EUROGEO WORKSHOP 2022

We e-shape EuroGEO 7-9 Dec.2022 | Athens

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Blazing new trails for EO markets

EuroGEO Workshop 2022

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ATHENS 7-9 DECEMBER 2022

Co-design for EO data-based services (e-shape)

Raphaëlle Barbier, Skander Ben Yahia, Pascal Le Masson

Center for Management Science (Mines Paris – PSL University), Paris, France



Introduction (11:15 – 11:25)

Overview of the co-design approach built in e-shape (11:25 – 11:45)

Testimonies of pilots: co-design seen by the experimenters (11:45 – 12:00)

- Evangelos Gerasopoulos (NOA, Health Showcase, Pilot 3, « EO-based pollution-health risks profiling in the urban environment »)
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 Q&A (12:00 12:05)

Resilient-fit co-design in practice (12:05 – 13:00)

- Diagnosis exercise
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Wrap-up (12:55 - 13:00)





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EuroGEO Workshop | 07.12.2022

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More than a project: supporting Copernicus and establishing the European contribution to GEO

- O1: Develop operational EO services with and for users active in key societal sectors
- O2: Demonstrate the benefits of the EO pilots through the coordinated downstream exploitation of EO data and the utilization of existing EO resources (especially Copernicus)
- O3: Promote the uptake of pilots at national and international scale, across vertical markets (private and public) and amongst key user communities
- O4: Enable the long-term sustainability of the numerous pilots, their penetration in public and private markets and support their upscaling
- O5: Increase uptake by raising awareness on the solutions developed through tailored and well-targeted communication, dissemination and outreach activities





opernicus



Goal: building a co-design approach adapted to the EO context

- Workpackage led by the *Center for Management Science* at MINES ParisTech - PSL University: leveraging our expertise in **design theory** and methods for innovation
- Bold challenge taken up by e-shape partners: considering 'co-design' as a scientific enigma
- Approach progressively built through interactions and experimentations with e-shape pilots





Raphaëlle BARBIER Skander BEN YAHIA, Pascal LE MASSON PhD student Professor **Research Engineer** WP2 co-lead WP2 co-lead





Benoit WEIL Professor







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An enriched understanding of codesign driven by e-shape objectives - in line with GEO vision

1. Enhancing cooperation among a large range of actors:

GEO core function - Fostering partnerships and \geq mobilizing resources: "Connect users, resource providers, and experts from different sectors in the domain of Earth observations and environmental information to form partnerships"

2. Targeting a viable fit on the long-term

GEO core function - Identifying user needs and \geq addressing gaps in the information chain: "Obtain commitments from providers and users to ensure these observations, products and tools are delivered and used in a comprehensive, coordinated and **sustained way**"



Usual co-design to fit EO data to user needs by involving users in the design process

designers/researchers

(1) Cooperation limited to the end user - data provider relationship (2) Mainly considering co-design as a one-shot action





'Resilient-fit' co-design to grow a socio-economic ecosystem around Earth observation by strengthening its ability to adapt to future and unexpected evolutions

As a plant being more robust to varying environmental conditions thanks to an expanded root network

(1) **Designing relationships** between a large range of actors (beyond end-users) (2) Taking a dynamic and long-term perspective







Resilient-fit co-design: diagnosis & workshops







Resilient-fit co-design: diagnosis & workshops









Four types of co-design: identifying the nature of relationships to be built or transformed

Type #1: identified user but how to build a robust relationship with users for further developments?









Four types of co-design: *identifying the nature of relationships to be built or transformed*

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Resilient-fit co-design: diagnosis & workshops







Co-design workshops: guidelines to build a resilient fit

- Rigorous process to avoid specific traps (design theory)
- Outcomes: designing a resilient fit
 - Designing a range of alternative development paths at different time horizons
 - **Designing the 'co'**: explicitly building the relationships between actors







Promising results out of e-shape experience

For practitioners of the EO community

"The co-design diagnosis also was very well structured [...] It was **very good to have short-term and long-term**, this helped us to come back couple of months after and see what we had said for the long-term and what is now time to implement." (Alexia Tsouni, NOA, SC & pilot leader)

"The initial co-design workshop proved to be an immense success [...]. The workshop served as a means to formalize relationships and find synergies between workflows and users, propelling us to officially pursue partnering with National Public Health Organization and the Ministry of Energy and the Environment." (Evangelos Gerasopoulos, NOA, pilot leader)

> "For me it was really eye opening that we could use it in such a broad way to look at all sort of possibilities rather than trying narrow down what we wanted to do. It was more about broadening out and gathering lots of ideas and inputs." (Merete Badger, DTU, pilot leader)

For management research

Paper accepted for publication:

IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT

Barbier, R. Ben Yahia, S., Le Masson P., and Weil, B., "Co-Design for Novelty Anchoring Into Multiple Socio-Technical Systems in Transitions: The Case of Earth Observation Data," in *IEEE Transactions on Engineering Management*, **2022**, doi: 10.1109/TEM.2022.3184248.

Co-Design for Novelty Anchoring Into Multiple Socio-Technical Systems in Transitions: The Case of Earth Observation Data Raphaëlle Barbier[®], Skander Ben Yahia, Pascal Le Masson, and Benoit Weil

- **Two other papers under review** (Technovation, Creativity and Innovation Management)
- A PhD thesis soon to be defended (24th March)...





