e-shape

EuroGEOSS Showcases: Applications Powered by Europe

D5.14 PERL definitions

ABSTRACT

The overall aim of WP5 is the long-term sustainability of e-shape Pilots, their penetration in the public and private markets and the support of their upscaling. In that context, a comprehensive effort to assess the maturity of R&D activities is proposed by e-shape. The methodology driving this effort is described in this report.

Focused on technology, the TRL approach, is well accepted and used but it doesn't take into account the market readiness of a given solution. Based on this rationale, the current document aims to propose a first definition and description of parameters to be included in a more inclusive approach which fits with the H2020 community: the Pilot Exploitation Readiness Level (PERL) indicator. This takes into account three key components:

- Technology
- Operations
- Market

A number of Indicators for each of the three components were defined. The final PERL reflects all three of these components in a 3-digit value, e.g. 6-8-4, indicating a reasonably well developed (6/10) technology, a very well developed operations team (8/10) and a poorly developed market fit (4/10).

Following this approach, this report discusses how the PERL assessment is implemented for the Pilots, and brings forward their needs in terms of e-shape support. For the purpose of this deliverable, testing and validation of the parameters, 3 pilots were asked to fill in the PERL matrix. WP5 will extend this assessment to all the remaining pilots in the course of Q2-Q3 of 2021:

- **Showcase 1 (Agriculture) Pilot 1- GEOGLAM:**

PERL gives much more information on the readiness of the team as a whole, of the Pilot's strengths, weaknesses, and needs that can be addressed through the project, identifying attention from WP3 and WP4 respectively for cloud resources and market/user communities and relevant policies for the Pilot.

- **Showcase 1 (Agriculture) Pilot 4 – Agro-industry**

Despite a TRL6, PERL results 7-8-6 show solid financial and policy expertise, and performance in the operational area, however the pilot could benefit from the support of WP2 for customer/geographical identification and WP6 through a targeted promotional campaign.

- **Showcase 5 (Water resource Management) Pilot 7 – Aquaculture Plus**

The onboarded pilot is a very advanced service as testified both from the TRL8 and PERL scores 9-9-6, indicating a complete and qualified system. The service could make use of the co-design, user uptake and promotional campaign under WP2, WP4 and WP6. Moreover, from the PERL it stands out that a policy outlook towards aquaculture is missing and not target by Planetek team, which may be useful to increase the attractiveness of their service.

With these inputs in hand, this report draws conclusions on the PERL methodology. This has been developed as way to go beyond the TRL. Its adoption is to be promoted throughout the remainder of the project, and beyond, giving outsiders a more comprehensive tool to self-evaluate their own service market readiness through a methodology of potential universal validity.

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1 INTRODUCTION

The overall aim of WP5 is to enable the long-term sustainability of the e-shape Pilots, their penetration in public and private markets and to support their upscaling.

This deliverable is produced under Task 5.3 focussing on "Pilot upscaling and on-boarding". In this context, the e-shape project brings forward the novel **Pilot Exploitation Readiness Level (PERL)** approach that builds on D5.2 "First PERL definitions" and the introduction of the TRL in assessing the readiness of the e-shape pilots' services.

Focused on technology, the TRL approach, is well accepted and used and has been customised to fit specific needs, but it doesn't take into account the market readiness of a given solution. The methods to assess "readiness" have shifted from technology readiness to go-to-market readiness, and methodologies increasingly consider both technology, market and commercialisation approaches. Different actors are considered to evaluate the maturity of the solutions; however, the market-oriented perspective could generate a difficulty for a non-commercial user such as R&D sector involved in H2020 projects.

Clear guidelines with clear definition of criteria for a dedicated solution are needed to ensure coherent assessments. In this context, the novel **Pilot Exploitation Readiness Level (PERL)** approach that will be described in detail in this deliverable, is to establish a standardised methodology for the assessment of the maturity of R&D activities and the potential of the company/institute to valorise, exploit and successfully deliver these solutions. The PERL methodology has a double value: it proves to be a tester methodology with 32 Pilots projects as candidates; and an open door for the results that can be used as a standard for those entities that need to evaluate their service market readiness.

