

Dr Valentina Vučković

Faculty of Economics, Faculty of Economics and Business, University of Zagreb

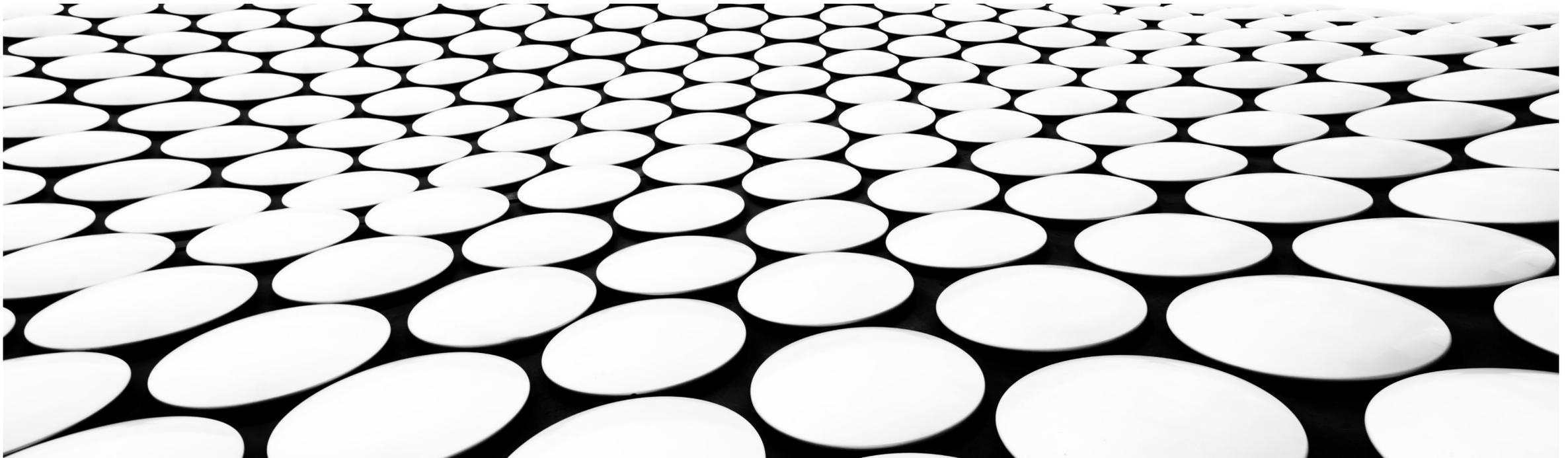
Dr Paško Bilić

Institute for Development and International Relations, Zagreb



DIGITAL INFRASTRUCTURE SPILLOVERS

STATE CAPACITIES AND INEQUALITIES IN THE EU



BACKGROUND

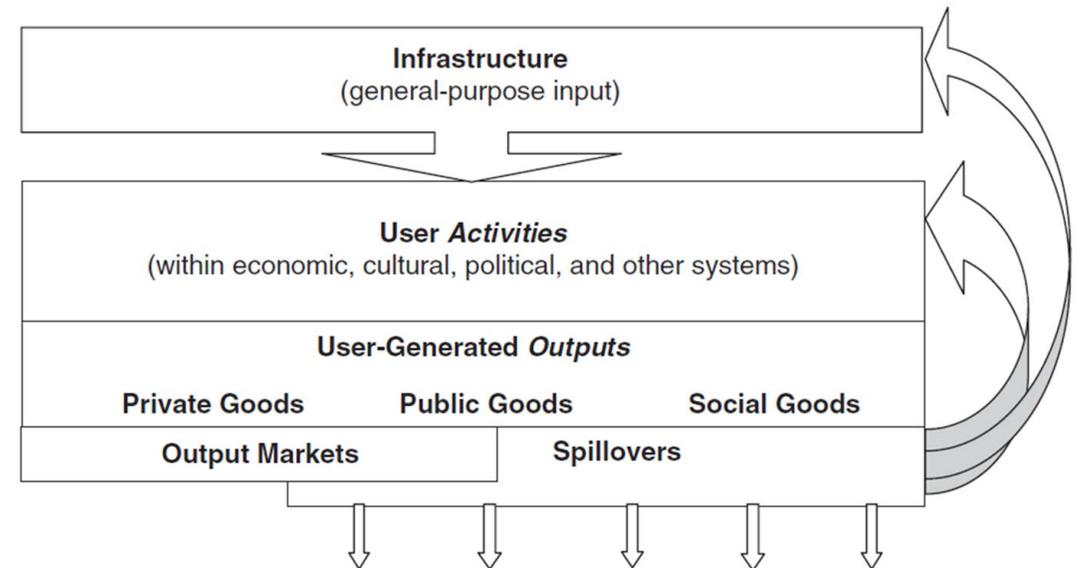
- Digital data, infrastructures and development (DEVELOPER), Croatian Science Foundation project (IP-2022-10-2780), Institute for development and international relations, Zagreb, Croatia, <https://kultura.irmo.hr/developer-2/>
 - Theoretical foundation: sociology of development + (critique of) political economy of development
 - Empirical research: (a) interviews – 55 and counting, (b) document analysis - 40 Digital Decade Policy Programme documents + computational analysis of a larger dataset next year; (c) digital infrastructure mapping in Croatia (physical data centres + cloud presence) + planned for other countries next year (UK, Germany); (d) general Croatian population survey in 2027
- Publications related to this talk:
 - Bilić, P., Prug, T., Petričušić, A. and Nenadić, I. (2026). Sovereignty without infrastructural power: Single data market and digital statecraft in the EU. In Chami, N., Gurusurthy, A., Korjan, A. (ed.) *Handbook of big data and economic development*. Edward Elgar.
 - Bilić, P., & Žitko, M. (2024). Personal data as pseudo-property: Between commodification and assetisation. *European Journal of Communication*, 39(5), 426-437. <https://doi.org/10.1177/02673231241267128>
 - Prug, T., & Bilić, P. (2024). Unlocking public infrastructures? State aid and the common European data space. *European Journal of Communication*, 39(6), 556-568. <https://doi.org/10.1177/02673231241290675>

GLOBAL CONTEXT

