

Enhancing biodiversity in offshore windfarms in the North Sea

APPENDIX

MASTER THESIS

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STRATEGIC PRODUCT DESIGN
TU DELFT

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

! USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name _____
initials _____ given name _____
student number _____
street & no. _____
zipcode & city _____
country _____
phone _____
email _____

Your master programme (only select the options that apply to you):

IDE master(s): ☐ IPD ☐ Dfl ☐ SPD

2nd non-IDE master: _____

individual programme: _____ - - _____ (give date of approval)

honours programme: ☐ _____

specialisation / annotation: ☐ _____

☐ _____

☐ _____

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair _____ dept. / section: _____

** mentor _____ dept. / section: _____

2nd mentor _____

organisation: _____

city: _____ country: _____

comments
(optional)

⋮

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair _____ date ____ - ____ - ____ signature _____

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC

Of which, taking the conditional requirements into account, can be part of the exam programme _____ EC

List of electives obtained before the third semester without approval of the BoE

☐ YES all 1st year master courses passed

☐ NO missing 1st year master courses are:

name _____ date ____ - ____ - ____ signature _____

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ☐ APPROVED ☐ NOT APPROVED

Procedure: ☐ APPROVED ☐ NOT APPROVED

comments

name _____ date ____ - ____ - ____ signature _____

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date - - - - end date

space available for images / figures on next page

introduction (continued): space for images

image / figure 1: _____

image / figure 2: _____

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date - - - - end date

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

13 Appendix

Appendix 1 - Interview guidelines employees DRN

- a) De Rijke Noordzee – projecten / doelen / ambities
- b) Huidige samenwerking in kaart brengen
- c) Toekomst exploratie

A. De Rijke Noordzee

Introductie

- 1) Zou je meer over je functie binnen de Rijke Noordzee willen vertellen?

Project specifiek

- 2) Aan welke projecten heb je meegewerkt op de Noordzee?
- 3) Welke stakeholders waren daarbij betrokken?
- 4) Kun je het proces rondom het opzetten van een natuur versterkingsproject omschrijven?
- 5) Welke doelen hadden jullie opgezet voor het project?
- 6) Zijn de doelen behaald?
- 7) Wat waren de successen van het project?
- 8) Waren er dingen die tegen vielen binnen het project?

De Rijke Noordzee organisatie

- 9) Wat zie jij als krachten van De Rijke Noordzee?
- 10) Wat zijn de limieten van de organisatie volgens jou?
- 11) Hoe zie jij de ideale toekomst van De projecten van de Rijke Noordzee?
- 12) Wat zijn belangrijke waarden van de Rijke Noordzee?
- 13) Hebben jullie alle doelen gehaald van de Rijke Noordzee?

Inspireren andere landen

- 14) Zie jij de Rijke Noordzee als pionier in natuurversterkingsprojecten rondom wind op zee?
- 15) Deel je nu kennis met andere landen, zo ja op welke manier? (bijv congress)
- 16) Welke kennis zou je willen delen met andere landen?
- 17) Zijn er vergelijkbare organisaties zoals de Rijke Noordzee dat je weet?
- 18) Haal jij kennis op uit andere landen/instituten? Hoe doe je dat en waar?
- 19) Wat doet (bijv België) heel goed op het gebied van natuurversterking op zee?
- 20) Denk je dat stakeholders van jullie (bijv een orsted) kennis delen in andere landen?

B. Huidige samenwerkingen

Algemeen

- 1) Heb je wel eens samengewerkt met een ander land/internationale organisatie?
- 2) Zo ja, met welk land?
- 3) Indien ja, wat voor soort project?

Manier van contact

- 4) Kun je beschrijven hoe de samenwerking tot stand is gekomen?
- 5) Wie heeft de outreach gedaan en op welke manier? (e.g linkedin, tel, viavia)
- 6) Kun je de vormen rondom het contact beschrijven?
- 7) Heb je contactgegevens internationaal die we moeten meenemen?

Ervaring

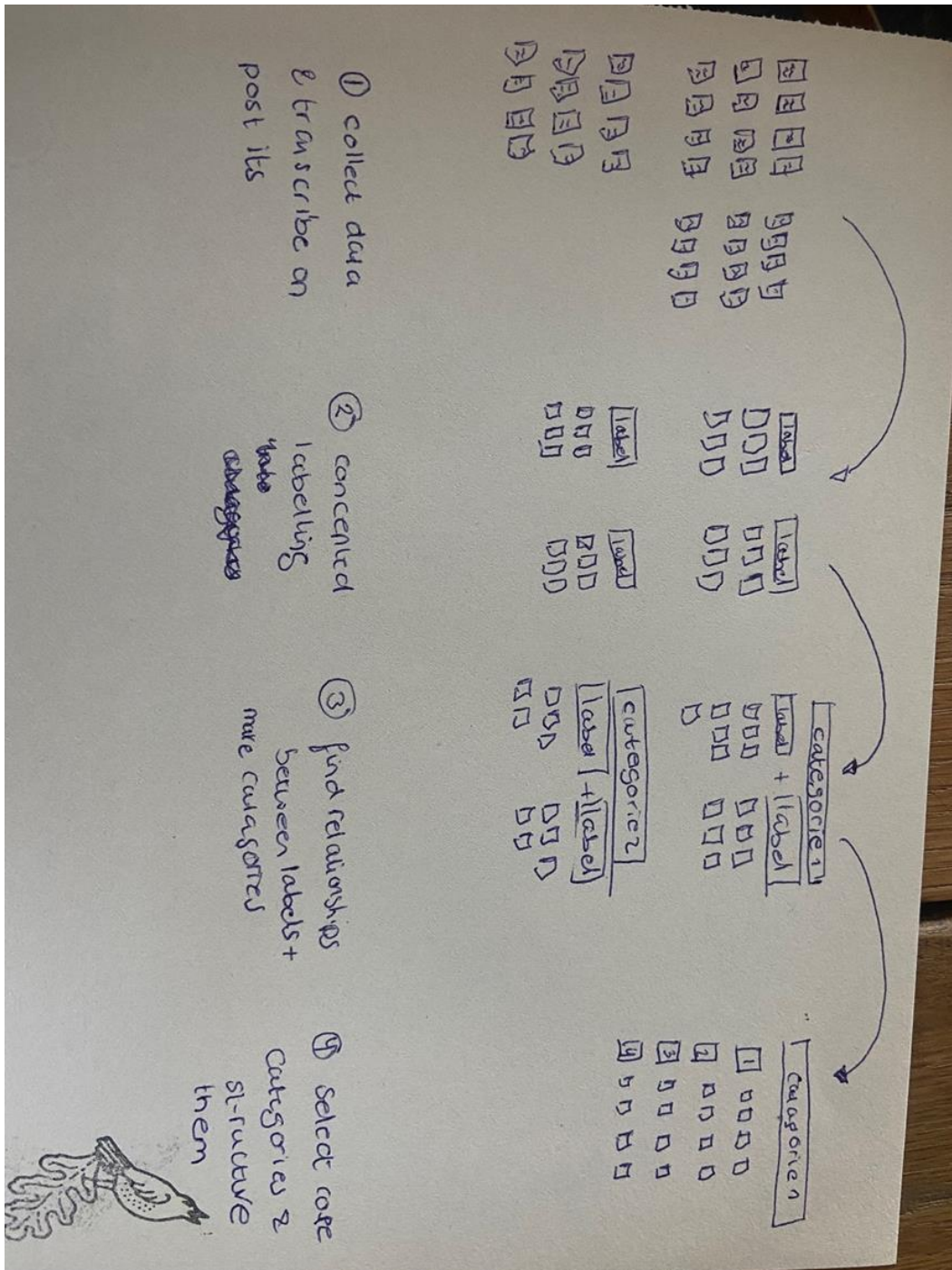
- 8) Was de samenwerking een succes?
- 9) Wat zijn de moeilijkheden rondom de samenwerking?
- 10) Andere opmerkingen wat betreft de samenwerking?

C. Toekomst

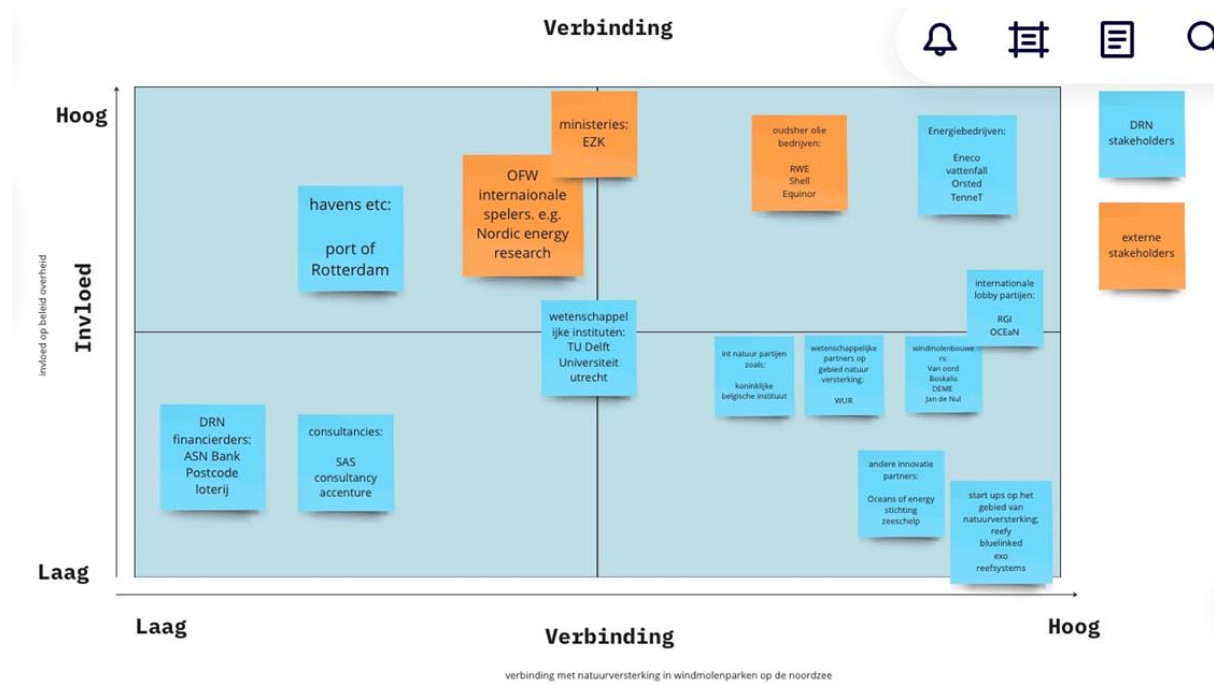
Ambities

- 1) Zou je graag meer willen samenwerken met andere landen?
- 2) Waarom zou je meer willen samenwerken?
- 3) Heb je al mogelijke ideeën voor samenwerkingen?
- 4) Met welke landen/instituten zie je mogelijkheden?
- 5) Hoe zou je de opzet van een samenwerking willen doen?
- 6) Waar zie je barrières voor samenwerkingen met andere landen?
- 7) Zie jij in andere sectoren manieren van samenwerking die je inspireren?
- 8) Heb je personen/organisaties in je hoofd met wie je contact zou leggen?
- 9) Heb je nog andere kennis die je wilt delen zodat die wordt meegenomen volgens jou?
- 10) Stel dat er een aanpak komt voor samenwerking, zou je dat dan gebruiken? Waarom wel/waarom niet?

