



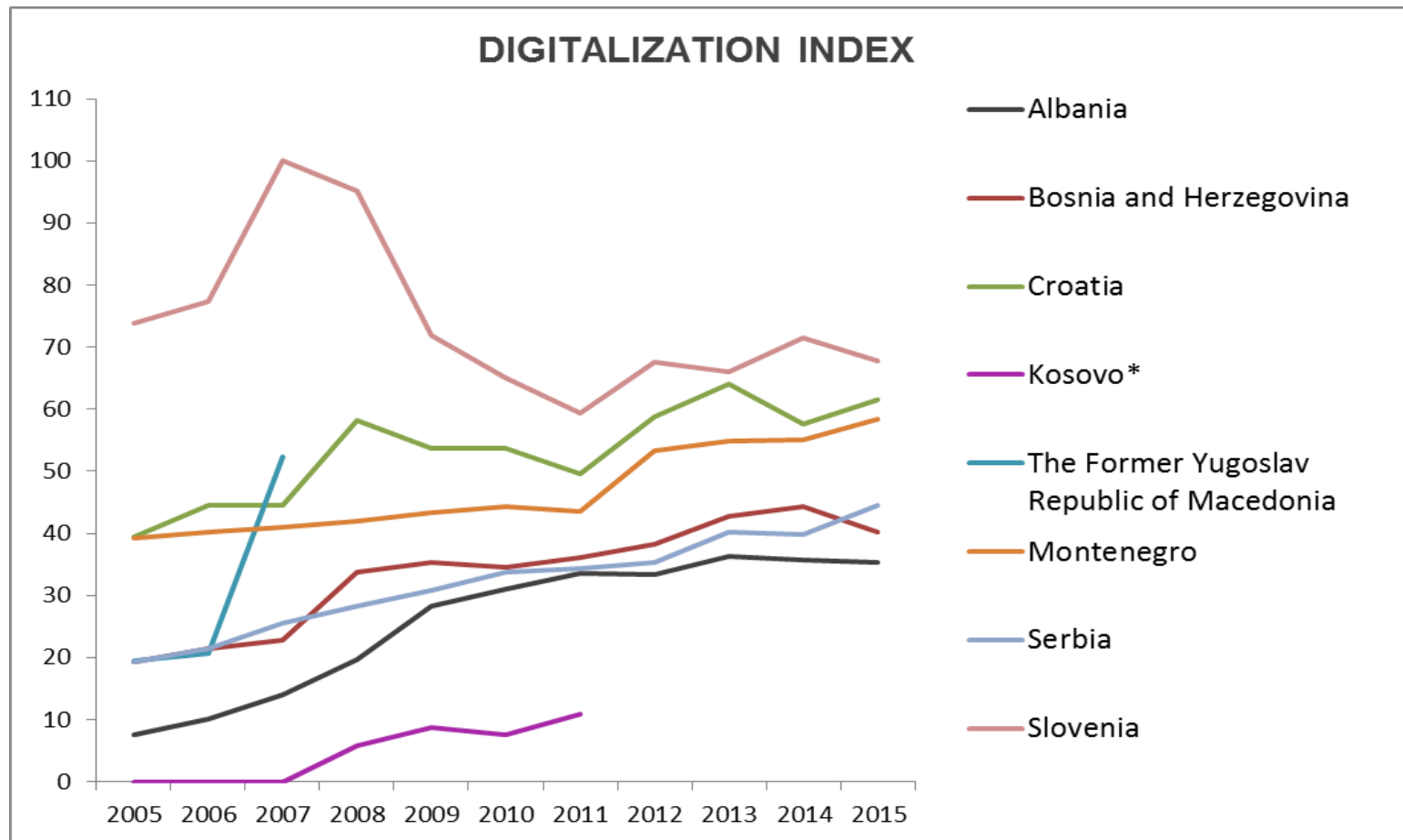
THE IMPACT OF DIGITAL TRANSFORMATION ON THE WESTERN BALKANS: TACKLING THE CHALLENGES TOWARDS POLITICAL STABILITY AND ECONOMIC PROSPERITY

