Inspire Policy Making with Territorial Evidence

FINAL REPORT //

DIGISER

Digital Innovation in Governance and Public Service Provision

Annex 1.2.1 DPSVI Report // April 2022

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Abbreviations

API	Application Programming Interface
DESI	Digital Economy and Society Index
DIGISER	Digital Innovation in Governance and Public Service Provision
DIGISURVEY	The survey deployed during DIGISER with 255 respondent cities
DPSVI	Digital Public Value Service Index
EAB	European Advisory Board
EDCI	European Digital City Index
EIF	European Interoperability Framework
ESPON	European Spatial Planning Observation Network
EU	European Union
EU ODP	European Union Open Data Portal
FUA	Functional Urban Areas
GDC	Green Digital Charter
GDP	Gross Domestic Product
GDPpc	Gross Domestic Product per Capita
GDPR	General Data Protection Regulation
ICC	Intelligent City Challenge
ICT	Information and Communications Technology
KPI	Key Performance Indicator
LAU	Local Administrative Units
LEA	Learning Technology Accelerator
NUTS	Nomenclature of Territorial Units for Statistics
OASC	Open and Agile Smart Cities
OECD	Organisation for Economic Co-operation and Development
OGD	Open Government Data
PA	Public Administration
PCP	Pre-Commercial Procurement
Q_	Question (in Digiser Survey)
R&D	Research and Development
SAB	Scientific Advisory Board
SAG	Scientific Advisory Group
SDGs	Sustainable Development Goals
SEM	Structural Equation Modelling
SI	Service area Index
T-LL	Triple-Loop Learning
ToR	Terms of Reference
UNDP	United Nations Development Programme
Reference Sample	It refers to 156 cities intended to be the best approximation attainable that could be considered as representative of the variety of European cities.

1   Introduction

This document present one part of the results of the analysis of the DPSVI, the Digital Public Service Value Index.

One of the main goals of DIGISER has been indeed the development of indicators capable of capturing and synthetically describing the performance of cities in the digital transition and their ability to drive this transition towards the creation of public value. This work resulted in the development of the DPSVI, Digital Public Service Value Index (DPSVI), that is reported in detail in the *Annex 1.1 Extended Methodology.*

In summary, the DPSVI is conceived as a multi-level composite index, nourished by primary data collected through a questionnaire (DIGISURVEY) targeting European cities.

These data have been processed and combined to feed a system of composite indicators that provide a synthetic assessment of the performance of cities in relation to complex phenomena underlying digital transformation in European cities.

1.1   DPSVI Definition and structure

The DPSVI and its other sub-indices are meant to be a concise **measurement of the performance of each city** with respect to several phenomena, that are explored through the combination and cross-checking of the answers to several single questions.

The core data model for the computation of the DPSVI, developed on top of the conceptual framework described in the *Annex 1.1 Extended Methodology,* is represented in the following picture:
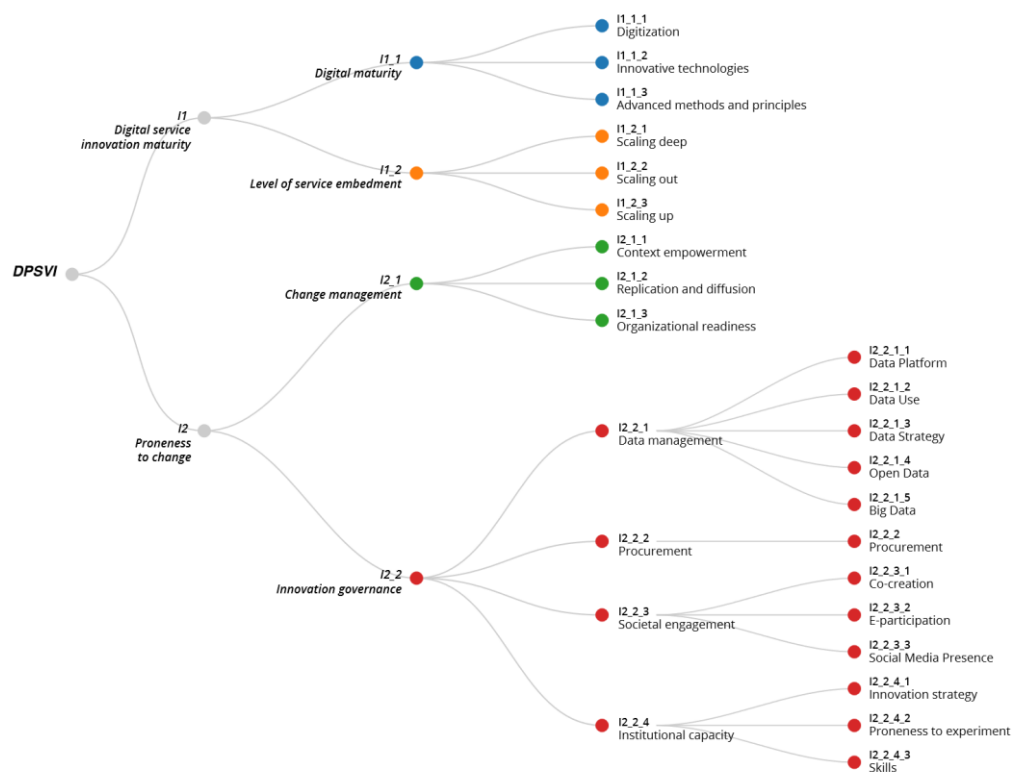

Figure 1 - DPSVI Structure

Overall, the DPSVI is composed of 31 Composite indexes that are organized in three groups (cfr. Table 1 - Composite indexes of DPSVI):

- 3 Top Indexes: are the apical indexes including the DPSVI itself and the two pillars (I1 DIGITAL SERVICE INNOVATION MATURITY and I2 PRONENESS TO CHANGE)

- 21 Bottom Indexes: the indexes directly generated on top of DIGISURVEY data

- 7 Intermediate Indexes: the other indexes in intermediate positions

Code	Label	Level	Description
I1	**DIGITAL SER-VICE INNOVA-TION MATURITY**	**Top**	**It explores the degree of penetration and maturity of technical and organizational innovation in public service delivery**
I1_1	Digital maturity	Intermediate	It assesses the level of digitalization of the public authority, intended not only as shift toward digital technologies, but also encompassing the related organizational change, namely the delivery of innovative public services
I1_1_1	Digitization	Bottom	It focuses on the degree of digitization of pre-existing internal procedures either ancillary or directly related to public service delivery
I1_1_2	Innovative technologies	Bottom	It explores the degree of adoption of innovative technologies (AI, blockchain, wearables, etc.)
I1_1_3	Advanced methods and principles	Bottom	It analyses the level of consistency of methods and principles used to increase the digitalization level of the public authority
I1_2	**Level of service embedment**	Intermediate	It indicates the extent to which the innovation of services is pervasive and has already generated changes
I1_2_1	Scaling deep	Bottom	It indicates the extent to which the innovation of services is pervasive and has already generated changes in the local context, at societal level
I1_2_2	Scaling out	Bottom	It indicates the extent to which the innovation of services has already generated changes either by replicating successful innovations from other contexts or exported elsewhere the innovations experimented locally
I1_2_3	Scaling up	Bottom	It indicates the extent to which the innovation of services is pervasive and has already generated changes within the organization of the public authority
I2	**PRONENESS TO CHANGE**	**Top**	**It assesses the inclination or readiness of the public authority to change and alter its behaviour, vision, procedures, and its preparedness to integrate and amplify innovations**
I2_1	Change management	Intermediate	The capacity of public administrations to put in play a set of actions, norms, policies, and tools either to proactively support innovation in digital service development and provision, or to increase its capacity to detect and adopt innovation dynamics developed in different contexts (within the context, or towards or from other contexts).
I2_1_1	Context empowerment	Bottom	It measures the effectiveness of the strategies, developed by the public authority, to ensure impacts of innovation within in the local context, at societal level, e.g. instillation of cultural values oriented to innovation and change; encouragement for the development of sustainable relationships
I2_1_2	Replication and diffusion	Bottom	It measures the effectiveness of the strategies developed to ensure replicability in other contexts to the innovations experimented locally, so to impact a larger number of citizens or communities
I2_1_3	Organizational readiness	Bottom	It measures the effectiveness of the strategies developed to ensure impacts of innovation within the organization of the public authority
I2_2	Innovation governance	Intermediate	It refers to the way in which the public authority uses transversal administrative processes (data management, societal engagement, public procurement, capacity building) as a leverage to promote cross-sectoral digital innovation
I2_2_1	Data management	Intermediate	It assesses the innovation capacity of data management strategies used by the public organization
I2_2_1_1	*Data Platform*	Bottom	It assesses the features of the data platform and the consistency between data management strategy and its underlying technical infrastructure
I2_2_1_2	*Data Use*	Bottom	It explores, from an operational perspective, how data are used by the public administration for the purposes of evaluation and monitoring, delivery, and anticipation and planning.

Code	Label	Level	Description
I2_2_1_3	*Data Strategy*	Bottom	It investigates whether the definition and the embrace of governance models effectively set appropriate and favorable conditions for data-driven, data-informed, or data-aware decisions and services for creating public value.
I2_2_1_4	*Open Data*	Bottom	It provides an overview of the degree of application of open data principles, practices, and framework, that are meant to improve performance and efficiency of government services in general
I2_2_1_5	*Big Data*	Bottom	It refers to the capacity of the city to generate, manage and use big data
I2_2_2	Procurement	Bottom	It assesses the level of digitalization of the public procurement processes within the public authority and their orientation to digital innovation
I2_2_3	Societal engagement	Intermediate	It provides an overview of the intensity and level of digitalization of societal engagement policies, and their impact on public service design and innovation
I2_2_3_1	*Co-creation*	Bottom	It gives the level of involvement of the citizens in service design and innovation
I2_2_3_2	*E-participation*	Bottom	It refers to the level reached by the municipality in involving citizens and/or communities through digital platforms
I2_2_3_3	*Social Media Presence*	Bottom	It provides information about how pervasive is the communication via social media by the municipality
I2_2_4	Institutional capacity	Intermediate	It refers to the institutional capacity of the public authority in relation to the experimentation and consolidation of digital innovation
I2_2_4_1	*Innovation strategy*	Bottom	It provides information about the agenda setting and pursuing capacity in relation to digital innovation strategies
I2_2_4_2	*Proneness to experiment*	Bottom	It analyses the readiness to experiment new organizational settings and methods within the public authority
I2_2_4_3	*Skills*	Bottom	It assesses the availability, within the public authority, of skills as key to the management of digital innovation

Table 1 - Composite indexes of DPSVI

1.2 DPSVI Methodology

The computation of indexes followed three steps.

- **Mapping** In this first step the DIGSURVEY's questions and answers are mapped to the indexes

- **Standardization**: this second step aims at transforming each question mapped to an index in a standardized value on the scale 0,00-1,00, converting the raw answers provided by the cities into numerical values via data coding and/or standardization techniques.

- **Aggregation**: in this final step the standardized numerical values obtained from the questions are aggregated and combined into indexes according to the hierarchy established in the Data Model. The value of indexes corresponds to a weighted average of the values of the questions aggregated.

1.2.1 Mapping questions and answers

The first step of data processing has been the detailed mapping of questions to the 21 Bottom Indexes, that are the ones directly generated on top of the raw data collected with the Digisurvey, while the other indexes are resulting from a successive aggregation between composite indexes.

Figure 2 maps the detailed relation between the questions of the DIGISURVEY and the DPSVI structure and represents the logical basis for the statistical aggregation of data. Chapter 2 includes a detailed description of the branch analysed in this document.

