ESPON

EUROPEAN UNION

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Inspire Policy Making with Territorial Evidence

Cross-border Public Services 2.0 (CPS 2.0)

Upgrade and update of the European-wide inventory on Cross-border public Services (CPS)

Final report // September 2022

OUTREACH AND UPTAKE OF TERRITORIAL EVIDENCE //

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Table of contents

List of tables and figures

List of tables

List of figures

Abbreviations

AEBR   Association of European Border Regions

CB   Cross-border

CBC   Cross-border cooperation

CBPT   Cross-border public transport service(s)

CEE   Central and East Europe

CPS   Cross-border public service(s)

JRC   Joint Research Centre of the European Commission

IPA   Instrument for Pre-accession Assistance

MOT   Mission Opérationnelle Transfrontalière

PT   Public transport

Introduction

The **ESPON CPS 2.0** study focused on an upgrade and update of the Cross-border Public Services (CPS) inventory produced within the ESPON targeted analysis that was completed in 2018 (ESPON, 2018). This new study aims at making this Pan-European territorial evidence easily available for both public authorities and other public or private stakeholders.

This report provides the overview and the results of the data collection process on the existing CPS throughout the ESPON space. The upgraded CPS Inventory is available in Excel and Shapefile formats, along with a series of maps illustrating the spatial distribution of CPS in Europe; the datasets collected are available on the ESPON Database, as well. The report is structured as follows: Chapter 1 offers the brief overview of the current Cross-Border Public Services, while Chapter 2 describes and presents the validated conceptual framework and methodology used for the Cross-Border Public Services data collection, as well as the process itself. Chapter 3 contains some recommendations for a sustainable future uptake of the new CPS 2.0 inventory, identifying a list of territorial indicators that could be updated periodically. The annexes to this report, provide the technical insights into the new CPS Inventory, as well as a set of 'static' and 'dynamic' maps produced within the study.

The project was run in close coordination with the European Commission - Directorate-General for Regional and Urban Policy - Deputy Director - General for Implementation - European Territorial Cooperation, Macro-regions, Interreg and Programme Implementation I - Interreg, Cross-Border Cooperation, Internal Borders - REGIO.D.2, which has been implementing, in parallel, another, complementary, project on **Cross-Border Public Services (2020CE160AT084)**. Annex I to this report provides an outline of how the two studies complement each other and how the activities have been designed to achieve the best results in overcoming the challenges, while reaching out to as many stakeholders as possible. Within the DG REGIO study the following activities were developed: an updated conceptional framework for CPS, a revised structure of the CPS Inventory, an interactive web application and 30 case studies. The revised and updated inventory structure is the basis on which the ESPON CPS 2.0 was built on. In consequence, building on the parallel evolution of both studies, as well as on previous work done at EU level, the new ESPON CPS 2.0 Inventory is composed of and has benefited from different inputs, as detailed in the box below.

The evolution of the *CPS Inventory*

1. The ESPON CPS study (**ESPON CPS 2018**[1]) provided the starting point for today's CPS inventory, by building the first structure for the database, with roughly 20 indicator fields, and collecting information on about 570 CPS.

2. The revised framework and structure of the database (covering nearly 70 indicators), the validated CPS definition and the framework in which these are operating, is the result of the activities run in parallel, within the complementary DG Regio CPS study (2020CE160AT084 / 2021-2022). The results of this project will be publicly available on the EC website. In addition, new information on CPS was collected when conducting the 30 case studies of the respective project, information which was transferred in the inventory.

3. The ESPON CPS 2.0 study (2021-2022) focused, inter alia, on data collection, for both newly proposed indicators and newly identified CPS. Apart from data originating from ESPON CPS 2.0 study activities, this drew on other studies, in particular the transfer and adaptation of cross-border public transport data collected by another DG Regio study (2020-2021)[2], which yielded about 900 additional CPS data entries.

    In view of these joint efforts and for keeping a good tracing of the complementarity of the 2 projects, the report will refer to the newly, integrated, inventory on Cross-Border Public Services as the **ESPON-REGIO CPS database**.

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[1] Initial Targeted Analysis on Cross – Border Public Services, that can be accessed at https://www.espon.eu/CPS
[2] Providing public transport in cross-border regions – mapping of existing services and legal obstacles, accessed at https://ec.europa.eu/regional_policy/en/newsroom/news/2022/01/13-01-2022-new-study-providing-public-transport-in-cross-border-regions-mapping-of-existing-services-and-legal-obstacles

1   Overview of CPS in the EU

As of 25 May 2022, a total of **1,551 CPS** has been recorded in the European-wide Inventory, out of which 1,533 are active at this date (98.8%). Some are in the planning stage (*soon-to-be* CPS, 0.4%), in a pilot phase (0.2%), and some are temporarily closed (0.3%) or ceased altogether (0.2%). Compared to the initial ESPON CPS database (2018) of 576 CPS, this implies nearly a tripling of entries, but this does not mean that the absolute numbers tripled. This is largely due to a changed data collection approach, which especially concerned the inclusion of newly available transport data (see Annex II). In consequence, the following overview does not include a systematic comparison of 2018 and 2022 to avoid misleading conclusions.[3]

1.1   Geographical distribution and service density along borders

Geographically, they are distributed along all borders between EU14 and EU13 states, as well as with non-EU countries (Figure 1). The highest shares of identified CPS in Europe are along the borders between the six founding EU Member States (i.e., the Benelux countries, France and Germany) and between the Nordic countries. There are also many CPS along the German-Czech and German-Austrian borders, and along the German-Danish border.

Figure 1. CPS in Europe - Place and area of service provision.

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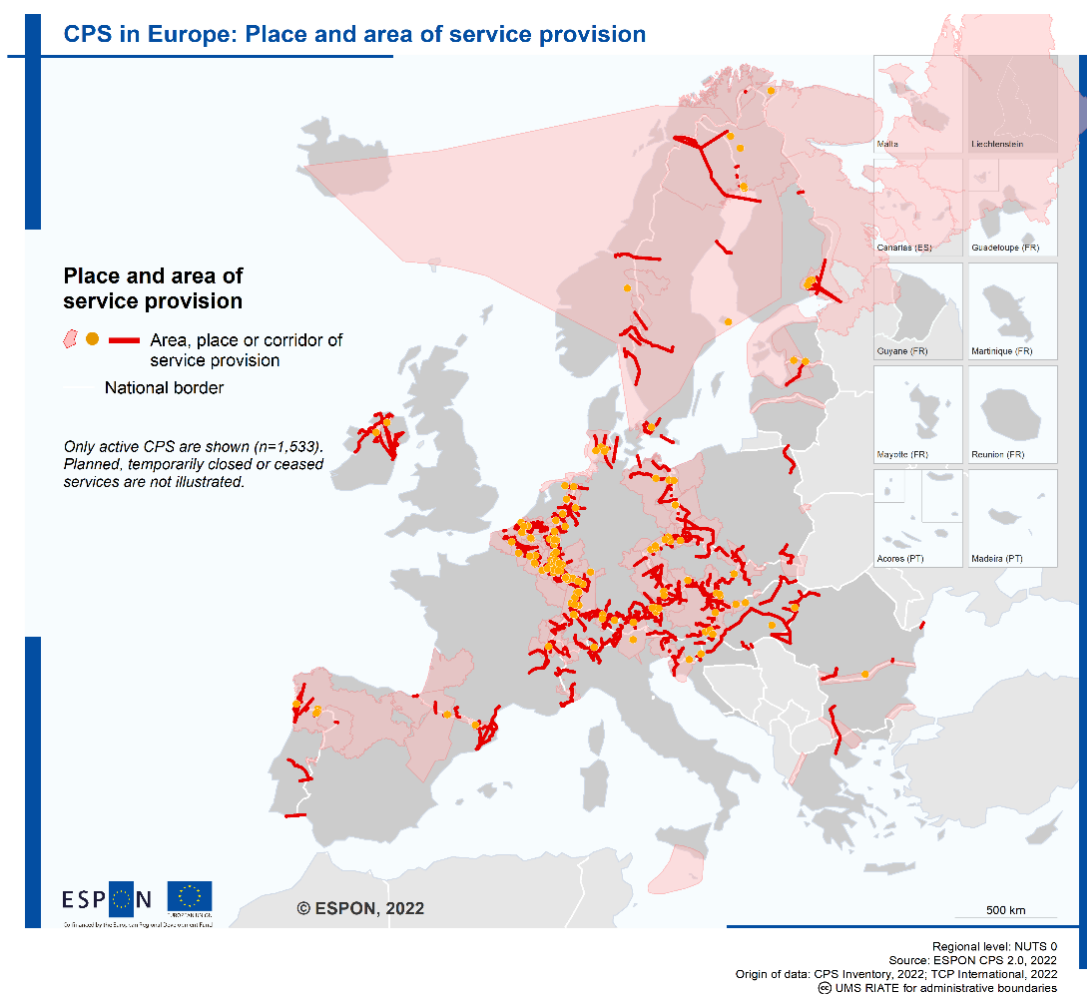
[3] The overview of CPS in the following sections does not always refer to all recorded CPS, since not all information is available for each CPS.

An important indicator to analyse CPS provision is the CPS density per border segment[4]. This indicator confirms that borders with the highest CPS densities are located between the Benelux countries as well as the French, German and Swiss borders (Figure 2). In contrast, other borders have few CPS (for example, Slovakian borders, the Portuguese-Spanish border) or only one or two services such as the Lithuanian-Latvian, Hungarian-Romanian, Bulgarian-Romanian and Bulgarian-Greek borders.

It appears that CPS have primarily developed along borders that either (I) have a long tradition of cross-border cooperation - areas with high population density or rural areas in Western Europe, i.e., where there is high demand for services of any kind and high experience in cooperation, or, (II) in contrary, in areas with extremely low population densities and long distances between towns and villages, i.e., in areas with difficulties and high pressure for maintaining public services (Nordic countries).

Figure 2. Number of CPS per segment of national borders.

Number of CPS per segment of national borders

Number of CPS per border segment

- 0
- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 50

One CPS may cross one or several border segments.

© ESPON, 2022

500 km

Regional level: not applicable
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
UMS RIATE for administrative boundaries
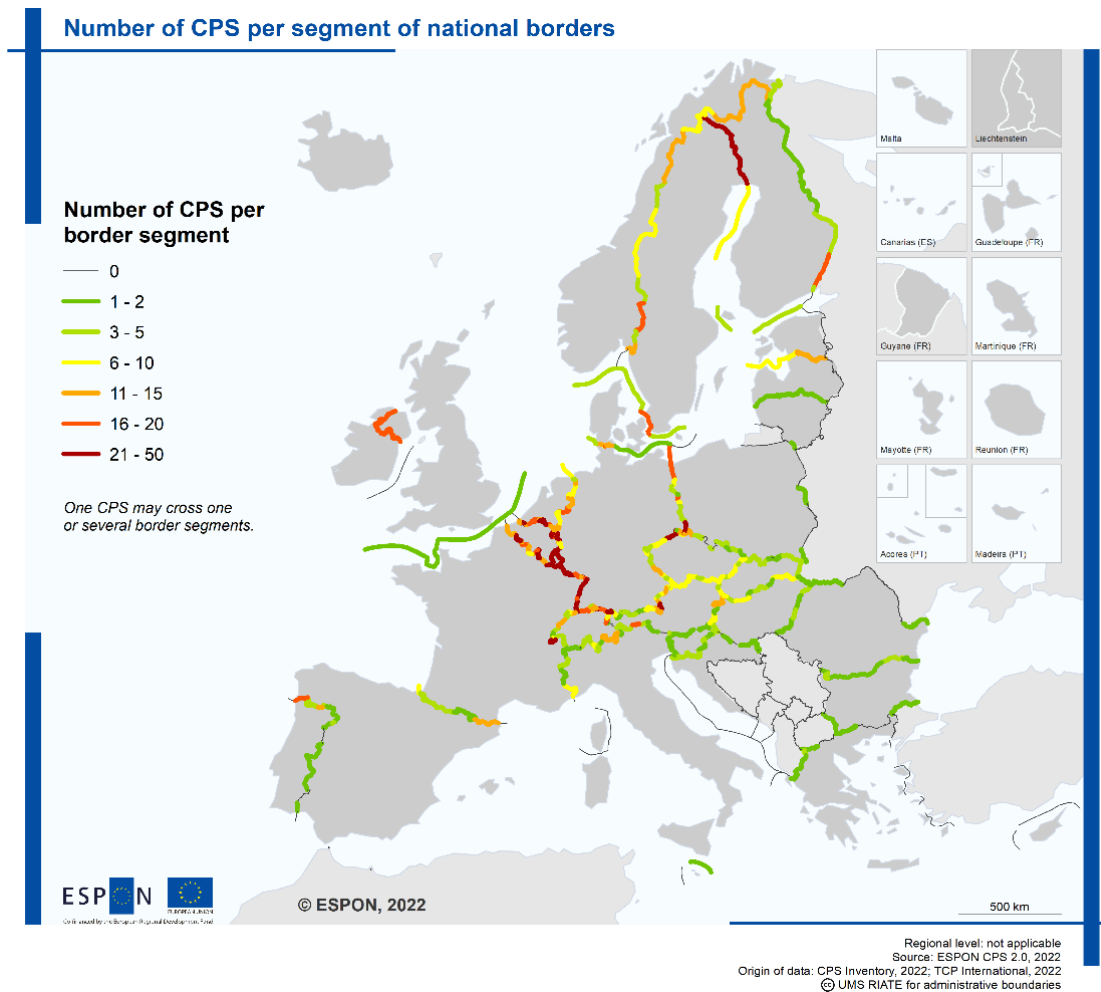
Moreover, there seems to be a negative relation between the size of a country and the number of CPS, i.e., the smaller a country is (like Luxembourg) the greater the need for CPS. Due to the vicinity of national borders in small countries, CPS are vital in many policy areas such as water management (both sewage water treatment and the provision of drinking water), natural assets, labour markets, urban development, and public transport. Furthermore, CPS can make the best use of limited resources for smaller countries.

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[4] Usually, the service area of a CPS crosses several sections of a national border, sometimes even two or more national borders. To be able to analyse the density of CPS in different parts of a national border, the concept of border segments was applied. According to this concept, each national border was split into several border segments, and each segment was assigned a unique ID. This ID was then transferred to all CPS that cross this border segment. The number of services per segment can then simply be added up and mapped.

With 8% of all identified CPS, the Belgian-Dutch border is the one with the highest number of CPS, followed by the Austrian-German and French-German borders with 7.5% each (Table 2). The Dutch-German border is ranked fourth allocating almost 7% of all services. Adding the CPS along Belgian-French (6th), the German-Luxembourgish (8th), the Belgian-German (9th), the French-Luxembourgish (11th) and the Belgian-Luxembourgish (12) borders, it can be observed that 32.5% of all CPS are allocated along the borders of the Benelux countries and their neighbours - France and Germany. The border to a non-EU country with the highest share of CPS is the French-Swiss border with 5.8%, followed by the German-Swiss border with 5.4% (ranked 4th and 5th, respectively).

Table 1 Ranking of borders according to share of CPS

Rank	Border	Share (%)
1	Belgium - Netherlands	8.05
2	Austria – Germany France - Germany	7.53
3	Germany - Netherlands	6.95
4	France - Switzerland	5.84
5	Germany - Switzerland	5.45
6	Belgium - France	5.06
7	Czech Republic - Germany	4.22
8	Germany - Luxembourg	3.51
9	Belgium - Germany	3.44
10	Germany – Poland Norway - Sweden	2.99
11	France - Luxembourg	2.79
12	Belgium - Luxembourg	2.73
13	Italy - Switzerland	2.60
14	Portugal – Spain Ireland - UK	1.75
15	Finland – Sweden	1.69
16	Austria – Czech Republic France - Spain	1.62
17	Austria - Hungary	1.49
18	Germany - Denmark	1.36
19	France - Italy	1.23
20	Austria – Italy Denmark - Sweden	1.17
./.	*Other borders*	*13.44*

Source: ESPON-REGIO CPS database, 2022

A further aggregation of the CPS distribution reveals that almost 63% of all identified CPS are located along EU14 internal borders (Figure 3), compared to only 5.4% along EU13 internal borders. More than 11% of all CPS are situated along borders between EU14 and EU13 countries. Given the high proportion of CPS along Swiss and Norwegian borders, the share of almost 20% of all CPS located along EU and other external borders is not surprising. CPS along borders between non-EU countries currently play only a minor role (0.7%).

The overwhelming majority of identified CPS are between partners from two countries (94.2%), some also between partners from three (4.3%) or four (1.4%) countries (Figure 4); one service (0.1%) even involves partners from five countries. On the one hand, this is not surprising given the fact that most border regions

in Europe are covering just two countries. On the other hand, even in border territories where three or more countries are neighbouring each other (like Greater Region, Liechtenstein, Austrian-Hungarian-Slovak border region), most CPS are only established between partners from two countries, even though there is potential to involve partners from three or more countries.

Figure 3. Share of CPS by border type.

non EU – non EU border 0.70%

EU – other external border 19.90%

EU14 – EU13 border 11.40%

EU13 internal border 5.40%

EU14 internal border 62.60%
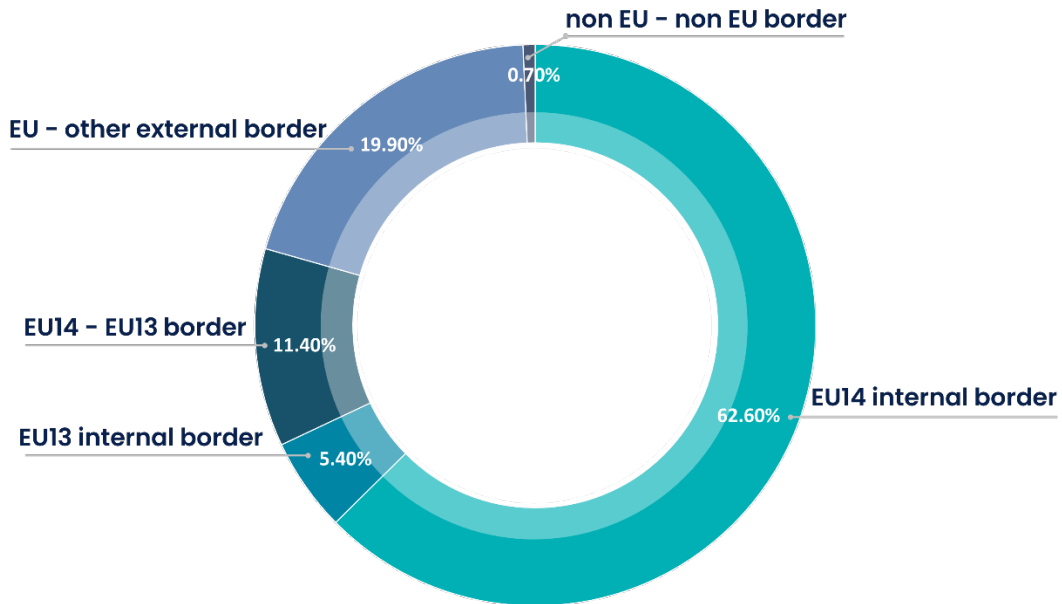
Source: ESPON-REGIO CPS database, 2022

Figure 4. Number of countries concerned by individual CPS.

4 countries 1.40%

3 countries 4.30%

5 countries 0.10%

2 countries 94.20%
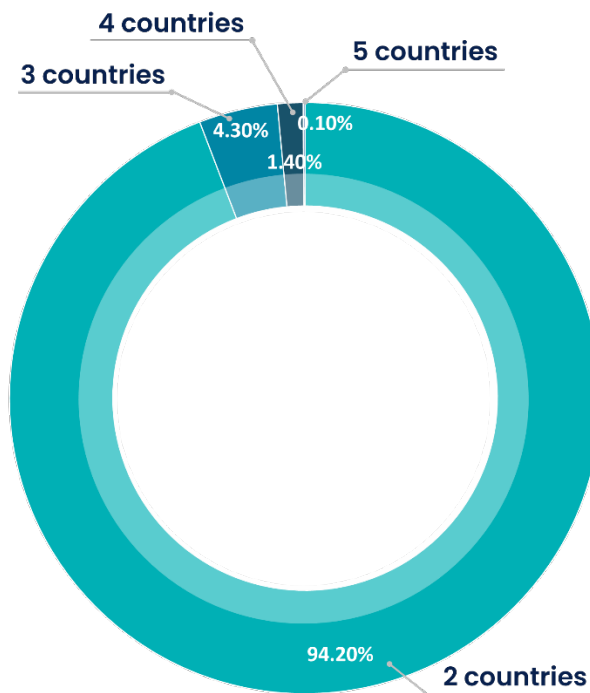
Source: ESPON-REGIO CPS database, 2022

1.2   Policy areas addressed

CPS address a broad spectrum of policy areas, and can be set up for one policy area, sometimes two or more. By far, most identified policy areas for CPS are for transportation services (Table 3); this adds up to 966 or 61.5% out of the total. These are followed by CPS in environmental protection and civil protection and disaster management, with shares of 8.6 and, respectively, 8.5. The important role of these two policy areas can be explained by the fact that many national borders pass through conservation areas, are along sensitive water bodies or through areas with high exposure to environmental or geological risks. CPS in education and training are fourth with about 5%, followed by services in healthcare and spatial planning/tourism/culture, which are accounting for slightly lower shares. Although only in the 7th place (accounting for 50 services), CPS play an important role in the labour market sector on many borders. Close behind are CPS in the area of civil society, justice and public security. Finally, cross-border services in the area of communications, broadband and the information society have had very little relevance to date, accounting for less than 1% of all services.