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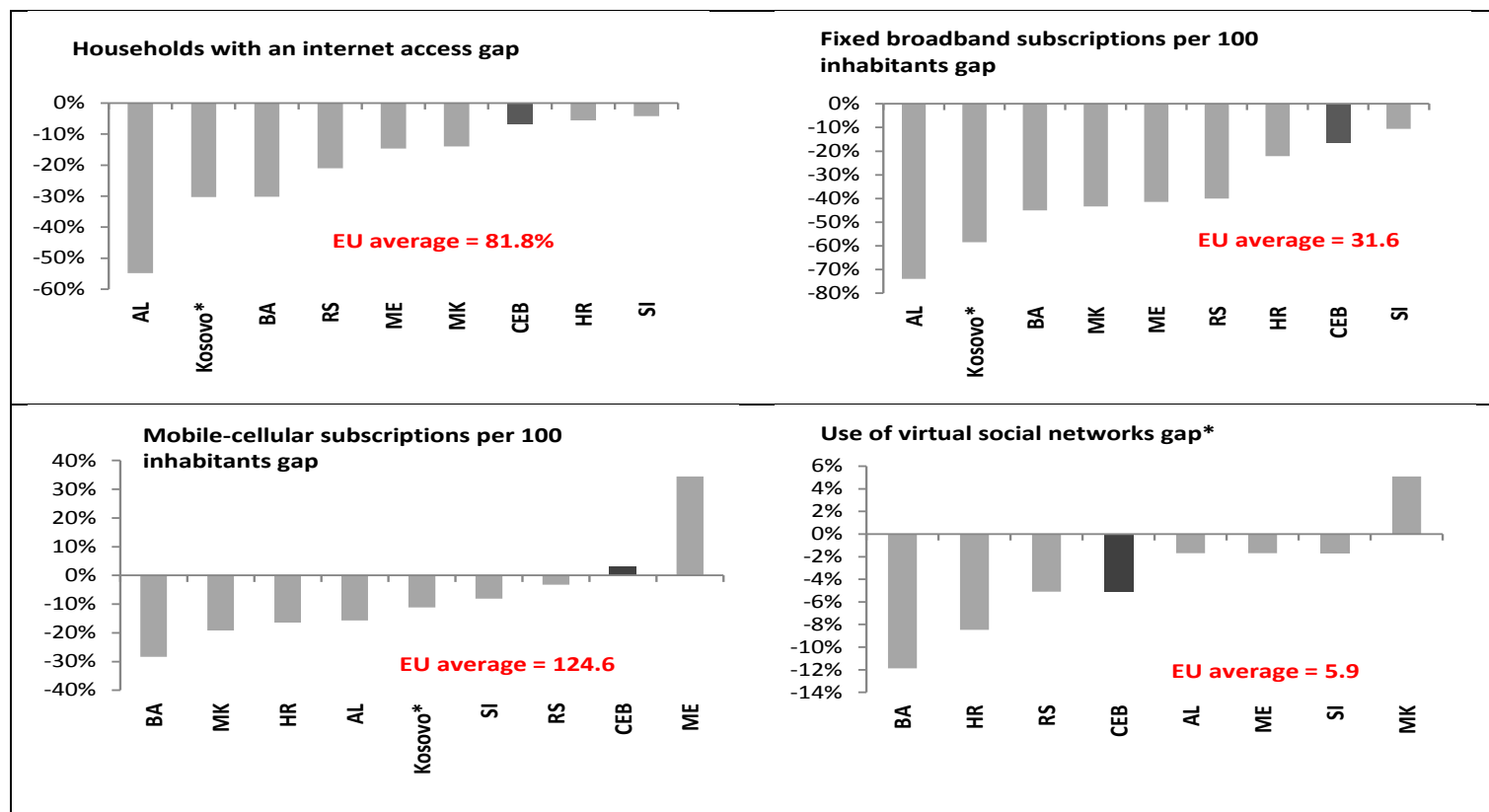
Study structure

- Current state of digital transformation in the Western Balkans
- Economic impact of digital transformation in the Western Balkans
 - ✓ macroeconomic effects
 - ✓ sectoral and microeconomic effects
 - ✓ multiplicative effects of broadband investments
 - ✓ cross-border effects
 - ✓ labor market effects
- Political and social dimensions of digital transformation
 - ✓ e-governance
 - ✓ social dimension
 - ✓ regional cooperation
 - ✓ European integration

Current state of digital transformation in the Western Balkans



Digital transformation gaps, 2016



With a regional commitment to digital transformation, these gap can be closed and significant economic, political and social benefits reaped, contributing to regional cooperation and to more rapid EU integration

Regulatory impediments for broadband investment (1)

