



EFOP-3.6.2-16-2017-00017

Sustainable, intelligent and inclusive
regional and city models

ESTIMATING THE ECONOMIC IMPACTS OF KNOWLEDGE NETWORK AND ENTREPRENEURSHIP DEVELOPMENT IN SMART SPECIALIZATION POLICY

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OUTLINE

- RIS3 and policy assessment
- The GMR-Europe policy impact assessment model
- Interregional innovation networks: collaborating for knowledge exchange
- Entrepreneurship and regional development
- RIS3: policy impact simulations
- Summary

RIS3 AND POLICY IMPACT ASSESSMENT

- Smart specialization (SS) is a regional development policy approach to *foster innovation in less advanced regions*
- SS became a key element of the reformed EU Cohesion Policy (2014-2020)
- Distinguishing novel features of SS (Foray 2015, McCann - Ortega-Argilés 2015)
 - Key concept: “entrepreneurial discovery” – a bottom-up approach to discover future industrial specializations
 - Key concept: “domain” – targeting industrial sectors highly embedded in the region’s economy (“related variety”) to end up with the highest possible impact
 - Key concept: role of learning from global knowledge networks: missing pieces of local knowledge for innovation is obtained via interregional collaborations with more advanced regions

RIS3 AND POLICY IMPACT ASSESSMENT

- Policy instruments and economic models in traditional EU Cohesion Policy impact assessment:
 - Instruments: infrastructure, human capital, R&D, investments
 - Economic models: dominantly macroeconomic (national-level) models (Quest, Hermin)

RIS3 AND POLICY IMPACT ASSESSMENT

- Challenges in economic impact modeling emerged with the reformed EU Cohesion Policy :
 - unit of observation became the regions;
 - integration of a RIS3-specific factor: regional entrepreneurship level;
 - integration of a RIS3-specific factor: interregional knowledge network embeddedness;
 - Integration of a RIS3-specific factor: detailed industrial dimension to estimate the impacts of different specialization schemes.

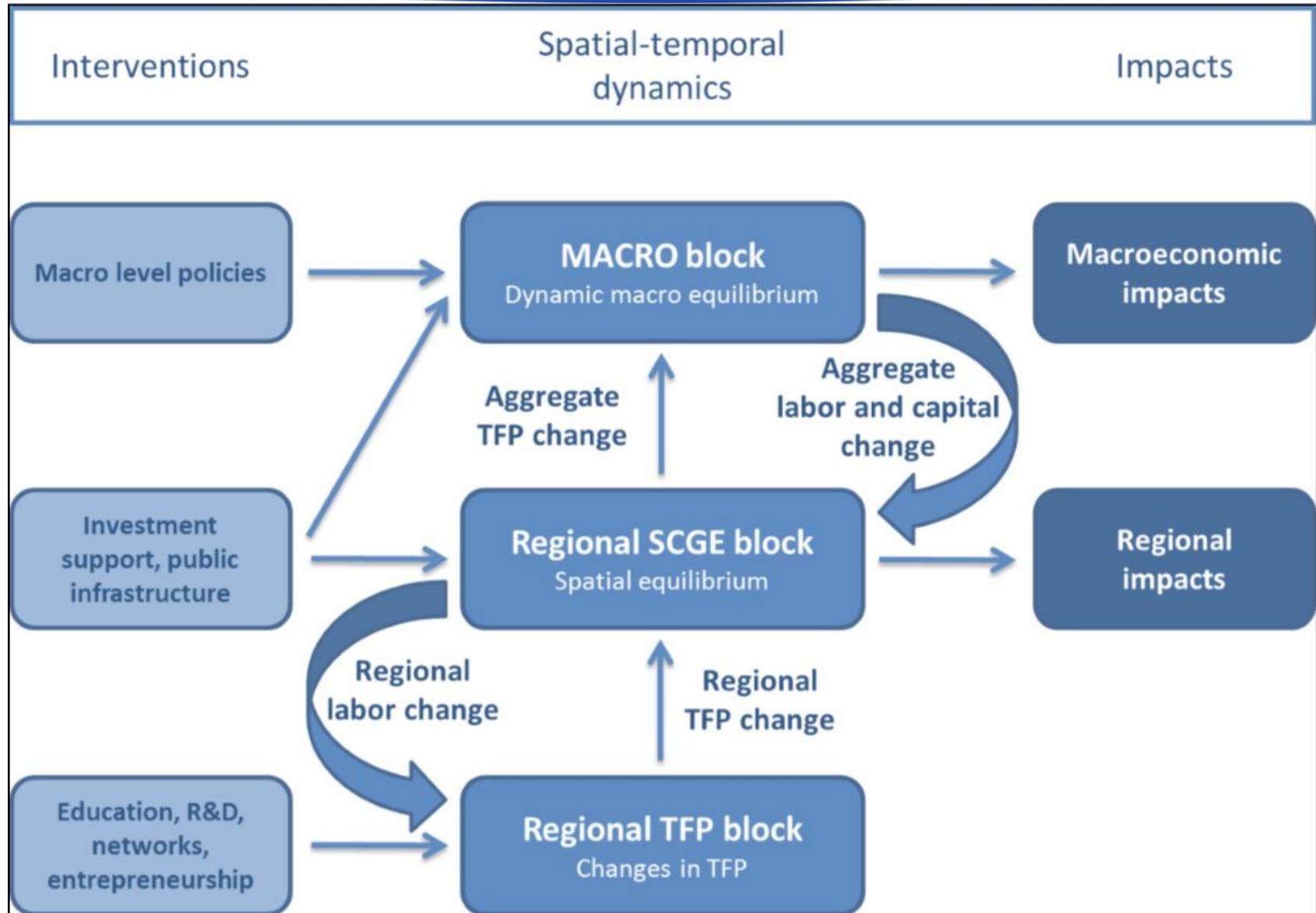
- **GMR:** Geographic Macro and Regional model
- EcoRET model (2004), GMR-Hungary (2007, 2013), GMR-Europe (2010, 2015), GMR-Turkey (2014)
- Selected applications:
 - Cohesion Policy impact assessment for the Hungarian government (since 2004 continuously)
 - Cohesion Policy impact assessment for the European Commission (DG Regio, 2011)
 - FP6 impact assessment (2010)
 - Policy impact assessment on Turkey regions (2014)

