Reflection and learning report - Drone Technology in the maritime industry - Rohde Nielsen

Group 50

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1. Team

Our team consists of two global business engineering students, two computer engineering students, one software engineering student and one IT and economy engineering student, each of whom have contributed their strengths to the project. Nuanced backgrounds and different knowledge has led to a complementary teamwork.

| Nadia | Benjamin | Vandad | Ansh | Nipun | Ali |

Nadia is studying Global Business Engineering and has through her education and work in Telemarketing at Animal Protection Denmark acquired competences about the understanding of customer needs, leadership, the use of innovative tools and problem-solving skills. Nadia has also had experience in overall structure, planning, and focused goal, which she contributed with in the project.

Benjamin is studying Global Business Engineering and works as a student assistant for pharmaceutical company AGC Biologics. During his time at DTU and AGC he has gained cross disciplinary knowledge in both business and engineering concepts enabling to bridge the gap between technical and business aspects. Throughout the course he has been the representative communicator between the project group and the companies.

Ansh, a Software Engineering student, applied his strong background in software and ISO-certified project management skills to effectively contribute to the project. His understanding of software systems and analytical thinking, developed from his studies, provided valuable insights into the integration of drone technology - which showcased his capability for innovative problem-solving in technology-oriented projects.

Nipun, who is studying Computer Engineering as a full-time student, possesses valuable knowledge in embedded software and programming in various languages. His ability to blend hardware and software to create tangible physical systems is a fundamental aspect of his studies. This background equips him to solve problems that can be addressed with technology, offering numerous possibilities in today's world.

Ali, an Engineering student in IT & Economy, brings a unique entrepreneurial perspective to the team. As an owner of a company in the automotive industry, he combines practical business acumen with technological insight. This dual focus equips Ali to effectively contribute to areas of business strategy and technological innovation, particularly in integrating IT solutions within business frameworks. His experience as an entrepreneur enhances the team's ability to address complex problems with innovative, real-world approaches, making a significant impact on the project's development and execution.

Vandad, a Computer Engineering student with an ISO certification in project management, applies his IT support background to merge technical expertise with structured project execution. His adeptness in troubleshooting and user-centric understanding streamlines project processes. Within the team, Vandad's skill in bridging technology and project management proved pivotal, ensuring seamless software-hardware integration. His proactive problem-solving and attention to detail highlights his capability to excel in tech-driven environments, making him an invaluable asset to any project.

2. Double Diamond
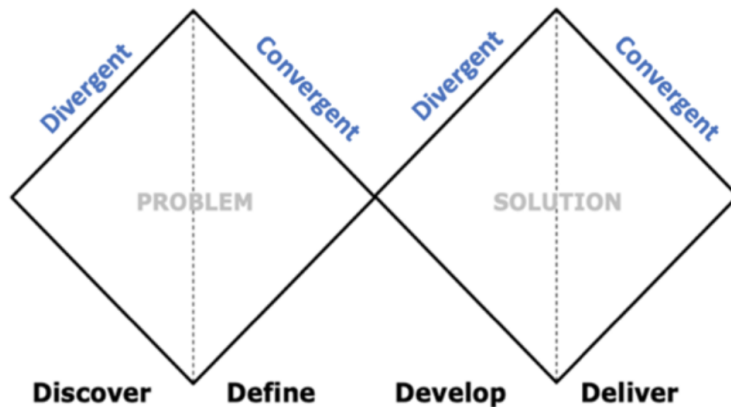
Figure 1. Double Diamond Model

2.1 Discover

The initiation of the Double Diamond model begins with the Discover phase, a critical starting point characterized by divergent thinking. During this phase, we extensively explore various problems, user needs, potential solutions, and opportunities.
During this stage, our focus was primarily on thorough research to uncover the challenges the company was facing and to identify potential solutions. We dedicated considerable time to this phase, given the extensive research and data collection required, along with the need for

innovative adaptations. Despite initially presenting our top three problem choices based on our interests to the company and facilitators, the feedback received was constructive but critical. The highlighted problems were either already addressed within the company or deemed unsuitable for further exploration. This compelled us to reassess our approach, prompting a shift in focus towards different challenges that occur in the maritime industry.

This feedback, while challenging, proved beneficial as it prompted a change in direction. We expanded our exploration to include vessel damages and inspection, taking us into a more creative space. We made use of the brainstorming technique and were forced to think outside the box with visual thinking, allowing us to explore diverse possibilities in problem-solving, as illustrated on the image below:
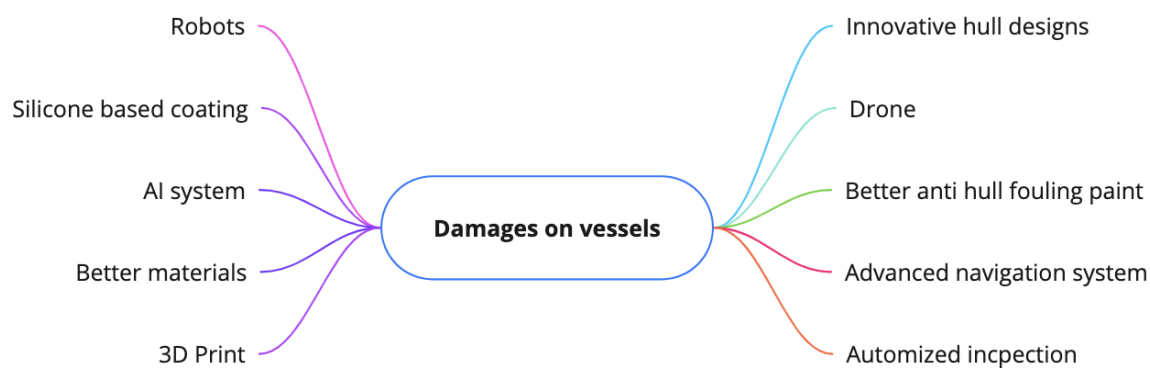

Figure 2. Brainstorm

Certain ideas were dismissed from consideration due to their high cost, lack of positive environmental impact, and impracticality or complexity in implementation. This decision-making process was informed by tools such as the Harris Profile, dot voting, and extensive research. Among the ideas, drone technology emerged as the most viable and promising option for implementation. Not only was it perceived as realistic, but it also held the potential to significantly benefit Rohde Nielsen by fostering digitization and automation.
While not all ideas made it to the project's next phase, the team took a deliberate approach to narrow down and thoroughly investigate the top ideas to get a better understanding and not limit us to a singular concept.

Utilizing tools like the Harris Profile, Dot voting and the two methods; Question Tree and the 5 Whys were used to problem-solve, decision-making and finding the root cause of the

problem. This systematic approach helped in refining the focus and selecting the most suitable path for further development.

