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Transboundary marine spatial planning across Europe: Trends and priorities in nearly two decades of project work

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ABSTRACT

As an instrument intended, amongst other things, to reduce transboundary conflicts, Transboundary Marine Spatial Planning (TMSP) has gained significant attention by coastal nations and regions recently, especially in Europe. Rather than leading to a joint marine spatial plan, TMSP is more of a continuous process of transboundary cooperation. This paper discusses the understandings of TMSP, tracks current progress of TMSP projects in Europe and examines their underlying priorities, so as to gain lessons and experience for the development of TMSP in the future. Using the project database of the European MSP Platform, European TMSP-related projects were subject to quantitative and qualitative analysis. The main findings are: (1) there are two accelerating periods of TMSP project development (2006–2010, 2014–2016), which coincide with relevant EU policy development, with the Baltic and Mediterranean Seas accounting for more projects than other sea basins; (2) TMSP projects in different sea basins have different priorities in marine activities and cross-cutting issues, with fisheries and conservation having the largest proportions respectively; (3) most projects are focusing on the pre-planning stages of marine spatial planning processes, and no attention has yet been given to plan implementation in the TMSP projects.

1. Introduction

Marine ecosystems are dynamic systems that transcend administrative and national boundaries and are strongly affected by different human activities, calling for Ecosystem-based Management (EBM) and Marine Spatial Planning (MSP) [1,2]. As a policy tool to make EBM a reality, MSP is becoming a popular tool for coastal nations to reduce user-user conflicts and user-environment conflicts, to achieve blue growth and sustainable ocean development [3–7]. It is also crucial for neighbouring countries or authorities with shared marine waters to address transboundary issues and challenges in regional ocean governance [8–11]. In recognition of the importance of cross-border collaboration and the transboundary nature of marine resources and activities, the concept of Transboundary Marine Spatial Planning (TMSP) has emerged, especially in Europe.

TMSP has perhaps gained much more attention in Europe because of its geographical situation. It is a continent with many peninsulas and islands and is intersected by several sea basins. Moreover, it contains many relatively small countries. The EU, for example, has 22 coastal Member States, located around five sea basins: the Baltic, North, Mediterranean and Black Seas, and the European part of the Atlantic Ocean. These features lead to a complex pattern of international maritime borders. Also, from a policy perspective, the European Union (EU) has established a legal and policy framework for transnational marine cooperation for its Member States in the framework of its sea basin strategies [8,12–14].

TMSP practice is therefore of great importance to integrated maritime policy and ocean regional governance, especially in Europe. However, no comprehensive assessment or study has yet been carried out of TMSP projects as a whole. This should be done so that, firstly, a fuller understanding can be gained of what has been learned from these projects, particularly in a European context. This should include consideration of the spatial and temporal distribution of TMSP projects, the priorities being addressed regarding different marine activities and cross-cutting issues, and the stages of MSP processes that are most frequently addressed, or, perhaps, neglected. Secondly, this study may help with a wider understanding of what has been learned and contribute to an evaluation of the EU's investment in these projects. This may help to guide future EU-funded projects. Thirdly, this may provide a valuable resource for future research on TMSP. Fourthly, this study may assist the development of TMSP initiatives in other parts of the world, as attention increasingly turns to MSP as a tool for regional ocean governance. Current research on TMSP focuses mainly on empirical sum-

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maries of individual projects; this paper provides new perspectives on the evolution of European TMSP projects as a whole.

This paper, therefore, aims to track current progress and to examine the priorities underlying TMSP projects in Europe. It presents the findings of a comprehensive study of 157 projects with TMSP dimensions carried out in Europe mostly since 2000, until the end of 2019, most of which were co-funded by the EU. This study demonstrates the continuing importance of TMSP projects in the European context, but also shows regional variation and considerable difference of emphasis concerning the activities, cross-cutting issues and elements of the MSP process dealt with in the projects.

2. The development of TMSP in Europe

Highlighted as a tool for integrated policy-making in the EU, MSP has been regarded as a coordinated and integrated approach for the promotion of maritime sustainable development and marine environmental restoration since 2007 [15]. From the outset, transboundary thinking has been embedded in the concept of MSP [9,16,17].

TMSP has gained attention in the European context, and elsewhere, for a number of reasons. Firstly, it is recognised that the sea is a complex ecosystem that transcends administrative boundaries. Although ecosystem management was identified as a 'wicked problem' that has no single or best solution [18], MSP is seen to be a useful policy tool to make ecosystem-based sea use management a reality [19–22]. TMSP is reckoned to be one means to develop a holistic and transparent approach to manage marine activities in line with ecosystem requirements [23,24]. This is supported by EU macro-regional strategies, some of which are geographically linked to the sea basins. Secondly, human activities have a cross-border dimension and are often closely interrelated across borders too. In this context, national sectoral policies may have implications for neighbouring countries, thus intergovernmental interaction and cross-sectoral integration can help to set harmonised objectives in the same sea basin or shared marine waters [23,25,26]. TMSP provides a framework for balancing competing human activities and achieve sustainable use of marine resources [27]. Thirdly, existing transboundary institutional structures established in marine regions or sub-regions, including international agreements, regional sea conventions and sea basin cooperative mechanisms, can play a strong role in TMSP processes; this can strengthen relationships with neighbouring governmental bodies and coordinate marine activities across different jurisdictions [28,29]. The emergence and development of TMSP are in fact largely based on current regional cooperation structures, such as the Baltic Sea region structures HELCOM (the Helsinki Convention on the Protection of the marine Environment of the Baltic Sea Area) and OSPAR (the Convention for the Protection of the Marine Environment for the North-East Atlantic).

