

# 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

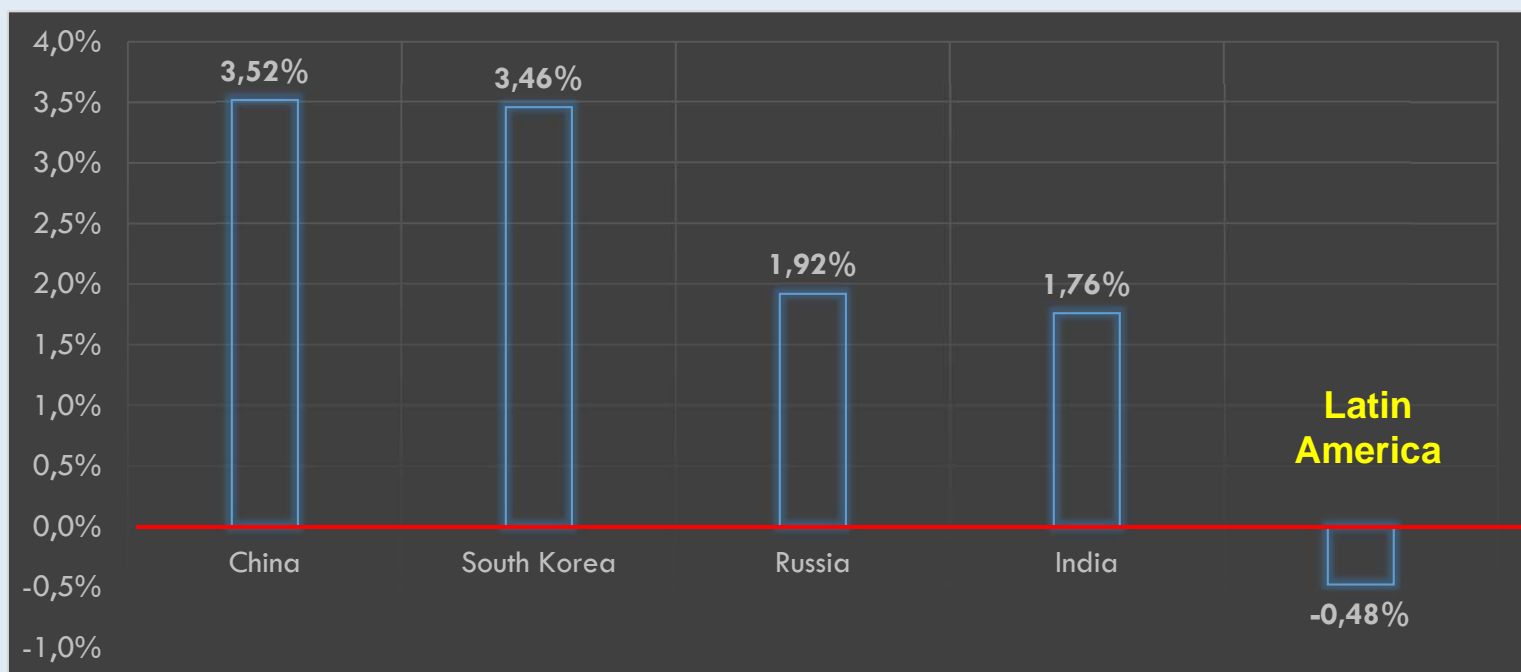
### LATIN AMERICA VS. OECD: GDP PER CAPITA (2003-2016)