The 5 Whys:

1. Why are there damages on the vessels?
2. Why do damages and issues occur during the docking process?
3. Why are there challenges in inspecting vessels effectively?
4. Why is there a resistance to adopting advanced inspection technologies?
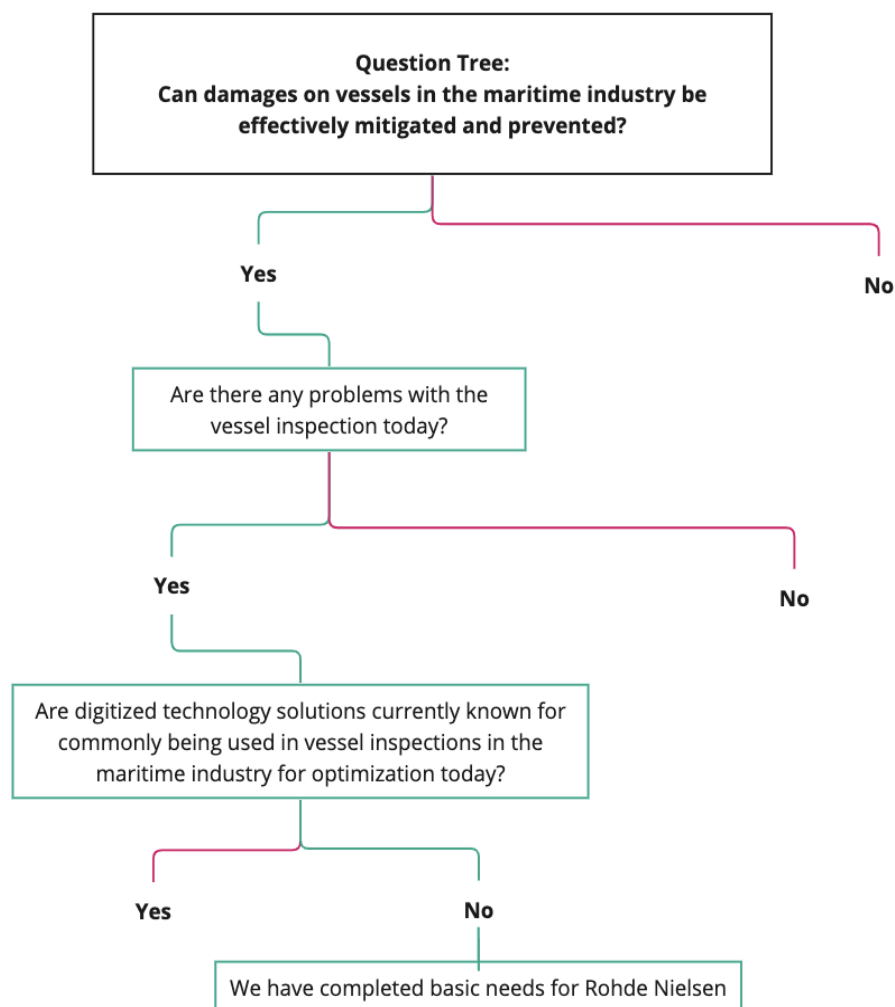5. Why is there a lack of modernization of inspection methods?

Figure 3. Question Tree

2.2 Define

In the Define phase of the Double Diamond model, our team focused on refining the insights we gathered during the Discover phase. This phase played a role in guiding our project toward a well-defined problem statement that aligns with the specific requirements of Rohde Nielsen. We integrated several methodologies from our course materials to enhance the accuracy and relevance of our problem definition.

One of the primary methods we utilized was the creation of personas representing various stakeholders within Rohde Nielsen, including management, employees, and clients. This approach, through research and interviews, provided us with an in-depth understanding of the needs and challenges faced by these stakeholders.

To ensure our solution was environmentally sustainable and complied with industry regulations, we conducted a detailed review of relevant environmental laws and sustainability goals, which was quite important in shaping our problem statement to align with global sustainability initiatives and regulatory requirements.

We also utilized tools such as the Business Model Canvas and the Lean Business Model Canvas, which were really helpful in figuring out how our proposal would affect the business. They provided clarity on resource allocation, potential benefits, and what challenges we might face when adopting the technology, this underlined the importance of considering the whole picture when developing a solution.

Economic impact was another critical aspect we explored, using the Value Proposition Canvas to understand how drone technology could economically benefit Rohde Nielsen. This approach was indicating the ways in which our solution could reduce operational costs and enhance efficiency, thereby creating significant value for the company.

After incorporating these insights and methods, we constructed a refined problem statement. The justification for this problem statement lies in its comprehensive approach. It considers various perspectives, such as technical, economic, and environmental aspects of implementing drone technology in the maritime industry. By using the personas, we ensured our solution was not just theoretically sound but also practically applicable.

The use of business model canvases was central in assessing the market viability of our solution. This approach made us confront the realities of cost and operational shifts required by Rohde Nielsen, which is achieving a great balance between innovation and practicality.

Overall, the Define phase was a journey of learning and critical evaluation. The methodologies and tools we employed were essential in shaping a well-rounded statement, which not only allowed us to understand the complexities of the problem, but also see the different aspects of a viable solution. This phase, therefore, set a nice groundwork for the project, aligning our solution with both the course objectives and the real-world needs of Rohde Nielsen.

2.3 Develop

In the "Develop" phase of the Double Diamond model, our team transitioned from defining the problem to actively creating solutions. This phase, centered around iterative development and refinement, involved a deep dive into the practicalities of implementing our proposed drone technology for Rohde Nielsen.

The primary methodologies employed were the Harris Profile, Dot Voting, and Rapid Prototyping. The Harris Profile allowed us to systematically evaluate our drone technology solutions against a set of predefined criteria, which included safety enhancements, environmental impact reductions, and operational efficiency. This methodical assessment was critical in confirming drone technology as the most suitable and impactful solution for maritime maintenance challenges.

Dot Voting was another key tool in our decision-making process. This method democratically prioritized features, criteria, and solutions, ensuring a balanced approach in our development phase. It was particularly beneficial in situations where the team faced multiple viable options or needed to decide on specific aspects of the solution to focus on further. In addition to the main methodologies discussed in our report, we also utilized Rapid Prototyping. This method played a supportive role, allowing us to quickly construct scaled-down versions of our drone designs, but ended with Upteko LARK drone.

A significant part of this phase was our collaboration with Upteko. Engaging in detailed discussions and knowledge exchange with Upteko provided practical insights into the implementation of drone technology in maritime environments. This collaboration was useful in refining our solution to meet the specific operational requirements and challenges faced by Rohde Nielsen.

Scenario planning and risk assessment were also undertaken to identify potential risks associated with the deployment of drone technology for inspections. This was important for

developing risk mitigation strategies, supporting the safety and reliability of our proposed solution.

The "Develop" phase was marked by a combination of thorough analysis, strategic collaboration, and innovative thinking. Our team's diverse skills and the key methodologies employed enabled us to develop a complete solution that is aligned with broader industry sustainability goals. This phase exemplified our ability to transform theoretical concepts into actionable and viable solutions, preparing us for the final "Deliver" stage of the Double Diamond model.

2.4 Deliver

This process involved presenting our pitch to the instructors and company. We received valuable feedback from the instructors in terms of being aware of some challenges that drone implementation can cause. We considered the input when we began initial contact with Upteko on how they could help Rohde Nielsen.

As our solution is to establish a collaboration initiative with the aim of proposing a partnership to Rohde Nielsen, our challenge in this section of the Double Diamond lay in the absence of a physical product to serve as a prototype. Given that our innovation centers around a collaboration, our prototype and testing methodologies took a special form in terms of understanding the product and service Upteko delivered. This meant a series of interviews with Benjamin Mejnertz co-founder of Upteko to get a deeper understanding of what actual value Upteko could give to Rohde Nielsen's operations.

