UNIVERSITÀ DEGLI STUDI DI URBINO "CARLO BO", Italy

Department of Economics Society and Policy (DESP)

The development of public eServices in Europe: New perspectives on public sector innovation

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UNECE, MINSK, November 26th, 2013

Outline

- **The EIBURS-TAIPS Project**
- **Patterns of eService diffusion in European cities**
  - Motivation and novelty of this approach
  - Data and indicators
  - How countries differ in terms of public eServices
  - How cities differ in terms of public eServices
  - How “smart” are cities in terms of public eServices
- **Conclusions and policy implications**

The EIBURS TAIPS Project – *general information*

- **Full title:** Technology Adoption and Innovation in Public Services (TAIPS)
- **Coordinating institution**: Department of Economics Society and Politics, University of Urbino, Italy (http://www.econ.uniurb.it/eib_project/)
- **Financial support:** funded by EIB within the University Research Sponsorship Programme, research line on The development of public eServices in Europe
- **Countries considered:** EU 15 countries
- **Focus:** *eGovernment, eProcurement, eHealth*, *Infomobility*
- **Levels of analysis:** Local, regional, and national
- **Main outputs:**
  - two special issues in *Structural change and economic dynamics* and *Telecommunications Policy* (forthcoming 2013)
  - Two international conferences on *Innovation in the public sector and the development of eServices*

    http://www.econ.uniurb.it/Eiburs-TAIPS_Conference_2012/

    http://www.econ.uniurb.it/Eiburs-TAIPS_Conference_2013/

The EIBURS-TAIPS Project: *Research issues and questions*

Exploring the development of public e-services in Europe

- How can EU public sector performance be measured in terms of e-services?
- How are EU policies, including cohesion policies, affecting the development of e-services?
- **How do European countries, regions and cities differ in terms of public e-service provision?**

A focus on e-services in Italy

- How do Italy's local PAs differ in terms of e-service provision?
- Which are the drivers of Italy's e-service provision?
- How advanced are Italian regions in terms of public e-services?

The effectiveness of public eServices in Europe

- Do Intelligent Transport Systems reflect the pollution levels in European cities?
- To what extent do eServices and related organizational change affect the budget of Italian municipalities?
- How are eHealth services changing the organization of services in Italian regions?
- How do Open Data affect the evaluation and monitoring of Regional Policy

Patterns of eService diffusion in *European cities*

Motivation

eService development across European cities is a key aspect of innovation in the public sector and contributes to EU **long term competitiveness** (Lisbon Strategy, Europe 2020).

…and novelty of this approach

Overcoming three limitations of extant literature on public eService development:

- Beyond a focus on eGovernment: we consider **a wider set web based public activities**
- Beyond case studies: Making data **comparable across service categories**
- Beyond the national level of analysis: we provide evidence on **cities and clusters of cities in Europe**

Data and indicators

Our study combines two datasets:

1) EIBURS-TAIPS Dataset (source: University of Urbino)

- **Data characteristics**: information collected in 2012 by the TAIPS team through website-surfing to monitor public e-services provided by local public transport companies, municipalities and hospitals at the city level (15-EU).
- **Sample design**: 229 cities representing the EU15 subset of the 322 cities monitored in Eurostat's Urban Audit dataset
- **Variables**: info on the (quality adjusted) provision of 23 eServices classified into four categories
  - ✓ *ITS/Infomobility* (based on ITIC-Between methodology, 2010)
  - ✓ *eHealth* (Based on Empirica methodology, 2008; and Deloitte methodology, 2011)
  - ✓ *eProcurement* (based on IDC methodology, 2010)
  - ✓ *eGovernment* (based on Capgemini methodology, 2010)

Data and indicators

2) Urban Audit Dataset (source: Eurostat) :

- **Data characteristics:** comparable information on 322 cities, out of which the EU15 sample of 229 cities is derived
- **Sample design**: cities included correspond to
  - ✓ 20% of the national population
  - ✓ the geographic distribution of population within the country (peripheral, central)
  - ✓ the size distribution within countries (medium-sized cities with 50,000 – 250,000 inhabitants, large cities with >250 000)

Time coverage: six waves

- ✓ 1989 - 1993; 1994 - 1998; 1999 - 2002; 2003 - 2006; 2007 - 2009

Variables:

- ✓ demography, social aspects, economic aspects, civic involvement, training and education, environment, ICT, travel and transport, information society, culture and recreation

Data and indicators: E-HEALTH

	Unit of analysis : **hospitals**	
Service list	***Videoconferencing/Video consultations between patients and doctors***	Dedicated and formal use of facilities such as consultations between patients (either at home or outside the hospital) and hospital medical staff (for clinical purposes)
	Electronic Patient Records (EPR)	A computer-based patient record system which contains patient-centric, electronically-maintained information about an individual's health status and care. The system allows online access to patients
	e-booking	Electronic appointment booking system
	Online clinical tests	Computer-based system for electronic transmission of results of clinical tests. The system allows online access to patients
	e-referrals	Hospitals offering the possibility to external health actors to make appointments for their patients
	Telemedicine service (tele-homecare/tele-monitoring)	The provision of social care at a distance to a patient in his/her home, supported by means of telecommunications and computerized systems
	Online chronic disease management	Home care services using ICT can contribute to the management of long duration/slow progression diseases
	Online ticket payment	Hospitals offering web based payment systems for visits and clinical tests

Data and indicators : ITS/INFOMOBILITY

Category	*Unit of analysis :* **Local public transport companies**	
Service list	**Public Informed Mobility**	
	Online info to users while travelling	Public transport companies providing online information to users (e.g. waiting times, strikes, delays, failures, etc.)
	Online time table consultation	Public transport companies offering the possibility to consult the online timetable of public transport network
	Online travel planning	Public transport companies offering timetables with route planning (travel planner) on the web
	Online ticket purchase	Public transport companies offering web based payment systems
	Private Informed Mobility	
	Info to car drivers while travelling	Public transport companies providing online information to travelers about traffic or parking
	Electronic road or parking toll	Public transport companies offering a electronic ticketing system of parking spaces

