Introduction:

- The annual Innovation Union Scoreboard provides a comparative assessment of the research and innovation performance of the EU Member States (European Commission, 2011)..
- The Innovation Union Scoreboard aims to cover the innovation system as a whole, analysing both public and private sectors' innovation capacities. The scoreboard captures a total of 25 different indicators, which aims at encompassing the external conditions for innovation, the level of firms own innovation activity and how this is translated into benefits for the whole economy (European Commission, 2013b).
- The Digital Agenda presented by the European Commission forms one of the seven pillars of the Europe 2020 Strategy which sets objectives for the growth of the European Union by 2020. The Digital Agenda proposes to better exploit the potential of Information and Communication Technologies in order to foster innovation, economic growth and progress.
- The digital agenda tackles a set of problems that have been identified as barriers to generate smart, sustainable and inclusive growth in Europe: - fragmented digital markets; - lack of interoperability; - rising cybercrime and risk of low trust in networks; - lack of investment in networks; - insufficient research and innovation efforts; - lack of digital literacy and skills; - missed opportunities in addressing societal challenges.

Theoretical Framework:

- There is in the scientific literature of Innovation systems (Gómez Uranga et al., 2014; Samara et al., 2012; Edquist, 2011, 2005; Hagedoorn and Cloodt, 2003; Furman et al., 2002) understanding a classic distinction of two different elements that drives Innovation: on the one hand the pure creation of new ideas, technologies, processes, knowledge and on the other hand the absorption of outside pre-existing technologies. Both contribute to the innovation of the countries even if the absorption of outside existing technologies is often forgotten (Bresciani et al., 2016; Cao et al., 2013).

- This work will not deal with the latest digital technologies but on the contrary with the basic digital technologies and skills a country must have to be innovative. In this line it can be cited as an example one of the most famous: Absorptive capacity: A new perspective on learning and innovation of WM Cohen and DA Levinthal (1990). In what follows, it will be used as measures of this basic digitalisation of European countries another indicator developed by the European Commission: The Digital Economy and Society Index (DESI). It is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU Member States in digital competitiveness.

Investigation Objective. Investigation Methodology:

- The main objective of this paper is to investigate the relation between the basic digital capacities of a European country and the performance of its national innovation system. Also, this work aims at questioning the favorite European Commission tool to monitor the Innovativeness of its countries regarding the absence of direct digital-related indicators. Thus a last objective would be to study the potential integration of digital data in the Innovation Union Scoreboard.

- This methodology used is a mix of a quantitative and qualitative approach. Indeed, this work consists of confronting two similarly structured databases with a simple correlation method and then analyzing what those databases point out in the light of the established scientific literature.

