DIGITIZATION AND THE PRODUCTIVITY CHALLENGE IN LATIN AMERICA

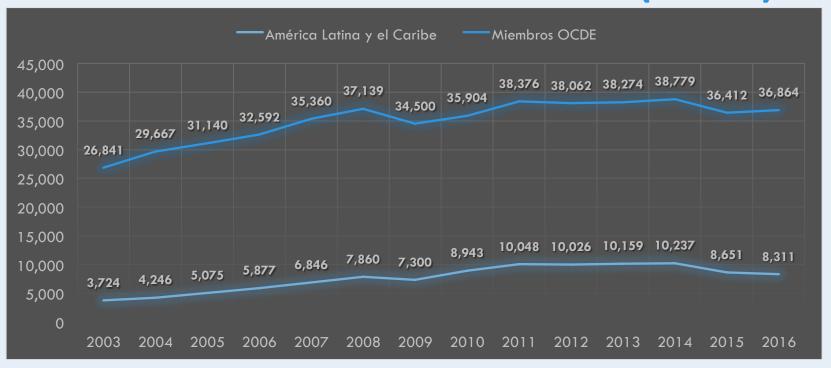
Industry 4.0: Reshaping productivity, employment and inclusiveness Policy Research Workshop at the German Development Institute Bonn, 28-29 May 2018

Dr. Raúl L. Katz

Columbia Institute for Tele-Information

THE GDP GAP BETWEEN LATIN AMERICA AND OECD COUNTRIES HAS BEEN GROWING OVER TIME

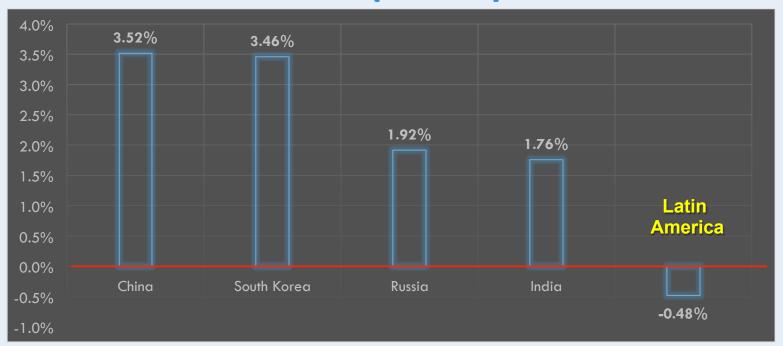
LATIN AMERICA VS. OECD: GDP PER CAPITA (2003-2016)



Source: World Bank

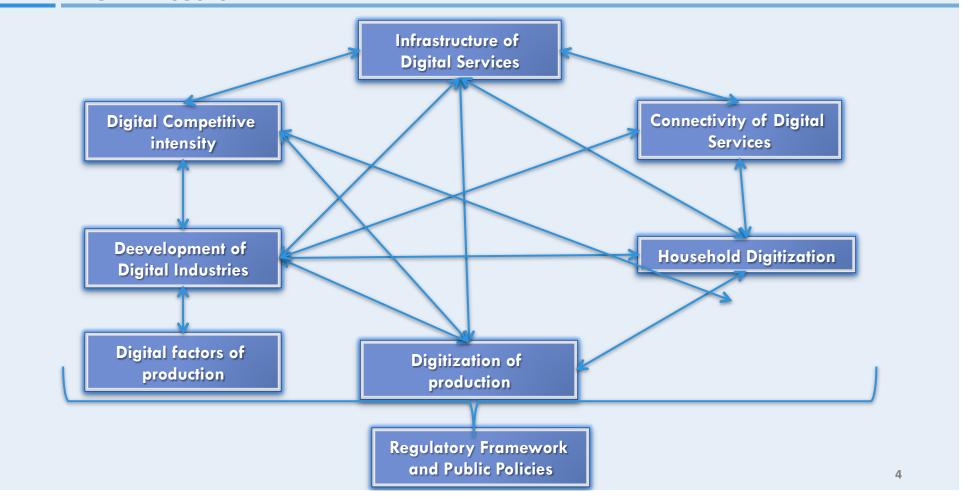
PRODUCTIVITY IS KEY TO FOSTER GROWTH: YET, ITS CONTRIBUTION IN LATIN AMERICA IS NEGATIVE

CONTRIBUTION OF TOTAL FACTOR PRODUCTIVITY TO GDP GROWTH (2003-2016)