Appendix 2 - GTM method interview visualization



Appendix 3 - Stakeholder selection



Appendix 4 - Interview guidelines external industry partners

These are the interview guidelines used for Ørsted Denmark - all guidelines are the same but with company name and country changed.

- Introduction Ørsted Denmark

Could you give a short introduction about your role and the company?

How does the process of winning tenders in Denmark look like?

What are the regulations concerning ecology in Denmark?

Which parties do you collaborate with in developing an offshore wind farm (OWF) in Denmark?

- International (focus on North Sea countries)

Do you work with Ørsted Denmark only for the Danish North Sea?

In what way is there international knowledge sharing?

Do you know if there are significant differences in regulations between Denmark and the Netherlands, etc.?

How are international collaborations being improved regarding OWFs?

- Nature enhancement in wind farms

To what extent is Ørsted Denmark involved in nature enhancement in OWFs?

If so, can you provide an example of a nature enhancement project in Denmark?

Are you familiar with Danish NGOs/nature organizations that are involved in nature enhancement?

- DRN

Are you familiar with DRN? If so, did you collaborate?

What kind of role does DRN have in your perspective?

- Future OWFs

How will the world of OWFs in the North Sea look like in 2050?

What role does nature enhancement play in 2050?

What are Ørsted's climate (and biodiversity) goals for 2050?

Appendix 5 - Interview guidelines RGI

Themes

- 1) Foundation of the organization
- 2) International collaboration
- 3) Partnerships & DRN

A) Foundation of the organization

- Could you give me a short introduction on the organization?
- Could you elaborate on the structure of the organization?
- How often do you meet up with parties?
- What are the ambitions of OCEaN?
- What are your opinions on what is needed in the future?

B) International collaboration

- How do you communicate with international partners?
- What are communication tools? E.g. events, news letters etc
- What are ways to spread learnt lessons?
- Do parties learn from each other?
- Do you also lobby for international governments?
- How do the policies differ per country?
- Do countries look at each other for innovation policies, rules and regulations?

C) Partnerships & DRN

- Who are your partners? Types – background?
- Can you name an example of two partners and explain why they are valuable for the organization?
- As what kind of partner do you see the rich north sea?
- Do you see them as pioneer?
- Are there any similar organizations that you are aware of like DRN?
- do you think more countries need a Rich north sea or similar organization?
- which organization or countries also work on nature enhancement?
- what do you think is needed to grow your mission on enhancing biodiversity in the European seas?
- who needs to collaborate with who?
- what are first partners for DRN which could be interesting to work with?

Appendix 6 - Insights interview Experts OWFs

BLAUW: Relevant for DRN

GROEN: Relevant for future context

ORANJE: Relevant in North Sea collaboration

E1:

- "OWF is a super competitive market."
- "We want to become net positive in biodiversity."
- "As a company we want to make extra costs to take ecological measurements but first priority is money"
- "In the Netherlands - ecological criteria are very important to win a tender."
- "Most companies work with minimum criteria for ecological measures."
- "Germany has minimal criteria towards ecology."
- "In Germany you can win by paying the most money."
- "UK has minimal criteria ecology."
- "Norway does not have criteria that I am aware of."
- "Denmark is still figuring out the criteria for ecology."
- "Offshore wind companies in the Netherlands pay the government to exploit on the North Sea."
- "DRN is a wanted partner because of their knowledge on nature enhancement which industry partners can use"
- "We have our in-house knowledge hub where we share information between countries."
- "We experimented with artificial reefs"
- "We paused the wind farm in Borsele for the birds."

E2:

- "Measuring progress in biodiversity will be a challenge in the future."
- "It takes sometimes a decade before you have results on positive biodiversity impact."
- "A company's first priority is to earn money."
- "We want to become net positive in biodiversity."
- "The habitat differs very much per country."
- "Quantification of data is really difficult in biodiversity."
- "With innovation projects there are many different stakeholders involved which makes DRN a good facilitator."
- "In UK and Schotland there are floating wind farms."
- "The floating offshore wind will be growing in the upcoming years."
- "Monitoring biodiversity is one of the biggest challenges which DRN has started to do."

E3:

- "The OWF spaces are very competitive however in the end it will be divided a bit."
- "Technology can not keep up with the OWF developments."
- "Societal awareness on ecology grows."
- "Making a positive impact on nature is difficult but using the windfarms to enhance nature is creating a positive impact and supporting the energy transition."
- "Nature reinforcement is already done by leaving the sea at rest."
- "There is limited space available for OWFs and the government is challenging to use it maximum."
- "Overcapacity of energy is a huge problem and storing it as well."
- "There is limited place to build offshore wind and little vessel capacity to ship it to other places."

E4:

- "I see DRN as a connector between different parties – also internationally"
- "Principles which are found in NL can be taken internationally."
- "We as a company are gonna make more data available in the future and share our knowledge."
- "I hope and expect that the EU will regulate more on biodiversity."
- "Monitoring of ecological impact takes a long time and much effort."
- "Marine habitats are very specific per location."
- "As a company we want to be net positive in biodiversity in 2025."
- "With nature enhancement you don't think about it as a competitive advantage."
- "More data will be shared openly in European context."
- "DRN could provide knowledge on the do's and don't in the field of nature enhancement."
- "We need 10 years to see what the effects are on biodiversity."
- "We should apply the principles locally."
- "Nature enhancement should be the standard in the future - not an add on."

E5:

- "Greenwashing is a threat for identifying what is good for nature."
- "Marine spatial planning is different for each country."
- "DRN is very good in practical performance."
- "Net biodiversity positive is going to be a thing in the future."
- "The restoration law is going to be a big turning point."
- "The Mediterranean countries would be a strategic choice - they are not far yet."
- "Uk is more complicated because outside of the EU."
- "Norway has floating wind farms."
- "France has a strong public opposition."
- "Mediterranean is floating wind farms."
- "Belgium has a close coherent habitat as the Netherlands"
- "Belgium small coast line but we can learn from the current practices they do now."
- "Denmark is super helpful to look at - there are big negotiations going on."
- "Germany is interesting because of close coherence habitats."

- "Germany is supporting the development of OWFs."
- "Denmark has huge targets for OFW development and the expertise of DRN would be super helpful."
- "Denmark is not as advanced as the Netherlands yet in nature enhancement."
- "The mediteranean have different marine ecosystems which DRN has not much knowledge of yet."
- Germany is interesting because there are also cumalitive impacts because of close explotation to the netherlands.
- "There is much to learn on nature enhancement projects from the UK."
- "Belgium is placing windfarms in nature protected areas."

Appendix 7 - DEPEST factor analysis

Demographic

- The demand for energy per person is growing (McKinsey, 2023).

Economic

- North European countries want to be independent of countries delivering fossil fuels (European Commission, 2022).
- There is growing interest in the utilization of hydrogen as an energy source among these countries (Clifford Chance, 2023).
- Demand for growth in renewable energy sources. (State of Green, 2023)
- Renewable energy will become more attractive in price.(De Correspondent, 2023).
- Half of the needs for energy will be met by renewables (Allianz, 2023)
- Materials to build windmills are scarce (Jowitt et al., 2020).
- Limitations in resources to transport the bigger wind turbines (E3, 2023)
- Building wind farms is a very competitive business (E1, 2023)
- Company first priority is money (E1, 2023) (E2, 2023).
- Businesses Expand Ads, Communities, And Commerce On Social Media (Howarth, 2023)
- Floating wind will significantly rise in capacity (Clifford Chance, 2023)(E2, 2023).

Political

- Cooperation between those countries will become important in the future. (Volkskrant, 2023)
- Companies and high profile individuals increasingly take a stance on political and societal issues (Itonics, 2023)
- Public figures like Carice van Houten are drawing attention to environmental issues (De Volkskrant, 2023).
- Ongoing discussions about whether nature needs enhancement, restoration or leave it at rest (DRN 1, 2023)
- Overload of information and growing amounts of fake news (Harari, 2021)
- EU targets from paris accord mean a lot of pressure on renewable energy (RVO, 2022)(“Trend outlook 2023”, 2022)
- Increase of international collaboration (AT Osborne, 2020).

Environmental

- Nature restoration is going to play a big role in increasing biodiversity. (Nordic Energy Research, 2022)
- Increasing societal awareness for the importance of nature and climate change (AT Osborne 2020).
- Biodiversity is crucial as it makes Earth a viable place for them to live (Raworth, 2017)

- Companies make commitments to create a net positive impact on nature (WWF, 2021) (E1, 2023) (E2, 2023)
- Quantification of nature positivity is difficult. (E2, 2023) (E4, 2023)
- Observing the outcomes of nature enhancement projects takes multiple years (E2, 2023) (E4, 2023).
- Greenwashing is a threat for identifying what is good for nature (E5, 2023)
- Societal awareness on ecology grows. (E3, 2023)