3. Project work

In this reflection, we delve into the journey and experiences of our project "Drone Technology in the Maritime Industry" for Rohde Nielsen. This section reflects on the various challenges and learnings encountered while aligning our innovative ideas with the company's practical needs. It's an exploration of the project's journey, focusing on key moments that shaped our approach and the valuable insights gained, which will inform our future endeavors in innovation and project management.

3.1 Limitations/What we could have done different

Reflecting on our project "Drone Technology in the Maritime Industry" for Rohde Nielsen, we realize that our journey was filled with both accomplishments and learning opportunities. We encountered the challenge of aligning our innovative aspirations with the company's practical needs. Rohde Nielsen's existing fleet, as described in their company profile, included a mix of modern and aging vessels. The company's focus, as highlighted in their description, on improving environmental aspects like sound emission in older vessels, underscored the need for adaptable and versatile solutions.

Our project was driven by a desire to innovate, aligning with the defined course's objectives of applying engineering knowledge to solve complex challenges, organizing multidisciplinary innovation processes, and encouraging an innovative mindset. However, as we progressed, it became obvious that our ideas, while innovative, were not entirely in sync with what Rohde Nielsen envisioned or required. This mismatch was quite a learning moment for us, emphasizing the need for more in-depth discussions with the company at the project's start. Engaging thoroughly with Rohde Nielsen from the beginning, particularly in understanding the specific technicalities and retrofitting challenges of their diverse fleet, would have helped us adapt our approach better. This experience highlighted the importance of balancing innovation with practical applicability, especially in a course focused on innovation. The company's feedback, which indicated a partial understanding of our solution and its relevance to their operations, was a clear indication that our initial discussions with them, actually lacked the depth required to fully align our project goals with their expectations.

Reflecting on the limitations, we acknowledge that a significant challenge was the lack of specific data from Rohde Nielsen. Despite our requests, we did not receive detailed information on vessel inspections and damages. This was mainly because Rohde Nielsen wanted us to focus on one of the two different problem areas presented. The absence of this data significantly impacted our research and economic calculations, leading us to rely on estimates. This experience highlights the critical need for access to relevant data for accurate analysis and how it shapes the direction and scope of a project.

Looking ahead, these insights will shape our approach to future projects. We plan to prioritize establishing clear communication with all project stakeholders. Engaging in detailed, initial discussions will be crucial to ensure alignment of expectations and objectives.

4. Communication

We've discovered that pitching isn't just about relaying information, it's about storytelling, engaging our audience, and building confidence in our ideas. Each pitch is an opportunity to captivate and persuade. Moving forward, we aim to integrate this learning by focusing not only on the content but also on the delivery—making it more clear with all important information, such as in the video pitch.

Our communication in bringing project details, whether in writing or orally, was decent, but we acknowledge there's always room for improvement. We've realized the significance of clarity and consistency in our communication. In the group we primarily communicated through messenger, which overall worked well, as all information about meetings and information or questions were communicated. Google docs were used to write the report, but also all our notes which we structured. This worked great, as all group members were informed with all information throughout the whole course.

Moving ahead, we are committed to enhancing communication with external partners after facing challenges. While it wasn't as seamless as desired, this experience taught us the importance of alignment in expectations and communication styles between parties. Moving forward, we believe that with clearer goals and better communication, we can work more effectively with external partners to achieve success together.

Collaborating with engineers from different fields has been eye-opening. It's clear that diverse viewpoints enhance our problem-solving and innovation efforts. This experience has expanded our awareness that good communication within interdisciplinary teams encourages a more well-rounded problem-solving approach. Embracing these different perspectives has the potential to uncover creative solutions by exploring various angles and approaches to a challenge.

5. Collaboration in the group

Reflecting on our journey through the project with Rohde Nielsen, we encountered a range of experiences that contributed to our learning and development as a team. A notable aspect of our journey was learning to align our group's diverse skills and perspectives with the specific needs of Rohde Nielsen's maritime operations. Our approach was guided by the Gibbs Reflective Cycle, a model that emphasizes the importance of reflection in learning from experiences.

Description

Our project, referred to integrating drone technology in maritime operations for Rohde Nielsen, began with high expectations. Our team, consisting of two global business engineering students, two computer engineering students, one software engineering student, and one IT and economy student, brought a good mix of skills to the table. We assigned roles based on expertise, which meant that the IT and Computer Engineering's students managed technology integration - while the

Figure 4. Gibbs Reflective Cycle

business students handled market analysis. This distribution allowed us to delve deeper into our areas, bringing nuanced insights to the group. This diversity, while might be considered an advantage, also presented initial challenges in task allocation and decision-making. For instance, when assessing the compatibility of drone technology with Rohde Nielsen's fleet, our computer engineers proposed the usage of complex tech solutions, while the business students focused on what would work in the market. These different viewpoints led to some challenging discussions on the initial approach with this project.

Feelings

There were a variety of emotions related to this project. We felt great when our diverse ideas converged to form innovative solutions, but it was stressful when we didn't agree. A specific turning point was during a feedback session following a project presentation rehearsal (more specifically the presentation pitch for the company). The constructive criticism we received afterwards, caused some kind of tension within the team - as regarding how we should proceed with the project. It was important for us to have an open, honest communication to work through our disagreements and keep the project moving.

Evaluation

Our collective ambition was high, defined by our shared vision to revolutionize maritime operations. We wanted to deliver an innovative solution, which also faced real-life limits. The debates and discussions often became intense as we tried to balance our innovative ideas with practical limitations. Aligning technical possibilities with market realities was our biggest challenge. We tackled it through brainstorming sessions, this process strengthened our cooperation, teaching us the value of collective problem-solving. Having team members with
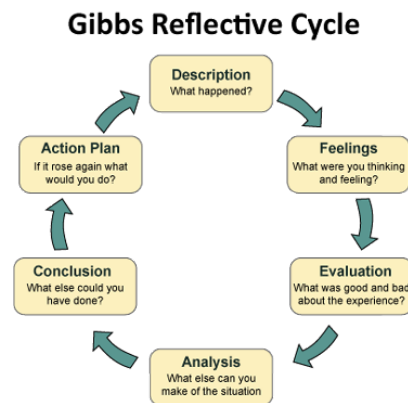
different skills made it hard to agree. However, it eventually became a great strength, helping us tackle the project from all angles. Even when feedback was hard to take, it was quite vital for our team's development and resolve internal conflicts.

Analysis

Our initial disagreements and struggles with role distribution came from our different study areas. The computer and IT engineers, with their technical focus, sometimes didn't see eye to eye with the more market-oriented approach of the business students. However, as we progressed, our shared commitment and effective communication led to a better blend of our ideas. This evolution showcases the stages of group development, transitioning from forming and storming to norming and performing - in relation to Tuckman's model.

Conclusion

This experience showed us the power of diversity in a team. We learned the importance of effective communication and adaptability in resolving differences. The project highlighted the need to align individual strengths with team objectives, finding a middle ground between visionary ideas and realistic limits. Our collaboration exceeded expectations. Even though we faced some problems at the start, we worked well together, using our diverse strengths/skills to overcome these challenges. It was quite a learning curve, but one that proved extremely valuable.

Action Plan

Our group contract, which we initially thought was just a formality, turned into a useful 'framework' guiding our collaboration. The contract outlined roles, responsibilities, and conflict resolution mechanisms. We revisited and adjusted it midway to reflect our evolving dynamics, which nicely contributed to maintaining focus. We plan to continue to improve our communication strategies and project planning methods. Emphasizing clear communication, detailed planning, and the adaptability aspect will be key to our approach in future projects. In future group work, we might focus on assigning roles early on, continuous open communication, and regular feedback loops. We also want to incorporate more structured brainstorming sessions to make the most of our different ideas.