In the context of e-shape, where this approach is first conceived, developed and tested, this applies to Pilots.

Therefore, Task 5.3 will work closely with WP2 co-design partners to codify the Pilot Exploitation Readiness Level (PERL), and use it to drive further Pilot development and support activities. As a 2nd step, this task will also support the introduction of new Pilots into the e-shape project and the EuroGEO landscape. This will be carried out within a dedicated "onboarding process".

The PERL has been presented in D5.2 "First PERL definitions Report" and is here expanded and adapted based on interactions with Pilots.

The overall structure of this report is formed of four chapters, including this introductory Chapter 1. The remainder of this work is organised in the following way:

- Chapter 2, 'PERL Approach' outlines the PERL concept described in D5.2, and the updated tables defined since then.

- Chapter 3, 'PERL Application' presents an early example of implementation of the PERL to three Pilots, and

- Chapter 4, 'PERL realisation' describes how this approach will be used to assess the maturity of and define the needs of Pilots throughout the course of the e-shape project and beyond.

2 PERL APPROACH

The Pilot Exploitation Readiness Levels (PERL) methodology aims to support the development of R&D activities and in particular to support the identification of milestones to be reached for a solution to become sustainable and, or to reach the market. In that regard, the PERL would be used as a metric to:

1) Assess the current status of e-shape Pilots;

2) Assess potential new Pilots to be on-boarded;

3) Identify technology or business components to be developed or improved;

4) Apply to other R&D projects to promote the exploitation of their results and their transformation into market-ready products.

3.1 PERL parameters

The PERL is considered to be a 'living' metric, ready to adapt to the rapidly changing EO services marketplace. As such, the PERL has undergone substantive changes since the publication of D5.2, resulting in a leaner approach, a more efficient data gathering process, and more easily comprehensible results. The PERL concept continues to evolve both within and beyond the course of the e-shape project as we attempt to categorise and assess Pilot maturity both for the purposes of this project, and more generally across the sector. The parameters of the updated PERL are broken down into three main categories ("TOM"):

- Technology: The technical ability to deliver the solution and keep it up to date.
- Operations: The internal team skills & processes needed to bring the technology to the identified market.
- Market: The readiness of team to capture the relevant markets for the solution (knowledge of customer needs, pricing strategy, business plan, competition etc.)

The raison d'etre of "TOM" is to provide a detailed overview of the service readiness from the technological maturity of a given pilot through the assessment of a supply chain establishing the steps of the service's uptake towards its market exploitation and sustainability. These three categories fit both with the range of service readiness reviewed in e-shape D5.2, and with the key support mechanisms offered through the e-shape project to Pilots.

Within each category, a number of indicators have been proposed, along with numerical responses between 1 and 5. Each of the Reponses has a description to help Pilot implementors to fill in the matrix in a consistent and comparable way. The full matrix is presented below.