Source: World Bank

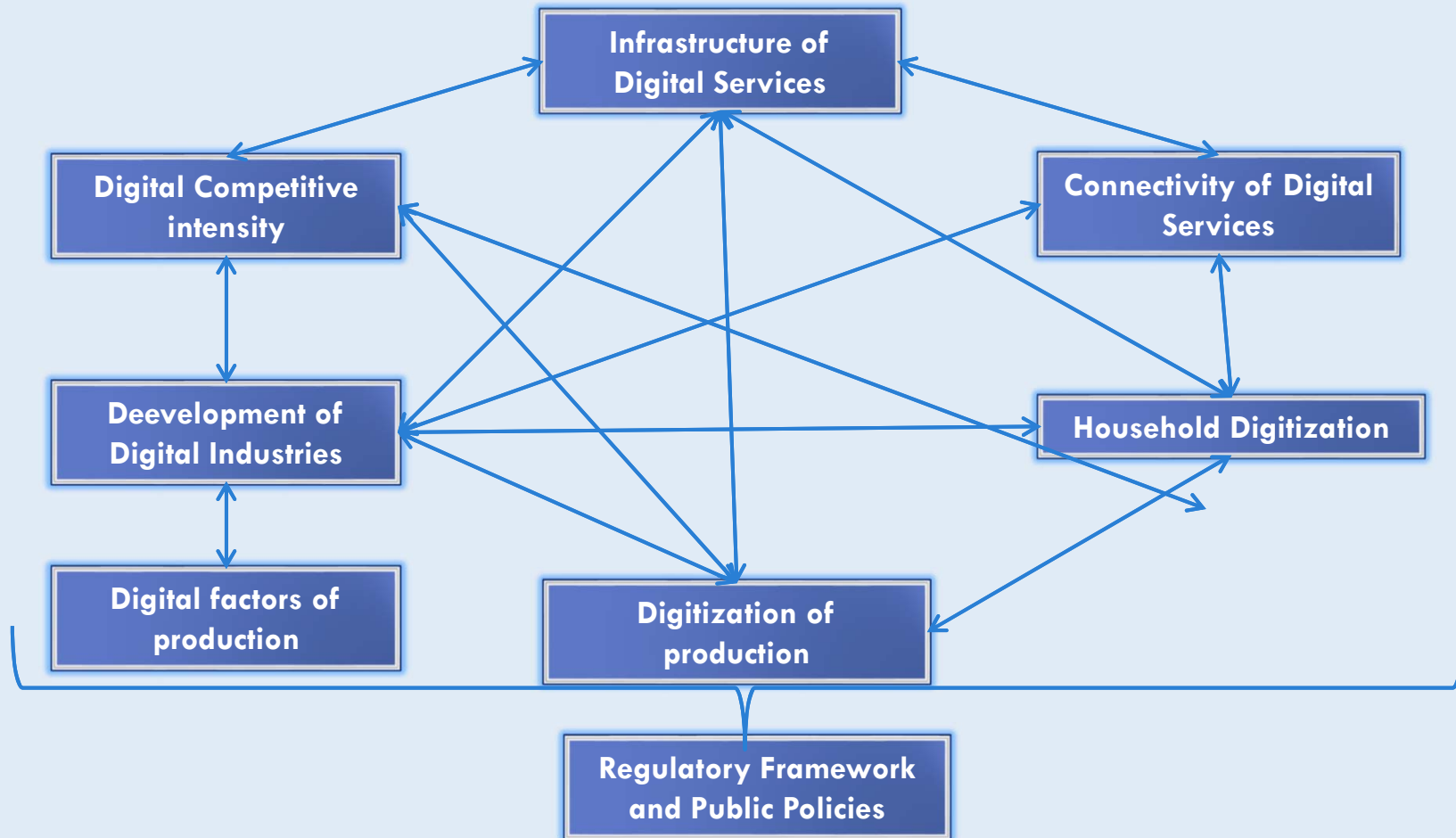
## PRODUCTIVITY IS KEY TO FOSTER GROWTH: YET, ITS CONTRIBUTION IN LATIN AMERICA IS NEGATIVE

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



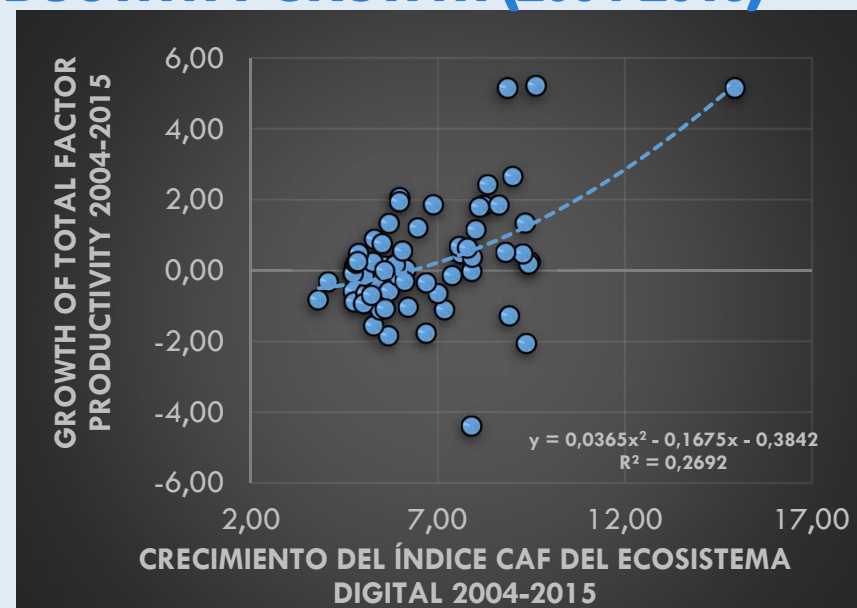
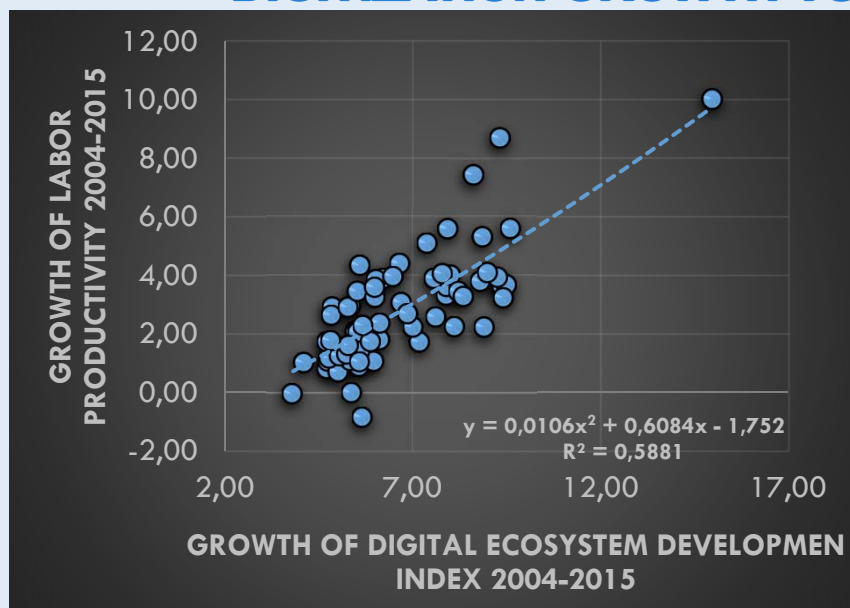
Source: Author based on data from The Conference Board Total Economy Database™ (Adjusted version), November 2017