Social/cultural

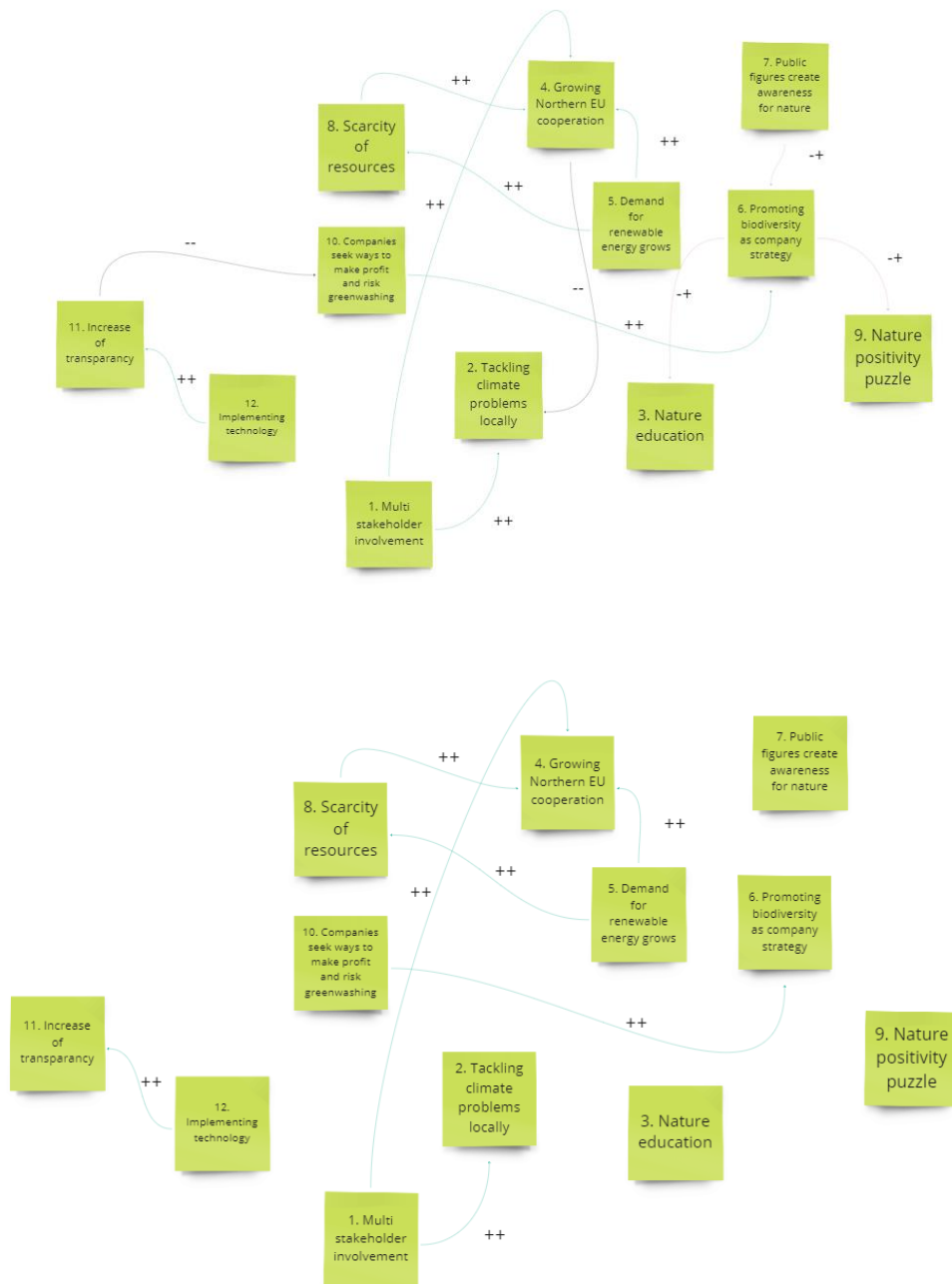
- Stakeholder Capitalism refers to the inclusion of all stakeholders in creating and distributing long-term shared value. (*ITONICS*, 2023)
- Marine resources is complexer than ever which requires cross border multi-stakeholder collaboration (Steins et al., 2021)
- High variety in partners involved in the energy transition (Clifford Chance, 2023)
- Local involvement on climate related topics. (*ITONICS*, 2023) (E4, 2023)
- Climate education is getting a role in creating awareness. (Darel, 2023)
- Education on nature related topics will be done more locally by NGOs and research institutions. (*ITONICS*, 2023)
- The brand activism of Patagonia and Oatly are examples of successfully using media to create attention (Latana, 2022).
- Demand for employees in the engineering sector will remain growing (McKinsey, 2023)
- Conscious consumers are following nature-minded brands (*The Future 100: 2023*, 2023)

Technological

- Challenges persist in energy storage, transformation and the transportation of energy. (E3, 2023)
- Your data, my data, our data. (Accenture, 2022)
- Sharing knowledge becomes the norm in open source platforms, especially on climate related topics (E4, 2023)
- Animals can be monitored 24 hours a day using IoT in order to protect or study them (Wensley, 2021).
- Importance of using the full capacity of emerging technologies (Accenture, 2023)

Appendix 8 - ViP method

8.1 Relations between clusters of factors



8.2 Extra clusters found

Multi-stakeholder involvement

Solving climate related issues often comes with a wide range of stakeholders. In the future the inclusion of all stakeholders is needed to create a sustainable value throughout the whole supply chain (*ITONICS*, 2023). This also applies to nature and the energy transition. Marine resources is complexer than ever which requires cross border multi-stakeholder collaboration (Steins et al., 2021) and according to Clifford Chance (2023) there will be a high variety in partners involved in the energy transition.

Demand for renewable energy is growing

Besides being independent of fossil fuels, the demand for energy per person is growing (McKinsey, 2023). The expectation is that in the future half of the needs will be met by renewables (Allianz, 2023). For example, floating wind will significantly rise up in capacity (Clifford Chance, 2023)(E2,2023). Besides, renewable energy will become more attractive in price and therefore used more (De Correspondent, 2023).

Scarcity of resources for OWFs

Since the demand for renewable energy will grow enormously in the upcoming years, bigger and more OWFs will be built on the North Sea. To keep up with this demand there is a need for more materials, transport and skilled personnel. However, materials to build windmills are scarce (Jowitt et al., 2020). Besides, the expectation is that there will be limited resources to transport the bigger wind turbines (E3, 2023) Also, the demand for employees in the engineering sector will remain growing (McKinsey, 2023). Moreover, building wind farms is a competitive business with limited places available (E1, 2023) Summarizing, there will be a scarcity of resources for the development of offshore wind farms

Companies seek ways to make profit and risk greenwashing

The interviews showed that the company's first priority is to make money (E1, 2023) (2, 2023). At the same time companies are actively seeking opportunities to generate profits while contributing to nature. Because more companies adopt this approach, it will become difficult to identify who has a positive impact on nature and where greenwashing plays a role. (E5, 2023)

Implementing technology

Knowing how to use emerging technologies can gain a competitive advantage for businesses (Deloitte, 2023). This also implies for businesses in offshore wind to optimize OWFs to gain competitive advantage. Another relevant implementation of technology is the internet of things (IoT) in marine environments. Animals can for instance be monitored 24 hours a day using IoT in order to protect or study them (Wensley, 2021).

8.4 Build the framework



Appendix 9 - Evaluation criteria

Need 1: Sharing knowledge on nature enhancement projects

Laura

- Time: The assignment is adjustable in time for the project and is independent of external factors
- SPD: Solving the need gives enough opportunities for strategic design and I will have many resources to dive into knowledge sharing
- Original: This need is also in line with the purpose of the toolbox - so I should be careful that it is not mixed with the toolbox

DRN

- Relevance: Five out of five employees mentioned their wish of sharing knowledge so the relevance is high comparing it with the other needs
- New value: Accenture is already working on this for DRN - so the value is not completely new - solving the need can however be a contribution for the toolbox or create a value next to the toolbox

Accenture

- Relevance: Solving this need is aligned with the purpose of the toolbox
- New value: Solving this design need can create new value for accenture by consider how accenture employees share knowledge

Need 2: Gain knowledge on nature enhancement projects internationally

Laura

- Time: The assignment is adjustable in time for the project because a scope for knowledge gaining could be created
- SPD: Solving the need will give challenges since I am not a marine ecologist
- Original: Tackling this need is also part of the toolbox so again should be careful that things don't get mixed up

DRN:

- Relevance: According to DRN solving this need will be relevant on a longer term
- New value: Gaining knowledge will create new value for DRN because it will improve their projects - however DRN is a pioneer in projects so knowledge sharing has more priority

Accenture

- Relevance: Solving this need will support the toolbox but within Accenture as a firm it will not be really relevant since it is very specific
- New value: Solving this need can generate new ways how Accenture can gain knowledge

Need 3: Get in touch with international parties

Laura

- Time: solving this need I will be dependent on the external response which can influence the length of my graduation project
- SPD: solving the need will be more of an outreach assignment than strategically interesting
- Original: someone from DRN is working on this assignment so it is not a standing alone project

For DRN the following criteria are important:

- Relevance: the need is relevant according to DRN but there is especially a need to find out with whom to get in contact first and with whom second etc.
- New value: solving the need will generate new value because it expands the possibilities to work internationally

For Accenture the following criteria are important:

- Relevance: not really relevant for Accenture - but an overview of international parties could be useful as part of the toolbox
- New value: connecting with the parties will be relevant for DRN - not specifically for Accenture

Need 4: strategy on international collaboration

Laura

- Time: solving the need is manageable within the given time of the project
- SPD: solving this need is strategically interesting
- Original: the need stands alone - no one else is working on it

DRN

- Relevance: the need is mentioned 4 out of 5 times and thus relevant to DRN
- New value: solving the need creates new value for DRN

For Accenture the following criteria are important:

- Relevance: The toolbox can be part of the strategy - so high relevance for Accenture
- New value: The strategy will be very specific for DRN - so minimal value for Accenture

Barrier 1: Limited resources available

Laura

- Time: overcoming this barrier is not manageable for me within the time of the project because it will become clear at the end of the year if there is new funding
- SPD: it is a strategically interesting to see how DRN can potentially grow in resources
- Original: people from DRN are already working on this

DRN

- Relevance: relevant but more within their own firm than as assignment for my research
- New value: solving it will not create new value but more possibilities

Accenture

- Relevance: does not fit with the toolbox
- New value: interesting perspective for Accenture to see how non-profit organizations can grow

Barrier 2: Language barrier

Laura

- Time: overcoming this barrier is not manageable for me within the time of the project
- SPD: not really fitting an SPD graduation project to translate marine data
- Original: OCEaN facilitates good collaboration between countries

DRN

- Relevance: only mentioned by marine ecologists thus not highest relevance for the whole organization
- New value: valuable but not priority

Accenture

- Relevance: the toolbox will solve this by using english
- New value: Accenture is an international firm using english as common language - so no new value

Barrier 3: Limited knowledge about rules and regulations

Laura

- Time: complex challenge within the time of the project
- SPD: more law related than strategical
- Original: someone within DRN is working on this so not original

DRN

- Relevance: very relevant if they want to work abroad
- New value: someone within DRN is working on this so minimal new value

Accenture

- Relevance: for the toolbox interesting as small part
- New value: minimal value for Accenture as a firm

Barrier 4: Effective communication tools are missing

Laura

- Time: Adjustable for the time span of the project
- SPD: interesting as designer
- Original: could mix up with the toolbox

DRN

- Relevance: it is relevant but not main priority for DRN themselves to overcome
- New value: Accenture is working on it so minimal new value

Accenture

- Relevance: in line with purpose of toolbox
- New value: same value as toolbox generates so I should look into other communication tools or supportive tools for the toolbox to generate new value

Appendix 10 - Interviews DRN regarding collaboration with countries

DRN 1:

“We do a project together with Seafess in the UK – with the VLIZ in Belgium – funded by the Crown Estate.”