Parameters	Description	Indicators	Description	1 - initial	2 - basic	3 - intermediate	4 - advanced	5 - optimised	Self assessment score + comments
TECHNOLOGY	The technological aspects of the product or service that influence its initial development, delivery and further scale-up/adaptation in the future.	TRL	Level of development of technical delivery of useful outputs	Technology concept formulated - TRL 2	Technology validated in lab - TRL 4	Technology demonstrated in relevant environment - TRL 6	System complete and qualified - TRL 8	Actual system proven in operational environment - TRL 9	
		modularity of components	Ease of uptake of new methodologies within the same use case or adaptation of technology stack components to new uses	hard coded addresses and locations	some dynamic programming tehniques employed	System uses VMs	system fully containerised	continuous deployment infrastructure (e.g. Jenkins machine etc.) in place	
		Level of exploitation of cloud based infrastructure	To what degree is the service run completely in the cloud? Such a service is more likely to scale more easily. Exception is if the pilot has their own HPC facilities.	System only runs on in-house computing infrastructure	System has been and can be run on one cloud environment	System has been and can be run on more than 1 cloud environment	System can be easily replicated on new cloud environment	The system can be scaled from local to cloud resources at will	
		Standards	To what degree does the service employ standards and guidelines (GEO/OGC/INSPIRE)?	Not aware if there are any applicable standards or guidelines	Aware of at least some applicable standards or guidelines + started to use them	Aware of most if not all applicable standards or guidelines + using them	Aware of all applicable standards or guidelines + using them + participating in standard development	Aware of all applicable standards or guidelines + using them + leading standard development	
			Average for Technology component						
OPERATIONS	The internal team structure and organisation that will deliver the technical solution to the market.	Team composition - software	What level of technical experience with the chosen software technologies is present within the Pilot team?	basic computing / graduate	tech lead has developed small projects (websites....)	Team has evidence of >10 small projects in a range of languages	Team has participated in previous operational service development	Team can show evidence of previous successful operational service development	
		Team composition - management	What level of management experience is present within the Pilot team?	No management experience	has led small teams in software / technical sector	has studies/accreditation in management	has led large teams in software / technical sector	Has successfully led distributed teams in software / technical sector	
		Team composition - financial	What level of financial experience is present within the team?	No one has experience in managing the finances of a company	At least one person with basic fin.mgmt. skills +basic fin.mgmt. system set-up	At least one experienced finance manager (5+ yrs) + fin.mgmt. system up and running	Solid, experienced fin.mgmt. team in place + fin.mgmt. system running at nominal level	Expert(s) in finanical management on board + financial management optimised + results to prove it	
		Team composition - sales/BD/customer management	What level of sales experience is present within the team?	no training, no experience	Ad-hoc sales experience	some qualifications and previous experience as a dedicated sales position(s)	proven sales experience (+(years) with strategy in place	team with proven track records + strategy in place + actual sales at or above target	
		Team composition - grant acquisition	What level of experience exists within the team in the winning of competitive grants e.g. H2020?	No experience with grants	team (member) has participated in competitive grant proposal	Team (member) has participated in successful competitive grant	Team (member) has led one winning H2020 grant proposals	Team (member) has led multiple successful H2020 proposals.	
		Team composition - private capital or intitutional/donor funding attraction - leave blank for sales-funded growth plan	What level of experience exists within the team in attracting private equity investment or, in the case of not for profit services, institutional or private donor funding?	No experience with rainsing private funds	Has participated in an accelerator to learn about funds acquisition	Has developed a pitch deck to present the company/team/service to potential investors or donors	Has delivered a pitch deck to potential investors or donors	Has successfully attracted private equity or institutional or donor funding	
		Team composition – policy awaareness	How aware is the Pilot team of relevant existing policies and potential changes to those policies	No policy awareness in target geography/marketss	some awareness of relevant policies in target grographies/markets	strong kawareness of relevant policies in target grographies/markets	strong knowledge of relevant policies, actively follows policy changes.	Strong knowledge of relevant policy, actively follows policy changes, contributes to industry review/ position papaers/ policy shaping	
		Processes - technical development	What level of process documentation exists on the topic of technical development within the Pilot team?	No system in place	Documented ad-hoc or pre/post-delivery reviews	Continuous improvement goal with regular reviews	Documented Agile approach e.g. evidence of Scum/Kanban approach implemented	Documented Agile approach with regular continuous improvement reviews	
		Processes - management	What management processes are used and documented within the Pilot team?	No system in place	Visions, goals and Policies clearly defined	Key business processes 'manually' mapped out/described.	Key business processes documented in a systematic way (accredited process/software)	ISO 9000 certified	
		processes - sales/customer management	What sales channels / approaches/strategies are used and documented within the Pilot team?	None	Implementation of CRM	Use fo tools (CRM) and tactical approach	Clearly defined and documenteed sales strategy and tactics	Strategy & tactics clearly defined + evidence they are succesfull + continuos development process in place and proven	
			Average for Operations component						
MARKET	How ready is the market for this solution? How have the developers of the product or service assessed and characterised their target market? What are the regulatory or commercial forces influencing the uptake of this solution?	No. Users - current	How many active users does the Pilot have? What evidence is there of this?	No current users	Letters of suppoert from interested companies	one or two active users	one to five active users	more than 5 active users	
		Customer needs	Has the 'Golden customer' been identified? Have their needs been documented?	No potential custmers have been contacted	<5 potential customers have been polled and their needs documented	>5 potential customers have been polled and their identified needs have been included into design/development phases	Customer needs well identified, integrated ito development plans and resulting PoCs validated by >5 trials	Customer needs well identified, integrated ito development plans and resulting PoCs validated by > 5 trials + customer feedback mechanisms in place	
		Pricing strategy	Has the value chain been mapped? Has a pricing strategy been defined/determined? Please describe the strategy.	no pricing strategy	understands own costs of service delivery approximately	understands own costs of service delivery very well, has understanding of value delivered to clients and knows competitiors prices	Understands own delivery costs, value delivered to clients, competitiors prices and new customer acquisiiton costs	Understands own delivery and new customer acquisisiton costs, value delivered to customers, competitiors prices and can convincingly justify own positioning within the marketplace	
		business plan	Is a complete and convincing business plan in place?	No documented business plan	Sketched value chain e.g. startup canvas	evidence for sufficient customer base and sustainable competitive advantage	Complete business plan	Multiple 'tailored' business plans and strategy to update regularly as knowldedge of business grows.	
		Target region	Has a geographical region of interest been identified and growth strategy defined?	Have trial useres in own region/country	Have users in neighbouring countires	Have users in several countries in Europe and plan to expand beyond Europe	have users outside of Europe	Have users outside of Europe and a plan for global expansion	
		policy aspects	To what extent does the governmental policy in the target region support the uptake of the solution?	Service is not relevant to any goct. Policy	Service is useful to support compliance activities in my target customer sector	Service is accepted to support compliance activities in my target customer sector	Service is explicitly mentioned as a permissable evidenciary proof in my target customer sector	Service is required for rcompliance in my target customer section	
			Average for Market component						