## 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 development index	0,2622 (0,0683)***	0,228 (0,0674)***
Digital ecosystem development index	0,0358 (0,0585)	0,0605 (0,0577)
Observations	201	201
R-squared	0,6914	0,5832

Source: Author

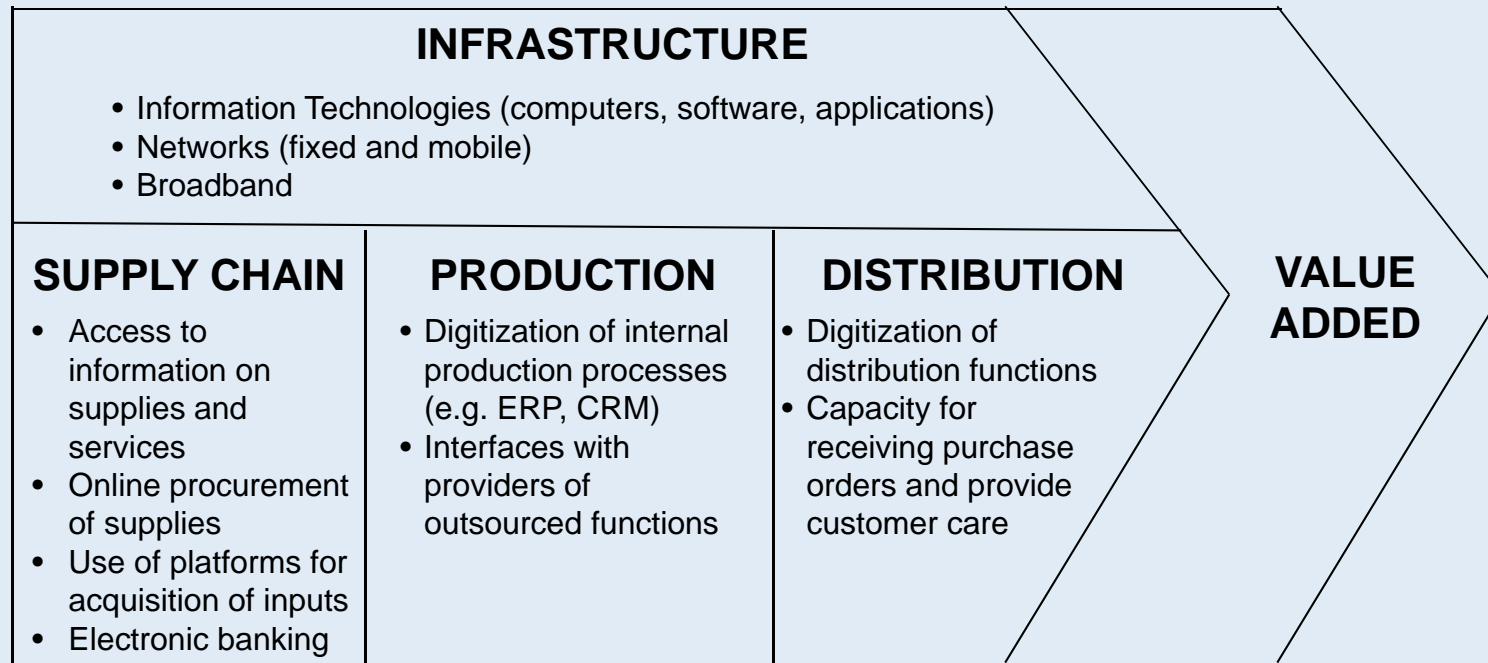