- Traditional innovation policy instruments in GMR-EU:
 - private investment subsidies
 - infrastructure development
 - R&D and human capital support
- Novel policy instruments in GMR-EU:
 1. support of the development of global knowledge networks
 2. entrepreneurship development

THE STRUCTURE OF GMR MODELS

- A regional Total Factor Productivity (TFP) block
 - policy impact on productivity
- A regional Spatial Computable General Equilibrium (SCGE) block
 - policy impact on regional economic variables (GDP, employment, etc.)
- A macroeconomic (MACRO) block
 - policy impacts at the macro level

THE STRUCTURE OF GMR MODELS



I. INTERREGIONAL KNOWLEDGE NETWORK AND REGIONAL DEVELOPMENT

- Smart specialization policy suggestion: *accessing missing pieces of knowledge from extra-regional knowledge networks* as a policy tool for development.
- Could global knowledge compensate for some forms of missing local knowledge? Evidence in the literature so far:
 - A significant role of interregional knowledge flows in regional innovation in Europe (Autant-Bernard 2007, Basile et al. 2012, Sebestyén and Varga 2013)
 - For CEE regions: A positive significant effect of FP networks on regional knowledge production
 - co-publication: Hoekman et al. 2012
 - patent applications for two scientific fields: Varga and Sebestyén, 2013, 2016

- Challenges in innovation network impact modeling
 - Measuring knowledge accessed from the network
 - Integration into an economic impact model
- Ego network quality (ENQ) is built on two sub-indices calculated for different distances:
 - Knowledge potential / node characteristics (accumulated knowledge) /
 - Local structure / network characteristics (number of partners, tie strength, density, centrality) /

- Smart specialization: the entrepreneurial discovery process (EDP) is in the core
- The level of entrepreneurship may have a significant effect on the EDP process in the region
- Policies supporting entrepreneurship may become key for smart specialization

- Challenges in the impact modeling of entrepreneurship policies:
 - measuring entrepreneurship,
 - integration of entrepreneurship in a policy impact model

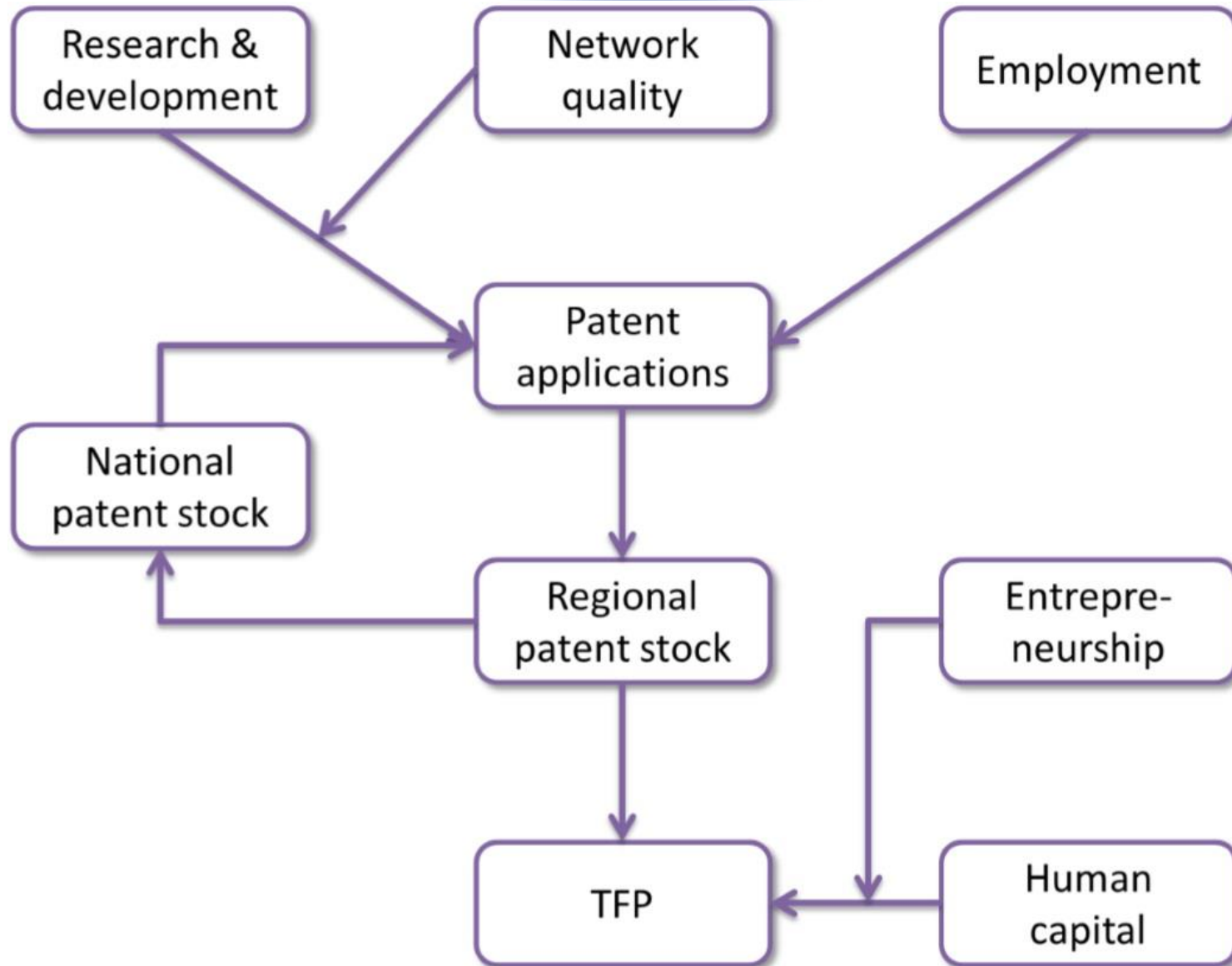
- Antecedent: the GEDI index (Acs and Szerb 2011, 2012, 2013)
- REDI (Regional Entrepreneurship and Development Index)
 - result of a collaborative project financed by DG Regio (Szerb, Acs, Autio, Ortega-Argiléz, Komlósi 2013)
 - provides initial clues on a given region's strengths and weaknesses in entrepreneurship
 - gives a framework for selecting region-specific entrepreneurship development policies (the penalty for bottlenecks principle)