6. Collaborations

6.1 The facilitators

The facilitators have played an important role in directing our focus towards the course. Initially, the company presentation led us to believe that expertise in mechanical engineering was essential for addressing the problem, which was outside our field of study. The facilitators helped us understand that our approach to the solution could be very different from what the company initially wanted. As a result, the approach we took differed significantly from their expectations, but it still effectively addressed crucial problems within the marine industry, which also could benefit Rhode Nielsen.

The facilitators were overall very cooperative, helping us maintain focus on the course goals. We attended every checkup and feedback session, which was immensely helpful. They provided critical yet supportive feedback on our ideas, greatly reassuring us. This approach not only brought more creativity but also ensured we remained aligned with the project's objectives. We effectively utilized the facilitators when we hit a wall or when aspects of the course were unclear. Our experience with the facilitators was valuable. They highlighted the significance of adaptability in problem-solving and the benefits of incorporating external viewpoints. These key insights will undoubtedly shape our methods in upcoming projects, particularly in enhancing team collaboration and effectively utilizing external expertise.

6.2 Company

Collaborating with Rohde Nielsen was challenging throughout the entire course. Initially, we had direct contact with two representatives during the first pitch session, where we gathered feedback, and we spoke with RN and assured them that we would contact them via email for further questions about data collection. After that, our communication mainly took place through email. We were keen on gathering more data, and Rohde Nielsen offered to help us obtain it. Unfortunately, despite our attempts, we couldn't get the desired data because Rohde Nielsen was reluctant or unable to provide it. This reluctance stemmed in our eyes from our decision to base our project on our own research rather than addressing the specific problems they had highlighted (noise and methanol).

Therefore, the collaboration was too inconsistent as it was too difficult to reach out to the company - there were also times where the representatives were out of town and unable to

answer. We would have liked a closer collaboration with Rohde Nielsen as we needed them more help especially for data collection.

Below, the communication via mail between Paolo and Suneeti from Rohde Nielsen and our group is showcased.

Benjamin Sepehr Salemi
Til: Suneeti Bala <suba@rohde-nielsen.dk>
Cc: Paolo Brezac <pabr@rohde-nielsen.dk>

Fre 17-11-2023 05:2

Dear Suneeti and Paolo.

We really do appreciate your time and attention, thank you. Regarding incidents causing damage to vessels resulting from operations or improper "vessel parking" (if that is what it is called) etc. do you have access to relevant data on such occurences? If affirmative, are we able to collaborate with your internal data, even if it is proprietary? We are open to signing a Non-Disclosure Agreement (NDA) if deemed necessary.

BR

Benjamin & Group 50

Sendt fra Outlook til iOS

Suneeti Bala <suba@rohde-nielsen.dk>
Til: Benjamin Sepehr Salemi
Cc: Paolo Brezac <pabr@rohde-nielsen.dk>

Fre 17-11-2023 23:09

Hi Benjamin,

Our internal HSE data is more of personal injuries data and environmental incidents.

What you need is vessel berthing incidents. I have reached out internally to find if had such incidents.

Also, pls let us know for which topic this data is relevant for? (Noise or Methanol)

We need to know the relevance before sharing the data.

We will let you know once we have answer from the relevant department internally.

Best Regards,

Suneeti Bala

Benjamin Sepehr Salemi
Til: Suneeti Bala <suba@rohde-nielsen.dk>

Tir 21-11-2023 05:45

Hello Suneeti,

The acquisition of this data is imperative for our project as it serves as justification for the magnitude of the problems at hand and underscores the necessity for resolution. Our proposed solution involves the implementation of drone inspections for vessels and enhanced navigation systems during docking procedures. We are keenly interested in and deem it relevant to engage in this initiative. The gathered data is anticipated to significantly contribute to our comprehensive examination of the situation. I hope you can help us with the data.

Best Regards

Benjamin

Suneeti Bala <suba@rohde-nielsen.dk>
Til: Benjamin Sepehr Salemi
Cc: Paolo Brezac <pabr@rohde-nielsen.dk>

Fre 24-11-2023 23:33

Hi Benjamin,

Pardon me for delayed response, I was on sick leave.

Refer below, pls note that we got response, and we did not have any incident related to vessel berthing.

Do remember that we have enhanced navigation system already in our ships in way of DP systems and directional propellers which already gives swift maneuvering opportunities.

Best Regards,

Suneeti Bala
Head of Sustainability

7. Feedback

7.1 Pitch Feedback

7.1.1 First pitch

Presenting our research and problems. This was the first initial pitch session that we presented to Rohde Nielsen. When presenting the top three problems identified through the research, the feedback was that the company already was solving the two of the problems and the third one was problematic to go further into.

During the research phase, it led us to many problems, and there was a lot of confusion behind selecting the problems. Despite the company providing us with two problems initially, the facilitators emphasized the importance of independent decision-making, urging us not to unquestioningly adopt the problems presented by the company.

7.1.2 DEMO Day

The company and facilitators expressed an overall appreciation to produce the video pitch, acknowledging that it was captivating and well made. We made sure that the video followed the NABC framework to create a strong video pitch. After the pitch, the company offered more direct and specific feedback on the pitch, guided by the questions they received. The company addressed that they were surprised and were not expecting the direction we took in the project - they did not know where to put it but would love to see the report for more detail and depth, the videos could not provide. Their feedback suggested a desire for more innovation and new thinking and expressed skepticism towards the idea. However, a short response to this critique is that if there had been a more open-minded approach regarding our decision not to address one of their specified problems, the criticism might have been received differently on our end.

Finally, they acknowledged the quality and craftsmanship of the video, and would have appreciated it a lot more if they had looked at it again. Considering this and various other comments, we perceived a lack of genuine opportunity and receptiveness from the company towards both the video pitch and the poster presentation. To mention, when we were presenting the posters, Notably, during the poster presentations, Suneeti from the company approached our poster, took a photograph, and was queried about her interest in hearing about our solution. She then said, "we will see for the pitch" and walked over to

another group. Despite standing and attentively listening to presentations from the other three groups, she did not afford us the same consideration as the sole group left unattended. We found this to be unfair, as we believe that with an open-minded opportunity, the feedback would have taken a markedly different and more positive tone, resulting in an overall enhanced experience at the DEMO Day.

7.2 Rohde Nielsen Feedback

Throughout the entire course Rohde Nielsen did not hesitate to tell us that our research and problems did not satisfy their expectations - we firmly believed that the company had misunderstood the main purpose of the course because we were told from the beginning of the course that the students and groups themselves are responsible to present problems based on their own research, however even though we tried to communicate this to Rohde Nielsen they took ground in only wanting us to solve the two problems that they themselves had addressed. This did frustrate us as a group especially at some of the first feedback sessions that we did receive from the representatives from Rohde Nielsen Suneeti and Paolo because we felt wrong in taking another approach, however after having conversations about this with the facilitators they ensured us that we were right on track because it's okay to go against the will of the company. The only feedback we received was that it wasn't relevant for Rohde Nielsen to address any of the problems we had presented and every time the communication from Rohde Nielsen was for us to choose one of two problems that they had presented us. With all that we chose to stick to our research because we found it relevant and interesting to work with. For some of the later feedback that we received - it was still not constructive and something that we could use directly in our project as our work was being shut down by both the representatives.