Figure 1: The PERL matrix showcases the Technology, Operations and Market parameters and the indicators along with numerical responses 1-5 with the description.

3.2 Calculation of PERL

Within each section of the matrix (Technology, Operations and Market) the numerical responses to each indicator are simply averaged and multiplied by 2 (to ensure a final score on the familiar scale of 10), resulting in three values.

Rather than seeking a one-number-fits-all approach, which would involve weighting the outcomes of the resulting value for each section, the PERL concept will comprise 3 digits, e.g. 7-5-8, referring to a mean score of 3.5 for Technology, 2.5 for Operations and 4 for Market. This decision has been arrived at as it conveys several benefits with no obvious downsides compared to condensing this information into a single number value from these. These benefits can be summarised as:

- More detailed information on the areas of strength and weakness of the Pilot
- Easier comparison of relative strengths across e.g. research vs commercial projects.
- Sufficient level of detail at a glance, which can be easily followed up through more detailed examination of responses in each section, i.e. reduced reliance on ad-hoc weighting factors.

3 Pilots have been contacted in March of this year for an initial application of the PERL to test the effectiveness of the methodology:

- Showcase 1 (Agriculture) Pilot 1- GEOGLAM
- Showcase 1 (Agriculture) Pilot 4- Agro-industry
- Showcase 5 (Water resource management) Pilot 6- EO based phytoplankton biomass for WFD reporting

The PERL will be sent to the remaining pilots between Q2 and Q3 of the current year and will be shared to the future onboarded pilots resulting from the Call for EO-based Products 2021.