Data and indicators :E-PROCUREMENT

***Unit of analysis*: Municipality**	
<u>eProcurement Visibility</u>	
Publication of general information on public procurement	General information on public procurement made available on the municipality websites
Publication of notices to official electronic notice boards	Official electronic board on the municipality websites where procurement notices are made
Link to e-procurement services	Link to a web page (owned by the municipality or by external parties) providing eProcurement services
<u>eProcurement (Pre-Award Phase)</u>	
e-NOTIFICATION	*Publication of tenders and procurement notices on the web*
Online registration of supplier	Creation of user accounts and profiles with related roles
e-mail alerts for suppliers	Possibility for the suppliers to receive email alerts about forthcoming calls and notices of their interests
e-SUBMISSION	
Assistance services to the supplier	E-mail, chat, audio/videoconferencing communication for Question and Answer sessions between eProcurement operators and bidders
Online supplier help session	help services to assist suppliers in the preparation of online tender
e-AWARDS	
Online information about awarded contracts	The website publishes the contracts awarded and their winner
e-auctions	Availability of tools to carry out real-time price competitions
<u>eProcurement (Post-Award Phase)</u>	
e-ORDERING	

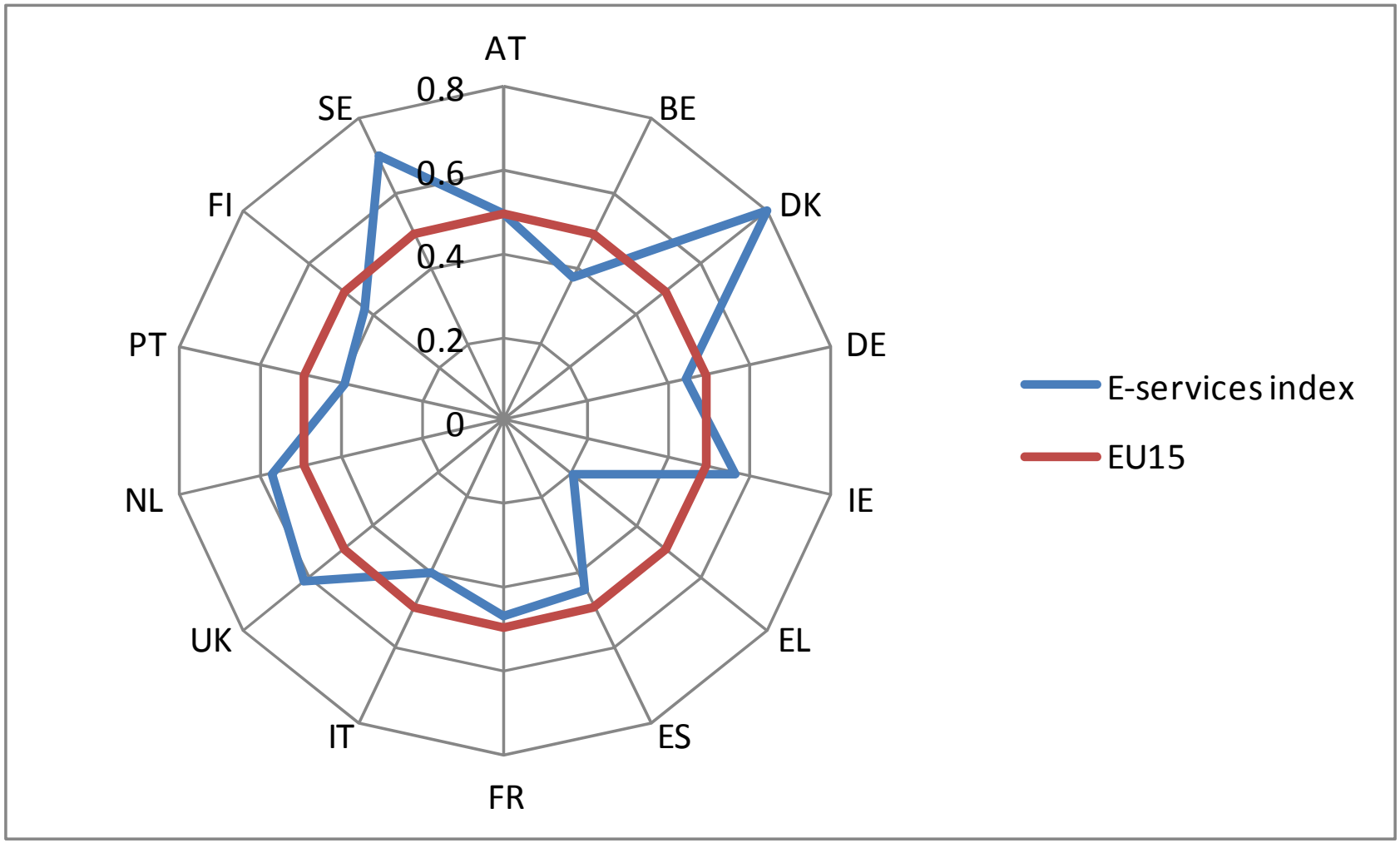
Data and indicators: EGOVERNMENT

	Unit of analysis : **Municipality**	
Service list	***Online local taxes***	Declaration, payment, notification of assessment
	Online registration school	Standard procedure to register children at kindergarden
	Online registration of residence	Standard procedure to register the residence in a local area of town
	On line payment fines	Standard procedure to pay fines at municipal police office
	Online personal documents	Standard procedure to obtain an international passport and an identity card
	Online public library	Standard procedure to consult the catalogue(s) of a public library to obtain specific information regarding a specific carrier (Book, CD, etc)
	Online birth/marriage certificates	Standard procedure to obtain a birth or marriage certificate
	Online registration of a new company	Standard procedure to start a new company

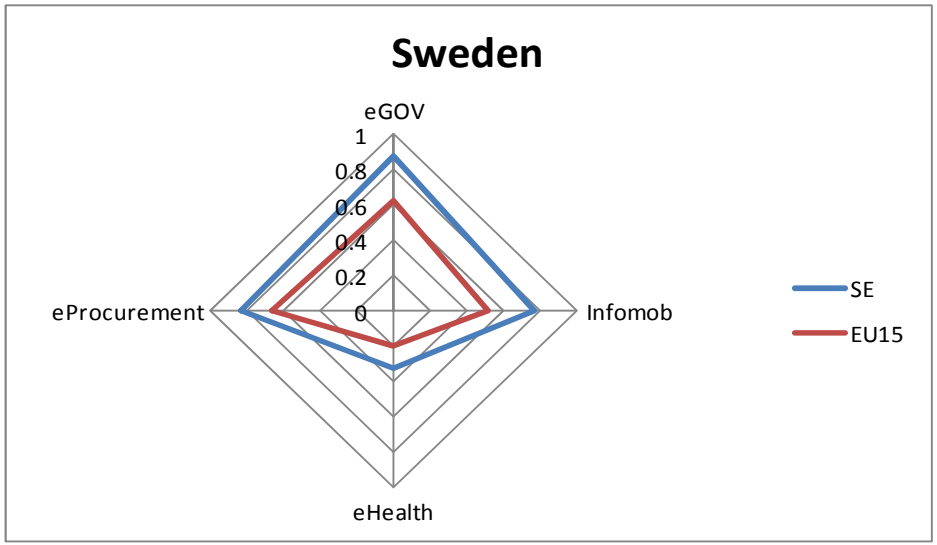
Measuring service availability and quality

