

Student Sustainable Entrepreneurship in Action: Design thinking and Co-creation on Bornholm, Denmark as Part of the INTERREG FREIIA Project

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Abstract

FREIIA (Facilitating Resilience Embracing Islands Innovation Approaches) is an INTERREG North Sea Region project funded by the European Union, aimed at enhancing resilience and innovation capacity in island communities across six countries. (FREIIA FREIIA | Interreg North Sea, u.å.)

Østfold University College is responsible for Work Package 4 (WP4), which focuses on fostering student entrepreneurship. The main objective of WP4 is to integrate entrepreneurship students into the strategic governance of island innovation, strengthening their role in circular economy transitions. This paper specifically addresses WP4, led by Østfold University College. When referring to the FREIIA project in this context, it is WP4 that is being examined.

In the first phase of this project, we identified innovation gaps on the island of Bornholm, Denmark, through semi-structured interviews with stakeholders from the public, private, and civil sectors. Key challenges included limited cross-sector collaboration, circular waste management, an aging population, and insufficient platforms for community engagement.

This paper presents the next phase of the project, which uses design thinking and the double diamond framework to co-create solutions to the identified challenges through workshops. Initiatives include developing youth-focused educational programs and innovation hubs, enhancing collaboration between stakeholders, leveraging Bornholm's proximity to Copenhagen for marketing and talent attraction, and creating sustainable business opportunities through circular economy initiatives.

This study offers a model for fostering sustainable development through collaboration, creativity, and local ownership and offers a model for other island communities facing similar challenges.



(Students and teacher at Bornholm)

Introduction

Through this project, the current and desired states, along with the challenges faced by the island community of Bornholm, were examined to identify potential gaps between these states. These gaps present opportunities for innovation and improvement in development capacity. In this context, development capacity refers to the ability of diverse stakeholders, including public officials, private enterprises, and civil society, to collaboratively drive sustainable innovation and growth.

To explore these challenges and opportunities in depth, on-site research was conducted on Bornholm from April 10 to April 12, 2024, with a workshop held on April 11. This setting enabled stakeholders to engage in discussions, share insights, and collaboratively explore solutions to the island's key challenges. Bornholm was the third location where both phases of the FREIIA project were carried out, following prior studies on Hvaler and Schiermonnikoog. These phases incorporated findings from the UNIC analysis, which will be further applied in the Design Thinking workshop, providing a structured approach to assessing and enhancing Bornholm's development capacity.

In the first phase of the FREIIA project, the UNIC analysis on Bornholm revealed five key findings:

1. **Dependence on Tourism:** The island's economy is heavily reliant on seasonal tourism, which creates economic instability outside the peak seasons. This dependency underscores the need for sustainable alternatives to tourism-driven growth.
2. **Development of Circular Economy for Construction Waste:** There is a significant need for improved waste management and the development of circular economy solutions, particularly in the construction sector. The increasing amount of construction waste presents an opportunity for implementing circular practices.
3. **Lack of Activities and Services Outside Peak Seasons:** Limited infrastructure and social offerings during the off-season periods hinder long-term sustainability. This seasonal fluctuation in service availability poses a challenge to maintaining a stable economy and engaging the local community year-round.
4. **Youth Migration and Limited Return:** Young residents often leave the island for education and employment opportunities elsewhere, with few returning due to limited career prospects on Bornholm. This demographic shift threatens the island's long-term viability and innovation potential.
5. **Lack of Coordination and Collaboration:** Insufficient cooperation between stakeholders across public, private, and civil sectors creates barriers to innovation and development. The lack of structured spaces for collaboration hinders effective partnerships and progress.

These findings laid the foundation for the second phase of the project, which is the focus of this paper. In this phase, we applied Design Thinking principles to co-create actionable solutions tailored to Bornholm's unique challenges and needs.

By engaging local stakeholders in structured workshops, the second phase aimed to address these gaps through collaboration and prototyping, ensuring that the solutions were both relevant and feasible within the island's socio-economic and environmental context.



Bornholm

Bornholm is a Danish island and municipality in the Baltic Sea, located 170 kilometers from Copenhagen and 40 kilometers southeast of Skåne, Sweden. The island has been part of Denmark since 1658 and includes the Ertholmene archipelago. Covering 588.5 km², Bornholm features diverse landscapes, including granite bedrock in the north, sandy dunes in the southeast, and fertile farmland in the south. Its highest point is Rytterknægten at 165 meters above sea level.