- **Global capital accumulation patterns (BRICS vs G7), sovereign wealth funds and state-owned enterprises** (Alami & Dixon, 2023), **asset managers** (Christophers, 2023) → reconfiguration of the state-capital nexus / **digital monopolies** (Bilić, Prug & Žitko, 2021), **intellectual monopolies** (Rikap, 2021) in infrastructure provision / **contraction and expansion of human rights and freedoms** (Bradford, 2023) / **technological dependency** (Bria et al, 2025) / **sovereignty and strategic autonomy** (e.g. Amoore, 2018; Bellanova et al., 2022; Farrand & Carrapico, 2022; Irion, 2012; Pohle & Thiel, 2020)
- *'The US views the EU's regulatory efforts as both excessive and protectionist, unfairly targeting (...) successful American rivals. The EU has responded by insisting on its sovereign right to preserve a competitive and fair marketplace while ensuring that the fundamental rights of Europeans are protected.* (Bradford, 2023: 21)
 - The tension escalated in the second Trump term + Digital Omnibus

INFRASTRUCTURAL POWER OF THE STATE

- Digital infrastructure as a crucial driver of economic development (Foster et al., 2023). Also extends to broader social, political, and environmental outcomes (e.g. Kirschning & Mrożewski, 2024; Yoshino, Siregar & Azhgaliyeva, 2022; Heidebrecht, 2025; Yang, Chen & Gu, 2023). Institutional quality plays a crucial role in digitalisation integration (Labhard, Lehtimäki & Baccianti, 2025).
- **Infrastructural power** as the capabilities of the central state, as the state's territorial reach, and as the state's effects on society (Mann, 1984; 2008; Soifer, 2008).
- **Infrastructure governance** must be non-discriminatory and inclusive to yield positive spillovers and broader social welfare, transcending narrowly commercial imperatives (Frischmann, 2012, p. 7). The over-reliance on market signals neglects the diverse range of infrastructural uses, including private, public, and social goods (p. 62). Importantly, the generative capacities of infrastructures lie in their ability to expand users' options, whether for movement, innovation, or communication (Frischmann, 2012, p. 65).

