ICT Measurement From Information Society to Digital Economy

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INTRODUCTION

Over the past twenty years, technologies using microelectronics for collection, storage, processing, retrieval, transmission, and presentation of data, texts, images, and sound, collectively known as ICT have completely changed all people's activities. The pattern of ICT development and its impact on economic growth and welfare has been reflected in a sequence of theoretical concepts based on a certain degree of understanding of allied transformations (Figure 1). Influence of ICT led at to emergence of a new socioeconomic configuration commonly referred to as the Information Society on the edge of 1990-2000s.

The Information Society is based on extensive use of information and its proliferation into economic and social processes, and engagement of all economic agents – business, governments, and citizens – into the system of communications. Due to inclusion of all these agents in the digital space, big data generated in the digital form has become a factor of economic productivity (Figure 1).

The rapid proliferation of ICT and their impact on all spheres of modern life (see *[Ahmad et al., 2004]*) – production processes, the interaction of individuals and organisations between themselves and with public authorities, the development of social infrastructure, and privacy issues – has stimulated the interest to statistical analysis of the ICT trends at the global, national and regional levels. Demand for statistical data has been changing along with the transformation of the very nature of various aspects of the economy and everyday life due to its digitalisation, while new measurement opportunities appear out of the progress of digital communications and the availability of large data arrays suitable for statistical processing and analysis. Overall, there is a need for the measuring of the digital technology and digital economy as a whole, while relevant international statistical standards have not yet been developed.

BACKGROUND

The Information Society is usually understood as a society that makes extensive use of information networks and technologies, produces large quantities of ICT goods and services, and has a diversified content industry. Both theoretical and practical issues related to measuring different aspect of information society have been increasingly addressed by many authors during the last two decades (see for example *[Gokhberg, Boegh-Nielsen, 2007; Blank, Groselj, 2014; Dolničar et al., 2014; Billon et al., 2016]*). As

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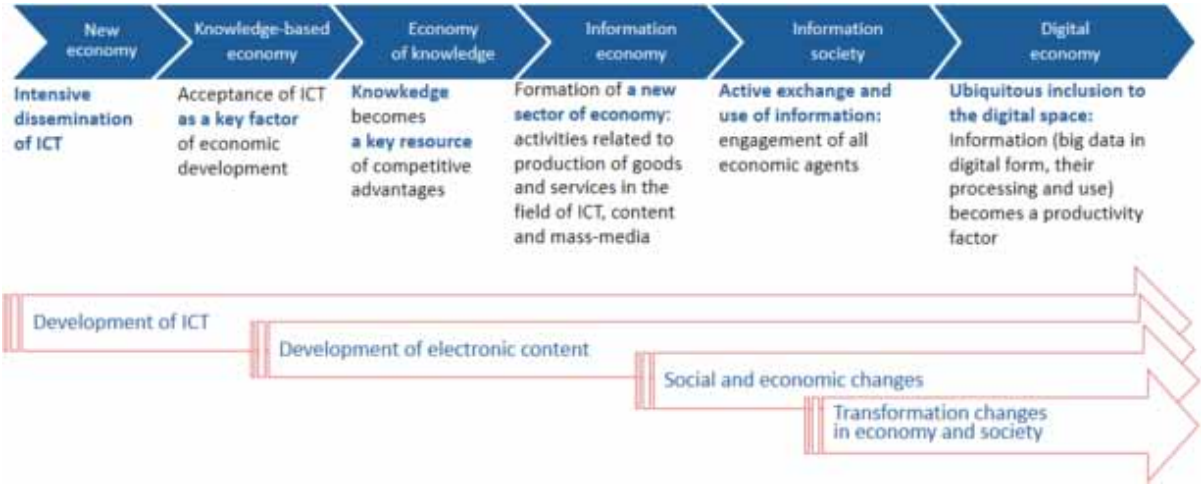
Figure 1. Evolution of definitions of economic formations and processes related to ICT
Source: compiled by the authors.



we can conclude from existing international statistical practices in this sphere, the key three thematic "pillars" related to the measurement of ICT are as follows *(Figure 2):*

- The ICT sector and supply of ICT: which industries it includes, how important are they for the national economy, how many enterprises are involved and how many persons are employed, which types of products and services are produced, and what is the total turnover?
- Technical infrastructure, including the penetration rates of landline and mobile telephone networks, the number of computers per inhabitant and the intensity of Internet connections (whether or not a country is ready to become an information-based society).
- ICT demand: which enterprises and individuals are using ICT products and services? Which technologies are being used, and why? What barriers hamper a country's integration into the global Information Society?

Best practice national and international experiences in the field of Information Society statistics have been accumulated in a set of indicators and methodological guidelines. The Organisation for Economic Co-operation and Development (OECD), Statistical Office of the European Union (Eurostat), International Telecommunication Union (ITU), and United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute of Statistics play the leading roles in these efforts *(Table 1)*.

Statistical standards are produced by the dedicated working groups at the international organisations in close collaboration with national statistical services, in particular: the OECD Working Party on Measurement and Analysis of the Digital Economy, Eurostat Working Group on Information Society Statistics (WG ISS), ITU Expert Group on Telecom/ICT Indicators, ITU Expert Group on ICT Household Indicators. Implementation of the international statistical standards at the national level is usually voluntary; however, in order to ensure full-scale participation in international data exchanges, and to be able to assess the country's positions vis-a-vis the global trends, most nations follow the international recommendations on measuring ICT. The most recent agenda of those working groups is focused on methodological approaches and standards for measuring the new phenomena related to the digital technologies and digital economy.