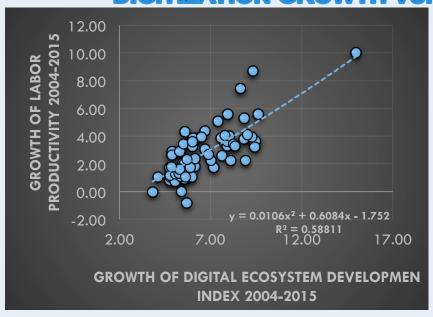
Source: Author based on data from The Conference Board Total Economy Database[™] (Adjusted version), November 2017

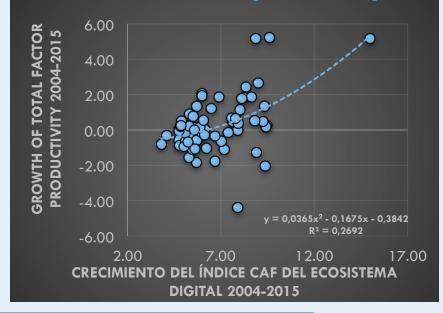
WE BUILT AN INDEX THAT MEASURES A COUNTRY'S LEVEL OF DEVELOPMENT OF A DIGITAL ECOSYSTEM



DIGITIZATION DEVELOPMENT IS DIRECTLY LINKED TO PRODUCTIVITY GROWTH

DIGITIZATION GROWTH VS. PRODUCTIVITY GROWTH (2004-2015)





	Labor productivity	Total Factor Productivity
Growth in digital ecosystem developemnt index	0,2622	0,228
	(0,0683)***	(0,0674)***
Digital ecosystem development index	0,0358	0,0605
	(0,0585)	(0,0577)
Observations	201	201
R-squared	0,6914	0,5832

Source: Author

FOUR CHALLENGES FACED BY LATIN AMERICAN DIGITIZATION OF PRODUCTION

- Limited accumulation of intangible capital
- Limited digitization of small and medium enterprises
- Low capacity in management of digitization within small and medium enterprises
- Embryonic adoption of advanced digital technologies

FIRST CHALLENGE: THE ANALYSIS OF DIGITIZATION OF PRODUCTION IS BASED ON A SIMPLIFIED VALUE CHAIN

VALUE CHAIN FRAMEWORK

INFRASTRUCTURE

- Information Technologies (computers, software, applications)
- Networks (fixed and mobile)
- Broadband

SUPPLY CHAIN

- Access to information on supplies and services
- Online procurement of supplies
- Use of platforms for acquisition of inputs
- Electronic banking

PRODUCTION

- Digitization of internal production processes (e.g. ERP, CRM)
- Interfaces with providers of outsourced functions

DISTRIBUTION

- Digitization of distribution functions
- Capacity for receiving purchase orders and provide customer care

VALUE ADDED

FIRST CHALLENGE: WE DEVELOPED AN INDEX TO MEASURE THE LEVEL OF DIGITIZATION BY VALUE CHAIN STAGE

7 9
INFRASTRUCTURE PRODUCTION SUPPLY CHAIN

- · Computer adoption
- · Tablet/smartphone adoption
- Internet use
- VPN use
- Intranet/LAN use
- Extranet use

10

DISTRIBUTION

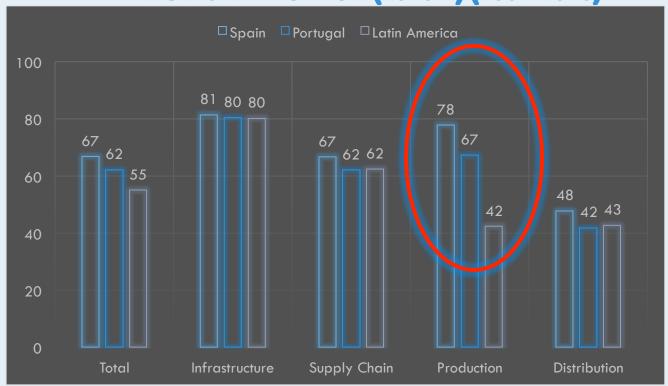
- Use of Internet for customer care
- · Use of online sales channel
- · Percentage of sales via electronic channels
- Use of Internet to receive purchase orders
- Use of Internet to distribute online products
- Share of digital distribution
- · Use of electronic banking
- Use of web site
- · Social network presence
- Mobile applications

- Percentage employees using computers
- Percentage employees using tablets
- Percentage employees using Internet
- · Percentage employees using email
- Percentage employees using VoIP
- · Use of IM
- Use Internet for training

- Use of Internet to get information on raw materials and services
- Use of Internet to gain government information
- Use of Internet to interact with government
- Use of electronic banking
- Use of internet for procurement of raw materials
- Procurement conducted by Internet
- · Use of Internet to pay suppliers
- Use of Internet to recruit employees