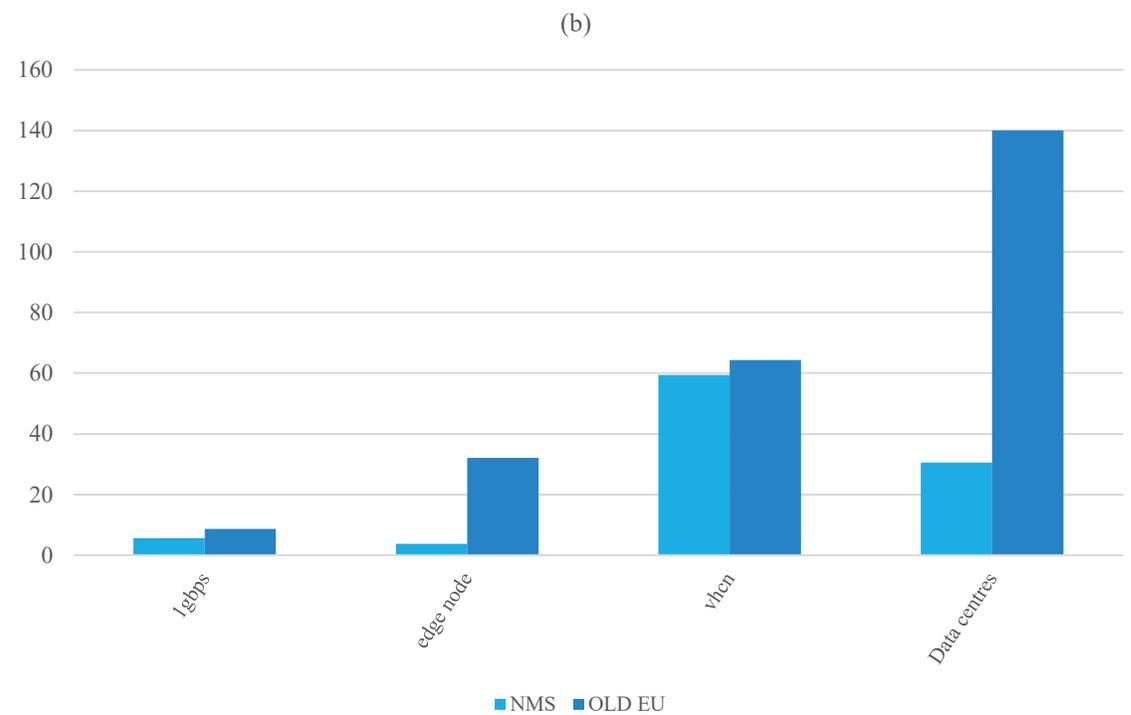