As for policy development, the EU has established a comprehensive legal and policy framework on transnational cooperation between Member States, extending to neighbouring third countries where possible. Also, the European Commission (EC) has launched a debate on developing integrated maritime strategies and policies in a coordinated way across sea basins since the early 2000s. This has proposed applying a holistic approach to marine governance at a European level. The EC adopted a Green Paper regarding future maritime policy in 2006 [30] and a Blue Paper promoting Integrated Maritime Policy (IMP) in 2007 [15]. The Blue Paper on European Maritime Policy introduced MSP as a fundamental requirement for the continued sustainable development of marine areas and coastal regions. Both the Green Paper and the Blue Paper highlight the transboundary nature of marine activities and the importance of implementing MSP, emphasising that it is a key instrument to advance IMP. Taking account of cross-border impacts and implementing MSP has then become the responsibility of the Member States. The transboundary nature of the marine environment has also become one of the reasons for regional coordination and cooperation, which is reflected and emphasized in the Marine Strategy Framework Directive (MSFD) 2008 [31]. As the environmental pillar, MSFD establishes a policy framework to address environmental challenges and pursue good environmental status. MSP has also developed as a policy tool to advance blue growth [32]. For example, Europe 2020 Strategy [33] and Blue Growth Strategy [34] were adopted by EC after the implementation of MSFD, transboundary MSP has become one of the essential components to ensure efficient and sustainable management of marine activities across border. Additionally, key principles of MSP were highlighted in the Roadmap of Maritime Spatial Planning in 2008 [23]. This emphasises the responsibility of Member States to implement MSP and to enhance regional cooperation including with third countries where possible. In 2014, the Directive 2014/89/EU for establishing the framework of MSP, namely the MSP Directive, also promoted transnational cooperation between the Member States and third countries in the relevant marine regions, and the Member States are now required to set up maritime spatial plans by March 31, 2021 [27]. Together with MSFD, these two Directives are not only the foundation stone for the sustainable development of European seas and oceans, but also provide legal certainty for blue economy[35].

Europe has thus become the leading region for developing TMSP. Moreover, given that financial support has been set out as one of the ten steps to advance MSP [20], the European Regional Development Fund and other funding programmes have supported transnational approaches to MSP. For example, EU Research Programmes have supported coastal and marine research in a multidisciplinary manner since the 1980s and since 2000 has funded at least 26 TMSP projects. Furthermore, a valuable resource for building capacity and for studying TMSP in Europe has been provided by an EC assistance mechanism, the European Maritime Spatial Planning Platform (European MSP Platform https://www.msp-platform.eu/msp-practice/msp-projects), which provides technical support for knowledge and information sharing on MSP. This includes an online database in which, to date, over 170 projects have been summarised. Tracking the progress of TMSP is now timely and can contribute to the future development of TMSP in Europe, whilst also providing a reference for regions beyond Europe.

Before exploring the development of TMSP process in Europe, the definition and evolution of TMSP should be clarified. MSP has a well-known definition, which is 'a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process' [20], but TMSP is more complicated because two or more authorities get involved in the process. Up to now, there has been no commonly agreed and clear definition of TMSP. However, the general meaning of TMSP has been discussed. Soininen and Hassan have observed that TMSP is 'a process in which at least two states, sharing a boundary at the Territorial Sea or the Exclusive Economic Zone, jointly manage a marine area'[36]. This concept has been developed further in EU projects. For example, the Baltic SCOPE project defines TMSP as 'MSP activities conducted between nation-states and across national/regional territories' [37]. As for the process of TMSP, Jay emphasises collaboration in the three aspects of data, governance and stakeholder engagement [38]. Whereas TMSP is viewed by Backer as a means of balancing the commercial demands of marine space and the conservation pressures of marine ecosystems through transboundary dialogue, intergovernmental interaction and joint planning [24]. Van Tatenhove considers that the implementation of TMSP has been hampered by conceptual and institutional fragmentation, and reckons that TMSP should be organised as a reflexive governance arrangement in which the actors involved can change the rules of the game and challenge the existing (national-oriented) MSP discourses[16]. The descriptions of TMSP above mainly stress three key aspects, which refer to (1) multiple authorities: at least two states, multi-subnational authorities, regional structures or interna-

tional organizations; (2) across territories: in the same sea basins or sharing marine areas; (3) joint planning: the main action is to jointly develop regional capacity or shared spatial strategies through transboundary negotiation.

Additionally, the practice of TMSP has gained considerable attention from academic researchers and marine planners. This has led to an interesting debate on TMSP from various perspectives. For scholars and researchers who are interested in TMSP, some hold the view that TMSP has developed simply along with the roll-out of TMSP pilot projects in the EU. These projects construct TMSP by summarising practical experiences and successful lessons from a single or several TMSP project and give best practices or recommendations for its future development [8,24,39–43]. Some argue that TMSP is proving to be an effective management instrument to help overcome transboundary conservation challenges and achieve marine protection targets by jointly setting spatial priorities and effectively promoting intergovernmental collaboration [10,44,45]. Some set it in the context of EU policy and existing regional institutional structures for transnational coordination and regional coherence [13,28,46–49]. Others analyse the governance dimensions of TMSP and explore the interactions between marine governance and TMSP [9,16,26,50]. Most of these perspectives are based upon the study of one or a few TMSP projects, and the following four integration dimensions have been explored and summarised as the main challenges and enablers for TMSP: transboundary integration (advancing cross-border on cross-level cooperation or coordination between jurisdictions), knowledge integration (sharing data, information and best experience), stakeholder integration (engaging a range of stakeholders in MSP activities) and sectoral integration (promoting synergies between sea use sectors) [43,51].