8. Learning and reflection

Reflecting on our project with Rohde Nielsen, we can see how it shaped our understanding and skills. Initially, we aimed to integrate drone technology for sustainable vessel maintenance, a goal that pushed us to understand the complex balance between innovation and practical application in the maritime industry - by actually working with a real company and dealing with complex, real-world issues.
Throughout the project, there was a lot of research and engagement with experts in the

maritime industry, which increased our insights into maritime challenges. For example, when we explored the potential of drones for vessel inspections, we not only had to understand the technical capabilities of drones but also the regulatory and safety implications in the maritime world.

We knew that our innovative approach didn't entirely align with Rohde Nielsen's initial brief, but we didn't see this as an issue, as the real purpose of this course was to be involved in an innovation process. We, as a group, did not feel we would be involved in an innovation process completely, if we followed Rohde Nielsen's company case which was quite narrowed down from the beginning. So instead of seeing this as a setback, we took it as an opportunity to research deeper and find a unique solution that, while might be unexpected, could offer a significant potential for the company. This phase of the project, we would say, tested our adaptability and problem-solving skills, as we had to reassess our approach and find a more valuable solution.

Another challenge was understanding and using the feedback from Rohde Nielsen, which initially didn't align with our ideas. We learned to see this feedback as an opportunity to refine and improve our project.

During our project, we improved our skills in working across different disciplines and analyzing stakeholder needs. Our collaboration with Upteko was a key part of the project. They helped us see how our theoretical ideas would work in practice, boosting our skills in managing the project and solving problems.

As we conclude the project, we're now more capable to solve problems in industries where old methods meet new technology. We would say our achievements were quite significant. We developed a proposal that balanced new drone technology with the practical needs of maritime vessel maintenance. We've learned the value of detailed research, effective communication, and being adaptable to changes. This experience/project has not only expanded our technical understanding but also sharpened our skills in problem-solving and innovation, preparing us for future professional challenges/journeys.

9. Individual reflections

9.1 Nadia El-Souki s200519

Assessment of the project framework:

Being part of a group of six students, with nearly all being from different academic backgrounds was a good addition to the course. The challenge of collaborating with people having different ways of thinking compared to myself, because of perspectives and academic foundations added complexity to the dynamics. With a course that refers a lot to innovation and focuses on new thinking, I think it is a great asset to have different minds to collaborate and brainstorm ideas for the project. Taking the Belbin and personality was not only interesting to take for my own personal curiosity but also provided valuable insights into how our group roles overall contributes to a dynamic group. In addition, the tests were something that sometimes helped me get an understanding and assess people's behavior in the group. It was also intrusive to work with people from different academic backgrounds, since we most likely in the corporate work experience working with someone who does not necessarily have the same background as yourself. The important thing here is cooperation and communication.

The way the course was structured had both good things and downsides to it. Loop 1 was a learning experience and I see it be relevant for those who aren't familiar with these kinds of courses, however it wasn't that relevant for me, because I have made many projects each semester at DTU, so it would have been better if we could have focused our energy on one project. Loop 2 was at last a bit forced later in the course, which I didn't find great. I feel like loop 1 had more planned pitches than loop 2 and what was good about loop 1 was the final pitch where we presented the project we made. I found that much better than only a video pitch and a poster we nevertheless presented. A final pitch is where we get the chance to present our final work and a chance for direct communication between the group, facilitators, and the company, this makes the feedback more valuable for our further work in the project. On top of that there were things about the course I was very positive about. There was a thorough explanation of the double diamond model, forcing us to think in that process. The model was mentioned several times throughout the course and was divided into parts making it easy for us to understand. Firstly, it was hard to only think of problems and not go into idea generating at all, but understanding why and really focus on the process was great learning

for me. I was also glad about the days that later were set for report writing on Wednesdays, because otherwise it would have been difficult to achieve our deadlines and communicate about our process in the group, due to our different schedules. I appreciated the constant presence of the facilitators both in loop 1 and 2, always ensuring us that we can get help when we need it. The whole idea with the company being there is a strong idea, which I think gives a lot of value to the project. I just wished that the two from Rodhe Nielsen agreed with what the purpose of the course was, so we could have had a better cooperation with them. The whole idea with being consultants for the company was very interesting, especially with the direct communication aspect of it. Regarding the tools employed, I found myself familiar with the majority of them, the business models, business case, methods and the double diamond. While this served as an advantage for me, choosing something that I am not familiar with serves as a challenge and makes me grow academically, which I will take with me. Nonetheless, I have familiarized myself with all parts of the report and have an in depth understanding of it.

Assessment of own team, opposition, and team development:
I believe that we as a group quickly laid down clear guidelines in relation to how our project should proceed and how we as a group should be towards each other. We quickly agreed on which rules of the project were most important and applicable to us. This reflected in loop 1 very well, as we went smoothly though it and with all agreeing to the process.
Overall, it became very clear that we went into our natural roles, somewhere more analytical or communicative etc. My roles were the planner, coordinator, and communicator, as I was setting clear lines for where the project should head, making deadlines and making sure we had a goal. I naturally take responsibility to ensure that we are following the process and following the plan, therefore I also ensure that everyone in the group were included and had their area to work on. Other than that, I was also the communicator with one other from the group. We spoke with facilitators and the companies, when having meetings or needing more information. We also communicated in the group when we wanted to make sure that everything was going as planned in the project.

There has been a good diversity in the group, as we are from various lines of study. This can cause a multidisciplinary, which can be taken advantage of, as it is relatively easy to divide certain things in the report based on one's knowledge. However, I thought it would be that way and I wished that there were more of it, but the distribution in the project wasn't all even,

because from my experience trying to involve everyone in the group was not successful, due to some not initiating enough or taking responsibility. I was very open to everyone being distributed throughout the reports equally, but it is not the reality when people show lack of interest in contributing. This caused conflict in the group, because a few of us in the group needed to take more work and responsibility for making the reports, also due to some being passive. This problem caused some of the less contributing members to be dissatisfied with the work distribution and addressed it to us, specifically me. I was disappointed in the way it was communicated and think that their dissatisfaction only came after noticing the work distribution scheme. However, I don't think it is legitimate, because I verbally informed them about it earlier and tried to initiate the distribution. I don't think it's my job to keep on ensuring all members contribute equally if they don't show interest in being so. We did not solve everything of this conflict, but we got over it in terms of still getting through with the project. It also became obvious that some of us in the group were more experienced in writing projects, being in groups and needing to use the tools given to us, this made some of us surprised as we thought it was a common thing in studying at DTU at Ballerup. It is not my first time working with innovative projects and was therefore not all new to me.

A less good thing was that we didn't get started on the project early enough in my opinion and it also went too slowly. A big reason for this is the company not cooperating and giving us the problems, they wanted us to go further into. This forced us to be more focused with research, brainstorming with the change of direction. In addition, we had very different schedules and therefore found it very difficult to meet apart from the Wednesdays themselves, which were available for report writing and group meetings, which we primarily used besides our private time. I feel best with structure and punctuality, in addition, the agenda was not always adhered to, which I personally found difficult because an agreement is an agreement.

