Telecommunications Policy xxx (2017) 1–21

Contents lists available at ScienceDirect

Telecommunications Policy

journal homepage: www.elsevier.com/locate/telpol

Accelerating the development of Latin American digital ecosystem and implications for broadband policy

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ARTICLE INFO

Portions of the research presented in this paper have been developed in the context of a study funded by CAF Development Bank of Latin America.

ABSTRACT

In the past ten years the Latin American and Caribbean region has been advancing in terms of various digitization metrics, such as the deployment of broadband infrastructure, and the adoption of the Internet and social media. However, despite the significant progress in terms of digitization of consumption,[1] the region faces still some important development challenges of its digital economy. This paper attempts to identify what the future challenges are for Latin America and the Caribbean, which raises a number of research and policy questions: (1) How close is consumer digitization in Latin America and the Caribbean to the levels observed in industrialized countries? (2) How should Latin America and the Caribbean address the broadband and Internet demand gap of the non-adopting population? (3) Are current digitization trends homogeneous across countries in the region or do we observe a divergence across countries, indicating some advanced nations approaching industrialized country performance, while others lagging? (4) If infrastructure and consumer adoption of certain digital products and services is evolving at a fast pace, what are the upcoming digitization challenges? (5) If broadband is a critical lever for the development of digitization, what are the policies to be implemented by Latin American and Caribbean governments to maximize investment for deployment of last generation technologies and promote adoption? To answer these questions the authors have developed, with support of CAF Latin American Development Bank, a comprehensive digitization index. This new index is used to assess the development of Latin America and the Caribbean region vis-à-vis industrialized countries. On this basis, an econometric model is developed to measure the economic development impact of digitization. Zeroing in on broadband as a critical lever for the development of the digital economy, a set of infrastructure investment and adoption goals is defined for different countries in the region. Finally, public policies are recommended to achieving the established goals.

1. Introduction

In the past ten years the Latin American and Caribbean region has been advancing in terms of various digitization metrics, such as the deployment of broadband infrastructure, and the adoption of the Internet and social media. In particular, by 2015 the prorated average

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[1] Digitization of consumption, or consumer Internet, is defined as the adoption of digital networks, products and services by individual consumers. The term is used in opposition to digitization of production, or Industrial Internet, which refers to the adoption of digital technologies and services by enterprises. See Barcena (2016). *The new digital revolution: from Consumer Internet to the Industrial Internet*. Santiago: Economic Commission for Latin America and the Caribbean.

https://doi.org/10.1016/j.telpol.2017.11.002
Received 26 July 2017; Received in revised form 19 October 2017; Accepted 20 November 2017
Available online xxxx

penetration of wireless broadband (as measure by adoption of 3G and 4G devices) in the region had reached 57.41%,[2] while 54.42% of the population regularly accessed the Internet,[3] and 47.77%[4] were members of the dominant social network, Facebook.

However, despite the significant progress in terms of digitization of consumption (defined as the adoption of digital networks, products and services by individual consumers), Latin America and the Caribbean faces still some important development challenges of its digital economy (defined as the digital transformation of traditional industries and the creation of digital industries). In particular, the digital divide remains an important feature of the region's Internet landscape: approximately 45% of the Latin American and Caribbean population remains unconnected to the Internet. Moreover, the digitization of production, defined as the assimilation of digital technologies by enterprises is still lagging, with the consequent negative impact on productivity levels. In addition, the aggregate telecommunications capital spending, while significant, is not enough to build the last generation of infrastructure, in particular fiber optics in the last mile. This is why, looking at the next decade, it is relevant to identify what the future challenges are for the region, which raises a number of research and policy questions:

- How close is consumer digitization in Latin America and the Caribbean to the levels observed in industrialized countries?
- How should Latin America and the Caribbean address the broadband and Internet demand gap of the non-adopting population?
- Are current digitization trends homogeneous across countries in the region or do we observe a divergence across countries, indicating some advanced nations approaching industrialized country performance, while others lag?
- If infrastructure and consumer adoption of certain digital products and services is evolving at a fast pace, what are the upcoming digitization challenges?
- How is industrial digitization evolving? Is the Latin American continent growing its digital industries at a sufficiently enough pace? Is human capital becoming a development bottleneck standing in the way of future digitization growth?
- And, more fundamentally, if broadband is a critical lever for the development of digitization, what are the policies to be implemented by Latin American governments to maximize investment for deployment of last generation technologies and promote adoption?

The following article attempts to answer these questions by introducing a new digitization index, which is more comprehensive and holistic than our prior efforts at measurement.[5] First, this new index is used to assess the development of Latin America and the Caribbean region vis-à-vis industrialized countries. Second, an econometric model is developed to measure the economic development impact of digitization. Third, zeroing in on broadband as a critical lever for the development of the digital economy, a set of infrastructure investment and adoption goals is defined for different countries in the region. Fourth, public policies are recommended to achieving the established goals.

1.1. A new index to assess digital ecosystems[6]

The study of a country or region stage of development in the adoption of Information and Communication Technologies has been progressing over the last twenty years. While the original focus was to assess the deployment and adoption of telecommunications and information technology infrastructure (broadband, mobile telephony, computers), research has been gradually expanding its focus to include dimensions such as the use of digital technologies (electronic commerce, electronic government, social networks) as well as the development of industries within the full digital value chain (Internet platforms, Collaborative Internet Services, etc.). In this process, a number of indices have been developed along the way, including the International Telecommunications Union's ICT Development Index, the World Bank's Knowledge Economy Index, the World Economic Forum Network Readiness Index, and the Inter-American Development Bank's Broadband Development Index. However, most of the indices developed so far tend to either address a particular aspect of the digital ecosystem, such as broadband penetration, or include a limited number of indicators. This is why a new index aimed at assessing the development of a digital ecosystem has been developed.

The development of a new index followed the methodology presented in the “Handbook on constructing composite indicators” (OECD, 2008). The starting point was a factor analysis conducted on a database of more than 150 relevant indicators to identify those more applicable to the index. Once completed, the resulting 64 indicators were categorized in eight pillars following a principal components analysis. Finally, based on the experience of ICT index construction, the weight for each pillar was determined. Once the pillars and factors were determined, each indicator was converted to an index ranging between 0 and 100, where the minimum value defined as the average value for the last available year minus two standard deviations and the maximum value defined as the average value of the last available year plus two standard deviations. This was done for all indicators, except for the technology penetration ones, where the minimum value was set at 0 and the maximum at 100. This allows comparing the evolution of the index over time as well as comparing countries. Lastly, the index by pillar and sub-pillar was calculated based on the prorated average of indices for each indicator.

The resulting index for measuring the development of a digital ecosystem is a composite metric for quantitatively assessing the eight pillars comprising the digital economy (see Exhibit 1).

According to this conceptual structure, the digital ecosystem is defined as a set of interconnected components (or pillars) operating

[2] Source: GSMA Intelligence.
[3] Source: International Telecommunications Union.
[4] Source: Owloo.
[5] See Katz and Koutroumpis (2013), Katz, Koutroumpis, and Callorda (2013 and 2014), and Katz (2015a, 2015b).
[6] Research for this section was funded by CAF Development Bank for Latin America.