CI pillar	eService Availability	eService Quality
E-HEALTH	8 eServices considered	Not measured
INFOMOBILITY	6 eServices considered	Presence/absence of quality features including: multi-channel delivery, advanced functions and applications
E-PROCUREMENT	1 eService considered = eProcurement	Presence/absence of quality features associated with each phase (visibility, pre-award, post-award phases)
E-GOVERNMENT	8 eServices considered	Interactivity stages, normalized 0-100% (see CapGemini, 2010)

Country index vs EU average index

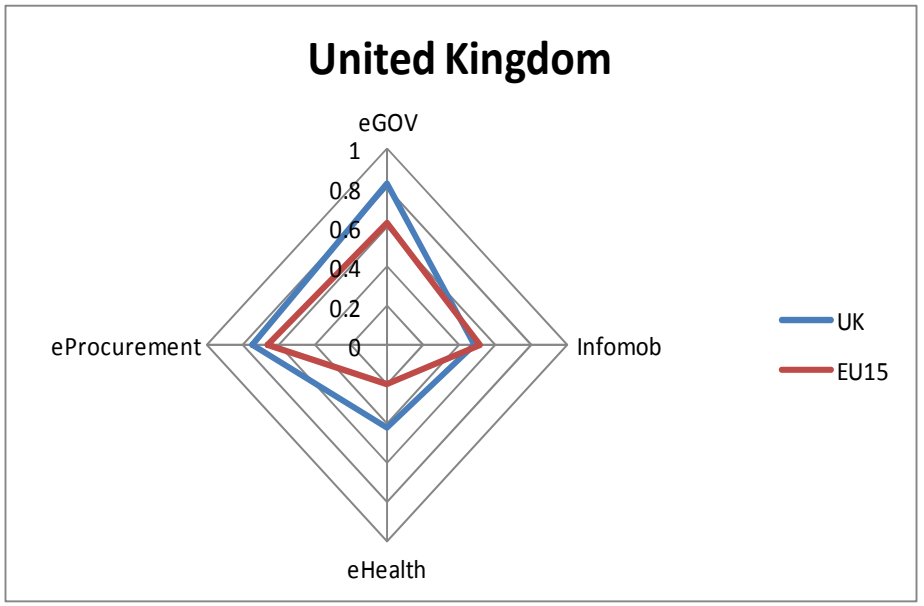


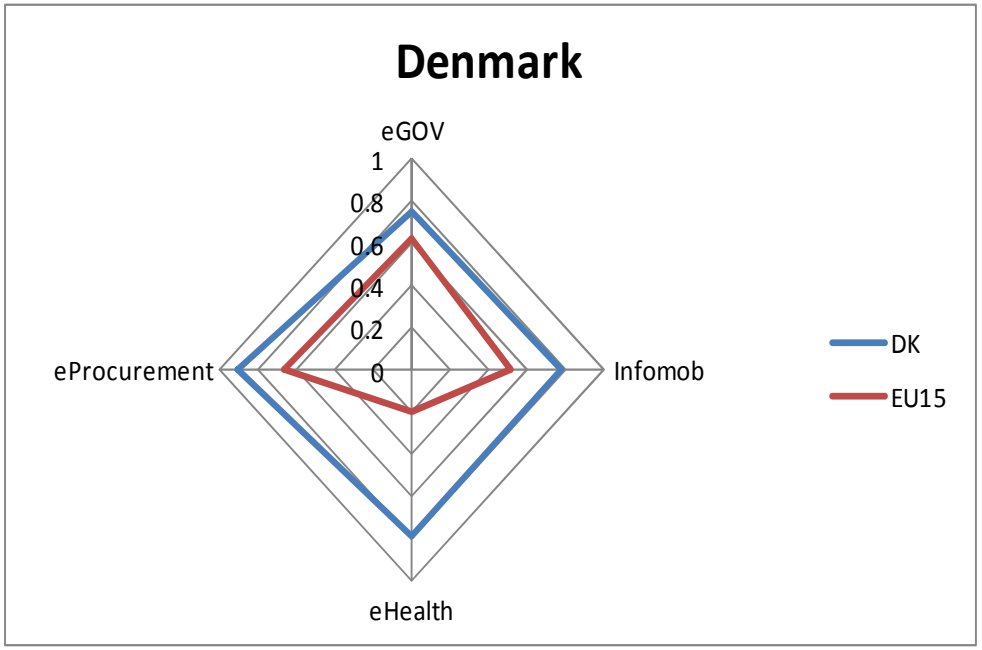
Heterogeneity across eServices and across countries



Front runners

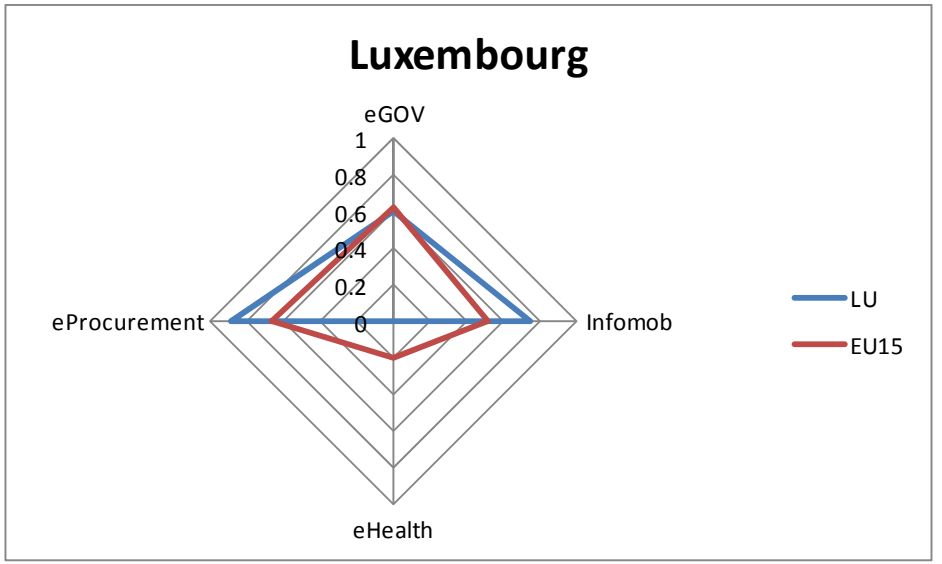
Countries with at least three e-services supplied above the EU average