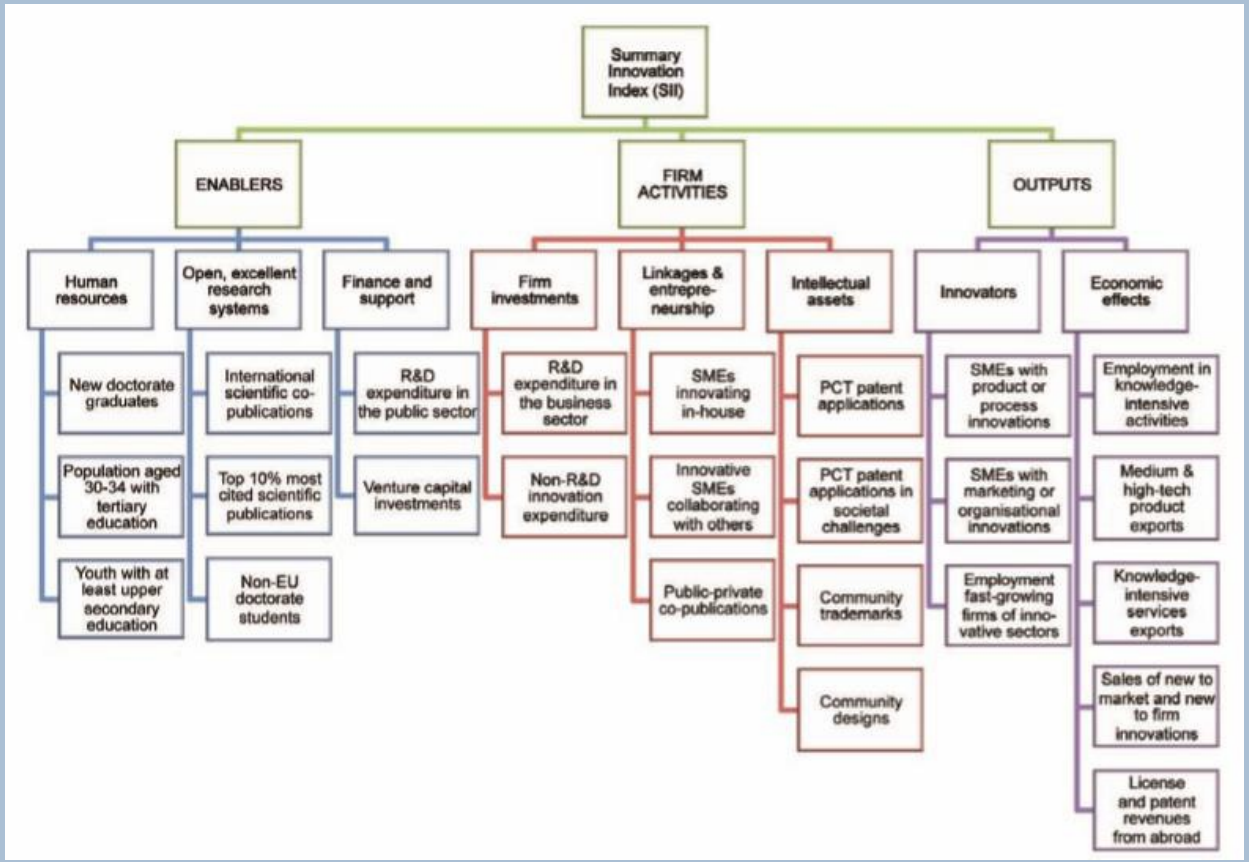
Databases:

- The Innovation Union Scoreboard database:

- The Innovation Union Scoreboard 2015, the 14th edition since the introduction of the European Innovation Scoreboard in 2001, follows the methodology of previous editions. Innovation performance is measured using a composite indicator – the Summary Innovation index – which summarizes the performance of a range of different indicators. The Innovation Union Scoreboard distinguishes between 3 main types of indicators – Enablers, Firm activities and Outputs – and 8 innovation dimensions, capturing in total 25 indicators

Databases:

- The Innovation Union Scoreboard database:



Databases:

- The DESI database:

- The Digital Economy and Society Index (DESI) measures progress of EU countries towards a digital economy and society. As such, it brings together a set of relevant indicators on Europe's current digital policy mix.

- The DESI has a three-layer structure as depicted in table 1. It is composed of 5 principal dimensions, each divided in a set of sub-dimensions, which are in turn composed by individual indicators.

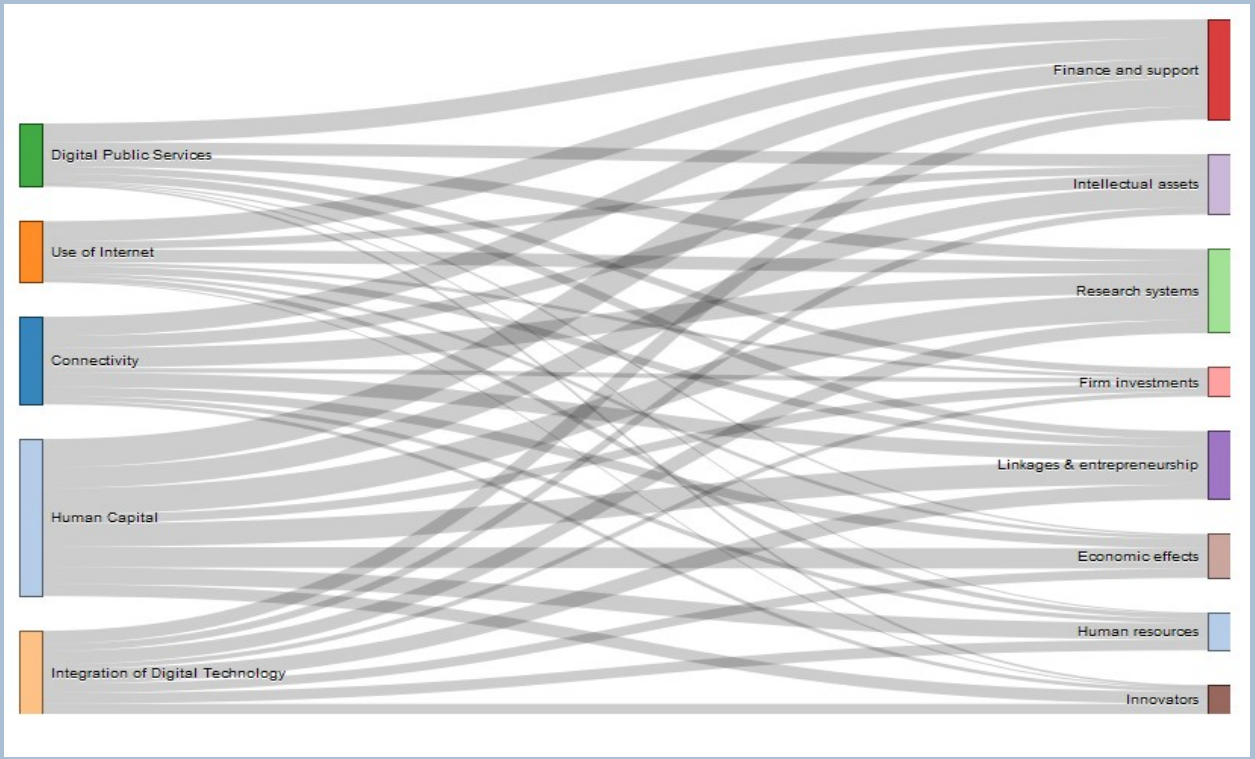
Databases:

- The Digital Economy and Society Index (DESI) :

1 Connectivity	1a Fixed Broadband	1a1 Fixed BB Coverage
		1a2 Fixed BB Take-up
	1b Mobile Broadband	1b1 Mobile BB Take-up
		1b2 Spectrum
	1c Speed	1c1 NGA Coverage
		1c2 Subscriptions to Fast BB
	1d Affordability	1d1 Fixed BB Price
2 Human Capital	2a Basic Skills and Usage	2a1 Internet Users
		2a2 Basic Digital Skills
	2b Advanced skills and Development	2b1 ICT Specialists
		2b2 STEM Graduates
3 Use of Internet	3a Content	3a1 News
		3a2 Music, Videos and Games
		3a3 Video on Demand
	3b Communication	3b1 Video Calls
		3b2 Social Networks
	3c Transactions	3c1 Banking
		3c2 Shopping
4 Integration of Digital Technology	4a Business digitization	4a1 Electronic Information Sharing
		4a2 RFID
		4a3 Social Media
		4a4 eInvoices
		4a5 Cloud
	4b eCommerce	4b1 SMEs Selling Online
		4b2 eCommerce Turnover
		4b3 Selling Online Cross-border
5 Digital Public Services	5a eGovernment	5a1 eGovernment Users
		5a2 Pre-filled Forms
		5a3 Online Service Completion
		5a4 Open Data

Correlations and Ranking correlations :

- For the moment, the study has been done with the most familiar measure of dependence, "Pearson's correlation coefficient", commonly called simply "the correlation coefficient". It tests the linear hypothesis between the variables we want to explain (The Innovation Union Scoreboard indicators) and the independent variables (the DESI indicators). :



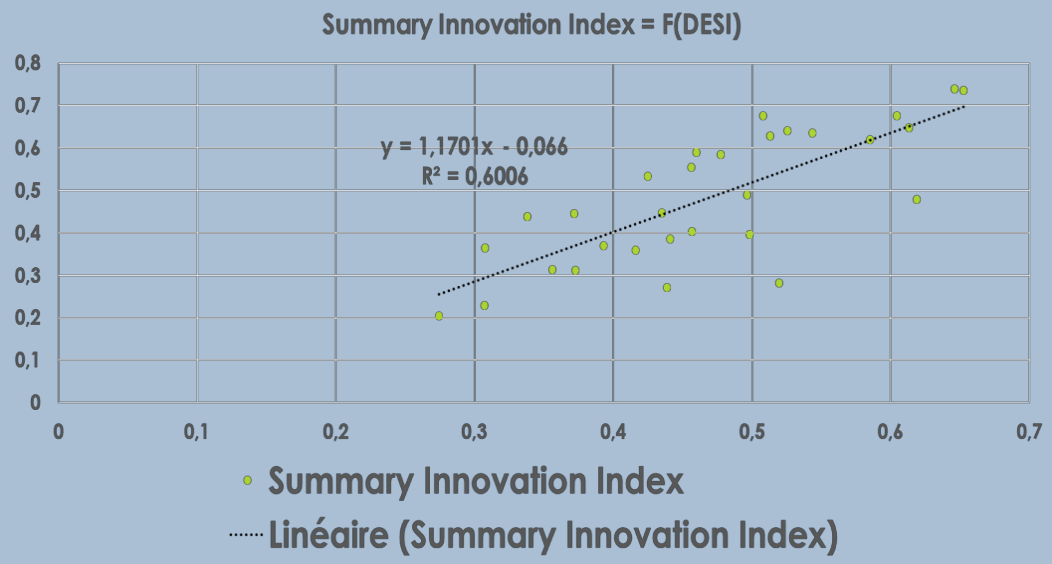
GRAPHIC REPRESENTATION OF THE SECOND LAYER CORRELATION TABLE.