## FOUR CHALLENGES FACED BY LATIN AMERICAN DIGITIZATION OF PRODUCTION

---

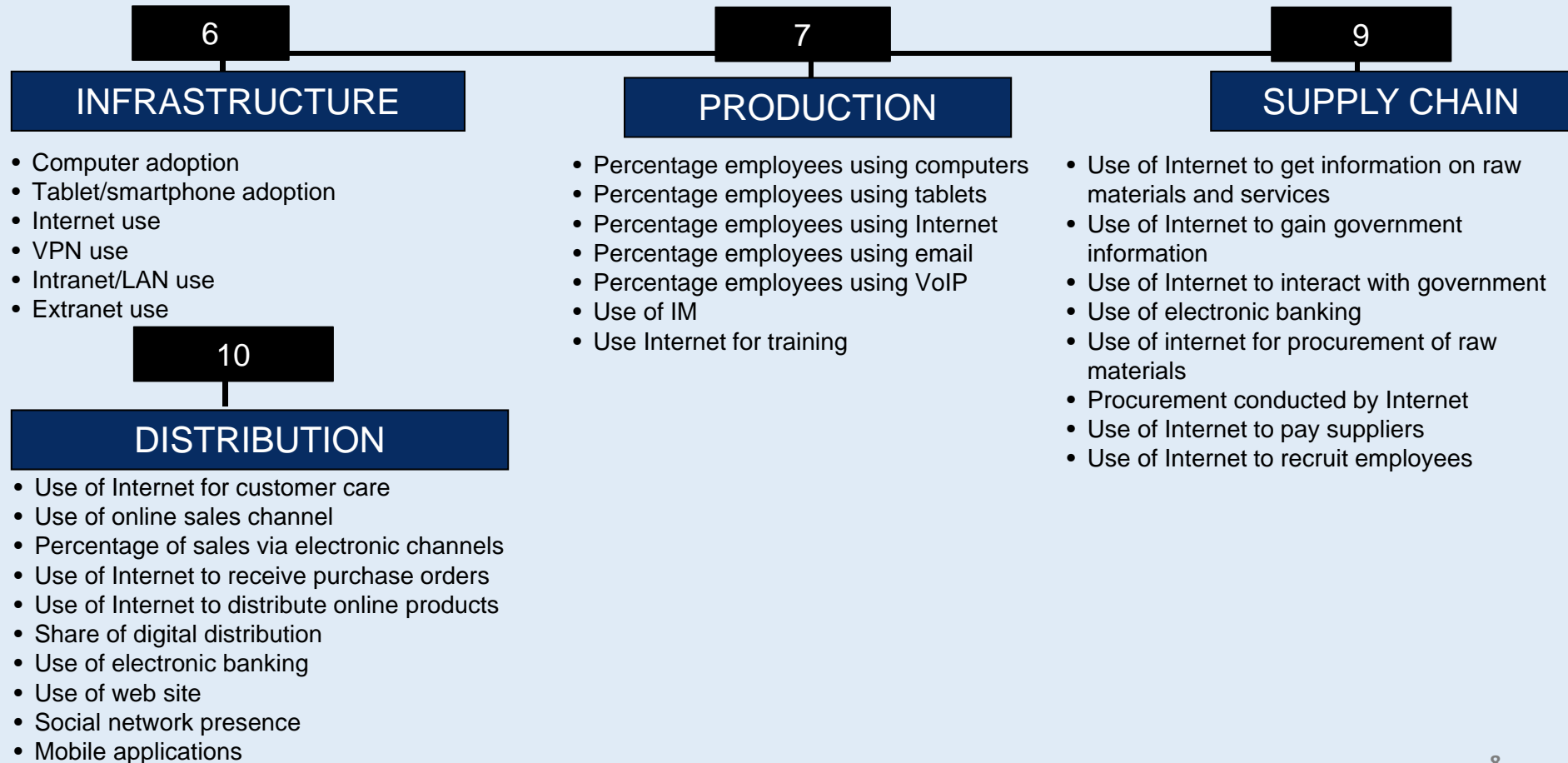
- Limited accumulation of intangible capital
- Limited digitization of small and medium enterprises
- Low capacity in management of digitization within small and medium enterprises
- Embryonic adoption of advanced digital technologies