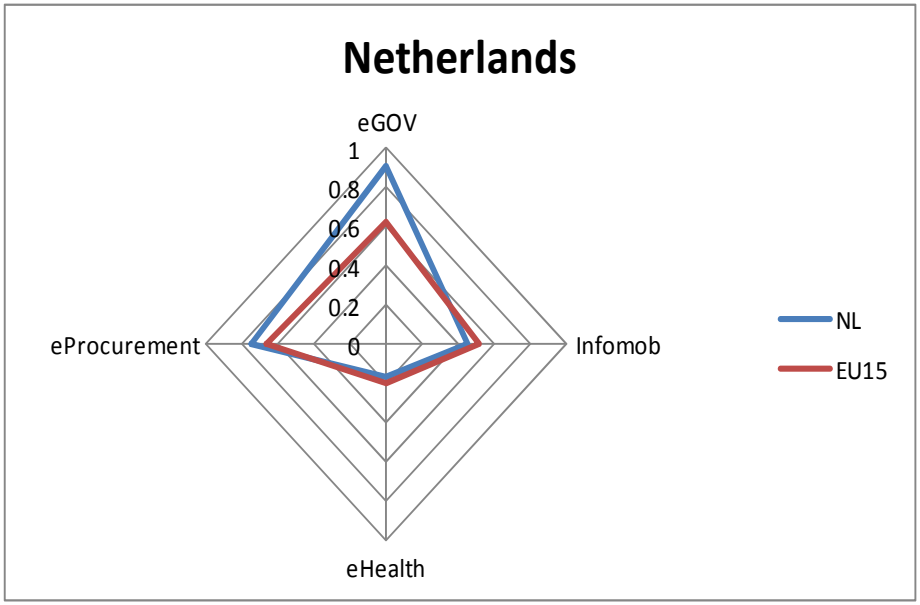


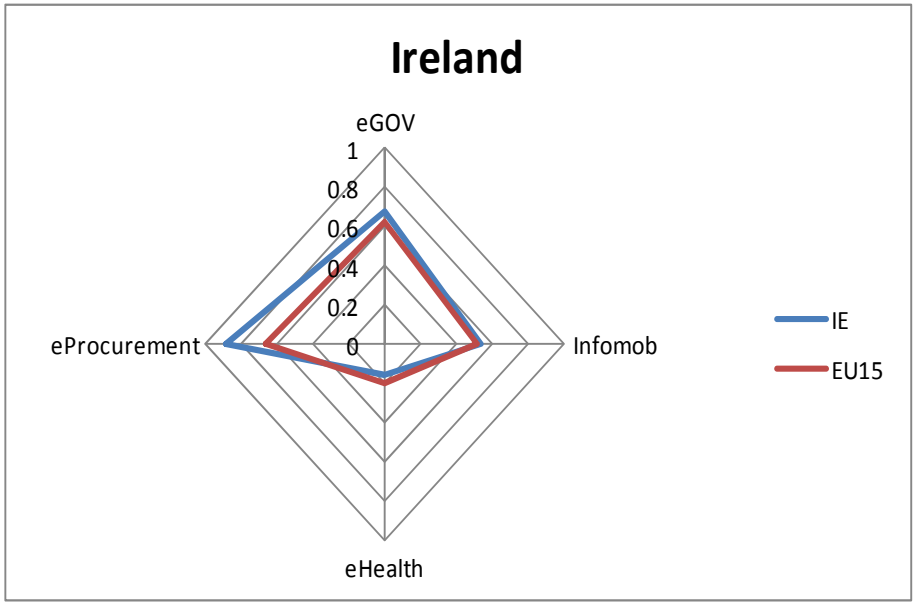


Good Performers

Countries with two e-services supplied above the EU average

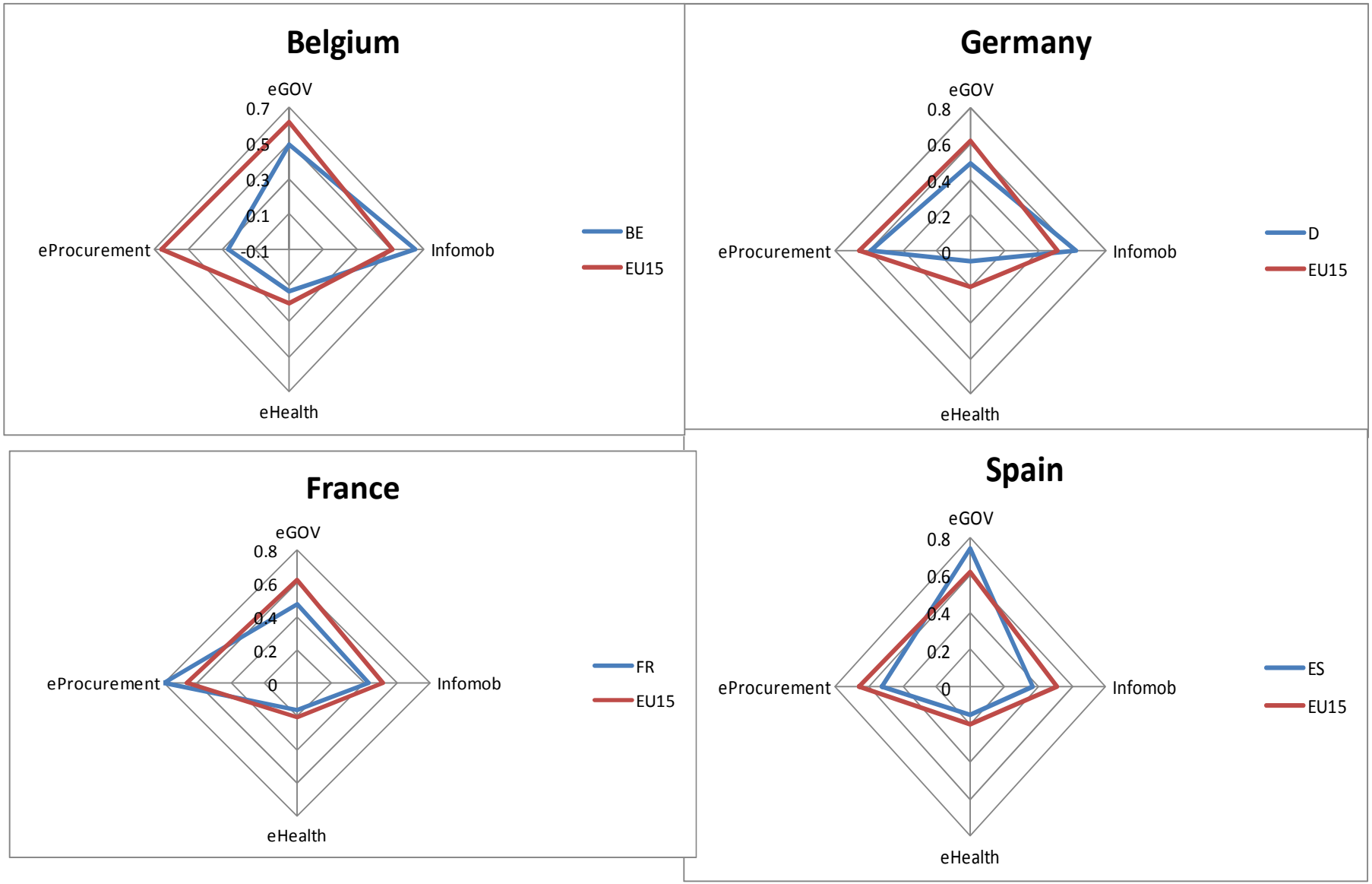