It is important to clarify that in several cases only a limited number of answers (of a given questions) have been mapped to indexes. In this manner the same question could have been used more than once but considering each time only a limited set of possible answers to which has been attributed a different meaning (and consequently a different numeric value). In summary the same question could have been standardized in different manners according to the indexes to which it is associated.
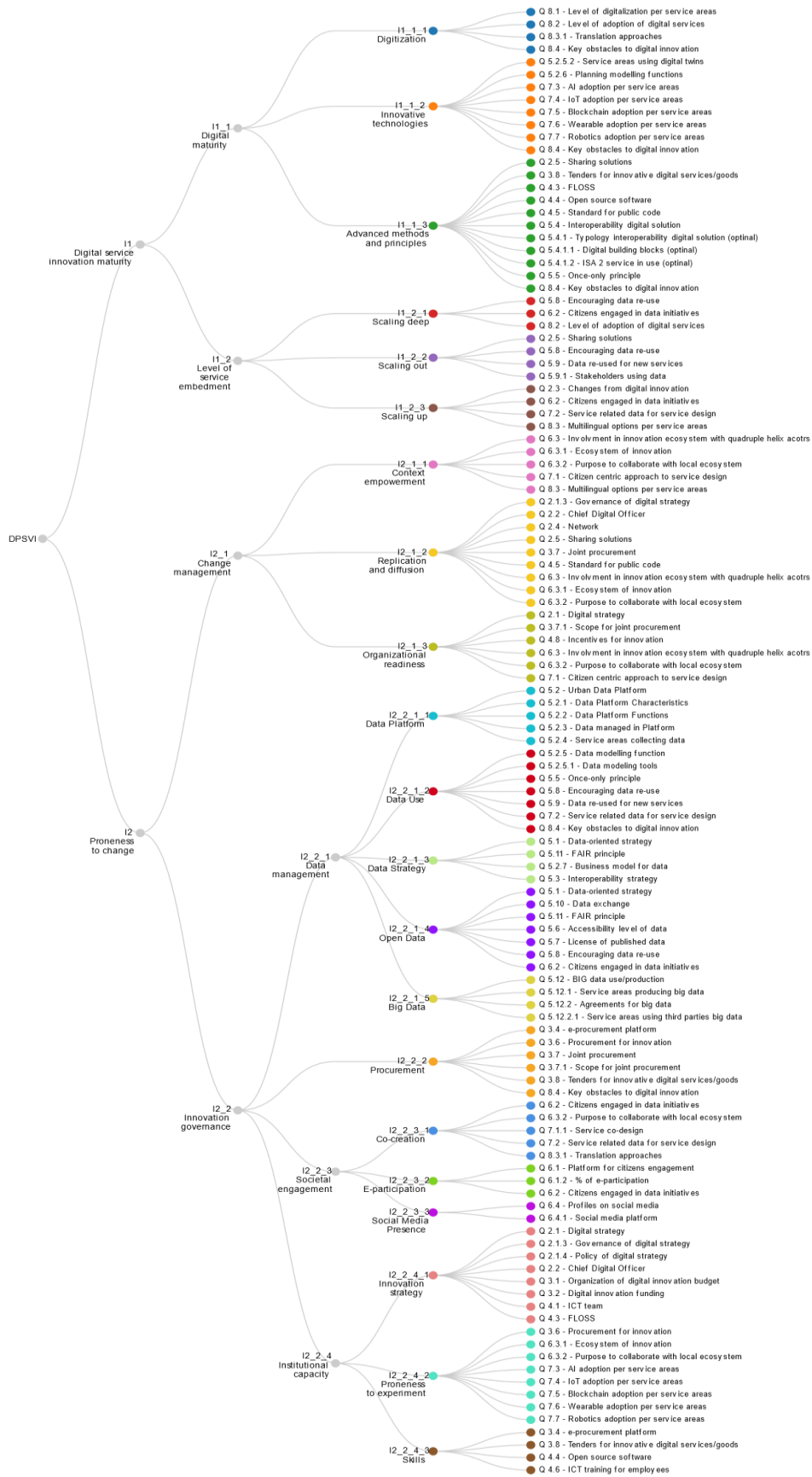
Figure 2 - DPSVI detailed structure – Questions

1.2.2   Standardization

To render the information gathered via the questionnaire processable via computational methods, each question, or group of answers, has been transformed into a number.

In practice, raw data have been replaced by a set of numerical values x_p, where $p = 1, \ldots, P$ and P is the total number of questions, or groups of them.

This operation is usually performed in an ad-hoc way, given the specificities of each item of the questionnaire. Nevertheless, the following table provides a synthesis of the methods for data standardization adopted for each category of question.

Type of question	Standardization methods
Binary	Converted into dummy (0-1)
Single Choice	Converted to cardinal value (e.g., answer A = 1, answer B = 3, Answer 3 =0)
Likert Scales	Converted to correspondent ordinal (e.g., Low = 1, Medium-Low = 2, Medium-High = 3, High = 4)
Multiple Choice / Matrix	Converted into dummies, then (weighted) sum, propaedeutic yes/no are dropped.
Scalars	Normalised using external values (population, size of municipality) if representative of relative phenomena
Matrix – Service Level	Converted into dummies, then summed by column (i.e., process level), finally normalised over number of digitalised services

Table 2 - Standardization methods overview

The *Annex 1.1 Extended Methodology i*ncludes all the information related to the standardization process underlying the DPSVI, including the detailed map of answers to indices and the weight attributed to each answer for standardization purposes.

Before aggregating the numeric answers, these have been rescaled into a 0.00 –1.00 range, so to make them comparable. The mathematical operation that needs to be performed to move these different scales into a unique one, where 0 is the worst possible value and 1 is the best possible one, is the following:

$$x_p^{IT} = \frac{x_p - x_p^{min}}{x_p^{max} - x_p^{min}}$$

Where x_p^{IT} is the rescaled value, x_p is the original value mapped on a generic scale and x_p^{min}, x_p^{max} are, respectively, the minimum possible and the maximum possible value of datum x_p.

1.2.3   Aggregation

In this final phase the standardized values computed on top of the answers to DIGISURVEY questions, are aggregated via a mathematical procedure, with the goal of finally creating the indexes.

After having refined the data to be taken as input, in accordance with the standard literature for this kind of dimensionality reduction task, the indices are introduced as linear combinations of data, that is:

$$I = \frac{\alpha_{n_1^I} x_{n_1^I}^{IT} + \alpha_{n_2^I} x_{n_2^I}^{IT} + \ldots + \alpha_{n_{N_I}^I} x_{n_{N_I}^I}^{IT}}{\alpha_{n_1^I} + \alpha_{n_2^I} + \ldots + \alpha_{n_{N_I}^I}}.$$

The table published in chapter 2 illustrates the different relative weight attributed to each of the question composing the indexes presented in this document.

1.3   Technical note: how to read charts

This report includes a large number of charts and maps that are generated on top of the indexes that make up the DPSVI and in some cases referred to the same underlying questions. This chapter explains how to interpret the legend that accompanies the publication of charts and maps.

1.3.1   Key info for DPSVI charts and Maps

The charts used to represent DPSVI indexes are relatively simple, being limited to radars, columns, box plots. All charts include a legend reporting the following key information:

Index observed	Index type	Index level	Data Sample	Cluster
Indicates the code and the label of the index observed	*Indicates the type of index as either:* • DPSVI • SI	*Indicates the Index position in its Data model:* • Top • Intermediate • Bottom	*Indicates the sample that the data refers to* • All respondents • Reference sample	*Indicates the series showed in the charts and listed in the legend* • Capital cities • Reference sample • Population • GDPPC • Country

Table 3 – Index charts legend

1.3.1.1   Index type

This information identifies the family of index, being either part of the DPSVI tree (Digital Public Value Service Index) or of the SI tree (Service Areas Index)

1.3.1.2   Index level

This information identifies the position of the index in its data model (cfr. Figure 1 - DPSVI Structure)

- **Top**: refers to the three apical indexes, built on top of all the other indexes:

    o   DPSVI
    o   Digital Service Innovation Maturity
    o   Proneness to Change

- **Bottom**: refers to all the indexes generate directly from questions (cfr Figure 2 - DPSVI detailed structure – Questions)

- **Intermediate**: all the other indexes composed by indexes

1.3.1.3   Data sample

This information identifies the sample on top of which data are computed:

- The "**All respondents" sample** is composed by **all the 255 respondent cities** with the exclusion of duplicate questionnaire coming from the same authority (same city at the same administrative level).

- The "**Reference" sample** is composed by a **selection of 155 respondents**. The reference sample is intended to be the best approximation attainable that could be considered as representative of the variety of European cities.

1.3.1.4   Cluster

Data can be grouped in clusters showed as series in the charts and listed in the legend. The cluster considered in the report could be the followings:

- **None**: no cluster, the data refers to the entire sample
- **Capital cities**: comparing the results of capital cities with all the other respondents.
- **Reference sample**: compared results of reference sample and all other respondents.

- **Population**: compared results among cities by population size
- **GDPPC**: compared results among cities by GDP per capita size
- **Country**: compared results among countries
- **Authority Type**: compared results among different types of local government
- **Case Studies**: 10 selected cities also surveyed through qualitative methods

In few cases cluster and possible answers can be switched, in this case the chart visualizes cluster class on the y-axis and the possible answers as chart series.

2 Digital Public Service Value Index

2.1 Definition of the indices and exploration of its structure

Digital Public Service Value Index or DPSVI is the key summary measure of the extent to which each urban public authority is actually adopting and scaling up best practices through open data, APIs, and standards, and thus increasing public value.
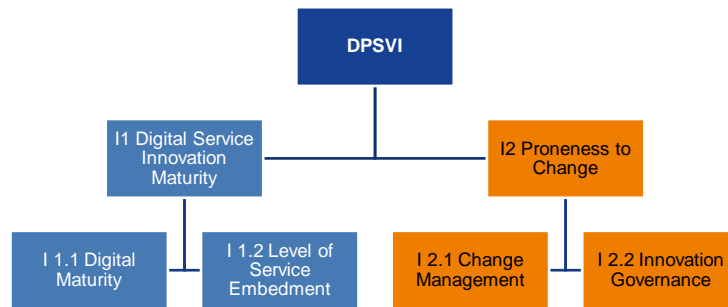

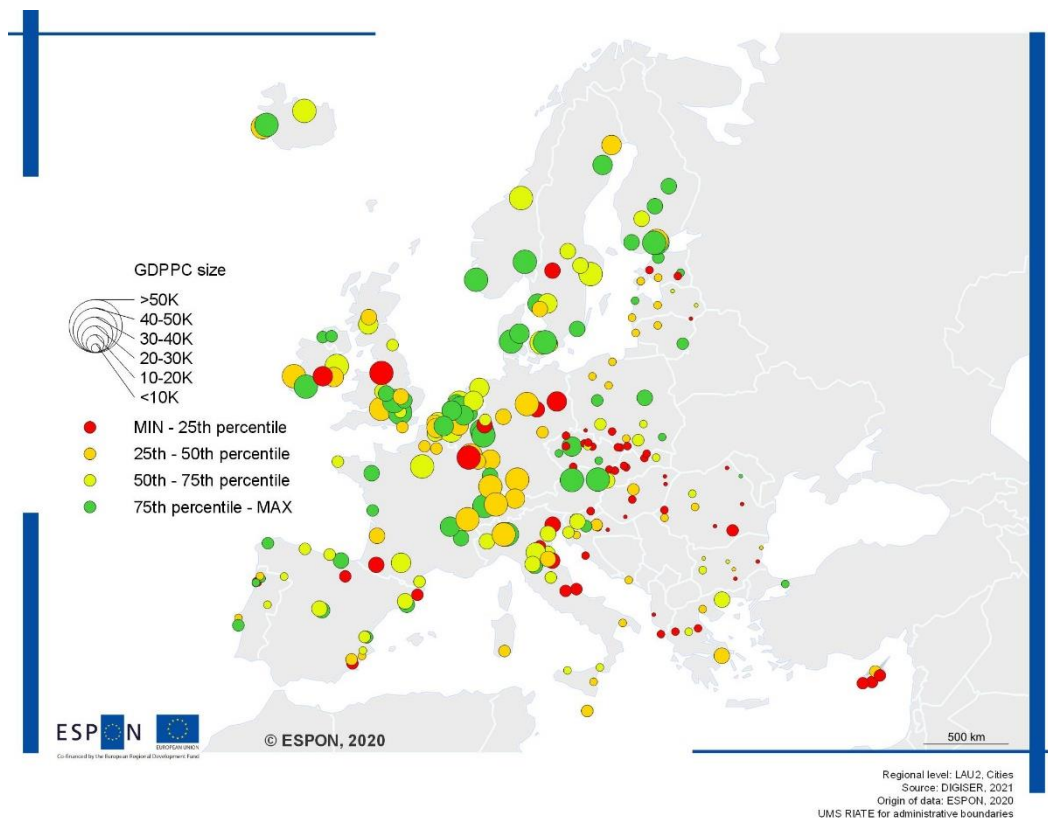**Figure 3 – DPSVI index composition**
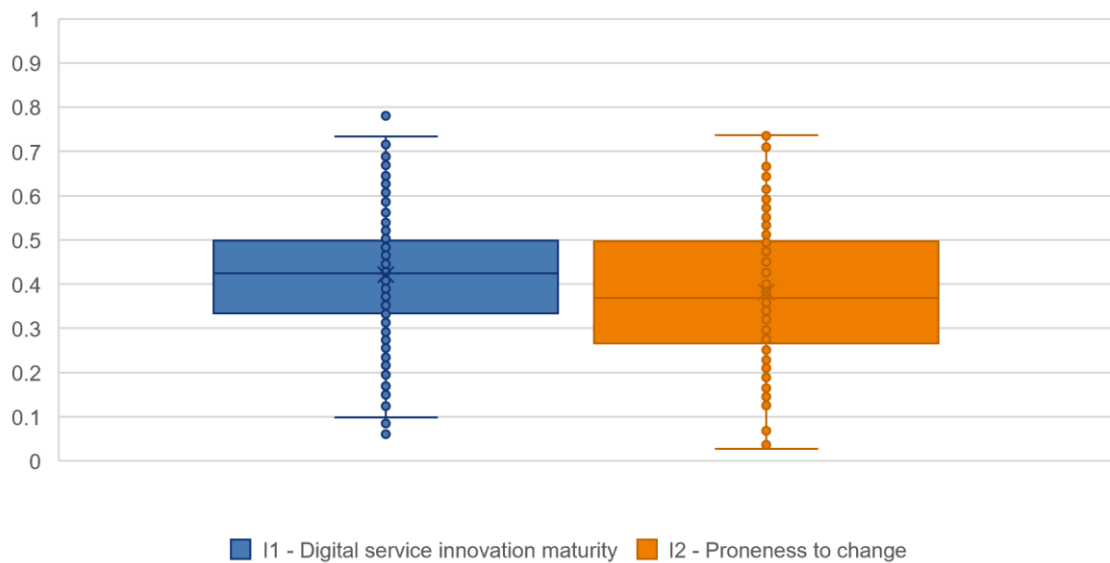
Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	Reference Sample	na