“The Crown Estate approached us and we had a successful project.”

“The initiative to share knowledge will begin among North Sea countries. However, UK's absence from the EU makes it difficult, although England is eager to adopt new practices.”

“Germany has its own guidelines, but there could be more knowledge sharing.”

“Belgium has been doing long-term monitoring for years.”

“Denmark is in the process of setting things up again.”

“Norway is making up their strategy so this could be a good opportunity to get involved.”

“We could connect with English NGOs.”

“We could do international knowledge sharing – currently Orsted has some internal international knowledge sharing, but we could engage with them more.”

DRN 2:

“Eline is currently working on the international project EXO which includes the UK.”

“The UK is allowing fishing in wind farms, so there we could start a lobby.”

“Denmark presents a viable option as they are already making progress in the field of nature enhancement in OWFs.”

“Norway is also starting its efforts but with a focus on floating wind projects.”

“Belgium has made some kind of commitments on ecological aspects.”

DRN 3:

“Belgium and the UK are relatively advanced in scientific matters. The UK's Insight program and Belgium's centralized monitoring of offshore wind are notable examples.”

“The Velux project is an excellent example of international cooperation.”

“We gave presentations in Copenhagen in collaboration with Vattenfall and Orsted, facilitated by OCEaN.”

“It can be a good first step if Vattenfall wishes to implement certain initiatives from the Netherlands in a wind park in Sweden. After this NGOs in each country with similar missions can be searched for.”

“Starting with North Sea countries, Ireland and Schotland (UK) have similar water conditions.”

“Scotland has shown success in oyster cultivation, and Norway is also a potential target.”

“France is making progress, but has different conditions and sizes in OWFs”

DRN 4:

“Currently, DRN is collaborating with OCEANS and RGI on the Velux project.”

“When it comes to nature inclusive design, discussions are held with the wind park owners. For instance, Vattenfall has created openings in its turbines to enhance nature.”

DRN 5:

“Eneco serves as an example of an international company. Their active involvement in European projects, such as Ijmuiden, is useful.”

“Given that ecological measuring initiatives originate from government policies, they have a considerable impact on companies way of working.”

Appendix 11 - Brainstorm sessie

Hoi! Zoals je weet ben ik bezig met mijn afstuderen aan de TU Delft. Gezien het midden in de zomervakantie is, vraag ik jullie hulp digitaal om mee te denken aan leuke ideeën voor mijn project.

Context over mijn project:

De Rijke Noordzee is een organisatie die de kansen benut die windparken op de Noordzee bieden om natuur te versterken. Een voorbeeld is bijvoorbeeld het plaatsen van oesters bij een windturbine om zo de voedselketen te stimuleren of het plaatsen van artificial reefs zodat dieren een schuilplaats hebben. (zie voorbeeld onderaan de pagina) Mijn onderzoeksdoel is om te kijken hoe De Rijke Noordzee kennis kan delen over deze natuur versterking in windmolenparken. Deze kennisdeling begint **lokaal** – maar gaat uiteindelijk internationaal nuttig zijn.

Mijn onderzoeksvraag: Op welke manieren kan De Rijke Noordzee mensen en organisaties leren over natuurversterking door mensen lokaal te betrekken?

Opdracht:

De sessie bestaat uit 2 onderdelen.

- a) Ik stel eerst vragen over je persoonlijk connectie, ervaring en kennis over de noordzee om zo een geprikkeld te raken over het onderwerp (15 min)
- b) Daarna gaan we brainstormen voor ideeën op de hoofdvraag (15 min)

Tijdens de sessie mag je vrij zijn in het geven van antwoorden, creatieve ideeën zijn welkom!

Alvast heel erg bedankt voor het meedenken!!

Liefs Laura



Appendix 12 - Assessment future contexts

Assessment

To assess the four future context on the fit with a strength of DRN, I use three types of scores:

++ fits very well with the strength

+ fits medium with the strength

- is not fitting the strength

The strengths which were identified in section 2.3.1 to be assessed:

1. Connector between science, industry and government.
2. Practical performer in nature enhancement projects
3. Opportunity focussed

All + are counted which will result in a final score for the best fitting future context to develop a concept of knowledge sharing for DRN.

Evaluation of the four future context directions

- A. Evaluating the first future context direction - North Sea cooperation play a significant role in educating people about nature topics.

Strength 1 fits future context A very well. North Sea cooperation can create a framework for collaboration between science, industry and governmental parties.

Strength 2 fits medium with future context A. North Sea cooperation can create commitment towards practical performance in nature enhancement projects. However, the laws and regulations don't directly execute the nature enhancement projects practically.

Strength 3 fits medium with future context A. North Sea cooperation can create new opportunities for businesses and organizations to comply, access new markets and funding programs. However the opposite is also possible: EU laws and regulations can put restrictions towards business and organizations.

- B. Evaluating the second future context direction - nature education starts by engaging locally in order to ensure the inclusion of stakeholders in the whole supply chain.

Strength 1 fits future context B fits very well. Engaging locally can facilitate connections between science, industry and government at a local level which enhances reaching goals.

Strength 2 fits future context B fits very well. Engaging locally demonstrates a practical approach regarding nature enhancement by actively involving local stakeholders.

Strength 3 fits future context B very well. Engaging locally can offer room for exploration and growth for local stakeholders which are more opportunity focussed than restriction focussed.

C. Evaluating the third future context, more public figures are speaking up to educate on nature related topics.

Strength 1 fits medium with future context C. While public figures have the ability to connect science, industry and government by speaking up on certain topics, the effectiveness varies on the type of speaker and message.

Strength 2 fits medium with future context C. While public figures in the media can encourage practical performance they don't directly do a practical performance.

Strength 3 fits medium with future context C. Using more public figures can focus as well on opportunities as warnings.

D. Evaluating the fourth future context, using technology to increase transparent data which supports self-education on nature related topics.

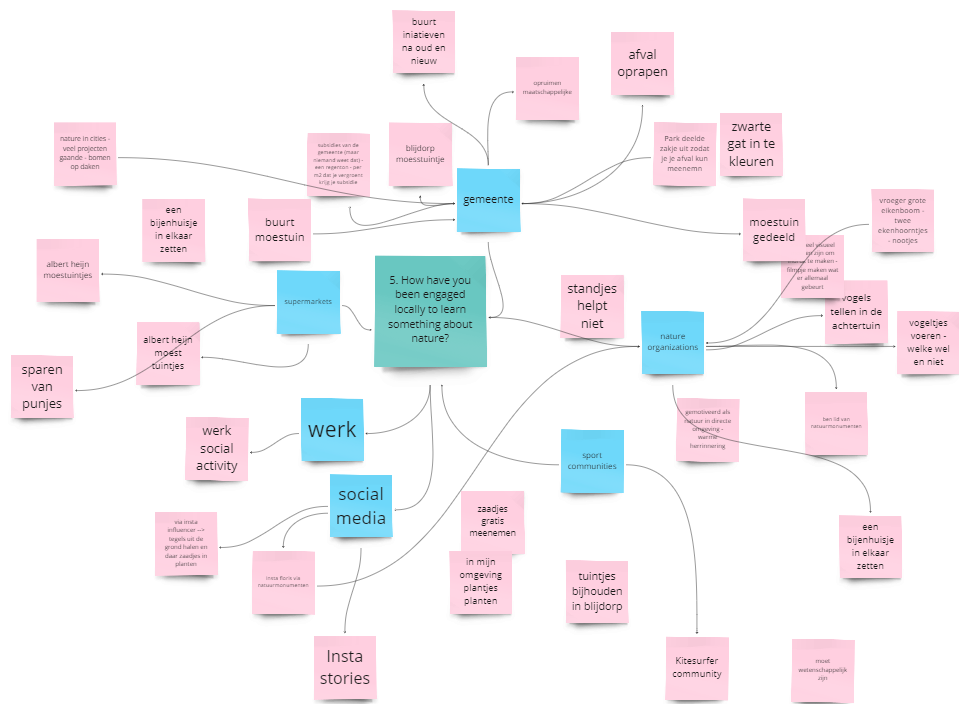
Strength 1 fits medium with context D. While transparent data can be used to connect science, industry and government it remains difficult to identify what is misguided information and what is really scientific.

Strength 2 fits medium with future context D. Transparent data can guide in self-education towards practical performance. This is however very situation dependent.

Strength 3 fits very well with future context D. Utilizing technology can create opportunities for enhanced data sharing, analysis and decision making.

To summarize this, I visualized the scores in table below. Counting the scores gives the following results on DRN strengths fitting the future contexts:

- A. In the future, North Sea cooperation plays a significant role in educating people about nature topics. (++++)
- B. In the future, nature education starts by engaging locally in order to ensure the inclusion of stakeholders in the whole supply chain. (++++++)**
- C. In the future, more public figures are speaking up to educate on nature related topics. (+++)
- D. In the future, using technology to increase transparent data supports self-education on nature related topics. (++++)



Appendix 14- Literature review

Engaging locally to ensure inclusion of stakeholders in the whole supply chain

Through literature research I found the following insights which are helpful in educating people locally on nature.

Nominate an official plant or animal

According to the New York State Department of Environmental Conservation (2008) nominating a plant or animal can show the exceptional biodiversity of the region. Upon the selection of a particular species, education can center around its characteristics, habitat, and the importance of responsible stewardship. By promoting awareness and understanding of this nominated species, the knowledge of biodiversity within local communities can be nurtured and expanded.

Emphasize importance of local habitats

Since many people do not directly feel attached to the loss of species in the ocean, it is important to emphasize concerns that may appear because of biodiversity loss. Emphasizing that conservation of biodiversity is important for the development of social and economic life can enhance education (Morar & Peterlicean, 2012).