In contrast, this paper takes a broader look at TMSP. As the Global Environment Facility (GEF) states, 'transboundary' is 'engagement of multiple entitles (e.g. countries, states, provinces) across one ecosystem, who also do not necessarily share a common border' (GEF LME: LEARN, 2018). This is particularly relevant in the context of regional sea ecosystems shared by several countries. It should also be recognised that TMSP is a continuous process that potentially contains five stages, like individual MSP processes: preparation, analysis, planning, implementation and evaluation [9,52]. In this context, this paper broadly defines TMSP as:

> A public and continuous process in which regional, national or subnational jurisdictions jointly work on marine spatial planning in their shared marine ecosystem areas to solve current or potential transboundary conflicts and develop shared spatial strategies for the future.

3. Methodology

This research carried out a quantitative and qualitative analysis of the TMSP projects included in the database of the European MSP Platform up until 2019. The total number of the completed or ongoing projects in this online database is 181 (as of January 31, 2020). However, not all 181 projects were suitable for analysis. Samples were therefore selected from this total number to allow two steps of analysis, as explained below. A research database was created to enable this selection. This consisted of input from all 181 projects, covering the title, start year, completion year, sea basins, countries, budget, funding programme, project summary, final results and languages of publication. Most of the data were collected directly from the EU MSP Platform, and the rest was gathered from the official website of each project.

Two analytical steps were then carried out, each with an appropriate sample of projects. In Step One, a large sample was selected in order to analyse the spatial and temporal distribution of projects, based on the start year and the countries and sea basins involved. Three criteria were used to select this sample:

1. The project should be MSP-related, covering one or more steps of an MSP process;
2. The project should be a European project;
3. The project should have transboundary dimensions, involving two or more countries or MSP authorities, either working directly on transboundary issues or cooperating on national-level issues.

This led to 157 projects being identified. The results of the analysis of these projects are described below in 4.1.

In Step Two, a smaller sample was selected to allow a more detailed analysis and qualitative assessment. For example, only completed projects could be analysed in this way. Two further selection criteria to those above were applied:

1. The project should have final reports or results, which should be publicly available;
2. These reports or results should be available in English.

This information was not all directly available from the Platform, and so required further searching from the websites, final reports or other deliverables of each project. This led to 88 projects being identified. The results of the analysis of these projects are described below in 4.2 and 4.3.

The research database was then supplemented with further information about these 88 projects. Project-oriented literature (such as executive summary, project reports or deliverables, published articles and other supporting documents) were collected and analysed to develop a four-dimensional analytical framework. These dimensions, and the criteria used for analysis, were defined as follows. In particular, this additional analysis was used to assign projects to the various cross-cutting issues and elements of MSP processes.

1. Temporal distribution. This was defined by the start date of projects, regardless of the duration. These dates are shown in Fig. 1.
2. Spatial distribution. This was defined at two levels: firstly, the countries participating in the project, and secondly, the European sea basins concerned. These locations are shown in Figs. 1 and 2. Some projects spanned more than one sea basin, so 'cross sea basins' is also used as a spatial category.
3. Thematic coverage. This was deduced from the projects as they were analysed; this, therefore, covers the themes that are typically found in MSP projects. They included firstly individual marine activities, such as fisheries, shipping, and renewable energy and secondly, cross-cutting issues, such as conservation, data management and blue growth. The full range of themes is shown in Figs. 3 and 4.
4. The coverage of general elements of an MSP process. This is based on the steps outlined in the UNESCO guide to 10 steps of MSP, supplemented by other project experience and practice [9,20,52–54]. These are outlined in Table 1 and are also shown in Fig. 5.

4. Results

4.1. Temporal and spatial distribution of TMSP projects

This first set of results is based upon the Step One analysis of the larger sample of 157 projects. Fig. 1 shows the inter-annual trend in the number of TMSP projects. Except for one project with a transboundary dimension starting in 1989, all the projects began from 2002 onwards. After a slow development in 2002–2006, there were two periods of acceleration, one from 2006 to 2010, and the other from 2014 to 2016, producing two peaks. The number of projects reaches the highest point at 20 in 2016.

Both Figs. 1 and 2 show the regional spread of TMSP projects. It is evident in Fig. 1 that Cross Sea Basins (42) and the Baltic Sea (42) account for the highest number. After this, the Mediterranean Sea (40) have a much higher number of TMSP projects than the Atlantic Ocean (15), the North Sea (9) and the Black Sea (9). Similarly, by sub-dividing the cross-sea basin projects into different regional seas in Europe, and adding them to the sea basin projects, the Baltic Sea (80) and the Mediterranean Sea (78) continue to account for the largest propor-