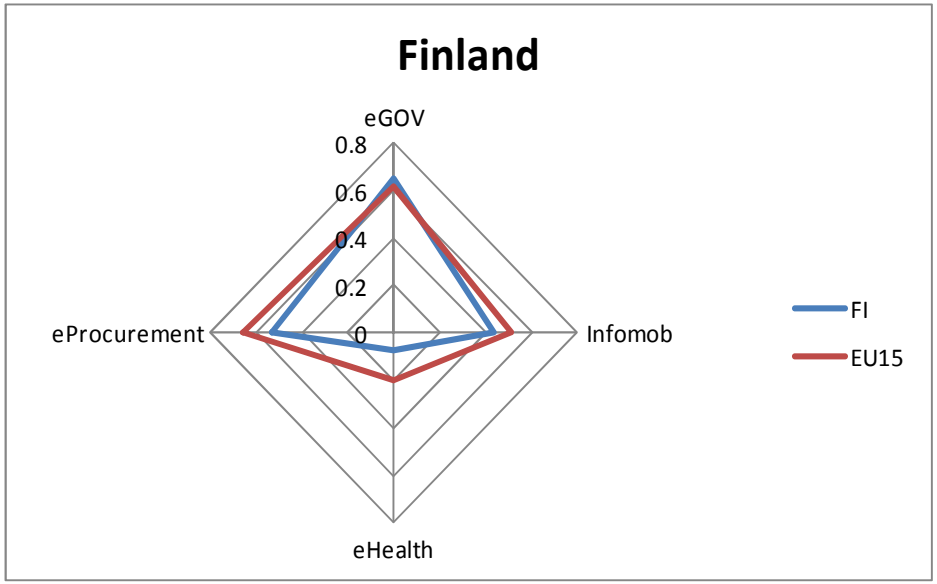
Heterogeneity across eServices and across countries

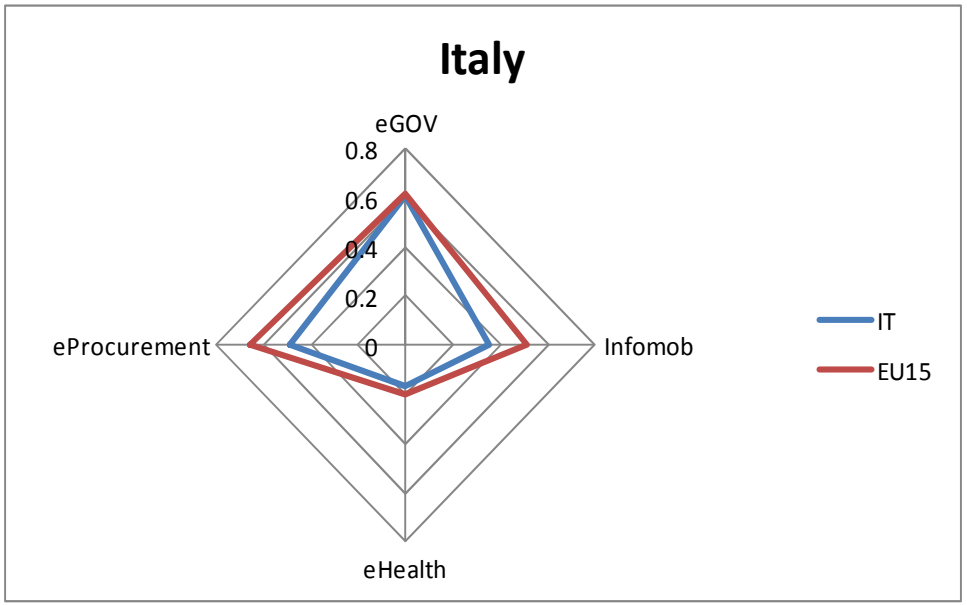
Group of countries with one e-service supplied above the EU average