PILLARS

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REGIONAL ENTREPRENEURSHIP INDEX	Sub-indexes	Pillars	Variables (ind./inst.)	
	ATTITUDES SUB-INDEX	OPPORTUNITY PERCEPTION	<i>OPPORTUNITY RECOGNITION</i>	MARKET AGGLOMERATION
		STARTUP SKILLS	<i>SKILL PERCEPTION</i>	QUALITY OF EDUCATION
		RISK ACCEPTANCE	<i>RISK PERCEPTION</i>	BUSINESS RISK
		NETWORKING	<i>KNOW ENTREPRENEUR</i>	SOCIAL CAPITAL
		CULTURAL SUPPORT	<i>CARRIER STATUS</i>	OPEN SOCIETY
	ABILITIES SUB-INDEX	OPPORTUNITY STARTUP	<i>OPPORTUNITY MOTIVATION</i>	BUSINESS ENVIRONMENT
		TECHNOLOGY ADOPTION	<i>TECHNOLOGY LEVEL</i>	ABSORPTIVE CAPACITY
		HUMAN CAPITAL	<i>EDUCATIONAL LEVEL</i>	EDUCATION AND TRAINING
		COMPETITION	<i>COMPETITORS</i>	BUSINESS STRATEGY
ASPIRATION SUB-INDEX	PRODUCT INNOVATION	<i>NEW PRODUCT</i>	TECHNOLOGY TRANSFER	
	PROCESS INNOVATION	<i>NEW TECHNOLOGY</i>	TECHNOLOGY DEVELOPMENT	
	HIGH GROWTH	<i>GAZELLE</i>	CLUSTERING	
	GLOBALIZATION	<i>EXPORT</i>	CONNECTIVITY	
	FINANCING	<i>INFORMAL INVESTMENT</i>	FINANCIAL INSTITUTIONS	