Table 2 Policy areas addressed by CPS.

Rank	Policy area	Frequency	Share (%)
1	Transport	966	61.5 %
2	Environment protection	135	8.6 %
3	Civil protection and disaster management	133	8.5 %
4	Education and training	81	5.2 %
5	Healthcare and social inclusion	77	4.9 %
6	Spatial planning, tourism, and culture	71	4.5 %
7	Labour market and employment	50	3.2 %
8	Citizenship, justice and public security	43	2.7 %
9	Communication, broadband, and information society	10	0.6 %
10	Other themes	4	0.3 %
	Sum	*1,570*	*100.0 %*

Note: Some CPS are assigned to more than one policy area. Source: ESPON-REGIO CPS database, 2022

The spatial distribution of CPS policy areas is quite uneven across Europe (Figure 5), with a concentration on borders that show a clear focus on one or two policy areas, contrasted with borders showing a mixture of a wider array. For example, CPS in the Nordic countries have a strong focus on civil protection and disaster management on the one hand, and healthcare on the other. In contrast, CPS in the Baltic States are predominantly concerned with citizenship, justice and public security. CPS along the Czech-German and Austrian-German borders concentrate either on environmental protection (including sewage water treatment) or transport services. The Belgian-French border area is a forerunner in healthcare CPS. Other borders like the British-Irish border or the German-the Netherlands border cover a wider array of fields and interventions, thus reflecting various policy objectives and public needs.

It can be concluded that the policy areas addressed in the various CPS reflect (taken separately or combined):

- regional topography and natural assets and specificities (for example, CPS on environmental or in civil protection and disaster management);

- high demand for services (for example, CPS on transport or in spatial planning, tourism and culture, as well as education and training);

- urgent political issues (for example, CPS in healthcare and social inclusion, labour market and employment, citizenship, justice and public security).

Figure 5. CPS by policy area.
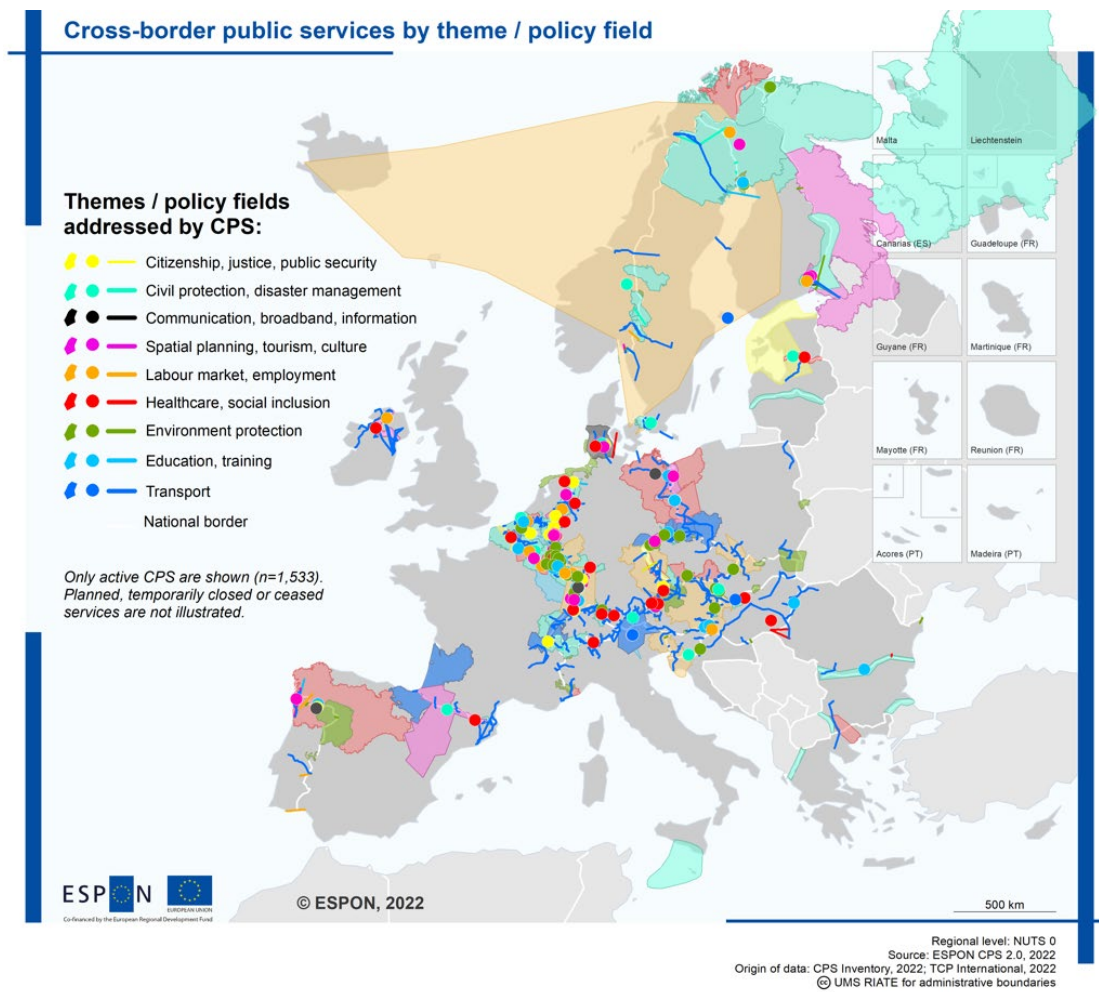
1.3 Target groups

CPS may address unspecific as well as very specific target groups (Table 4). By far the largest target group, accounting for more than 41% of CPS, is the general public, attempting to address as broad a spectrum of the population as possible. Conversely, this also means that more than half of the CPS are aimed at a specific target group. Among the special target groups, the following categories stand out: cross-border workers (7.5%), tourists (6.6%), pupils, students and apprentices (6.3%), job seekers (5.6%), and fire brigades and rescue services (5.1%). In other words, CPS providing services on education and labour market account for almost 1/5 of all addressed target groups.

Other specific target groups seem to have lower shares, and are comprised of economic actors (4.3%), residents (4%), people requiring medical or permanent care (2.9%), or police and customs (2.9%). Adding up to 13.5% of all services.

Table 3 Target groups addressed by CPS.

Target group	Frequency	Share (%)
General public	998	41.3 %
Cross-border workers	182	7.5 %
Tourists	160	6.6 %
Pupils/students and apprentices of all ages	151	6.3 %

Job seekers	135	5.6 %
Fire brigades and rescue services	123	5.1 %
Economic actors (companies/entrepreneurs)	103	4.3 %
Residents	96	4.0 %
People requiring medical or permanent care	71	2.9 %
Police and customs	71	2.9 %
Other target groups	326	13.5 %
Sum	*2,416*	*100.0 %*

Note: A CPS may address several different target groups. Other garget groups include families with small children, public transport users, sector authorities, fire brigades and rescue services, households, schools and universities, elderly people and people with disabilities, employment agencies, athletes, police and customs. Source: ESPON-REGIO CPS database, 2022

1.4   Obstacles encountered

In many cases, obstacles have to be overcome when implementing a CPS. One obstacle may arise individually, or several can occur simultaneously, but usually these are manifold in nature. Obstacles can be classified into administrative and institutional obstacles, into economic, demographic and cultural divides, as well as into legal, technical and physical obstacles (Figure 6). The most often encountered obstacles are of administrative and institutional nature, followed by legal obstacles. Economic, demographic and cultural differences are the third most cited, while technical and physical barriers hardly play a role.

Figure 6. Obstacles encountered when setting-up a CPS.
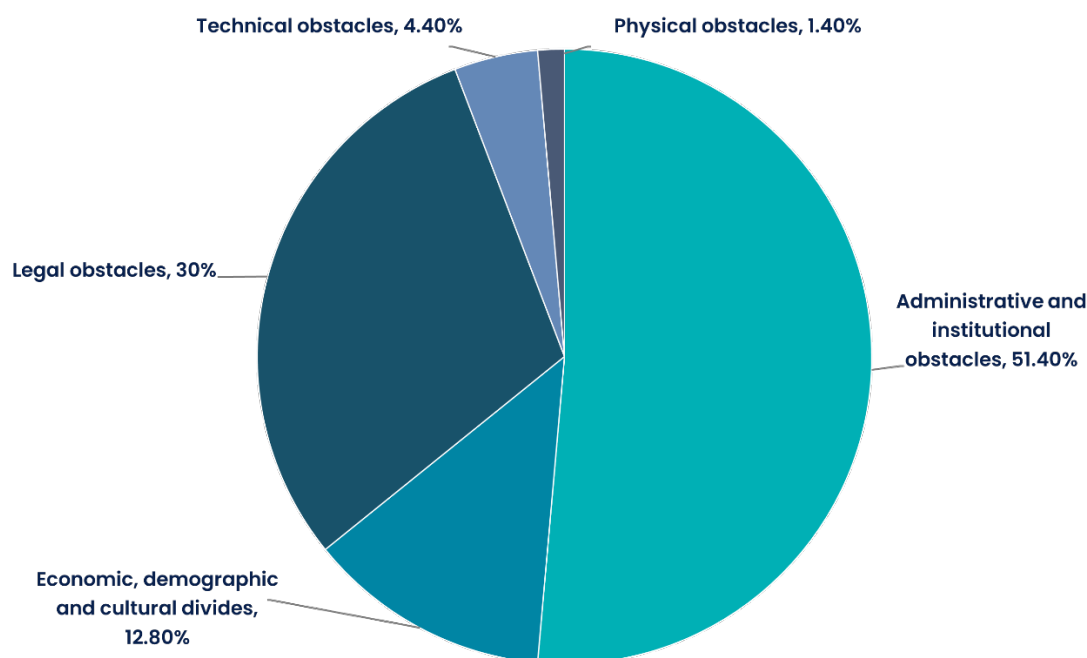
Source: Source: ESPON-REGIO CPS database, 2022

1.5   Temporal development

The development of CPS until 1990 was quite moderate. Although some CPS forerunners can be dated back as far as 1932,[5] in the period until 1990 only few initiatives were launched to implement cross-border services. A few CPS were indeed established, but often the necessary legal frameworks were missing, and cross-border cooperation has not been given a high political relevance in those times. By way of consequence, before 1950 only one CPS was established across all policy fields, from 1950 to 1959 a total of 5, between 1960 and 1969 there were 7, and in the following decades 17 (1970-1979) and 20 (1980-1989), respectively. 1990 can be considered as a key year for CPS development (Figure 7); the following decades saw a significant increase in the establishment of CPS throughout Europe: 108 new CPS between 1990 and 1999, another 137 new CPS from 2000 to 2009, and up to this date since the year 2010, another 192 new CPS were identified.

Figure 7. Number of new CPS established in a year between 1970 and 2022.
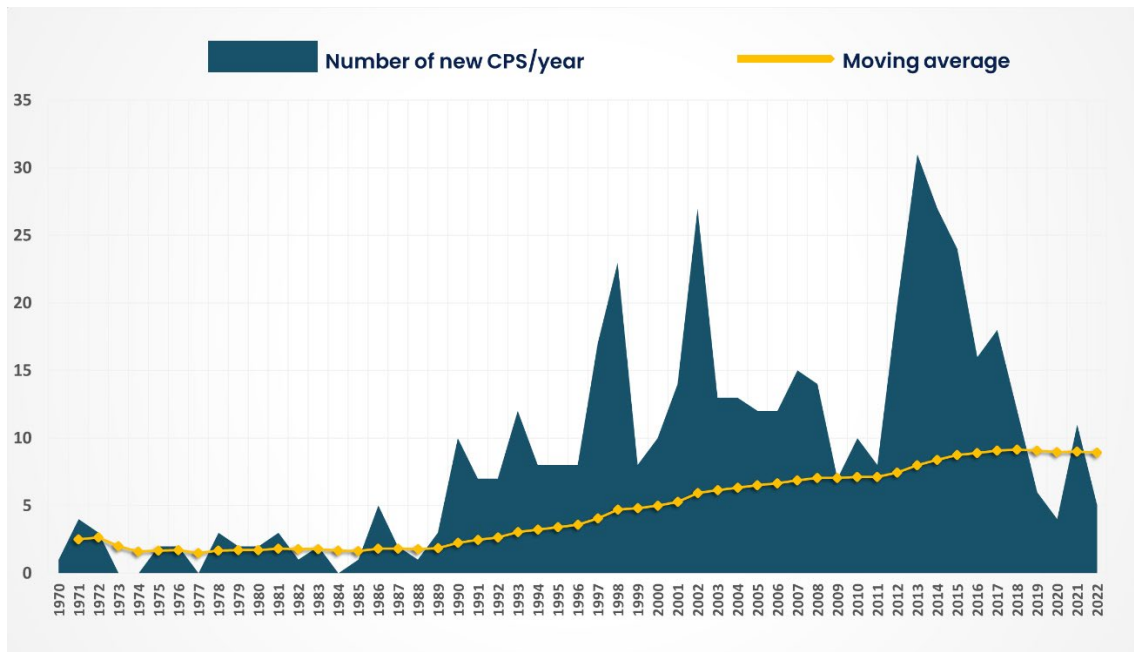
Source: Source: ESPON-REGIO CPS database, 2022

Figure 8 illustrates the spatio-temporal development of identified CPS throughout Europe, in 5-year increments. Until 1989, the few CPS services that were implemented each year, were mainly registered between France and Germany. Increasing dynamics in the coming ten years still kept the focus on Western Europe. Only after the year 2000, Eastern European countries recognised the power of the CPS instrument and started to use it widely. In the first years, German-Czech cooperations were initiated, and later CPS along the Austrian-Hungarian and Slovenian borders started.

However, since 1990 the number of CPS in Europe is slowly and steadily growing, with an average of 5 to 10 newly identified CPS per year (Figure 7). The steady increase in new CPS per year is also reflected by the moving average of annually newly established CPS. In 1991, this average jumped to 2.45, followed by next jumps to 3.04 in 1993 and to 4.07 in 1997. Since then, the averages steadily increased with further jumps in 2002 (from 5.28 to 5.94) and in 2013 (from 7.44 to 7.98). In 2018, the average reached its temporary peak of 9.14.

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[5] For some transport services the dates of first implementation go even further back but have not yet been considered in the CPS Inventory.

Figure 8. Temporal development of CPS provision (1960-2022).

Development of CPS over time (5-year increments)

● — ▬ CPS (punctual, linear, areal)

Only those CPS are shown, for which information on the implementation year are available (i.e. 493 out of 1,551 CPS are shown). Implementation year is the year when service provision started.

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Source: CPS Inventory, 2022;
TCP International, 2022
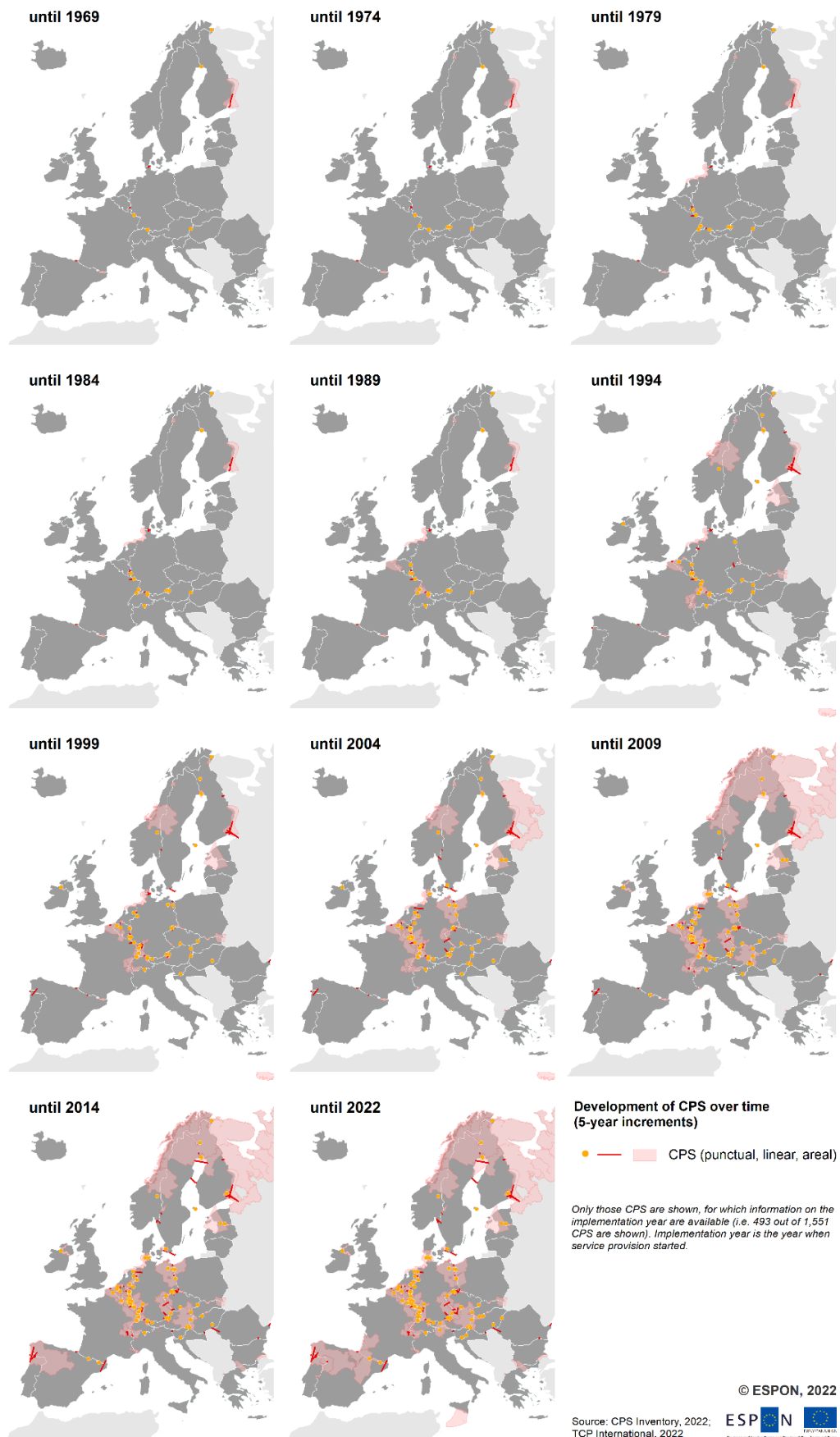
2 The conceptual framework and data collection process for the CPS inventory

2.1 Conceptual framework

The revision of the original ESPON CPS (2018) definition carried out within the DG Regio CPS study concluded with a few alterations of its main characteristics. One characteristic (delivery) was removed from the original ESPON CPS definition, as it can be covered by other characteristics (no.1 'materialised' and no. 10 including CPS that have ceased since inclusion in the database). For consistency, the order of characteristics was amended, exchanging 'thematic fields' with 'public nature of a cross-border public service (financing)'. But, most adjustments aim at providing additional information to be included in the new CPS Inventory, rather than altering the understanding of what a CPS is. Table 4 below outlines the new definition indicating the main changes in *italics and orange*.

Table 4 Revised proposal of CPS characteristics (definition).

Characteristics of CPS
1. *Service* **area** – A CPS covers a specified area and must have already materialised in the cross-border area.
2. Joint problem or opportunity – A CPS addresses a joint problem or development opportunity in the cross-border area.
3. Target groups – A CPS shall have a target group on both sides of the border, even if it is targeted in quite different ways.
4. Non-discriminatory – Within the target group there is no access restriction for using the CPS.
5. Composition of actors – CPS *usually* include actors from both sides of the border*, as well as border bodies such as EGTCs, that* are involved in initiation, establishment/financing and/or provision. However, the degree of involvement can vary. *A service delivered by an entity from one side of the border is a CPS if there are users on both sides of the border and all other characteristics of the definition are fulfilled.*
6. Public nature of a cross-border public service (organisation and provision) – A CPS is publicly organised and may be directly provided by a public body or a private/ non-profit organisation via a concession*, delegation or other contractual / regulatory arrangements.*
7. **Public nature of a cross-border public service (financing)** – A CPS is publicly *(co-)*financed.
8. **Thematic fields** – A CPS can be provided in any of the listed policy fields within the inventory. The sub-fields are not exhaustive, *and one CPS may be assigned to more than one policy theme or field of intervention if this describes the service and target groups.*
9. Service vs infrastructure – A CPS is a service which means that the mere existence of a (hard) infrastructure does not represent a service (e.g., a cross-border bridge, road or pipeline).
10. Timeframe – A CPS offers a long-term service provision, i.e., there is no limited timeframe as with 'one-off projects'. *Service provision may differ over time.*
11. Delivery – ./.

Note: Amendments to the original definition highlighted in blue and based on DG Regio CPS study (Deliverable 1). Source of the original definition: ESPON CPS, 2018

2.2 Data collection

The update process entailed the collection of the specific information for each CPS, and filling in the new inventory fields (see Annex II).

In most cases, several sources had to be consulted, since individual sources rarely provide all the necessary information. The following data sources were used:

- **CPS providers**: The actual service provider should be the primary data source as they know the service best. Thus, if a CPS in a border area is already known, direct contacts should be established with the service providers.

