Transforming Society 5.0

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

ASIA-EUROPE FOUNDATION

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Transforming Society 5.0:
Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

Published as part of the 6th ASEF Young Leaders Summit (ASEFYLS6)

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Foreword

It is with great pride and optimism that I present this publication, which stands as an important milestone in the ASEF Young Leaders Summit (ASEFYLS) journey on Leadership in Society 5.0. Building on our previous work capturing youth perspectives on technology-informed leadership, this volume takes a vital next step: it moves from perception to practice, showcasing concrete solutions to societal challenges through technology.

Since 2015, the ASEFYLS programme has brought together young leaders from across Asia and Europe to learn, collaborate and co-create new ideas for the future of our societies. In recent years, our focus on Society 5.0, which explores a human-centred vision of society where technology supports both economic development and the resolution of social challenges, has provided a powerful framework for this work. At the heart of this vision are values that are deeply important to ASEF and its partners: sustainability, ethics, and inclusion.

This publication compiles 10 challenge reports featuring 40 case studies collected and analysed by participants of the 6th ASEF Young Leaders Summit (ASEFYLS6) in response to real-world challenges. These case studies were presented at the ASEFYLS6 Youth Summit and at the Osaka World Expo 2025. These cases span diverse fields, from education, healthcare, and agriculture to waste management, energy, housing, and reproductive health, drawing on examples from communities across Asia and Europe. They show how technology, when grounded in human needs and local context, can help address complex problems in ways that are both innovative and just.

I see this volume as more than a record of a successful programme activity; it is a resource for dialogue and action. It can inform educators who wish to introduce practical examples of Society 5.0 into their teaching, support youth organisations and start-ups seeking inspiration, and offer policymakers a window into how young leaders understand and engage with pressing societal issues. By presenting comparative case studies, the publication also underlines the value of cooperation between Asia and Europe in co-creating responses to shared challenges.

I extend my heartfelt thanks to all the Participants of ASEFYLS6 who contributed to these challenge reports, and to the many partners, experts, and colleagues whose support made this work possible.

As you read the challenge reports that follow, I invite you to reflect on the ideas and initiatives presented here, and to consider how they may resonate with your own context and work. Together, we can help shape a future in which technology truly serves people, and where young leaders play a central role in guiding our societies towards a more sustainable, inclusive, and human-centred Society 5.0.

Ambassador Beata Stoczyńska

Acknowledgements

This Publication would not have been possible without the collective efforts of a dedicated team of contributors and supporters. ASEF would like to express its sincere appreciation to everyone who contributed to this endeavour.

First and foremost, our deepest thanks go to the 89 participants of the 6th ASEF Young Leaders Summit (ASEFYLS6) who authored the challenge reports, and whose insightful research and comparative analysis form the core of this volume. These committed young leaders enthusiastically participated in the ASEFYLS6 programme, and produced a collaborative body of work that exemplifies thoughtful analysis and intercultural teamwork. Of these young leaders, 20 make up the ASEFYLS6 Navigators – a cohort of ASEF Education Department alumni who joined the programme with a goal of developing their team leadership skills and giving back to a new cohort of young leaders. They led their teams through the research and writing process with grace, enthusiasm, and integrity.

We are grateful to the expert speakers from diverse sectors whose perspectives enriched discussions and helped shape the participants' ability to critically analyse the case studies. Their profiles can be found here.

We are especially grateful for our partnership with colleagues from the United Nations Development Programme (UNDP) Movers Programme who co-developed the challenges and connected us with start-ups and non-governmental organisations from their network, who provided the inspiration for each of the challenges in this publication. United by a shared goal of promoting youth initiatives and sustainable development, we are thankful to work alongside such passionate partners.

Furthermore, the ASEFYLS6 project as a whole would not have been possible without the contributions of our dedicated Partners: the Japan Hub for Innovative Global Education (JIGE), the Institute for Innovative Global Education at Kansai University, College of Europe in Natolin; our Knowledge Partners: the Copenhagen Institute for Futures Studies and the Tech for Good Institute; and our Supporting Partners: the Ministry of Foreign Affairs of Japan, the European Students' Forum (AEGEE), the ASEAN Youth Organization (AYO), the All-China Youth Federation (ACYF), the European Law Students Association (ELSA), the Erasmus Student Network (ESN), the European Students' Union (ESU), the Student Thinktank for Europe-Asia Relations (STEAR), and European Guanxi.

ASEF would like to thank the core team who worked on the production of this report. Our appreciation goes to Mr Tomas Akynov for his meticulous editing, proofreading and intellectual contributions at the compilation stage, and Mr Martin Vidanes for his creative design, and layout of the entire volume. We also wish to thank our editors Ms Réka Tózsa, Director of ASEF's Education Department, Ms Freya Chow-Paul, ASEF Youth Project Lead, and Ms Linnéa Regnell, Senior Project Executive, Youth, ASEF, who conceptualised and carefully edited this publication. In addition, ASEF would like to thank members of its Education Department for consultation and input throughout the project.

Finally, ASEF is particularly thankful to the European Union and the Ministry of Foreign Affairs of Denmark for providing the financial support for this project and publication, enabling us to showcase initiatives across Asia and Europe that are striving for a more human-centered society.

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Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

Introduction

In an era defined by rapid technological transformation and shifting societal priorities, from 2023 to 2025, we have continued to invest in nurturing the next generation of leaders with a focus on Leadership in Society 5.0. Described by the Government of Japan as a "human-centered society that balances economic progress with the resolution of social challenges," Society 5.0 signifies far more than a digital evolution – it embodies a profound transformation in how people live, work, and connect, with technology seamlessly woven into the fabric of everyday life.

Since 2023, we have published 2 reports (2023, 2024) capturing the perspectives of over 12,500 youth voices on this topic, and we have organised two Youth Summits and four Capacity Trainings across 6 countries. Collectively these initiatives have directly empowered 261 young leaders from 50 countries, individuals with diverse academic, cultural, and professional backgrounds, with the skills and tools to lead the societal transition toward Society 5.0 in their communities. Through the direct empowerment, these young leaders have engaged a further 2,000+ youth across Asia and Europe, widening the impact of these initiatives.

Through this journey, young leaders expressed a clear desire to complement theoretical understanding with practical examples and resources that demonstrate how technology can address societal challenges in ethical, inclusive, and sustainable ways. We designed the 6th ASEF Young Leaders Summit (ASEFYLS6) to bridge this gap by providing participants with an opportunity not only to learn but also to contribute knowledge themselves, and be the very creators of a resource for other young people.

To set the scope of this publication, we co-developed ten challenge questions with colleagues from the United Nations Development Programme (UNDP) Movers Programme:

Challenge 1.
Equipping youth with practical tech skills using everyday materials: how can we make practical technology education more affordable and accessible for all youth through the use of low-cost materials?

Challenge 2.
Making farming a viable career path for youth: how can we make financing and support easier to access for small farmers and encourage youth to see farming as a viable work opportunity?

Challenge 3.
Ensuring deaf communities can access services and opportunities: how can we break down everyday communication barriers for deaf and hard-of-hearing communities to ensure full participation in society?