Deployment of new electronic communications infrastructure				
Country	Investment activities	Easiness of using public land and infrastructure*	Number of months to get permits for civil works	Impediments (all countries)
AL	-	3	12	✓ legal framework
BA	YES	1	12-24	✓ price of the dark fibre
MK	YES	2-4	3 or more	✓ long period to get permits and supporting documents
ME	YES	1	6	✓ return on investment
RS	YES	2	6	✓ various parafiscal charges

* Obtained from survey of WB telcos, from 1 (very difficult) to 5 (very easy)

- Regulatory impediments preclude more intensive investments in EC infrastructure in WB region
- In majority of WB economies using public land for infrastructure deployment is difficult or very difficult
- Obtaining permits needed for infrastructure deployment particularly challenging

Economic impact of digital transformation in the Western Balkans

Dependent variable:	Estimation results	
GDP	World	Western Balkan
Fixed capital stock	0.417***	0.309***
Labor	0.276*	0.527
Digitization	0.047***	0.063**
Year effects	Yes	Yes
Country effects	Yes	Yes
Observations	205	73
Adjusted R-squared	0.99	0.99

WB economies can benefit more from stepping up the digitalization processes when compared to the rest of the world!

- Econometric evidence suggests an increase in the digitalization index by 10% increases GDP in the world by 0.47%
- In the WB an increase in the digitalization index by 10% increases GDP in 0.63%
- As the 'average' WB economy increased its GDP at market prices by 22.3 percent, digitization contributed 1.8 percent to country's GDP growth

Economic impact of digital transformation in the Western Balkans

Dependent variable:	Western Balkan			Western Balkan (partial model)		
GDP	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Fixed capital stock (K)	0.361***	0.507***	0.510***	0.260***	0.342***	0.327***
Labor (L)	0.837**	0.190	0.056	0.525	-0.128	-0.114
Computer share				0.134***		
Internet use					0.054**	
Broadband tariff		-0.090**				
Mobile network	2.234***		0.238**			0.025
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45	506	576	82	93	93
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99

- Among digitalization components in the WB computer usage and mobile network access contributes the most to GDP growth
- 1% increase in the share of population with mobile network access increases GDP by 2.38%
- Higher broadband tariff hampers GDP growth!

Sectoral impact of digital transformation in the Western Balkans

Microeconomic and sectoral effects

- Panel data analysis of 160 thousands WB firms over 2010 – 2015 period suggest sizable benefits of an overall increase in digitalization

Sector	Manufacturing		Services	
Variables	Productivity	Employment	Productivity	Employment
Digitalization index	+2.12%	+1.16%	+0.67%	Not significant

- Sectoral effects are more pronounced among knowledge- and technology-intensive firms and firms in rural areas
- Digital transformation could be used as an important element in a policy mix aimed at the reindustrialization and more balanced regional development of Western Balkan economies

Sectoral impact of digital transformation in the Western Balkans

Sector Explanatory variables	Manufacturing			Services		
	Productivity	Sales	Employment	Productivity	Sales	Employment
Capital	0.04***	0.17***	0.13***	0.06***	0.25***	0.19***
Labour costs	-0.95***	-	0.18***	-0.95***	-0.84***	0.11***
		0.76***				
Material costs	-0.04***	-	-0.004	-0.09***	-0.13***	-0.03***
		0.05***				
Localization externalities	-0.02***	-0.02**	0.01	-0.001	-0.06***	-0.06***
Urbanization externalities	0.01***	-	-0.04***	0.05***	0.05***	0.001
		0.03***				
Foreign ownership	-0.05***	-	-0.37***	-0.08***	-0.32***	-0.23***
		0.42***				
Location (urban/rural)	-0.04***	0.03	0.06***	-0.10***	-0.08***	0.02***
Digitalization index	2.12***	3.28***	1.16*	0.67***	0.91***	0.24
R ² (overall)	0.76	0.31	0.13	0.77	0.45	0.18
F-test	5331***	773***	248***	23131***	5671***	1526***

Sectoral impact of digital transformation in the Western Balkans

Digital transformation and technology intensity – impact differences

Sector	High- vs. low-tech manufacturing		Knowledge- vs. less knowledge-intensive services	
	Productivity	Employment	Productivity	Employment
Broadband speed (> 10 mbit/s)	+77%	+24%	+40%	+31%
User allowance	+62%	+65%	+19%	+1%