3 TRIAL PILOT ASSESSMENTS

1.1 PERL estimates for select Pilots

Each of the three select Pilots resposes' to the PERL matrix and resulting scores are shown below.

Parameters	Description	Indicators	Pilot 1.1	Pilot 1.4	Pilot 5.7				
TECHNOLOGY	The technological aspects of the product	TRL	3	3	4				
		modularity of components	3	3	5				
		Level of exploitation of cloud based infrastructure	2	3	5				
		Standards	4	4	4				
		Average for Technology component	3.0	3.3	4.5				
OPERATIONS	The internal team structure and organisation that will deliver the technical solution to the market.	Team composition - software	5	5	5				
		Team composition - management	5	5	5				
		Team composition - financial	4	4	4				
		Team composition - sales/BD/customer management	2	2	4				
		Team composition - grant acquisition	5	5	5				
		Team composition - private capital or intitutional/donor funding attraction -	3	3					
		Team composition - policy awaareness	4	4	3				
		Processes - technical development	4	5	5				
		Processes - management	5	5	5				
		processes - sales/customer management	1	3	4				
		Average for Operations component	3.8	4.1	4.4				
MARKET	How ready is the market for this solution? How have the	No. Users - current	2	3	5				
		Customer needs	2	3	4				
		Pricing strategy	1	4	4				
		business plan	1	2	4				
		Target region	5	3	2				
		policy aspects	2	2	0				
		Average for Market component	2.2	2.8	3.2				
		PERL	6-8-4	7-8-6	9-9-6				

These values will be analysed in Section 5 Discussion, to form a comprehensive overview of the readiness of any particular Pilot to succeed in their chosen market and to help identify which of the e-shape support measures could be most beneficial to this Pilot.

e-shape

4   E-SHAPE SUPPORT

As described in the e-shape Guide for Applicants, the e-shape value proposition when it comes to the support it provides can be described as:

- Co-design: e-shape develops EO services with and for the users. Moving to a user centric approach, a co-design methodology is used to develop and tailor to the specific institutional, technical, scientific and business situations each pilot. The co-design approach is based on a collaborative challenge (how to coordinate highly skilled and specialized experts in multiple fields of expertise to innovate together) and a cognitive challenge (how to coordinate these experts to propose breakthrough innovative services, combining user-driven design and genericity-driven design).
- Pilots implementation: The goal of e-shape is to take the best advantage of the distributed assets and build on top of the existing European Earth Observation resources, scaling up the pilots towards higher visibility of the European actions within GEOSS Flagships and Initiatives. Hence, each pilot will start from existing development. The pilots' implementation will be done through a user-centric approach, building an as easy-to-use as possible service from one end to another end, from data to information provision and/or visualization/exploitation. From the data architecture point of view, e-shape is a federation of platforms and services in the most interoperable way as possible. This will allow flexibility in terms of development and exploitation of data. User uptake approach: e-shape will design and execute a global user uptake approach aimed at promoting the utilisation of EuroGEO-enabled services at sectorial, national/regional and international level. This will be complemented by targeted liaison activities with key communities (e.g. UN-SDGs, GEO, Copernicus, PRIMA, EIPs, etc.) within the greater EO ecosystem but also among non-traditional actors (e.g. EU associations representing primary application sectors in line with the thematic areas of the showcases. The capacity building and liaison
- Sustainability booster: One of the main aims of e-shape is to support the sustainable delivery of EO-based benefits to users. To achieve this, researchers and SMEs developing EO services in the context of the pilots, require access to four types of key resources.

    - Access to knowledge (e.g. market trends, user requirements, policy priorities)
    - Access to technology (i.e. data and tools)
    - Access to markets (incl. matchmaking, investment readiness, export promotion)
    - Access to capital (incubation support, funding, financing)

    The sustainability booster will provide access to these resources.