Challenge 4.
Making creative and digital skills accessible for all: how can we build learning environments that make digital and creative skill-building easier to access and more inclusive for young people?

Challenge 5.
Bringing healthcare to remote communities: how can we ensure people in rural or low-resource areas can get timely, reliable healthcare support?

Challenge 6.
Making waste management more inclusive and effective: how can we build community-centered systems that improve recycling and create decent jobs in waste management?

Challenge 7.
Smart solutions for clean energy access: how can we harness digital tools and innovation to make clean energy affordable, accessible, and people-centered?

Challenge 8.
Enhancing access to reproductive health education and support for women: how can we improve access to comprehensive reproductive health education and support for women and adolescents, particularly in underserved areas?

Challenge 9.
Turning sensitive waste into sustainable resources: how can we use innovation to transform hard-to-handle waste, such as menstrual products, into safe and sustainable resources that protect public health and promote responsible consumption?

Challenge 10.
Rethinking housing for sustainable cities: how can we use innovation and technology to design affordable, sustainable housing that reduces environmental impact and makes cities more resilient?

The participants were grouped into 10 diverse teams to work on each challenge, with each team comprising 2 ASEFYLS6 Navigators (team leaders) and 6-8 participants. They were tasked with identifying 4 real-world case studies and best practices from across Asia (2) and Europe (2) and compiling these into a challenge report. For each challenge, the teams were given an 'inspiration start-up or NGO' already active in the field as a starting point for research and reflection.

This publication compiles 10 challenge reports featuring a total of 40 Case Studies - 20 from Asia and 20 from Europe – and accompanied by comparative analyses for each of the ten challenges. Together, these ten challenge reports present a rich collection of youth-led inquiry and reflection at the intersection of society, technology, and multilateralism. The reports demonstrate both analytical depth and regional diversity – highlighting how emerging technologies adopt and adapt to different contexts to meet social needs. Throughout the process, participants engaged in peer-to-peer discussions, examining whether solutions could be transferred across regions and communities – or if not, how they might be adapted. The comparative approach not only surfaces innovative practices but also uncovered shared challenges and opportunities for inter-regional cooperation. The findings underscore the enduring value of cross-cultural collaboration and youth agency in advancing the inclusive, human-centered vision of Society 5.0.

The reports were presented at the ASEFYLS6 Youth Summit in Osaka, Japan to partners, expert speakers, and youth peers, as well as at the Osaka World Expo 2025 to a public audience.

To prepare this compilation, all ten reports were reviewed and harmonised for coherence, structure, and consistency. This volume stands as both a record of ASEFYLS6's intellectual outcomes and a testament to the collective leadership of its participants. Above all, it aims to serve as a resource for knowledge exchange across Asia and Europe and offer inspiration for how technology can be purposefully harnessed to address complex societal challenges, and guide our transition towards a more connected, equitable Society 5.0.

CHALLENGE

01

Equipping Youth with Practical Tech Skills Using Everyday Materials

How can we make practical technology education more affordable and accessible for all youth through the use of low-cost materials?

Challenge Overview

Description

Around the world, many young people remain excluded from hands-on technology learning because of high costs, limited resources, and unequal access to equipment. At the same time, digital literacy and practical tech skills are increasingly essential for education, employability, and civic participation in Society 5.0. This challenge explores how low-cost, recycled, and locally available materials can be transformed into meaningful learning tools that make technology education affordable, engaging, and inclusive. Inspired by Stick'Em (Singapore), it invites us to rethink who gets to build, tinker, and innovate—and with what resources.

Inspired by Stick'Em (Singapore)

Stick'Em is a youth-led initiative that turns recycled materials into educational tools for teaching robotics, design, and creativity. By using everyday objects, they reduce costs and make tech education engaging and inclusive.

Website: https://stickem.sg/

Related SDGs:

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Introduction

In an increasingly digital and interconnected world, equipping youth with practical technology skills is essential for social inclusion, economic participation, and long-term resilience. Yet, across Asia and Europe, access to quality technology education remains uneven, often constrained by high costs, limited digital infrastructure and resources, and a lack of inclusivity in schools (UNESCO, 2025). This challenge reflects broader inequalities in education systems and risks excluding many young people from developing skills that are increasingly necessary for everyday life, learning, and future employment.

A central challenge lies not only in what is taught, but how technology education is delivered. In many settings, digital learning is still associated with expensive equipment, specialised laboratories, or advanced infrastructure, placing it beyond the reach of many schools and communities. Low-cost, hands-on approaches that use everyday or reusable materials therefore play a critical role in lowering entry barriers. Such models allow young people to engage directly with technology, develop problem-solving skills, and build technological confidence even where resources are limited.

By analysing case studies across Asia and Europe, the project explores practical approaches to addressing these inequalities. The analysis is framed through the lens of Society 5.0 (Cabinet Office, Government of Japan, 2015) as part of the 6th ASEF Young Leaders' Summit in Osaka, Japan. This perspective emphasises the integration of digital innovation with social inclusion, while uncovering how low-cost, scalable technology education initiatives can empower youth to contribute to a human-centred, knowledge-based society (Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2018). For this report, practical technology education is defined as hands-on learning in digital literacy. This includes areas such as coding, engineering, and renewable energy solutions, while relying on tools and materials that are low-cost or freely available. Several subtopics are discussed, including equitable access to digital skills in formal education, interregional differences in education systems, peer-led teaching models, community-based learning, digital literacy, and low-threshold, curriculum-aligned teaching materials.

The selected case studies span both formal and informal education settings for youth aged approximately 6 to 18 and reflect diverse regional priorities. In the Asia-Pacific context, initiatives often respond to gaps in basic technological infrastructure by emphasising hands-on hardware learning and peer-to-peer knowledge exchange. In Europe, where infrastructure is more developed, programmes tend to focus on product-based learning, reusable materials, and systematic integration into existing education frameworks. Across both regions, cross-sector partnerships between educators, communities, public institutions, and private actors play a key role in scaling and sustaining these efforts.

By analysing cases from New Zealand, Indonesia, Latvia, and a cross-border initiative operating in Austria and Germany, this study identifies principles rather than one-size-fits-all solutions. It highlights how affordable, inclusive, and community-oriented technology education can be adapted to different socioeconomic contexts, supporting the broader goal of democratising access to digital skills in line with the values of Society 5.0.

CASE STUDY

Initiative Name	The Wonder Project
Country, Region	New Zealand, Asia
Organisation	Engineering New Zealand

Year started

The project originally began in 2005 as "Futureintech" but was rebranded as the Wonder Project in 2018.

What specific problem in the challenge does this case study tackle?

New Zealand faces a declining supply of science, technology, engineering, and mathematics (hereafter: STEM) professionals, driven in part by limited access to practical STEM education in schools. High costs and resource constraints restrict hands-on learning opportunities, while insufficient early engagement reduces young people's awareness of and interest in STEM career pathways.

How does the solution address the challenge?

The Wonder Project is a nationwide, not-for-profit programme that delivers free, curriculum-aligned STEM learning for Year 5–8 (ages 8–13) youth. Its programmes are hands-on and immersive, designed to spark curiosity and build confidence in science, technology, engineering, and maths. Delivered across schools throughout New Zealand.

Who is involved?