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

**VALUE CHAIN FRAMEWORK**



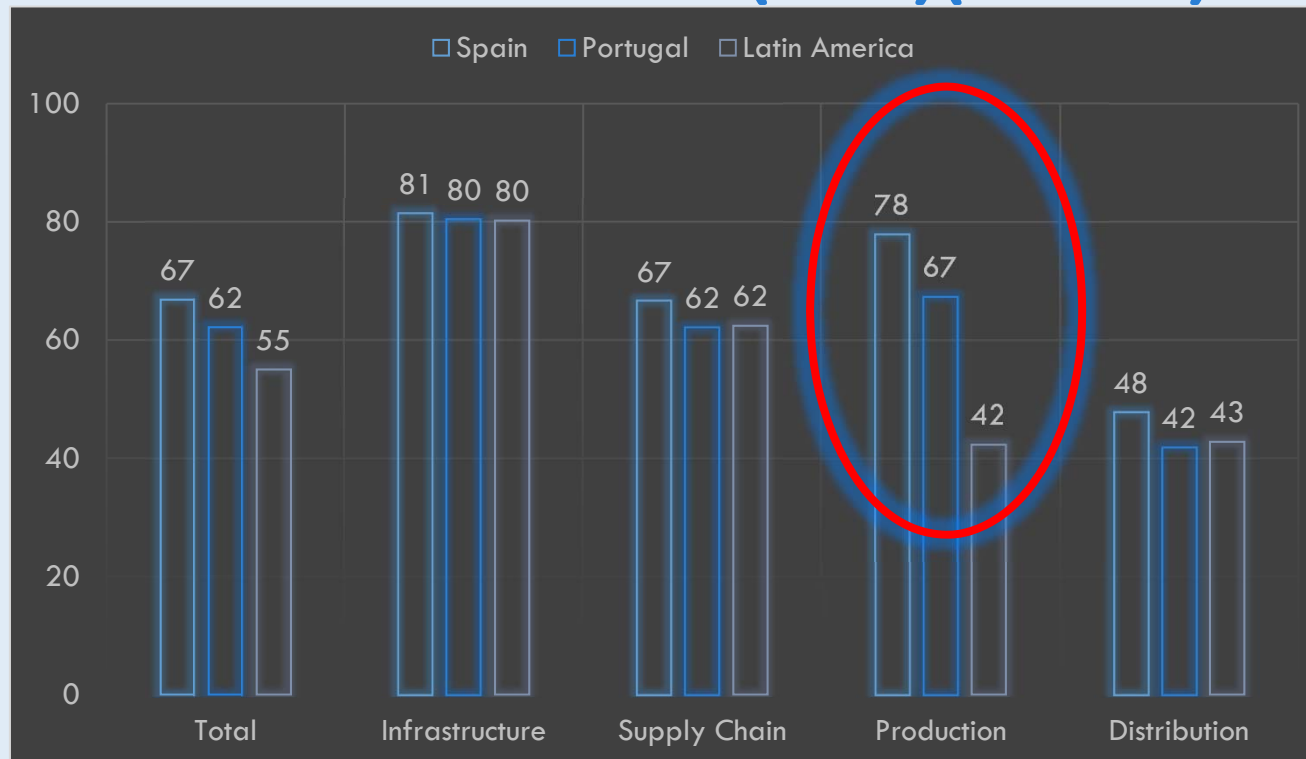
## FIRST CHALLENGE: WE DEVELOPED AN INDEX TO MEASURE THE LEVEL OF DIGITIZATION BY VALUE CHAIN STAGE





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

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



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

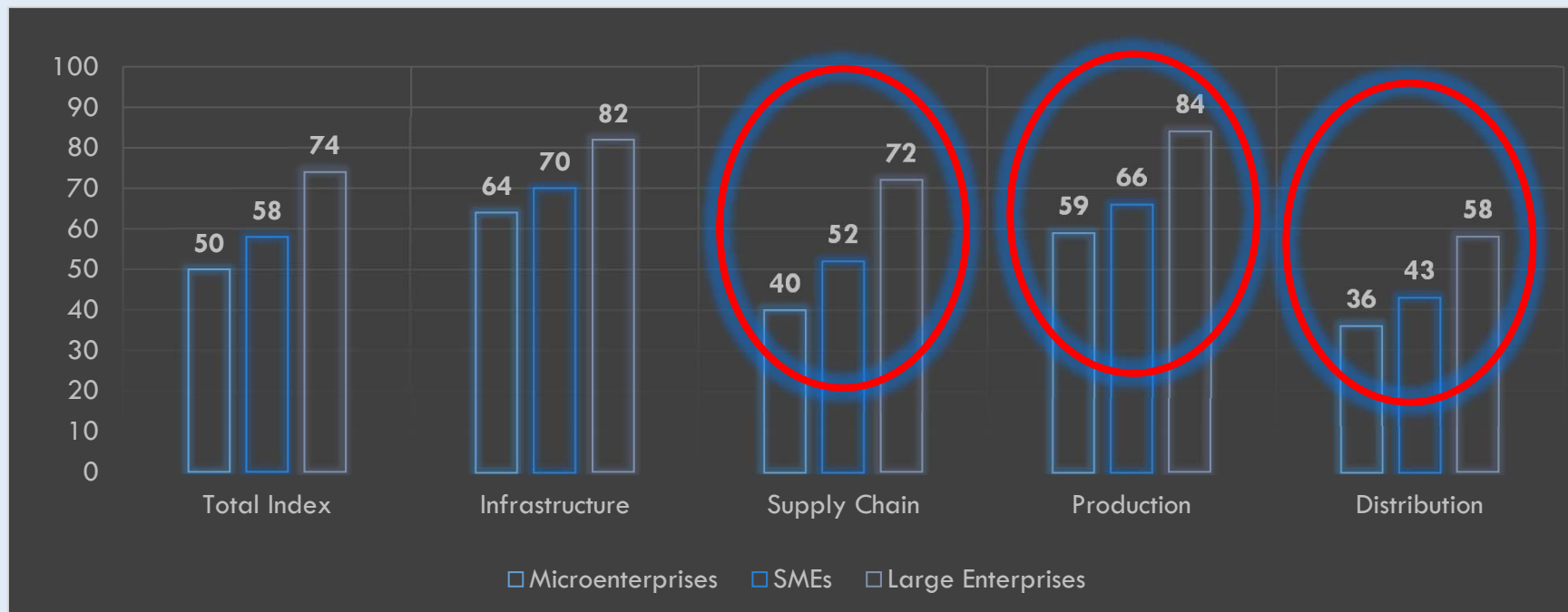
**SECOND CHALLENGE:** WE BUILT A COUNTRY-BASED OBSERVATORY BASED ON MICRODATA ANALYSIS OF SEVERAL INDUSTRIAL SURVEYS