Figure 4 – DPSVI overview
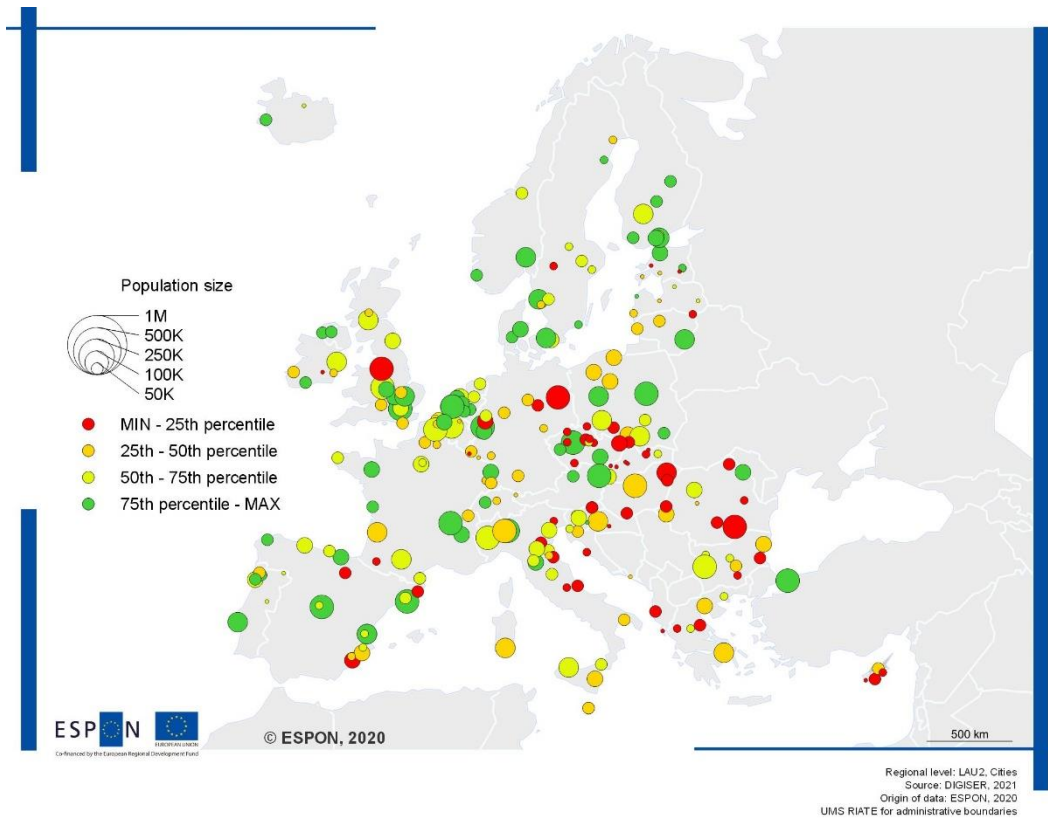
Map 1 – DPSVI and population size

Map 2 – DPSVI and GDPPC size

2.2   Population
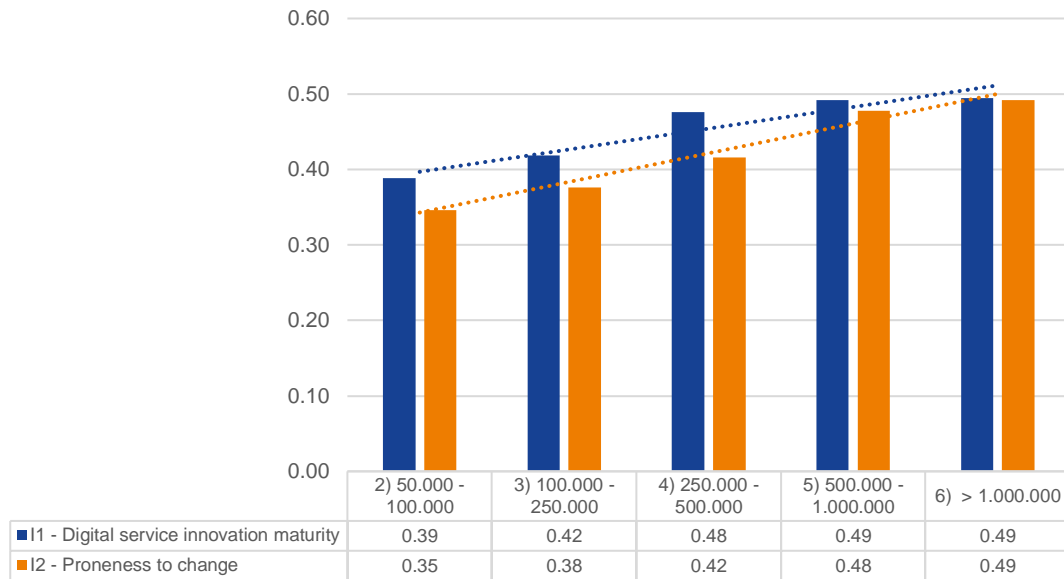
	2) 50.000 - 100.000	3) 100.000 - 250.000	4) 250.000 - 500.000	5) 500.000 - 1.000.000	6) > 1.000.000
I1 - Digital service innovation maturity	0.39	0.42	0.48	0.49	0.49
I2 - Proneness to change	0.35	0.38	0.42	0.48	0.49

Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	Reference Sample	Population

Figure 5 - DPSVI by population

2.3   GDP per Capita
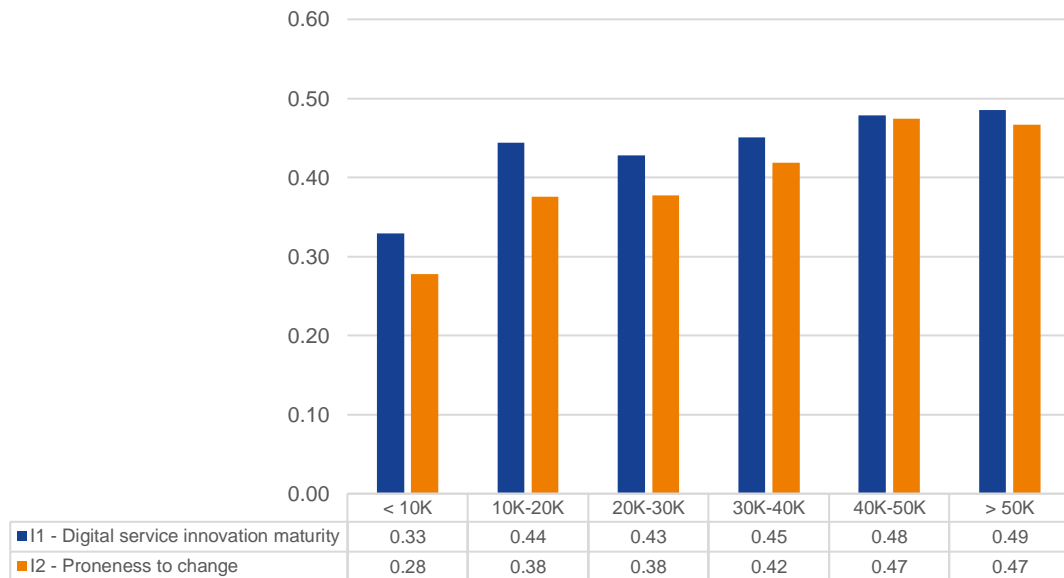
	< 10K	10K-20K	20K-30K	30K-40K	40K-50K	> 50K
I1 - Digital service innovation maturity	0.33	0.44	0.43	0.45	0.48	0.49
I2 - Proneness to change	0.28	0.38	0.38	0.42	0.47	0.47

Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	Reference Sample	GDPPC

Figure 6 - DPSVI by GDPC

2.4   Authority Type
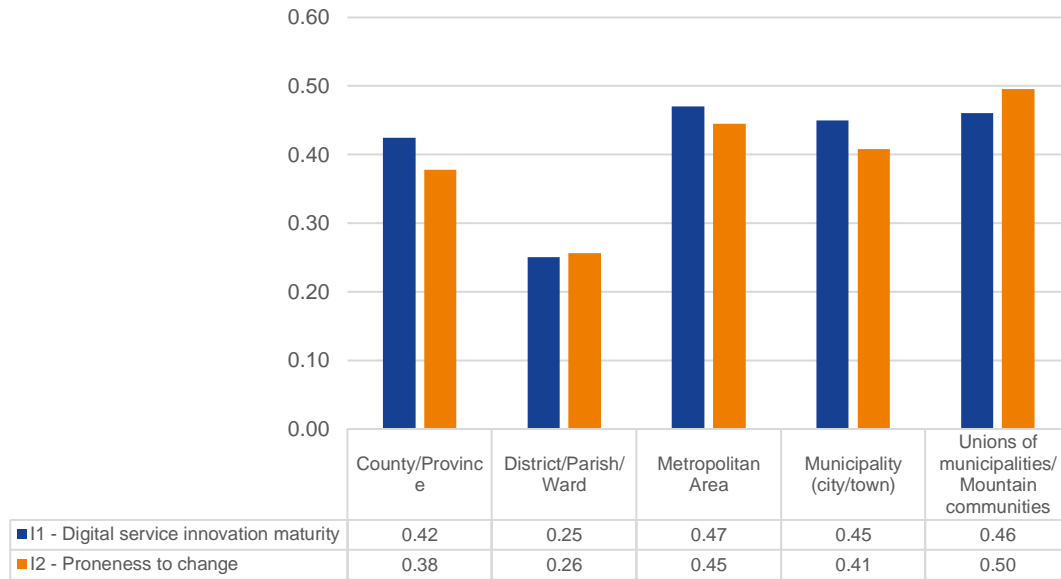
	County/Province	District/Parish/Ward	Metropolitan Area	Municipality (city/town)	Unions of municipalities/ Mountain communities
■ I1 - Digital service innovation maturity	0.42	0.25	0.47	0.45	0.46
■ I2 - Proneness to change	0.38	0.26	0.45	0.41	0.50

Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	Reference Sample	Authority type