- **CPS websites**: The CPS website should also be consulted.

- **Formal documents**: Documents published when service was established or submitted for regulatory approvals also often contain valuable information about the CPS.

- **Newspaper and media**: The opening of a new service is often announced in the media. Often the media also closely follow the implementation of a CPS, publishing interesting insights and useful context information.

- **Border organisations**: Sometimes, cross-border organisations such as an EUREGIO or EGTC were involved in implementing or providing a service and should therefore be able to provide background or context information. It therefore makes sense to contact the secretariats of these organisations and visit their websites.

- **Interreg projects**: Often, Interreg projects were engaged in developing a CPS or at least in financing the infrastructure. It is thus worthwhile visiting Interreg secretariats or websites to review documents published there.

- **Local and regional authorities**: Many services are (co-)provided by local or regional authorities like municipal administrations, police, health care centres, fire departments and rescue services, as well as public utility provision.

- **Associations, business councils and NGOs**: This includes special purpose associations like chambers of commerce, workers unions, transport organisations, NGOs and the like, who are also often involved in the development or provision of a CPS. Sometimes the initial impetus for founding a CPS comes from these organisations.

- **Studies**: that explicitly or implicitly address cross-border services. Such studies may have a thematic (e.g., CPS in healthcare) or spatial focus (e.g., CPS in a particular border area), or a combination of both. Some of the study reports contain detailed and in-depth information on individual CPS and should therefore be reviewed.

- **(Online) surveys**: Surveys are a good way to (a) obtain information on what CPS there are in a border region or (b) collect missing information. For (a), the survey should be addressed to all possible experts in the border region, or for (b) directly to the CPS providers.

In order to populate the CPS inventory, to obtain information on additional CPS and fill the data gaps for existing services, some of the above resources were used, namely, (i) involving border organisations – partners of this project - MOT and AEBR, (ii) launching an online survey, and (iii) consulting websites, media, and studies. Below are presented the results of the collection process.

Direct inputs of cross-border networks: MOT

MOT ensured the coverage of the CPS along French borders. A list of 45 new CPS was drawn up, as well as, noted changes to 9 existing CPS. The new CPS were reviewed and checked against the new CPS definition. 5 of these CPS were proposed for the case studies within the DG Regio CPS project.

Direct inputs of cross-border networks: AEBR

AEBR approached the stock-take process in a more complex manner. The association engaged in broad consultations with their stakeholders to cover all relevant geographies. There was a special focus on borders which seem to be 'under-represented' in the existing CPS Inventory, particularly EU borders with IPA countries.

The in-house knowledge and data from about 100 members (the EU border regions and cross-border structures), as well as outcomes of two relevant projects, (i.e., a study on the cross-border flow of patients and b-solutions - to identify legal and administrative obstacles to cross-border cooperation (CBC)) – were reviewed. Altogether, information on 16 new potential CPS was received. Many AEBR members confirmed their CPS are already included in the existing CPS Inventory. However, there might still be some unreported CPS, highlighting the necessity that this inventory should be continuously updated. This issue is of relevance particularly in cross-border areas which are under-represented in the current repository.

To ensure proper outreach and coverage of Central and East European (CEE) internal borders as well as EU / IPA country borders the AEBR Balkan office carried out desk analysis of cross border projects under Interreg-IPA programs within the Keep database. Approximately 130 projects were identified as potential CPS. In addition, AEBR also reached out to Balkan stakeholders and partners at EU borders with IPA countries (Croatia – Bosnia and Herzegovina, Croatia – Montenegro, Croatia – Serbia, Hungary – Serbia, Romania – Serbia and Bulgaria - Serbia). Several potential CPS cases were detected during interviews with stakeholders. The process of confirmation is slow because the term CPS is new in the Balkans, while some of the services have been in place for decades, e.g., on the border of Croatia and Bosnia and Herzegovina there are common water supply services for more than 30 years. As stakeholders are uncertain about what exactly a CPS is they are rechecking with colleagues and supervisors before sending an official reply. Also, some of the CPS are provided within the national frameworks, and stakeholders do not consider them as CPS services, e.g., regional employment agencies in Serbia are providing information on the job opportunities in Romania, and also carry out job seeker prequalification for the positions.

Other potential CPS involve disaster management, firefighting and assistance in accidents and flooding management covering EU external borders for Croatia – Serbia, Hungary – Serbia, Romania – Serbia and Bulgaria - Serbia. Official replies from the Ministry of Internal Affairs on these services takes time due to internal procedures. During the interviews with experts and stakeholders, it was also discussed what can be done to make CPS in the Balkans more visible and understandable. The joint conclusion is that awareness raising seminars on the concept and types of CPS must be carried out in the region by specific policy area.

On the outreach and raising awareness side, AEBR used its monthly newsletters for members - *Insight*, and the one open to public published quarterly ; this reached over 400 members and more than 3,000 partners to (1) inform them about the project highlighting the new definition of CPS and on the updating of the existing CPS Inventory, and (2) ask them to share information on new CPS via an online survey. Information on four new potential CPS was received via this method.

Additionally, more information could be collected during specific meetings:

1) A meeting with Norden - the cooperation partner in the Northern Europe, where CPS 2.0 and *b-solutions 2.0* would be presented (meeting postponed from the first half of 2021 for 2022). There the AEBR experts would discuss about a systematic approach to identify CPS and obstacles to cross-border cooperation in Nordic countries. The outputs of this exercise would be integrated in the online platform,

2) For the same purpose, to raise awareness about CPS in Nordic countries, an event to disseminate outcomes of this study was organised in Vaasa (Ostrobothnia, Finland) on 16 June 2022, imbedded in AEBR Executive Committee Meeting.

3) A meeting with all Spanish-Portuguese EGTCs which will take place outside the timeline of this study. Nevertheless, some consultations on CPS were possible during the launch of the *b-solutions* workshops in Vigo on 7 June 2022 where all EGTCs in the Galicia-Norte cross-border region were present. Analysis of the 11 cases from the region and the importance of identifying and promoting CPS was highlighted.

ESPON EGTC online survey

The ESPON EGTC volunteered to survey their contact points, resulting in 15 responses. 6 indicated new CPS and these have been reviewed against the new CPS definition, and only 2 qualified as new CPS.

Desk research

In addition to the above data collection, an intensive desk research was conducted, that help identified new CPS. This included, inter alia, information on new CPS while reviewing documents and web pages. An example is the Borisoglebsky hydroelectric station on the Paatsjoki River along the Norwegian-Russian border in the far north of Europe, or the identification of a second kindergarten in the twin city Frankfurt (Oder)

– Słubice operated separately from a previously identified CPS. Tentatively, these reviews yielded additional 39 CPS to be added to the CPS Inventory. Many of them have been inserted into the inventory to, inter alia, test its new structure.

Revision of the services from the old inventory has also produced new CPS. For example, the Municipality of Torsby (Sweden) has signed separate cooperation agreements to prevent and limit damage to property and the environment, with five neighbouring Norwegian municipalities. In the old CPS inventory, this was aggregated into a single service, while the new inventory now stores them as 5 separate services.

2.3   Resumé of the process

As a result of this process, more than 50 new CPS have been added to the new CPS 2.0 inventory, apart from the ones from taken form the DG Regio CBPT study on transport. Still there are many gaps due to lack of data. Not all the newly identified CPS, nor the new data updates for existing CPS can be entered into the inventory yet due to necessary verification steps.

A continuous update of the new CPS 2.0 inventory requires additional searches for completing datasets. The most complete updates come from direct contacts, to both update the information as well as to request additional data that were not included in the initial CPS Inventory. To facilitate this process, first steps have been taken by the CPS DG Regio study and its web application development, which also involved a process description for future updates[6].

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[6] Cross-border public services – Methodology and processes for updating the CPS inventory

3   Recommendations

3.1   Future uptake of the inventory

A continued update of the CPS Inventory is necessary to make best use of the CPS experience. It can be further structured by the following work / process flows:

- **Overall CPS promotion and awareness raising**

For future uptake of the CPS Inventory, raising awareness on the concept, bringing the added value and practical experience should target more than the primary stakeholders. More than often, the focus of the campaigns on cross-border activities is more or less exclusively targeting Euregios, EGTCs, or other cross-border structures and actors already involved in Interreg projects or programme implementation, leaving many of the hands-on stakeholders uninvolved or unaware of what is happening. Thus, more activities are required to overcome this information gap and to reach out to the *non-usual* stakeholders for cross-border cooperation located in under-represented border areas. Some examples of stakeholders are water associations or firefighters, that like other locally acting organisations, are very often not involved in Interreg or Euroregional activities. This implies that their activity in delivering (potential) cross-border service is also not known by Euregios. For these local actors many aspects of CBC may be of interest also beyond the concept of CPS. Hence, it is recommended to raise the visibility of CPS in a more targeted way, not only by the target groups, but mainly by the specific policy areas.

Apart from these general communication needs, there are also different needs in different territories, which may require targeting some border territories more than others and possibly applying different approaches of communication and outreach. For example, in the EU 13 and IPA countries exploring the actual situation much deeper is needed along with awareness raising (i.e., seminars on the concept and types of CPS for specific policy areas could be carried out in CEE).

Clarification of the concept of CPS is also important in this context to avoid overloading the validator for the continuous update, with assessing inadequate proposals. Survey experience in the search of new CPS during the data collection of the ESPON CPS 2.0 study has illustrated this need, since a considerable share of the information suggested as CPS was not fulfilling the criteria that qualify for a cross-border activity to be included in the CPS Inventory.

- **Searching new CPS**

It is very likely that new CPS may be found mainly along EU13 borders and with non-EU countries. The concept of CPS is new and not well known along such border segments. CPS could have slipped by the present data collection which mainly reached out to primary CPS stakeholders, such as the EGTCs, who are more knowledgeable on the subject. Feedback from EU border areas with IPA countries has highlighted several potential CPS that are more than 30 years old, within national and not necessarily regional frameworks. Verification is a lengthy procedure requiring also explaining the CPS concept.

- **Update existing CPS data**

Some CPS criteria and categories of information will also require continuous monitoring to take into account changes in terms of CPS foci, financing structures etc. that may evolve over time. The CPS Inventory also indicates some systematic data gaps, if not for all CPS then for their large majority. Frequently, the 'cross-border' dimension of the service use is not well documented. Information on the number of users by country is frequently missing and if available, it is not necessarily collected systematically over time. Regular reporting on the service use, however, is crucial to improve and/or adapt the service in view of potentially changing needs or in assessing actual and potential demand for a service.

Experience of several CPS that have been in place for many years show that they are often not "perfect" or "finished" in their development. This further challenges any continuous documentation on CPS, when the quality of the service or legal or administrative frameworks for the provision are changing over time. Furthermore, when CPS are first installed, they may not always solve all obstacles but are subject to further improvement over time. One example are health care services, for which cross-border access is frequently developed following several steps. Better and transparent documentation would be helpful in different ways. It is a means to illustrate the order and arrangement of the steps taken to set-up a CPS for the own purpose and for others to learn from experience of other stakeholders. It also shows how

challenges may develop once a CPS is in place, since not all challenges are subject to the CPS development and set-up but may also concern daily provision.

Such an update of the existing CPS data involves not only additional meticulous searches through the various data sources as mentioned in Annex II, but mainly getting in contact with individual CPS. More targeted research should also entail case studies and fact sheets. These have proved to be very useful for exploring individual CPS and collecting data on them.

Experience shows that stakeholders may also need support in collecting data for the CPS Inventory. As a result, the validator may also have to enter the CPS data or help in the data entering process. Besides these tasks, there is also need for further technical improvements and data harmonisation of the inventory. This requires a full review of all data sets already compiled from different sources and through different processes in the inventory, which are by nature not harmonised. But other fields would also benefit from harmonisation such as the descriptions of CPS, the detailing of target groups, the selection of fields of intervention, titles of CPS etc.

Summing up, following the first development of the CPS Inventory in 2018 and its notable recent extension, by simultaneously adding new CPS and significantly widening the number of indicators, a sustainable use of the inventory would highly benefit from further harmonisation efforts. This may possibly need a step-wise improvement considering also that CPS provision as such may change over time and will thus also need to be regularly revisited and updated.

- **Populating the inventory by CPS as external users**

This is the ultimate goal of the CPS Inventory upgrade and update. It will be possible for CPS to enter and revise their own data when technical issues related to hosting and data validation are resolved. Please see related recommendations below. Awareness raising on the new opportunity will also be necessary to inform stakeholders and enhance use of the inventory. **The CPS Inventory is a useful and integral source of information**, and properly populating it by CPS providers, includes final agreements about validation responsibility as well as the capacity to validate new CPS entries.

3.2   List of territorial indicators that could be updated periodically

The necessity, as well as, the benefit of the indicator update result from two main factors:

- **Closure of data gaps**: Currently, there are still a number of gaps in the CPS Inventory. These relate in particular to the second indicator area, the characterisation of services. It is hoped that over time these gaps can be filled through continuous updates of the inventory, so in future the indicators can be calculated on the basis of a larger statistical population.

- **New CPS in the inventory**: The hope is that experts will continuously add new CPS to the inventory. New CPS are constantly emerging along European borders and the inventory does not yet contain all existing services.

Apart from the new geographical context indicators presented in Annex II, the CPS Inventory includes other indicators characterizing CPS and territories they cover. Indicators and indicator maps may be updated periodically, subject to the CPS Inventory update, assuming that this is continuously updated via the web application. Table 5 elaborates a proposal for this.

Table 5 Proposal for indicator updates.

Indicator	Description	Update interval
Territorial indicators / geographical context		
1 **NoCPS**	Number of CPS per border segment	Semi-annually
2 **CC_Numb**	Number of CPS per country	Semi-annually
3 **CC_NumbBorder**	Number of CPS per country per 1,000 km border length	Semi-annually
4 **BordBuffer**	Share of CPS per distance buffer to national border	Semi-annually
5 **LangSim**	Share of CPS by language similarity	Annually
6 **Permea**	Share of CPS by level of border permeability	Annually

7	**Geography**	Share of CPS by geographical specificity	Annually
8	**BorderType**	Share of CPS per type of border	Semi-annually
9	**Establ**	Number of CPS by establishing year	Annually
Characterization of the service			
10	**Status**	Share of CPS by operational status	Semi-annually
11	**Theme**	Share of CPS by theme / policy area	Semi-annually
12	**Man_mode**	Share of CPS by management mode	Annually
13	**Del_mode**	Share of CPS by delivery mode	Annually
14	**Gov**	Share of CPS by governance mode	Annually
15	**Legal_frame**	Share of CPS by legal framework	Annually
16	**UserPay**	Share of CPS by user payment mode	Annually
17	**Targets**	Share of CPS by target groups [7]	Annually
18	**TriggerRS**	Share of CPS by reason for establishing the CPS	Annually
19	**Obstacles**	Share of CPS by obstacles encountered	Annually
20	**LangBias**	Bias in providing information in all required languages	Annually [8]

[7] Since a CPS may address several target groups, it does not make sense to create a map for this indicator; instead, the shares of individual target groups are tabulated in Table 4.

[8] At present, mapping this indicator is not yet meaningful, as this information is only available for less than 4% of the CPS in the inventory. If this share increases in the future (to at least 30%), then it could be evaluated.

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Annex I DG REGIO and ESPON CPS studies
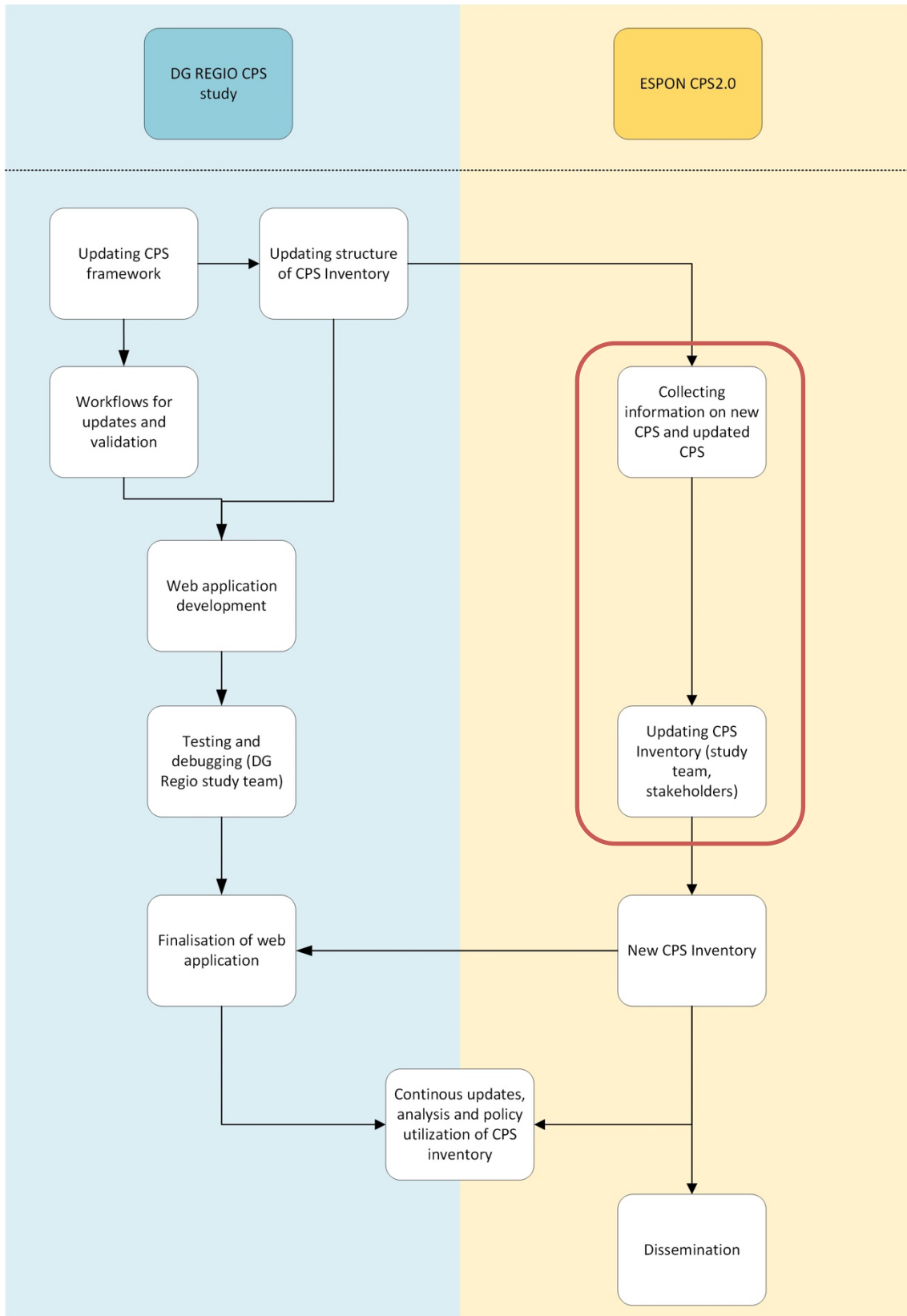
Annex II The framework of the new CPS Inventory

Compared to the initial ESPON CPS project (2018), the CPS Inventory has been extended in several dimensions:

- A completely revised database structure,
- Many more information fields,
- New CPS found and added to the inventory,
- Supporting layers broaden the information base.

New structure of the inventory

The new CPS Inventory structure concerns the number and type of shapefiles, their attributes, and the number and type of supplementary layers.

Three types of shapefiles

A cross-border service can be spatially provided in different ways, situation which affects how the services are stored in the inventory.

- The majority of CPS are offered in just one location which can be described by its address or by coordinates (e.g., cross-border school, border info point, wastewater treatment plant). These CPS are stored in the inventory in a *point feature class*.
- Other CPS are provided at two locations or are linear with a start and destination (e.g., bus lines). These CPS are stored in the inventory in a *line feature class*. Here, the two locations or the start and end points are connected by a straight line.
- Other services are not offered at a specific location but have a spatial reference or service area. Sometimes this area is precisely defined (e.g., nature parks, health regions), sometimes not (e.g., cross-border police, fire brigade, or disaster management cooperation). These CPS are stored in the inventory in a *polygon feature class*. If a CPS is provided at three or more locations in a border region, these are also connected by a polygon, where the corner points represent one location.

Therefore, in contrast to the initial ESPON CPS project inventory (2018), which only had a point and a line feature class, the enhanced CPS Inventory is now based on three CPS layers:

1. cpsPoints (point)
2. cpsPolygons (polygon)
3. cpsLines (line)

All three layers have the same attribute structure.

As a result of this restructuring, many CPS that were previously coded as lines, but actually cover a service area, have now been moved to the polygon layer. As part of this process, polygon boundaries, which were often represented in the old inventory in a simplified way by straight lines, were replaced by more precise boundaries where possible.

Attributes

In parallel to updating the geometries, also the attribute structure of the shapefiles was enhanced by adding new fields or re-defining existing ones (for instance, from open text fields to coded-value numeric fields), as presented in Annex II. After updating the structure, the attribute values of existing CPS have also been updated accordingly.

Some of the new fields in the CPS Inventory are only needed internally to manage the inventory, while others are concerned with data protection rules. The following fields are thus not exported to shapefiles: ProvName, ProvAddr, ProvEmail, ConAppr, Date, Update, UpdNum, Source, InfProv, and Verificat.