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Title: Co-design for EO data-based services (e-shape)

Presenter: Raphaëlle BARBIER, WP2 'co-design' leader, ARMINES – Center for Management Science WP2 team: Skander BEN YAHIA, Pascal LE MASSON, Benoit WEIL (ARMINES – Center for Management Science)

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Diagnosis of co-design needs in e-shape



Identification of co-design needs was **not self-evident** → need of better understanding the context of each pilot

Based on WP2 analysis, discussion of co-design types adapted to pilot's needs Updated analysis of co-design types based on the discussion (different types at different time horizons)





e-shape pilot



1) Fill in the blanks in	Exercise 1: Diagnosis 1) Fill in the blanks e-shape pilot Usage ecosy 3) Indicate further knowledge on the ecosystem of these users (users of users)	Insert organization name) aims a vstem 2) Specify the users with whom you will have direct interaction,	at developing new services for				
the sentence on top of the exercise sheet	other key players, etc.)	and the assumed use-case					
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	Exercise 1: Diagnosis
1) Fill in	(Insert organization name) aims at developing new services for
the	(Insert targeted usage ecosystem) with
blanks	(Insert main data sources and EO-derived information)

e-shape pilot Usage ecosys	stem	4) Added value of EO: what type Type of information: what data i Data sources: database (CMEMS	of product s generated , users' in-s	/service (monitoring, decis and what is its specificity (itu data, Sentinel-1, etc.) an	ion support, s resolution, tin d any other re	scenario design, etc.)? nescale, etc.) elevant information	
3) Indicate further knowledge on the ecosystem of these users (users of users, other key players, etc.)	 2) Specify the users with whom you will have direct interaction, the identified contact points, and the assumed use-case 	Added value of EO		Type of information		Data sources	
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Exercise 1: Diagnosis							
1) Fill in	(Insert organization name) aims a	at developing new services for					
the (Insert targeted usage ecosystem) with							
blanks							
e-shape pilot Usage ecos	ystem	 4) Added value of EO: what type of product/service (monitoring, decision support, scenario design, etc.)? Type of information: what data is generated and what is its specificity (resolution, timescale, etc.) Data sources: database (CMEMS, users' in-situ data, Sentinel-1, etc.) and any other relevant information (type of data, resolution, geographical coverage, etc.). Please be concise! 					
ecosystem of these users (users of users, other key players, etc.)	you will have direct interaction, the identified contact points, and the assumed use-case	Added value of EO	Type of information	l.	Data sources		
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Exercise 1: Diagnosis								
1) Fill in	(Insert organization name) aims a	at developing new services for .						
the		((Insert ta	argeted usage ecosyste	em) with			
blanks		(Inser	rt main d	lata sources and EO-de	erived infor	mation)		
e-shape pilot Usage ecosystem		 4) Added value of EO: what type of product/service (monitoring, decision support, scenario design, etc.)? Type of information: what data is generated and what is its specificity (resolution, timescale, etc.) Data sources: database (CMEMS, users' in-situ data, Sentinel-1, etc.) and any other relevant information (type of data, resolution, geographical coverage, etc.). Please be concise! 						
3) Indicate further knowledge on the ecosystem of these users (users of users, other key players, etc.) and the assumed use-case	Added value of EO	٦	Type of information		Data sources			
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Co-design types

Complete the co-design diagnosis tab

Instructions for the diagnostic exercise

5) Based on the definition of each type of co-design, tick each co-design type that is relevant to your case and specify for each time horizon with which actor(s) you wish to carry out the co-design action

Short-term long-term

eo desiBil types	onore term	Long term
Co-design type 1		
Co-design type 2		
Co-design type 3		
Co-design type 4		





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Instructions for the diagnostic exercise







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Q&A on the diagnosis exercise

- What type of co-design should be done and with whom?
- What **difficulties** did you encounter doing this exercise?
- What **knowledge** are you missing? What **knowledge** would you seek in priority if you had more time?







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Workshop exercise

• What questions would you ask the various partners during the codesign session, in the perspective of getting the same kinds of outcomes?









Q&A on the workshop exercise

• Does somebody want to share his questions with us?

e-shape



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Workshops (questions)

Opening question after the demo

What potential do you see in DTU's products and services?



Guided questions

- Could you detail a potential use case for this information: for which use? Added-value of this information? What would be the constraints of using it?
- 2. Same questions for **other actors** (wind farm developers, large utility companies, investors, foundation designers/fabricators, wind turbine manufacturers, others...)
- 3. If you forget the current technological/resource constraints, what Earth observation services would you/other actors **dream of?**









Workshop protocol (ex for co-design type 2)

Possible agenda for a 1h30 workshop (timing to be adapted)

- 2 12:30 12:35 Introduction: e-shape & co-design
- 2 12:35 12:45 Phase 1: demonstration by the pilot leader
- I2:45 13:45 Phase 2: exploration of the range of usefulness of the pilot's service with the support of the user
- 13:45 13:55 Phase 3: setting-up relationships with the ecosystem (User + other potential actors)
- 2 13:55 14:00 Wrap-up

Setting-up the relationships with the ecosystem

- According to you, which stakeholders of the ecosystem would it be interesting to work with to continue the exploration & development of the service? (possibly new contact points for the pilot to carry out next cycles of exploration)
- Regarding [insert the name of the user organization], to what extent would you like to continue working with [insert the name of the pilot leader organization]? In which form?
 - Potential future user ? → co-design type 1 to further work of lists of requirements and cooperations modalities
 - Tester of [insert the name of the pilot leader organization]'s prototypes?
 - Participating to future [insert the name of the pilot leader organization]'s interactions with other actors of the ecosystem

e ...





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Thanks for your attention! raphaelle.barbier@mines-paristech.fr skander.ben_yahia@mines-paristech.fr pascal.le_masson@mines-paristech.fr

To learn more on codesign (click on WP2):







Lunch 13:00 - 14:30

Roof garden (8th floor)

EGW program:







ATHENS 7-9 DECEMBER 2022

HELLENIC REPUBLIC MINISTRY OF DEVELOPMENT AND INVESTMENTS