FIRST CHALLENGE: LIMITED ACCUMULATION OF INTANGIBLE CAPITAL CONSTRAINS DIGITIZATION OF PRODUCTION PROCESSES

LATIN AMERICA VS. IBERIAN PENINSULA; AVERAGE DIGIZATION BY VALUE CHAIN STAGE (2013-4) (2004-2015)



Source: Katz, R. Human Capital and digital transformation in Latin America. ECLAC, 2018

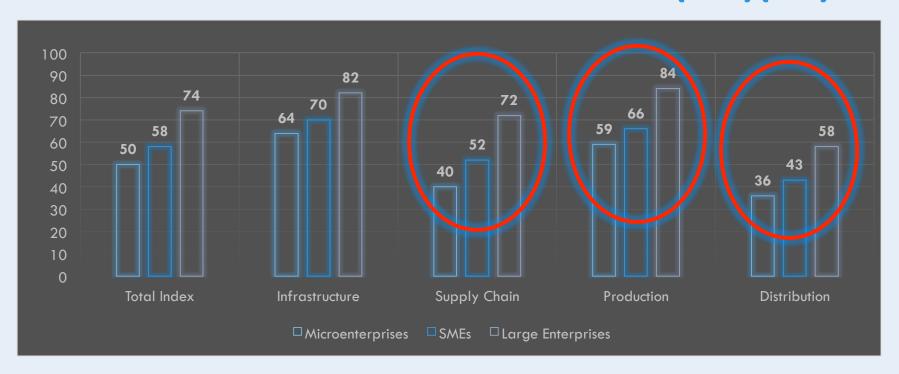
SECOND CHALLENGE: WE BUILT A COUNTRY-BASED OBSERVATORY BASED ON MICRODATA ANALYSIS OF SEVERAL INDUSTRIAL SURVEYS

COLOMBIA: SAMPLES OF SURVEYS USED

	DANE		ICT Ministry		
	Indicadores básicos de tenencia y uso de TIC en empresas	Indicadores básicos de tenencia y uso de TIC en micro- establecimientos	Encuesta de caracterización de las MIPYME colombianas y su relación con la tecnología	Gran Encuesta TIC	Universe
Year	2016	2015	2015	2017	
Micro (<10)	3,019	36,430	3,870	2,108	1,369,061
Small (11-50)	5,901		809	500	53,304
Medium (51-100)	10,766		134	250	12,056
Large (>100)	2,638		107	150	1 , 507
Total	22,324	36,430	4,920	3,008	1,435,928

SECOND CHALLENGE: THE ANALYSIS CONFIRMED THE LOW DIGITIZATION OF PRODUCTION PROCESSES OF SMEs

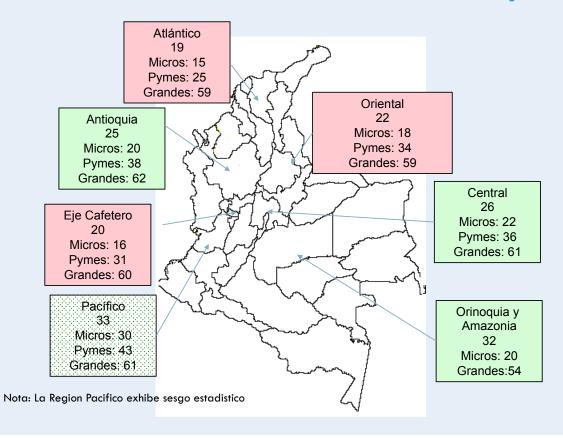
COLOMBIA: DIGITIZATION OF PRODUCTION INDEX (0-100) (2017)



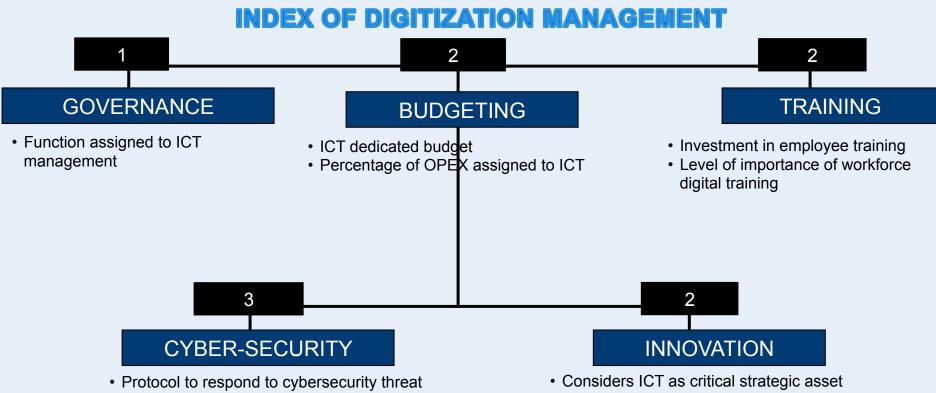
Source: Author developed for the Observatorio de la Economía Digital de Colombia