- The help desk: e-shape is providing a Helpdesk for linking users with the pilot teams and to insure efficient and fruitful exchanges between "clients and service providers". The main goal of the platform's support service is to help the user to overcome the obstacles that may appear for each phase: initial uptake, integration, operation usage.
- Targeted communication: e-shape beneficiaries benefit from specific actions to develop their visibility and promote their capabilities. Beneficiaries have access to dedicated events and meetings with communities of users and stakeholders.

5 DISCUSSION

The pilots joining the e-shape project completed a comprehensive assessment questionnaire (See DR.1) to capitalise the scope of the pilot in term of assets and methods, technical aspects, (included questions on the Technology Readiness Level), the developments planned in the framework of the project and highlight the expectations from - and contributions to e-shape and therefore to EuroGEO. The future on-boarded pilots joining the e-shape consortium will go through the questionnaire process and the PERL matrix presented above seeks to gather much of the required information with which to identify the most useful e-shape support in a simple and efficient manner. The information captured within the responses to the PERL matrix will be used to better target support services, as well as giving a useful overview to the e-shape PMT (Project Management Team) on the actual state of the applicant Pilot and its ability to successfully penetrate their target markets.

On a practical manner, WP4 team will collect the answers to the questions listed in the PERL matrix and conduce a call with the pilots to fully identify the type of focused support each Pilot need. This will be done in cooperation WP4-WP5 and shared with WP2 to support the co-design approach relation. The potential of the PERL approach is a statistical analysis in order to assess the Pilots EO service's maturity readiness based on their current sprint.

Throughout the course of the e-shape project, each Pilot benefits from a range of support services: co-design methodologies, deployment support, users' uptake, capacity building & liaison, sustainability & upscaling, communication, dissemination & Help Desk. These have been identified based on ongoing iterations with the Pilots and this Task aims to make the identification and extraction of these information straightforward so that the support services can be more quickly delivered.

This section comprehensive overviews of the Pilot based on the responses to the relatively simple PERL matrix, and identifies the most beneficial support services from within the e-shape ecosystem for each Pilot.

1.2 Showcase 1 (Agriculture) Pilot 1- GEOGLAM

The PERL score of 6-8-4 describes a Pilot that is at TRL6, that is running on one cloud provider, exploiting standards and some degree of modular coding (dynamic coding makes it easier to update components when required), with a team that is technically very strong, but lacking in sales staff and processes, reflected also in the relatively weak donor funding indicator. The Pilot has a weak market engagement, with room for improvement in the number of users, identification of their needs, business plan and pricing strategy. The Pilot is not exploiting a market that benefits strongly from policy requirements but has a very sound definition of their target geography. Based on the first sprint, the Pilot had identified a 4-5 TRL, now at 6, and has engaged in a co-design type 1 short term and type 3 longer term to engage with EO-users oriented.

This information can lead us to several conclusions about the ideal further support from the e-shape project:

- Attention from WP3 (Implementation) could be beneficial to develop the TRL and use of additional cloud resources for expansion (if required).
- Attention from WP4 (User uptake) is of clearest benefit to this Pilot. The Pilot lead could likely benefit greatly from a planning exercise to identify target markets/geographies, and key users in those markets/geographies, along with identification of any relevant policies for the Pilot.

- The third thing this Pilot could benefit from is a business training on pricing and business plan creation. This can be delivered through WP5.

Compared to the TRL given at the beginning of the project, which indicated only that the Pilot was at TRL 6, the PERL gives much more information on the readiness of the team as a whole, of the Pilot's strengths, weaknesses, and needs that can be addressed through the project.