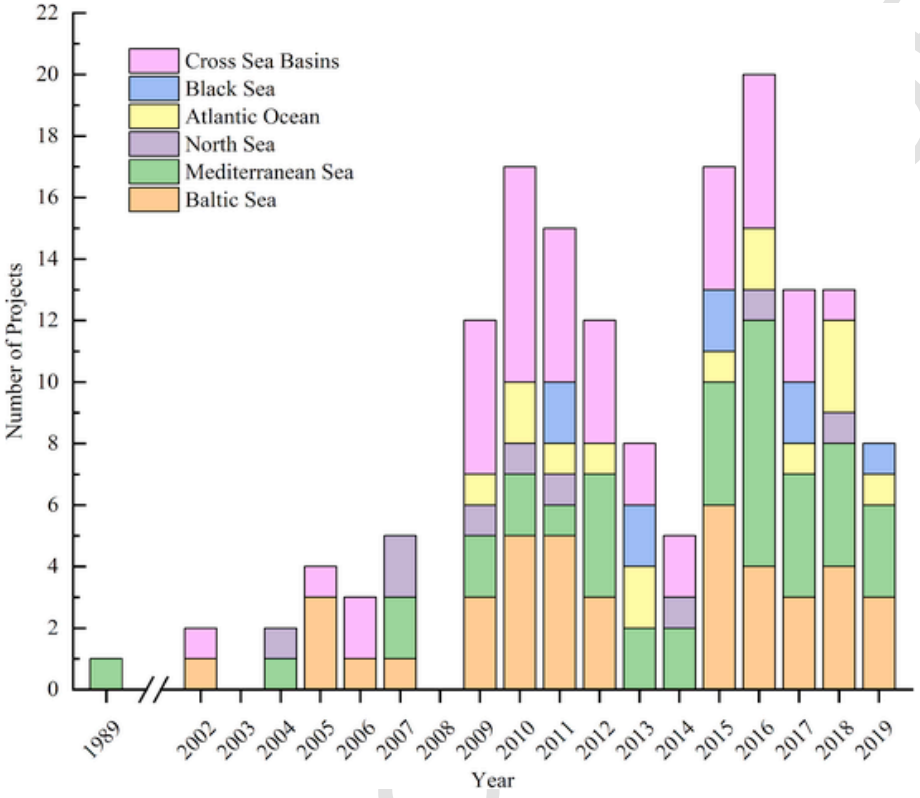

Fig. 1. Interannual number of TMSP-related projects in European sea basins.

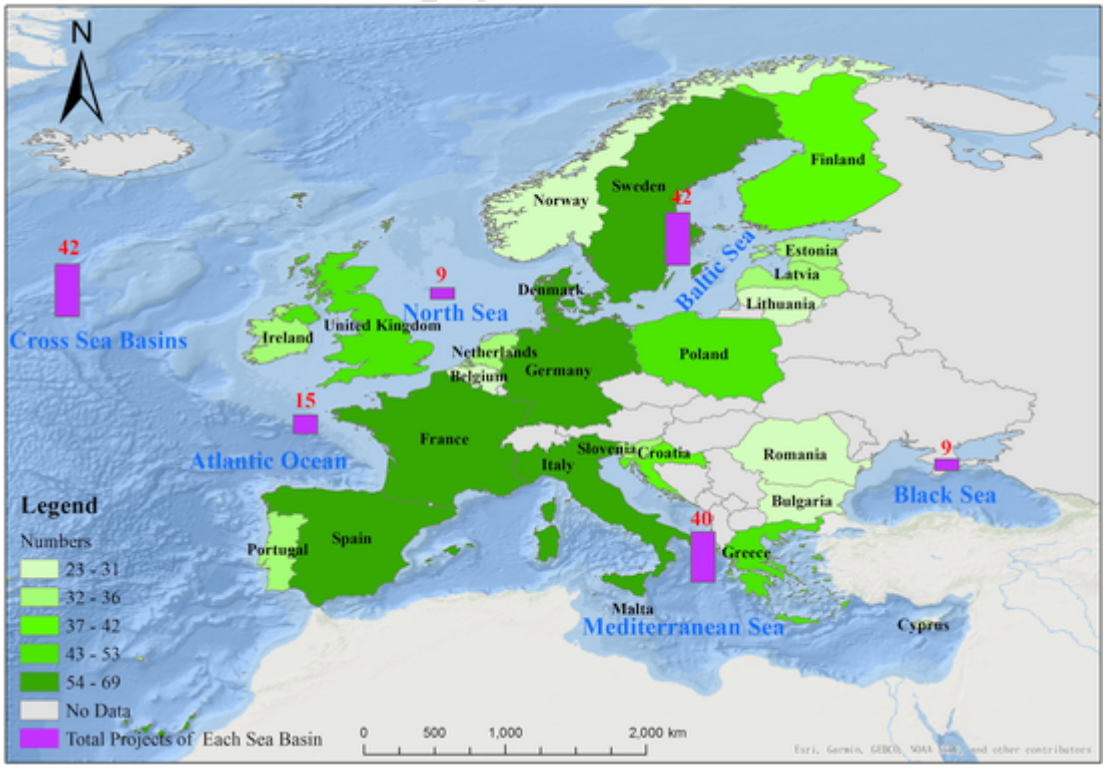

Fig. 2. Spatial distribution of TMSP projects in European countries and sea basins.