The upgraded CPS Inventory structure

All CPS from the initial inventory (2018) were transferred to the new one through GIS functions. During this process it was ensured that not only were all CPS transferred correctly, but also that all existing information was preserved. In addition, attempts were made to fill in as much information as possible on the new attributes. Several supplementary layers were used, as described below.

The 'new indicators' – strengthening the geographical dimension of CPS provision

When analysing CPS in Europe, the focus is usually on two dimensions:

1. **Characterisation of the service** in terms of policy areas and target groups, governance and delivery models, legal frameworks and actors involved in the service development and provision.

2. **Geographical context** in which the service is embedded, which may have contributed to or determined the design of the service in terms of regional requirements, obstacles, or potential.

Regarding the second dimension, the new indicators were intentionally identified to strengthen geographical aspects and thus enable spatial-temporal analysis of the CPS geographical context, which is of prime interest for ESPON as a spatial monitoring observatory.

In detail, the following new indicators have been implemented[9] [10]:

1. 25 km border area

2. Border permeability by public transport

3. Geographical specificities of border areas

4. Types of borders, group of countries

5. Language similarities

6. Language bias (bias in providing information in all required languages).

Very specifically, indicators address the following hypotheses:

- **Border proximity and permeability**: The closer a region is to a national border, and the higher the accessibility and permeability of the border, the better the conditions for CPS development. This will be tested by analysing the distance of CPS to national borders and border permeability by public transport.

- **Geographical specificities** in border regions such as mountain ranges, border rivers and lakes, as well as agglomeration areas and twin cities can influence the development of CPS both negatively and positively. Any relationship between these factors is reviewed.

- **Experience in cooperation**: The experience of border region actors with international cooperation may also have a major influence on the establishment of CPS. Border regions with a long tradition of cooperation often find it easier than those that only recently established cooperation. As this

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[9] The indicator 'car travel time to next border crossing' could not be implemented as access to the input data was not possible until the project end.

[10] For the first five new indicators, 'static' and 'dynamic' maps have been produced, which are presented in Annex III. 'Static' maps illustrate the indicator at the level of input data. Except for border buffer areas, which are polygons, all input data are line layers representing national borders in Europe. These maps are considered 'static' as they do not change (or are very unlikely to change in the medium term). By contrast, 'dynamic' maps illustrate the indicator at the level of CPS. Having assigned the relevant information to each CPS, these can also be mapped. These maps are considered 'dynamic' because the characteristics of a CPS may change over time. Eventually, for each indicator, one 'static' map for the input data and one 'dynamic' map at CPS level has been drawn up and presented in Annex IV. As the sixth indicator fully relies on the CPS itself, no static map has been produced.

qualitative aspect is difficult to grasp, it is analysed on the basis of the type of border (EU14, EU13, border with IPA or other non-EU states).

- **Language barriers / language similarities**: Language can also have a big impact on CPS development. For actors on both sides of a border with a common language, establishing cooperation is often easier (and cheaper) than in border areas where different languages are spoken. It is not only the language skills of the actors that matter, but different language areas often create mental barriers to policy development - looking across the border and offering joint cross-border services is often not thought of.

Supplementary layers

Along the new indicators that rely on geographical analyses, several new attributes were added to the CPS Inventory to provide additional location and context information. For these, supplementary layers were developed as data input, ensuring that the same criteria are applied to fill the respective attributes. Concretely, the following layers have been developed[11]:

- **Border segments**: This line layer represents national borders. Each border is divided into individual segments wherever NUTS3 regions touch the national border. Each border segment is assigned a unique ID ('*BorderNo*' field). This layer was first developed in the ESPON CPS project (ESPON, 2018), but its resolution and spatial accuracy has now been improved. This information is primarily used for analytical purposes and to visualise the density of CPS per border segment (i.e., number of CPS that cross a border segment).

- **Buffer areas:** This polygon layer represents 25 and 50 km buffer areas along national borders. This layer helps to identify whether a CPS is located within (or beyond) a 25 or 50 km distance zone from the national border.

- **Permeability:** This line layer indicates the permeability of border segments for public transport and was developed in the DG REGIO 'Cross-border public transport services (CBPT)' study (Zillmer et al., 2022). The name of the related field in the CPS Inventory is *Permea*.

- **Geography:** This line layer indicates the geographical specificities of border segments, i.e., a maritime border, a border river, mountains, rural or sparsely populated areas, or agglomerations or twin cities. The *Geography* layer was also developed in the DG REGIO CBPT study (Zillmer et al., 2022). The name of the related field in the CPS Inventory is also *Geography*.

- **Border types:** This line layer indicates whether a national border is between EU14 or EU13[12] countries, between EU and IPA or non-EU countries, or between non-EU countries. This layer is unchanged from the DG REGIO CBPT study (Zillmer et al., 2022). The name of the related field in the CPS Inventory is *BorderType*.

- **Language similarities:** This line layer indicates language similarities along border segments, i.e., whether the same (i.e., IE-UK border), similar (i.e., ES-PT border) or different (i.e., CZ-DE) languages are found along the national borders. The inventory field is named *LangSim*. Information has been compiled based on expert knowledge from different nationalities' viewpoints and consulting online information on language similarities.

Apart from using these layers as inputs to further characterise CPS or to select subsets, the information also provides new options for European-wide spatial analyses of CPS patterns. For example, a correlation analysis between the distribution of CPS and language similarities is possible as is an analysis of the location of CPS in relation to 25 or 50 km buffer zones or in relation to geographical specificities such as mountain border areas. This provides a new dimension to the analysis of CPS in Europe. This is ultimately also the

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[11] It was planned to utilise a layer developed by the Joint Research Centre (JRC) of the European Commission representing car travel times to the next border crossing (Christodoulou et al, 2019; Kavalov et al., 2019) but it was not possible to access this layer until project ended.

[12] EU14 is all Member States from 1 January 1995 to 1 May 2004 minus the United Kingdom, while EU13 is all Member States joining the EU after 1 May 2004.

rationale for selecting the 'new indicators' as presented further below ('The 'new indicators' – strengthening the geographical dimension of CPS provision').

CPS Inventory in Excel and Shapefile formats

The following files have been submitted to the ESPON Database (Table 7):

Table 6 Files delivered to ESPON Database.

Dataset		File type	Content
1	**cpsPoints**	Shapefile	Point CPS, i.e., services provided at one location
2	**cpsLines**	Shapefile	Linear CPS, i.e. services provided along a corridor or line, or that are provided at two locations
3	**cpsPolygons**	Shapefile	Area CPS, i.e., services provided in an area, or at three or more locations
4	**Borders_CPS_per_Segment**	Shapefile	National borders with border segment ID and the number of CPS per border segment
5	**CPS_Database**	Excel	CPS in the inventory with all information and indicators (characterisation of the service, geographical context) associated with each service

As usual, comprehensive metadata are available for each dataset.

Uptake of additional public databases: transfer of CBPT database to the new CPS Inventory

The DG REGIO CBPT study published early 2022 identified cross-border services for transport. This study is an important data source to complement CPS in this policy field. Unfortunately, the definition of 'public' used there was not identical to the criteria applied for the CPS Inventory, so only a subset of the services identified in DG REGIO study meet the CPS criteria. Nevertheless, the study results were used to improve the CPS Inventory in various aspects and the transfer of CBPT to the new CPS Inventory involved several automated and manual steps (Table 6).

Table 7 Transfer of CBPT to the new CPS Inventory

Operation		Initial database (CPS Inventory 2018)	Upgraded inventory (CPS 2.0 Inventory)
1	**Adding new CPS**	Data gaps in the transport sector	Identifying and adding new CPS
2	**Improving geometries**	Existing geometries are represented by straight lines connecting the start and terminus of a Public Transport line	The detailed alignments of Public Transport lines were transferred from the DG REGIO study to the CPS Inventory to yield real-world geometries
3	**Disaggregating clustered CPS**	Individual Public Transport lines in a border region operated by the same Public Transport provider were aggregated to just one CPS	Results of the DG REGIO study were used to split the aggregated service into individual Public Transport lines; each Public Transport line then becomes an individual CPS

Annex III New structure of the CPS Inventory

Field name	Description	Field type	Status of information: m = mandatory, O = optional
Identifier			
Title	Title or name of CPS	Text	m
CPS_No	Unique CPS ID (combining theme and field ID with consecutive numbers, in the format XX.YY.ZZZZ where the first part (XX) indicates the policy theme, the second part (YY) the intervention field and the third part (ZZZZ) a unique number. The third part has to have 4 digits because of the large number of CPS in transport (i.e. bus, ferry, tram and rail services). Examples: 01.1.0012 = CPS number 12 in Field 1.1 04.2.0008 = CPS number 8 in Field 4.2 10.1.0025 = CPS number 25 in Field 10.1	Text	m
Numb	Unique CPS number (1 … n)	Numeric	m
Location and geography			
Border_CC	Countries covered by CPS; countries identified by the 2-digit ISO country code, codes in alphabetical order and separated by a minus sign Examples: ES-FR CH-DE-FR AT-CH-DE-LI	Text	m
BorderNo	Number of border segments crossed by CPS. Two or more border segments separated by comma. Border segment ID corresponds to segment number in border shapefile Examples: ,431, ,296,314,317,319,373,	Text (serial string)	m
BorderType	Type of border / group of countries 1 = EU14 internal border (=EU15 without UK)	Text (serial string)	m

	2 = EU13 internal border 3 = EU14 – EU13 border 4 = EU – IPA country border 5 = EU – other external border 6 = nonEU – nonEU border *Multiple values are possible, if three or more national borders are involved.*		
CC_No	Number of countries covered by CPS. Minimum number is 2.	Numeric	m
Extent	Description of the geographical extent / service area	Text	m
BordBuffer	Delineation of border area: 1 = CPS location / CPS service area completely within 25 km border area 2 = CPS location / CPS service area mainly within 50 km border area 3 = CPS location / CPS service area extends beyond 50 km border area	Numeric (coded values)	m
Population	Population demand for the CPS in its service area *If possible, provide exact figures; if not, give estimates or leave blank if population is not relevant for a certain service. Only report the demand for the specific service. Example:* *For a cross-border kindergarten, only estimate the number of kindergarten age children. For cross-border schools, estimate the number of pupils rather than total population.*	Numeric	o
LangSim	Language similarities along national borders: 1 = Same language on both sides of the border 2 = Language with commonalities enabling people to understand each other 3 = Different languages but local commonalities 4 = Different languages	Numeric (coded values)	m
Street_1	Address / Street name including house number *Note: The addresses refer to the place(s) where the service is provided.*	Text	o
Zip_1	Zip code	Text	o
City_1	City name	Text	o
County_1	County name	Text	o
Country_1	Country name	Text	o
Street_2	Address / Street name including building number	Text	o
Zip_2	Zip code	Text	o
City_2	City name	Text	o
County_2	County name	Text	o

Country_2	Country name	Text	o
Street_3	Address / Street name including building number	Text	o
Zip_3	Zip code	Text	o
City_3	City name	Text	o
County_3	County name	Text	o
Country_3	Country name	Text	o
Geography	Geographical specificity of the border area: 0 = area with no specific geography 1 = mountains 2 = border river, waters, maritime border 3 = rural area, sparsely populated area 4 = agglomeration, twin city *Multiple specificities are possible.*	Text (serial string)	m
TravTime	Car travel time to next border crossing 30 = within 30 min 60 = within 60 min 90 = within 90 min 9999 = more than 90 min *This field indicates the shortest travel time to the next border crossing from the location(s) where the service is provided.*	Numeric (coded values)	m
Permea	Permeability index: Degree of border permeability by public transport -9999 = Index not applicable 0 = no permeability 1 = extremely low permeability 2 = very low permeability 3 = low permeability 4 = low to medium permeability 5 = medium permeability 6 = good permeability 7 = good to high permeability 8 = high permeability 9 = very high permeability 10 = extremely high permeability	Numeric (coded values)	m

	Default value is -9999. *If more than two countries are covered by a CPS, this index is not applicable (i.e. value = -9999). Similarly, if a CPS crosses the sea, this index is not applicable. As the DG REGIO CBPT study only covered countries of the European Union, borders to non-EU countries are not covered by the Permeability Index. Consequently, CPS located along borders of non-EU countries cannot be assigned any permeability index. In this case, a value of -9999 shall be assigned.*		
CS_Name	Name of case study (if available, otherwise blank)	Text	o
CS_ID	Unique case study number 0 = No case study available	Numeric	o
CS_Cat	Case study category 0 = No case study 1 = Fact sheet 2 = Long case study / full case study report	Numeric (coded value)	m
CS_Link	Weblink to case studies (case study reports or fact sheets) (if available, otherwise blank)	URL	o
GeoPrec	Precision of the location information: 1 = precise geography / precise information 2 = 'fuzzy' geography / inaccurate information because service area is not precisely defined 3 = 'fuzzy' geography / inaccurate information because service area is unknown	Numeric (coded values)	m
Service characterisation			
Description	Brief description of CPS	Text	m
Status	Status of a CPS: 1 = Planned (soon-to-be CPS) 2 = Pilot phase 3 = Operation 4 = Temporarily closed 5 = Ceased (permanently closed) *A planned CPS should only be included if the opening is imminent or is highly probable in the near future.*	Numeric (coded values)	m
Mode	Mode and frequency of CPS provision: 1 = Permanent service 2 = Seasonal service (within season permanent) 3 = On demand / upon request	Numeric (coded values)	m
Theme	Themes / policy fields: 1 = Transport	Text (coded values)	m

	2 = Spatial planning, economic development, tourism, and culture 3 = Health care and social inclusion 4 = Education and training 5 = Labour market and employment 6 = Communication, broadband and information society 7 = Environment protection, natural resources management and climate change action 8 = Civil protection and disaster management 9 = Citizenship, justice, and public security 10 = Other *Several themes can be entered, separated by comma, where the first theme in the list represents the main theme, and the following ones secondary / minor assignments.*		
Field	Field of intervention: 1.1 = Public transport service 1.2 = Services for transport infrastructure maintenance 1.3 = Service at border crossing points 1.4 = Other transport service 2.1 = Spatial planning or sector policy planning 2.2 = Services supporting economic development 2.3 = Services for culture and cultural heritage 2.4 = Services for tourism development 2.5 = Other services for spatial planning, economic development, tourism and culture 3.1 = Primary, secondary and tertiary care 3.2 = Support services for hospitals 3.3 = Services for non-hospital care or ambulatory care 3.4 = Medical emergency care and rescue 3.5 = Long-term care services 3.6 = Social assistance and social integration 3.7 = Other services in health care and social inclusion 4.1 = Early childhood education and primary education 4.2 = Secondary education 4.3 = Tertiary education 4.4 = Vocational education and training 4.5 = Services for recognition of diploma or professional qualification certificates 4.6 = Other services for education and training	Text (coded values)	m

	5.1 = Public information and advice services facilitating mobility of workers 5.2 = Services for job placement 5.3 = Services for further qualification and life-long learning 5.4 = Other services for labour markets and employment 6.1 = Mail delivery, telephone or mobile phone services 6.2 = Broadcasting services 6.3 = Digital services 6.4 = Other services for communication, broadcasting and information 7.1 = Protecting/restoring and managing terrestrial freshwater bodies (blue infrastructures), estuaries and coastal waters 7.2 = Restoring, protecting and managing valuable terrestrial ecosystems or landscapes for developing green infrastructures, including risk prevention and climate change resilience services 7.3 = Improving resource efficiency and promoting low carbon economy or a greening of the society 7.4 = Sewage water collection / treatment & drinking water 7.5 = Solid waste 7.6 = Production / distribution of energy from renewable sources 7.7 = Other services for environmental protection, natural resource management and climate change actions 8.1 = Services for firefighting and assistance in accidents 8.2 = Services for flood management 8.3 = Managing large-scale incidents and major disasters 8.4 = Other services for civil protection and disaster management 9.1 = Advice and support services for citizens 9.2 = Other services for citizenship, justice and public security 10.1 = Other services *Several fields of intervention can be entered, separated by comma, where the first field in the list represents the main field, and the following ones secondary / minor assignments.*		
Y_Idea	First year (start) thinking about developing a CPS -9999 = information not available	Numeric (value range)	o
Establ	Establishing year (service inauguration) -9999 = establishment year unknown	Numeric (value range)	M
Y_Cease	Year when service ceased (if ceased) -9999 = service in operation, not ceased	Numeric value (range)	o

LegalFrame	Legal framework: 0 = information not available / cannot be allocated 1 = Type 1: Other secondary EU legislation, indirectly 2 = Type 2: Multilateral interstate agreement on general decentralised cross-border cooperation 3 = Type 3: Theme-specific interstate agreement 4 = Type 4: Regional / local cooperation agreement 5 = Harmonised / amended national or regional rules 6 = Type 4 in connection with Type 2 7 = Type 4 in connection with Type 3 8 = Others	Numeric (coded values)	m
LegalFrSt	Adaptation of legal frameworks to introduce the CPS 0 = information not available 1 = New 2 = Existing 3 = Adapted	Numeric (coded values)	M
Gov	Governance model 0 = information not available 1 = Central with legal personality domestic law 2 = Central with legal personality interstate agreements or EU law 3 = Operated in network	Numeric (coded values)	m
ActorEst	Name of the actor(s) developing/establishing the CPS *Multiple actors to be separated by comma*	Text	m
ActorChEst	Characterisation of the actor(s) developing/establishing the service: 0 = Information not available 1 = Public cross-border body (e.g. EGTC, GöZ) 2 = Regional/local authority/ies of one or more countries 3 = Private organisation 4 = Non-profit organisation 5 = Combination of public and private actors	Numeric (coded values)	m
ActorProv	Name of the actor(s) providing the CPS *Multiple actors to be separated by comma* *Often, actors that developed/established the CPS also provide the CPS. However, sometimes those providing the service differ from those developing it (for instance, concessionaries) or several actors were involved in the development whereas only one is the provider.*	Text	m

ActorChProv	Characterisation of the actor(s) providing the service: 0 = Information not available 1 = Public cross-border body (e.g. EGTC, GöZ) 2 = Regional/local authority/ies of one or more countries 3 = Private organisation 4 = Non-profit organisation 5 = Combination of public and private actors	Numeric (coded values)	m
Man_mode	Management mode 0 = information not available 1 = Cooperative delivery and shared management 2 = Delegated joint delivery and delegated joint management 3 = Border crossing extension of existing service 4 = Unilateral delivery and one-sided management 5 = Harmonised / coordinated delivery 6 = Public Service Obligation (transport)	Numeric (coded values)	m
Del_mode	Delivery model 0 = Information not available 1 = Better cross-border coordination 2 = Border crossing extension 3 = Completely new CPS	Numeric (coded values)	m
Financing	Financing model for the service 0 = Information not available 1 = Public-public 2 = Public-private 3 = Fares and fees 4 = Subsidies *Different combinations possible (i.e. multiple financing models).*	Text (serial string)	m
UserPay	Model of user payment (from the perspective of service users): 0 = Information not available 1 = User payment not applicable / not relevant 2 = Free of charge for users 3 = Fee or ticket 4 = Reimbursement 5 = Indirect payment (tax or insurance)	Numeric (coded values)	m

	6 = Other		
Targets	Primary target group(s) 1 = Athletes 2 = Children of all ages 3 = Consumers 4 = Cross-border workers 5 = Economic actors (companies, entrepreneurs) 6 = Elderly people, people with disabilities 7 = Families with small children (below school age) 8 = Fire brigades and rescue services 9 = General public 10 = Health insurances (public and private) 11 = Hospitals 12 = Households 13 = Job seekers 14 = National and regional employment agencies 15 = NGOs / natural conservation and preservation organisations 16 = Other person groups 17 = Other stakeholders and experts 18 = People requiring medical or permanent care 19 = Planning authorities 20 = Police and customs 21 = Public authorities, public administrations 22 = Public transport users 23 = Pupils, students, and apprentices of all ages 24 = Researchers 25 = Residents 26 = Schools and universities 27 = Sector authorities 28 = Tourists 29 = Employment agencies *(Multiple values possible)*	Text (serial string)	m
Subtargets	Secondary target group(s) *Same values as field 'Targets'. This field is empty if no subtarget group is addressed by the service.*	Text (serial string)	o

LangBias	Bias in providing information in all required languages 0 = Information not available 1 = Information provided in all required languages 2 = Information not provided in all required languages	Numeric (coded values)	m
Product	Free key words that best describe the main 'product' of the CPS.	Text	o
Context information			
TriggerRs	Reason ('trigger') for establishing the CPS: 0 = Information not available 1 = Fill domestic service gap 2 = Fill cross-border service gap 3 = Increase effectiveness and efficiency of a service to reach critical size (economies of scale I) 4 = Increase effectiveness and efficiency of a service to achieve excellence (economies of scale II) 5 = Promote service differentiation and variety (economies of scope)	Numeric (coded values)	m
Trigger	Joint problem or development opportunity that triggered the development of the CPS (brief description)	Text	o
Obstacles	Obstacles encountered: 0 = No obstacles 1 = Legal obstacles 2 = Administrative obstacles 3 = Institutional obstacles 4 = Physical obstacles 5 = Cultural obstacles 6 = Socio-economic conditions 7 = Technical obstacles *Multiple values possible.*	Text (serial string)	m
Potentials	Untapped potential and opportunities (before CPS development) (brief description)	Text	O
DemEvo	Demand or usage evolution: 0 = Information not (yet) available 1 = Continuous decrease since inauguration 2 = First small decrease, then severe decrease 3 = Stable but low usage over time 4 = Stable but high usage over time 5 = Continuous increase since inauguration 6 = First small increases, then significant growth	Numeric (coded values)	o

	Information may not yet be available in cases where a CPS recently started service or where a demand assessment has not yet taken place. In this case indicate '0'.		
CoopGeo	Existing formal cooperation structures in CPS service area (territorial perspective): 0 = None 1 = Supra-regional working group (e.g. AG Alpen) 2 = Large scale cross-border cooperation (e.g. Greater Region) 3 = Euregios/Euroregions/Eurodistricts 4 = Local cooperation such as twin city (with formal cooperation agreement) 5 = Others *Multiple values possible*	Text (serial string)	m
CoopOrga	Existing formal cooperation structures in CPS service area (organisational perspective): 0 = None 1 = Unilaterally organised cross-border bodies 2 = Separate cooperation bodies on both sides 3 = Others *Multiple values possible.*	Text (serial string)	m
Relation with other services			
Hardware	Free key words that describe the infrastructure requirements of a CPS Examples: Tram tracks, sewage water treatment plant, bridge, school building	Text	o
Rel_CPS	Related CPS: Reference to another service which is linked to this CPS (brief description).	Text	o
Rel_CPS_ID	Related CPS: Reference to the unique CPS ID of the service linked to this CPS *Enter CPS_No (the field CPS_No)*	Text	o
Predecess	Reference to predecessor of the CPS (predecessor may already have ceased) *Enter CPS_No (the field CPS_No)*	Text	o
Success	Reference to successor of the CPS / follow-up CPS *Enter CPS_No (the field CPS_No)*	Text	o
Contact information			
Website	Website of CPS *Format: http://www.example.com or 'https://www.example.com'*	URL	o

ProvName	Name of contact person of main CPS provider *Whether or not this information is displayed on the web viewer depends on the selection in the field ConAppr.*	Text	o
ProvAddr	Full address information of the CPS provider(s) *Whether or not this information is displayed on the web viewer depends on the selection in the field ConAppr.* *Several providers may be entered*	Text	o
ProvEmail	Email of main contact person of CPS *Whether or not this information is displayed on the web viewer depends on the selection in the field ConAppr.*	Email	o
ConAppr	Approval that contact information may be displayed in web viewer 0 = Contact information must not be shown to the general public 1 = Approval to display contact information to general public	Boolean	m
Metadata			
Date	Date when CPS was initially added to the inventory	Date	M
Update	Date of last update of CPS information	Date	O
UpdNum	Number of updates of CPS information (1, 2, 3, …) *With each update, this number will increase by one. One indicates services that have been added to the inventory, but since their initial integration have not been updated.*	Numeric	O
Source	Indication of data source(s)	Text	O
InfProv	Information provider (name of expert, organisation, website etc. who provided information on CP)	Text	M
Verificat	Status of verification 1 = Submitted (verification pending) 2 = Verification in process 3 = Approved 4 = Rejected 5 = Not yet verified	Numeric (coded value)	m

Annex IV Indicator and CPS maps

This annex provides a series of maps visualising:

- Static maps of the new indicators
- Dynamic maps of the new indicators
- Selected maps illustrating CPS patterns in Europe

The latter two kinds of maps are maps illustrating the actual state of the CPS Inventory as of 31 May 2022.