→ Youth (ākonga) are the main participants (ages 8–13).
→ Schools & teachers receive free access to teaching resources.
→ Private sector / STEM professionals volunteer as ambassadors and mentors.
→ Corporate partners provide funding and technical support (e.g., Transpower, Mercury, EECA, Beca, Fonterra).
→ Community / Government benefit indirectly from the increased STEM pipeline.

Impact & Outcomes

→ Inspired 160,000 youth.
→ Reached over 5,500 classrooms.
→ Touched 1,400 unique schools.
→ Has been supported by over 2,000 ambassadors.

What lessons or ideas can be applied in other countries or contexts?

Accessibility is key: free, curriculum-aligned programmes reduce inequality of access. Every day, low-cost materials make STEM practical and scalable in resource-limited contexts. Volunteer mentoring connects youth with role models and industry, bridging the gap between school and real-world careers. Long-term engagement (multi-year programmes) is more impactful than one-off initiatives. Public–private partnerships ensure sustainability, combining education expertise with industry support.

CASE STUDY

Initiative Name	Society of Renewable Energy (SRE) Indonesia
Country, Region	Indonesia, Asia
Organisation	SRE, a youth-led organisation operating through a network of university chapters in collaboration with government bodies and industry partners.

Year started

2019.

What specific problem in the challenge does this case study tackle?

Indonesia's transition to renewable energy is constrained by gaps in technical knowledge and practical skills among young people, limiting local capacity to adopt and maintain renewable technologies.

This case study tackles the subtopic of peer-led teaching models and practical, community-based learning. It demonstrates how a volunteer youth network can deliver hands-on technical education (e.g., solar panel installation) and raise awareness, making specialised technology accessible to other youth and communities at a low cost.

How does the solution address the challenge?

Through community projects and shared resources, students can organise workshops and practical education seminars to spread hands-on energy tech skills.

Its innovation also lies in the decentralised network of the project, whereby local university organisations are run by the students themselves, and thus, knowledge isn't only limited to big cities like Jakarta but is spread through local networks, too.

Through a mix of theory and practice, students can gain a greater, more well-rounded understanding of sustainability and the technology that powers it.

Who is involved?

→ University students under 30 are the main stakeholders who lead and implement projects.
→ Government agencies such as the Ministry of Energy and Mineral Resources, for policy alignment and support.
→ Universities host the chapters.
→ Local communities and schools are the beneficiaries of educational outreach and technology installation projects.

Impact & Outcomes

→ Over 540 kWp of solar power installed across 150+ locations.
→ Over 500 young people were involved in hands-on installation projects.
→ More than 15 members have achieved professional certification as solar PV designers and installers, creating a skilled workforce for Indonesia's growing renewable energy sector.
→ Over 400,000 people were educated through 300+ events.

What lessons or ideas can be applied in other countries or contexts?

By implementing youth-led university-based clubs, a low-cost and high-impact localised learning network can be achieved that is fundamentally based on resourcefulness. Students can distribute their STEM knowledge, either with regard to sustainability or not, to other students, thereby not having staffing costs, and seeking minimal funding from universities and corporate partners for materials and other expenses.

CASE STUDY

Initiative Name	Start(IT) – IT Education Foundation Latvia
Country, Region	Latvia, Europe
Organisation	IT Education Foundation, in cooperation with schools, universities, and private sector IT companies.

Year started

2015.

What specific problem in the challenge does this case study tackle?

Lack of affordable, accessible programming and computing education in schools. Teachers lack the training and resources to deliver practical technology lessons. Early digital education was not compulsory or standardised across the school system. (Start IT, n.d.)

How does the solution address the challenge?

Start(IT) provides a free, nationwide online platform with curriculum-aligned programming and IT resources, combined with teacher training to build long-term capacity. It uses digital learning materials, professional development for educators, curriculum integration from Grade 1, and public–private partnerships that ensure both quality and scale. Innovative elements include its dual focus on students and teachers, accessibility to all schools, and its direct role in shaping system-level change.

This case addresses the subtopic of equitable access to digital skills in formal education. By providing free teaching materials, online learning tools, and teacher training, Start(IT) ensures that youth across Latvia, regardless of background or school resources, can gain practical technology education. It directly relates to the overall challenge of making practical technology education more affordable and universally accessible. (Start IT, n.d.)

Who is involved?

→ Youth and students, as primary beneficiaries, gain access to digital skills.
→ Teachers and schools who use the platform and receive training to deliver computing lessons.
→ IT Education Foundation (NGO) develops and manages the programme.
→ The government supports curriculum integration and national rollout.
→ Private sector IT companies contribute expertise, resources, and funding. (Start IT, n.d.)

Impact & Outcomes

→ Around 60,000 unique users annually access its free learning portal.
→ 1,000 teachers received training and teaching resources, significantly strengthening digital pedagogy in schools.
→ The programme directly supported the introduction of compulsory computing education from Grade 1, ensuring equal access for all students.
→ As a result, young people have gained practical programming, IT, and problem-solving skills, while schools are better equipped to deliver modern, high-quality digital education regardless of their location or resources. (Start IT, n.d.)

What lessons or ideas can be applied in other countries or contexts?

Start(IT) shows that affordable, nationwide technology education can be achieved by combining free digital platforms, teacher training, and curriculum integration. A key lesson is the importance of public–private partnerships, where NGOs, government, and industry work together to keep content relevant and sustainable. The dual focus on both students and educators, paired with systemic policy support, ensures long-term impact and scalability. (Start IT, n.d.)

CASE STUDY

Initiative Name	Cody 21
Country, Region	Austria and Germany, Europe
Organisation	Developed by Acodemy GmbH, Austria's first coding school for children.

Year started

2022.

What specific problem in the challenge does this case study tackle?

Lack of early digital literacy and media competence training in primary schools. Teachers often lack resources and equipment, creating barriers to integrating digital skills in class. Need for low-threshold, curriculum-aligned teaching materials that do not require individual devices.

How does the solution address the challenge?

This case focuses on early digital literacy and basic informatics education for 3rd and 4th-grade students, using video-based lessons and playful storytelling to introduce core digital skills. Through 16 interactive units delivered over two school years, children develop problem-solving and critical media competencies in an age-appropriate and engaging way. The programme is designed for low-threshold implementation, requiring only a laptop, a beamer, and an internet connection, with no individual devices needed, ensuring inclusive access. Supporting materials, teacher guidance, and optional training are provided, and the content aligns with international frameworks such as DigComp and CSTA while being adapted to Austrian primary curricula.

Who is involved?

→ Acodemy GmbH is a developer and provider of content.
→ Vienna Board of Education, A1 digital.campus, OMV, financial and organisational supporters.
→ City of Linz and Raiffeisenlandesbank Upper Austria are local pilot funding partners.
→ Teachers / after-school educators implement the material in classrooms.
→ Children (3rd & 4th grade primary school) are the main target group.
→ Parents & school leaders are indirect supporters.

Impact & Outcomes

→ Available in over 800 Austrian primary schools, with around 25 per cent of all schools participating by 2023.
→ Thousands of children in 3rd and 4th grade now receive structured digital literacy lessons without needing extra devices. Teachers report a significant reduction in preparation workload and improved confidence in teaching digital topics.
→ Children gain concrete skills in digital literacy, problem-solving, safe media use, and introductory coding concepts.
→ The programme continues semester by semester, supported by municipalities and sponsors, showing strong scalability and long-term adoption potential.