Figure 7 - DPSVI by authority type

2.5   Case Studies
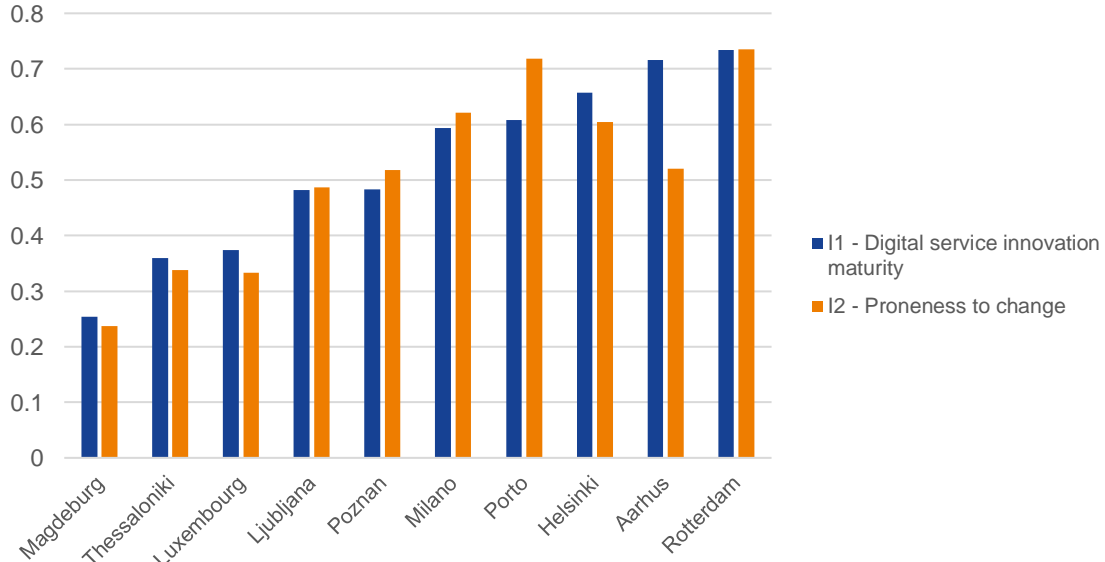
Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	Case studies	na

Figure 8 - DPSVI, case studies

2.6   Semiotic squares

Semiotic squares are used to provide cities with feedback about their attitudes and behaviours in relation to DIGISER processes and process typologies. Also, they are used to help respondents visualise how they are currently performing in terms of proneness to change and digital service innovation maturity.

To facilitate the interpretation, bisectors are associated with ideal-typical profiles, that characterise each cartesian quadrant. Those are:

1. **Transformative Pioneer**
   Innovative and aware / Change prone
   The transformative pioneer displays a high level of technical and digital-enabled organizational innovation in public service provision and delivery. Also, the pioneer uses digital technologies as an integrated part of governments' modernization and innovation strategies.
   This profile is aware and ready to actively support changes in organizational behaviors, attitudes, and procedures to face challenges related to the digitalization, and to drive pervasive and transformative service innovation practices.

2. **Champion Prospect**
   Conservative and unaware / Change prone
   The champion prospect has a strong orientation to change, as it is inclined and ready to modify behaviors, visions, and practices to foster and amplify innovation, as witnessed e.g., by efforts made to enhance data management, societal engagement, procurement, or institutional capacity-building.
   The champion prospect, how-ever, might need to work on its ability to actively support technological and organizational change and to improve the scalability and replicability of service innovation practices

3. **Conservative Follower**
   Conservative and unaware / Change reluctant
   The conservative follower has a low degree of penetration and maturity of technical and organizational innovation in public service delivery.
   Also, this profile does not seem to be particularly inclined nor ready to modify behaviours or attitudes to support organisational or technological innovation.

4. **Deadlocked innovator**
   Innovative and aware / Change reluctant
   The deadlocked innovator displays a high level of technical and organizational innovation in public service provision and delivery.
   The deadlocked innovator, however, might need to overcome organizational, societal, and legal barriers that constrain its space for action and do not allow this profile to fully grasp its transformative potential.
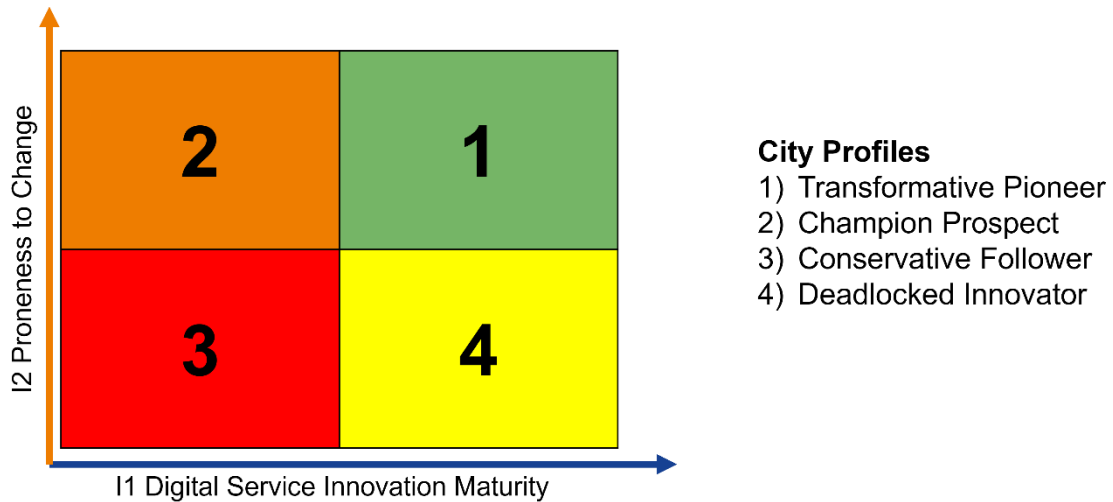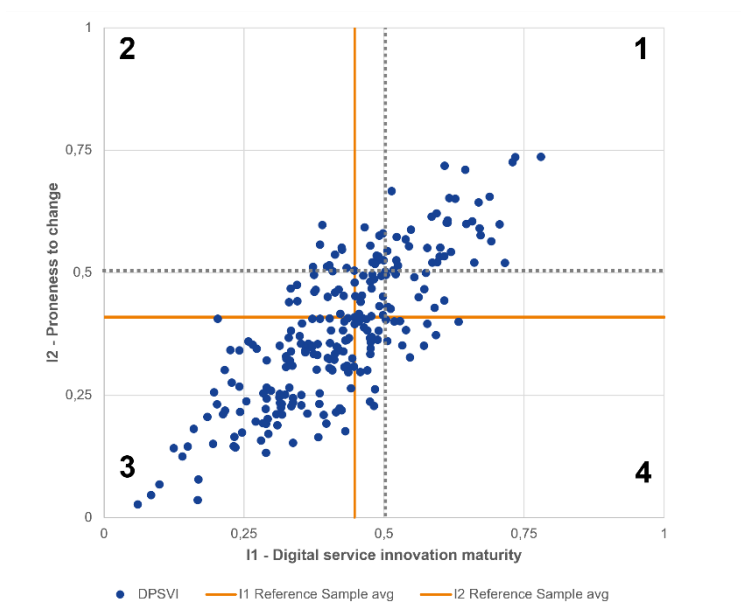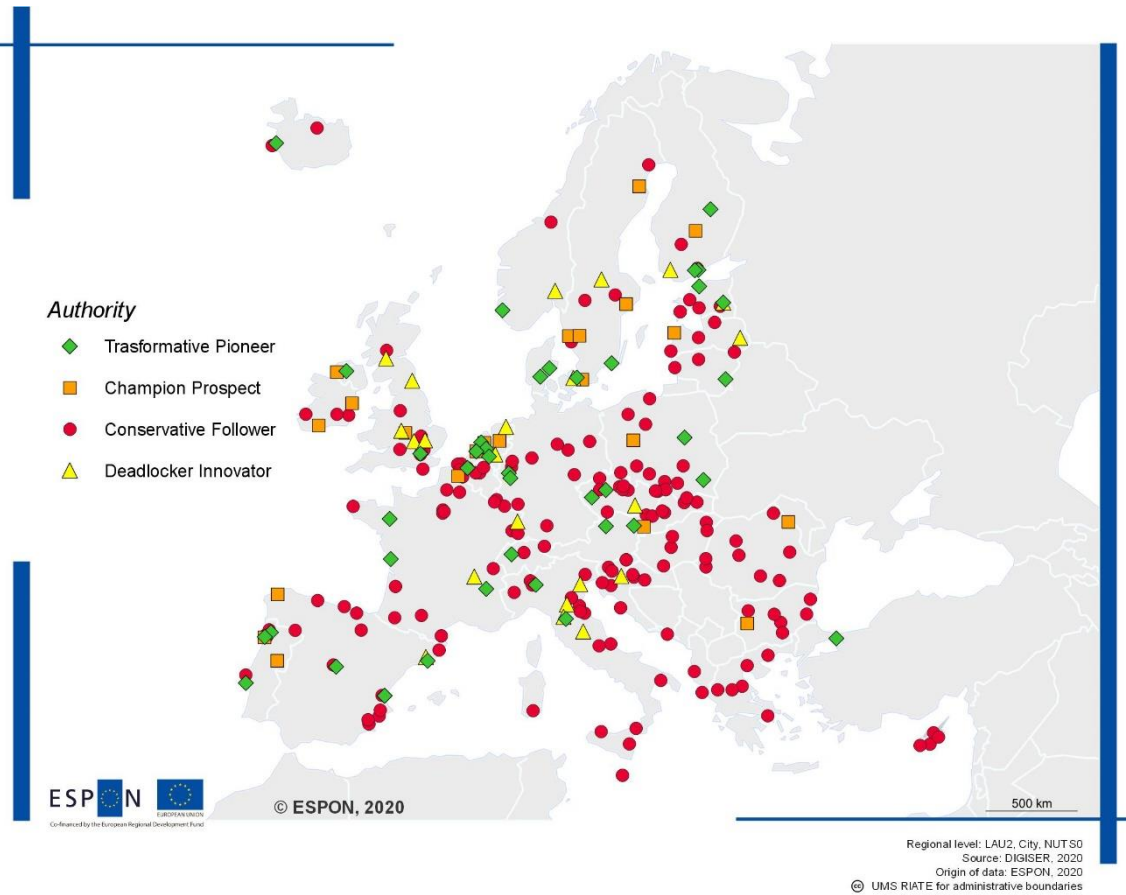
Figure 9 – Semiotic square quadrants

Semiotic square DPSVI shows the results at the highest level of aggregation of DIGISER conceptual categories, representing Digital Service Innovation Maturity and Proneness to Change, on the X- and Y-axes respectively.

Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	All respondents	na

Figure 10 – DPSVI - semiotic square

Authority

◆ Trasformative Pioneer

■ Champion Prospect

● Conservative Follower

▲ Deadlocker Innovator

© ESPON, 2020

500 km

Regional level: LAU2, City, NUTS0
Source: DIGISER, 2020
Origin of data: ESPON, 2020
ⓒ UMS RIATE for administrative boundaries

Map 3 – DPSVI by semiotic square
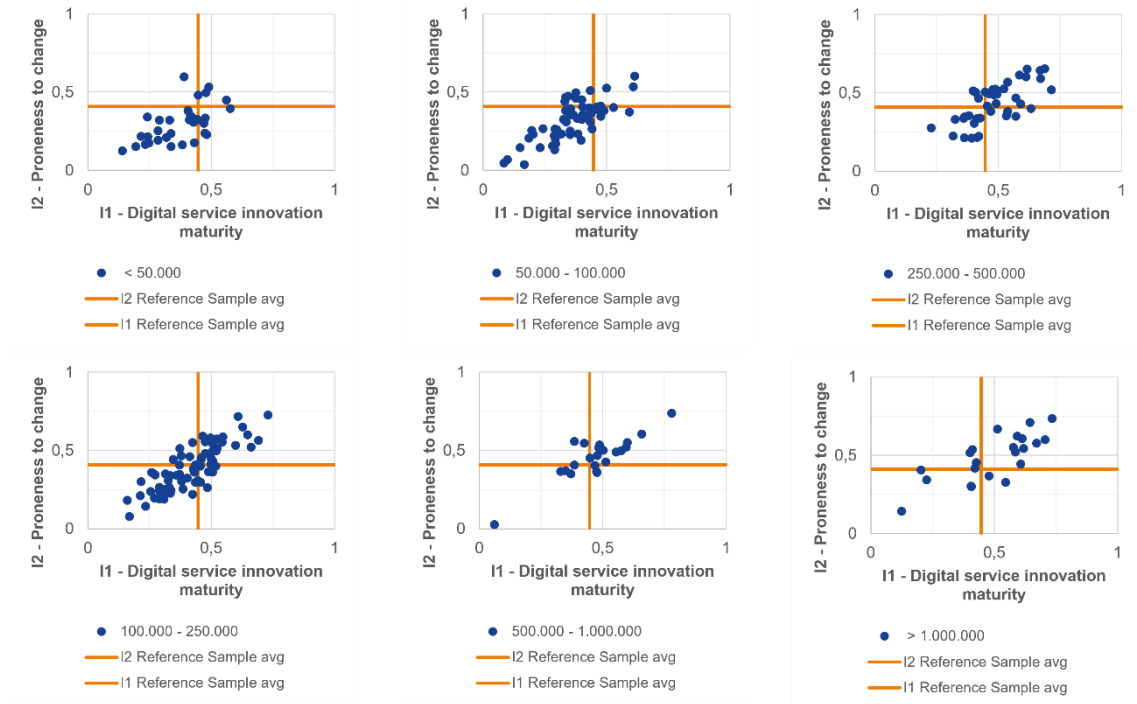
Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	All respondents	Population