As of 2024, Bornholm has a population of 39,332, with Rønne (13,759) as its largest town and administrative center. The island's economy relies heavily on tourism and agriculture, particularly livestock farming and fishing. Bornholm is known for its cultural traditions, including smoked herring and ceramics. Tourism plays a vital role, attracting visitors to landmarks such as Hammershus, Northern Europe's largest medieval fortress, and the round churches from the 12th century.

Despite modern transport connections, including flights to Copenhagen and ferries to Sweden, Germany, and Poland, Bornholm faces challenges such as an aging population, youth migration, and a seasonal economy, making sustainable development strategies crucial for its future. (Pihl, 2024).



Methods: Theoretical framework

In this study, we applied principles from Design Thinking and the Double Diamond framework to guide the co-creation workshops aimed at addressing sustainable development challenges on Bornholm. Both methodologies share a user-centered approach, making them ideal for tackling complex challenges faced by island communities.

Design Thinking: Define, Ideate, and Prototype

Design Thinking emphasizes empathy, creativity, and iteration. In this study, we utilized the Define, Ideate, and Prototype phases to co-create solutions. (*Innovation as a Learning Process*, u.å.)

- Define: Insights gathered from earlier interviews with stakeholders were synthesized to identify the core challenges facing the community, including youth retention, economic development, and collaboration gaps.
- Ideate: During the co-creation workshops, stakeholders collaboratively brainstormed a wide range of potential solutions. These sessions were designed to encourage creativity and generate diverse ideas to address the identified issues.
- Prototype: The most promising ideas were developed into low-fidelity prototypes. These prototypes were simple, testable models that allowed for iterative refinement based on stakeholder feedback.

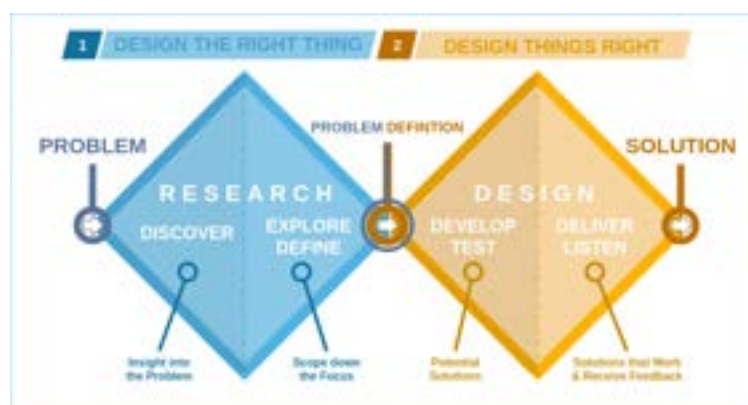


Double Diamond: Define, Ideate, and Prototype

The Double Diamond framework structures innovation into four phases: Discover, Define, Develop, and Deliver. In this study, we focused on the Define, Ideate, and Prototype phases:

- Define: This phase involved synthesizing insights from the Empathize phase (interviews) into clear problem statements. This ensured all stakeholders had a shared understanding of the core issues.
- Ideate: Collaborative brainstorming sessions allowed participants to explore multiple solutions, ensuring that ideas were generated with input from a diverse set of perspectives.
- Prototype: The most promising solutions were turned into prototypes, which were evaluated and iterated upon during the workshops.

Both Design Thinking and Double Diamond provided a structured approach to problem-solving, ensuring a creative and collaborative process that focused on real-world needs. («The Double Diamond Model», 2024).



Methods: Applied in Practice

Building on the findings from the fieldwork in March of 2024, we held a clarification meeting with BOFA (Bornholm waste management company and FREIIA partner) to review the results from the UNIC interviews and analysis, to set the direction for the Design Thinking workshop.