What lessons or ideas can be applied in other countries or contexts?

Introducing digital literacy at the primary level is essential to narrowing the digital divide before inequalities deepen. Low-threshold programme design, particularly models that do not require personal devices, makes digital education more inclusive across diverse socio-economic contexts. Cross-sector partnerships between schools, public authorities, and private actors support sustainable implementation and scale. Narrative-based learning, such as storytelling and gamification, helps make abstract digital concepts accessible for young learners, while ready-to-use, curriculum-aligned materials reduce pressure on teachers and ensure consistent quality. Centrally produced, adaptable video lessons further offer a scalable model for wider national or international adoption.

Comparative Analysis

One of the main differences in Asia-Pacific lies in the educators. The Wonder Project is a centralised project that provides resources to formal educators to strengthen STEM knowledge among young people aged 8 to 13. On the contrary, SRE Indonesia operates as a decentralised student-run network across universities, focusing on hands-on sustainability and renewable knowledge. While the two projects differ in structure, age groups, educational practices, and their skill focus, they share a common premise: delivering practical hardware education through a community-first approach.

Across Europe (Cody 21, Start(IT)), both similarities and differences can be identified in the design and implementation of initiatives. The targeted age groups are largely the same, with a shared emphasis on comparable stages of education and youth engagement. Low-cost materials are used across contexts, though the mode of application and primary focus groups differ between countries. The scale of initiatives varies significantly, with some countries implementing programmes at the national level, while others operate on a more local or regional basis.

Differences across regions can be observed in several dimensions. Cultural aspects play a central role, as projects are often adapted to local traditions and practices, reflecting distinct cultural differences. In Europe, initiatives tend to be more product-focused, whereas in the Asia-Pacific, there is a stronger emphasis on peer-to-peer learning and knowledge exchange. Sustainability is more prominently integrated into European approaches, particularly through the use of reusable materials and resource-efficient practices. Furthermore, cross-sector partnerships are a common feature, though their form and extent vary across regions, shaping how initiatives are organised and delivered. The European cases are often more systematically organised and are frequently shaped by top-down governance, from national or EU-level authorities.

These differences can also be partly explained by the broader socioeconomic conditions of the two continents and their respective approach to technological evolution. In many European contexts, where hardware infrastructure is relatively advanced, there is greater emphasis on developing technological thinking and software-related skills, such as coding, that build on existing systems (UNICEF, 2023, pp. 6–9). In contrast, parts of the Asia-Pacific, particularly in rural or under-resourced areas, continue to face gaps in basic technological infrastructure (UNESCO, 2022, pp. 1–6). Therefore, projects that accelerate the adoption of new technologies through hands-on learning of hardware are needed more than coding skills for the time being.

Summary

The analysis highlights how technological needs and education priorities differ across regions, and how these differences are reflected in youth-led projects. Specifically, the findings demonstrate which specific type of technology education was most valuable in each region based on several factors, such as economic development, technological advancement, and current educational gaps.

Affordable, inclusive, and sustainable technology education is evidently at the core of Society 5.0 (Cabinet Office, Government of Japan, 2015; Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2018), which emphasises the use of technology for societal good. The distinct focus of the challenge on repurposing everyday materials for said education brings forward the innovation that characterises Society 5.0, especially in terms of sustainability.

Overall, the comparison reveals strong commonalities across regions, particularly the emphasis on community-based and peer-supported learning. Such observations could bridge the gap between Europe and Asia in our understanding of the challenge and combine the solutions for the regions' varying needs to come up with intercontinental ideas that can address the myriad of sub-topics of the issue at hand.

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CHALLENGE

02

Making Farming a Viable Career Path for Youth

How can we make financing and support easier to access for small farmers and encourage youth to see farming as a viable work opportunity?

Challenge Overview

Description

Farming remains a backbone of many economies, yet young people often perceive it as unstable, low-status, or financially unviable work. Smallholders, especially in rural areas, frequently face barriers in accessing finance, markets, and technical support, limiting both productivity and resilience. This challenge asks how financing, digital tools, and non-monetary support can be redesigned so that agriculture becomes an attractive and dignified livelihood for youth. Drawing inspiration from iFarmer (Bangladesh), it highlights opportunities for youth-led innovation in sustainable, tech-enabled food systems.

Inspired by iFarmer (Bangladesh)

iFarmer supports smallholders by connecting them to affordable loans, farm inputs, and guidance through an easy-to-use digital platform. Their model helps farmers become more resilient and economically independent.

Website: https://ifarmer.asia/

Related SDGs:

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Introduction

Agriculture remains a critical sector across Asia and Europe, underpinning food security, rural employment, and economic stability. However, farming is becoming increasingly unattractive to young people due to low profitability, high start-up costs, limited access to land and credit, and perceptions of farming as outdated or high-risk work. These challenges threaten the long-term sustainability of rural economies and food systems.

In Asia, the average age of farmers is rising, with fewer young people taking up agricultural livelihoods. In particular, countries like India and China have experienced a steady decline in youth participation in farming activities, while China (Yang & Wu, 2024) also experiences declines due to urban migration and higher-paying non-farm opportunities. In Europe, the situation is similarly concerning, with only 6.5 per cent of farm holders under the age of 35 (European Council of Young Farmers, 2025). This demographic trend shows a significant challenge to rural economies and food systems.

Financial exclusion is a recurring obstacle. Young farmers face significantly greater barriers in accessing agricultural financing, with banks rejecting over half of all loan applications from young farmers compared to 32 per cent for older farmers. Nearly 30 per cent of young farmers are classified as high-risk borrowers versus only 4 per cent of older farmers (European Commission, 2023). This restricts the entry of new generations into agriculture and perpetuates cycles of rural disadvantage.

The digital divide further exacerbates these challenges. Rural internet penetration lags significantly behind urban areas, only 60.5 per cent in rural China compared to 85.1 per cent in cities (Zhou et al., 2025), with Europe showing similar gaps (Eurostat, 2024). Despite precision farming adoption reaching 42 per cent in Europe by 2024 (Ronzhin et al., 2025), smallholder farmers representing 84 per cent of all farms remain excluded from digital agricultural technologies due to connectivity gaps, high costs, and limited digital literacy, preventing access to productivity-enhancing innovations and market opportunities (Marie, 2022).

Insights from practitioner engagement further reinforce these findings. Discussions with iFarmer, a social enterprise in Bangladesh specialising in youth engagement and agricultural finance, revealed that young farmers often become early adopters of new technologies and innovations when they have access to training, finance, and supportive networks. Bridging the digital divide and making finance accessible all emerged as vital ingredients for structural change.

This study examines four case studies, two from Asia and two from Europe, that present innovative approaches to financing, technology, and youth empowerment in agriculture. Framed within a Society 5.0 perspective, the analysis focuses on evidence-based, scalable solutions that reduce barriers and promote inclusive leadership, position young people as active agents of change, and contribute to sustainable rural development.