Figure 11 – DPSVI semiotic square by population
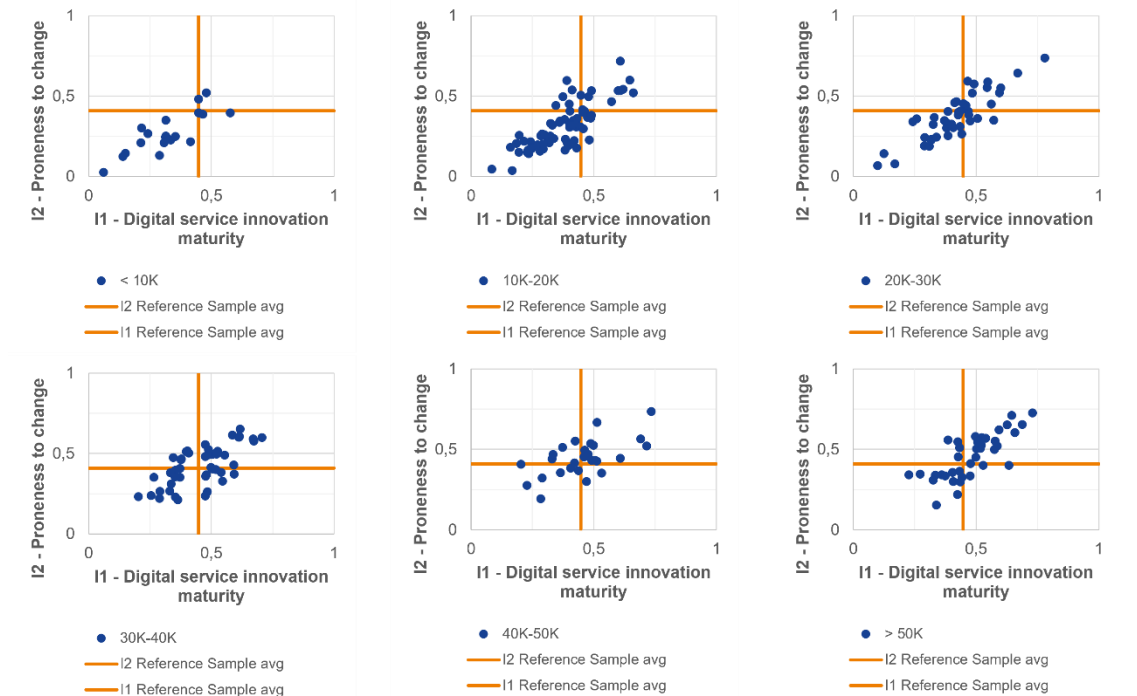
Index observed	Index type	Index level	Data Sample	Clusters
DPSVI	Absolute	Top	All respondents	GDPpc

Figure 12 – DPSVI semiotic square by GDPpc

3 Digital Service Innovation Maturity

3.1 Definition of the indices and exploration of its structure

Digital technologies are deeply affecting people's lives in general, and how people interact with public infrastructures in particular. These technologies, their growing availability and performances, the wide use of data, the wide offer of services provided by a large variety of actors are reshaping the value supply chain of public service and the associated concept of public good. Given this premise, Digital service innovation maturity focuses on the degree of penetration and maturity of technical and organisational innovation in public service delivery, analysing to what extent the creation and implementation of digital innovations can lead advancement in technological infrastructuring, and bring changes in the structures, practices, values and culture of public administrations. Therefore, Digital service innovation maturity analyses on the one side the dimensions of the Digital maturity of a public administration, and on the other, its Level of service embedment.
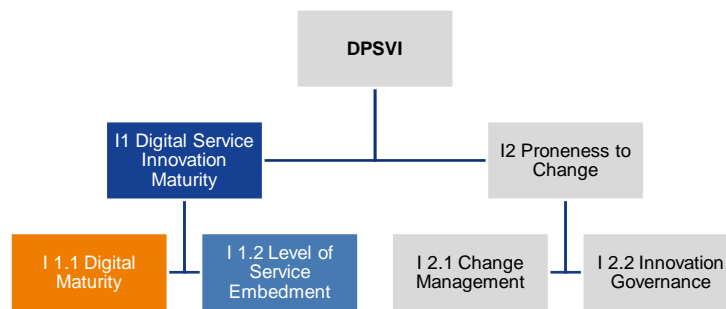

Figure 13 – DPSVI composition
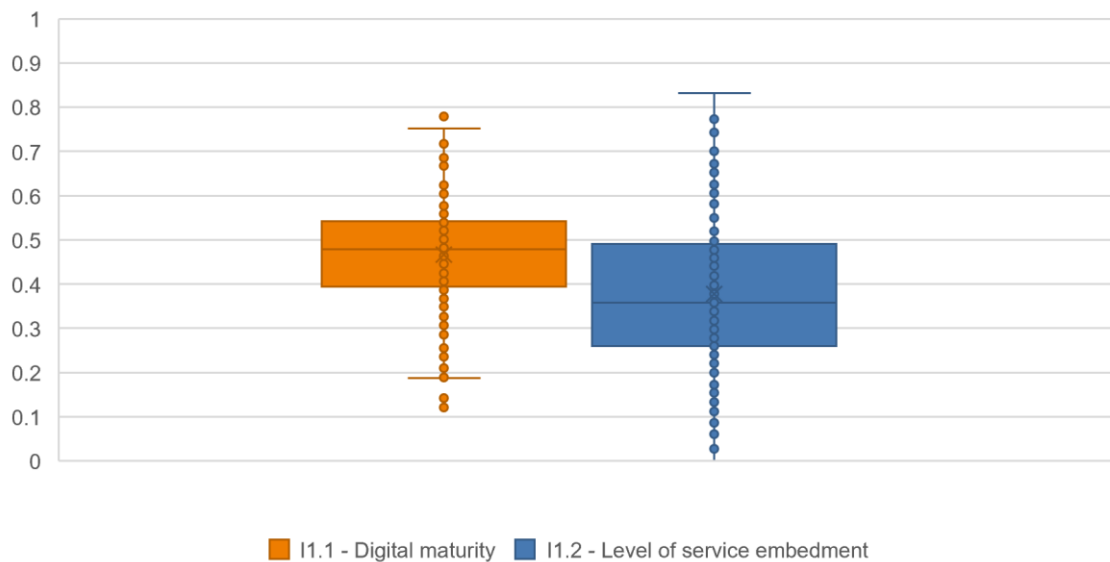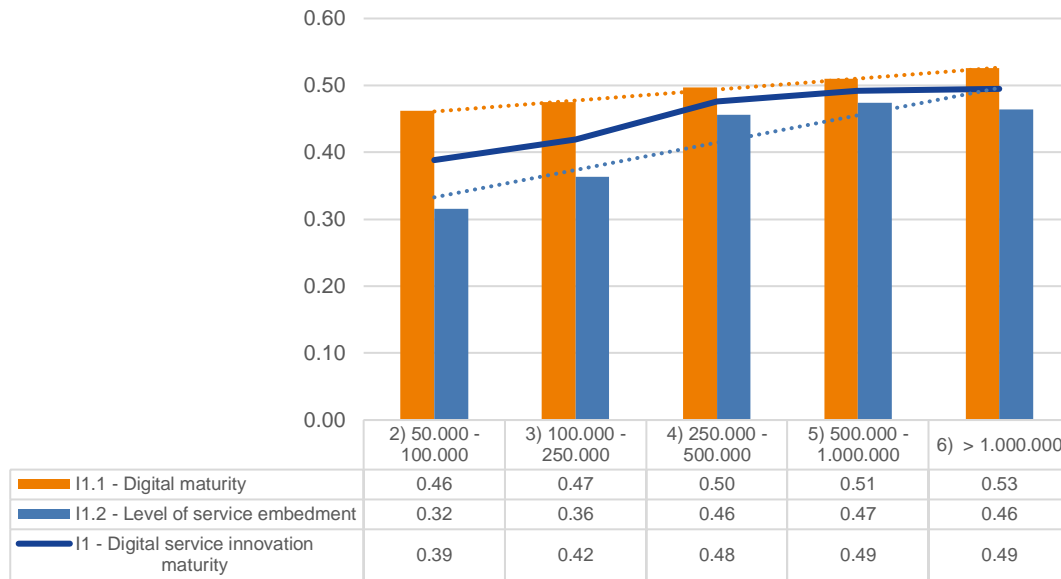

Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	Reference Sample	na

Figure 14 – Digital Service Innovation Maturity overview

3.2   Population

Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	Reference Sample	Population

Figure 15 - Digital Service Innovation Maturity by population

3.3   GDP per Capita
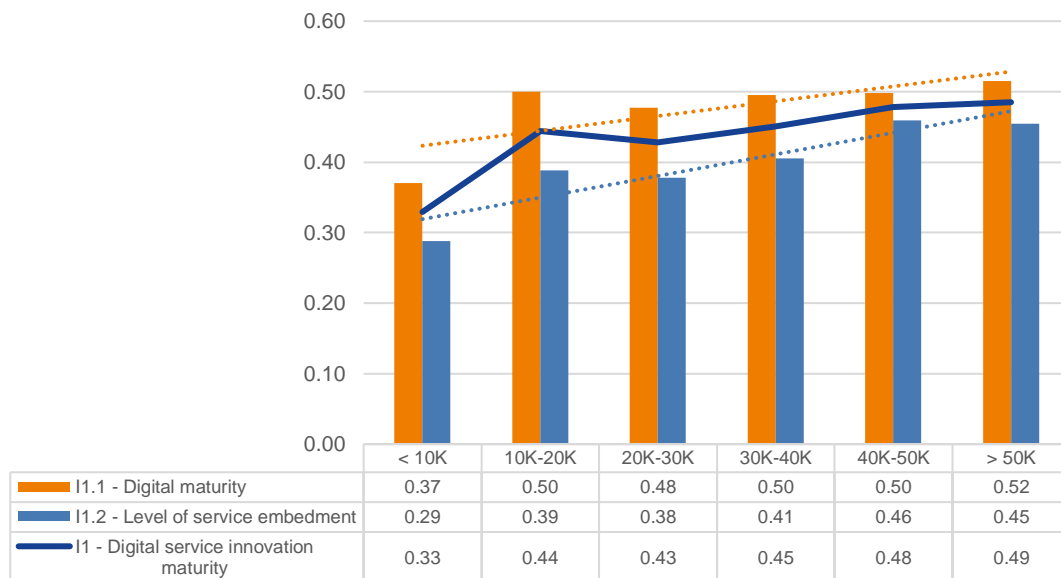
Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	Reference Sample	GDPPC