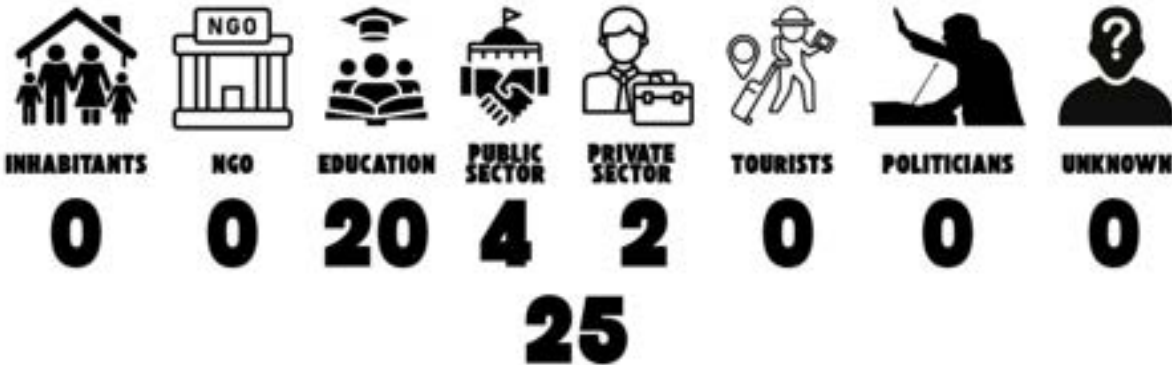
This meeting, conducted via Zoom, allowed representatives from Bofa to collaborate with us in verifying key challenges and determining which areas should be prioritized in the upcoming Design Thinkin based co-creation workshop. The goal was to ensure that the workshop addressed the most pressing issues while aligning with the broader objectives of sustainable development on Bornholm, while also contributing to the FREIIA projects overall goals.

We traveled to Bornholm in April 2024, with Norwegian students, professors, and representatives from Drivhuset to organize a co-creation workshop, designed to engage stakeholders in developing solutions to the identified challenges. This workshop moved into the Ideation and Prototyping phases of Design Thinking, fostering collaboration between a diverse group of participants.

Stakeholder Involvement

After analyzing the transcribed interviews and identifying core challenges from the UNIC Workshop in phase 1, we invited stakeholders and students to participate in the next phase, Co- creation workshop. Participants included Danish students from Aalborg University and Norwegian students from the Innovation and Project Management program at Østfold University College. Additionally, the workshop included stakeholders from both the public and private sectors, ensuring a broad and interdisciplinary approach to problem-solving.

However, there was a noticeable lack of stakeholder participation during the workshop. Despite initial efforts to recruit a diverse group, it became evident that not enough proactive measures had been taken in advance to secure stakeholder attendance. This limited the range of perspectives present and may have affected the depth of discussions. The low turnout was largely due to a lack of clarity and misunderstandings regarding the purpose of the workshop and the role of stakeholders in the process. Additionally, the fact that the initiative was student led may have influenced how seriously our efforts were taken by potential participants. This experience underscores the importance of clear communication, defined expectations, and stronger engagement strategies to ensure meaningful stakeholder involvement in future iterations.



(This model provides an overview of the participants in the co creation (design thinking) workshop categorized into groups)

Ideation Phase

The Design Thinking framework is a structured, iterative approach to problem-solving that emphasizes empathy, problem definition, ideation, prototyping, and testing. A key feature of this process, as implemented in previous FREIIA workshops, has been guiding participants through a focused ideation phase where teams select a single problem statement, refine it into their Point of View, and develop a concrete, prototyped solution.

On Bornholm, however, the workshop did not fully follow this structure. Instead of choosing one challenge to work with per group, participants engaged with multiple problem statements at once. While this encouraged broader discussions, it resulted in fragmented and less actionable solutions. Several teams produced loosely connected ideas rather than a singular, well-defined solution that could be tested and refined. This deviation from the established methodology affected both the consistency and comparability of results across the different islands in the FREIIA project. A well-facilitated ideation and prototyping phase would have ensured that each group refined a specific challenge into a concrete solution, rather than generating scattered ideas that lacked clear implementation paths.

Without this structured approach, the outputs from Bornholm were less tangible compared to earlier workshops. While some valuable discussions emerged, they lacked the clear, testable solutions that the project aims to generate.

Student Involvement and Leadership Transition

A core element of the FREIIA project's methodology is the structured progression of student involvement, transitioning from an internship phase, where students take on project leadership roles for Work Package 4 (WP4), to a bachelor thesis phase, where they conduct research within the project based on their chosen academic focus. This model provides students with both hands-on leadership experience and a research-oriented approach to innovation and sustainable development.