CASE STUDY

Title	“One Tambon, One Product” (OTOP)
Country, Region	Thailand, Asia
Organisation	Royal Thai Government for policy (leadership and certification)

Year started

2021.

What specific problem in the challenge does this case study tackle?

One Tambon, One Product (OTOP) addresses declining youth participation in agriculture caused by low crop prices, limited value addition, weak market access, and perceptions of farming as outdated and unprofitable. It also responds to high levels of youth disengagement from employment, education, or training (NEET), particularly in rural areas.

How does the solution address the challenge?

The initiative increases the attractiveness and profitability of farming by transforming raw agricultural products into branded, market-ready goods. Each tambon (subdistrict) develops a unique local product, supported by training in processing, packaging, branding, quality assurance, and sales. A national five-star grading system rewards quality and enables high-performing products to access domestic and international markets, including trade fairs.

Who is involved?

→ Youth lead innovation, design, marketing, and digital sales.
→ Farmers supply raw materials and form cooperatives.
→ Private companies manage distribution, retail, and tourism linkages. NGOs and schools provide skills training and incubation.
→ The government oversees certification, grading, export support, and market access.

Impact & Outcomes

→ OTOP operates nationwide across more than 7,000 tambons, with over 100,000 registered producers as of 2023.
→ More than half of producers are community-based groups, and nearly 43 per cent are individual entrepreneurs.
→ The programme has generated significant economic returns, including THB 142 million (approximately USD 4.4 million) in sales over two days at the 2024 mid-year OTOP exhibition.
→ It has strengthened rural entrepreneurship, linked agriculture with tourism and cultural identity, and expanded youth participation through digital marketing and e-commerce training.

What lessons or ideas can be applied in other countries or contexts?

OTOP demonstrates how value addition, branding, and market integration can make farming a viable and attractive career for youth. Government-backed certification systems can enhance credibility and market access, while linking agriculture to culture and tourism increases appeal. The model is transferable to other contexts but could be strengthened through greater use of digital tools, online marketplaces, and innovation beyond face-to-face sales channels.

CASE STUDY

Title	e-NAM × Farmer Producer Organisations (FPOs)
Country, Region	India, Asia
Organisation	Government of India (policy leadership); Farmer Producer Organisations (FPOs);

Year started

2016 (e-NAM); 2020 (Mission for Formation and Promotion of 10,000 FPOs)

What specific problem in the challenge does this case study tackle?

In India, 86.08 per cent of farmers are small and marginal (Government of India, Ministry of Agriculture & Farmers Welfare, 2019), and 28 per cent of agricultural loans are sourced from informal lenders (NABARD, 2018). The initiative addresses limited access to finance and weak market power among small and marginal farmers, which discourages youth from viewing farming as a viable and professional career. High reliance on informal lending and low bargaining power have historically constrained profitability and long-term sustainability in Indian agriculture.

How does the solution address the challenge?

The model combines a national digital marketplace (e-NAM) with collective farmer organisation through Farmer Producer Organistions (FPOs). e-NAM improves price transparency and generates transaction data, while FPOs strengthen bargaining power, reduce costs through collective procurement, and improve access to markets. Banks use digital transaction records and FPO-level creditworthiness, supported by government guarantees, to offer data-driven, low-collateral loans. Private agri-tech firms and CBBOs provide logistics, data analysis, and long-term business support.

Who is involved?

→ Small and marginal farmers organised into FPOs.
→ Youth engaged in farm management, logistics, and data-driven roles.
→ Government agencies providing policy frameworks and guarantees.
→ Banks offering formal credit.
→ Agri-tech companies supporting logistics and analytics; CBBOs (Cluster-Based Business Organisations) delivering sustained capacity building.

Impact & Outcomes

→ By February 2025, 10,000 FPOs had been formed, supporting approximately 2.5 million farmers, 82 per cent of whom are small-scale producers.
→ FPO members earn on average ₨7,254–8,133 (approximately USD 88) more in annual net returns than non-members and have reduced input costs by 15–30 per cent.
→ Around 1,900 FPOs have secured credit guarantees, enabling access to collateral-free loans and improving financial inclusion.

What lessons or ideas can be applied in other countries or contexts?

The case demonstrates the value of layering digital platforms onto existing markets to generate data-based creditworthiness for small producers. Bundling finance, market access, and advisory services within farmer organisations increases scale, efficiency, and trust. Long-term institutional support is essential for newly formed groups. By transforming farming into a data-driven, business-oriented sector, the model creates new professional roles and makes agriculture more attractive to young people, offering a replicable pathway for other countries facing similar challenges.

CASE STUDY

Title	The Land Mobility Service (Generational Renewal, Facilitation & Support Service)
Country, Region	Ireland, Europe
Organisation	Macra na Feirme

Year started

2014.

What specific problem in the challenge does this case study tackle?

In Ireland, one-third of farmers are over the age of 65, with more than half being over 55, and only 5 per cent are under 35 (Eurostat, 2021, 2024). At the same time, 48 per cent of full-time farmers have no identified successor (Bogue, 2012; IFAC, 2025). The initiative addresses barriers to youth entry into farming caused by limited access to land and weak succession planning. An ageing farming population, combined with a high proportion of farms lacking identified successors, prevents young farmers from establishing viable careers and threatens long-term food security, rural vitality, and environmental sustainability.

How does the solution address the challenge?

The Land Mobility Service operates as a neutral, independent “honest broker” connecting older farmers wishing to step back with young farmers seeking land access. Instead of land purchase, it facilitates collaborative arrangements such as long-term leases, share farming, share milking, contract rearing, and registered partnerships. These models are flexible, legally secure, and tailored to individual circumstances, creating mutually beneficial outcomes for both generations.

Who is involved?

→ Macra na Feirme (lead organisation).
→ FBD Trust (financial backing).
→ Older landowners.
→ Young farmers and new entrants.
→ Regional facilitators.
→ Professional advisers (legal, financial, agricultural).
→ Industry partners.
→ Government of Ireland (tax incentives and support schemes).

Impact & Outcomes

→ Since 2015, the service has facilitated over 960 collaborative arrangements covering more than 75,000 acres across Ireland.
→ In 2022 alone, it recorded 1,080 enquiries, resulting in around 100 new agreements.
→ Approximately 35 per cent of enquiries came from young farmers or new entrants, while 45 per cent came from older landowners.
→ The model enables young farmers to establish enterprises without large upfront capital investments while providing older farmers with income stability and confidence that their farms remain productive.

What lessons or ideas can be applied in other countries or contexts?

The case highlights the importance of independent facilitation in managing the emotional and financial complexity of farm succession. It demonstrates that secure land access can be achieved through collaborative arrangements rather than ownership, lowering entry barriers for youth. Structured entry pathways for young farmers, combined with dignified exit options for older farmers, can support generational renewal and make agriculture a more viable and attractive career globally.

CASE STUDY

Title	The Human Capital Pillar: CULTIVA Programme
Country, Region	Spain, Europe
Organisation	Ministry of Agriculture of Spain, Fisheries, and Food (MAPA)

Year started

2020.

What specific problem in the challenge does this case study tackle?