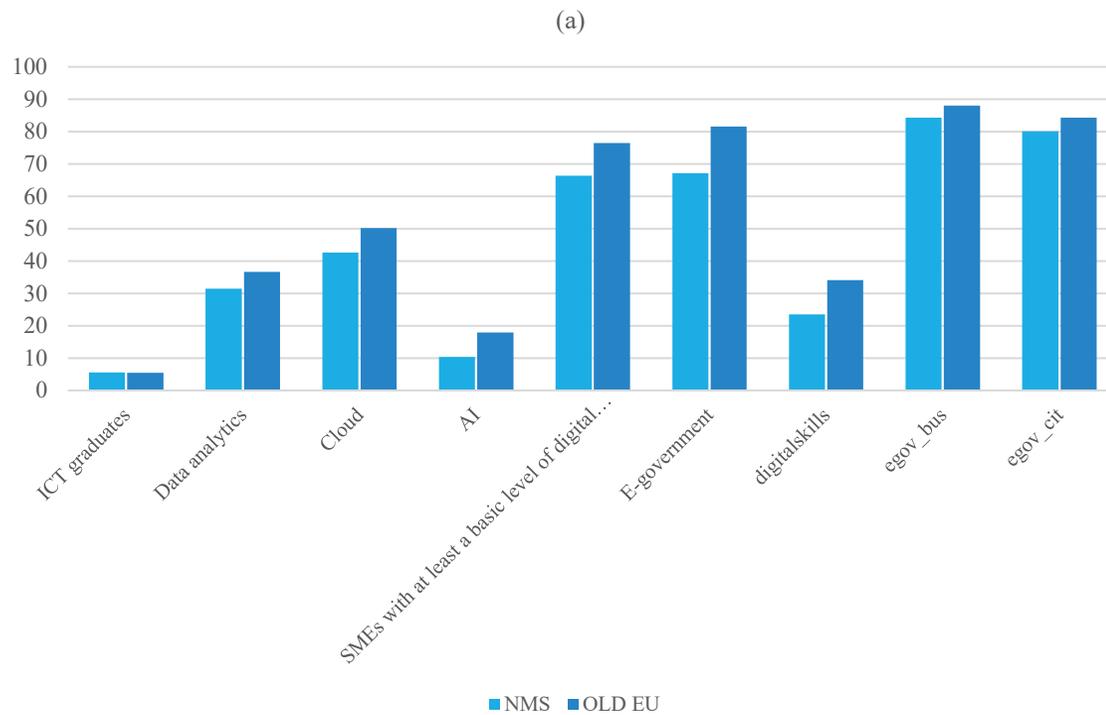