The maps are structured as follows:

- New indicators of CPS provision: Static and dynamic maps
- CPS by policy areas
- Temporal development of CPS provision
- Characterisation of the services

Annex IV.1 – New indicators of CPS provision: Static and dynamic maps

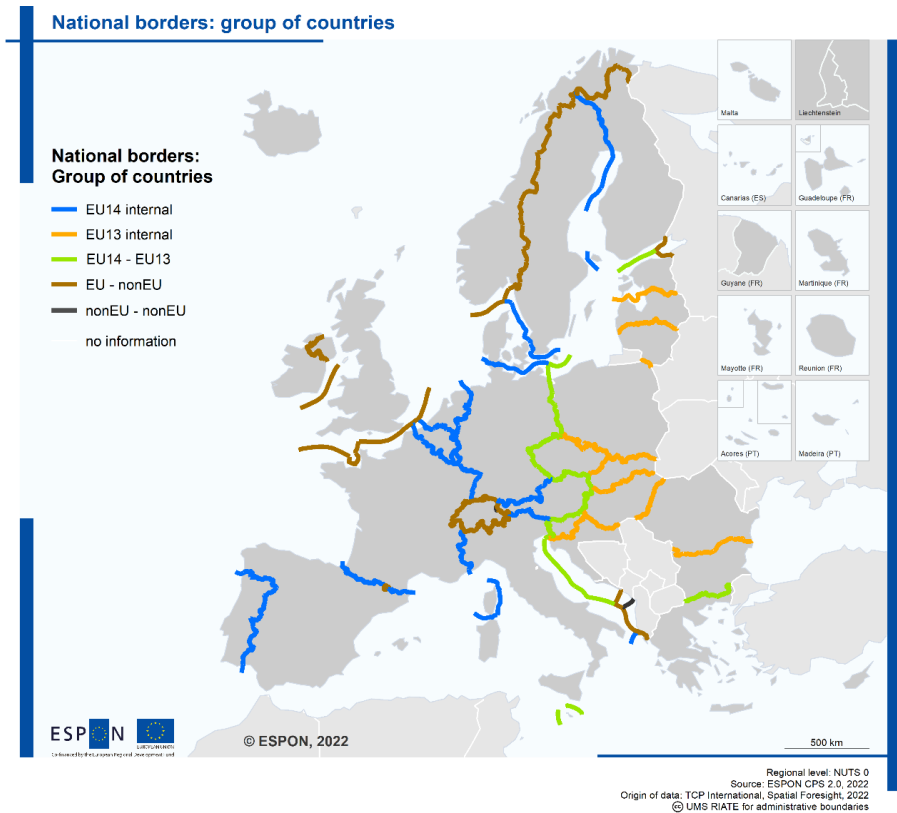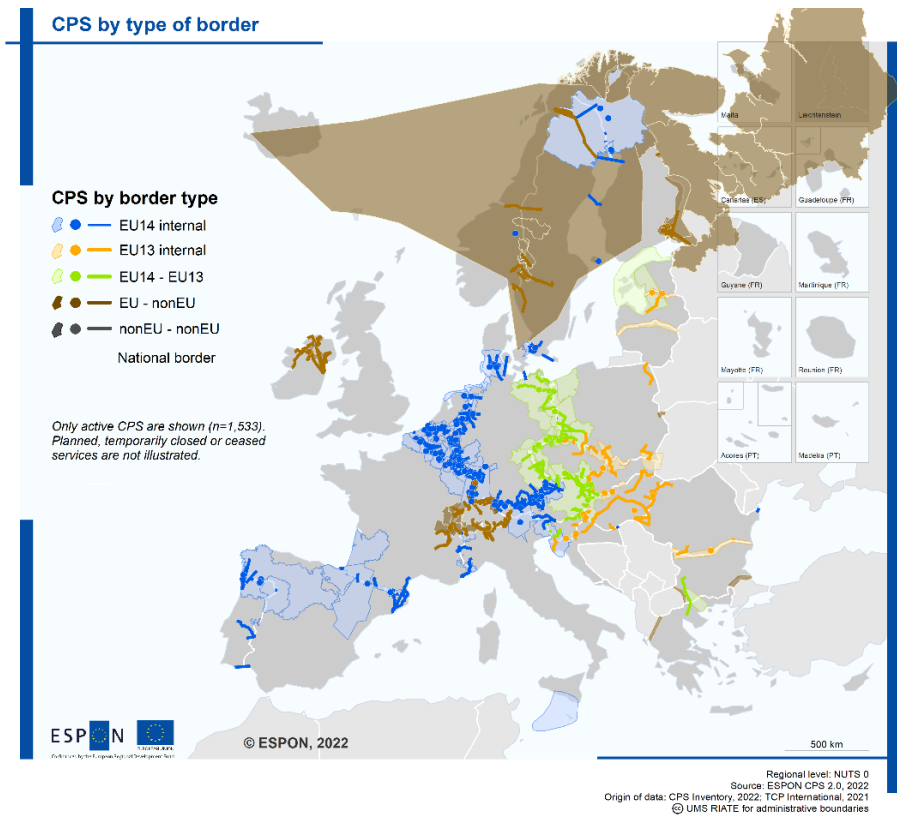### Figure 9. National borders - Group of countries.

Figure 10. CPS by type of border.

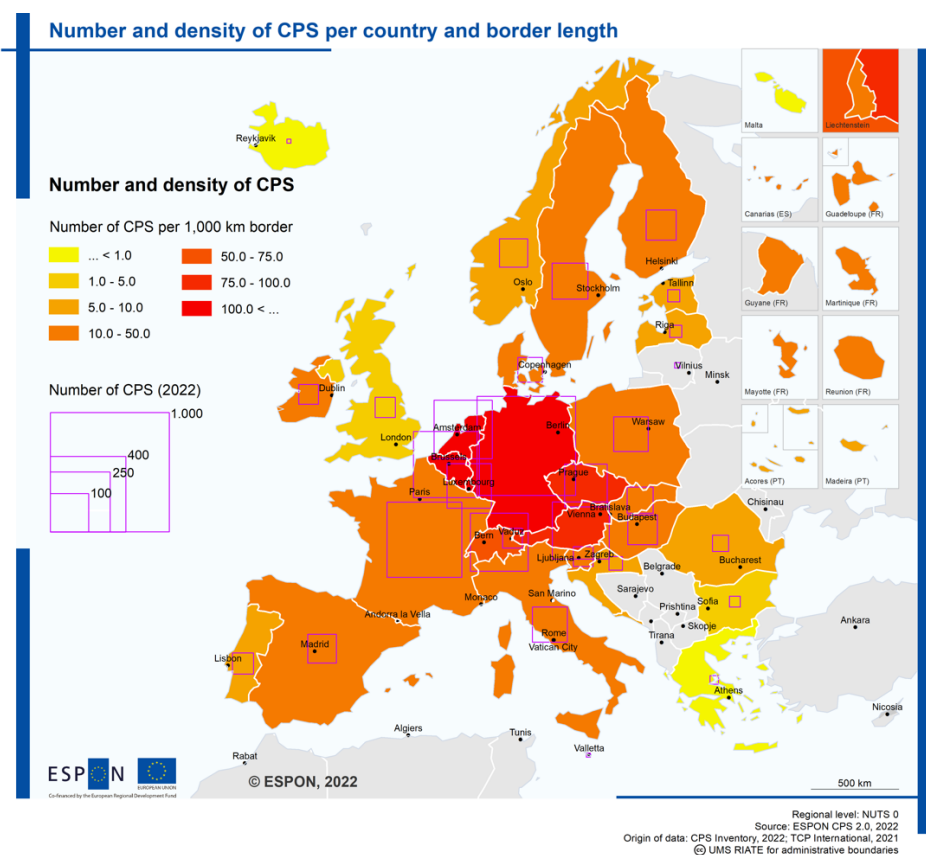## Figure 11. Number and density of CPS per country and border length.

Number and density of CPS per country and border length

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2021
© UMS RIATE for administrative boundaries

© ESPON, 2022

Table 8 CPS density by country, area and border length.

Country	Number of CPS[13]		Number of CPS per 1,000 km² country area		Number of CPS per 1,000 km border length	
	Rank	#	Rank	#	Rank	#
Germany	1	694	4	1.93	4	195.36
France	2	400	13	0.54	10	38.13
Belgium	3	310	2	10.09	2	352.59
Netherlands	4	241	3	6.65	3	198.42
Switzerland	5	238	5	1.65	7	74.90
Austria	6	231	7	1.48	6	75.07
Luxembourg	7	140	1	53.71	1	635.70
Czech Republic	8	130	6	1.63	5	92.51
Sweden	9	91	20	0.20	15	19.61
Italy	10	87	15	0.29	18	15.25
Poland	11	84	17	0.27	12	33.08

---

[13] Since for each CPS at least two partners from two different countries are involved (sometimes partners from even three or more countries), the sum of CPS in this column is higher than the total number of CPS in the inventory.

Finland	12	64	21	0.19	16	18.43
Hungary	13	62	12	0.67	8	43.59
Spain	14	59	24	0.12	19	11.66
Norway	15	57	22	0.17	21	8.38
Slovakia	16	48	9	1.00	9	43.11
Denmark	17	43	10	0.97	14	22.24
Portugal	18	31	15	0.29	20	8.76
United Kingdom	19	29	25	0.11	26	4.98
Ireland	20	28	14	0.39	17	17.31
Slovenia	21	27	8	1.25	11	33.83
Lichtenstein	21	27	11	0.81	13	25.40
Romania	23	18	26	0.08	22	8.16
Croatia	24	13	18	0.22	25	6.57
Latvia	25	10	23	0.15	23	7.20
Estonia	25	10	19	0.21	24	7.17
Bulgaria	27	8	27	0.07	27	4.74
Greece	28	5	29	0.04	29	0.79
Malta	29	1	28	0.05	28	0.94
Iceland	29	1	30	0.01	30	0.54

Source: ESPON-REGIO CPS database, 2022

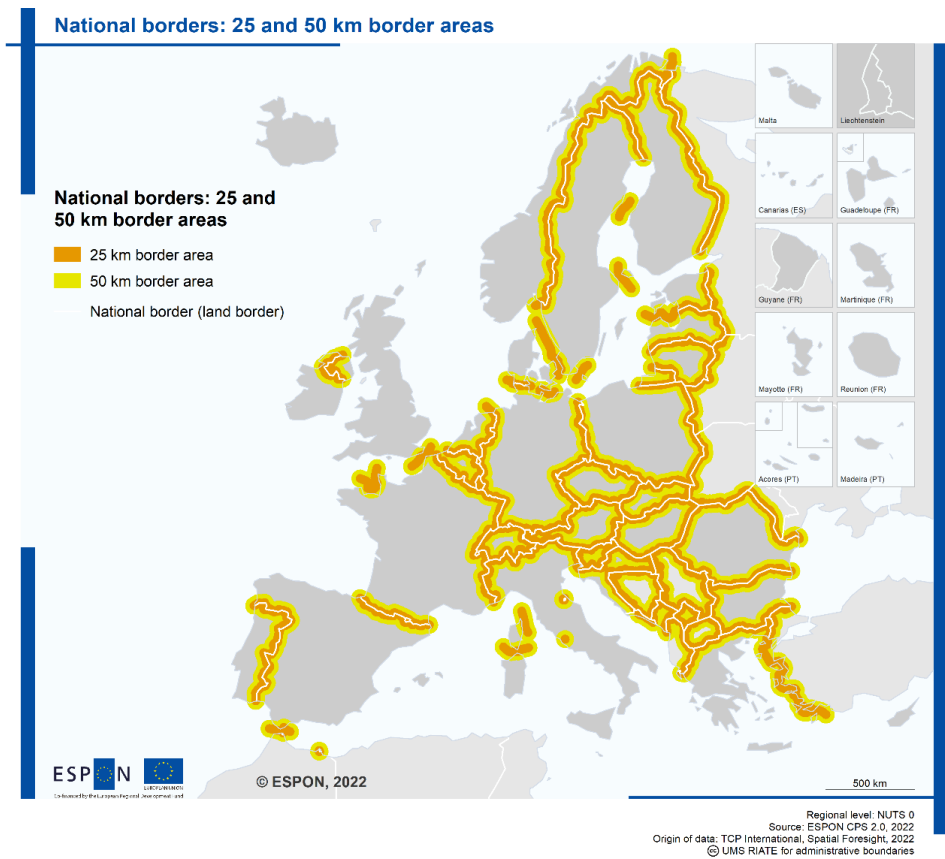## Figure 12. National borders: 25 and 50 km border areas.
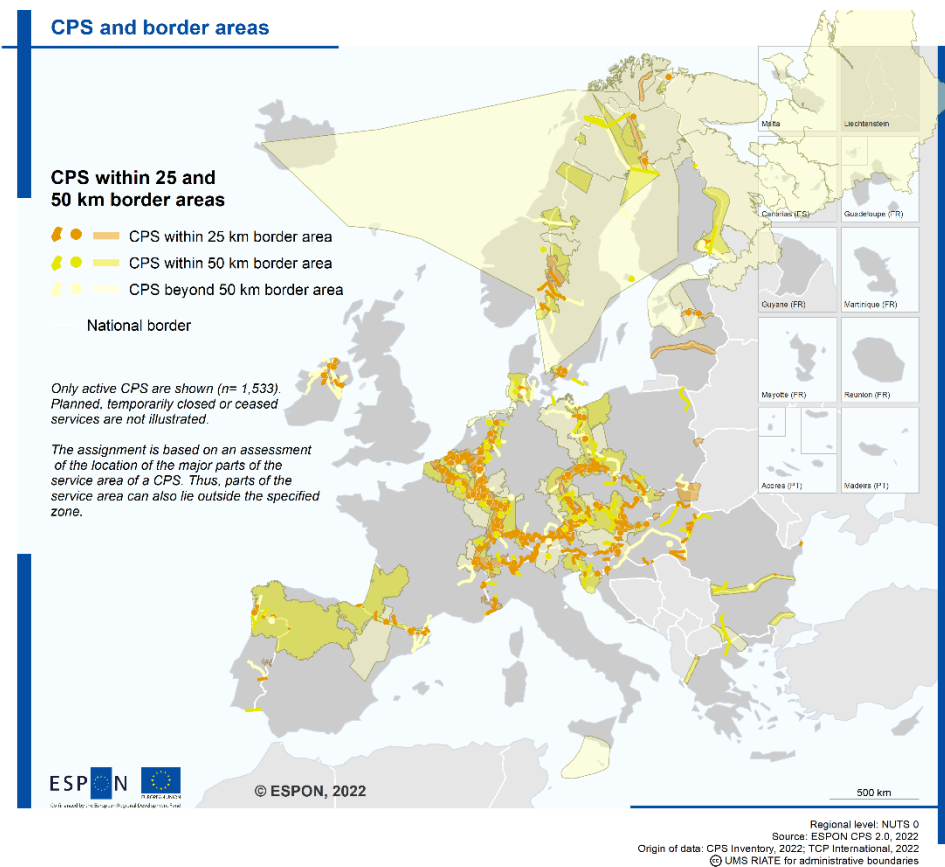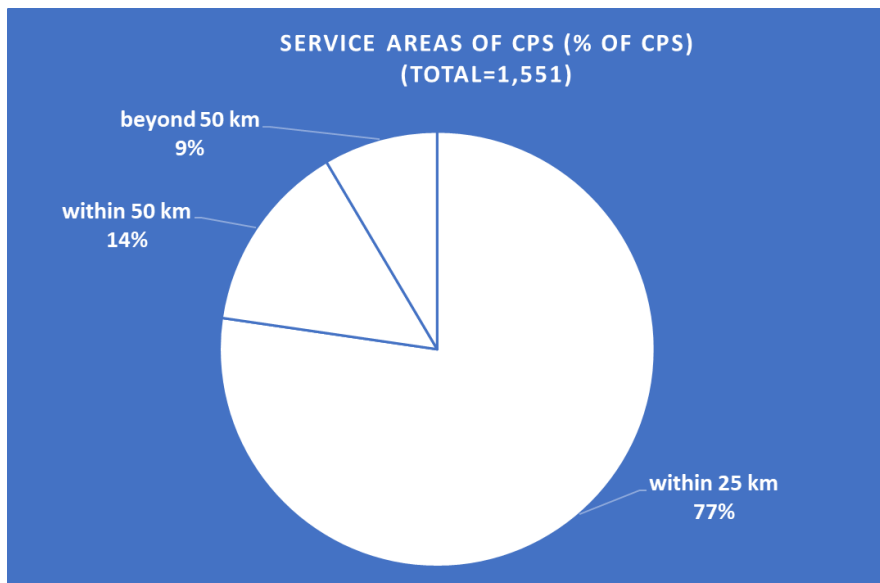

Figure 13. CPS and border areas.

Figure 14. CPS service areas and border buffers.

Source: ESPON-REGIO CPS database, 2022

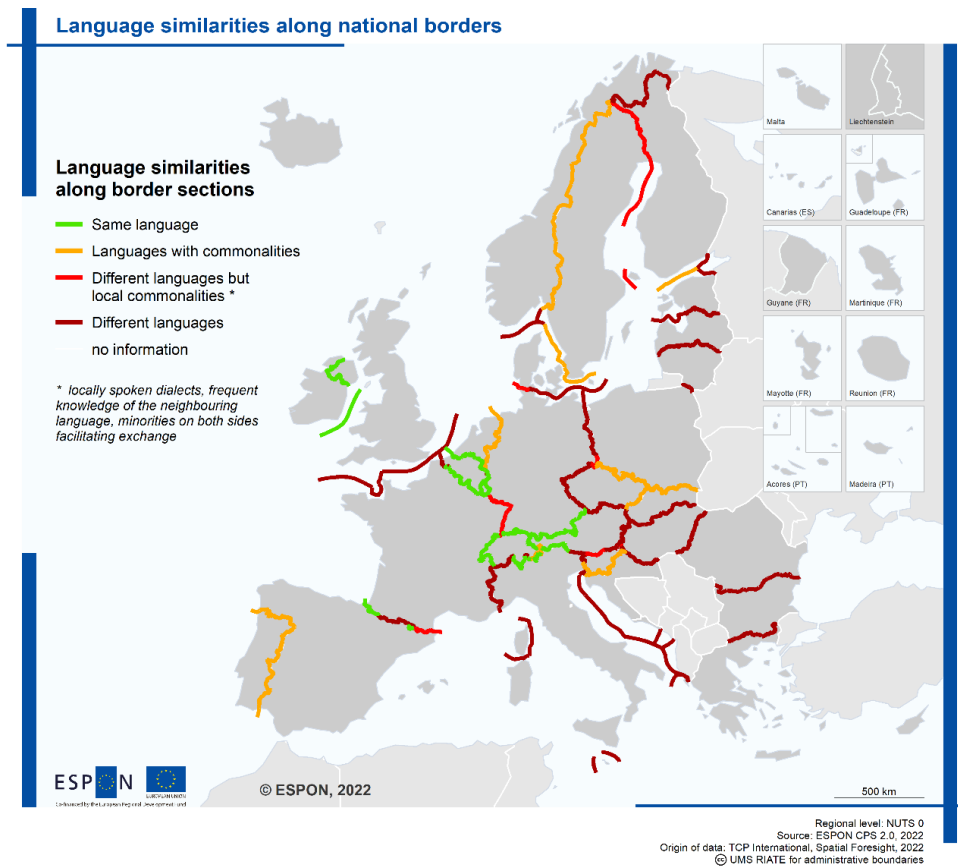## Figure 15. Language similarities along national borders.