1.3 Showcase 1 (Agriculture) Pilot 4 – Agro-industry

The PERL of 7-8-6 for Pilot S1P4 describes a service that has a TRL of 6, an intermediate inclusion of modular components (the use of virtual machines impacts positively on the ability of the service to keep up to date with new IT developments and include new service components easily), that can be run on more than 1 cloud environment, increasing its flexibility and broadening the potential pool of users, and a team that is very involved with standards development, which increases the interoperability of the service and its broader appeal and potential uptake. The team is highly skilled in software and financial implementation and management, and has sound experience securing European funds, which is very important to remain competitive in the EO sector. While the team has solid policy expertise, the match of the service to policy requirements is not strong. Despite this, the service has several active users, and an intermediate knowledge of the target customer needs, and a sound pricing strategy. The service team struggles with dedicated sales staff, and this is reflected in the limited geography of the users. Similarly, despite strong financial expertise, and a sound pricing strategy, the team does not have a complete and comprehensive business plan.

The team shows solid performance in many areas, particularly operational, reflecting the depth of skills at the lead institute, VITO. The team could benefit first and foremost from business training, which makes sense for a research institute, and a targeted customer acquisition plan in clearly identified target geographies. The e-shape services offered under WP3 could help with the technical development beyond TRL6, although, much of this necessarily has to be done in-house. The pilot, based on the first sprint, had identified a 4-5 TRL, now at 6. Support of WP2 in co-design type 1&2 "Usefulness & usability fine-tuning" and "Usefulness exploration" in terms of interaction between the pilot and the engaged users have been brought forward and will further explored with WP4 after the customer/geographical identification has been conducted. Once potential users have been identified and the co-design process is under way with them, a targeted promotion campaign led by WP6 will be of most benefit. Finally, while pressure can be applied to bring relevant policy in the target regions to the fore, this is likely to be a much longer-term venture, and not within the scope of the e-shape timeline.

1.4 Showcase 5 (Water resource Management) Pilot 7 – Aquaculture Plus

The PERL of S5P7 of 9-9-6 shows a very advanced stage in all measures. The TRL of the service is at a relatively advanced level of 8, indicating a complete and qualified system, ready for market penetration and exploitation. Accordingly, the use of modular code, cloud resources and standards are very high. The operational team is similarly well qualified, with strong technical development, management competencies and systems, and well-developed grant acquisition skills. The team also has sound processes for sales, reflecting the experience in the established commercial company in which the team sits. As part of this company, and with the financial reserves contained therein, the team does not have pressure to seek outside funding, so the Indicator on capital funding is left out. The team scores low on policy awareness, which reflects the fact that policy is not considered relevant to the target market. The service already has more than 5 active users, and the team has a clear idea of what

these customers want. The team has well developed business plans and pricing strategies but lacks a clearer direction in terms of target geographies.

This overview shows a very well-developed product and team. Nonetheless, the service can still benefit from e-shape value offer during Sprint 2, specifically, the user uptake efforts conducted under WP4 and promotion efforts of WP6 are clearly of value to the Pilot team, which could benefit from a facilitated discussion on the most appropriate target geographies, and subsequent promotion within those geographies. Once these new potential users are identified, the co-design aspects of e-shape under WP2, will be very valuable to ensure that the Pilot services are able to be easily integrated into the users' workflows, facilitating adoption and promoting expansion. While policy aspects are not being targeted by the team, it may be useful for them to become aware of the policy outlook towards aquaculture in the target geographies, with a view to lobbying the relevant policymakers to increase the attractiveness of their service.

6   CONCLUSION

This Deliverable has presented the updated PERL approach, which has evolved and been simplified since the initial presentation in D5.2 on the parameters to be included in the PERL indicator, into a matrix comprising three components: Technology, Operations and Market. These components reflect not only the key aspects of a successful new service, but also map well onto the e-shape value proposition. This generic overview is followed by a more in-depth presentation of the complete matrix that is used to calculate the PERL.