THE STRUCTURE OF THE TFP BLOCK



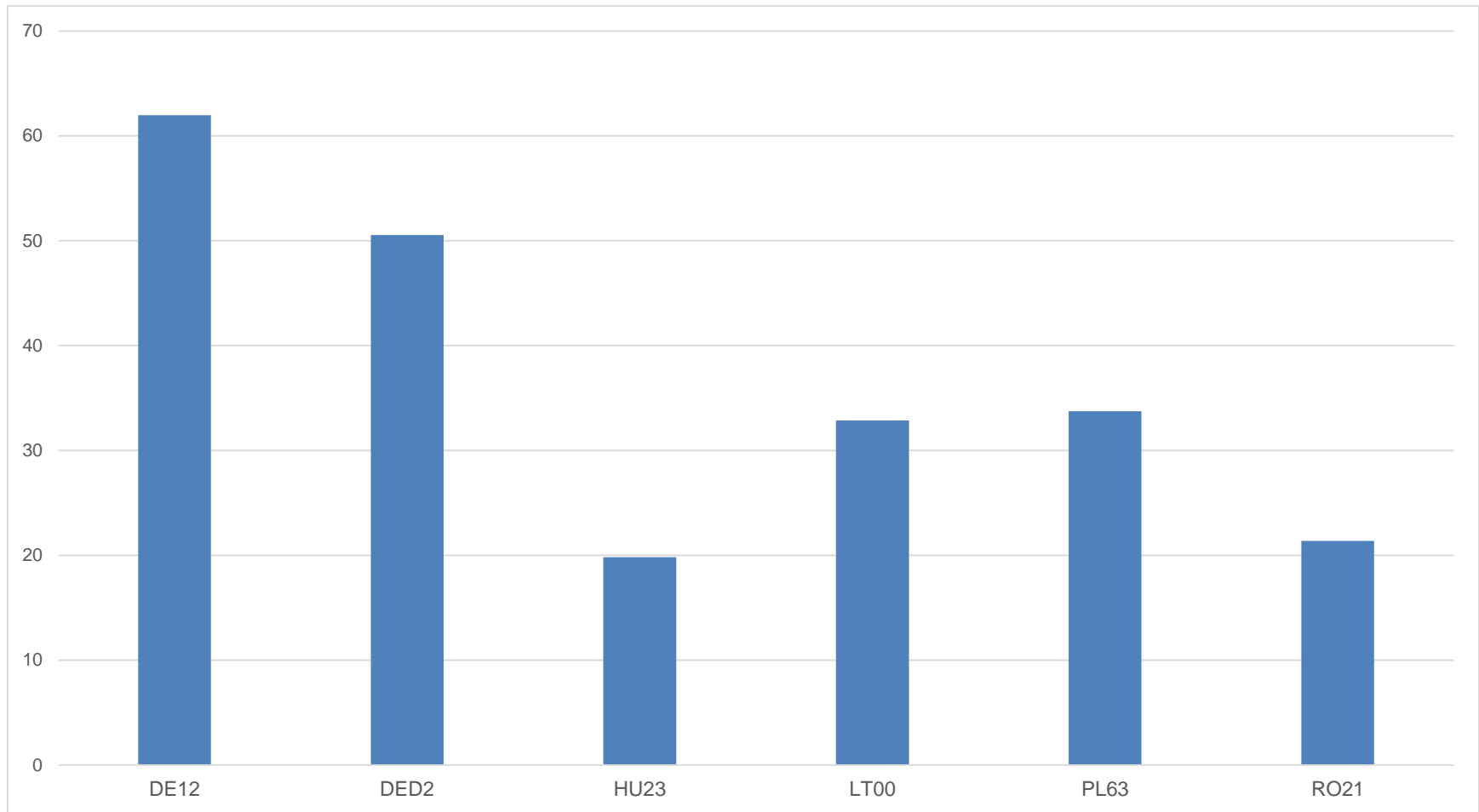
THE SELECTED REGIONS WHERE SMART SPECIALIZATION STRATEGIES HAVE BEEN INTRODUCED

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- **Karlsruhe region** in Baden-Württemberg (DE12): the implementation of the smart specialization concept has not generated significant changes in regional innovation policy (Kroll et al. 2014).
- **Dresden** in Saxony (DED2) is a post-socialist German where the basics of S3 strategy were successfully implemented even before the elaboration of the concept of smart specialization (Baier et al. 2013, Koschatzky et al. 2017).
- **Pomerania** (PL63) is a less developed region but the only one in Poland where the emergence of smart specialization was implemented as a bottom-up process through competition (Kamrowska-Zaluska, Soltys 2016).
- **Lithuania** (LT00) is characterized by a high dependence on EU funds and a weakly performing innovation system which has not gone through major changes as a result of RIS3 (Reimeris 2016).
- **Northeast Romania** (RO21) is one of the least developed EU regions where regional strategy planning and its implementation are strongly constrained by the lack of local capacities (Healy 2016).
- **Southern Transdanubia** (HU23) is a Central European region in Hungary with low innovation capacities, low level of industrialization and no history in the implementation of S3 principles (Hungarian National Innovation Office 2014).

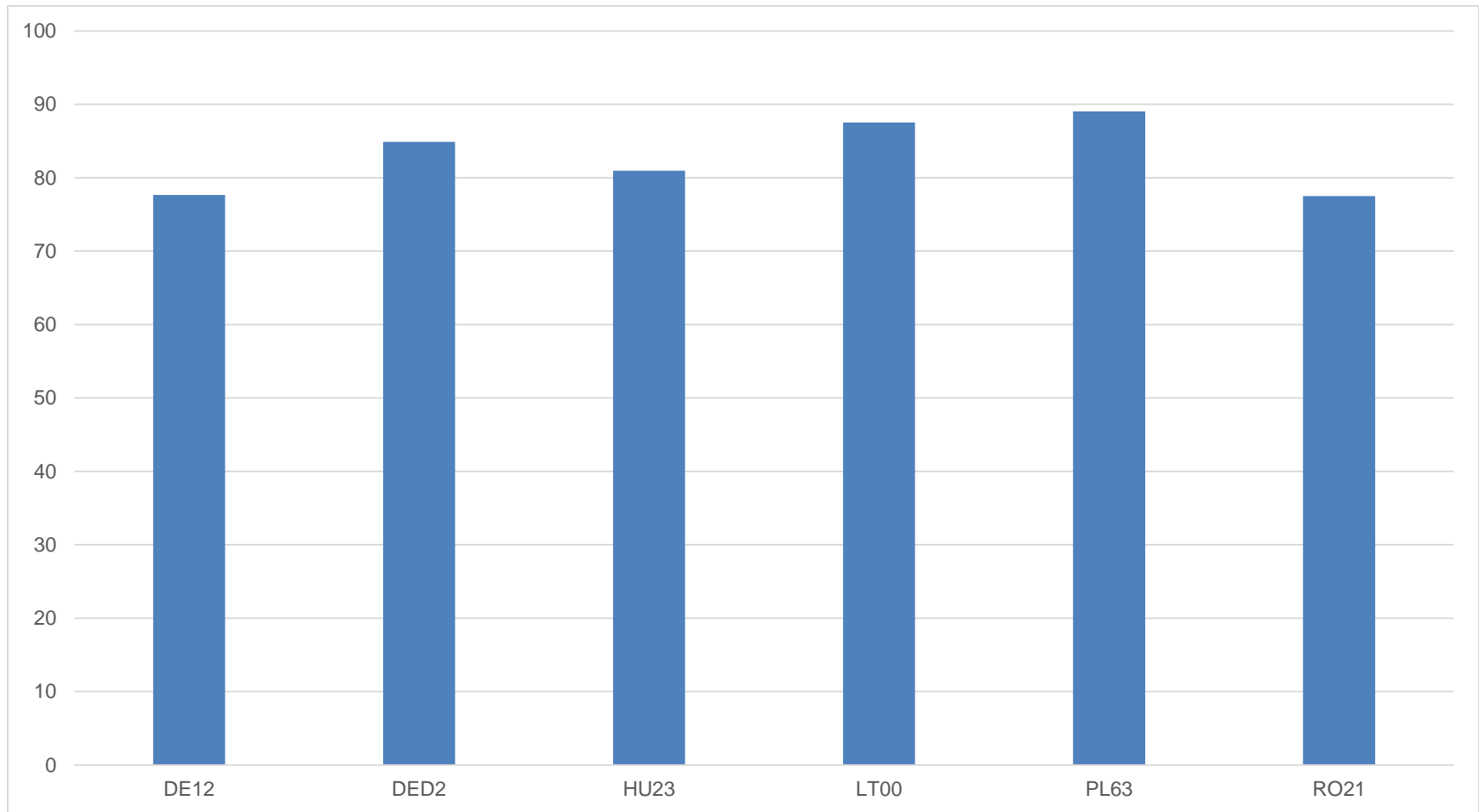
THE ENTREPRENEURIAL ECOSYSTEM IN THE SELECTED REGIONS (MEASURED BY THE REDI INDEX)