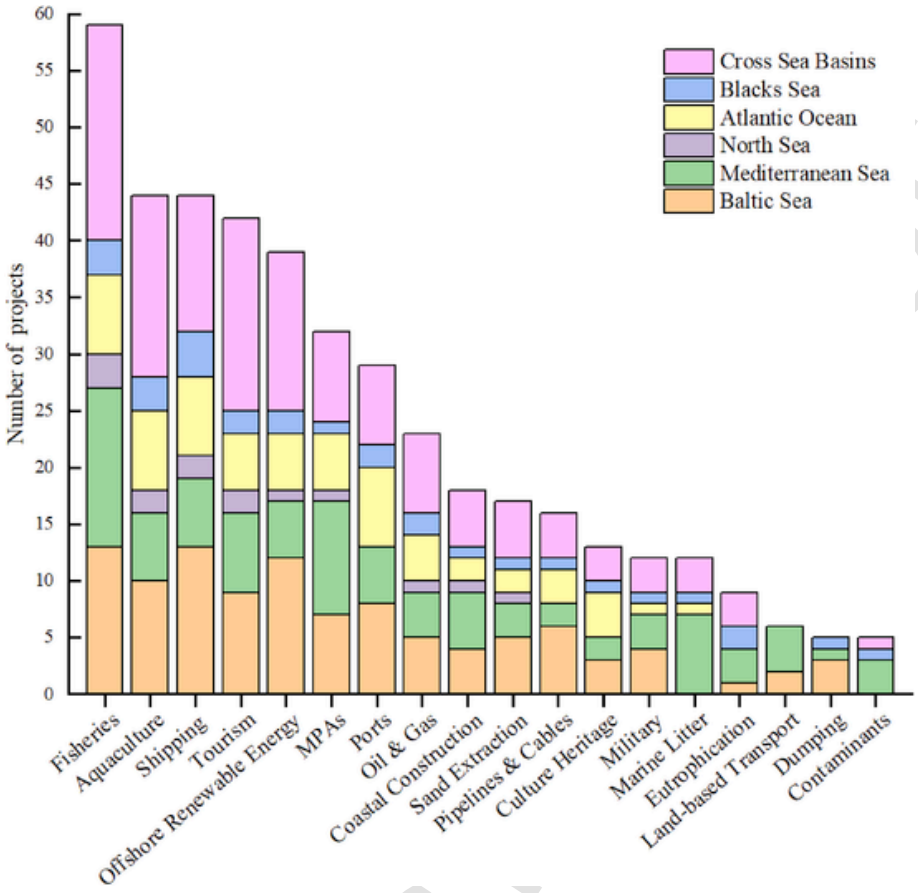

Fig. 3. The representation of individual or sectoral activities in European sea basins.

tion of projects. According to this distribution, the Atlantic Ocean (49), the North Sea (44) and the Black Sea (44) have a similar number of projects.

Fig. 2 also shows the spatial distribution of projects by the countries participating in the projects. This includes all 22 coastal EU Member States, Norway, which is a participant in many EU funding programmes, and the UK, which participated as a Member State during the period of this study. Italy (69), Germany (61), France (61), Spain (61), Denmark (58) and Sweden (57) are the top six countries. Greece (53), UK (49), and Poland (48) also play a very active role, each participating in over 45 projects. Finland (42) and Croatia (40 are in the middle level of participation compared with other countries, whilst Netherlands (36), Estonia (36), Latvia (36), Slovenia (33), Ireland (33), Malta (32) and Portugal (32), have a similar number of participated projects. Cyprus (31), Belgium (30), Romania (30), Bulgaria (29), Lithuania (29) and Norway (23) are less involved. These figures suggest that the level of participation on TMSP partly reflects whether a country borders just one sea basin or more.

4.2. Thematic coverage

The remaining results are based upon the Step Two analysis of the smaller sample of 88 projects. Firstly, the main individual or sectoral activities that were of concern to the projects were analysed. Fisheries is the most significant, included in 59 projects. Other uses that figure highly are aquaculture (44), shipping (44), tourism (42), and offshore renewable energy (39). Other marine activities such as marine protected areas (MPAs) (32) is an important issue in TMSP processes, exceeding the number of projects concerned ports (29) and oil & gas (23). Coastal construction (18) is also important. On the other hand, marine litter (12), eutrophication (9), dumpling (5) and contaminants (5) are less well represented. However, if projects concerned with all these aspects of marine pollution are combined, their number is significant (31).

The regional priorities for individual activities are also shown in Fig. 3. This indicates that the Baltic Sea is most concerned about fisheries (13), shipping (13), offshore renewable energy (12) and aquaculture (10). The Mediterranean Sea is also focusing on fisheries (14), as well as marine pollution (14), MPAs (10) and tourism (7). The North Sea also gives priority to fisheries (3), aquaculture (2), shipping (2) and tourism (2). The Atlantic Ocean also pays attention to fisheries (7), as well as aquaculture (7), shipping (7) and ports (7). The Black Sea emphases the importance of shipping (4) and energy (offshore renewable energy (2) and oil & gas (2)). As for cross-sea basins projects, they focus on fisheries (19), offshore renewable energy (17) and aquaculture (16).

Secondly, the cross-cutting issues dealt with in the 88 projects were analysed in a similar way. The following issues were identified from the projects as a whole: conservation, data management, land-sea interaction, governance system, ICZM, blue growth, climate change, ecosystem services and sectoral integration. Fig. 4 shows that the issue that the greatest number of projects dealt with is conservation (37), followed by data management (28), land-sea interaction (25), governance system (19), ICZM (17), blue growth (17) and climate change (17). Fig. 4 also shows that different sea basins have different priorities regarding cross-cutting issues. The Baltic Sea pays close attention to most of the cross-cutting issues. Conservation (8) account for the top one for the Baltic Sea, while conservation (11), land-sea interaction (8) and climate change (7) are the top three for the Mediterranean Sea. For the North Sea and the Black Sea, they have the same number of projects fo-