In the group, when disagreements arose over how to approach a certain aspect of the report, effective compromise was crucial. Fortunately, all members demonstrated openness to compromise, resulting in satisfactory outcomes. If we had constructive criticism then the members were open to it and used it in the report, which I also found very important for good cooperation. Almost all members were good with meeting up at time and being at school every week, which I was happy to see, as it made the communication better through all group

members. I also found it strong that our group stood firmly together with continuing our goal with the project even though we got a lot of criticism from the company.

Each group member brings unique roles, working styles, and competencies to the table, creating a dynamic and effective collaboration. The overall positive and friendly communication further enhanced our group dynamics. If the conflict about the work distribution weren't a challenge, then the group work would have been significantly improved.

9.2 Benjamin Sepehr Salemi s200532

About the Course

The Innovation Pilot course has been a unique experience, teaching me about the importance of collaboration among students from diverse engineering backgrounds with different competences. Overall, the course has been an eye-opener for me personally, showing me how to conduct professional consultation work for a company and engage in and understand an innovation project in a different way. It has shifted my focus from being solely solution-oriented to having a deeper understanding of problem-solving, which has been a valuable lesson.

The collaborative diversity provided a glimpse into real-world scenarios that we may face when working in interdisciplinary teams, where you do not always pick and choose your project members. What I appreciated about the course was its structure, which included a practical dimension in the learning process. The mix of learning theoretical theories and models in lectures and applying them directly when working with the company enhanced the learning experience. This real-world connection elevated the course beyond theoretical aspects, which can sometimes be overwhelming without the chance to apply the knowledge. Working with a real company brought a sense of responsibility, as our efforts could potentially impact the organization. I've learned about the importance of communication and feedback, lessons that I will undoubtedly carry with me in the future. We had big difficulties with Rohde Nielsen. It would have been better if the two representatives from Rohde Nielsen were better informed about the course. In our group, we felt like they didn't quite understand the main idea of the course, which is to let students identify and address problems through their own research. This caused some delays in our progress during the early meetings and

pitches because they rejected most of the ideas and problems we wanted to work on. They insisted that we focus only on the problems they presented to us. This stayed as a problem also at the demo day when we presented the video pitch which is very unfortunate.

I was already familiar with most of the models used in this course like double diamond designing model, business case, dot voting etc. as this was not my first innovation course.. But for me it's not only about using models and theories; it's also about understanding the importance of having a plan, working in an organized way, and being able to adjust to certain situations. Being open-minded and getting inspiration, instead of just going with my own ideas, is something I've learned and will continue to do. One critique I must give is that while I liked the demo day and presenting the video pitch, I felt it was a mistake not to let us give an actual presentation or pitch for our work. This also confused the company. I think an actual pitch could have been more reliable and allowed us to present additional data to support our ideas and solutions. As a result, some of the critiques we received were challenging to address because the company only provided feedback based on what they saw in the video pitch.

About the project group

We in our project group did establish some ground rules based on the group contract early in the course. These rules formed the foundation for our collaboration, aiming to create a positive environment. In this course, roles were not fixed; instead, it was a dynamic team where everyone had the opportunity to contribute in their own way. We aimed to foster a free-thinking environment, encouraging everyone to share their thoughts, but later on naturally members took on some roles.

However, the absence of clearly defined roles at the start may have led to some individuals feeling overly comfortable, showing a lack of initiative to contribute to the project at times. This led to some members feeling the need to take on more responsibility. While taking on more responsibility is not necessarily a bad thing, it became a challenge in the later stages of the course when some members perceived an unfair distribution of responsibilities. Personally, I didn't see it as unfair, as efforts were made to involve everyone in the group. It's not up to members to persuade others to show initiative; it should come naturally in my opinion.

This dynamic created some tension in the group, and it seemed for me that some members lacked experience in writing DTU projects in this set up.The way we divided up the work made some group members a bit nervous about their own outcomes. While I understand that the work distribution scheme may not always make everyone happy, the main focus should be on the project itself, not just how we divide things up. However, it's crucial to have a fair work distribution scheme. At the start, when we were deciding who would do what, some members didn't seem very interested and almost acted like they didn't care. Naturally, other members ended up taking on more parts of the project. Towards the end of the course, this caused some challenges because some members felt their names weren't on enough segments. Our group, in my opinion, invested too much thought into adhering strictly to the work distribution scheme. Even though there were challenging times, I appreciated how my project group stayed united. Despite facing challenges, there were positive moments during the project. I admired the unity within my project group, especially when the company representatives expressed dissatisfaction with our research and ideas. Despite this, we remained committed to our plan. I appreciated our collective effort to avoid unnecessary stress. In the initial stages, our group faced some confusion, and it took us a while to identify specific problems to address. Several factors contributed to this initial setback. Although we fell behind other groups, we maintained our focus on our own progress. The experience taught me the importance of resilience and teamwork in overcoming obstacles.

My role
Throughout the course, my role evolved into being the communicator of the group, serving as the bridge between the project group and companies. I maintained contact with Rohde Nielsen via email and also communicated with Upteko, the company we proposed a collaboration with. This role came naturally to me, as I enjoy working with different stakeholders and taking on such a role in the project.

Reflecting on the 13 weeks of the Innovation Pilot course, I've acquired valuable skills in managing and driving projects. The experience taught me the importance of collaboration within diverse teams and provided insights into real-world scenarios. The course gave me a chance to work with an actual company and it was a great experience to be able to speak with companies that I really learned from. I must say that throughout my time at DTU, I have primarily worked within my study group or with fellow students whom I already knew. Therefore, it has been a nice experience for me to collaborate with a group where I didn't

know the members beforehand even though there have been challenges, I learned that this is natural and also a part of being in a team.

9.3 Anshjyot Singh s215806

Reflecting back at the project for Rohde Nielsen, my journey as a Software Engineering student, characterized by my Myers-Briggs Type Indicator as a 'Commander' and my Belbin roles as 'Chairperson' and 'Driver', was full of opportunities for learning and self-reflection. These roles, while empowering, brought their unique challenges in a team consisting of diverse academic backgrounds – from Global Business Engineering to IT and Economy.

Professionally, the project tested my skills in both software engineering and innovation, by integrating advanced technology, more specifically drone technology, into maritime maintenance. The initial concept of using drone technology in maritime vessel maintenance was, to be honest, a challenging task – which required us to think innovatively while making sure our ideas were realistic. For instance, when we proposed the drone technology, it was met with skepticism by Rohde Nielsen, revealing this gap between our innovative vision and the company's practical expectations. They were reminding us to align our ideas with their actual expectation in regard to their initial company description, which was an interest in improving sound emission and filtration in old ships. As this is an innovation course, which meant we had to undergo "a multidisciplinary innovation process", precisely we had to "apply the course's innovation theory foundation in connection with an innovation process" (taken from the course objectives) which I and the rest of the group did not believe we would, if we followed Rohde Nielsen's exact case. Even though we didn't exactly align with their expectations (which we were completely allowed to), this experience still taught me the value of not only creating innovative solutions but also of presenting them in a manner that aligns/resonates with the stakeholders' needs and perspectives.