Rural areas across Spain are experiencing an aging population, with fewer young people choosing to take up farming as a profession. The programme addresses the generational renewal challenge in agriculture by tackling the "experience gap" faced by young farmers. While many young people enter the sector, they often lack practical skills, confidence, and professional networks, limiting their ability to build viable and sustainable farming careers.

How does the solution address the challenge?

The CULTIVA Programme provides immersive, short-term on-farm placements that enable young farmers to gain hands-on experience at selected "model farms" using innovative and sustainable practices. Government funding removes financial barriers by covering travel, accommodation, and daily allowances, allowing participants to focus fully on learning and professional development.

Who is involved?

→ Young farmers under 41 participating in placements.
→ Host farmers offering mentorship.
→ Agricultural organisations managing placements and outreach.
→ The Ministry of Agriculture providing funding and oversight.
→ Sector networks supporting follow-up and peer exchange.

Impact & Outcomes

→ Between 2020 and 2023, nearly 300 young agricultural professionals participated in the programme, with an additional 220 selected for the 2024–2025 cycle.
→ Reported satisfaction rates among participating organisations are close to 100 per cent.
→ Beyond technical skills in sustainable management, digitalisation, and direct marketing, the programme builds confidence, reduces rural isolation, and strengthens professional networks through national alumni events.

What lessons or ideas can be applied in other countries or contexts?

CULTIVA's effectiveness lies in its ability to tailor learning experiences to the specific needs of each participant. Replicating the programme elsewhere would require a similarly robust matching process, pairing young farmers with host farms that align with their interests, production systems, and learning objectives, ensuring relevance and practical value. Financial support for travel, accommodation, and participation costs is also essential to remove economic barriers for young farmers with limited resources. Equally important is the programme's mentoring dimension: sustained relationships between participants and experienced host farmers enable ongoing guidance beyond the training period. Incorporating structured follow-up mechanisms would help reinforce learning outcomes and ensure that knowledge transfer leads to lasting professional development.

Comparative Analysis

Across Asia and Europe, the case studies demonstrate that making farming a viable career for youth requires addressing financial, social, and knowledge barriers simultaneously. However, regional contexts shape how these barriers are prioritised and addressed. Asian initiatives tend to focus on economic viability and scale, while European approaches emphasise social structures, skills transfer, and intergenerational continuity. Both models rely on strong government leadership and multi-stakeholder ecosystems, demonstrating how national-level policy frameworks can reposition agriculture as a modern, business-oriented sector with space for youth participation.

In Asia, Thailand's One Tambon One Product (OTOP) and India's e-NAM with Farmer Producer Organisations (FPOs) concentrate on improving profitability and digital tools. OTOP enhances the attractiveness of farming by adding value to agricultural products and linking them to tourism, culture, and branding, thereby creating youth-led entrepreneurial opportunities. In India, FPOs use digital platforms to improve access to finance, markets, and data-driven decisions. Both models rely on large-scale government support and multi-stakeholder collaboration to reach thousands of farmers, demonstrating that national-level backing can transform farming into a business-oriented, youth-driven sector.

European cases emphasise social structures, mentorship, and intergenerational collaboration. Ireland's Land Mobility Service provides secure land access through a neutral brokerage model, helping young farmers to begin without prohibitive costs. Spain's CULTIVA Programme builds confidence, skills, and networks through mentorship and peer learning. Although smaller in scale than the Asian cases, these initiatives prioritise sustainability and long-term impact through building human capital, legal support, and community-building. Digitalisation is a common thread, though its role varies. In India, digital tools integrate with finance, giving smallholders efficient access to loans and markets. In Thailand, e-commerce expands youth-led enterprises. In Europe, technology plays a smaller role but could be strengthened through fintech, digital advisory services, and online marketplaces.

All four initiatives rely on multi-stakeholder cooperation, engaging governments, communities, private sector actors, and civil society. They expand the concept of farming beyond production alone, incorporating elements of business, technology, tourism, and social learning, making it a more rewarding career path for youth. From a Society 5.0 perspective; ethics, inclusion, and sustainability act as guiding pillars. Ethical principles appear in India and Ireland through fair access to finance and land. Inclusion is highlighted in Thailand and India through youth and smallholder empowerment, while European programmes foster intergenerational cooperation and resilience. Sustainability emerges through cultural heritage preservation (OTOP), financial security (FPOs), sustainable practices (CULTIVA), and prevention of land abandonment (Land Mobility Service).

Overall, these cases demonstrate that combining financial, technological, and social interventions can make farming a viable, attractive career for the next generation, regardless of geography. Investing in youth, innovation, and collaboration can revitalise rural areas and strengthen the long-term sustainability of global food systems.

Summary

Our analysis provided a deeper understanding of the complex barriers to generational renewal in farming and why many young people no longer view agriculture as a viable career. The case studies confirm that farming becomes attractive to youth only when financial, social, and knowledge barriers are addressed simultaneously. In Asia, large-scale, government-backed initiatives such as India's Farmer Producer Organisations and Thailand's OTOP demonstrate how technology, market access, and cultural identity can generate new economic opportunities. In Europe, the emphasis lies on mentorship, training, and trust-based models, as seen in Spain's CULTIVA Programme and Ireland's Land Mobility Service, highlighting the importance of human capital development and intergenerational cooperation. Comparing these approaches shows that both scale and community depth are essential for making farming sustainable and appealing to younger generations.

Our understanding of leadership within a Society 5.0 framework also evolved. Effective leadership depends on systems in which responsibilities are shared among governments, communities, industry, and farmers. Three guiding principles emerged across the cases: ethics, reflected in fair access to land and finance; inclusion, through the empowerment of youth and smallholders; and sustainability, by safeguarding food security, cultural continuity, and environmental stewardship.

Collaborative analysis further highlighted opportunities for cross-regional learning. European contexts could benefit from Asia's digital finance models and OTOP's success in linking farming to value-added products and tourism, while Asian contexts could draw on Europe's structured succession planning and mentorship approaches supported by neutral facilitators. Addressing these challenges is urgent: without action, agriculture risks losing an entire generation, with long-term consequences for global food security and rural resilience.

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CHALLENGE

03

Ensuring Deaf Communities Can Access Services and Opportunities

How can we break down everyday communication barriers for deaf and hard-of-hearing communities to ensure full participation in society?

Challenge Overview

Description

Deaf and hard-of-hearing communities continue to encounter everyday communication barriers in education, healthcare, workplaces, and public services. These barriers restrict full participation in society and reinforce stigma, even when technological possibilities for accessible communication are rapidly expanding. This challenge focuses on how inclusive digital communication models and universal design can remove these barriers and create more equitable access to services and opportunities. Inspired by DeafTawk (Pakistan), it invites reflection on how technology, attitudes, and policy must evolve together to support meaningful inclusion.

Inspired by DeafTawk (Pakistan)

DeafTawk connects users with trained sign language interpreters through video, allowing real-time communication in schools, hospitals, and workplaces.

Website: https://www.deaftawk.com/

Related SDGs:

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Introduction

Deaf and hard-of-hearing (DHH) communities throughout the world continue to encounter obstacles in reaching and accessing day-to-day services, ranging from emergency services to bank services, education, or public services. DHH communities refer to people with partial or total hearing loss who rely on sign languages, speech-to-text technologies, captioning, or assistive tools to communicate on equal terms with hearing citizens. Ensuring equitable access to communication is recognised as a fundamental human right, structural gaps in technology deployment, service provision, and policy enforcement continue to limit the full participation of DHH individuals in society.