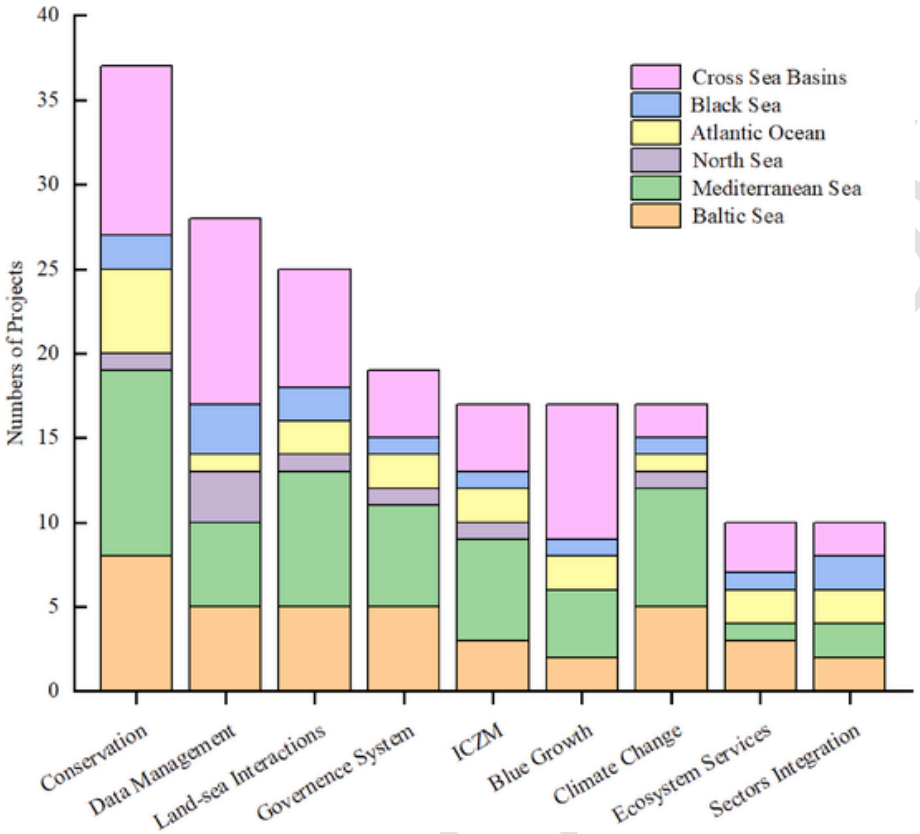

Fig. 4. The representation of cross-cutting issues in European sea basins.

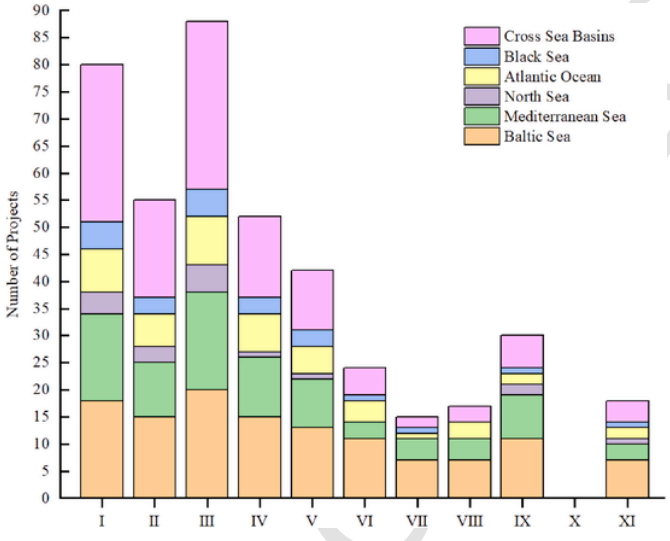

Fig. 5. 11 Elements of MSP processes (see Table 1 for the definition of elements).

cusing on data management (3). However, the Black Sea gives more priority to sectoral integration (2), blue growth (1) and ecosystem services (1). The Atlantic has a greater interest in conservation (5). The cross-sea basins projects focus largely on data management (11), conservation (10), and blue growth (8).

4.3. Elements of the MSP process

The 88 projects were also analysed to see which of the 11 aspects of MSP processes (as shown in Table 1) that they each covered, or were concerned with to some extent. Fig. 5 shows that most attention is given to III (stakeholder engagement) (88); in fact, all the projects dealt with this in some way.

This is closely followed by I (data and information management) (80). Other elements at the early stages of MSP processes also figure prominently in the projects: II (use of GIS and mapping) (55), IV (identification of issues, pressures and opportunities) (52) and V (Developing a vision and objectives) (42). In fact, if the elements are grouped into the five broad stages shown in Table 1, the main efforts of the projects can be seen to be concentrated on the early preparation and analysis stages: respectively combined totals of 135 for elements I and II, and 94 for elements IV and V.

As far as the other elements are concerned, IX (environmental assessment) features in a fair number of projects (30). This and III (stake-

Table 1
Elements of MSP processes.

Element	Description	Stage of MSP Process
I	Data and information gathering	Preparation
II	Use of GIS and mapping	Preparation
III	Stakeholder engagement	(Cross-cutting)
IV	Identification of issues, pressures and opportunities	Analysis
V	Developing a vision and objectives	Analysis
VI	Developing and selecting options and scenarios	Planning
VII	Developing spatial allocations and zoning.	Planning
VIII	Developing policies and management measures	Planning
IX	Environmental assessment	(Cross-cutting)
X	Implementation	Implementation
XI	Monitoring, evaluation and review	Evaluation

Source: TPEA final results and [9].

holder engagement) are elements that cut across the other stages, which are consecutive in nature. Lesser numbers of projects deal with elements that generally come later in MSP processes (the planning and evaluation stages): VI (developing and selecting options and scenarios) (24); VII (developing spatial allocations and zoning) (15); VIII (developing policies and management measures) (17); and XI (monitoring, evaluation and review) (18). Most notable is the fact that none of the projects deals with the plan implementation stage of MSP (X (implementation) (0)).

When looking at the different elements as dealt with in the different sea basins, the results largely reflect the main findings above. The first four elements (I, II, III and IV) are covered by the highest number of projects in all regional seas and cross-sea basins projects. Apart from the lack of coverage of implementation (X), the Baltic Sea and the Mediterranean Sea projects seem to have a better spread of the whole MSP process. The North Sea projects omit a number of elements.

