services in 2010/11, while urban rich households spent 8.88 % of their expenditure on ICT goods and services. The urban rich spent the most followed by the rural middle-class households on ICT goods and services in 2010/11. In 2015/16, the rural middle-class households spent 37.11% of the total ICT expenditure followed by 24.78% by the urban rich households.

ICT as an enabler

The discussion in this sub-section will delve into the role of ICT as an enabler. Activities buy intermediate inputs in the commodities market and hire land, labour, and capital in the factor markets. The total value of output is the sum of the intermediate inputs and value-added of the sector.

A shock to the ICT sector will have far-reaching consequences, as it is an intermediate input and supports the production process in non-ICT sectors.

According to the estimated output multiplier, a unit increase in the exogenous demand for ICT content and media products, increase the agricultural output by 0.51-unit, Food process by 0.4 unit, CT contents and media by 0.08-unit, Trade, Hotels, Transport, and real estate industries by 0.20 unit, 0.08 units, 0.07 unit and 0.07 unit. A unit increase in the ICT manufacturing products increases the agricultural output by 0.37 units. Furtherer, the output of trade, transport and hotels would increase by 0.20-unit, 0.07 unit and 0.06 unit respectively.

Likewise, a unit increase in the exogenous demand for ICT services leads to a 0.69 unit increase in agricultural outputs, 0.23 unit in trade outputs, 0.12 unit in hotels output, 0.11 unit in construction outputs and so on.

Conclusion

The ICT sector has contributed above 4% to the GDP and has become increasingly integrated into the international market, contributing to expanding and diversified export. The urban-rural divide has come down over time. Ethiopia's development has been characterised by the expansion of communication infrastructure and urban centred value-added ICT services in the early stage of development. The ICT sector gives a big boost to non-ICT domestic production, which indicates that investments in the ICT sector trigger a chain of actions and reactions that significantly increase the national output.