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FP INTERREGIONAL NETWORK EMBEDDEDNESS OF THE SELECTED REGIONS (MEASURED BY THE ENQ INDEX)

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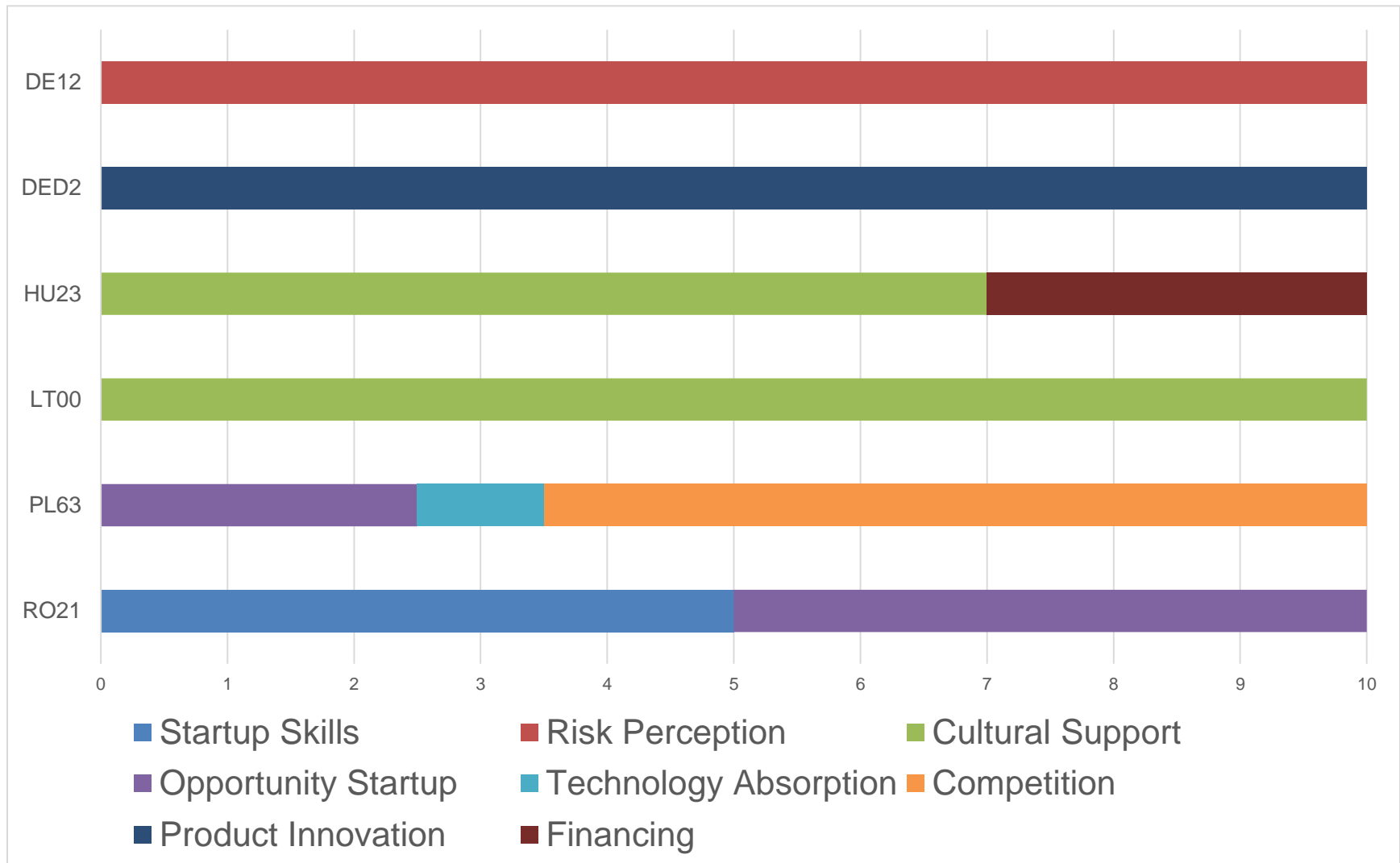