5. Discussion

5.1. Relationship with EU policy development

Looking at the temporal distribution of the 148 TMSP projects (Fig. 1), it is likely that this represents a close relationship to EU policy development. The two periods of rapid growth (2006–2010 and 2014–2016) map onto milestones in MSP policy and legislation, and broader maritime policy-making, as set out above. To summarise, during the first period, this consisted of the 2006 Green Paper and 2007 Blue Paper introducing IMP for the EU, with emphasis upon MSP is a key instrument for IMP, followed by the 2008 MSFD and the 2008 MSP Roadmap[12]. The beginning of the second period coincides with the adoption of the 2014 MSP Directive. EU funding for TMSP projects would appear to have been released to support the development of MSP at the national and sea-basin level [14,31,34,40]. Most of the projects were intended to address transboundary issues in sea basins and to enhance the alignment of national maritime spatial plans with each other. They are concerned both with the uptake of national MSP, in response to EU policy and legislation, and with transnational cooperation in the interests of regional cooperation and specific requirements for neighbouring countries to cooperate in MSP [55]. Hence most of the projects take the form of pilot projects or research activities to build capacity and gain experience for official MSP processes. By 2014, for example, there were no legal-binding maritime spatial plans in existence in these countries, except for Germany (the federal EEZs and the Länders' coastal waters). Additionally, the most recent one is in Latvia, which approved the Latvian Maritime Spatial Plan 2030 in 2018.

Some aspects of the thematic distribution of projects may also be closely related to the orientation of EU policy. For example, the MSFD aims to develop an ecosystem-based approach to achieve good environmental status throughout European seas [31,56]. At the same time, MSFD and other European Strategies or policies reinforce the efforts of Member States and regions and provide common blocks for a successful blue economy [31–35,57]. In this context, TMSP projects may be playing the role of balancing sectoral interests and sustainable use of marine resources, along with achieving nature conservation objectives [19,48,58]. Hence a wide range of sectoral activities and interests, including fisheries, aquaculture, tourism, shipping and marine energy, MPAs, cultural heritage and marine pollution are being considered in the projects, along with cross-cutting issues. In this regard, the prominence of conservation and land-sea interaction is consistent with EU policy, given its aim of pursuing a balance between economic development and ecosystem protection.

EU policy also places importance on cross-border cooperation between Member States and neighbouring third countries. This is reflected in the 42 projects that cross two or more sea basins, in that they focus on macro-regional strategy formulation, data management and governance system analysis. These projects suggest a response to EU priorities for regional development and cooperation, particularly linked to sea basin connection and identity. Also of note is that the non-EU countries figure in 36 of the 148 projects, suggesting a response to EU calls for cooperation with third countries where possible [14,48].

5.2. Thematic focus

It is clear that some maritime activities and cross-cutting themes are particularly prominent in TMSP projects (Figs. 3 and 4). The most prominent activities and interests include those that involve competing uses: fisheries, aquaculture, shipping, tourism, offshore renewable energy, MPAs and ports. This raises questions needing further exploration. It is interesting, for example, that fisheries receive the highest level of attention. Does this reflect the economic, social or cultural importance of fisheries? Or the strength of representation of fisheries in TMSP processes? Or the perceived importance of fish in human nutrition and global food supply [59]? Or its longer-standing history than most other activities? Aquaculture has also been paid considerable attention, possibly reflecting its place as the fastest-growing animal food production sector worldwide [60]. Aquaculture has perhaps also received more attention as an emerging issue in the TMSP projects because of its potential for co-location with other different uses, like offshore wind farms[61–66]. Each of the activities receiving particular attention in the projects warrants further investigation, not least regarding the regional and transboundary dimension of interest.

Of particular interest is also the projects that focus on estuaries or gulf areas aiming to promote cooperation and exchange in conjunction with Integrated Coastal Management (ICM). These are also concerned with specific issues regarding land-based pollution, such as marine litter, eutrophication, dumping and contaminants. This may reflect the parallel interest in ICM during this period, including the initial intention to incorporate ICM requirements into the MSP Directive [67,68].

When it comes to the cross-cutting issues in 88 European TMSP projects (Fig. 4), it can be seen that all the economic, social and environmental dimensions have been considered in those projects. The environmental dimension (conservation, land-sea interaction and climate change) is most strongly represented, in almost half the projects. Addressing the challenges of Climate Change has become one of the objectives in some TMSP projects, reflecting wider policy priorities [23]. In the social dimension, the elements considered by many projects include data management, governance system, ICZM and sectors integration. Regarding economic benefits, blue growth and ecosystem services have attracted the most attention.

5.3. Coverage of MSP elements

Noteworthy regarding the 11 elements of the MSP process that TMSP projects deal with in some way (Fig. 5) is the predominance of stakeholder engagement, itself a cross-cutting element that can occur throughout MSP processes. This might be seen as particularly important for transboundary processes, as it can contribute to building mutual trust, sharing experience and collecting information. It might be seen that stakeholder engagement is crucial for TMSP process because it can facilitate intergovernmental negotiation and sectoral integration[69,70].

Following this, the greater degree of attention given to the early stages of the MSP process, preparation and analysis, is significant. This may reflect the practical constraints of TMSP projects, as they do not generally have the remit of producing plans, but rather of capacity-building by developing means of cooperation and exploring options for future work; they generally take the form of pilot projects. This, plus the time constraints involved, may make them focus more on these early stages. There may thus be a bias towards elements that are com-

paratively easy to complete than others in the project duration. Avoidance of more sensitive elements, from a political point of view, may also be a factor; as TMSP progresses towards later stages, decisions need to be made about the spatial organisation and policy statements, which require political negotiation and authority, which may be beyond the scope of a TMSP project. Earlier elements, such as data and information gathering and identification of issues, are on safer ground, and may also fall more within the skills set of research-oriented project teams. The specific requirements of the MSPD may also be at play here, as it gives some priority to data and information gathering and stakeholder engagement [27].