Within Europe, the legislative foundation for accessibility is comparatively robust. The European Accessibility Act (Directive 2019/882), the Web Accessibility Directive (Directive 2016/2102), and the European Electronic Communications Code (Directive 2018/1972) mandate accessible products, emergency communications, and digital services by June 2025 (European Union, 2016, 2018, 2019). Yet, even with these frameworks, everyday challenges still exist. Interpreter shortages remain a systemic barrier, not only in terms of numbers but also in distribution and linguistic diversity. Approximately 51 million people in Europe experience hearing loss, representing around one in ten EU citizens (European Federation of Hard of Hearing People, 2015). Moreover, it's estimated that there are currently only one million sign language users in the EU (Leeson et al., 2020), and around 80 deaf people to one interpreter (Health Europa, 2021). Interpreter services are often concentrated in urban centres, leaving rural regions underserved. At the same time, deaf interpreters play a vital role in bridging cultural nuance and non-standard signing, yet their availability across Europe remains limited (Deaf Journalism Europe, 2025).

In Asia, the challenge of ensuring equitable communication access is amplified by uneven policy frameworks and resource constraints. In Bangladesh, for example, Bangla Sign language is recognised in practice (Hasib et al., 2023), yet the absence of formal legal protections and the limited provision of sign language services across key public institutions, particularly hospitals and schools, continue to impede effective communication for deaf individuals. These structural limitations are further compounded by the widespread lack of sign language proficiency among family members, leaving many deaf persons without adequate communication support in essential everyday contexts (Dhaka Tribune, 2025; Cricchio, 2024). In Vietnam, an estimated 2.5 million people experience hearing or speech disabilities, but interpreter availability is limited, restricting access to essential medical and public services (VUFO-NGO Resource Centre, 2024). Rapid urbanisation and digitalisation across Asia have created opportunities for mobile-based solutions, such as speech-to-text apps and video relay, but affordability and language diversity remain barriers.

These challenges highlight a core tension addressed by the Society 5.0 framework. While digital technologies capable of enabling inclusive communication already exist, social systems, institutions, and policies frequently lag behind their effective integration. This study examines everyday communication barriers experienced by DHH communities and the role of technology-based solutions in addressing them, analysing these challenges across three interrelated dimensions: (1) technology-based access, (2) institutional integration, and (3) legislative support. Situated within a Society 5.0 framework, the study assesses how the alignment of technology, policy, and institutional practice can reduce everyday communication barriers and enable fuller social participation for deaf and hard-of-hearing communities.

CASE STUDY

Initiative Name	Accessibility for All: Integrating Sign Language and Deaf Awareness in Community-Based Rehabilitation
Country, Region	Bangladesh (Savar, Dhaka District), Asia
Organisation	Centre for the Rehabilitation of the Paralysed (CRP)

Year started

1979.

What specific problem in the challenge does this case study tackle?

Limited accessibility and inclusion for deaf and hard-of-hearing people in healthcare, vocational training, and community services in Bangladesh.

How does the solution address the challenge?

Centre for the Rehabilitation of the Paralysed (CRP) ensures inclusion through integrated services, providing sign language interpreters in its hospital and therapy units. It offers vocational training in areas such as IT and tailoring within accessible settings to support economic independence. Alongside this, it runs awareness and advocacy programmes to reduce stigma, while its scale, a central facility with nationwide outreach, serves as a model for replication across Bangladesh.

Who is involved?

→ CRP leadership provides infrastructure and management.
→ Medical and therapy staff trained in basic sign language ensure service delivery.
→ Local communities and employers are engaged to foster broader inclusion.
→ Deaf individuals and their families act as both beneficiaries and advocates.
→ The Government of Bangladesh provides financial contributions to CRP (CRP Bangladesh, 2025).
→ The Valerie Taylor Trust (UK) is a major supporter, contributing over £3.3 million since 2007 (Valerie Taylor Trust, 2025).

Impact & Outcomes

→ CRP treated 129,471 patients in the last reporting year (CRP Bangladesh, 2025).
→ 369 vocational trainees completed CRP's programmes in the last year (CRP Bangladesh, 2025). Beneficiaries acquire employable skills leading to documented cases of employment and self-employment, while broader awareness efforts help reduce stigma and enhance social participation.

What lessons or ideas can be applied in other countries or contexts?

The case highlights the value of holistic integration, embedding accessibility directly into essential services. Its community-centric approach engages families, communities and employers, while its sustainability comes from anchoring programmes within established institutions.

CASE STUDY

Initiative Name	Deaf Young Code, Romania
Country, Region	Austria, Slovakia, Serbia, Romania, Hungary, Greece, and Italy; Europe
Organisations	Consortium of 8 NGOs and schools (e.g., DeafStudio, SignCoders, Equalizent, Liceul Tehnologic Special “Vasile Pavelcu” in Iași, Romania, etc.).

Year started

2019.

What specific problem in the challenge does this case study tackle?

DHH young people often lack access to digital and STEM education in accessible formats. The absence of sign language-based coding resources limits their employability and independence. This project addresses barriers in digital inclusion and ensures equal access to ICT skills and tech careers. In Romania, needs assessments tied to early coding club efforts highlighted the absence of structured, sign supported IT curricula and a shortage of trained teachers for bilingual (sign + plain language) delivery (British Romanian Chamber of Commerce, 2020; Liceul Tehnologic Special “Vasile Pavelcu”, 2024).

How does the solution address the challenge?

The project promotes accessible learning with bilingual materials and visual tools like Scratch. [Scratch is a visual programming language that allows students to create their own interactive stories, games and animations.] The project set up coding clubs in Romania (Iași and Craiova) and organised career visits to companies like Microsoft and Google. Deaf students gain coding, digital literacy and soft skills, while bilingual toolsets and resources are created for reuse. It also raises employer awareness and promotes greater deaf inclusion in the tech sector.

All core learning resources (animated videos, short lessons on C++, algorithms, HTML/CSS, Flutter) are free and accessible online via the project’s channels.

Who is involved?

→ A consortium of 8 NGOs develops accessible materials.
→ Schools provide space and support.
→ DHH experts and interpreters adapt and deliver content.
→ ICT companies offer technical expertise and mentoring.
→ DHH youth are the main beneficiaries, taking part in coding clubs and training.

Impact & Outcomes

→ 50 deaf pupils trained in Craiova’s first coding club; 10 teachers trained to deliver sign-supported coding; ~250 IT signs in Romanian Sign Language (LSR) developed as a reusable online resource.
→ Coding clubs operated in two cities (Iași and Craiova), integrating local school infrastructure.
→ Clickable digital map of accessible coding practices across seven countries.
→ Improved self-determination and independence were reported among participants.
→ Employer awareness strengthened in Romania; Ford Romania highlighted successful inclusion of hearing-impaired employees.

What lessons or ideas can be applied in other countries or contexts?