Give responsibility

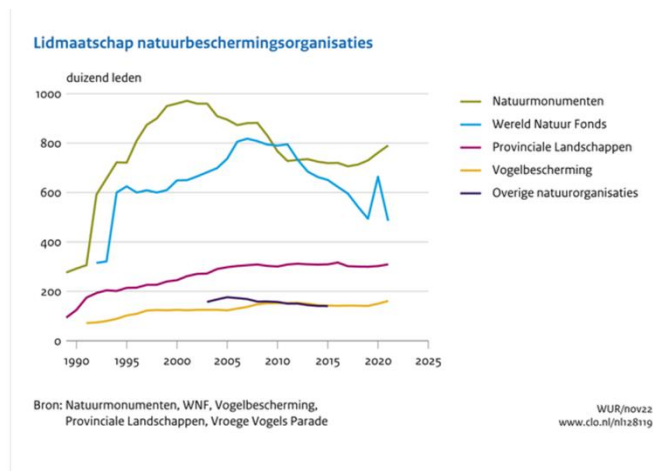
Another way of increasing knowledge on nature in the ocean is to give people responsibility (Liu et al., 2023). This can be done by explaining to people their role in conserving ocean habitats by for example cleaning up beaches or protecting the shore. When people are aware of possible solutions to conserve nature they are more likely to take action.

Create involvement and commitment

Connecting with local habitats can increase understanding of the relevance of nature. People can be involved in monitoring or protecting a certain area of nature enhancement. Such activities that bring people together can increase the likeliness of involvement (New York State Department of Environmental Conservation, 2008). Besides, it is effective to let people commit to a positive contribution to nature to make them follow through with it.

Nature organizations in the Netherlands

There are different nature organizations in the Netherlands which aim to share knowledge on nature enhancement. In order to understand what DRN can learn from their current practices on knowledge sharing I look at the biggest nature organizations in the Netherlands. The four nature organizations with the most members are Natuurmonumenten, Wereld Natuur Fonds (WNF), Provinciale Landschappen and de Vogelbescherming. (Rijksoverheid, 2022)



Natuurmonumenten has several initiatives of local engagement. On their website you can find different things you do yourselves to enhance nature in your own garden: e.g. make a bee hotel, attract birds to your lawn with food and greening your garden. (Natuurmonumenten, 2023)

WNF is specialized in engaging kids in nature. The organization has a course for the primary school on nature and biodiversity, offers several card games on biodiversity and has a ranger program which kids can get home. (WWF, 2023)

Provinciale landschappen has a more financial approach towards engaging people in nature. At their website they offer the opportunity to rent a location for a wedding, business meeting or holiday in one of their nature protected areas. (Stichting LandschappenNL, 2020)

Vogelbescherming has different ways to engage people locally. Annually there is an event where people can support the birds by counting all the birds in their neighborhood. (Vogelbescherming Nederland, 2022) The organization also has an educational programme for kids at high school.

Some of these examples described above can be taken into the ideation phase as ideas for DRN. Besides I refer to the organizations in the brainstorm session to find out which nature enhancement examples the participants are aware of.

Appendix 15- Ideation sessions

30 ideas from the individual brainstorm

design an oyster box	plant coral reefs (florida example)	artwork about nature (connect with local musea)	a game on biodiversity in the north sea	cycling for nature (iets zoals cycling for climate)	education program on high schools	tuinieren zoals in westerpark
plant an oyster	sponsor run around biodiversity	collaborate with musea on interactive tools (fabrique de lumiere)	huge experience kijkdoos	journalism wedstrijd on best ideas for nature enhancement	excursie naar de windmolenparken	write a book
donate to an artificial reef and get your name on it	create wedding locations around nature enhancement	create your own aquarium zoals met moestuintjes gebeurd	from old material workshop making nature enhancement parts to use	restaurant openen rondom biodiversiteit en natuur versterking	online platform where people can maintain their part of the north sea	podcast maken vanuit DRN
Nature enhancement exchange program (universities)	Via orsted etc een beurs winnen om kennis te delen door studenten	nature ranger application	host webinars on nature enhancement	pitch wedstrijden	Pop-up food stand with food from north sea	community creates environmental art
Grants for local involvement	built a nature club at TU Delft / wageningen	organizing "DRN event around nature enhancement"	open air movie night on nature enhancement	local cooking competition on seafood	youth ambassador program for nature enhancement	VR Tours door de windfarms


56 ideas from multiple brainstorms

in rotterdam met zoals de haven presenteren hele grote fotos uit printen over natuurversterking in windmolen parken	news articles in local newspapers	maak prullebakken --> in de vorm van kunst	afval - natuurbescherming - Je gooit iets weg	punt waar je glas weg brengt - kunst bord	advertisements on instagram	promotions to win something	using spotify reclame for information
bij surf wedstrijden DRN onder aandacht brengen	interactive game bij surf dorpjes	duik mogelijkheden organiseren bij de windparken	use North sea jazz for artwork on nature enhancement	museum where you experience the look and feel of nature enhancement	in bushokjes fotos hangen	symposium om op te spreken	create booklet with games
flyeren in supermarkt	supermarkt verpakkingen gebruiken	using public transport to inform people of nature enhancement	guest lectures on universities	scheveningen strand voel je het al - dus eerder in grote steden	gemeente campagne opzetten	collab met hema of xenos met producten	dierentuin wordt "zeetuin"
wandel tour van dorp naar dorp wandelen met uitleg over natuurversterking	in de lokale bibliotheek boeken neerleggen	tijdens oestersplukken excursie informatie geven	afval verzamel acties rondom natuurversterking	in verschillende biodiversiteits groepen denken en services mee bekladden	lokale natuurversterking vergelijken met natuurversterking op zee	Duin/zee plantjes bij het tuin centrum ophalen	vuur toren neerzetten in dorpen
een serie maken over de noordzee zoals moccro mafia	metro kunstwerken expositie	exclusive festival op windmolen park	grote visuals in de stad hangen	make tik toks on nature enhancement	wist je dat op bijvoorbeeld water fles	foto wedstrijd	gratis schoolreisje voor kinderen en volwassenen
feitjes op thee zakjes	kunstwerken op rotterdam plein bijv	use the NOS 3 stories	borden langs het strand met info / panorama	plant een oester in de noordzee	strand jutters die dingen gebruikt - in de stad creëren	fashion line of nature enhancement	vrijwilligers project opzetten om de noordzee te onderhouden
Kite app met quiz over natuurversterking	excursie naar windmolenpark	plant een oester --> mee op excursie --> oester business --> hele business --> restaurants	"Natuurdag" actie	menu kaart met info over natuurversterking	via bnrs het uitleggen op social media	water games on biodiversity	biodiversity playground in communities



miro

Appendix 16 - Presentation Accenture



Vision in product Design (ViP)

An introduction to a design methodology from TU Delft

Laura Stassen - Accenture Song

Which design methodologies do you use to create a future vision for a client?


Introduction to the ViP method

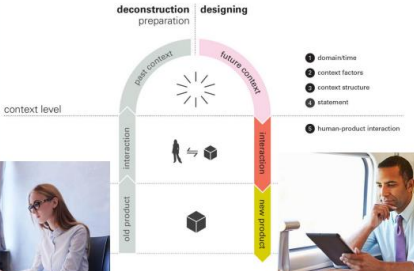
- How does the ViP method work?
- How did I apply the ViP in my thesis?
- ▲ Discussion and compare
- Feedback!

What is the ViP methodology?

ViP aims to design towards a **desired future** which a product fits.

- The idea behind this method is that designers should first and foremost design the *reason why*.
- Context driven and interaction-centered





04


Today, we focus on creating a future context

4 steps:

1. Set a domain
2. Find context factors
3. Cluster factors
4. Create a future context

Future context(s) for de Rijke Noordzee

09

1. Domain
"Enhancing biodiversity in offshore wind farms on the North Sea by 2030"
2. Finding context factors

3. Cluster of factors
Cluster 1: Public figures creating awareness for nature
Cluster 2: growing attention for nature education
Cluster 3: Scarcity of resources in offshore wind farms
4. Future context(s)
Cluster 1
X
Cluster 2
Future context A:
In the future, more public figures are speaking up to educate on nature related topics.

Discuss

05

- Would you use this method and why?
- Which methods do you use to work on a future vision or future context?
- Where do you find design methods in daily business?
- How could the method be improved to make it fit with Accenture Song?

Appendix 17 - Insights session workshop

Insights session:

Similar methods identified:

- forecasting
- future probing

Differences of methods currently used to create a future vision:

- future problem instead of current problem
- richer in collecting factors
- more open-minded
- inspirational

How would we use the ViP (including possible adjustments):

- still abstract for the product design team - they need some clear starting points when the future context is created
- make it more fact based which future context to choose: RANK your future contexts
- could be used with the lenses: which future context is more viable, feasible and desirable?
- back casting - use a roadmap to work your way back
- test with customer which future context they prefer
- could be used in as design sprints to generate inspiration and creativity
- method should be flexible for client and use to use: what if the future context says the next day something different and then we already started designing

How would we prefer using the ViP manual at the office?

- card game
- workshop ready miroboard
- toolkit

Appendix 18 - Insights user tests accenture

Consultant 1

ziet er mooi uit

mag iets persoonlijker aangesproken worden dat mensen het graag willen lezen

inhoudsopgave en introductie

tekeningetjes die duidelijk aangeven waar je bent
examples geven aan de onderkant van de kaartjes

logo downloaden

domain verder specificeren

mensen aanmoedigen om het te gebruiken: bijvoorbeeld van "great job"

heel toegankelijk om te gebruiken op kantoor als die kaartjes leuke plaatjes
goede nummering helpt goed bij het gebruik

Consultant 2

Voorkant mooi gedesigned

Logo moet scherper

- Clients meervoud

- 50 minutes still

Take a coffee break

Domain same als scope

Or your client mission

Example aangeven

Cool design

Visualisatie inhoudsopgave

Write it down

—> Actie punt SCHRIJF OP

Factors signals of change

Factors zijn dit .. trends

Hoofdletters

Example of trends

Hoofdletters !!

2. Cluster of factors —> assign a name —> schrijf op
Sterretjes in 1 ster

Cluster of factor 1 ipv X

Matrix visualiseren

TIP KAARTJES of example kaartjes maken

Wel hoofdletters

Score ipv rate

Discussing aan de hand van de criteria

1.