Language similarities along national borders

Language similarities along border sections

- Same language
- Languages with commonalities
- Different languages but local commonalities *
- Different languages
- no information

* locally spoken dialects, frequent knowledge of the neighbouring language, minorities on both sides facilitating exchange

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: TCP International, Spatial Foresight, 2022
© UMS RIATE for administrative boundaries

Figure 16. Language similarities in cross-border public services.

Language similarities in a cross-border public service

Language similarities in a CPS

- Same language
- Languages with commonalities
- Different languages but local commonalities *
- Different languages
- National border

* locally spoken dialects, frequent knowledge of the neighbouring language, minorities on both sides facilitating exchange

Only active CPS are shown (n=1,533). Planned, temporarily closed or ceased services are not illustrated.

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
© UMS RIATE for administrative boundaries

Figure 17. Language similarities - number of CPS per category.

LANGUAGE SIMILARITIES (% OF CPS PER CATEGORY)
(N=1,551)

Different languages 23%

Different languages, local commonalities 14%

Language with commonalities 18%

Same language 45%
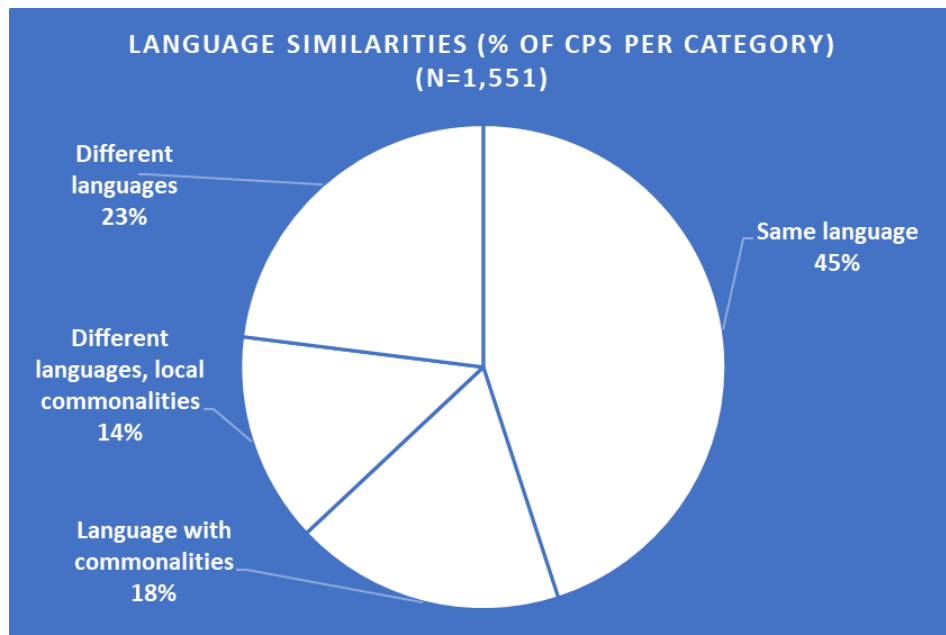
Source: ESPON-REGIO CPS database, 2022
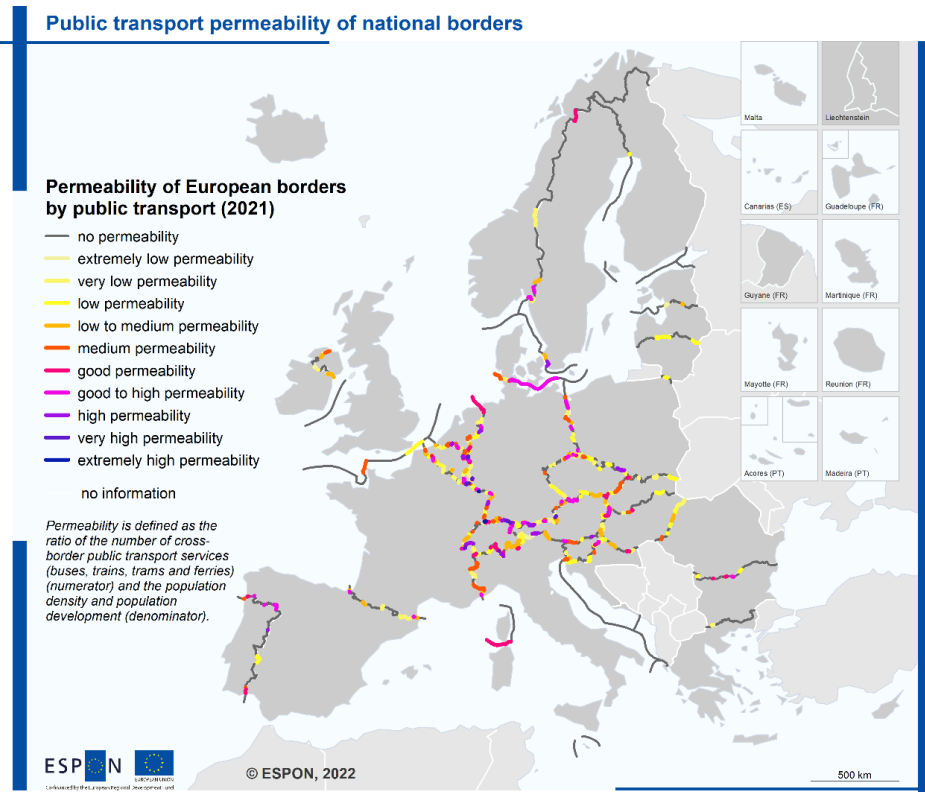
Figure 18. Public transport permeability of national borders.

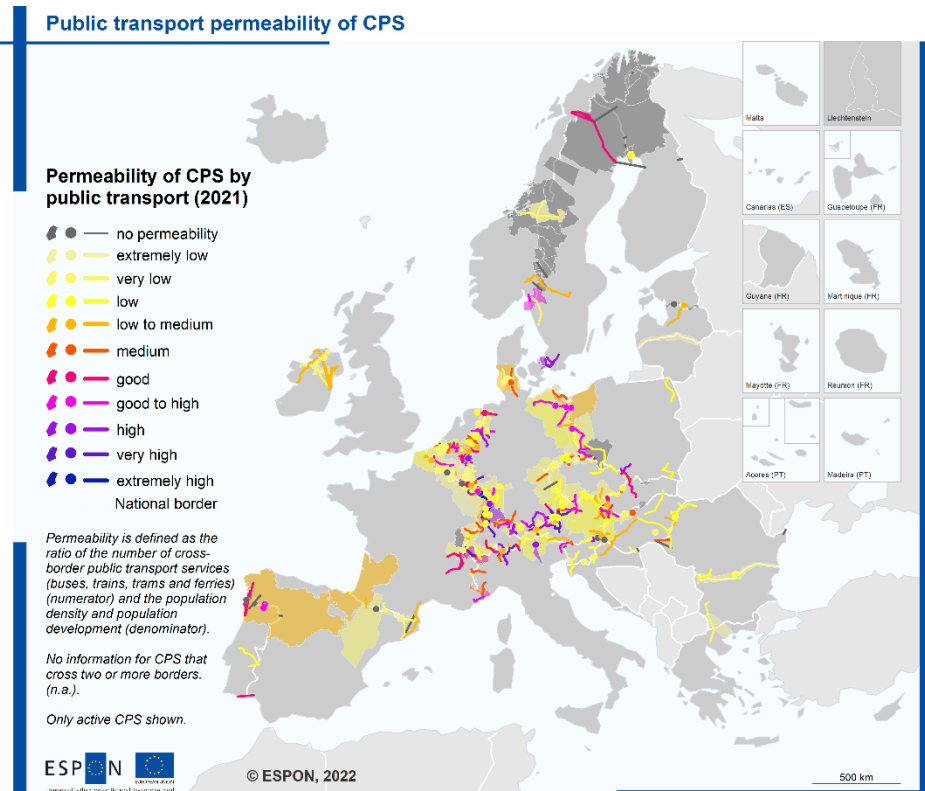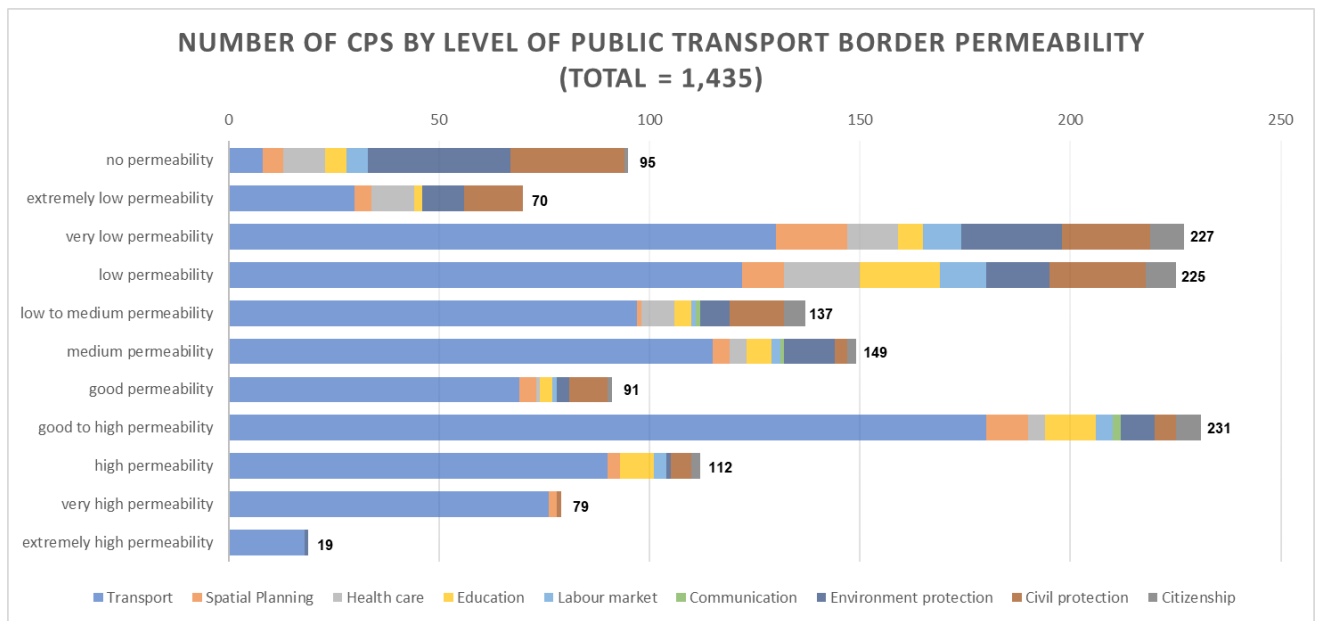## Figure 19. Public transport permeability of CPS.

Figure 20. Number of CPS by level of public transport border permeability.

Source: ESPON-REGIO CPS database, 2022

Figure 21. Geographical specificities: Maritime and mountain borders, rural and SPA borders, agglomerations and twin city borders.
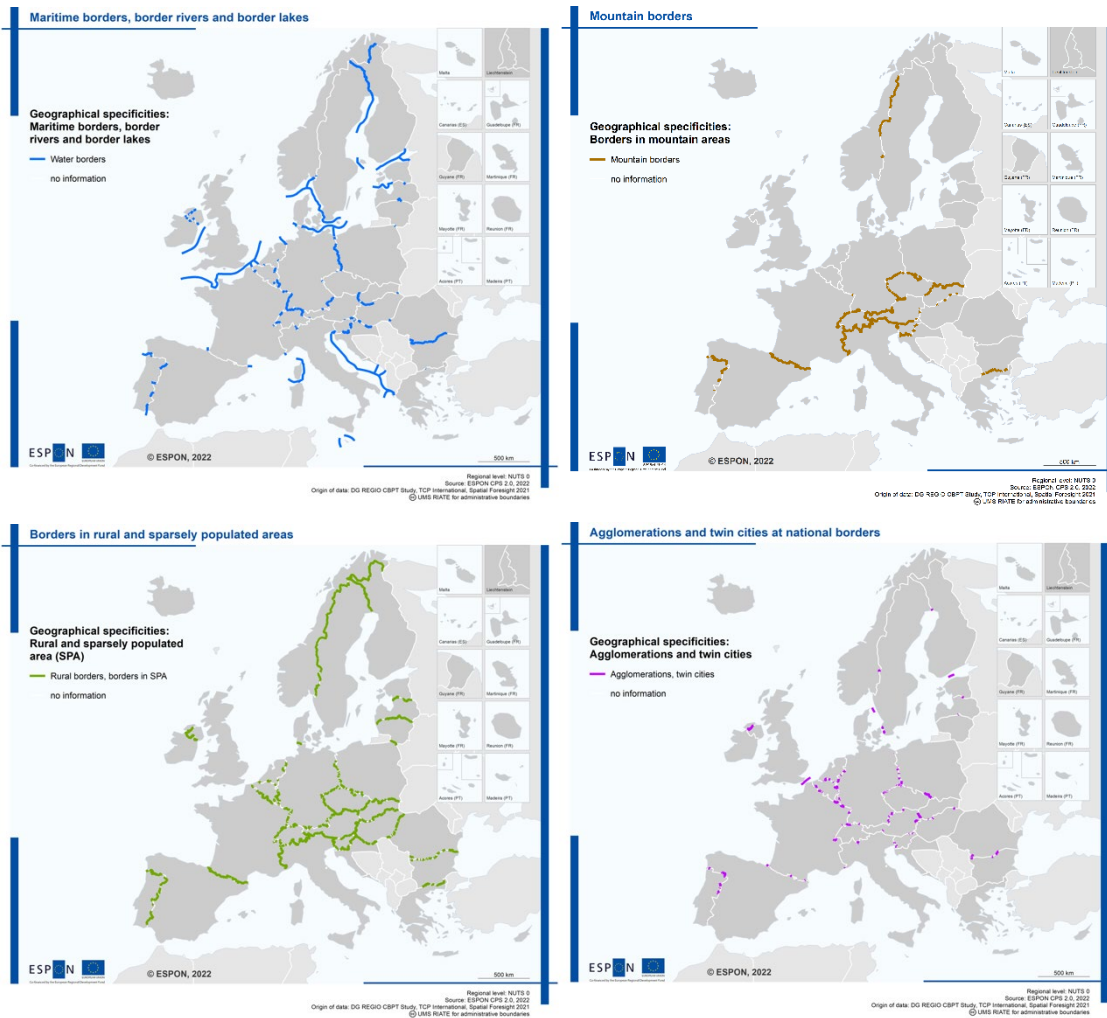
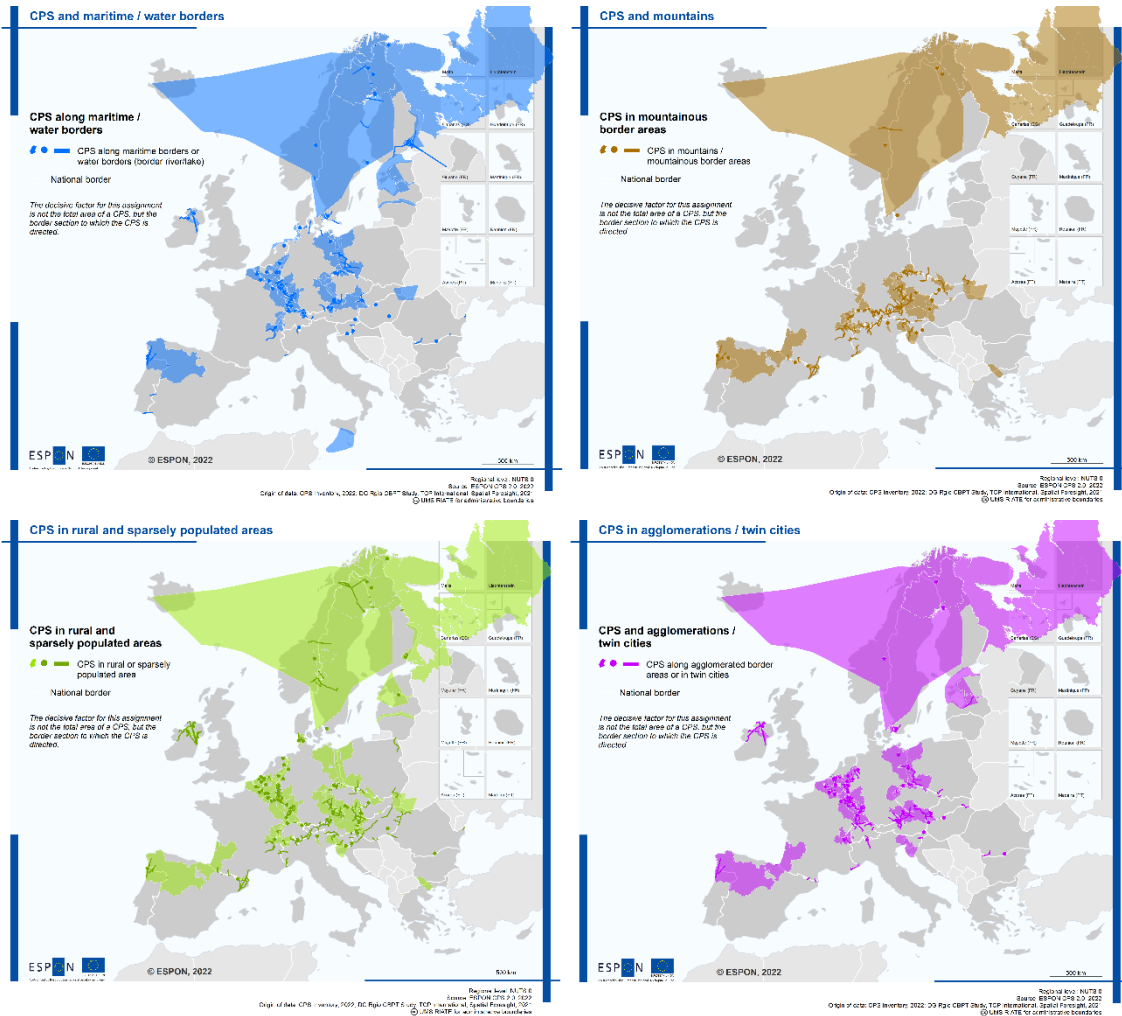**Figure 22. Geographical specificities and CPS: CPS along water borders, in mountains, in rural areas and in agglomerations.**
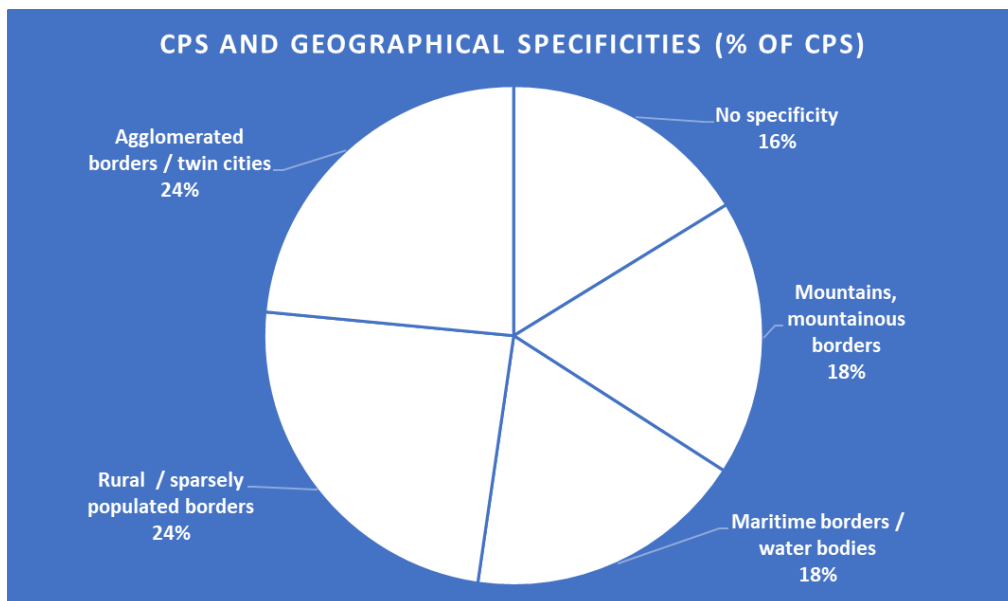

Figure 23. CPS and geographical specificities.