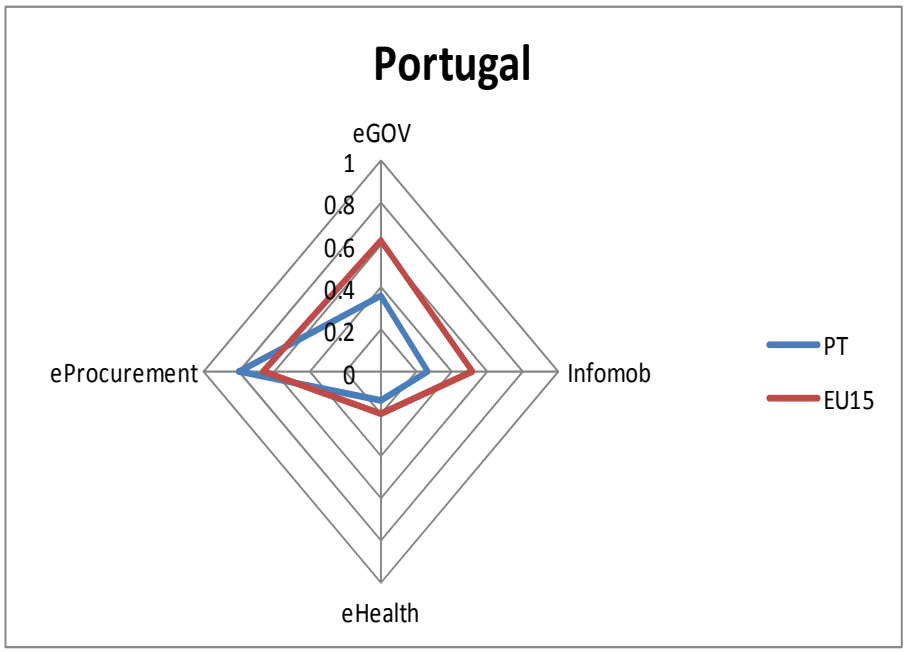


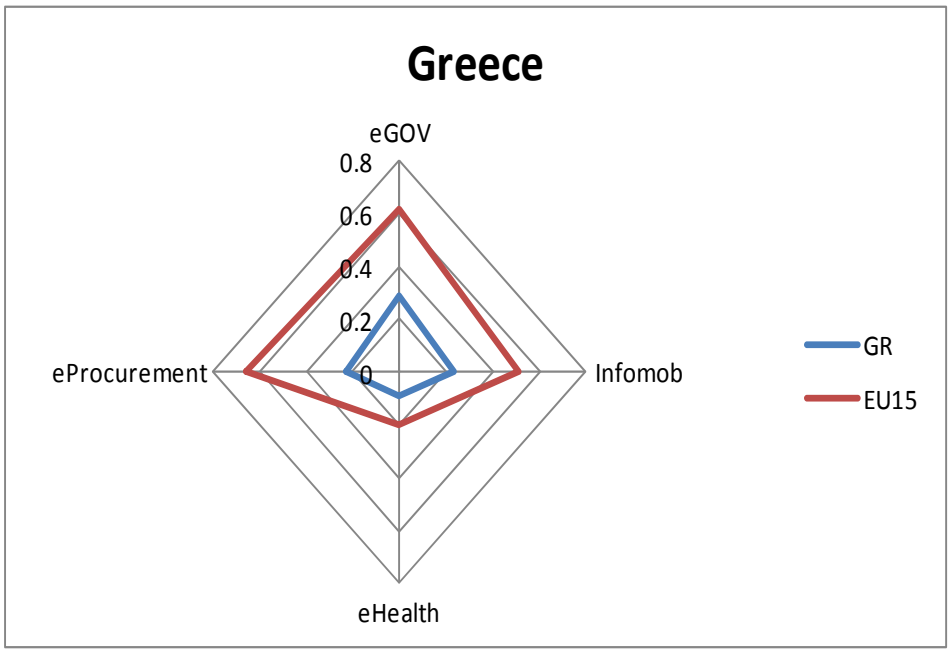
Lagging behind

Group of countries with eService performance below EU average

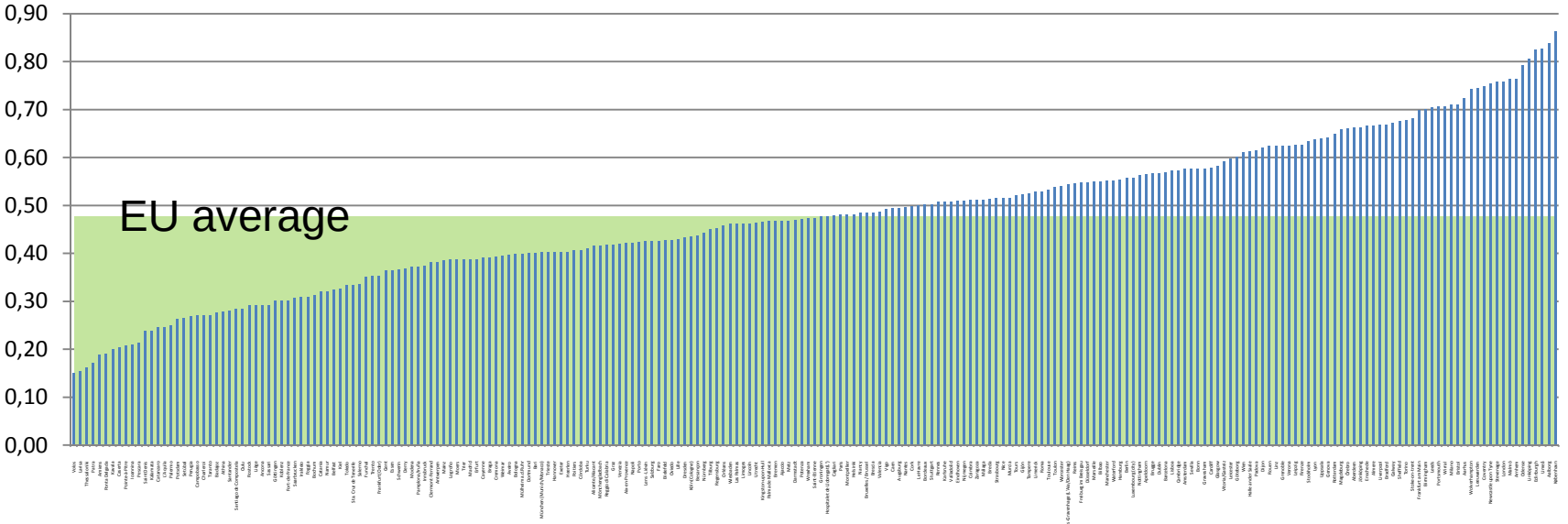


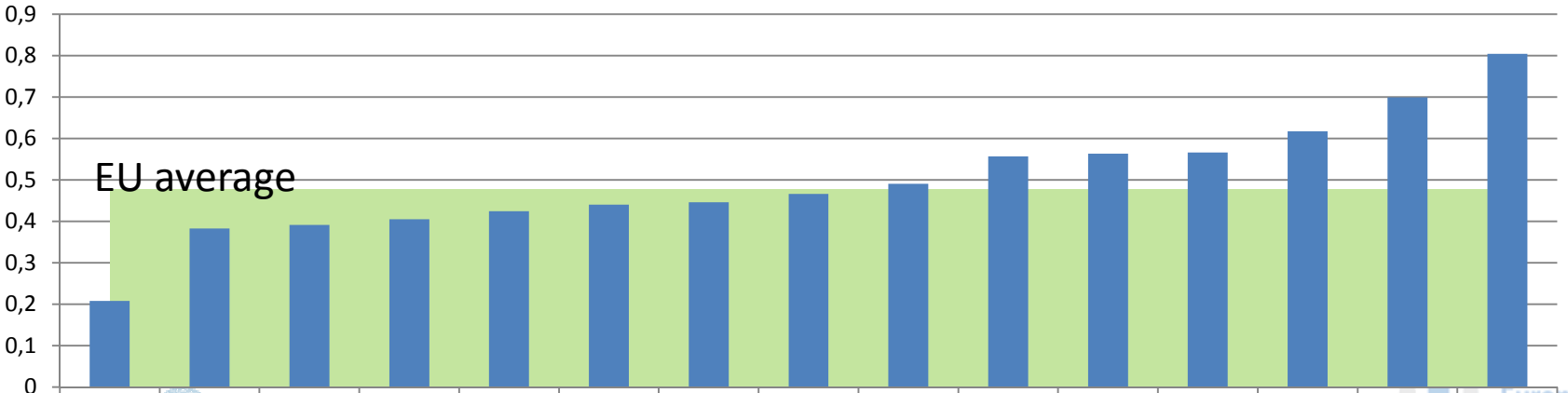






Heterogeneity across municipalities is even higher than across countries





Key components for cluster definition

Demographic characteristics:

- Percentage of residents over 65
- Population density: total resident pop. per square km

Infrastructural characteristics

- Length of public transport network / land area
- Percentage of households with Internet access at home

Civil society