2

3

En dan place stars

Select most promising future

Ziet er Nice uit

Extra kaartje

Mooi eruit zien & Makkelijk

Geen eng document

Consultant 3

cute design - method

inhoudsopgave dat de kaartjes niet door elkaar
leuke plaatjes

ander logo

- hoofdletters

example benoemen

"prioritize the factors"

alle examples op een kaartje

icoontjes toevoegen

weinig tijd dus meer tijd 30 minuten bij selecting factors

15 minuten is kort

duidelijk aangeven hoe je het moet documenteren

next steps aangeven

lettertype aanpassen naar bold

meer visueler

kleuren zijn nice passen ook wel goed bij accenture
spelregels

- timekeeper

- rolverdeling

tekeningetje inhoudsopgave

sticky notes op een whiteboard - documenteren

Consultant 4

5 stappen in een uur is duidelijk

Inspiring words om te beginnen is leuk

Voorbeelden zijn Nice aan de andere kant Examples op een
kaartje laten zien zodat mensen goed het voorbeeld kunnen
volgen

Future context multiplying vind ik moeilijk voor te stellen - mis een
plaatje

Voorbeelden zijn flex

Je hebt een soort handvatten Voor de toekomst

Je bent er best snel doorheen - als het er ligt en het is makkelijk te
volgen

Beginnen met een introductie

Een soort overzicht maken dan zie je hoe de stappen met elkaar
samenhangen en dan heb je een abstracte idee van waar je heen
werkt

Een voorbeeld kaart met zoom in effect Lay out ziet er heel
professioneel uit - zou het gebruiken met clients tijdens design
sprints

Appendix 20 – Identified strengths, weaknesses, needs and barriers

DRN 1	DRN 2	DRN 3	DRN 4	DRN 5	Interviewee / Strengths
"We have an unique collaboration between industry and science ."	"We are the spider in the web between industry and government en science "		"we create a unique shared interest between industry and science " "we bring people together to the table to talk"	"we are playing between the football lines: science, government and industry ."	1) Connector between science, industry and government
"Teammembers have practical experience in the field" "We learn by doing"	"We have a small team with which makes us quick in execution"	"we are very good in performing practically – e.g. Monitoring, placement of replica"	"We are learning by doing."	"we have a practical mindset in the ecological part" "we are experimenting within nature enhancement"	2) Practical performer in nature enhancement projects
"we are seen as independent and not as a competitor" "There is a 50/50 contribution with industry partners in money or facilitation."		"different parties reach out to collaborate with us because of our position" "stakeholders involved are equally contributing to the nature enhancement projects in terms of money or resources"			3) Equal partner in collaboration
"We are only working on science-based results."				"we evaluate based on experiments what works and what does not work"	4) Science-based
"we are taking the chances which windfarms offer us "	"freedom in what we can do and open for opportunities "	"comparing to other parties we focus on the opportunities instead of holding things back and setting restrictions like the most NGO's"	"we create a unique shared interest between industry and science which is valuable for both"		5) Opportunity focussed

Strengths / External quotes	E1: "DRN is a wanted partner because of their knowledge on nature enhancement which industry partners can use"	E2: "Monitoring on biodiversity is one of the biggest challenges which DRN has started to do."	E2: "With innovation projects there are many different stakeholders involved which makes DRN a good facilitator."	E3: "making positive impact to nature is difficult but using the windfarms to enhance nature is creating a positive impact and supporting the energy transition."	E4: "I see DRN as a connector between different parties – also internationally"	E5: "DRN is very good in practical performance."	SCORE
1) Connector between science, industry and government							3x
2) Practical performer in nature enhancement projects							2x
3) Equal partner in collaboration							
4) Science-based							
5) Opportunity focussed							1x

DRN 1	DRN 2	DRN 3	DRN 4	DRN 5	Weaknesses / Interviewees
<p>"Dependent on financial support from third parties."</p> <p>"We are a temporary project."</p>	<p>"We are not independent – we are linked to the mother organizations."</p>		<p>"We work with the 'droomfonds postcode loterij.'"</p> <p>"We are currently busy with new funding."</p>	<p>"We need money to continue our mission."</p>	<p>Financial dependency</p>
	<p>"we have a small team which has advantages but also disadvantages."</p> <p>"we can not do 20 projects at the same time."</p>	<p>"the team we currently have is too small to operate in the international waters."</p>	<p>"we need to realize scalability."</p>		<p>Limited operational capacity</p>
	<p>"We need to communicate with our mother NGO's and align our message."</p>		<p>"we are born from the two mother organizations – so we discuss our strategy with them."</p>		<p>Accountability to two NGO's</p>

DRN 1	DRN 2	DRN 3	DRN 4	DRN 5	Needs / Interviewees
<p>"we want to start sharing our knowledge."</p> <p>"We want to spread our message through OCEaN."</p>	<p>"We want to propagate internationally that windfarms should be build NID."</p> <p>"I want us to be a central information center for NID inside and outside windfarms."</p>	<p>"We need to start the conversation at the table where we can share our knowledge and give advice."</p>	<p>"We should highlight the role of DRN in the Netherlands and share our vision - would be a good start."</p> <p>"We would like to share our successes and failures from our nature enhancement projects on the North Sea."</p>	<p>"share our best techniques around nature enhancement."</p> <p>"we want to collect all the knowledge gained and make it open source."</p> <p>"we want to create like a kind of shop window where we can share our projects internationally."</p>	<p>1) A way to share knowledge on nature enhancement projects</p>
	<p>"We need to know what is done in other countries and we need a database for benthic."</p>	<p>"Oceans and RGI have a network and know more about other countries –we could use that to gain more information."</p>			<p>2) Gain knowledge on nature enhancement projects internationally</p>
<p>"We want to connect with English NGO's"</p>		<p>"we need to start the international relations."</p> <p>"We need to find the NGOs in countries with the same mission."</p>	<p>"we are the ones that need to start international bonds with other countries."</p>	<p>"create visibility in an active way if this is in line with our vision."</p>	<p>3) Get in touch with international parties</p>
<p>"we miss an approach on international collaboration."</p>		<p>"where do you start? What are logical steps to take – what are logical countries to start with or in."</p> <p>"We are currently receiving many requests for collaboration and we need to decline because of time limits."</p>	<p>"we are trying to get a vision on the future.- I dont know how we go from a to B."</p> <p>"Approach for international collaboration is needed"</p>	<p>"Where does the international collaboration starts." "With who does it start."</p> <p>"How do we cope with the international component- we need to be clear in our goals."</p>	<p>4) A plan of approach on international collaboration</p>

DRN 1	DRN 2	DRN 3	DRN 4	DRN 5	Interviewees / Barriers
	"we are not doing 20 projects because we have limited people and money available. "	"the team we currently have is too small to operate in the international waters."	"In order to scale up projects – we need to grow."	"we need more money to grow internationally. " "we are currently to small to grow internationally. "	1) Limited resources available.
"Simply said we can not learn from other countries because they are written in the original language. "	"some ecological research is difficult to understand because of other languages."				2) Different languages makes learning from other countries difficult
"there is limited knowledge about rules and regulations of other countries." "there are differences in ambitions and visions in countries."			"I want to discuss the future of national and international rules and regulations. "	"There are other countries where you can find inspiration on nature enhancement – we need to figure out how exactly."	3) Limited knowledge about rules and regulations in North Sea countries.
	"A useful platform is missing to communicate. "	"we need to make the toolbox as international as possible – to gain as much knowledge as possible."	" <u>Most</u> of the time webinars and congresses are either wind- or nature events - not combined into nature enhancement in OWF."	"we want to use an open source platform. "	4) Effective tools are missing to communicate on nature enhancement.

Appendix 21 – ViP approach

3.1.1 Domain definition

In the first step, I define the *domain* to scope the future context and deconstruct the domain to generate understanding of this subject. According to Hekkert & Van Dijk (2016) the domain is the area where you aim to make a contribution. It should be interesting and relevant for the organization and is formulated from the perspective of the end user. In this project, I discuss the domain with DRN to make sure it covers the clients needs and supports their mission. The end users in this project are stakeholders (e.g. nature organizations, industry partners, universities) with whom DRN is collaborating or wants to collaborate in the future. Since the end users are a wide range of stakeholders and mostly businesses instead of humans, I discuss this with the founders of the ViP method.

3.1.2 Collecting factors

Within the domain defined, the objective is to identify and explore *context factors* which contribute to the future context.

3.1.2.1 What is a context factor and how to find them?

Building the future context starts with the collection of factors. Factors are observations, thoughts, laws, considerations, beliefs or opinions (Hekkert & Van Dijk, 2017). To find interesting factors, I use newspapers, scientific research, books, my own observations and the interviews with DRN. Besides, I conduct interviews with experts in the field of OWF development which were identified in section 3.2.4. In section 3.2.5, the interview approach is explained.

3.1.2.2 How to select a context factor?

In order to select context factors which shape the future context, I take into account two measurements. First of all, the factor should be relevant for the domain. In this project this means it is related to biodiversity or to offshore wind. Secondly, the factor should be interesting to me as the designer of the future context. So if I have the feeling that the factor is exciting or new - I take it into account for the future context.

3.1.2.3 How to organize factors?

To create an overview, I organize the collected factors according to the DESTEP method (Simonse, L. 2018). The DESTEP method consists of areas where the factors can be related to. The factor can be Demographic, Economic, Social, Technological, Environmental or Political.



3.1.3 Clustering of factors

After the collection of context factors, I want to bring the context factors together into clusters. The goal of clustering is to connect factors and thus create a vision of the future context.

3.1.3.1 Approach of clustering

To comprehensively analyze the factors and group them into clusters, I facilitate a co-creation session. This collaborative approach unlocks fresh perspectives and enhances the generation of ideas and opportunities (Sanders & Stappers, 2012). The co-creation session will be held with three other Strategic Product Design (SPD) students and is scheduled for four hours on a Monday afternoon.

3.1.3.2 Co-creation session

The first step in the co-creation is to transcribe all factors on sticky notes. For each sticky note, me and three other students briefly discuss what the factor entails. Subsequently, we place the factor in a cluster and assign a name to the cluster. Next, we choose the next factor and provide an explanation. We determine if this factor aligns with any existing cluster. If it does, we incorporate it into the corresponding cluster along another factor. The name of the cluster is evaluated each time and modified as needed to align with the overarching theme. If the factor does not fit with any existing cluster, we create a new cluster with a new name. This process is repeated until all factors have been assigned to a cluster. Towards the end, we discuss potential overlap and the need for combination. If there are any factors which do not fit to any cluster, we exclude them from the research because the connection between these factors and others will be too weak for inclusion.

3.1.4 Create future contexts

The final step is to create the final future contexts based on the clusters of factors.

3.1.4.1 Building the two dimensional framework

To design axes for the two dimensional framework, I look for two overarching themes within the cluster of factors.