**COLOMBIA: SAMPLES OF SURVEYS USED**

	DANE		ICT Ministry		Universe
	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	
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

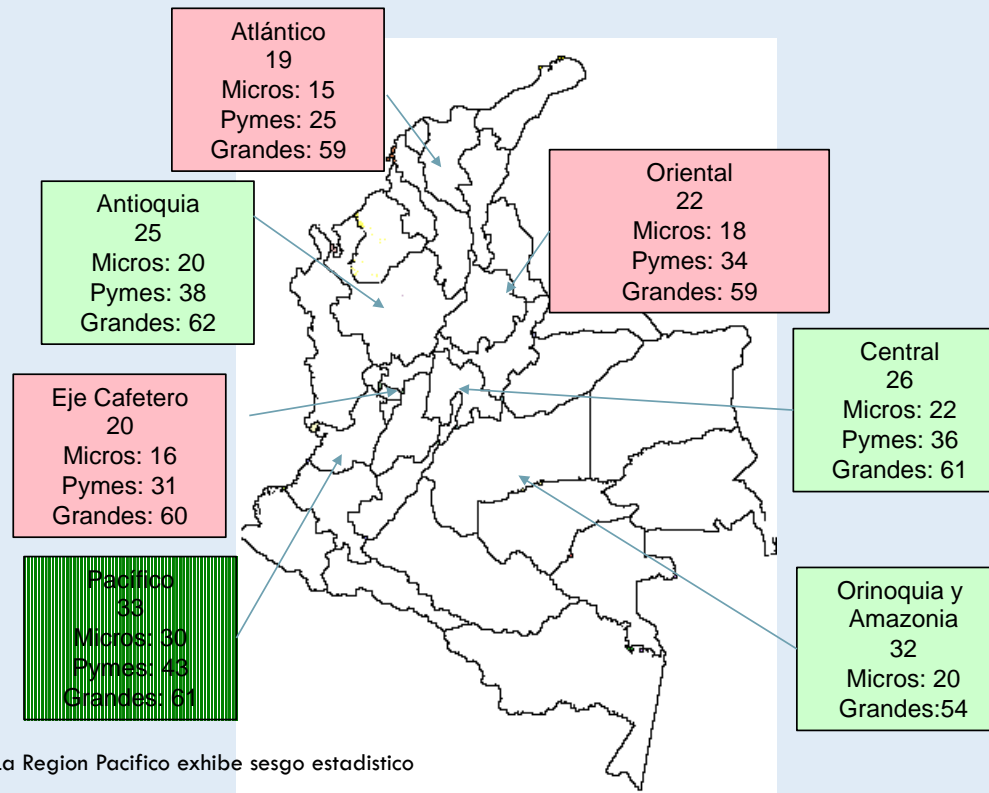
**COLOMBIA: DIGITIZATION OF PRODUCTION INDEX (0-100) (2017)**



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

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

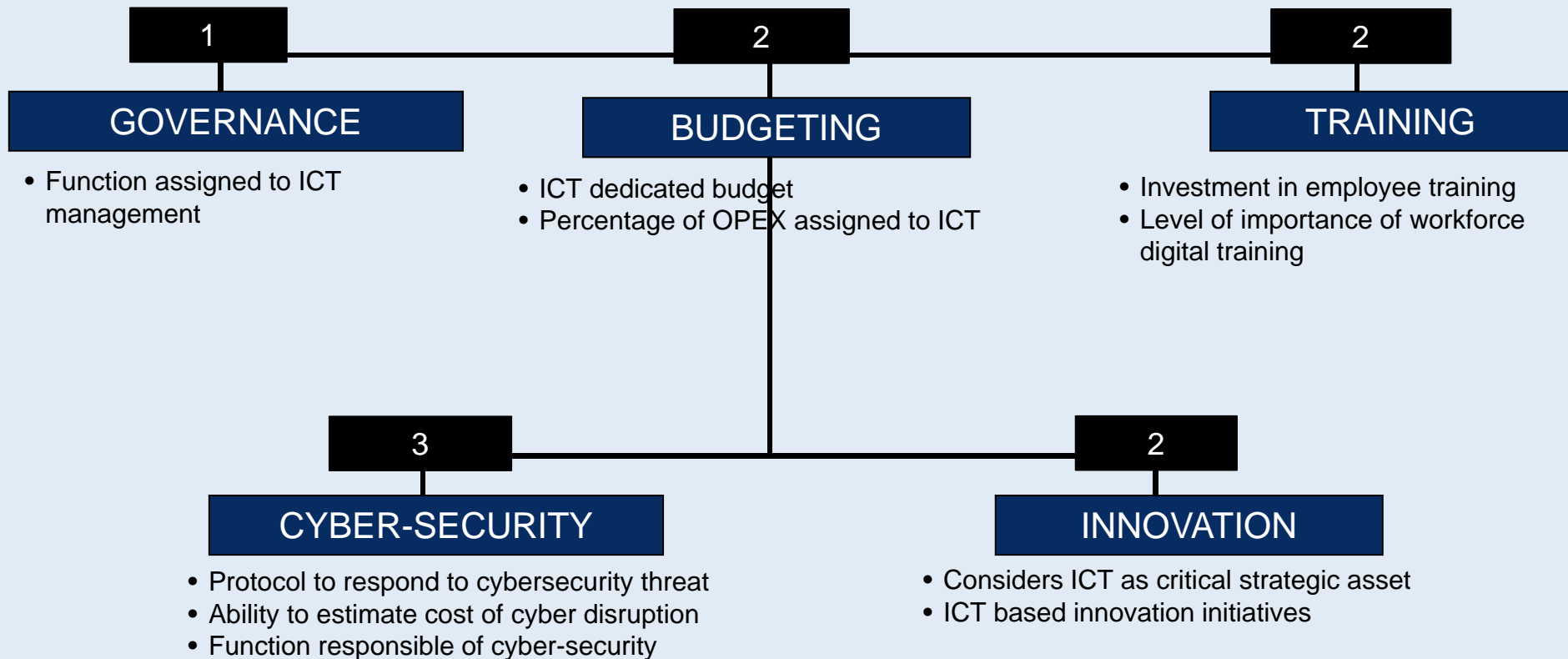