 On a **personal** level, the project was a journey of self-discovery and a path of growth. Being a 'Chairperson' and 'Driver', I found myself often at making key decisions and keeping the project moving forward, which, while empowering, wasn't always easy. For example, disagreements within the team about work distribution and approach strategies were frequent, especially in the last phase of the project. I recall a specific instance where group members were not satisfied with the work distribution. It required some intense and heated discussions to address this matter. Was I content with the outcome of our discussion on this issue? Not really. Diverse perspectives and approaches will always exist. The issue at hand specifically

pertains to certain group members being less active during the project and in the process of work distribution. However, I want to clarify that my dissatisfaction wasn't with my own involvement in the group distribution or the amount of work that was allocated to me or I was responsible for taking. Rather, I found the way some of the work distribution was handled by other group members, and the level of communication around this, to be somewhat unfair. The so-called 'final distribution' didn't seem to adequately consider whether the rest of the group members had a reasonable share of tasks. Personally, I found certain aspects of this matter unacceptable. Despite this, we must continue forward. This experience has underscored the importance of clear and empathetic communication within a team environment to ensure equitable task distribution.

In my **field of study**, innovation is frequently linked with technological advancement. In the realm of software engineering, the integration of advanced technologies like drones into maritime maintenance represented a significant innovation. For example, some breakthroughs in software engineering that are currently influential – could be exploring technologies in software engineering which could revolutionize maritime operations, such as the application of AI in predictive maintenance. Software engineering can also be central in developing autonomous ships, which can navigate through waterways, reducing human error and increasing efficiency.
 However, this project highlighted that innovation is not just about technology, but also involves thinking differently and approaching problems from unconventional angles. For instance, our project didn't initially center on drones, it evolved into that as we explored various potential solutions. This iterative process of ideation, validation, and re-ideation is aligned with the theoretical innovation models we have learned/studied, and putting those concepts into practical use.

The **project group** consisted of individuals from various disciplines, which naturally brought different viewpoints and challenges in team interactions/dynamics. As someone who took on the role of a mediator often, I frequently found myself balancing these differing opinions while ensuring the project's progress. This role was not formally assigned but emerged naturally as I found myself facilitating discussions and bridging gaps between different team members' approaches.

One of the major challenges we encountered was establishing a respectful and productive

dialogue with Rohde Nielsen. Initially, there was a noticeable disconnect between our innovative approach and their expectations, which was explained earlier. It became evident that we needed to refine our communication strategy, but from my perspective, the collaborative aspect of our interaction wasn't as supportive as it could have been. Their responses often redirected us towards their initial interests and did not seem conducive to genuine collaboration. In general, this experience taught me the importance of stakeholder engagement in innovation projects.

Looking ahead, the insights I've gained from this experience are significant. I've come to understand that innovation is not a linear process, but a complex interplay of ideas, people, and contexts. Moving forward, I intend to apply this understanding to future projects, particularly those that require navigating complex stakeholder landscapes. In future software engineering projects, I plan to apply insights from this experience, focusing on specific methodologies like Agile and Design Thinking to contribute to an innovative mindset. The ability to adapt, communicate effectively, and think innovatively are skills I'm determined to carry forward.

In conclusion, this project was a comprehensive learning experience that went beyond the boundaries of a typical academic project. It was a real-life exercise in innovation, communication, and collaboration. The challenges we faced and overcame have equipped me with a deeper understanding of how to navigate complex projects, a skill that will prove invaluable in my future professional pursuits.

9.4 Nipun Fernando s215518

What i have learned professionally and personally
Professionally it was my first time working with a company. Even though the communication could have been much better with the company. I understood that communication with both parties, at the start, is very crucial. Here the company did not understand what we could offer and what our expertise was. Ultimately that led to bad communication during the working process, which was why they were unsatisfied at the end.

Innovation in my field of study
In the field of computer science, we are in an exciting time of new discoveries. Things like AI and Machine Learning are changing the way we handle information and make systems

that can work on their own. Quantum Computing is still new but could greatly change our computing power. The Internet of Things (IoT) is bringing more connectivity into our everyday life, and Blockchain technology, which began with digital currencies, is now key in keeping data safe. Also, the introduction of 5G technology has made communication faster and more reliable.

However, as we make progress, some areas need new ideas. Cybersecurity is a constantly changing area that urgently requires stronger protections against more advanced dangers. There's a growing need for eco-friendly computing to help our planet, aiming for technology that's less harmful to the environment. Another big challenge is making technology useful and available to everyone, including people with disabilities and those in less developed places.

Innovation mindset

When it comes to nurturing an innovation mindset in this field, it's about staying endlessly curious and well-informed about the latest trends and research. Collaboration is key; by bringing together diverse perspectives and skills, we can uncover unique solutions. A problem-solving approach, focusing on real-world challenges, often leads to the most impactful innovations. Embracing failure as part of the journey is essential, as it's often through mistakes that we learn and grow. Moreover, considering the ethical implications and sustainability of what we create is not just important—it's our responsibility. By weaving these elements into our studies and projects, we as computer engineering students can not only contribute to the current landscape but also help shape the future of technology.

Team dynamic

Our team generally worked well together during our meetings at school. The team dynamics were mostly positive, although occasionally other priorities would cause some of us to lose focus. We understood and respected that each of us, as students, had various commitments outside the team. Everyone contributed in their own way, with some members being more involved than others. However, the key was that everyone was present and engaged during the working process. We talked, discussed, and worked collaboratively, which, to me, is the essence of effective teamwork.

My contribution

In our team, I focused on being cooperative and supportive. Given the project's scope and the constraints of time and resources, my specific skills weren't fully utilized. However, I believe in adapting to the team's needs. So, I contributed by sharing my views and insights wherever possible and supporting the team's overall direction. While I may not have taken on a specialized role, I aimed to be a constructive and flexible team member, contributing in any way I could.

What i have learned from our research

I have learned a lot more about the marine industry, it is not as simple as you think it is implementing new and innovative technologies out to the seas. There are plenty of regulations you need to look out for. The problems they deal with are also very arduous, such as removing hull fouling takes days and sometimes it requires that the ship is in dry land. Just doing inspection takes a lot of time and effort. I was also surprised by the environmental impact that vessels had. The ship's engineers, who work with motors also, have problems that really can affect their health. Overall there are a lot of things that can be done in this industry, a lot of space for new solutions and innovative ideas.

The experience i take with me

In the next projects I would be more aware when working with a company, making sure I understand their perspective of the problem, and understand what situation there is when figuring out a solution. I would also very much like better communication, so we can get better insights on what the company is dealing with. In our situation we could have had more success, if the company were more cooperative and open to new ideas. The last thing is I want to be sure my skills and expertise are relevant to the topic and solution, as my skills weren't so valuable in solving this problem.

9.5 Ali Shanoof s215716

Professional and Personal Learnings:

Professionally, I learned the importance of interdisciplinary collaboration in innovation. Working with team members from different engineering and business backgrounds, I gained insights into how diverse perspectives can enrich problem-solving. This project taught me the value of integrating technical knowledge with business acumen, especially in developing and

evaluating technology solutions like drone applications in the maritime industry. This involved understanding technical aspects, industry regulations, and the practical challenges of implementation. Collaborating with Upteko provided real-world insights into technology deployment, enhancing my knowledge of practical applications in a business context.

Personally, the project enhanced my skills in teamwork and interdisciplinary collaboration. Working with a diverse team, I developed better communication and problem-solving skills. I learned to value different perspectives and the importance of constructive feedback in driving innovation. This experience also improved my ability to adapt to changing scenarios and to think creatively in solving complex problems.