3.1.4.2 Describing the future contexts

When the framework is set up, I describe future worlds by looking how the driving forces influence each other. This is done by multiplying two cluster of factors from a different axes:

“Cluster of factor X” x “Cluster of factor Y” = Description of a future world

To make sure the outcomes are comprehensive, I iterate on these descriptions of the future context in three sessions with two SPD students and a ViP expert. This generates diverse perspectives and more critical eyes on the outcoming future world. I schedule a call for half an hour over Teams and discuss the descriptions. After three sessions, final descriptions of the future contexts will be presented.

Appendix 22 – Constraints and criteria

5.2.1 Elaboration constraints and criteria

For each of the six criteria and two constraints, I explain why it is relevant and how it is measured.

5.2.1.1 Current market size - constraint

The first constraint is the market size of OWFs. The larger the OFW market size of the country, the more impact DRN can make in the North Sea. The market size is expressed in the capacity of OWFs in GigaWatt (GW). DRN wants to start collaboration and knowledge sharing in 2024. This means if the existing capacity* is 0 GW, the country is not relevant for now to share knowledge with.

Not relevant: existing OWF capacity of this country is between 0 GW

Relevant: existing OWF capacity of this country is higher than 0 GW

5.2.1.2 Offshore wind construction - constraint

Principles DRN has used in Dutch wind farms can be taken to countries where wind farms are constructed in a similar way, e.g placing artificial reefs. The construction of wind turbines can be divided into two types: fixed foundations and floating foundations.

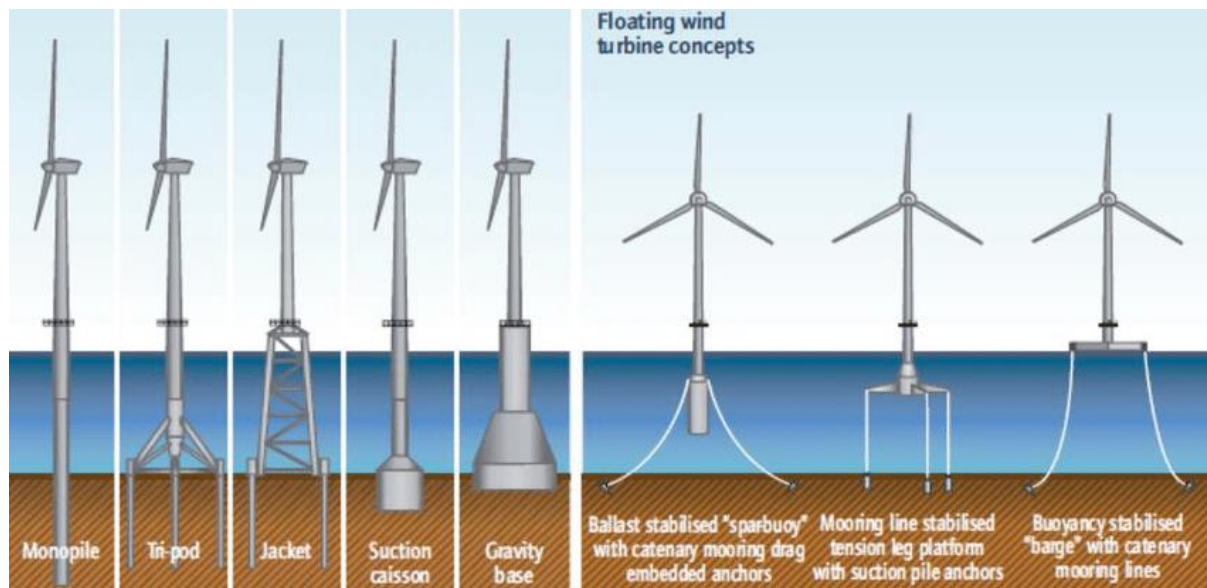


Figure 11: bottom fixed foundations and floating wind turbine concepts (Konstantinidis & Botsaris, 2016)

DRN is currently working in Dutch waters with fixed foundations. Therefore countries with fixed foundations are relevant for DRN to share knowledge with, countries which have currently no fixed foundations present are not relevant for 2024.



Figure 12: overview floating offshore wind potential (Ørsted, 2023)

DRN aims to research the possibilities for nature enhancement with floating offshore wind, therefore countries which are not relevant for knowledge sharing in 2024 might be interesting for collaboration in the future. Ørsted (2023) analyzed the floating and fixed potential of offshore wind, see figure 12. In this image is shown which countries have possibilities for bottom fixed and or floating offshore wind.

5.2.1.3 Expected market size - criterion

Besides looking at the current OWF capacity in the concerned country, it is relevant to investigate the country's ambition before 2030. The larger the OFW market size of the country in 2030, the more impact DRN can make in the North Sea. Countries are evaluated on their ambition for 2030 in GW according to research in figure 13 (Royal Haskoning, 2023). The scoring system is therefore as follow:

High: OWF capacity of this country is likely to larger than 20 GW before 2030

Medium: OWF capacity of this country is larger than 1 GW but lower than 10 GW before 2030

*note the report was written published 2022 so the existing capacity might have changed

Table 3.2 Overview of existing capacity, planned capacity and ambition for 2030 at the North Seas

Country	Existing capacity	Planned capacity	Ambition for 2030
		<i>Sum of capacity of all planned offshore wind farms to be developed before 2030.</i>	<i>Based on information retrieved from Marine Spatial Plans (MSP)/ other reliable governmental sources, or delivered by the countries.</i>
Ireland	0.025 GW	4,049 – 4,649	7 GW
France	0 GW	5.3 GW	5 GW
Belgium	2.3 GW	3.5 GW	5.4–5.8 GW
Netherlands	2.5 GW	18.5 GW	21 GW
Germany	7.7 GW	18.9 GW*	30 GW* (at least 19,8 at the North Seas)
Denmark	2.3 GW	10.5 GW*	12.8 GW* (at least 3,65 at the North Seas)
Norway	0 GW	Unknown	4.5 GW**
UK	11 GW	Unknown	50 GW
Total	25.8 GW	61 GW	At least 117 GW at the North Seas
* Capacity is not limited to the North Seas; this will also be partly developed in the Baltic Sea. ** It is not known yet exactly when the 4.5 GW will be developed. The UK and Norway are not part of the EU.			

Figure 13: Overview of existing capacity and ambition for 2030 at the North Seas (Royal Haskoning, 2022)

5.2.1.4 Marine habitat - criterion

DRN has executed projects in the Dutch part of the North Sea with a specific marine habitat. When collaborating in a new country it would be beneficial to use the lessons learned from the past within this marine habitat. This is easiest when the marine habitat of the country is similar to the Netherlands. To compare the marine habitats on similarity I analyze two different aspects: substrate and depth. Besides, I use insights from marine ecologists in the interviews with DRN and external parties.

The bathymetry map shows the various depths of parts of the North Sea. The Dutch North Sea is for a larger part colored red and yellow which means the depth remains under 40 meters.

In figure 14, the seabed substrate of the North Sea is shown. As shown in the picture, a large part of the Dutch coastline is yellow which means it has a sand substrate (substrate type 2).

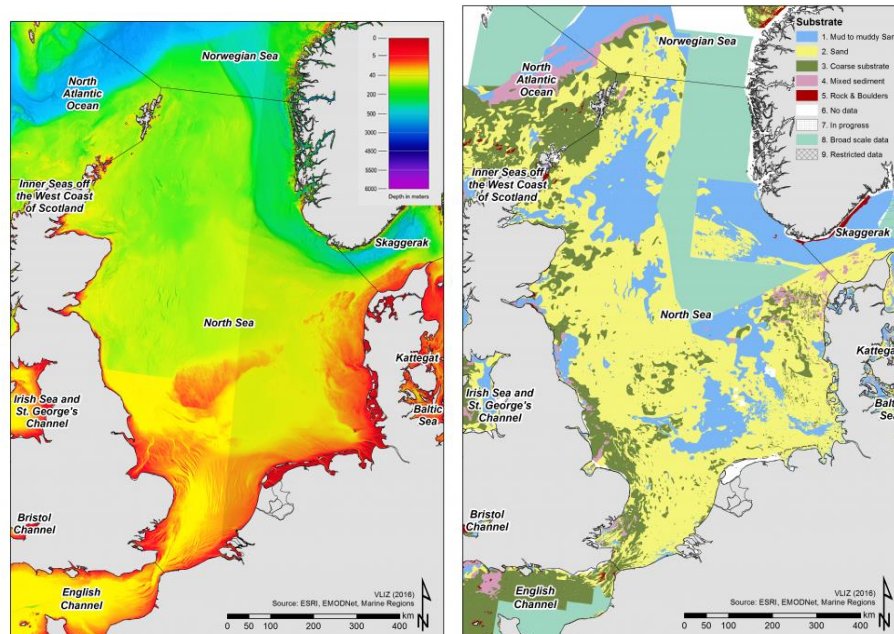


Figure 14: maps of the North Sea depth and substrate (Bathymetry of the North Sea, z.d.)

Based on these insights, countries get a *high* score when the marine habitat is very similar to the Netherlands, *medium* score when a marine habitat is slightly overlapping and *low* score when the habitats are very different.

5.2.1.5 Progress nature enhancement - criterion

The Netherlands is quite advanced in nature enhancement projects (E5, 2023). It is interesting to figure out how the North Sea countries are progressing around nature enhancement in order to know where knowledge of DRN can have the most impact.

Countries get a *high* score when the country is not engaged in nature enhancement projects, *medium* when countries experimented with nature enhancement projects and *low* when the country is advanced in nature enhancement projects.

5.2.1.6 Overlapping stakeholders - criterion

According to DRN 3 and DRN 5, it is beneficial when industry, science or governmental partners of DRN are internationally active in the concerned country. Moreover, being a member of the EU is also an advantage in collaboration. Therefore, I identify if there are many overlapping stakeholders in the concerned country and assign the scores as following:

High: DRN collaborates already with this country or this country has many overlapping stakeholders.

Medium: Country has overlapping stakeholders.

Low: Country has limited overlapping stakeholders.

5.2.1.7 Rules and regulations - criterion

Government-imposed rules and regulations can stimulate nature enhancement, as companies tend to comply with these requirements (E5, 2023) (DRN 5, 2023). To evaluate this criterion I look into if a country has ecological rules and regulations for OWFs. Countries which have numerous rules and regulations for nature enhancement limit the urgency for DRN to share knowledge. Countries which are not advanced in their rules and regulations for nature enhancement in OWFs leave room for DRN to share their knowledge. Therefore, I assign scores as following:

Low: countries with numerous ecological rules and regulations to stimulate nature enhancement

Medium: countries with few ecological rules and regulations to stimulate nature enhancement

High: countries with no ecological rules and regulations to stimulate nature enhancement.