Investigation questions:

- 1- What digital basic capacities are determinant for the innovation system of a country and how do they actually impact?
- Hypothesis: The Human Capital dimension is to have a great weight in the Innovation Union Scoreboard results explanations.
- 2- What Innovation Union Scoreboard sub indicators can be directly related to digital capacities?
- Hypothesis: They must mainly belong to the input dimensions (enablers).
- 3- How can the Innovation Union Scoreboard be redesigned to integrate direct digital input? What would that change in its analysis?

Results:

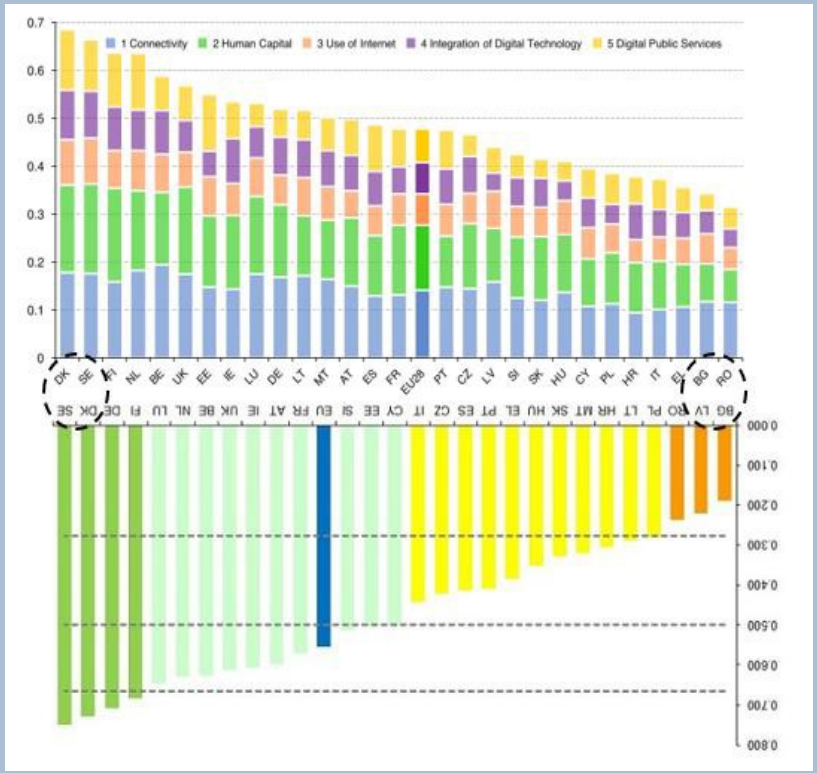
- A first result directly from the first layer analysis: the correlation between the Innovation
- Union Scoreboard macro-indicator and the DESI one:



LINEAR REGRESSION BETWEEN THE INNOVATION UNION SCOREBOARD MACRO-INDICATOR AND THE DESI ONE

Results:

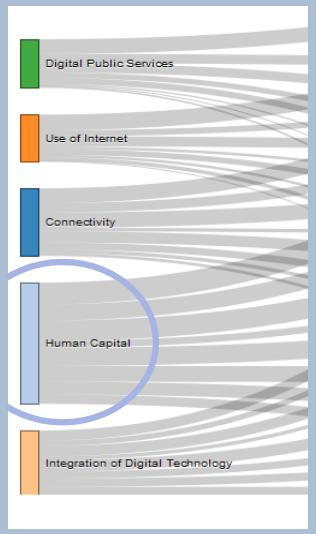
We can observe the high correlation coefficient R2>0.6 confirms the genuine observation of both rankings:



