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Exploring the Pattern between Education Attendance and Digital Development of Countries

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Abstract

There is a clear belief among academics and policy makers about the importance of ICT for sustainable development and welfare. Thus, all across the world, a variety of strategies to promote the digital development have been proposed and implemented by national and international authorities. Simultaneously, academics have been dedicating their efforts to understand what explains the international digital divide. Within the academia, one can find the education of the individuals as one of the most popular reasons for the digital divide across countries. We tasked ourselves with analyzing this last correlation between digital development and educational attendance of countries and, with data pertaining to 105 countries and we conclude that the correlation is significant and surprisingly high, emphasizing the role of educated individuals in ICT adoption at country level.

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Keywords: digital divide; ICT adoption; information society; education; digital development; e-inclusion;

1. Introduction

The importance of information and communication technologies (ICT) for economic and social development of countries is presently well supported by academics and policy-makers [1, 2]. Reputable international organizations often posit that greater adoption and use of ICT will support countries, communities, firms and individuals, to

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engender development and welfare, especially in times of economic crisis as the ones we currently face. The United Nations (UN) (see e.g., [3, 4]), the United States of America (USA) (see e.g., [5-9]), the Organization for Economic Co-operation and Development (OECD) (see e.g., [10-12]), and the European Union (EU) (see e.g., [13-16]) have all deployed some recommendations/strategies to achieve digital development and thus, benefit from the use of ICT. However, as these strategies are been followed mainly by developed countries, they appear now to be contributing to a widening digital divide between developing and developed countries [17]. Even in other countries than the developing ones, there is evidence that the international digital divide is not narrowing, as it was believed to. Within the European Union-27, for example, there is evidence that the most digital developed countries are increasing the adoption and use of ICT at a higher level than those who are not as digital developed, and thus widening the European digital gap [18].

With this work we aim to present a first approach to an exploratory analysis for the commonly referred as important relationship between digital development of countries with the education levels of its inhabitants using for this purpose, data from 105 countries belonging to very different contexts, including 41 from Europe; 24 from Africa; 21 belonging to Asia; 10 from North America and seven from South; and also two from Oceania. In order to measure its digital development we used seven ICT related variables provided by the UN´s International Telecommunications Union (ITU) with the indicator for the tertiary gross enrolment ratio (1) (Educ) provided by the World Bank. This variable is used as a proxy for measuring the education level of individuals within a country. The ICT-related data is concerned to the year of 2011, while the Educ is in respect to 2010, the year immediately before 2011.

2. Measuring the digital development of countries

Measuring and understanding ICT adoption, and thus the digital divide, is a complex and difficult task because these technologies positively influence almost every aspect of our daily actions. Internet browsing, VoIP communications, emailing, access to blogs, multimedia online streaming, social and professional networking, wiki-sites, access to online libraries for research, e-business, and services like e-government, e-health, e-learning, and e-banking are examples of new possibilities that are creating new types of improved communications and interactions, between individuals, firms and public entities. For these reasons ICT are considered as general-purpose technologies (GPT (e.g. the 19th century´s transportation and communications technologies, the Corliss steam engine, the internal combustion engine, or the electric motor), i.e. technological innovations that have the potential to revolutionize most of industries and society sectors.

As previously referred, in order to measure the digital development of countries we used seven variables that together, we believe to cover a wide extent of the ICT adoption and use of a country. The rationale and academic support behind each variable is as follows: One major aspect of the digital development of countries is its ICT infrastructure. Hence, we included the percentage of households with computer (HsPC) [19, 20] , having access to the Internet (HsInt) [18, 21] along with the fixed-telephone (FixTel) [19] and mobile-cellular telephone subscriptions per 100 inhabitants (MobTel) [22]. These four variables provide an important basis to assess the level of ICT adoption and infrastructure. Moreover, considering that the Internet is in constant evolution it is becoming constantly more demanding in terms of resources. Thus, in order to take complete usufruct of it, a broadband connection is necessary, since the majority of websites contain bandwidth-intensive applications such as audio and video streaming, animated content, or interactive applications. We therefore included the fixed (wired)-broadband subscriptions per 100 inhabitants (BroRt) [23, 24], which is a pre-requisite to participate fully in cyberspace. Likewise the fixed (wired) broadband, the mobile (wireless) broadband connection (MobRt) is becoming an important and increasingly popular way to access the Internet in other places than the household or workplace [25]. Finally, as the Internet browsing is perhaps the most general and popular action that individuals can perform through the use of ICT, we have also included the percentage of population regularly using the Internet (IntPop) [18, 21, 24, 26]. The data with its descriptive statistics can be seen in Table 1.