SECOND CHALLENGE: FURTHERMORE, DIFFERENCES ACROSS REGIONS WERE ALSO IDENTIFIED AND MEASURED

COLOMBIA: DIGITIZATION OF PRODUCTION INDEX (0-100) (2015)



THIRD CHALLENGE: AN INDEX OF DIGITIZATION MANAGEMENT WAS CONSTRUCTED

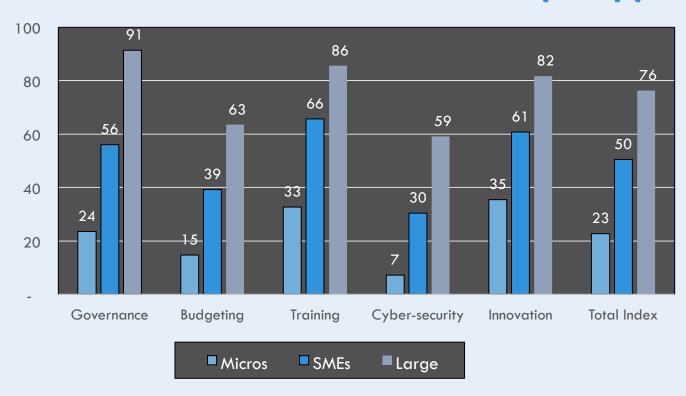


- Ability to estimate cost of cyber disruption
- Function responsible of cyber-security

ICT based innovation initiatives

THIRD CHALLENGE: INDEX OF DIGITIZATION MANAGEMENT WAS PARTICULARLY LOW WITHIN SMEs

INDEX OF DIGITIZATION MANAGEMENT (0-100) (2017)



Source: Author developed for the Observatorio de la Economía Digital de Colombia

FOURTH CHALLENGE: LIMITED ADOPTION OF ADVANCED DIGITAL TECHNOLOGIES

COLOMBIA: ADOPTION OF ADVANCED DIGITAL TECHNOLOGIES BY VALUE CHAIN STAGE (2017)

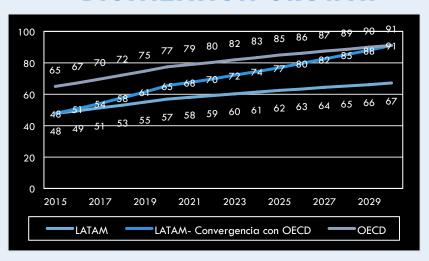
Pillar	Technology	National	Large	SMEs	Micros
Infrastructure	Cyber-security	26 %	67.2 %	37.1 %	25.4 %
	Cloud computing	20 %	48.8 %	22.9 %	13.6 %
Manufacturing	Internet of Things	8 %	14.8 %	9.3 %	8.2 %
	Robotics	1 %	11.1 %	1.2 %	0.6 %
	Additive manufacturing	3 %	4.8 %	2.1 %	2.1 %
	Virtual reality	1 %	1.7 %	0.9 %	1.0 %
Distribution	Big data	5 %	16.8 %	4.0 %	1.3 %
	Artificial Intelligence	3 %	9.7 %	2.4 %	0.7 %
	Blockchain	3 %	5.9 %	1.6 %	1.1 %

Source: Observatorio de la Economía Digital de Colombia

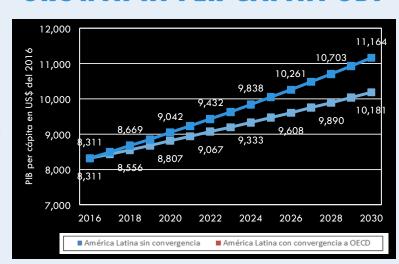
DIGITIZATION GROWTH IS THE KEY TO INCREASING LATIN AMERICAN COMPETITIVENESS

- The digitization gap between Latin America and OECD countries is of 17 points
- > We assumed a convergent scenario over the next ten years

DIGITIZATION GROWTH



GROWTH IN PER CAPITA GDP



If this occurs, TFP would grow at 0.66% per year and economic growth would 3.02%, which would result in cumulative GDP of US\$ 708.460 between 2017 and 2030

Columbia Institute for Tele-Information

For more information, contact:

Raul Katz - raul.katz@teleadvs.com