For this iteration of the workshop, we transferred much of the responsibility to the next generation of student project leaders, primarily from the Innovation and Project Management program. These students were tasked with workshop logistics, stakeholder coordination, and facilitation, marking an essential step in their leadership training. This transition aligns with the FREIIA project's long-term goal of empowering students to take ownership of complex, interdisciplinary projects while developing critical skills in adaptability, communication, and stakeholder management.

The workshop was facilitated in collaboration with Drivhuset, an organization specializing in student entrepreneurship and innovation, which has an established partnership with Østfold University College. Drivhuset contributed to the session design, ensuring alignment with Design Thinking principles. However, despite this support, the execution of the workshop deviated from the structured Design Thinking process used in previous iterations of the project.

Unlike earlier workshops, where teams selected a single problem statement to refine, ideate upon, and prototype into a concrete solution, the Bornholm workshop allowed groups to address multiple issues simultaneously. While this encouraged broad discussions, it also led to fragmented and less actionable solutions. The shift away from the structured process made it more difficult to extract clear, implementable outcomes from the workshop.

Key Takeaways for Future Student Leadership

This experience highlights the need for stronger methodological guidance and facilitation training when transitioning responsibility to new student project leaders. While transferring leadership is

essential for long-term project sustainability, it must be paired with closer mentorship and clearer expectations to maintain the consistency and effectiveness of the Design Thinking approach.

Future workshops should ensure that student leaders receive structured training in facilitation techniques, particularly in guiding participants toward well-defined problem statements and concrete, prototyped solutions. Additionally, a more hands-on role from senior project leaders during workshop execution would help prevent deviations from the established methodology and ensure that the co-creation process remains structured and effective.

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2023 - 2024



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Methodical Reflection

Before presenting the key findings from the workshop, it is essential to reflect on the methodological challenges encountered during this phase. These insights help contextualize the results and provide guidance for future implementations of the FREIIA project.

One of the key challenges encountered in the planning and execution of the workshop was the need for improved coordination and clearer communication between project partners. While BOFA was a valuable local partner, the absence of a clearly defined engagement strategy during the early planning phases resulted in some stakeholder groups being underrepresented in the workshop. The transition of project leadership from one pair of Norwegian students to another introduced additional complexity, as it required a new team to align with pre-existing plans and expectations. Unclear expectations within BOFA regarding their role in the process, coupled with insufficient communication between project partners, further complicated the engagement process.

The Bornholm workshop marked a deliberate transition of responsibility from the current student project leaders to the next generation, preparing them for leadership in the upcoming phases of FREIIA. While this provided invaluable hands-on experience in stakeholder engagement, logistical

planning, and facilitation, it also revealed challenges in securing stakeholder participation and maintaining structured facilitation in line with Design Thinking principles.

One of the most significant challenges was low stakeholder turnout. Only five stakeholders attended, the lowest participation rate in the project so far. Unlike previous workshops, where participants were actively reminded and encouraged to attend, this time, no structured follow-up was conducted beyond the initial invitation. BOFA was responsible for outreach, but without additional reminders or direct engagement, many previously interviewed stakeholders were not contacted again. This lack of follow-up likely contributed to the poor attendance.

To compensate for the missing stakeholders, the workshop included three Danish students who had participated in the UNIC analysis phase, along with five new international students from various academic programs. Their contributions helped sustain meaningful discussions, but the absence of key stakeholders limited the depth of collaboration between students and local actors.

This experience highlights two key areas for improvement in future workshops. First, structured stakeholder follow-up must be prioritized, email invitations should be reinforced with reminders, personal outreach, and possibly physical handouts distributed during interviews. Second, while leadership transition is an essential part of the FREIIA model, stronger mentorship and oversight from senior student project leaders is necessary to maintain methodological consistency and ensure that future workshops remain well-structured and impactful.

Results

This co-creation workshop on Bornholm differed from previous workshops held on Hvaler and Schiermonnikoog in its approach to solution development. Unlike the earlier workshops, where the focus was more on arriving at specific, actionable solutions, this session took a broader, more open-ended approach. The group engaged in a wide-ranging discussion, brainstorming a variety of potential solutions to the challenges of youth retention and sustainable development. As a result, the outcomes of the workshop are organized into key thematic categories, with the discussed solutions placed under each, reflecting the diverse ideas that emerged during the session.