After the presentation of the methodology and associated matrix and the application of the methodology onto Pilots S1P1 GEOGLAM, S1P4 Agro-Industry and S5P7 Acquaculture Plus, the discussion section takes the inputs of the three example test cases of the PERL matrix application, and uses the PERL information to derive a comprehensive overview of the Pilot's readiness, as well as an indication of the most appropriate e-shape support services for that Pilot:

For S1P1, PERL score of 6-8-4 identifies attention from WP3 and WP4 respectively for cloud resources and market/user communities and relevant policies for the Pilot. S1P4 PERL results 7-8-6 show solid financial and policy expertise and suggests support from WP4 and WP6. S5P7, the most advanced pilot, with a score 9-9-6, shows a very advanced stage in all measures with further inputs by WP4 and WP6.

The approach will be further refined following additional interaction with all e-shape pilots. While this investigation has shown the robustness of the methodology to e.g. non-paying services vs commercial services, as the market evolves and new approaches are devised by creative entrepreneurs, the methodology will no doubt have to be further adapted to deal with these increasing complexities.

Nevertheless, this investigation has shown that the PERL methodology, as presented herein, is an effective tool to quickly gain a useful overview of the state of a service under development, to guide service development teams in identifying areas for improvement, and to guide support service providers in delivering useful, tailored support to these service developers.

The PERL methodology has the potential to became of international validity being expanded for testing to the totality of the e-shape Pilots. Future projects in the realm of Horizon Europe with this capacity will have a ready-to-use methodology to auto evaluate a service readiness. Within the context of e-shape, the PERL matrix will be shared with the totality of the pilots between Q2-Q3 and with the new pilots joining the consortium through the second on-boarding process. Further potential is the support that can bring assess the Pilots EO service's maturity readiness based on their current sprint.

The healthy approach to the development of a new index, in which the PERL remains a 'live' concept, ready to adapt to a rapidly changing marketplace, has the potential to become a methodology of international validity and will be one of the keys to its success in being taken up by the EO and other sectors to describe the readiness of a new service to enter the market.

ANNEX 1

e-shape Pilots TRL

Pilot	Current TRL	Expected TRL
S1-P1-GEOGLAM	4-5	7
S1-P2-EU-CAP Support	5	7
S1-P3-EU-Vegetation-Index Crop-Insurance in Ethiopia	7	9
S1-P4-EU-AGRO Industry	4-5	7
S2-P1-EO-based surveillance of Mercury pollution	5-6	7-8
S2-P2-EO-based surveillance of POPs pollution	8-9	9
S2-P3-EO-based pollution-health risks profiling in the urban environment	8	9
S3-P1-nextSENSE	4,7	8
S3-P2-High photovoltaic penetration at urban scale	4-5; 7-8	7-8; 5-6
S3-P3-Merging offshore wind products	3-4	6-7
S4-P1-mySPACE	7-8	8-9
S4-P2-mySITE	8	9
S4-P3-myVARIABLE		
S5-P1-Improved historical water availability & quality information service	7-8	8-9
S5-P2-Satellite Earth Observation-derived water bodies & floodwater record over Europe	7-8	8-9
S5-P3-Dive - Diver Information on Visibility in Europe	4	6-8
S5-P4-Sargassum detection for seasonal planning		
S5-P5-Monitoring fishing activity	5	7
S6-P1-EO4D_ASH - EO Data for Detection, Discrimination & Distribution (4D) of Volcanic ash	5	7
S6-P2-GEOSS for Disasters in Urban Environment	5-9	7

S6-P3-Assessing Geo-hazard vulnerability of Cities & Critical Infrastructures	7-9	7-9
S6-P4-ReSAgri - Resilient & Sustainable ecosystems including Agriculture & food	5-6	7-8
S7-P1-Global Carbon and Greenhouse Gas Emissions	1-3	4-6
S7-P2-Urban resilience to extreme weather - climate service	1-2	6-7
S7-P3-Forestry conditions - climate service	7	9
S7-P4-Hydropower in snow reservoir – climate service	1-3	9
S7-P5-Seasonal preparedness	3	7