(Frischmann, 2012)

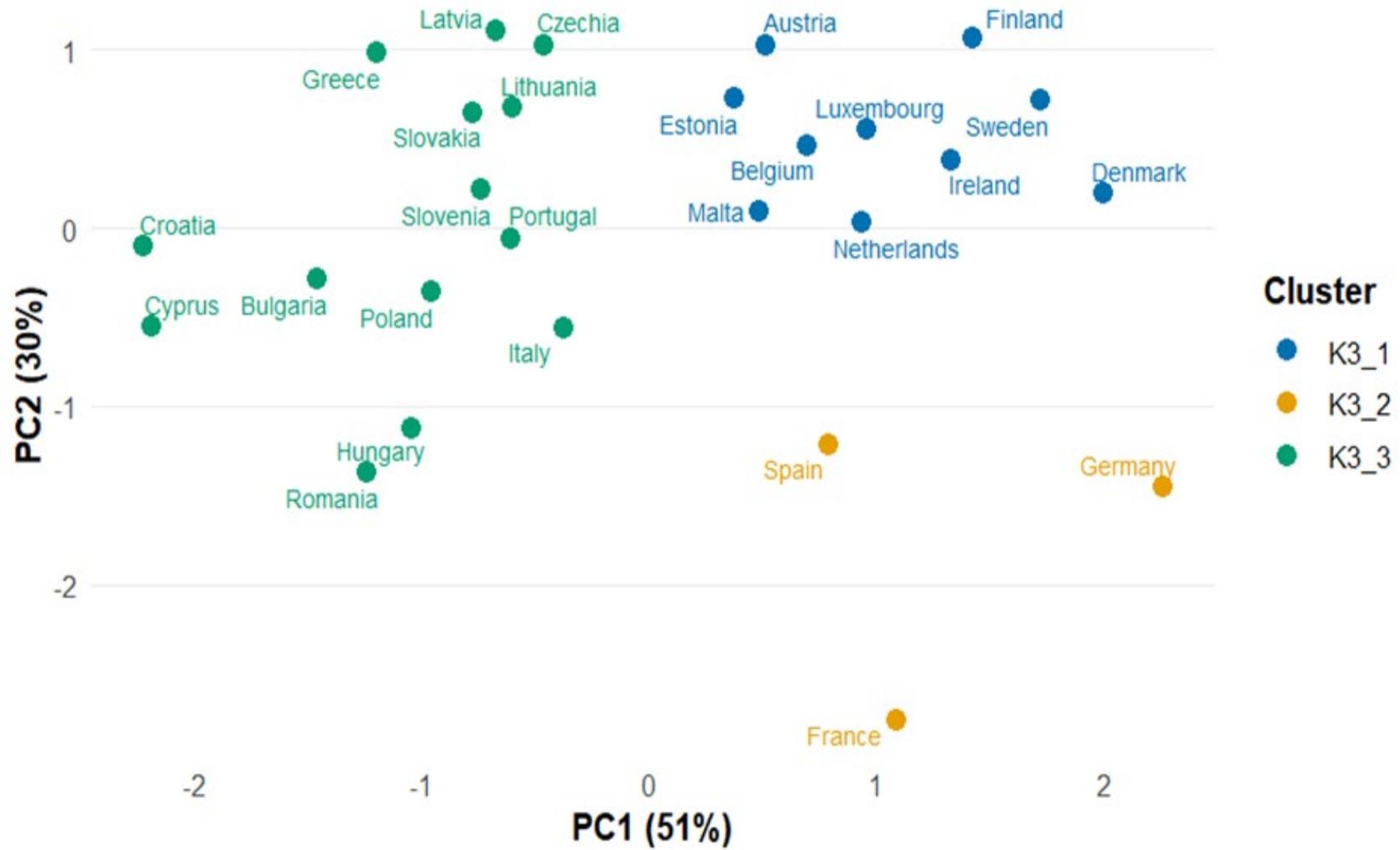
RQS AND VARIABLES

- **RQ1:** *Under which political and institutional conditions does digital infrastructure yield higher or lower spillovers in the EU member states?*
 - **RQ2:** *What are the intra- and inter-state variations regarding infrastructure deployment and their societal impacts?*
 - **RQ3:** *What factors determine the successful uptake of the new policy and investment cycle in some EU countries compared to others?*
- **Political variables:** egalitarian democracy index (V-Dem), domestic policy autonomy (V-Dem), state Internet regulation (V-Dem); **Economic variables:** GDP pc (Eurostat), GERD (Eurostat), Internet advertisements pending (Eurostat); **Infrastructure variables:** VHCN (DD KPIs), 1 GBPS (DD KPIs), edge nodes (DD KPIs), data centres (Data Centre Map); **Spillover index:** (1) digital government DD KPIs (e-government users, public services for citizens, public services for business), (2) digital skills DD KPIs (at least basic, above basic, ICT graduates), (3) digital business DD KPIs (SME basic digital intensity, data analytics, cloud, AI)
 - → spillovers as outcomes contingent on institutional configurations and infrastructural capacities.