1. Education and Youth Engagement

- Natur Bornholm Museum: Suggested as a potential educational and engagement hub for young people, the museum could offer programs that connect youth to local nature and sustainability issues, encouraging a deeper connection to the island.
- Technical University of Denmark (DTU): There was discussion around collaborating with DTU to provide local educational programs, internships, or innovation hubs. This would help keep students engaged with Bornholm while also boosting innovation and knowledge transfer to the island.
- Hub for Kids: A dedicated physical or digital space where young people could gather, share ideas, access resources, and participate in community activities. This could serve as a platform for building a sense of belonging and engagement for youth.
- Educational Courses: The creation of targeted educational programs in collaboration with local schools, businesses, and universities could help equip young residents with relevant skills and career pathways, making Bornholm a more attractive destination for young professionals.

2. Collaboration and Innovation

- Student Involvement in Innovation: There were ideas around incorporating students into local innovation initiatives, especially in the context of sustainable development, to bring fresh perspectives and foster a more innovation-driven culture.

- Municipality as a Key Actor: The municipality was identified as a key stakeholder in driving change, particularly in implementing policies and initiatives aimed at youth retention. Potential strategies include housing incentives, job creation, and community development projects.
- Cultural Houses and Workshops: There was interest in revitalizing cultural houses or old buildings, turning them into spaces for workshops, collaboration, and lectures. These spaces could serve as innovation hubs and places for professional development, especially in areas like circular economy and sustainability.

3. Promoting Bornholm as a Living Destination

- Marketing Campaigns: A proposal emerged for a marketing initiative highlighting successful families who have moved to Bornholm and thrived. This could be part of a broader effort to showcase the benefits of living on the island, emphasizing factors like quality of life, family-friendly environments, and successful business ventures.
- Close Proximity to Copenhagen: The geographic advantage of Bornholm's proximity to Copenhagen was discussed as a potential asset for attracting people, particularly young professionals. The idea is to market Bornholm as a “getaway” with easy access to urban centers while still offering the peace and natural beauty of the island.
- Recycling and Circular Economy Awareness: There were discussions about increasing awareness around sustainability, particularly the reuse of materials in construction and the promotion of circular economy practices. These efforts could be integrated into educational programs and the innovation hubs, tying into Bornholm's broader sustainability goals.



(Students and Stakeholders in Process During the Workshop)

Discussion

The workshop on Bornholm differed from previous workshops held on Hvaler and Schiermonnikoog by adopting a more open-ended approach to solution development, allowing for a broader range of ideas. While challenges were encountered during the implementation process, the proposed solutions reflect key opportunities to address Bornholm's unique issues, such as youth migration and economic dependence on seasonal tourism.

A significant part of the workshop's outcome revolved around four central themes: education and youth engagement, collaboration and innovation, attracting young people and families, and circular economy practices. These themes emerged as crucial pillars for strengthening Bornholm's economy and ensuring its long-term sustainability. Below, the main discussions and proposed solutions are addressed within these thematic categories.

Education and youth engagement

First and foremost, discussions around education and youth engagement highlighted the importance of providing concrete educational opportunities and community platforms for young people on Bornholm. The idea of using the Natur Bornholm Museum as an educational and engagement hub for youth is particularly relevant for fostering a deeper connection to the island's nature and sustainability. A collaboration with DTU to offer local educational programs or innovation hubs could help reduce youth migration by creating job opportunities and increasing engagement with the island's development.

Collaboration and innovation

These themes emerged as crucial pillars for strengthening Bornholm's economy. By integrating students into local innovation projects related to sustainability, the island can benefit from fresh, creative perspectives that contribute to a more sustainable and innovative economy. This could also make Bornholm more attractive as a destination for young professionals who seek a closer connection to the local job market. Revitalizing cultural houses and establishing physical or digital hubs could serve as community gathering spaces for youth, and over time help build a more dynamic and engaged youth culture on the island.

Attracting young people and families

The discussions around marketing campaigns to promote Bornholm as a viable and attractive place for young families and professionals emphasized the island's proximity to Copenhagen as a key selling point. Bornholm could position itself as a "getaway" destination that offers easy access to urban life while providing a tranquil and natural environment. Increased marketing around success stories of families and businesses thriving on the island could help change the perception of Bornholm as a place for young professionals.

Circular economy

However, the implementation of these solutions will require careful consideration of resources, partnerships, and long-term support from both public and private stakeholders. For instance, collaboration with the municipality and local businesses will be necessary to realize the proposed innovation hubs and cultural houses, as well as to develop a more integrated approach to circular economy practices on the island. Close cooperation between project partners, with clearly defined roles and early alignment of expectations, will be essential to ensure that these initiatives receive the necessary backing and execution.