Figure 16 - Digital Service Innovation Maturity by GDPC

3.4   Authority Type
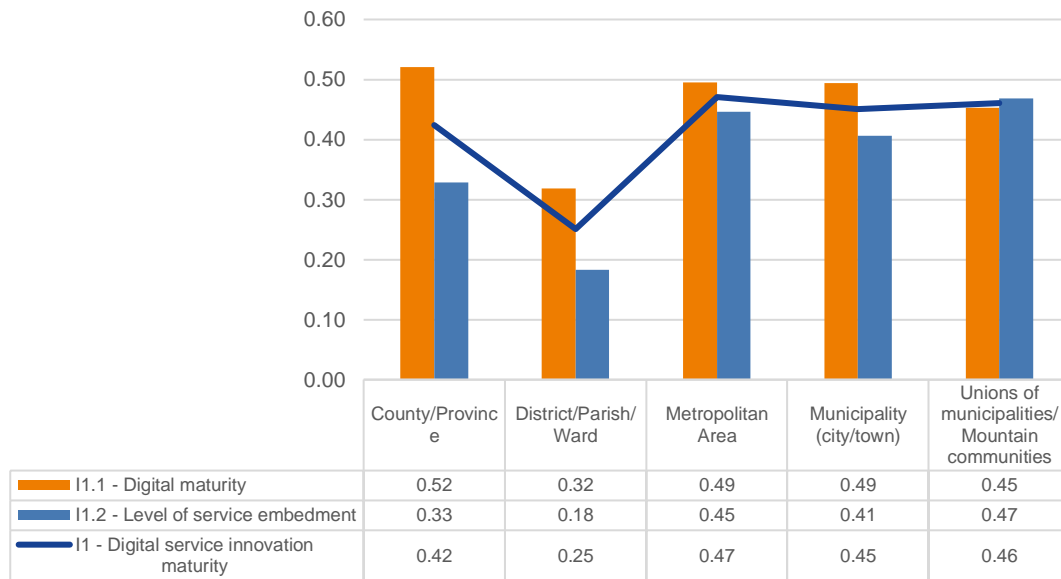
Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	Reference Sample	Authority type

Figure 17 - Digital Service Innovation Maturity by authority type

3.5   Case Studies
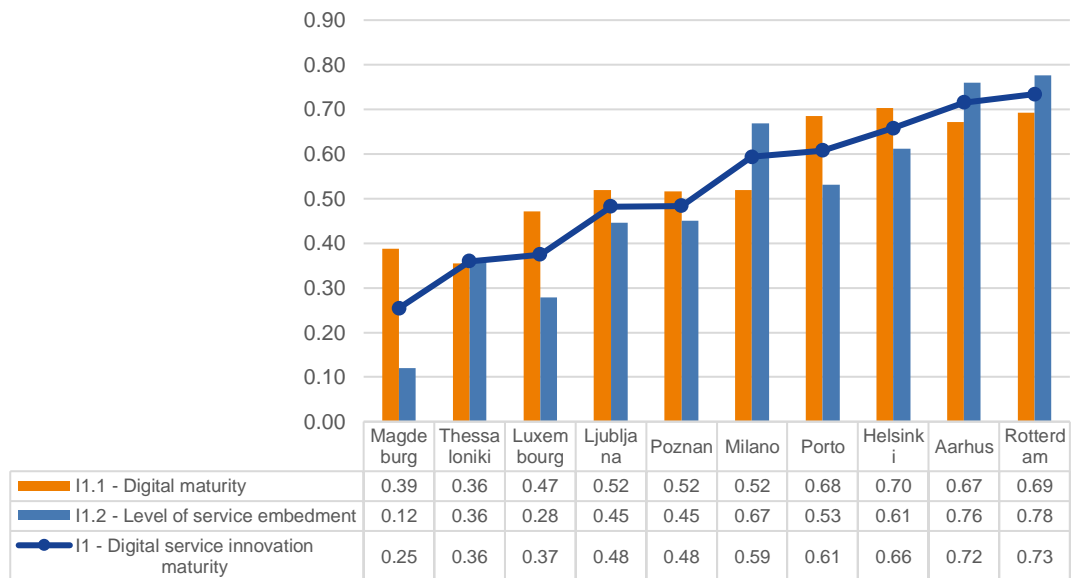
Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	Case studies	na

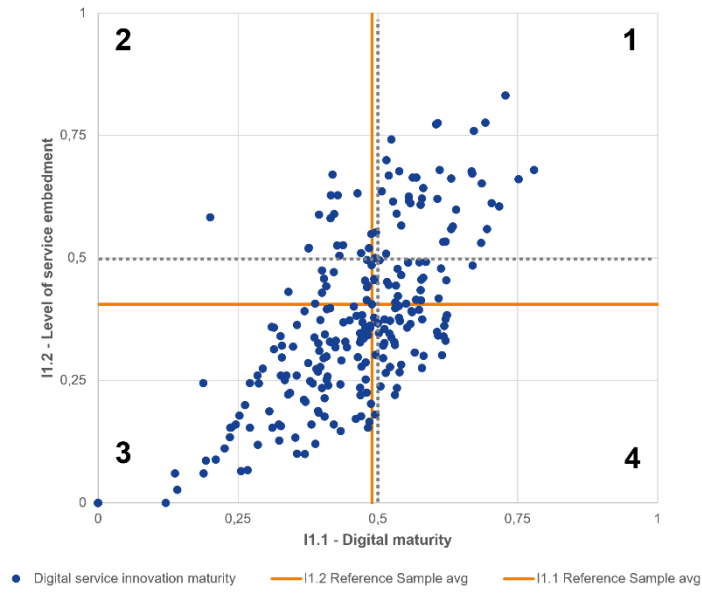**Figure 18 - Digital Service Innovation Maturity, case studies**

3.6   Semiotic squares

Following the ideal-typical approach, semiotic squares are used to provide cities with feedback about their attitudes and behaviours in relation to DIGISER processes and process typologies. Also, they are used to help respondents visualise how they are currently performing in terms of digital maturity and level of service embedment.

To facilitate the interpretation, bisectors are associated with ideal-typical profiles, that characterise each cartesian quadrant. Those are:

1. **Transformative Pioneer**
    Innovative and aware / Change prone
    The transformative pioneer can enhance the overall digitalisation of the public administration, not only supporting a technological shift but also achieving digitalenabled organisational change. This profile succeeded in digitalizing pre-existing internal procedures, adopting new technologies and in using advanced methods and principles to foster organisational innovation. Also, in these Public Administrations digital services are accessible and adopted by most of the citizens, are fully exploited by skilled employees and have been successfully replicated also in other contexts.

2. **Champion Prospect**
    Conservative and unaware / Change prone
    The champion prospect is capable to develop and implement innovative services, that are widely accessible to citizens, that are exploited by public employees and that have also been adopted in other contexts. Despite this high level of internalisation of digital settings in the public administration organisation and setting, the champion prospect has not yet succeeded in achieving digitalenabled organisational change, as it failed to challenge itself while developing new services.

3. **Conservative Follower**
    Conservative and unaware / Change reluctant
    The conservative follower might rely on a good degree of technological innovation but fails in fostering digitalenabled organisational transformation. Also, due to technological, social, organisational, or legal barriers, the innovation of services is not pervasive and face problems in generating impacts that produce changes within the public administration, in the local context or in other contexts through replication.

4. **Deadlocked innovator**
    Innovative and aware / Change reluctant
    The diligent employee embraces new digital technologies and delivers innovative public services, displaying a high degree of digital infra-structural innovation and a positive attitude towards organisational change. Due to technological, societal, organisational, and legal barriers, however, the prisoner cannot fully supply its services autonomously, nor achieve changes in practices and behaviours related to service innovation adoption by local users or by stakeholders acting in other contexts.

Semiotic square shows the distribution of respondent cities around the two processes directly connected to digital service innovation maturity, i.e., digital maturity (on the X-axis) and level of service embedment (on the Y-axes). As for semiotic graph B, also in this case scaling deep, scaling out and scaling up categories used to capture the extent to which the innovation of services is effective and has already generated changes also affect digital maturity, so that the two processes are independent.

Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	All respondents	na

Figure 19 – Digital Service Innovation Maturity results - semiotic square
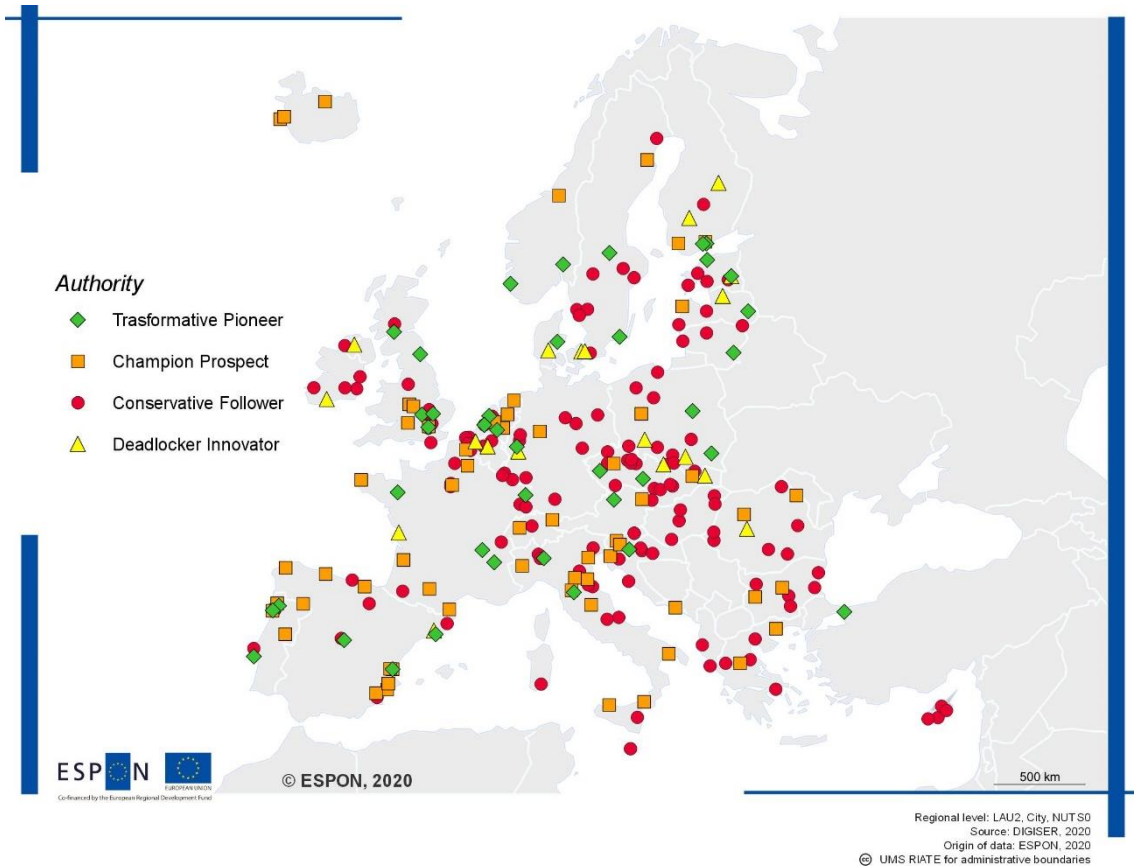
Map 4 – Digital Service Innovation Maturity by semiotic square
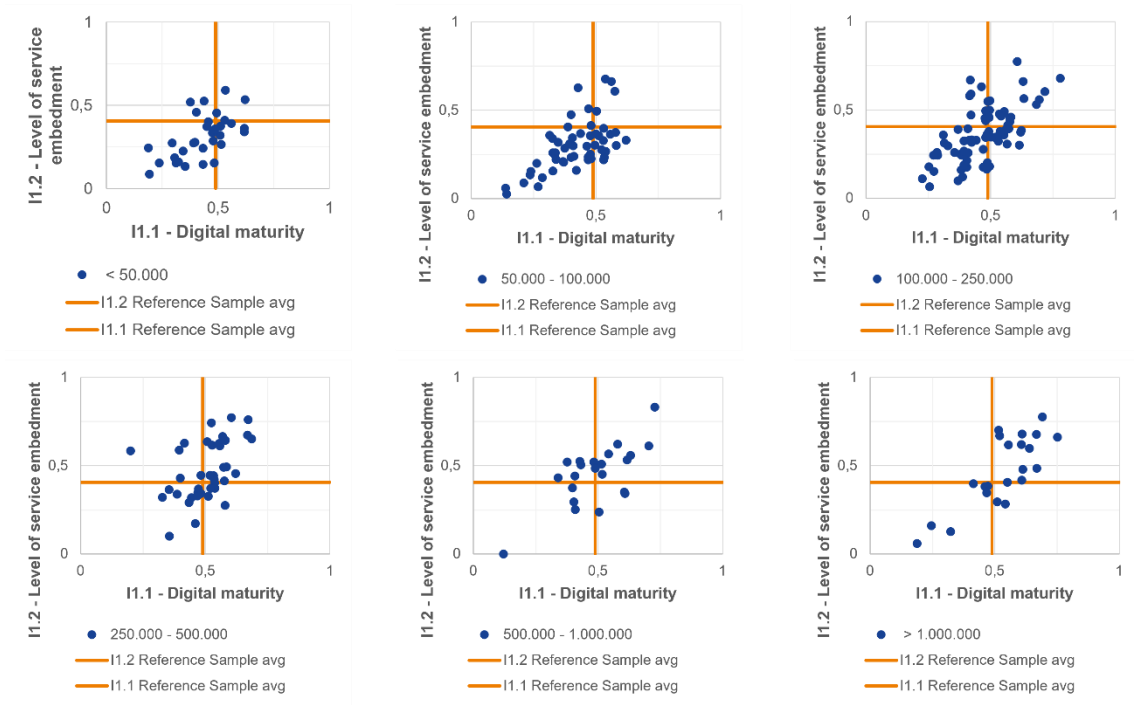
Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	All respondents	Population