POLICY SHOCKS TO THE REGIONS

- The level of entrepreneurship is increased by the same units (10 units) between 2014 and 2020
- EU Framework Program network of each region increased with their 10 leading partners by adding 10 new cooperation annually between 2014-2020

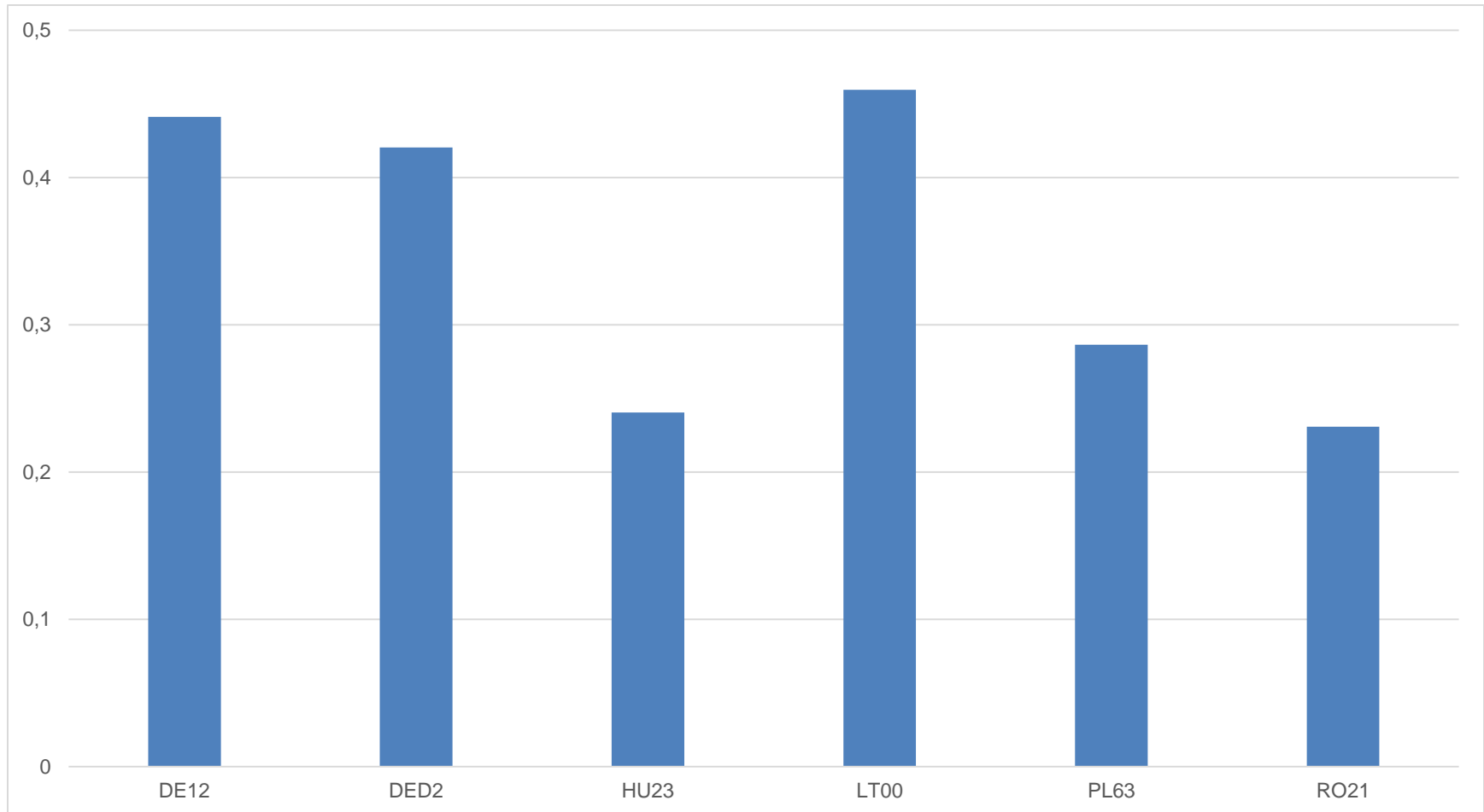
DISTRIBUTIONS OF REGION-SPECIFIC ENTREPRENEURSHIP POLICIES (REDI PILLARS)