Source: ESPON-REGIO CPS database, 2022

Annex IV.2 – CPS by policy areas

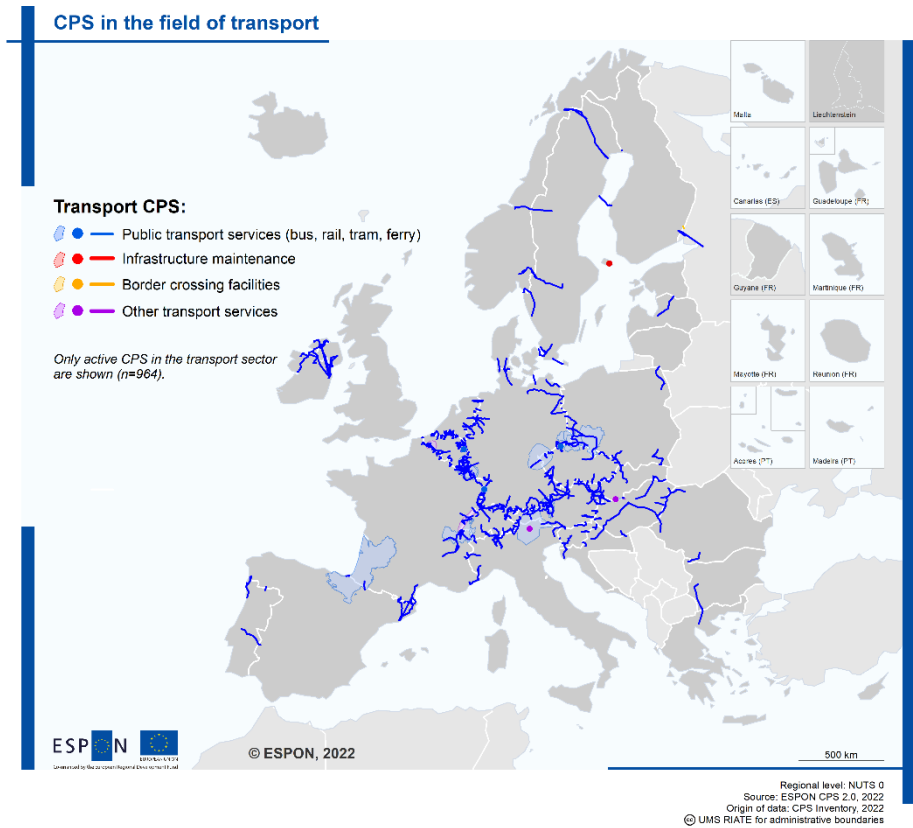## Figure 24. CPS in the field of transport.

Figure 25. CPS in the field of health care and social inclusion.
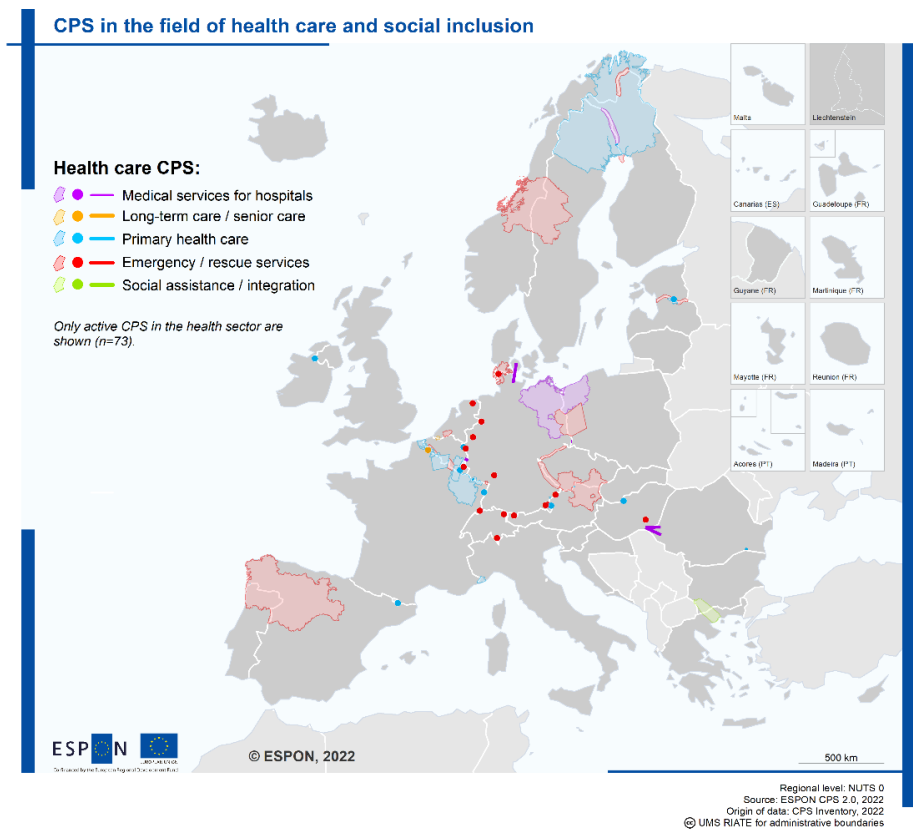
Figure 26. CPS in the field of citizenship, justice and public security.
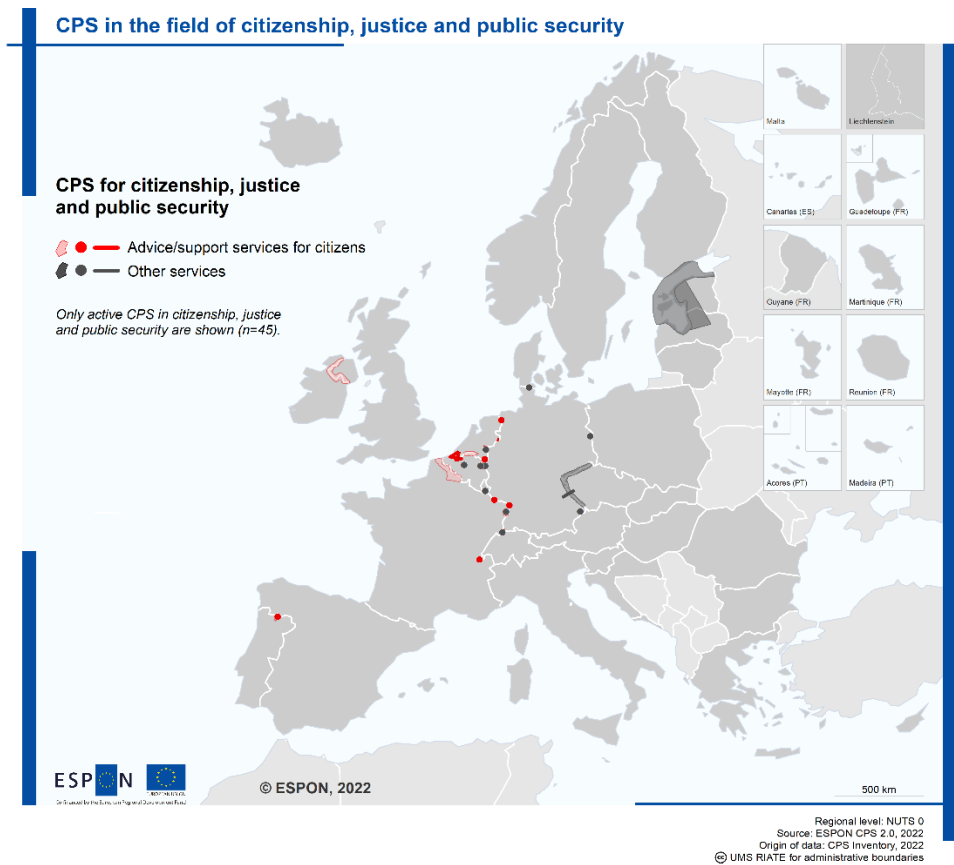

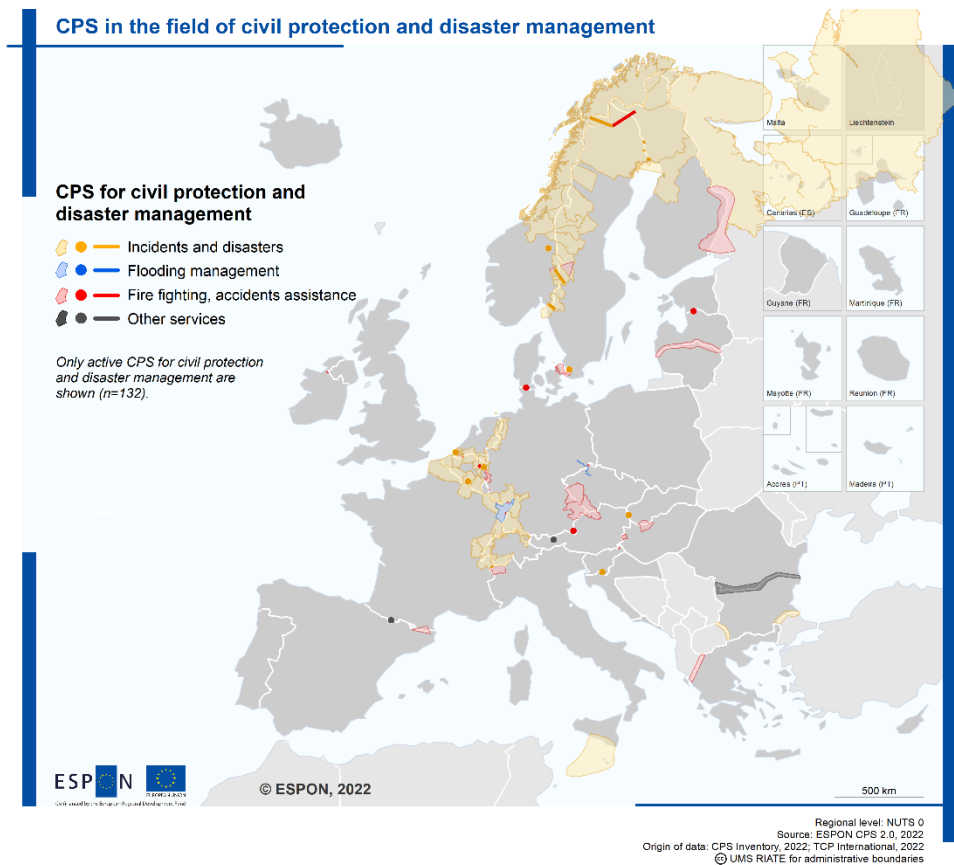## Figure 27. CPS in the field of civil protection and disaster management.

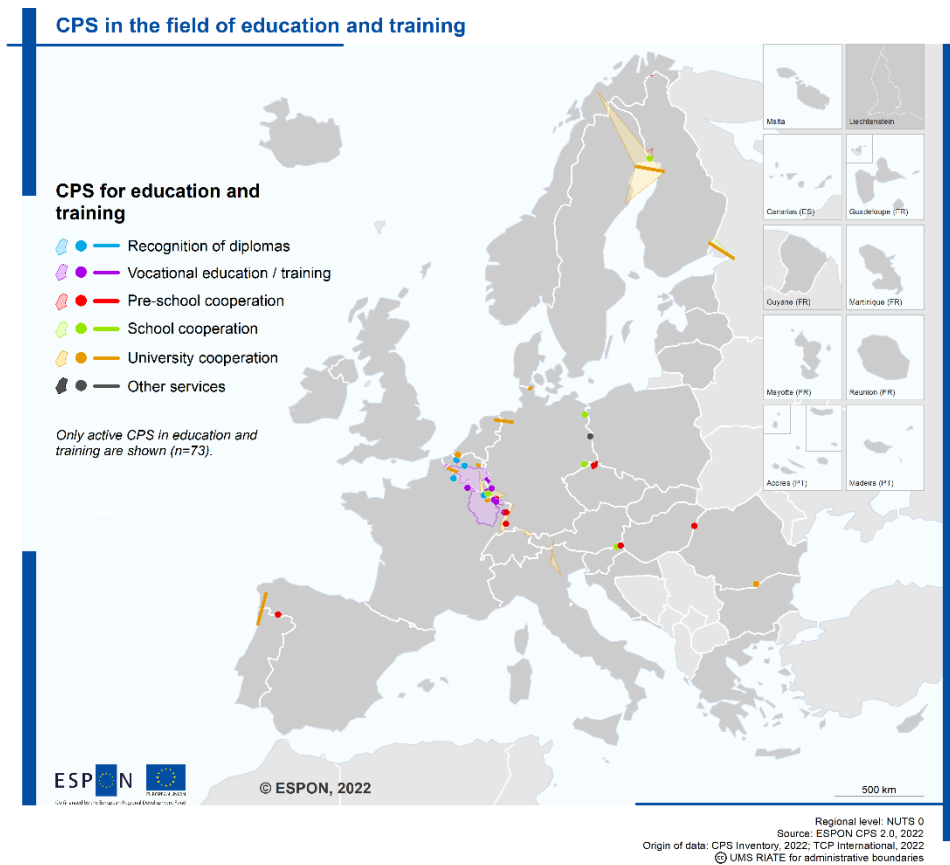**Figure 28. CPS in the field of education and training.**

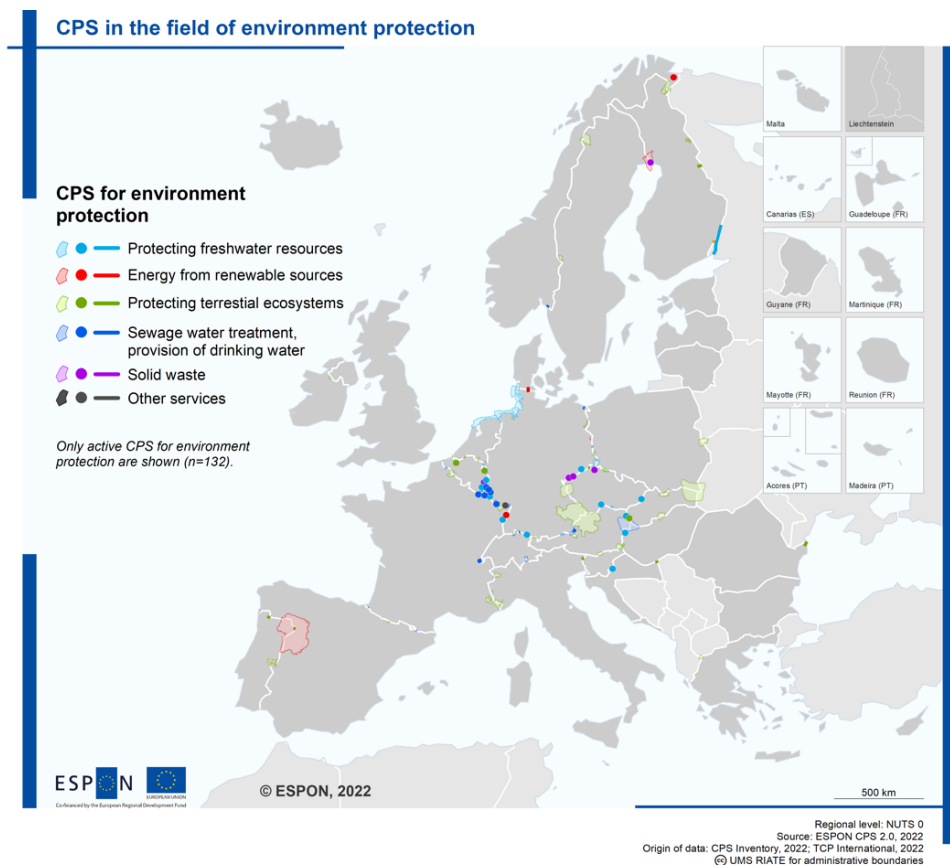**Figure 29. CPS in the field of environment protection.**

Figure 30. CPS in the field of labour market and employment.
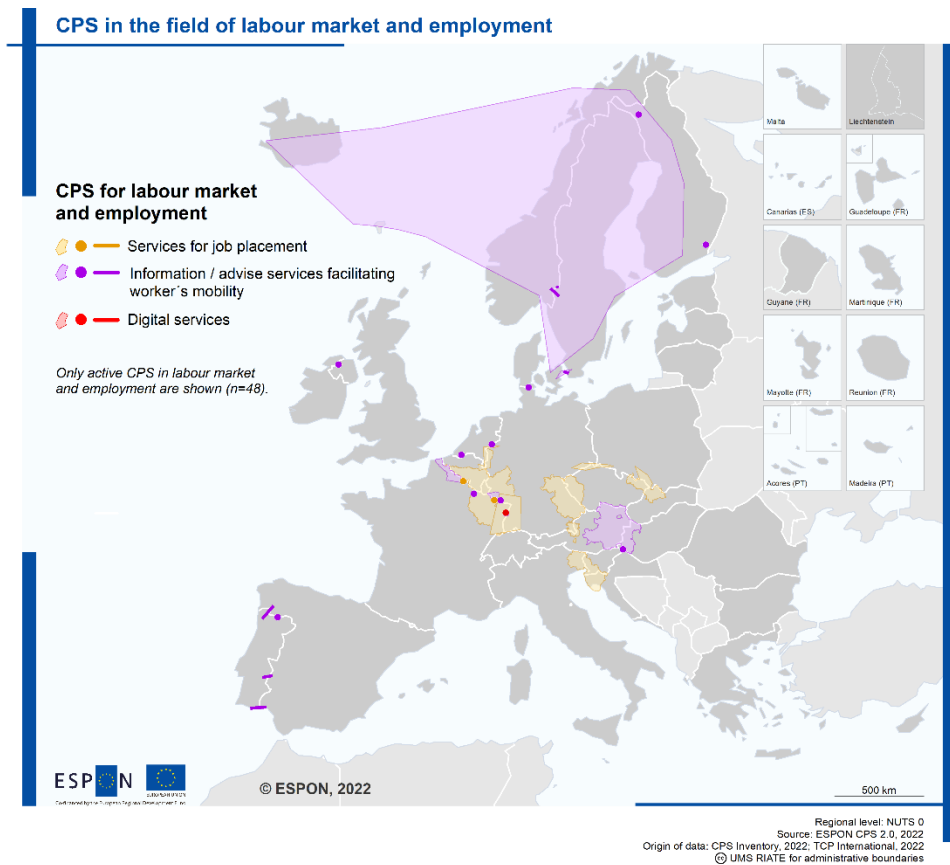
Figure 31. CPS in the field of spatial planning, tourism and culture.
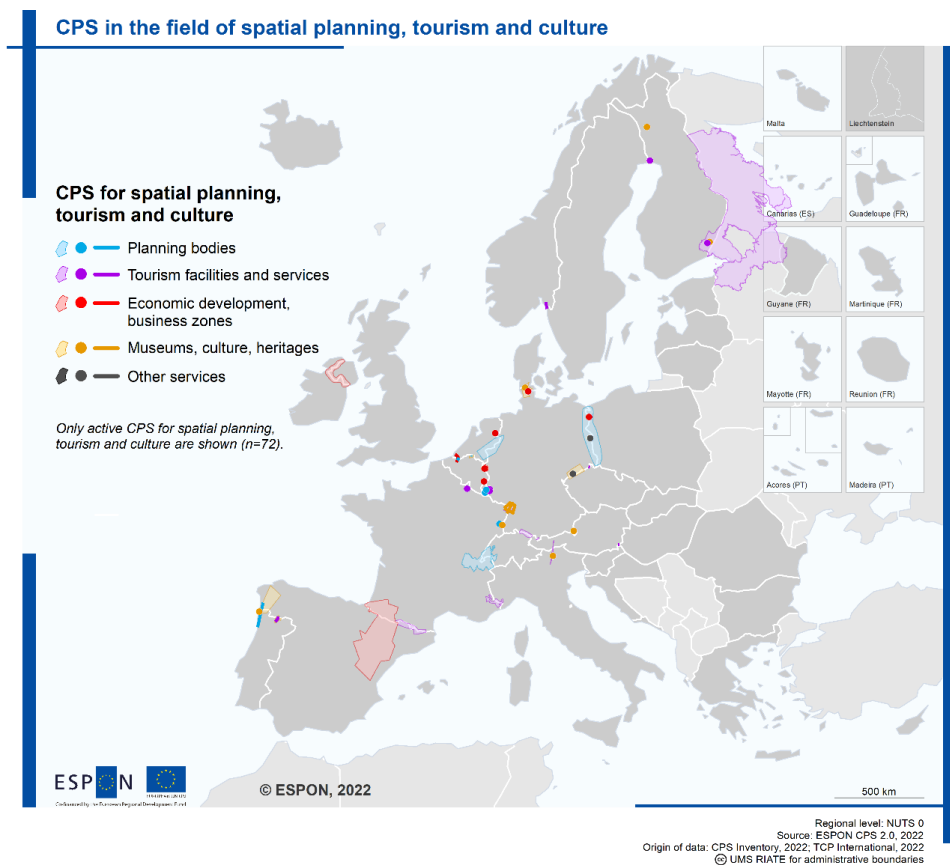
Annex IV.3 – Temporal development of CPS provision

Figure 32. CPS - Status of operation.