Figure 20 – Digital Service Innovation Maturity semiotic square by population

Index observed	Index type	Index level	Data Sample	Clusters
I1 – Digital Service Innovation Maturity	Absolute	Top	All respondents	GDPpc

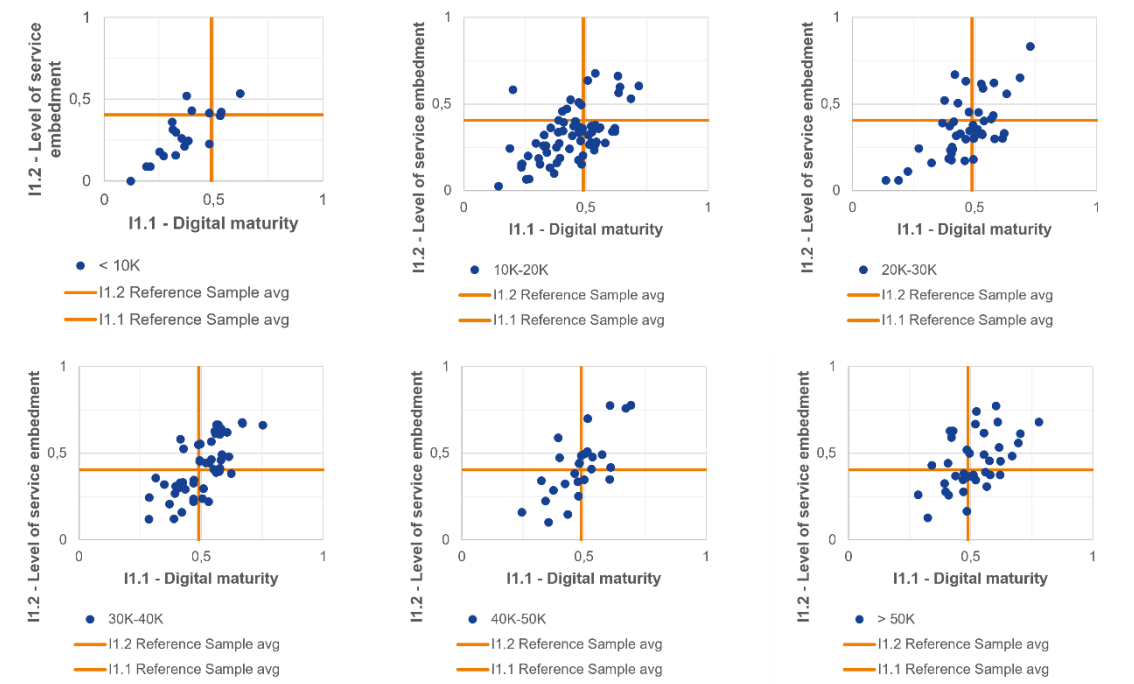**Figure 21 – Digital Service Innovation Maturity semiotic square by GDPpc**

4 Proneness to change

4.1 Definition of the indices and exploration of its structure

Proneness to change relates to the capacity of public administrations to deal with change for engaging in digital innovation and supporting innovation pathways through transitional dynamics. Nurtured by a transition management perspective, it encompasses different levels:

- the strategic level in terms of problem structuring and the definition of long-term goals related to specific and urgent societal challenges;

- the tactical level, referring to agenda-setting, partnership development, and networking;

- the operational level, related to actual experimentation and implementation of innovative policies, practices, and tools.

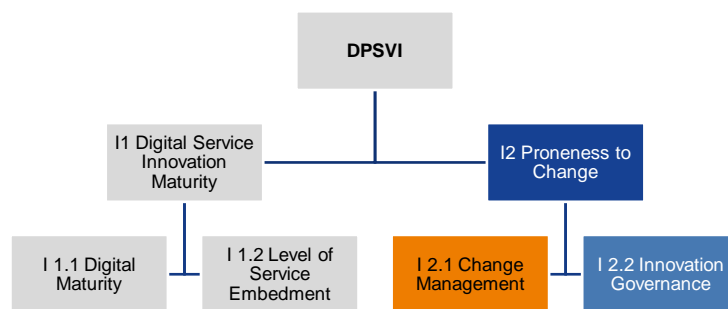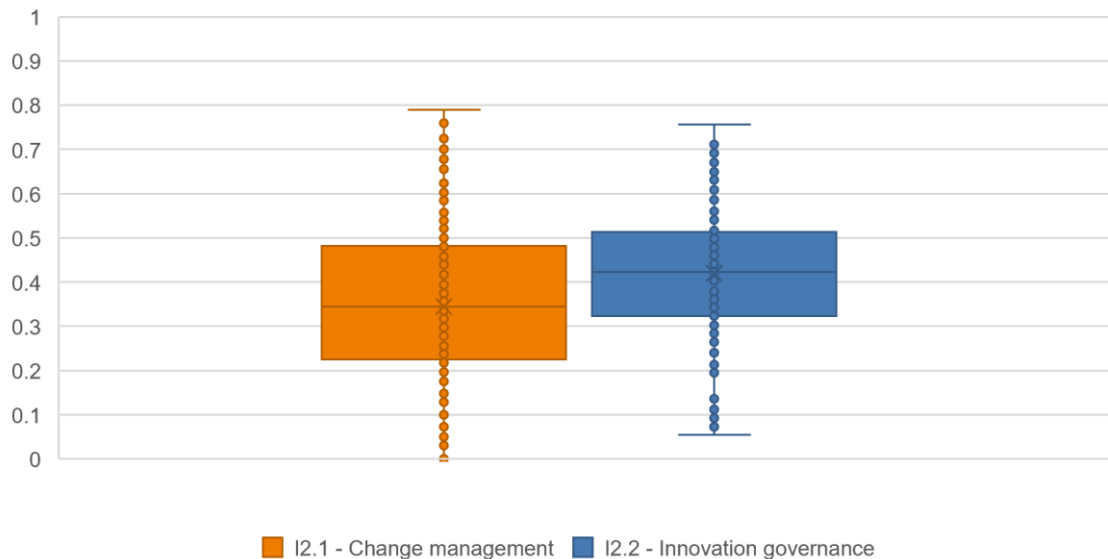**Figure 22 – DPSVI index composition**

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	Reference Sample	na

Figure 23 – Proneness to Change overview

4.2   Population

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	Reference Sample	Population

Figure 24 - Proneness to Change by population

4.3   GDP per Capita

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	Reference Sample	GDPPC

Figure 25 - Proneness to Change by GDPC

4.4   Authority Type
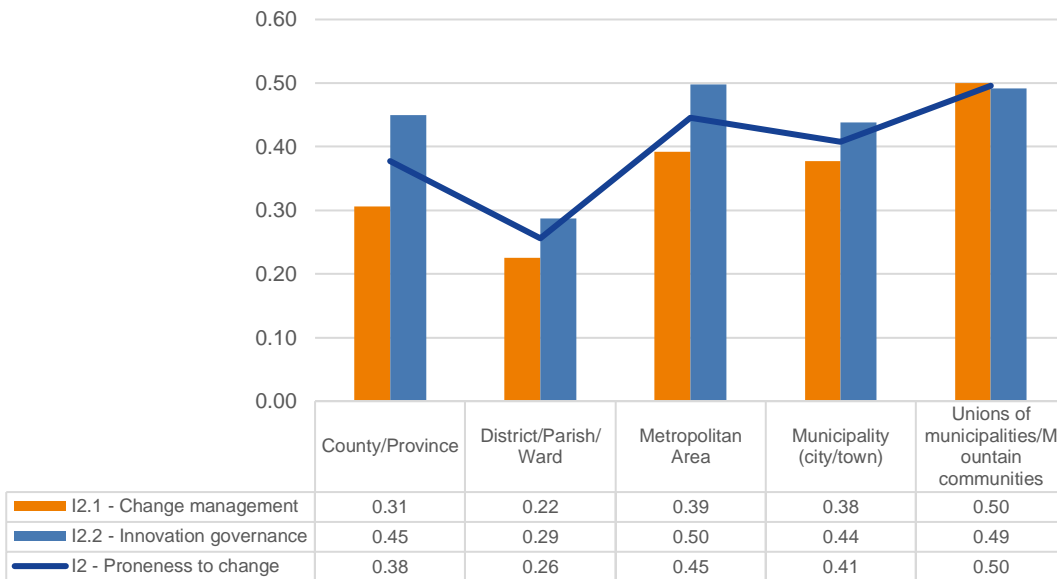
	County/Province	District/Parish/Ward	Metropolitan Area	Municipality (city/town)	Unions of municipalities/Mountain communities
I2.1 - Change management	0.31	0.22	0.39	0.38	0.50
I2.2 - Innovation governance	0.45	0.29	0.50	0.44	0.49
I2 - Proneness to change	0.38	0.26	0.45	0.41	0.50

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	Reference Sample	Authority type

Figure 26 - Proneness to Change by authority type

4.5   Case Studies
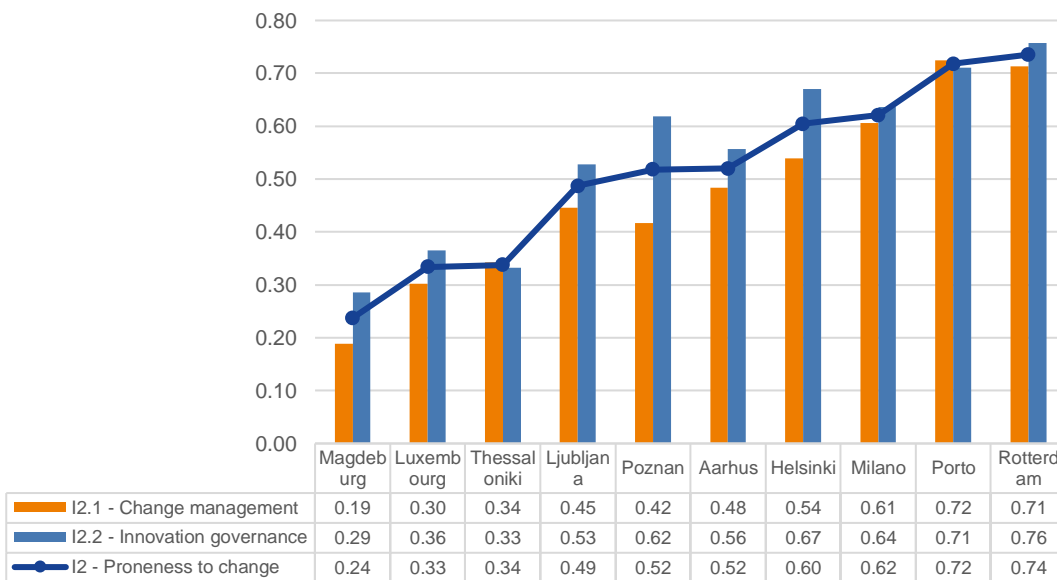
	Magdeburg	Luxembourg	Thessaloniki	Ljubljana	Poznan	Aarhus	Helsinki	Milano	Porto	Rotterdam
I2.1 - Change management	0.19	0.30	0.34	0.45	0.42	0.48	0.54	0.61	0.72	0.71
I2.2 - Innovation governance	0.29	0.36	0.33	0.53	0.62	0.56	0.67	0.64	0.71	0.76
I2 - Proneness to change	0.24	0.33	0.34	0.49	0.52	0.52	0.60	0.62	0.72	0.74

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	Case studies	na

Figure 27 - Proneness to Change, case studies

4.6   Semiotic squares

Following the ideal-typical approach, semiotic squares are used to provide cities with feedback about their attitudes and behaviours in relation to DIGISER processes and process typologies. Also, they are used to help respondents visualise how they are currently performing in terms of innovation governance and change management.