Overall, the results from the workshop demonstrate that Bornholm has significant potential to become a more sustainable and attractive destination for young people. However, the successful implementation of these solutions will require long-term collaboration, clear communication, and strategic planning.

Entrepreneurship

The workshops also highlighted the importance of attracting and retaining young people on Bornholm. The ongoing challenge of youth migration requires initiatives that connect education, entrepreneurship, and local industries. By creating opportunities for young people to engage in the local economy and develop innovative solutions, Bornholm can work towards a more sustainable future. Encouraging entrepreneurship and fostering an environment where young professionals see viable career paths on the island will be essential in bridging the gap between education and employment.

Finally, balancing Bornholm's deep rooted traditions with the need for innovation is critical for its long term development. While modernizing infrastructure and expanding economic opportunities, it is equally important to preserve the island's cultural identity and strong sense of community. Ensuring that development initiatives align with local values will help maintain public support and strengthen Bornholm's resilience as a sustainable island community.



(Beautiful and picturesque street in Bornholm)

Conclusions

The implementation of the FREIIA project on Bornholm provided valuable insights into the island's innovation challenges and opportunities. Using the UNIC method and the Design Thinking approach, the research highlighted key barriers to sustainable development, including:

- Heavy dependence on seasonal tourism, leading to economic instability outside peak months.
- Limited activities and services in the off-season, reducing Bornholm's attractiveness as a year-round place to live and work.
- Youth migration, with few returning due to limited career opportunities.
- A lack of structured coordination and collaboration between stakeholders, hindering innovation and sustainable initiatives.
- Challenges in the implementation of circular economy principles, particularly in the construction sector.

The interdisciplinary workshops provided a collaborative platform for addressing these challenges by bringing together stakeholders from public institutions, private enterprises, and the local community. Through this process, several actionable initiatives were co-created, such as:

- Strategies for extending tourism beyond the summer season to create a more stable economy.
- Concepts for improving stakeholder collaboration, particularly between public and private actors.
- Exploring circular economy solutions in the construction industry to enhance sustainability and waste management.

These solutions demonstrate the power of co-creation in tackling complex, localized issues. The workshops underscored the importance of ensuring that innovation aligns with Bornholm's existing strengths while addressing its socio-economic and environmental vulnerabilities.

A key takeaway from this phase of the project is the necessity of structured collaboration platforms. Many of the challenges identified, such as youth migration and seasonal economic fluctuations, require long-term, coordinated efforts that extend beyond individual initiatives. Strengthening stakeholder engagement and fostering a culture of innovation will be crucial for ensuring Bornholm's future resilience.

Next Steps

The next stage of the FREIIA project on Bornholm will focus on refining and testing the proposed solutions through continued collaboration with local stakeholders. Establishing long-term engagement strategies will be essential to ensure that the co-created solutions translate into concrete actions.

A crucial aspect will be ensuring that stakeholders take ownership of the initiatives developed in the workshops. By maintaining a continuous feedback loop and building local capacity, Bornholm can become a model for how island communities can overcome structural challenges through collective innovation and sustainable development.

Acknowledgements

We wish to thank our mentor and project leader from the Norwegian partner, Bjørn Gitle Hauge, for his mentoring, trust, and support throughout the project duration. Thank you to Dr. Gunnar Andersson for his invaluable feedback and guidance throughout the project. Thank you to Eivind Andre Leister (HiØ) and Thobias Linkjendal (Drivhuset AS) for facilitating and developing the workshop.

This work was made possible by the generous support of the Interreg NSR and the EU. We would also like to acknowledge Østfold University College for providing access to the necessary facilities, staff, and data. Our gratitude extends to the technical staff at SIKT for their assistance with all matters regarding data collection.

We are deeply grateful to all the students from Aalborg University and Østfold university college: Innovation and project management, for their invaluable contributions to the workshop. We also extend our thanks to the stakeholders from Bornholm, who shared their time and perspectives, creativity, and engagement in the co-creation workshops. Without them, there would not be a project to write about.

Finally, we would like to thank BOFA, Aalborg University, and Drivhuset AS for their invaluable support in identifying stakeholders, facilitating workshops, and enriching the project with their insights and contributions.

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