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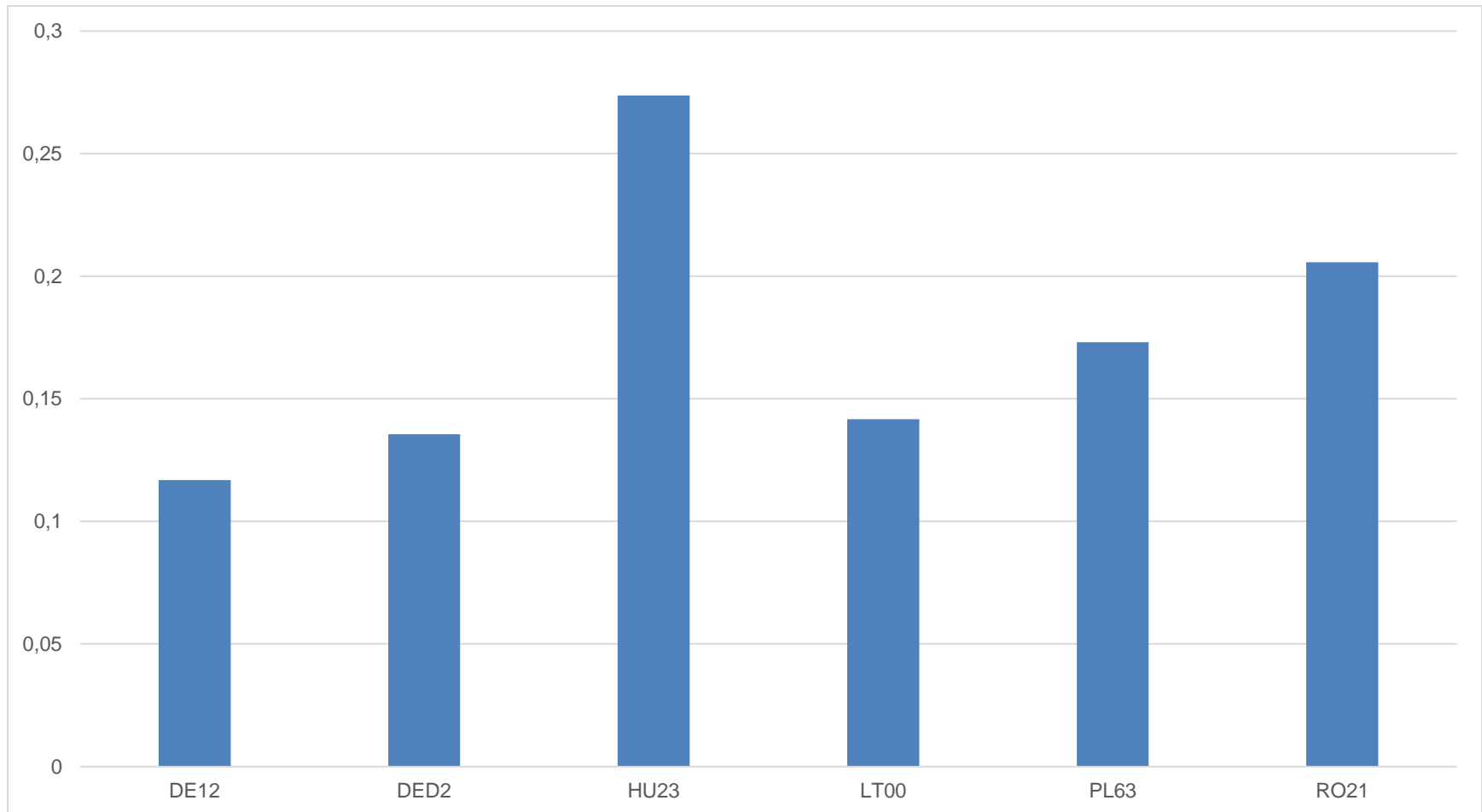
THE ANNUAL ABSOLUTE CHANGE OF REDI IN THE SELECTED REGIONS

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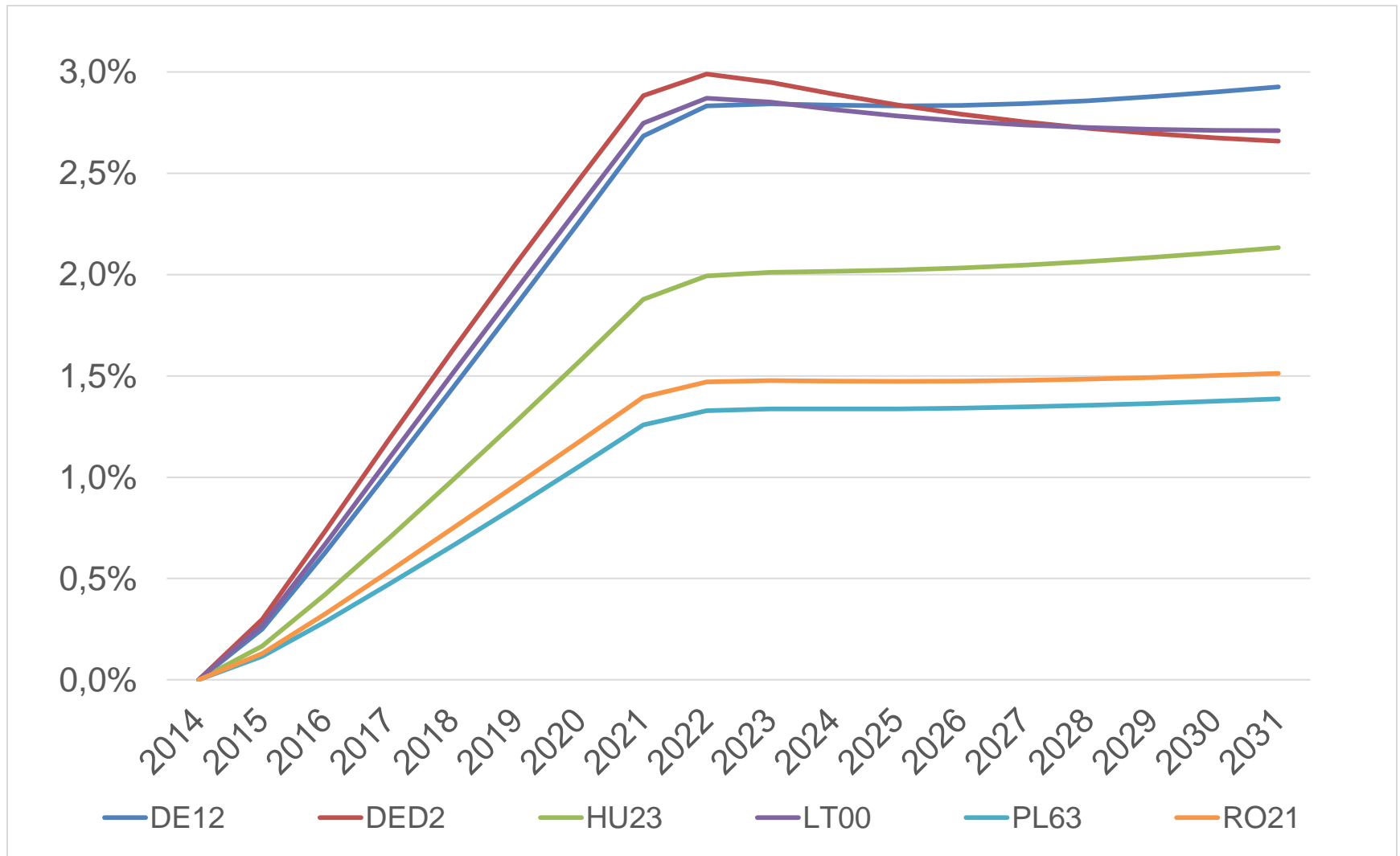
THE ANNUAL ABSOLUTE CHANGE OF ENQ IN THE SELECTED REGIONS