Cross-border public services (CPS): Status of operation

CPS status:
- Planned (soon-to-be service)
- Pilot phase
- Operation
- Temporarily closed
- Ceased

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
UMS RIATE for administrative boundaries
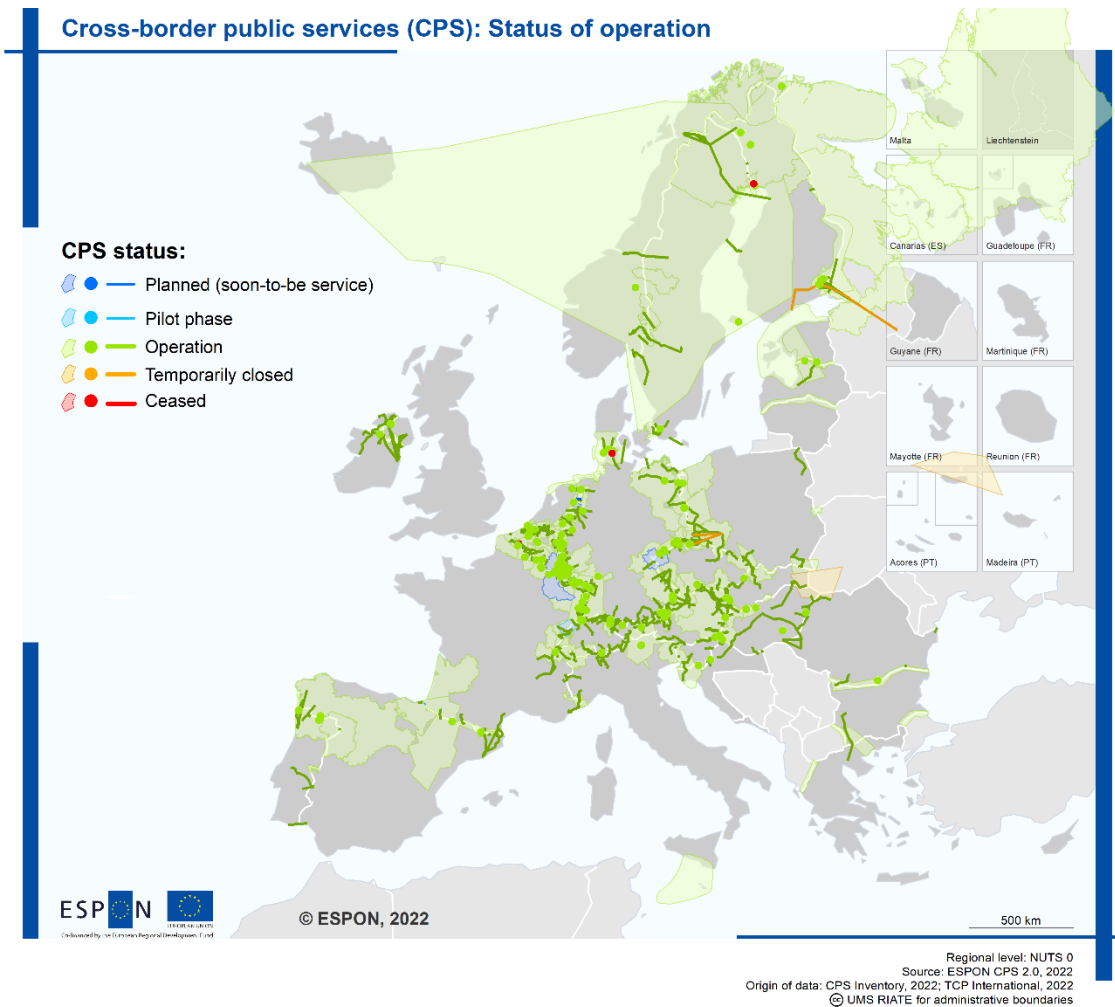
Figure 33. Number of newly established CPS per decade.

TEMPORAL DEVELOPMENT OF CPS - NUMBER OF NEWLY ESTABLISHED CPS PER DECADE

Decade	Number
< 1950	1
1950-1959	5
1960-1969	7
1970-1979	17
1980-1989	20
1990-1999	108
2000-2009	137
2010-PRESENT	192
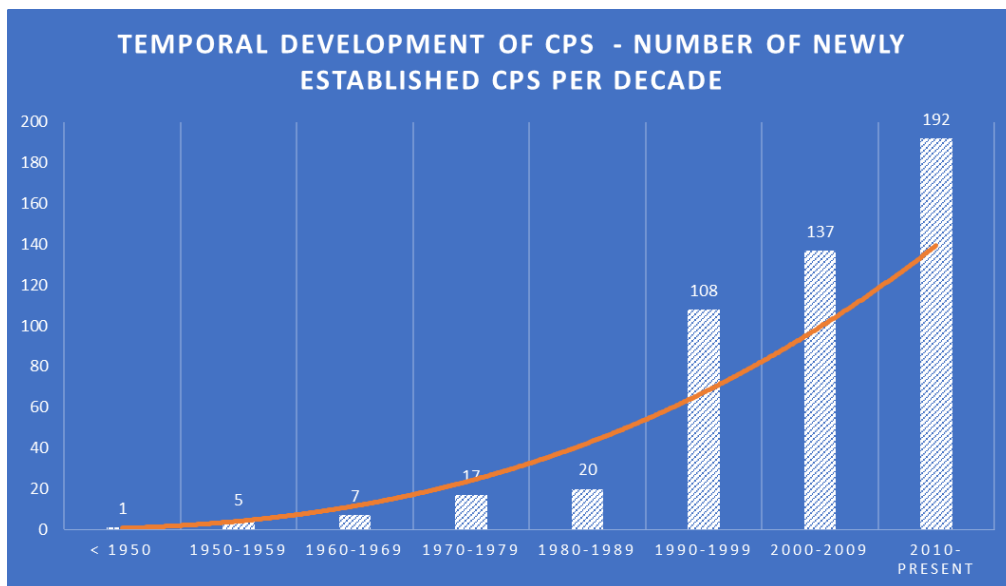
Source: ESPON-REGIO CPS database, 2022

Annex IV.4 – Characterisation of the services

Figure 34. CPS - Management modes.

Cross-border public services (CPS): Management mode

Management mode of CPS
- Border-crossing extension
- Cooperative delivery, shared management
- Harmonised/coordinated delivery
- Unilateral delivery, one-sided management
- Delegated joint delivery and management

Only CPS for which information is available are shown (n=70).

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
© UMS RIATE for administrative boundaries

Figure 35. CPS - Delivery model.

Cross-border public services (CPS): Delivery model

Delivery model of CPS
- Border-crossing extension
- Better cross-border coordination
- Completely new service

Only CPS for which information is available are shown (n=448).

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
© UMS RIATE for administrative boundaries

Figure 36. Share of CPS by delivery model.

Source: ESPON-REGIO CPS database, 2022

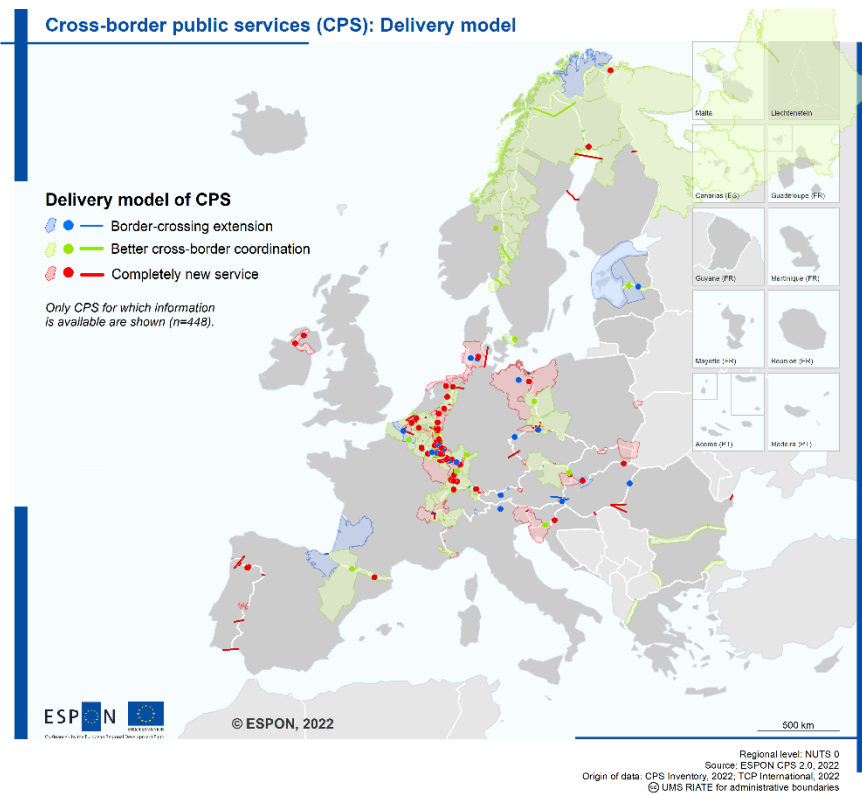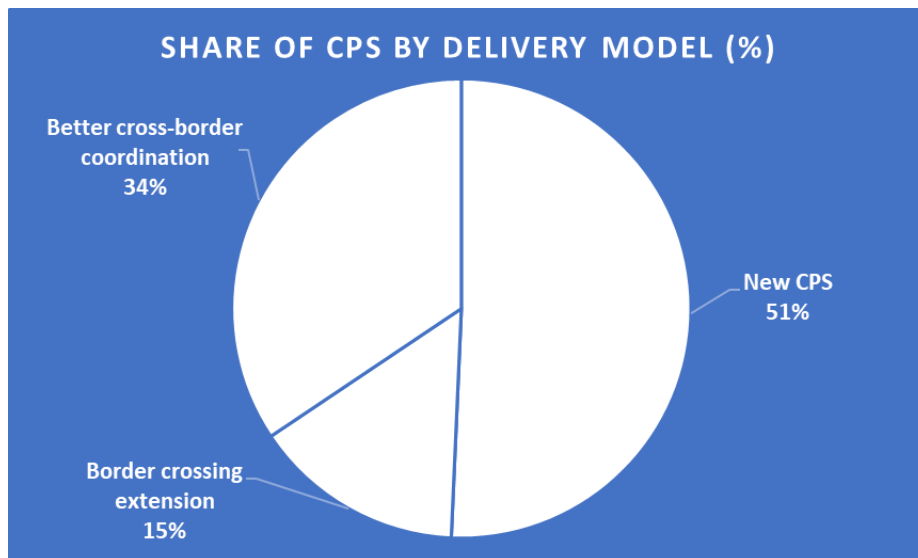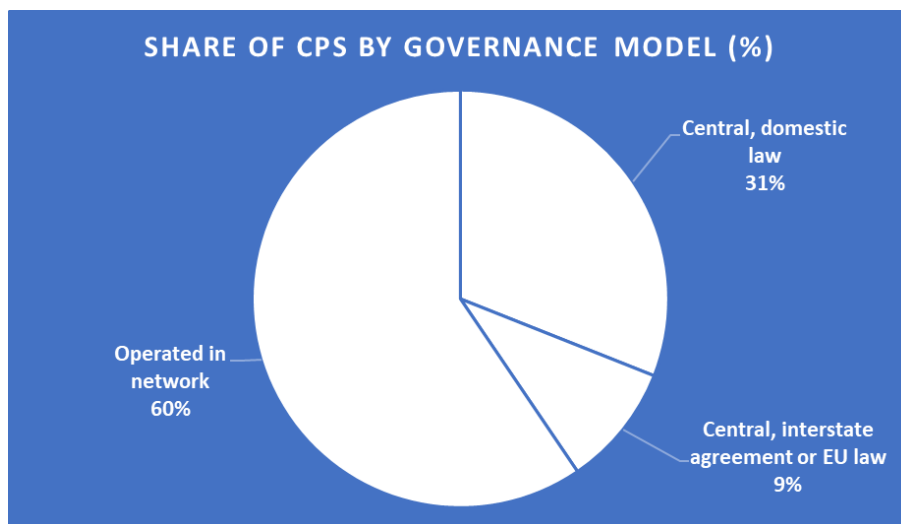**Figure 37. Share of CPS by governance model.**

Source: ESPON-REGIO CPS database, 2022
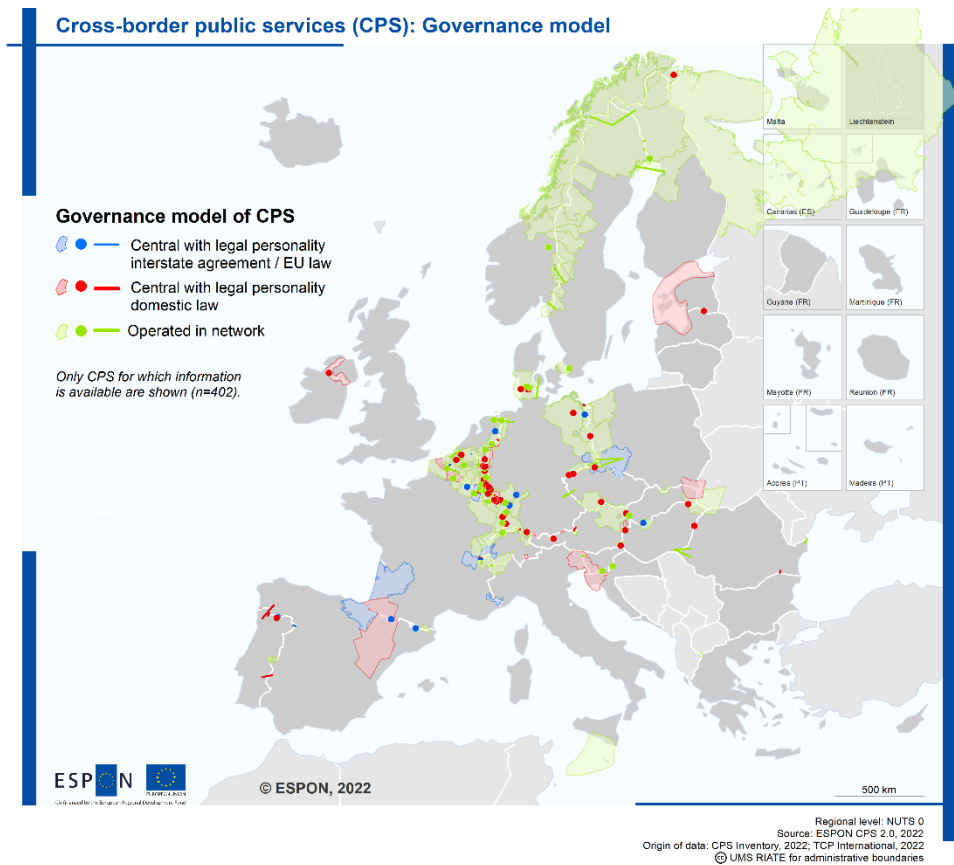
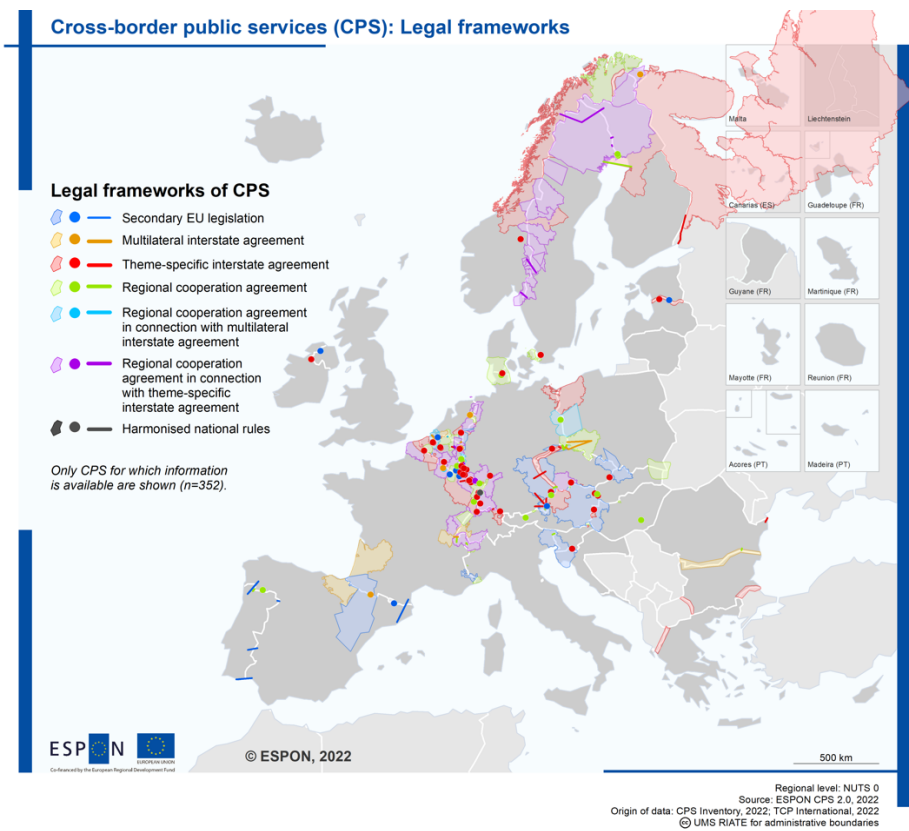**Figure 38. CPS - Governance models.**

Figure 39. CPS - Legal frameworks.

Figure 40. CPS - Model of user payment.

Cross-border public services (CPS): Model of user payment

User payment models
- Usage free of charge
- Fee or ticket
- Indirect payment (tax, insurance, etc.)
- Reimbursement
- Other model
- Not applicable, not relevant

Only CPS for which information is available are shown (n=930).

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
UMS RIATE for administrative boundaries

Figure 41. Reasons ('triggers') for establishing a CPS.

Cross-border public services (CPS): Reason ('trigger') for establishing the CPS

Reason ('trigger')
- Increase effectiveness / efficiency
- Fill domestic service gap
- Fill cross-border service gap
- Promote service differentiation

Only CPS for which information is available are shown (n=927).

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
UMS RIATE for administrative boundaries

Figure 42. Type of obstacles encountered when establishing a CPS.

Cross-border public services (CPS): Type of obstacles encountered

Type of obstacles encountered when establishing the CPS

- No obstacles encountered
- Administrative obstacles
- Socio-economic conditions
- Legal & administrative obstacles
- Institutional obstacles
- Cultural obstacles
- Legal, administrative & cultural obstacles
- Physical & technical obstacles
- Administrative obstacles & socio-economic conditions

Only CPS for which information is available are shown (n=682).

© ESPON, 2022

500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
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Annex VII Infographic on the CPS

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CPS 2.0 INVENTORY

Cross-border Public Services (CPS) address joint problems or development potential in cross-border regions. They are provided on a long-term basis and aim to generate benefits for the general public or a specific target group in the cross-border territory, contributing to improving living conditions in border regions.

Added value

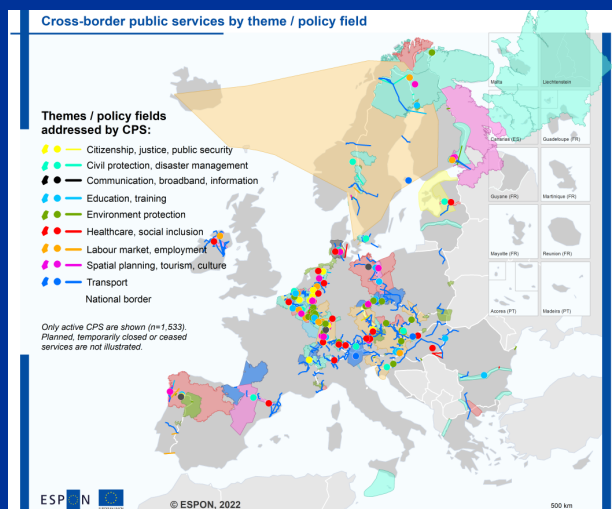CPS enhance **functionality in border** areas by:

- …contributing to **better connetions**
- …supporting **cross-border flows** of people
- …creating (thematic) **functional areas**
- …addressing **gaps in domestic service provision**
- …increasing **efficiency of service provision**
- …raising **awareness of cross-border opportunities**
- …capitalising **Interreg projects**

CPS reduce negative effets of borders and contribute to cohesion in MS.

CPS are characterised by...

☑ Public nature
☑ Cross-border service area
☑ Joint problem or
☑ Service   ☒ Not infrastructure
☑ Target groups on both
☑ Non-discriminatory access
☑ Permanent   ☒ Not project
☑ Involvement of actors from both sides of a border

Geography of CPS

Cross-border public services by theme / policy field

Themes / policy fields addressed by CPS:
- Citizenship, justice, public security
- Civil protection, disaster management
- Communication, broadband, information
- Education, training
- Environment protection
- Healthcare, social inclusion
- Labour market, employment
- Spatial planning, tourism, culture
- Transport
- National border

Only active CPS are shown (n=1,533). Planned, temporarily closed or ceased services are not illustrated.

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500 km

Regional level: NUTS 0
Source: ESPON CPS 2.0, 2022
Origin of data: CPS Inventory, 2022; TCP International, 2022
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Policy areas of CPS

~ 1,000 CPS	Transport
+ 50 CPS	Spatial
+ 50 CPS	Healthcare and social inclusion
+ 50 CPS	Education and training
+ 25 CPS	Labour market and employment
~ 10 CPS	Communication and
+ 100 CPS	Environmental protection and natural resources management
+ 100 CPS	Civil protection and disaster management
+ 25 CPS	Citizenship, justice and public security