DESI (TOP) AND IUS (BOTTOM) RANKING SIMILITUDES

Results:

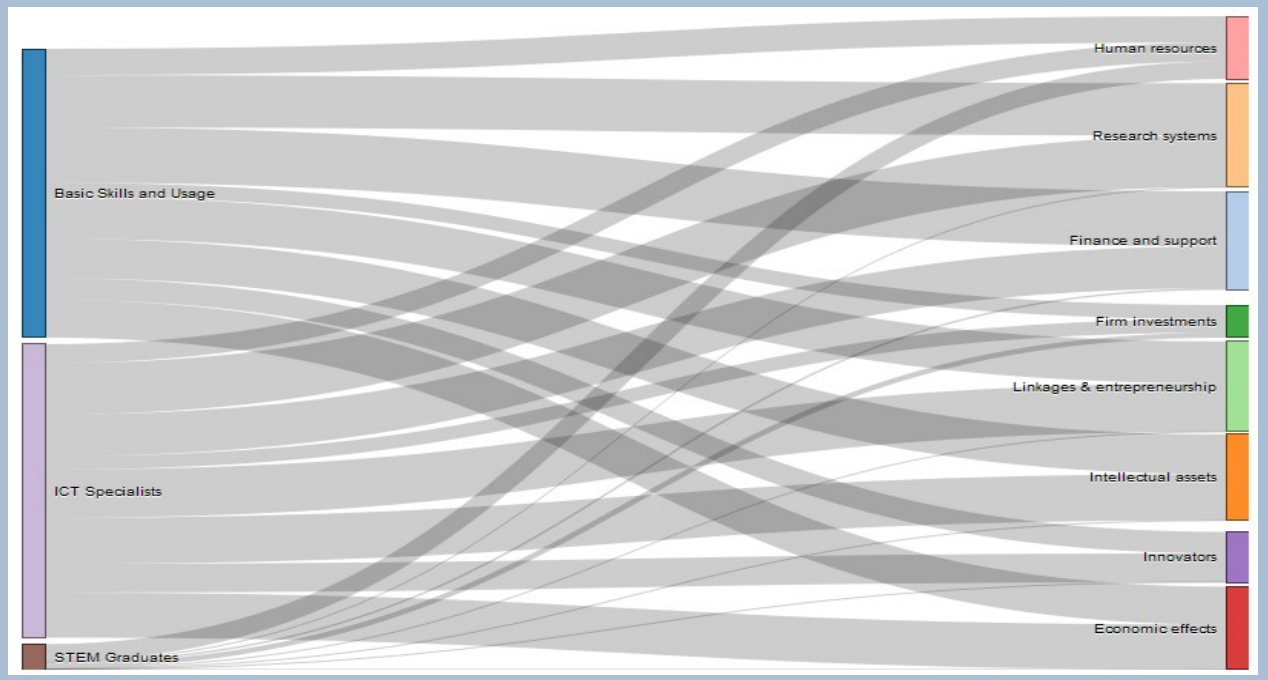
What digital basic capacities are determinant for the innovation system of a country and how do they actually impact?



THE HUMAN CAPITAL DIMENSION SHOWS THE GREATEST CORRELATION COEFFICIENTS WITH THE INNOVATION UNION SCOREBOARD DIMENSIONS

Results:

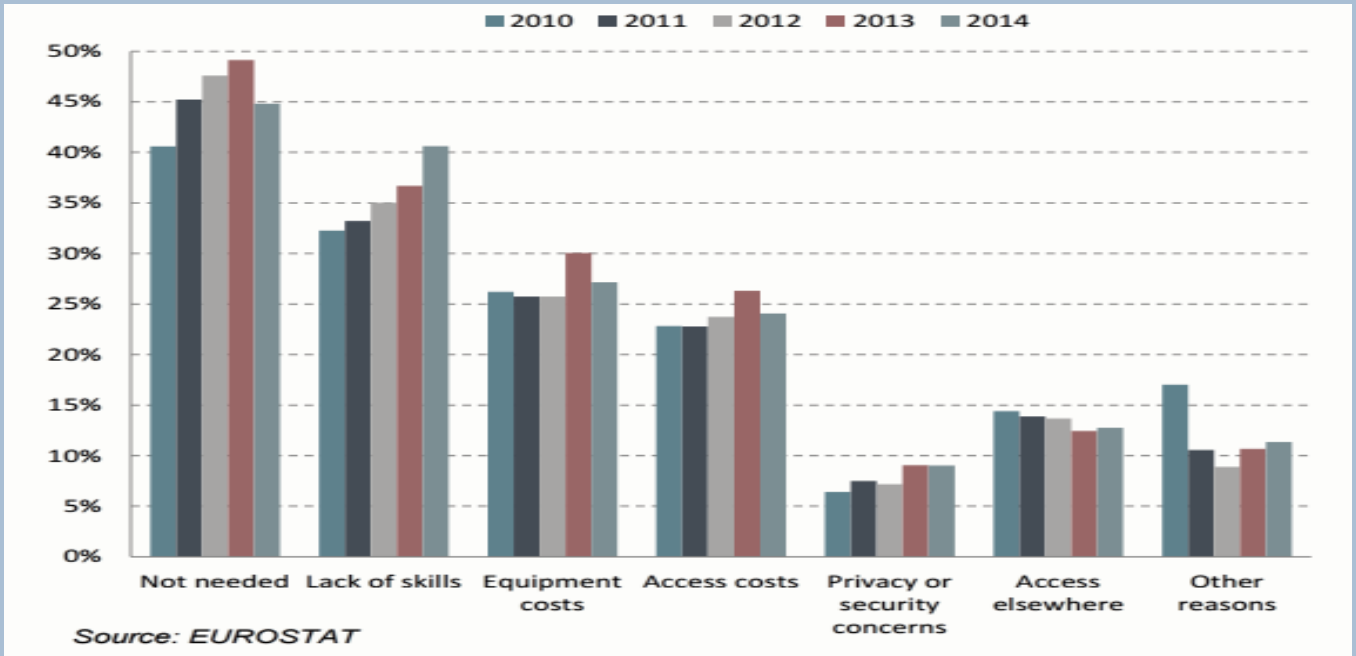
What digital basic capacities are determinant for the innovation system of a country and how do they actually impact?



HUMAN CAPITAL SUB-INDICATORS CORRELATION WEIGHTS WITH THE INNOVATION UNION SCOREBOARD DIMENSIONS

Results:

What digital basic capacities are determinant for the innovation system of a country and how do they actually impact?



BARRIERS TO INTERNET ACCESS AT HOME IN THE EU28 (% HOUSEHOLDS WITHOUT INTERNET)

Results:

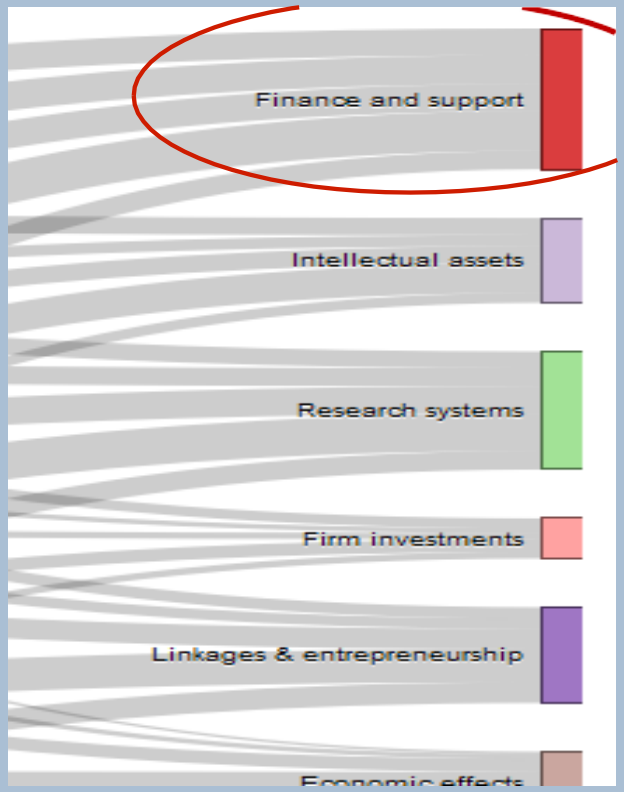
What digital basic capacities are determinant for the innovation system of a country and how do they actually impact?