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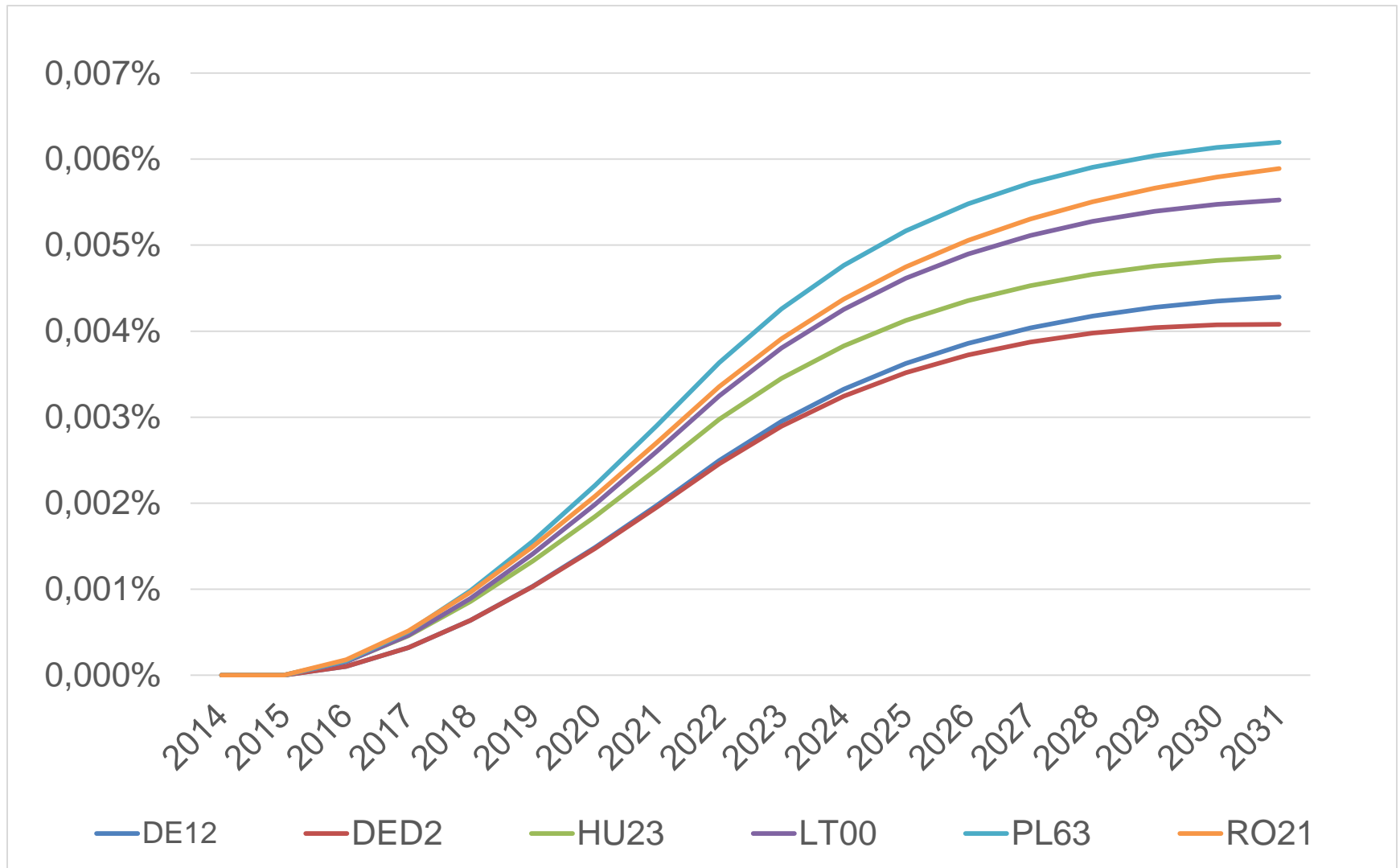
THE RELATIVE GVA IMPACTS OF ENTREPRENEURSHIP POLICIES

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THE RELATIVE GVA IMPACTS OF NETWORK POLICIES

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- Policy integration (human capital, entrepreneurship, knowledge networks, etc.) is required to develop regional framework conditions
- To get forward in integrated policy design the development of specific analytical tools (economic impact models) is required
- These tools can help
 - in the process of domain selection and
 - in the design of policies targeting regional framework conditions
- The plans should govern regional developments over longer periods covering several consecutive government cycles
- EU-country-region collaborations in design and financing

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