**COLOMBIA: DIGITIZATION OF PRODUCTION INDEX (0-100) (2015)**



Nota: La Region Pacífico exhibe sesgo estadístico

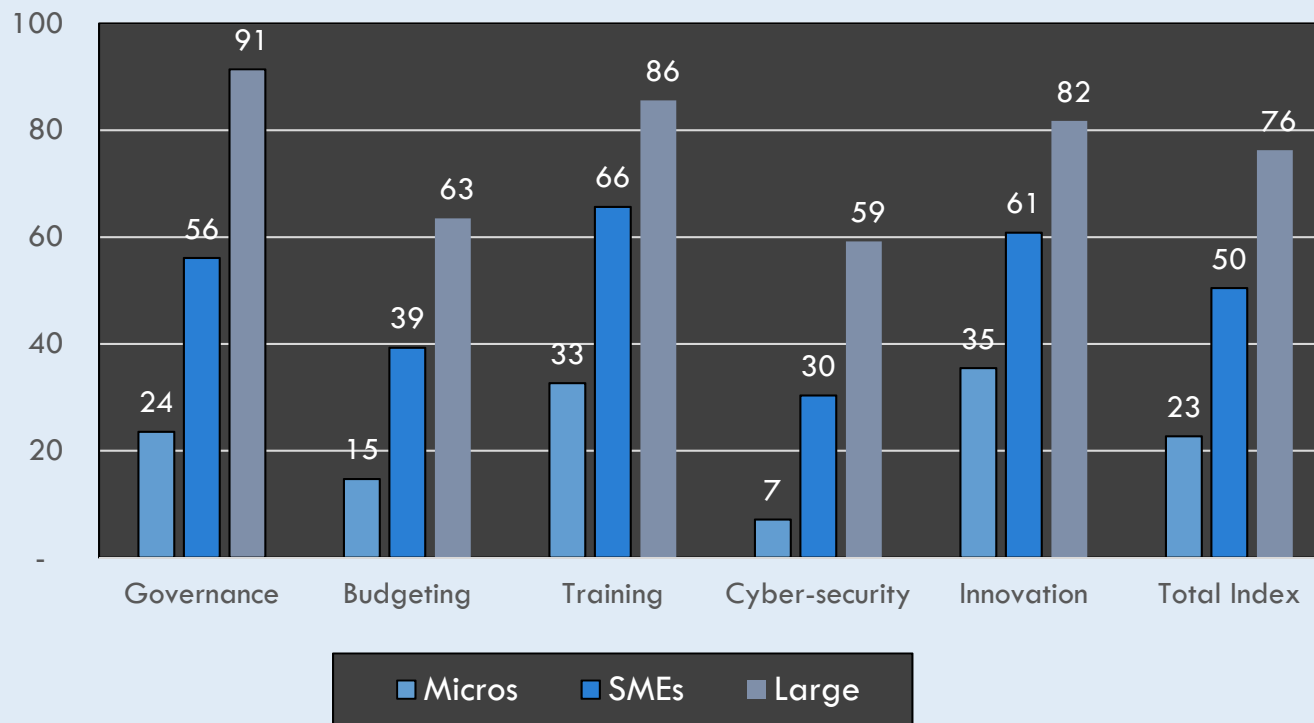
## THIRD CHALLENGE: AN INDEX OF DIGITIZATION MANAGEMENT WAS CONSTRUCTED

### INDEX OF DIGITIZATION MANAGEMENT



**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)

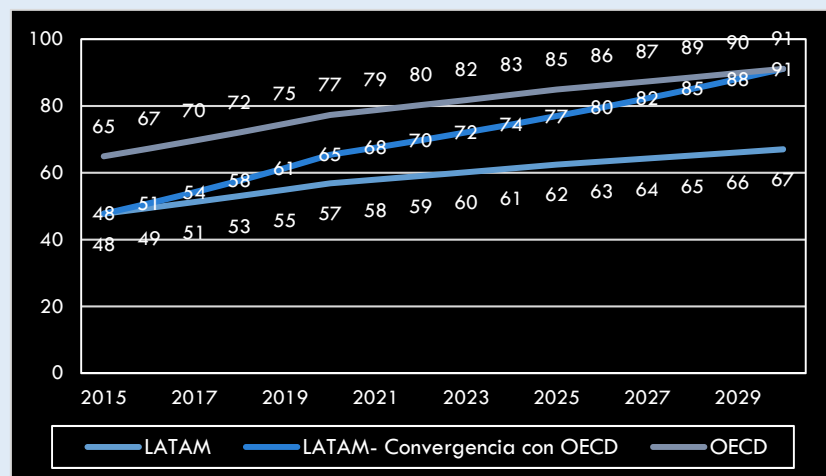
Pillar	Technology	National	Large	SMEs	Micros
Infrastructure	Cyber-security	26 %	67.2 %	37.1 %	25.4 %