R2 coefficient	Internet users	ICT specialistskills
Venture capital	0.56	0.43
Public R&D expenditure	0.45	0.35

R2 CORRELATION TABLE

Results:

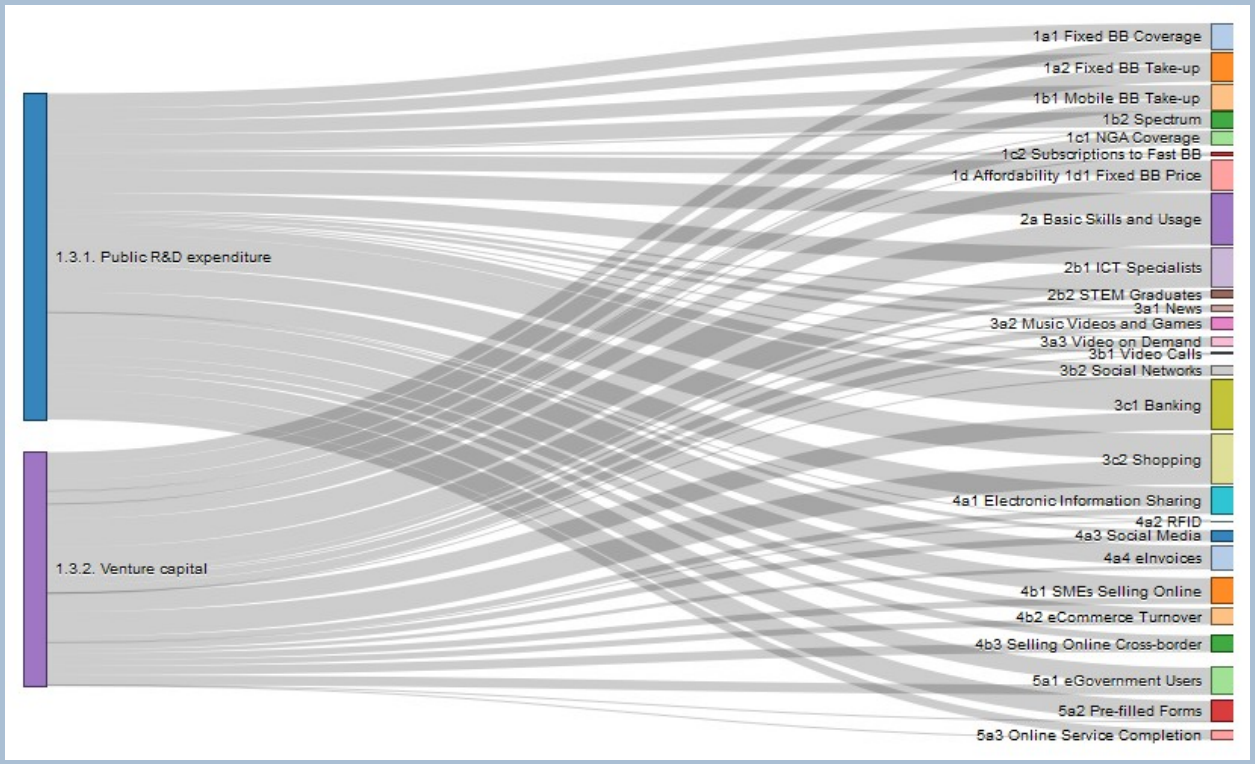
What Innovation Union Scoreboard sub indicators can be directly related to digital capacities?



FINANCE AND SUPPORT WEIGHT.

Results:

What Innovation Union Scoreboard sub indicators can be directly related to digital capacities?



FINANCE AND SUPPORT SUB-INDICATORS CORRELATION WEIGHTS WITH THE DESI DIMENSIONS (THIS TIME, DESI INDICATORS ARE PRINTED ON THE LEFT)

Conclusion:

•The starting point of this paper was the following apparent contradiction: The European commission has set the digitalisation of Europe as a top priority although its main tool to monitor the innovativeness of the member states, The Innovation Union Scoreboard, does not take into account any direct digital indicator.

•As a conclusion, we hope that this work will eventually lead to a rise of consciousness from politicians and a better understanding of the mechanisms that link the basic digital capacities to the innovativeness of member states. Also, it should lead to improvements of the Innovation Union Scoreboard or at least to a more accurate understanding of its scope.

Thank you!

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