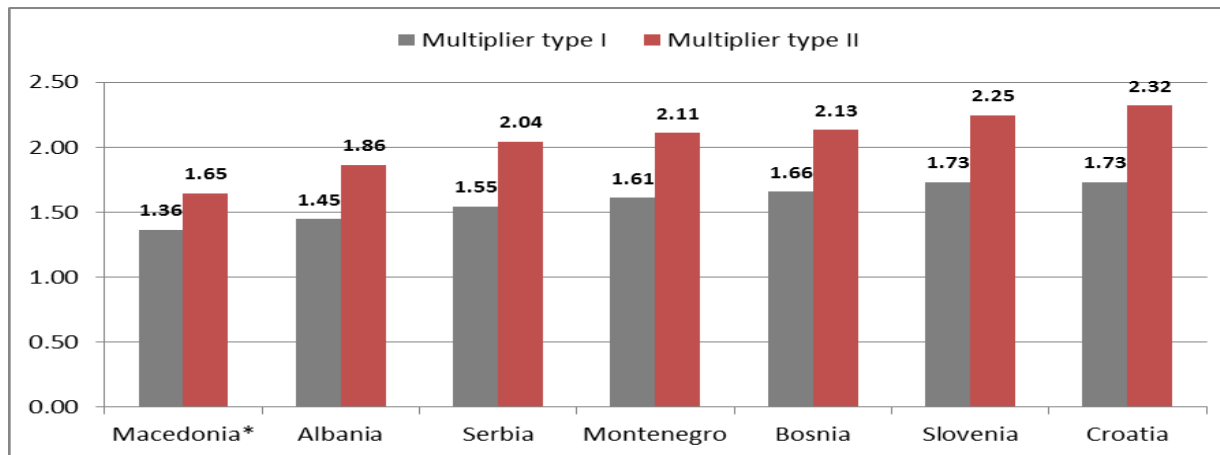
Digital infrastructure and firm location – impact differences

Sector	Urban vs. rural Manufacturing		Urban vs. rural Services	
	Productivity	Employment	Productivity	Employment
Broadband speed (>10 mbit/s)	-7.7%	-2.0%	-3.0%	-5.8%
User allowance	-5.8%	-3.0%	-9.9%	-2.0%

- Between-effect panel data ; controls for country effects, cross-sectional (annual) shocks that may affect all units and differences in technological intensity are applied
- Broadband speed is measured with a categorical variable that takes the value of 1 for a user with access to at least 10 mbit/s broadband speed and 0 otherwise; user allowance is measured with a categorical variable that takes value of 1 if unlimited traffic allowance is provided, 0 otherwise

Multiplicative effects of investments in broadband infrastructure

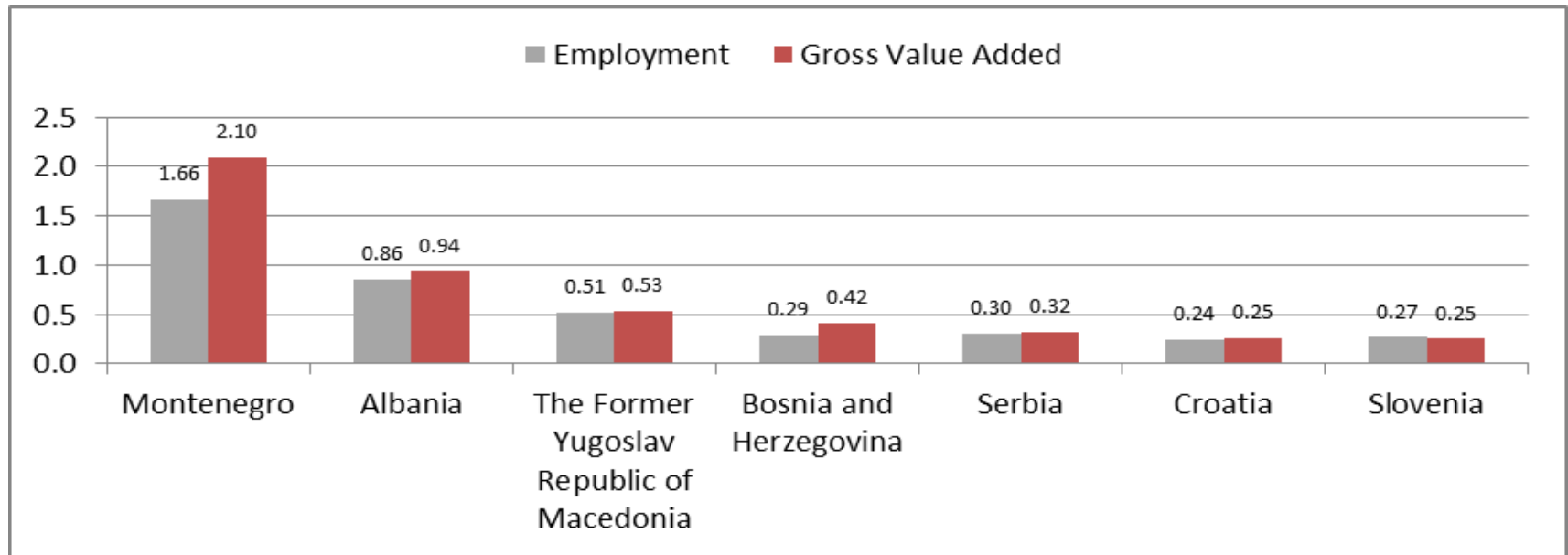
- Analysis based on input-output tables
- Broadband investment multipliers