Examples include navigating the complexities of drone technology to propose a viable solution for vessel maintenance, and the collaborative efforts in aligning our diverse team's strengths towards a common goal.

Innovations in my field of study

In the field of IT and Economy, major innovations that are emerging in tech include artificial intelligence and machine learning, blockchain technology, and the increasing integration of IoT (Internet of Things) in business processes. These technologies are revolutionizing how data is managed and how decisions are made in various industries.

There is a pressing need for innovation in cybersecurity and data privacy, given the rising complexity and frequency of cyber threats. As businesses continue to digitize, ensuring solid, scalable, and user-centric security solutions is paramount. Furthermore, the application of AI in economic forecasting and analysis presents significant opportunities for innovation, enabling more accurate and timely economic insights.

Innovation mindset in my study field

To work with innovation in IT and Economy, it's important to keep up with new tech trends and think creatively about applying them. This means exploring how things like basic data analysis and new software can improve business processes and try to come up with innovative IT solutions. It's about staying curious and open to trying out new ideas, even if they seem small, to find better solutions in your field.

Teamwork- and dynamic

In our teamwork, I learned the importance of understanding and respecting different team roles and dynamics. Each team member has unique strengths, and effective teamwork involves leveraging these diverse skills. We navigated through various challenges by communicating openly and supporting each other, which was crucial for maintaining a positive team dynamic. This experience taught me that successful teamwork requires adaptability, mutual respect, and a shared commitment to the project goals.

However, we did face a challenge with miscommunication, leading to decisions made without full team involvement. This situation, though unfortunate, was a learning opportunity. We managed to resolve it, gaining valuable insights into handling such issues. Our ability to move forward and continue our effective collaboration on the project was a testament to our team's resilience and commitment to collective goals.

Personal contribution

In our group work, while I focused mostly on research, data analysis and how technology could be implemented for the company, we didn't assign specific roles formally. Instead, we often worked collaboratively, contributing our strengths where needed and developing collective ideas of how to tackle this project. This approach allowed a flexible and dynamic teamwork environment. We all helped each other whenever needed. Our teamwork was about flexibility and mutual support, creating a dynamic where everyone contributed and learned from each other across different tasks. This not only enhanced our teamwork but also enriched our skills, making the project a valuable learning experience for all involved.

Key Learnings and Takeaways

This innovation project has boosted my innovative thinking and given me a lot of valuable knowledge. It's shown me new ways to approach problems using various mythologies, both in my professional and personal settings. Learning to think creatively and see different viewpoints has been a big part of this, and it's important in any professional field, especially in areas like IT and Economy. The project has also been a valuable learning experience, particularly in teamwork and problem-solving in interdisciplinary settings. Working with diverse perspectives has enhanced my understanding of complex problem-solving and how technology could be implemented in such an industry. The importance of adaptability, effective communication, and mutual support in a team became clear. These skills are also

crucial in my field of study; IT and Economy, a field that constantly evolves. This experience has not only improved my analytical and teamwork skills but also prepared me for future academic and professional challenges, reinforcing the significance of collaborative learning and innovation.

For future projects, I'll take with me the skills of collaborative problem-solving, adaptable thinking, and effective communication. The experience of working in a diverse team has taught me the value of different perspectives. I've also learned the importance of innovative thinking in practical applications, which is crucial in IT and Economy. These learnings will guide me in approaching future challenges with a balanced blend of creativity and analytical thinking.

9.6 Vandad Kolahi Azar s205073

Professional and Personal Learnings:
Throughout this course, the chance to engage in a collaborative project with an external company has been a new experience. It provided a gateway to witness firsthand the complicated workings of real-world communication within a professional setting. The nuances of communication, although challenging at times, became a pivotal focal point of learning. These challenges, surprisingly, turned out to be valuable lessons in understanding the importance of developing effective and transparent channels of communication in the field of project management.

Innovations in Computer Engineering:
The field of computer engineering has undergone an extraordinary evolution, particularly in its merging with industries such as maritime operations. This merging has birthed a wave of groundbreaking innovations, with technologies like drone applications reshaping traditional standards. Drone technology, specifically tailored for ship inspections, stands as a proof to this transformation, indicating an immensely promising trajectory in the fusion of technology and maritime projects.
The evolving landscape of computer engineering and its integration into maritime operations signifies a growing wave of possibilities. It's a merger that not only revolutionizes traditional practices but also sets the stage for a more efficient, safer, and technologically-integrated maritime industry. This trajectory paves the way for continual exploration and innovation

within the intersection of these fields, offering solutions that transcend boundaries and redefine industry standards.

Engaging in Innovation as a Computer Engineering Student:

As a computer engineering student, embracing an innovation mindset involves exploring emerging technologies like AI, IoT, and machine learning to devise solutions for complex problems in various sectors, including marine operations. Integrating these technologies with hardware for efficient data collection and analysis could revolutionize maritime processes.

Team dynamics:

During our team meetings at school, we mostly got along well. Things were positive, but sometimes, people got distracted by their other responsibilities. We all understood that everyone had their own stuff going on outside our teamwork. Some of us were more involved than others, but what mattered most was that everyone showed up and took part in our work. We made sure to talk a lot, discuss ideas, and work together. That's what teamwork meant to me – sharing thoughts, talking things out, and working on stuff together. Even though we sometimes got busy with other things, our team always managed to come together, talk, and work on our projects

Personal contributions to group work:

I had some skills that I couldn't really use much because of the limits of the project. But instead of getting stuck on that, I tried to be flexible and help out however I could. I shared what I knew, backed up the team's choices, and stayed open to changing things around to fit what the project needed. Even though I couldn't use all my skills, I still wanted to be useful and help the team move forward.

Key Learnings from the Project:

This experience provided deep insights into the challenges of the maritime industry— complex regulations, time-consuming tasks, environmental impacts, and health concerns for engineers. It highlighted the vast potential for innovative solutions in this sector.

Takeaways for Future Projects:

In future projects, I aim to better understand the company's perspective, foster improved communication, and ensure the relevance of my skills to problem-solving. Learning from this experience, I'll strive for a more cooperative environment between academia and industry partners.

10. Work distribution

	Nadia	Benjamin	Ansh	Nipun	Ali	Vandad
Data Collection	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%
Information Research	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%
Qualitative Research	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%
ProofReading	60%		40%			
Communication with company		100%				
Pitch Presentations	50%	50%				
Pitch Video Presentation	50%	30%			20%	
Poster	60%		40%			
Proposal report						
Abstract	100%					
Problem Background			100%			
Methods					100%	
Company description				100%		
Stakeholder analysis						100%
Market description		100%				
Identification of the hard nut	100%					
Proposals			80%			20%
Dot voting			80%		20%	

Harris Profile			80%			20%
Solution and prototype				100%		
Collaboration with Upteko		100%				
SDG Goals	100%					
Business models						
Business Model Canvas					100%	
Value proposition canvas	100%					
Risk Analysis		100%				
Economic view	50%	50%				
Conclusion						100%
Reflection report						
Double Diamond						
Discover	100%					
Define			100%			
Develop					100%	
Deliver		100%				
Strategy:						
What we could have done different			60%		40%	
Communication						100%
Collaboration in the group:						
Gibbs Reflective cycle			70%	30%		
Collaborations:						
The facilitators					100%	
Company		100%				

Feedback						
Pitch Feedback	100%					
Rohde Nielsen Feedback		100%				
Learning and reflection			70%			30%