- Participation rate at city elections
- Number of female elected city representatives

Human capital

- Share of working age population qualified at level 5 or 6 ISCED

Economic Characteristics:

- Gross Domestic Product per inhabitant in PPS of NUTS43
- Unemployment rate

Sectoral specialization:

- Number of Manufacturing Companies
- Number of persons employed in provision of ICT services
- Share of employment in financial and business services (NACE Rev.1.1 J-K)

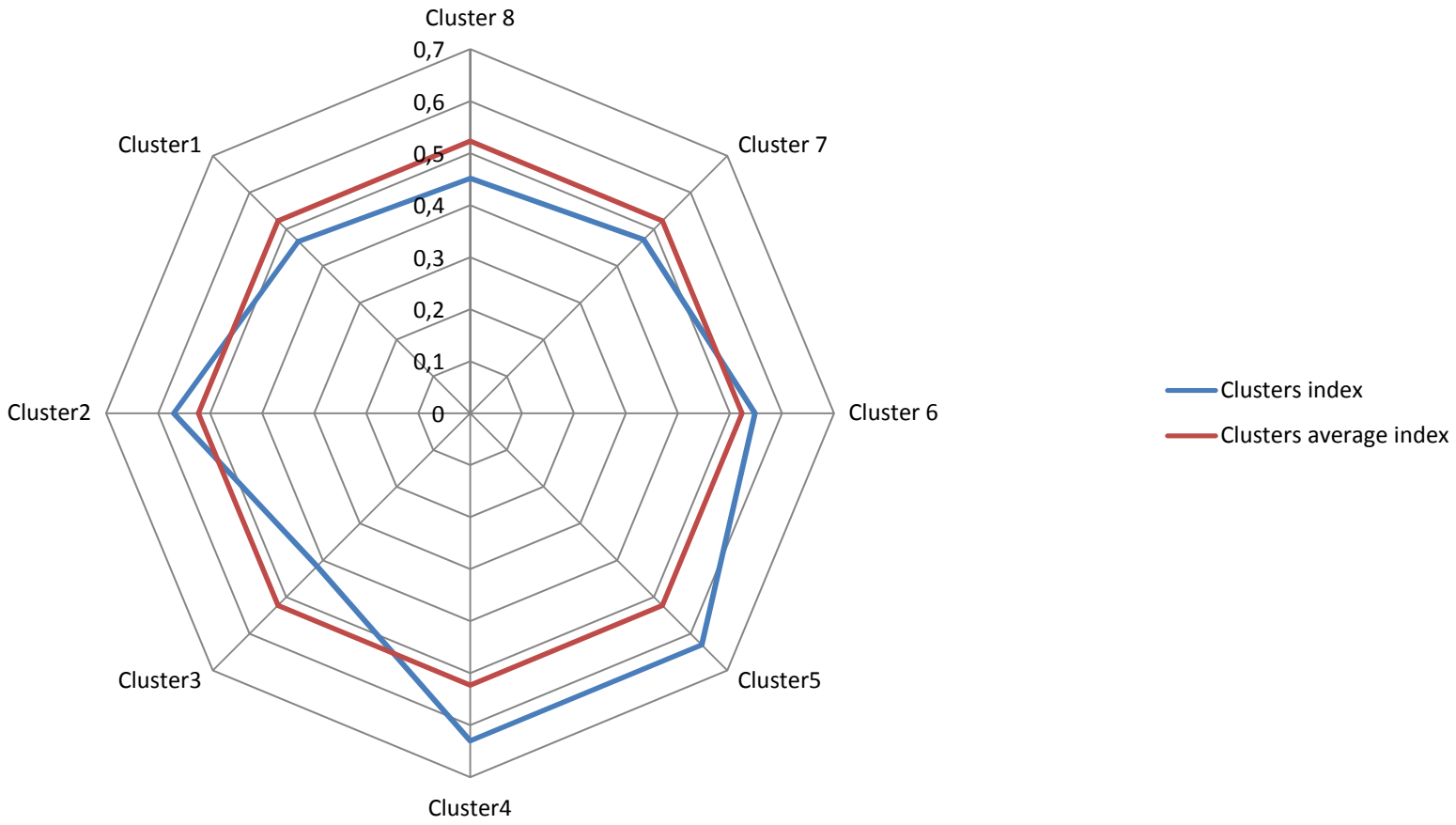
Environmental care:

- Annual amount of solid waste (domestic and commercial) that is recycled

Tourist attractiveness:

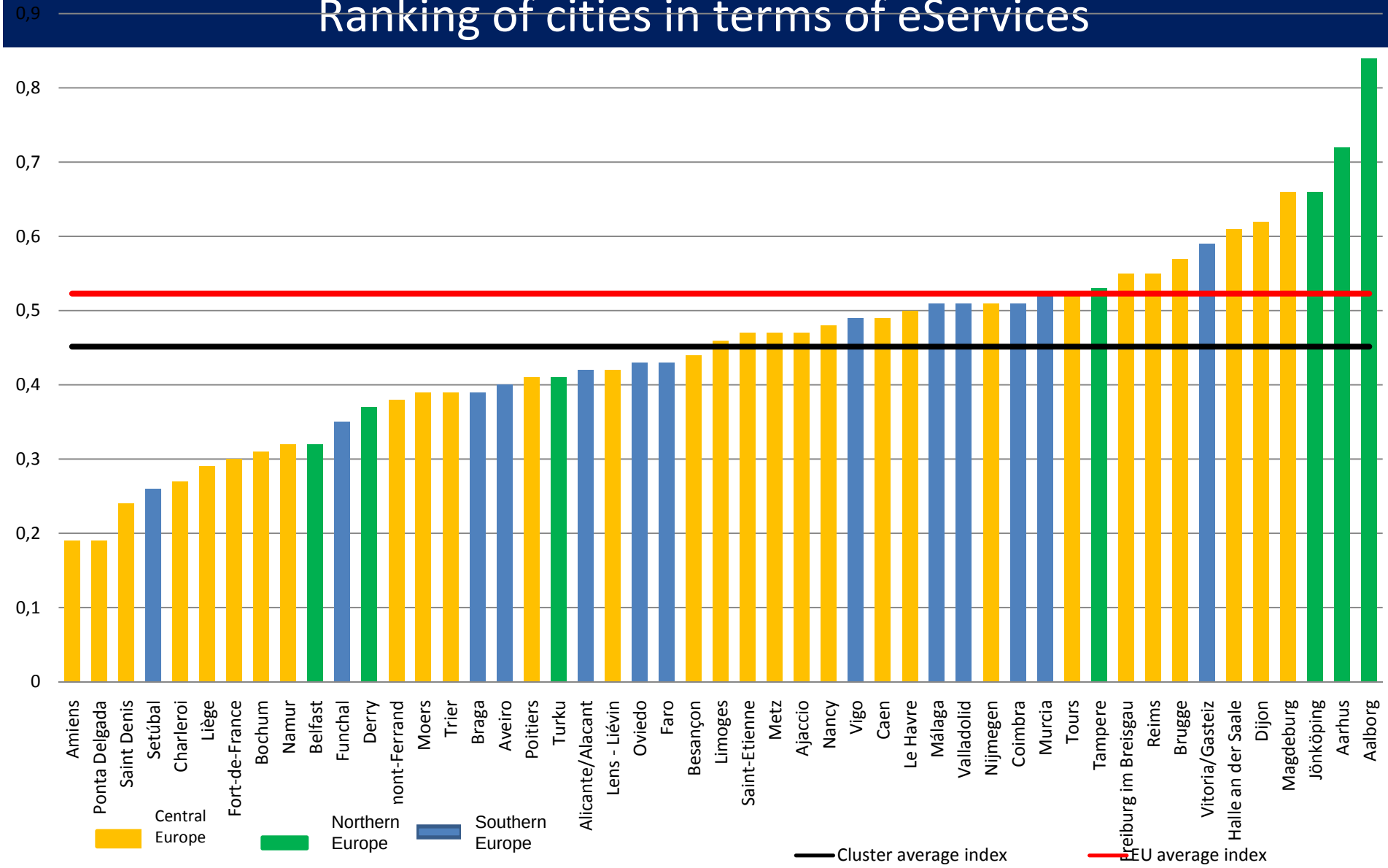
- Total annual tourist overnight stays in registered accommodation

Heterogeneity across clusters remains high



Cluster 3 – “medium low industrial/infrastructural development and medium low share of business services”

Ranking of cities in terms of eServices



In search of determinants of eService development

- We find a high correlation between smartness indexes and e-service development

- We single out determinants of Smart cities that are most likely to favour public eService development

cf. European Smart Cities (2007), Caragliu, Del Bo, Nijkamp(2011), Caragliu & Del Bo (2012)

Determinants of the development of smart cities

- Gross Domestic Product of city/region/country (Euro)
- New business that have registered in the reference year*
- Self-employment rate
- Proportion in part time

- Proportion of population aged 15-64 qualified at tertiary level (ISCED 5-6) living in Urban Audit cities - %
- Total book loans and other media per resident*

- Length of public transport network per inhabitant
- Number of stops of public transport
- Number of deaths in road accidents

- Number of tourist overnight stays in registered accommodation per year per resident population
- Total number of recorded crimes per 1000 population
- Number of hospital beds
- Cinema attendance (per year)*
- Theatre attendance (per year)*
- Number of museum visitors (per year)

Smart economy component

Smart mobility component

Smart people component

Smart living component

* Large number of missing values

How linked are smartness and eServices?

Using different multivariate techniques

Using different combinations of variables that are generally considered as drivers of the "smartness of cities" to explain eService development

We find that two variables are systematically associated with public eService development:

- ***Human capital intensity*** *(expressed in terms of Share of working age population qualified at level 5 or 6 ISCED)*
- ***Advance*****ment of *transportation infrastructures***
  (expressed in terms of number of bus/metro stoips and of km of transportation networks per inhabitant)

CONCLUSIONS and POLICY IMPLICATIONS (1)

- This research line fills three gaps:
  - Coverage of different domains of public eServices with comparable data
  - Comparing eService development across countries and cities
  - Linking eServices with smartness of cities
- Heterogeneity in Public eService development is high across countries and across service categories
- Heterogeneity is even greater when examined at the city level and across clusters of relatively "similar" cities
- Cities from nordic and central European countries are largely ranking high, but there is heterogeneity also across these cities → a regional and sub-regional approach needed
- "Smart cities" also exhibit high levels of eService development
- Smart city characteristics that are most associated with public eService diffusion are: human capital and transportation infrastructure development

CONCLUSIONS and POLICY IMPLICATIONS (2)

- Human capital development is revealing of how advanced and dynamic are both the supply of and demand for eServices

- Transportation infrastructure may have a dual role:
  - it increases the efficiency of economic activity, hence increasing demand for eServices
  - it reveals greater complexity of transportation infrastructure, thus increasing the need for more advanced eServices as a substitute for physical mobility

- Public sector innovation policies should :
  - Adopt a broader perspective of sensitive service areas, well beyond general government
  - Be fine tuned according to regions and cities within countries
  - Be focused on both the demand and supply side to favor public eService diffusion and the development of smart cities

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Thanks for your attention

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