ICT Sector, Output and Employment in Nigeria: An Input-Output Analysis
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1. Introduction
- A new telecommunication liberalisation policy came on-board in 2001;
- The policy gave rise to private telecommunication firms: ECONET (now AFRTEL), MTN, GLOBACOM, ETISALAT (now 9MOBILE); and a government-owned, NITEL (now rested);
- This led to increased access to telecommunication facilities/services by Nigerians;
- The number of active voice call increased from about 400,000 before 2001 to about 162,522,772 in the second quarter of 2011;
- The teledensity also increased from around 0.4% before 2001 to about 120% in 2012;
- The percentage of people using internet increased from 0.06% in 2001 to around 27.68% in 2017;
- The percentage contribution of ICT to GDP increased from 0.16% in 1999 to about 8.40% in 2016;
- ICT achieved the highest contributor to the economy among the information technology subsections;
- About 6.97 trillion naira generated as revenue to the government, representing 8.69% of GDP by 2015.

2. Objective of the Study
- To estimate the output and employment contributions of ICT to the economy;
- Three categories of contribution of ICT are considered: direct, indirect and induced;
- Direct contribution is generated when ICT sector makes purchases;
- Indirect contribution is generated in the sectors that supply input to ICT sector;
- Induced contribution is generated when employees/households connected to ICT and ICT-related sectors spend their income on goods/services within the economy.

3. Extant Literature on Nigeria ICT Sector
- Most of the studies were simple descriptive analyses and some were econometric analyses using Ordinary Least Squares and Vector Autoregressive methods;
- Studies have addressed issues related to ICT in relation to poverty, employment, investment and evolution of ICT industry in Nigeria;
- No study has employed input-output model to estimate output and employment contribution of ICT sector in the Nigerian economy.

4. Evolution of ICT Industry in Nigeria

5. Methodology: Input-Output Model of Nigeria
- The input-output model used in this study follows Miller and Blair (2009), Kečék, Zajdela Hrustek and Duliak (2016), Garza-Gil, Suris-Reguero and Varela-Lafuente, (2017);
- The economy consists of several sectors as denoted n;
- The total value of domestic output of a sector i, say, ICT, is denoted as \( x_i \);
- Equation 1 below shows how the output of the sector is distributed as sales to other sectors as an intermediate input and to final demand \( f_i \);
- The final equation 4 contains the core \((I-A)^{-1}\) of the model;
- Microsoft Excel used to estimate the model for each year (2001, 2006 & 2011);
- Input-Output Tables of Nigeria for 2001, 2006 & 2011 constitute the data for the model.

6. Estimated Model Results

7. Conclusions
- ICT sector’s contribution to the economy estimated in terms of output and employment effects/contributions (direct, indirect & induced) of the sector;
- ICT sector’s contribution to output (GDP) rose from N28,699.68 million in 2001 to N216,888.37 million by 2011;
- The sector’s contribution to employment increased from 124,617 (employees) in 2001 to about 1,721,145 (employees) at the end of 2011;
- Services’ sector is the biggest beneficiary of ICT contribution to output and employment;
- The other sector that benefited immensely from ICT sector’s activities is the manufacturing sector while the building and construction sector and agricultural sector occupy the third and fourth positions respectively;
- Mining and quarrying sector benefited minimally from ICT contribution to output and employment;
- It is found that most of the benefits that accrued to other sectors were from induced effects/contribution of ICT sector thereby underscoring the centrality of employment/households’ expenditure in deepening and spreading the benefits of ICT sector’s activities;
- It is recommended that government efforts be directed at deepening integration of ICT sector’s activities into the economy.

Figures and Tables:
- Figure 2: Fixed Telephone Subscription
- Figure 3: Percentage of Individual Using the Internet and Teledensity
- Figure 4: ICT Contribution to Gross Domestic Product (1981-2016)
- Table 1: Contribution of ICT Sector to Output produced in the Economy in 2001
- Table 6: Contribution of ICT Sector to Employment in the Economy in 2011