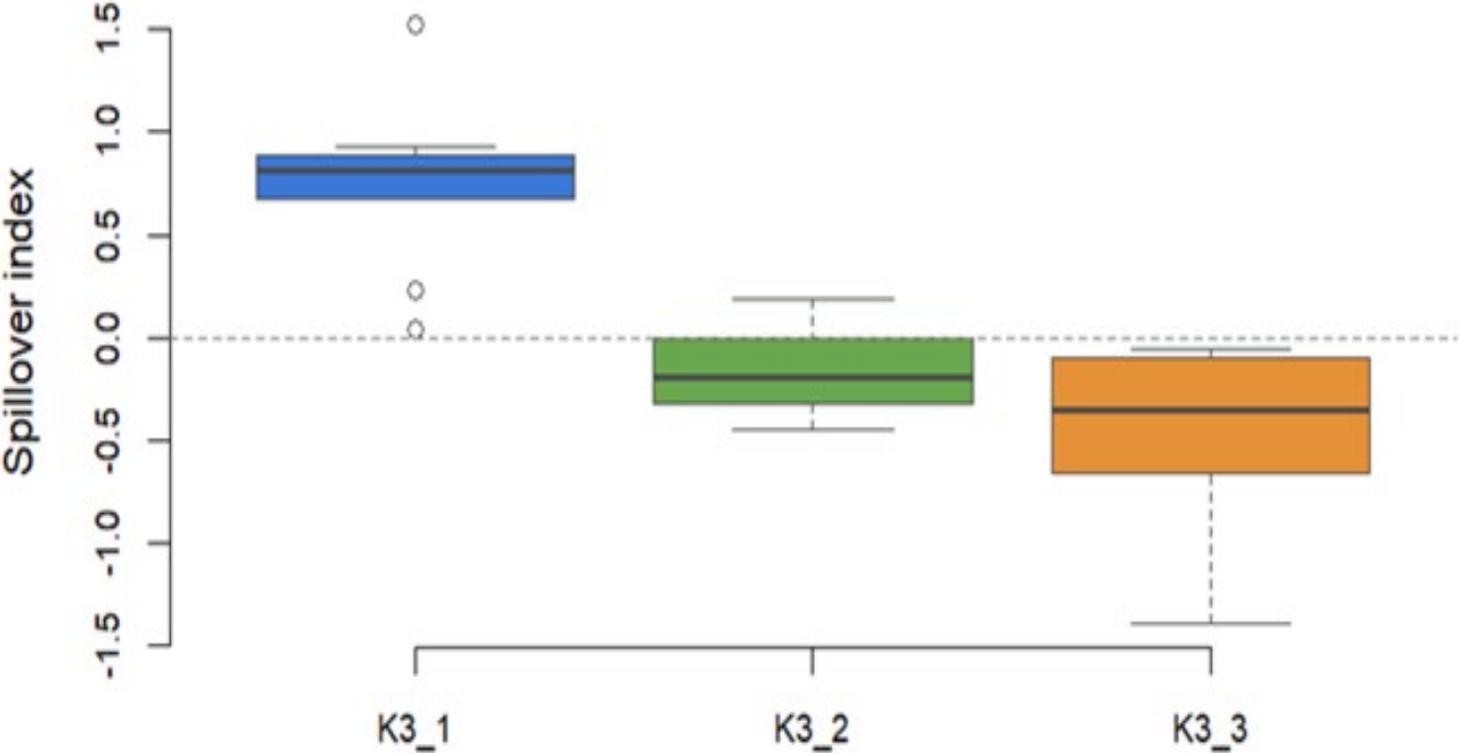
DIGITAL TRANSFORMATION UPTAKE AND COVERAGE



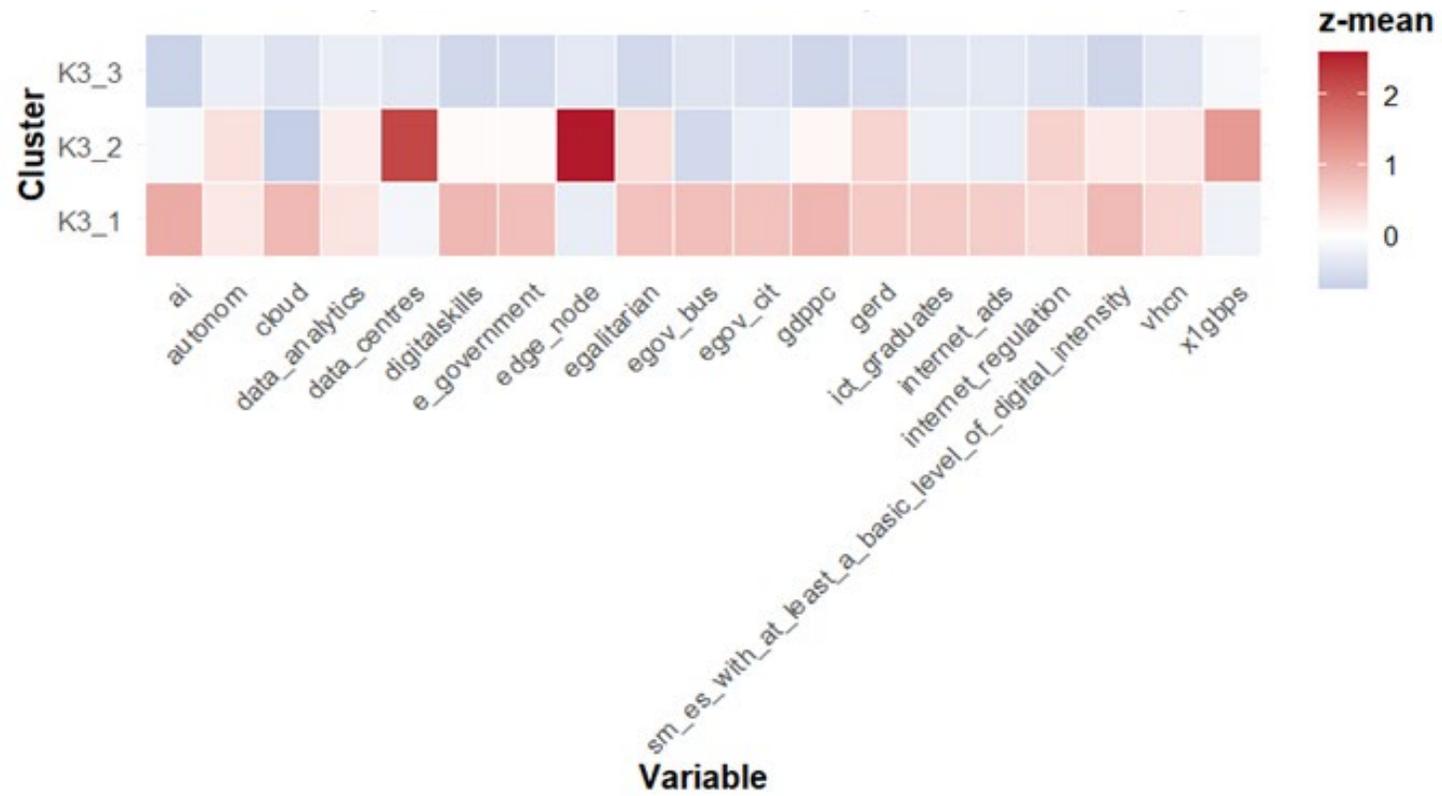
CLUSTERING



SPILOVER INDEX BY CLUSTERS



CLUSTER PROFILES



PRELIMINARY CONCLUSIONS

- ✓ Infrastructural availability alone is insufficient to produce positive externalities unless supported by robust institutional frameworks, egalitarian governance, and sustained public investment.
- ✓ The most digitally advanced EU economies, grouped in the leading cluster, demonstrate that infrastructural maturity yields spillovers primarily through advanced utilisation and innovation. Lagging countries remain constrained by weak institutional arrangements and low absorptive capacities.
- ✓ The EU's digital sovereignty is unlikely to emerge spontaneously through market mechanisms; rather, it depends on deliberate state action and coordinated governance structures that align infrastructural development with digital uptake. More broadly, the analysis highlights the need to reconceptualise digital infrastructures as public and social goods that extend beyond economic rationales, market and growth oriented goals



THANK YOU FOR THE ATTENTION!

pasko@irmo.hr

vvuckovic@net.efzg.hr