Along these same lines, it is striking that, at the opposite end of the occurrence of MSP elements, the implementation of plans does not feature at all. Firstly, this again reflects the fact that projects are pilot projects or research programmes that do not reach the point of delivering plans, and would have no remit for implementation in any case. Secondly, the countries involved in the same TMSP projects are typically at different stages of national MSP, so their policy priority may be to formulate and implement national MSP first. They may not be ready to implement cross-border planning. Thirdly, and perhaps most importantly, the varying policy priorities of each country may not favour implementation at a cross-border level. The decision-making power to implement TMSP belongs to each country, not the EU or regional marine organizations. Lastly, implementing TMSP may need the agreement and approval of various stakeholders sharing marine waters, and it may be difficult to satisfy all related stakeholders with potentially competing benefits.

5.4. Sea basin variation

Geographical variations are evident particularly from the temporal distribution, the numbers of projects and the thematic priorities of TMSP projects (Figs. 1–3). For example, Fig. 1 shows that the Mediterranean and the Baltic Seas made an early start in TMSP projects, beginning in 1989 and 2002 respectively, whereas the Atlantic and the Black Sea had their first projects in 2007 and 2011 respectively. The early starters have a correspondingly higher total number of projects. The early start of the Baltic Sea region is perhaps because of its stronger policy framework; the Mediterranean has also had various regional initiatives. (HELCOM and VASAB in Baltic Sea and the UNEP (United Nations Environment Programme) MAP (Mediterranean Action Plan) in the Mediterranean Sea, or new established regional MSP working groups, such as HELCOM-VASAB Working Group in Baltic Sea and the Working Group on IMP-MED in the Mediterranean Sea.) In addition, regional institutional structures may have supported the EU Member States and third countries to share information and data. For example, the Baltic MSP Forum has been organised by VASAB since 2014 and helps to build capacity on transnational coordination among different participating countries and competent authorities [47].

The thematic emphases in the projects also vary somewhat by sea basin. This is likely to reflect a number of regional characteristics, such as environmental conditions, historic uses, emerging activities and regional and national policy priorities and structures. For instance, the main competing human activities in Baltic Sea are shipping, fisheries, wind farms or mineral extraction [71] [24,72], which is consistent with the range of themes in the TMSP projects of the Baltic Sea (Fig. 2). In addition, as the Baltic Sea is a fragile ecosystem with significant pollution, especially eutrophication, and is vulnerable to climate change, the Baltic Sea projects are concerned with conservation, governance systems and climate change in the cross-cutting issues. This also reflects the long-standing pan-Baltic MSP structures, VASAB, HELCOM and the HELCOM-VASAB MSP Working Group, which have strengthened sea-basin cooperation and transboundary collaboration in the Baltic Sea [28].

6. Conclusion

This review of European TMSP projects demonstrates that the EU has made a great deal of effort to promote transboundary cooperation at sea basin level since the early 2000s, and more recently, to support Member States in formulating national maritime spatial plans by 2021. According to the results, most projects are addressing transboundary issues as well as national issues. It shows that the biggest benefit of TMSP projects may be to advance the capacity for transboundary collaboration and also to contribute to national MSP processes.

The main findings of this paper are as follows.

1. TMSP has recently gained attention in the European context, not only in academic research but also in practice. Although the general meaning of TMSP has been discussed in previous studies, there is no commonly-agreed and clear definition of TMSP. Based on the literature and projects' review, this paper takes a broader look at TMSP and attempts to conceptualize TMSP, arriving at a new definition (see the end of section 2). Multiple authorities, complex territories and joint planning efforts are emphasized as three key aspects of TMSP.
2. TMSP is more focused on the process of cooperation than on producing regulatory plans. TMSP has been understood as a continuous process involving multiple organizations working towards different individual plans and seeking to address transboundary issues in a shared way. It involves similar aspects to those for national MSP processes, covering preparation, analysis, planning, implementation and evaluation stages, though to differing extents, with early stages being the main focus of attention so far. Compared with the national MSP process, there is perhaps a greater emphasis on making progress on ecosystem-based sea use management, which demands transboundary negotiation and interaction between countries sharing the same waters.
3. The empirical results reveal that (1) Most European TMSP projects began from 2000 onwards, and changes in the number of projects are closely related to the implementation of EU policies; (2) The projects are largely concerned with fisheries, aquaculture, tourism and shipping; MPAs and offshore renewable energy have also received considerable attention, but culture, heritage and various aspects of marine pollution have gained relatively little attention; (3) The cross-cutting issues cover economic, social and environmental dimensions, with most projects being more concerned about environmental consideration (conservation and land-sea interaction), data management and governance systems; blue economy and climate change are also being addressed; (4) The coverage of elements of MSP processes shows a preference for the preparation and analysis stages, with a notable lack of attention to the implementation and evaluation stages.

To sum up, TMSP could be a regional policy tool to advance ecosystem-based management and transboundary governance, contributing to the goals of sustainable maritime economic development and marine nature conservation. This is in line with the original rationale for MSP as a whole, that of integrating uses in given areas, avoiding conflict and maximizing synergies. However, little attention has been given to the implementation of MSP outputs within a transboundary context. This could be a priority for future TMSP efforts, though it will demand greater political effort, as it takes TMSP beyond the territory of projects and into that of statutory plan-making.

In Europe, TMSP has relied upon regional institutions such as the EU or sea basin organizations, which have played a crucial role in the initiative and development of TMSP. However, this role has been one of advocacy, often backed by project funding, not mandatory. The political will and stakeholder engagement of each country involved

have equally been important factors, even deciding ones, in the development of TMSP. The future development of TMSP will depend upon neighbouring countries, as well as regional organizations, finding common ground for cooperating in maritime activities and marine protection. This will be very context-specific. Indeed, the European experience of TMSP illustrates that TMSP is related to geography, in which the approaches to advance TMSP varies with specific transboundary context, especially the sea basin in question. It could offer a wealth of experience to other regions to develop TMSP within their shared waters.

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Appendix A. Supplementary data

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