5.2.1.8 Willingness to cooperate

The last criteria which is considered important is the willingness of a country to cooperate. To assess this I ask DRN if the concerned country has reached out to DRN for collaboration? Based on this answer I assign the following score:

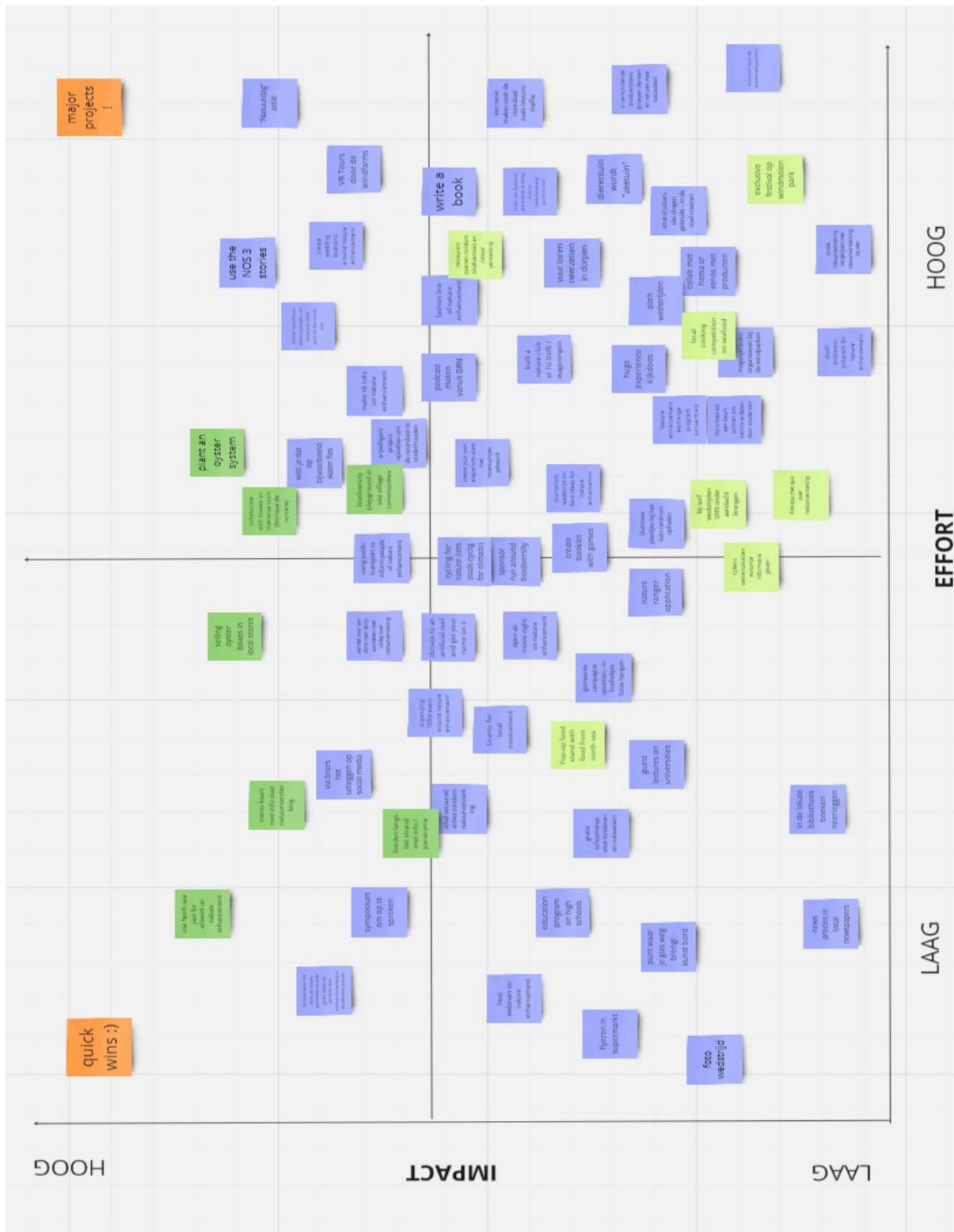
High: yes the concerned country has asked DRN for cooperation

Low: the concerned country has not reached out to DRN for cooperation

Appendix 23 – Scoring evaluation

	Weight	Belgium	France	Germany	Denmark	UK	Norway
Constraints 1 – current market size							
Constrain 2 – fixed foundations							
1. Expected market size	30%	2	2	3	3	3	2
2. Marine habitat	20%	3	2	3	3	3	2
3. Progress on nature enhancement	20%	2	3	3	2	2	3
4. Overlapping stakeholders	10%	3	1	3	3	2	1
5. Rules and regulations	10%	2	3	3	2	2	1
6. Willingness to cooperate	10%	3	3	1	1	3	3
SCORE	100%	2,4	2,3	2,8	2,5	2,6	2,2

Appendix 24 – ideas gathered during brainstorming



Appendix 25 – one pagers of ideas

H1

Sharing knowledge idea 1

North Sea Jazz festival x DRN



Storytelling idea

Bill (56) goes with his daughter, Elly (23), to the North Sea Jazz festival in Rotterdam. At the festival they enjoy all great artists at the main stage. Bill's eye catches the huge images next to the stage. He says to Elly – "Look Elly – check out the sea life in the North Sea." Elly wonders what the windmills are doing in the picture. She looks up De Rijke Noordzee website and finds out about nature enhancement in offshore windfarms. Elly says to Bill: "wauw dad did you know they enhance sea life in offshore wind farms to increase biodiversity?"

Steps towards realization

1. Give responsibility to someone within DRN to arrange partnership
2. Contact RGI to find suitable partners in concerned country
3. Search for festivals in concerned country and reach out to them
4. Arrange availability for funding via industry partners like Vattenfall & Eneco
5. Create pictures which are presentable and informative on nature enhancement
6. Deliver pictures to festival organizations like North Sea Jazz

Impact/Effort inschatting

Impact: High impact generated in a festival with +90.000 visitors like North Sea Jazz caused by visibility, word of mouth, social media

Effort: Easy and doable; a) b) can be expensive to arrange partnerships however funding is available or receiving funding from industry partners is possible – must be doable

Relevant stakeholders

1. External: Festival organizations
2. Ecosystem NGOs: RGI
3. Ecosystem partners: Eneco, Vattenfall

Points of interest

- Need to investigate the willingness of Germany to receive information on nature enhancement (*Desirability*)
- Determine which images to present which clearly show what nature enhancement is
- Investigate in costs to implement idea to ensure financial health of the organization (*viability*)
- Investigate in organizations capability to arrange partnerships or hire possible freelancers to set up network (*feasibility*)

6

H1

Sharing knowledge idea 2

Menucards in OWF Seafood Restaurants



Storytelling idea

Jenny (33) and Bruce (32) are going to a seafood restaurant to have dinner. The waitress brings menu cards to their table. When discussing their choice for food, Bruce notices the oysters from from the North Sea and says: "Hey Jenny listen, there are oyster from offshore windpark Blauwwind." Jenny wonders what that means and asks the waitress. The waitress explains to them: "The oysters placed in offshore windfarm Blauwwind are served in our restaurant, in this way we support nature enhancement by De Rijke Noordzee and offer a delicious meal at the same time."

Steps towards realization

1. Give responsibility to someone within DRN to arrange partnerships
2. Create a design for the menu cards
3. Reach out to Seafood restaurants for collaboration
4. Arrange budget for collaboration
5. Deliver designs on menu cards

Impact/Effort inschatting

Impact: High impact when collaboration is set up with multiple restaurants

Effort: Low a) design is easy to create b) can be expensive to promote nature enhancement on menu card but restaurants can get promotion via DRN platforms in return

Relevant stakeholders

1. Seafood restaurants
2. Designer for menu cards

Points of interest

- Need to investigate the willingness of restaurants to share information on nature enhancement (*desirability*)
- Determine which food can be offered which explains what nature enhancement is
- Investigate in costs to implement idea to ensure financial health of the organization (*viability*)
- Investigate in organizations capability to arrange partnerships or hire possible freelancers to set up network (*feasibility*)

7

Sharing knowledge idea 3

Walking trail with visuals



Storytelling idea

Eva (30) and Barbara (65) want to do a walking route along the coast during their holiday. Arriving at the seavillage they notice beautiful pictures on the promenade. They walk closer and see all kind of pictures with information about nature in the North Sea. They decide to follow the walking trail to the next seavillage.

Steps towards realization

1. Give responsibility to someone within DRN to arrange partnerships
2. Create a design for the menu cards
3. Reach out to Seafood restaurants for collaboration
4. Arrange budget for collaboration
5. Deliver designs on menu cards

Impact/Effort inschatting

Impact: High impact when collaboration is set up with multiple restaurants

Effort: Low a) design is easy to create b) can be expensive to promote nature enhancement on menu card but restaurants can get promotion via DRN platforms in return

Relevant stakeholders

1. Seafood restaurants
2. Designer for menu cards

Points of interest

- Need to investigate the willingness of people to receive information on nature enhancement (*desirability*)
- Determine which images to present which clearly show what nature enhancement is
- Investigate in costs to implement idea to ensure financial health of the organization (*viability*)
- Investigate in organizations capability to arrange partnerships or hire possible freelancers to set up network (*feasibility*)

Sharing knowledge idea 4

Oyster box in local supermarkets



Storytelling idea

Fred (40) and Liane (39) attend a dinner with friends. They want to bring oysters as starter. Arriving at the local fish market, they see all kinds of oyster boxes. Fred says: "Hey Liane take a look – these oysters are from offshore wind farm blauwwind in the North Sea" Liane says: "That's interesting I did not know oysters could grow in an offshore windfarm."

Steps towards realization:

1. Give responsibility to someone within DRN to arrange partnerships with offshore windfarms
2. Contact start-ups who experiment with oysters in OWFs
3. Contact fish/supermarkets to sell oyster boxes
4. Design boxes for oysters and information sheets
5. Research possible prices for oyster boxes to make it viable for stakeholders involved

Impact/Effort inschatting

Impact: High impact when fish markets over the country are involved

Effort: Low a) Since the network for relevant stakeholders already exists, the effort is relatively low for DRN. The only high effort is finding supermarkets/fishmarkets for DRN to collaborate with.

Relevant stakeholders

1. Offshore windfarm owners
2. Oyster related start-ups
3. Supermarket/fishmarkets

Points of interest

- Need to investigate the willingness of people to receive information on nature enhancement (*desirability*)
- Determine which oysters can be eaten from which windfarms and if the production is high enough (*feasibility*)
- Investigate in costs to implement idea to ensure financial health of the organization (*viability*)