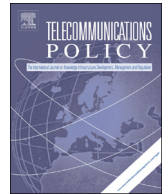


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## Inequality in the network society: An integrated approach to ICT access, basic skills, and complex capabilities

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### ABSTRACT

This paper seeks to apply a new approach to the study of informational inequality, that is, the phenomenon of ICT-related inequality in the transition to the so-called “network society”. We propose a composite measure of digital inclusion/exclusion which combines three sub-indexes, each integrating a number of variables into a single indicator. This framework covers access (to ICT devices and technological connectivity), basic skills (individual know-how for elementary uses), and complex capabilities (higher-level ability for creative engagement and ICT-mediated interaction). On the basis of a composite measure ranging from 0 to 100 we provide quantitative assessments of informational inequality levels amongst individuals and by employing an ordered probit model we are able to identify its key determinants. We explore a large and rather under-exploited nationally representative dataset – the official large-scale survey of information and knowledge society, a Eurostat standardised data collection instrument. In Portugal this is implemented by the Portuguese National Statistics Office, which for 2011 reached a sample of 7175 respondents. Results show a high level of inequality, especially in terms of ability for basic as well as complex ICT utilisation. This particular inequality configuration seems to be mostly explained by age, education, employment situation, household type, and income distribution. Methodological approaches such as ours, which may be extended to other national cases, can be considered as an increasingly appropriate way to address the need for a new generation of equality-friendly ICT policies that go beyond the early notions of “digital divide” focusing on the availability of ICT tools (to have or to not have resources) and start addressing individual and interactive uses (emerging behavioural developments).

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### 1. Introduction

Information counts in large amounts. Indeed, data and connectedness, computing power, and digitally-mediated interaction increasingly constitute the very core and fabric of today's “network society”, the always-online borderless knowledge economy that lives “in, on and by” information to work, socialize, govern, and make business (Castells, 2014, p. v).

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This evolving socio-economic paradigm is organised around information and communication technologies (ICT). As noted by sociologists and economists, networks become the key symbol-processing systems in the contemporary society at the same time that knowledge becomes the fundamental resource in the transition to a twenty-first century economy (Freeman, 2007; Castells, 2010). The more the distributed and mobile power of ICT permeates our lives, the more important it becomes for policy analysis to catch-up with its, often uneven, socio-economic implications.

In this fast changing context a number of programmes have for years emphasised both inclusion and competitiveness. Since the first policy measures for the promotion of advanced electronics-based computing and telecommunication technologies in the US this agenda has been linked to social welfare (Castells, Tubella, Sancho, Isla, & Wellman, 2004; Mansell & Wehn, 1998). More recently, in the European Union (EU), whereas the “Digital Agenda” became a flagship initiative under the Europe 2020 framework programme charged with no less than “to reboot Europe’s economy” (see, e.g., European Commission, 2010a, 2010b; European Parliament, 2013; this policy trend is also true for the OECD, 2008a). Top European policy makers, indeed, continue to emphasise a “connected continent for the next generation” as issues such as citizen participation and digital entrepreneurship become synonyms of active, social, and creative (“smart”) take-up of ICTs (see, e.g., Kroes, 2013). This article engages the persistent theme of equality in the ICT policy discourse from a systematic empirical point of view.

If ICTs were initially seen through the lens of technological optimism as a “great equaliser” over time, the spread and effective adoption of new technologies proved more uneven and stratified than early envisioned (Hargittai & Hsieh, 2013). Recognising this variegated picture, ICT policy and public discussion of ICT inequality broadened from the early focus on the “digital divide” and “access differences” to “e-inclusion” and “digital literacy” (European Commission, 2010b). Notwithstanding, assessing the patterns and drivers of digital participation remains very much a work in progress. In particular, comprehensive frameworks of policy analysis remain needed as ICT’s potential role for a broad-based individual and social development continuously expands (Brimacombe & Skuse, 2013). What is more, as the transformative role of new technologies becomes ever more apparent in countries affected by the global financial crisis, the ICT agenda appears to regain traction both as an economic and social policy tool. The OECD (2012a, p. 17), for instance, has recognised that amongst governments there is a growing “emphasis on ICT skills and employment as many countries continue to face economic challenges”. This paper focuses on an example of a European country that was catching-up in ICT but then severely hit by the crisis, Portugal.

Our core research questions are: (a) in what way is inequality to be understood in the context of a dynamic ICT-pervasive age?; (b) how can a working measurement that is theoretically-informed be developed?; and (c) can such a methodology yield policy-relevant results? To address these challenges we start by referring to “informational inequality”, i.e., an encompassing and integrated label to capture the evolving forms of inequality in the transition to the so-called “network society”. On this theoretical ground we build an “ICT index” based on a three-pronged approach that harnesses a succession of research streams that have addressed the phenomenon of ICT-related inequality for three decades. From this we derive a conceptual framework for examining “access” (availability of devices and connectivity, existence and quality of wired and wireless infrastructures), basic skills (low-level individual know-how for elementary uses of ICT), and complex capabilities (higher-level literacy for creative engagement in digital media and ability for ICT-mediated interaction). Finally, an econometric appraisal of these three inequality dimensions, and the variables driving them, allows for a discussion of policy frames and priorities. In order to illustrate our theoretically-based methodological approach to these challenges we employ a large and under-utilised dataset for Portugal, which is based on the EU survey on ICT usage in households and by individuals. For this work we mobilise a number of inequality metrics and model them using an ordered probit model. This approach can be used to assess the design and impacts of ICT policy as well as be replicated for and compared with other countries on the basis of similar data.

Our work seeks to add to current literature and practice in three ways. First, it aims to fill a gap noted by Vehovar, Sicerl, Hüsing, and Dolnicar (2006) in their survey of empirical research on ICT inequalities applying a general conceptual framework without venturing too much into oversimplification. Second, it complements benchmarking techniques, such as work in the line of the Digital Opportunity Index (ITU, 2005) and the “Indexing Broadband Performance” (European Commission, 2008), which emphasise differences and disparities in *inter*-country ICT adoption. Third, it extends recent analysis of income inequality, which has re-ignited as a dynamic research programme in the past few years, to other variables with impact on quality of life, well-being, and ability to participate in socio-economic life (see Atkinson, 2011; Atkinson, Piketty, & Saez, 2011).

Our key assumption is that differences in the ability to fulfil information, communication, and knowledge needs are an increasingly important dimension of social welfare (see Graham & Dutton, 2014, for an up-to-date overview of how the increasing diffusion of digital technologies and the centrality of networks are shaping the contemporary personal and public spheres). Economic literature itself has recently recognised that a correct evaluation of inequality (as well as of related concepts such as poverty and richness), cannot be done considering income as the exclusive dimension (Ferreira, 2011; McCloskey, 2014). The list of areas already covered by the inequality studies is long, covering dimensions such as health (Laudicella, Cookson, Jones, & Rice, 2009), education (Holsinger, 2009; Zhang & Li, 2002), time use (Harvey & Mukhopadhyay, 2007), water (Ahmed, Wang, Bhaskar, & Quabili, 2009), and food (Sahn & Stifel, 2002). Since differences and deprivations are multidimensional, there is growing room for methodological alternatives that go beyond the representation of inequality phenomena in terms of scalar measurements and fragmented batteries of indicators (Ferreira & Lugo, 2013).

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