To facilitate the interpretation, bisectors are associated with ideal-typical profiles, that characterise each cartesian quadrant. Those are:

1. **Transformative Pioneer**
   Innovative and aware / Change prone
   The transformative pioneer has a pro-active attitude towards digitalisation. As a public administration, it strives to innovate transversal administrative processes (including data management, societal engagement, or institutional capacity-building) and to use them as leverage to support cross-sectoral digital innovation. It has developed and implemented effective strategies to ensure long-term trans-formative impacts in public sector organisations, generate value in the local context and make innovation practices replicable and scalable

2. **Champion Prospect**
   Conservative and unaware / Change prone
   The champion prospect is not fully using transversal administrative processes to drive cross-sectoral innovation. Even if it might be very successful in developing sectoral innovation strategies, it has a limited capacity to use them to orient broader innovation governance processes. It displays, however, an open and flexible attitude towards change management at the strategic, tactical land operational levels, and has a good capacity to ensure long term transformative impacts in public sector organisations, generate value in the local context and make innovation practices replicable and scalable.

3. **Conservative Follower**
   Conservative and unaware / Change reluctant
   The conservative follower has a limited capacity to use transversal administrative processes to support and orient cross-sectoral innovation governance processes. Also, lock-in mechanisms (e.g., related to their scarce degree of awareness, to limited commitment to change and capacity to act, or to their role and position in their networks) do not allow this profile of PAs to fully support innovation in (digital) service development and provision or to increase its capacity to detect and adopt innovation dynamics developed in different contexts.

4. **Deadlocked innovator**
   Innovative and aware / Change reluctant
   The diligent employee is making significant efforts to enhance innovation governance and to support cross-sectoral governance innovation processes. It developed strategies and measures to enhance innovation e.g., in relation to data management, procurement, societal engagement and institutional capacity-building, and dis-plays a positive attitude towards learning. As for the conservative follower, also in the case of the organisational prisoner lock-in mechanisms do not allow this profile of PAs to fully support innovation in (digital) service development and provision or to increase its capacity to detect and adopt innovation dynamics developed in different contexts.

Semiotic square shows the distribution of respondent cities around the two processes directly connected to proneness to change, namely innovation governance (on the X-axis) and change management (on the Y-axes). As explained in the conceptual model, scaling deep, scaling out and scaling up categories used to capture the degree of effectiveness of change management strategies also affect innovation governance processes, so that the two processes are interdependent.
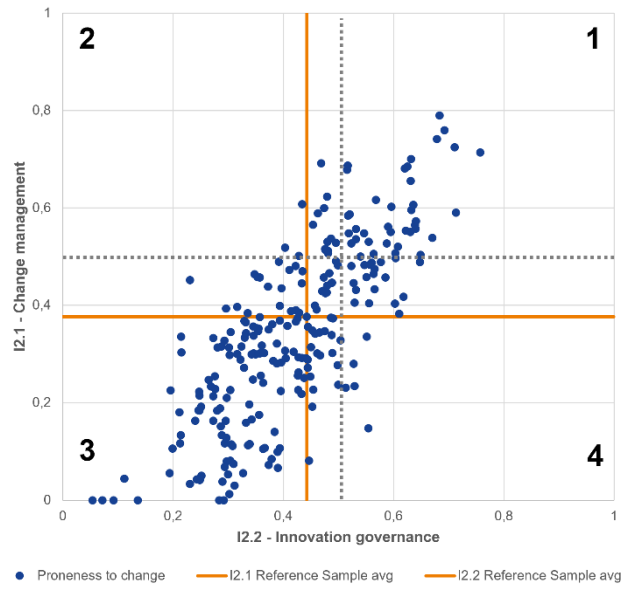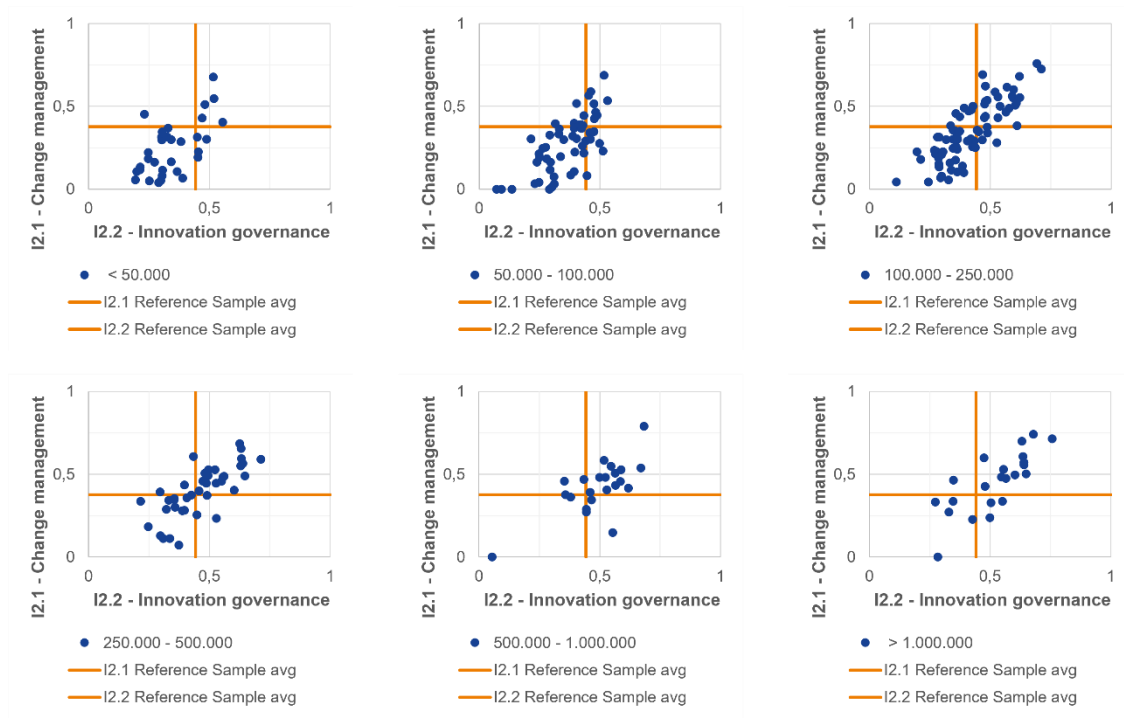
Figure 28 – Proneness to Change in semiotic square

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	All respondents	na
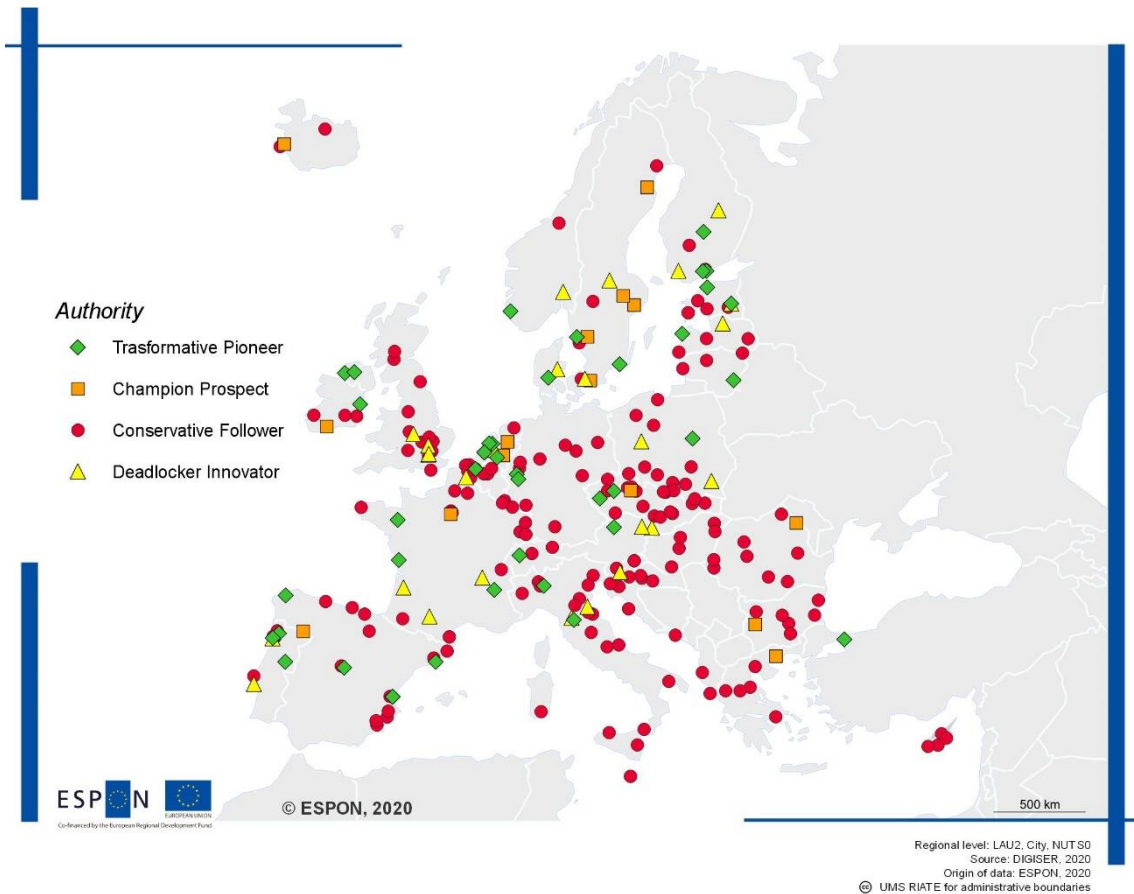
Map 5 – Proneness to Change by semiotic square

Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	All respondents	Population

Figure 29 – Proneness to Change semiotic square by population
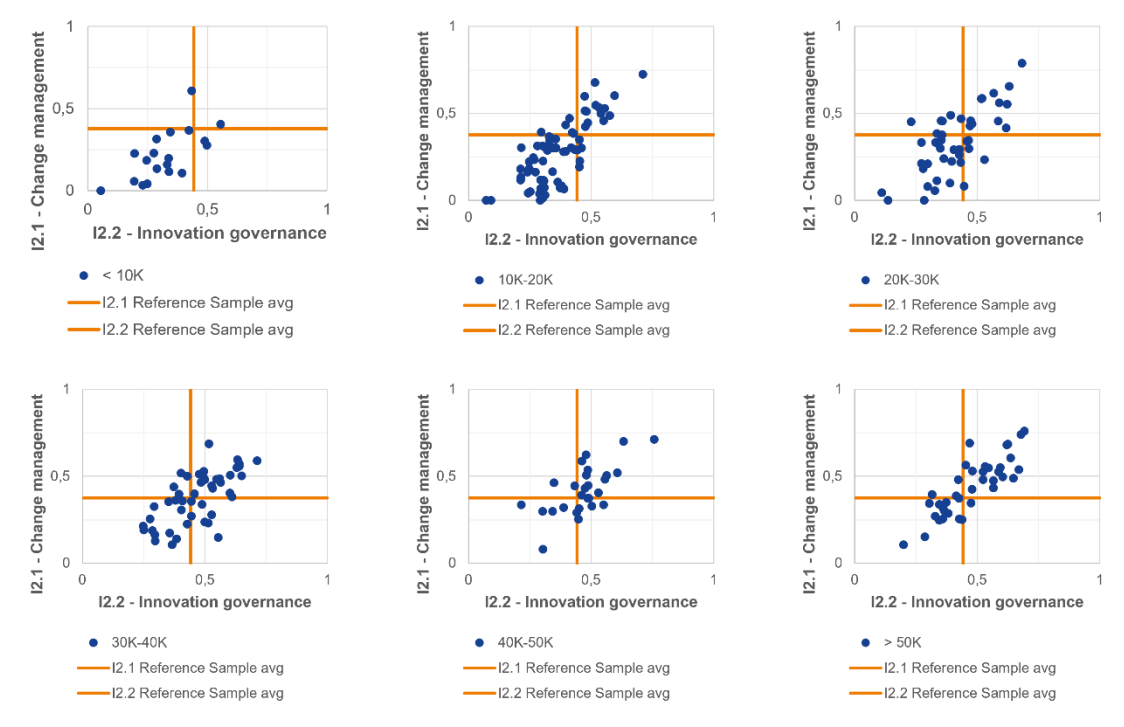
Index observed	Index type	Index level	Data Sample	Clusters
I2 - Proneness to Change	Absolute	Top	All respondents	GDPpc

Figure 30 – Proneness to Change semiotic square by GDPpc

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