- Type I multiplier (ratio of direct and indirect effects to direct effects) means that each euro received by a domestic direct supplier indirectly induces additional output of other domestic producers included in the value chain, estimated in range between 36 cents in Macedonia to 73 cents in Croatia and Slovenia
- Type I multiplier is the lowest for Macedonia and Albania due to high import dependency
- Type II multiplier incorporates induced personal consumption
- Total output induced by broadband investment is expected to be 1.65 (Macedonia) to 2.32 (Croatia) times higher than the initial value of broadband investment delivered by a domestic producer

Multiplicative effects of investments in broadband infrastructure

Effects of 100 million EUR broadband investment, as % of total employment and GVA



Broadband investments also induce the increase in government revenues from taxes and contributions, ranging from 15 million EUR in The Former Yugoslav Republic of Macedonia to 47 million EUR in Serbia & Croatia

Political and Social Dimensions of digital transformation in the Western Balkans

Dimensions	Direct	Indirect
Governance	e-governance	Transparency and corruption
	Online media	Empowering agents of good governance
Society	Education	Inclusion of disadvantaged and marginalized groups
		Support brain circulation
Regional cooperation	Cross-border e-governance cooperation	Improved citizen-citizen contacts
	Cross-border business clusters	
European integration	Joining the digital single market	Preparedness for competitive pressure and market forces in the EU
		Greater preparedness in the field of rule through e-governance
		Support regional cooperation, including a regional economic area

Key Recommendations

- ✓ Permanent regional **working groups**.
- ✓ Faster **permits** granting procedures for electronic communication infrastructure (ECI) deployment and decreasing the size and scale of parafiscal charges.
- ✓ Facilitating the **use of public land** for ECI.
- ✓ Future-proof **regulation** that is fit-for-purpose and removes national barriers.
- ✓ Facilitating the **deployment of ECI** in rural regions.
- ✓ Standardizing and harmonizing **rules governing** digital transformation at a regional level.
- ✓ Adapting **Labor Market regulation** to the needs of digital transformation.
- ✓ Integrating digital aspects into **curricula and education**.
- ✓ Providing **retraining** programs

Key Recommendations

- ✓ Adopting a **regional e-governance** strategy.
- ✓ Committing to a clear timetable to **abolish roaming** charges.
- ✓ Supporting the development of **cross-national e-commerce**.
- ✓ Providing support for the **digital preparedness** of SMEs and start-ups.
- ✓ Supporting **digital start-ups** .
- ✓ Targeting **EU funding** through IPA and twinning.
- ✓ Establishing **twinning projects** to pair up digital frontrunners.
- ✓ Integrating the WB6 into the **European Digital Single Market**.
- ✓ Mainstreaming a **digital dimension**.

digital WB6+

- Mission: Foster digital transformation in the Western Balkans and facilitate the region's path towards the EU
- Regional approach to foster intergovernmental cooperation in the region and to strengthen multi-lateral ties with the EU.
- The study was commissioned by the digital WB6+ initiative. The findings reflect the research conducted by the team of researchers of the Center for Southeast European Studies of the University of Graz and The Institute of Economic, Zagreb. The findings and conclusions are strictly those of the authors.