	Cloud computing	20 %	48.8 %	22.9 %	13.6 %
Manufacturing	Internet of Things	8 %	14.8 %	9.3 %	8.2 %
	Robotics	1 %	11.1 %	1.2 %	0.6 %
	Additive manufacturing	3 %	4.8 %	2.1 %	2.1 %
	Virtual reality	1 %	1.7 %	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

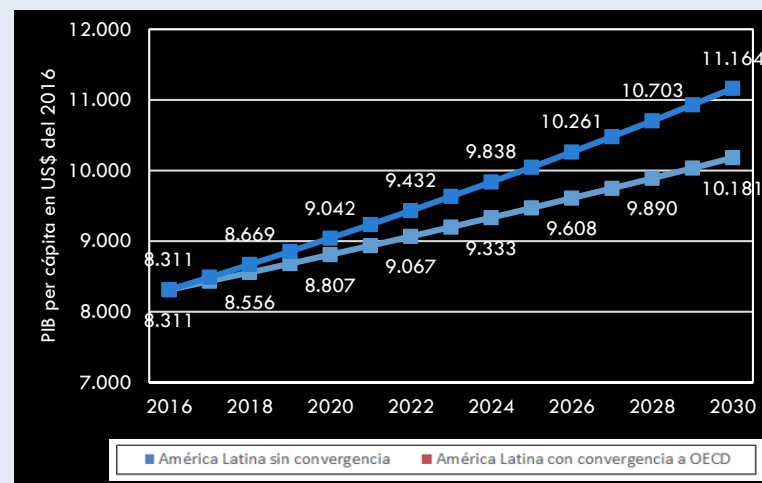
## DIGITIZATION GROWTH IS THE KEY TO INCREASING LATIN AMERICAN COMPETITIVENESS

- 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](mailto:raul.katz@teleadvs.com)