Other countries can draw lessons from this model by developing bilingual signage, accessible written materials, and visual coding tools that lower barriers to learning. Effective initiatives should combine technical training with mentoring and career orientation, while fostering strong partnerships among NGOs, educational institutions, DHH experts, and ICT companies. Balancing local adaptation with international collaboration ensures both relevance and scalability.

CASE STUDY

Initiative Name	SVisual – Spanish Video Interpreting Service in Spanish Sign Language (LSE)
Country, Region	Spain, Europe
Key actors driving initiative	The CNSE Foundation for the Elimination of Communication Barriers, with support and funding from the Spanish public administrations.

Year started

Planned in 2006, launched in 2009.

What specific problem in the challenge does this case study tackle?

DHH citizens face barriers in services like healthcare, banking and administration due to the shortage of Spanish Sign Language interpreters, highlighting the need for technology-based communication access.

How does the solution address the challenge?

SVIsual is the first Spanish Sign Language video interpreting service in Spain that allows deaf people to make phone calls to hearing people, using their preferred communication method, and vice versa. This service is accessible to everyone, free of charge, and available 24/7, addressing the everyday communication needs of deaf and hearing individuals. It combines hybrid deployment (in-person and remote), strong legal backing, and ISO certification to guarantee confidentiality and trust.

Who is involved?

→ CNSE Foundation manages and provides the necessary technical and human resources for the service.
→ Spanish Confederation of Deaf People (CNSE).
→ Ministry of Industry and Tourism, Spain.
→ Funded by the European Union – NextGenerationEU.
→ Ministry of Social Rights, Consumer Affairs and Agenda 2030 (Spain).
→ ONCE Foundation.

Impact & Outcomes

→ SVisual has interpreted over one million calls, serving thousands of DHH citizens annually in healthcare, finance and administration. Use grew during the pandemic, normalising sign language access across public and private services.
→ Public administrations and private sector organisations are increasingly incorporating it as an accessibility measure across telephone and in-person service provision for deaf individuals.

What lessons or ideas can be applied in other countries or contexts?

Remote video interpreting platforms offer scalable solutions to bridge gaps caused by interpreter shortages. In Spain, strong CNSE advocacy secured institutionalisation through disability law, ensuring sustainability and mainstream adoption. Success also depends on public–private cooperation and, crucially, the active involvement of the DHH community rather than externally imposed services.

CASE STUDY

Initiative Name	SiLViA - Sign Language Virtual Assistant
Country, Region	Singapore, Asia
Key actors driving initiative	FingerDance, Singapore Association for the Deaf (SADeaf), SBS Transit

Year started

2024.

What specific problem in the challenge does this case study tackle?

DHH commuters can find it challenging to navigate routes, directions or announcements when using public transit.

How does the solution address the challenge?

At a kiosk in Chinatown Mass Rapid Transit (MRT) Station, DHH commuters can speak or type their queries into the SiLViA system, which replies in both spoken and sign language. Built on FingerDance's flagship Sign LLM, SiLViA combines proprietary sign language AI translation with advanced avatar technology. In collaboration with SADeaf, Singapore Sign Language is being integrated into the platform to ensure it meets local communication needs effectively.

Who is involved?

→ SBS Transit, a public transport operator, provides the station at which the technology is trialled.
→ FingerDance, an AI start-up, develops the technology-based solution.
→ Huawei and IMDA, acting as incubators, provide the resources and support required to develop and scale the technology.
→ SADeaf, a deaf community organisation, represents the interests of the deaf community and ensures community perspectives are reflected in the project.
→ Deaf signers, as individual users, contribute lived experience and practical input to the development of the product.

Impact & Outcomes

→ DHH commuters receive essential information in real-time at public transit stations.
→ The sign language digital signage concept was recognised as one of the top three winners of the Global Rail 2025 Innovation Awards, selected from over 240 international submissions.

What lessons or ideas can be applied in other countries or contexts?

Kiosks that utilise AI LLMs to generate text and sign language answers to public transit queries can be replicated in any public transit system globally. Enabling public and private sector ecosystems is critical to support trialling and deploying technology to support DHH communities, given the niche market opportunities.

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

Comparative Analysis

The selected case studies differ in scope, strategy, and governance, revealing multiple pathways to advancing inclusion for deaf and hard-of-hearing (DHH) communities. Some initiatives, such as Deaf Young Code (DYC), operate transnationally, whereas others focus on select communities within a country, such as Accessibility for All (AfA) in Bangladesh. They also diverge in their primary focus, economic participation versus public-sphere communication. DYC and AfA focus on a particular area of participation in society through their vocational approach, whereas SiLViA in Singapore and SVisual in Spain tackle inclusive communication in public life. Across Asia and Europe, these cases demonstrate how Society 5.0 solutions can be applied across both economic participation and everyday civic life.

Across both Asia and Europe, technology is a shared enabler of accessibility, but its effectiveness depends heavily on governance structures and partnerships. Public–private collaboration is a consistent success factor, as demonstrated by SiLViA and SVisual, where cooperation between government bodies, technology developers, and service providers supports nationally adapted solutions. This underscores a Society 5.0 principle: technology alone is insufficient without institutional coordination, community partnership, and social integration.

The Deaf Young Code project illustrates cross-border adaptation through the European Digital Learning Network (DLearn), which convenes diverse organisations to exchange methods and localise curricula with national partners. This approach navigates cultural and linguistic differences by working with organisations that can provide necessary local and national insights. It reinforces a design rule: co-create with Deaf communities to ensure ethical, sustainable solutions. Furthermore, the most persistent barrier to cross-border scaling is the proliferation of different sign languages internationally. Accordingly, effective scaling depends on sign-language localisation, interpreter capacity, and policy alignment.

Summary

The case studies deepened understanding of how everyday communication barriers persist despite advances in technology and policy. Together, they illustrate both the diversity of approaches and the common values that underpin them. A key learning is that regional context shapes solutions. In Europe, legal frameworks and EU-level coordination enable services such as SVisual to be institutionalised and sustained. In contrast, Asian initiatives rely heavily on community-based models or public–private partnerships to fill gaps where legislation is weaker or resources are more limited. Despite these differences, collaboration between civil society, government, and the private sector is essential to long-term success.

The cases consistently reflect core Society 5.0 values of ethics, inclusion, and sustainability. Ethical design appears in data protection standards; inclusion is visible in community-driven initiatives where deaf and hard-of-hearing individuals co-create solutions; and sustainability is achieved either through legislative anchoring, as seen in Europe, or institutional embedding within established organisations, as observed in Asia. Ethical design is visible in secure, user-centred communication tools; inclusion appears in community-driven initiatives where DHH individuals co-create solutions; and sustainability is achieved either through legislative anchoring (Europe) or institutional embedding in established organisations (Asia).

The analysis also identifies innovations with cross-border potential, such as Deaf Young Code, Spain's legislation-backed relay model, and Singapore's AI-driven sign language tools. Grassroots digital enterprises such as DeafTawk (a mobile sign-language interpreting platform) further illustrate how community-led innovation and scalable apps can complement national systems and international networks. Taken together, these cases indicate a pathway forward that combines legal guarantees, scalable technology, and meaningful community participation. To align with the principles of Society 5.0, technological innovation must advance not only efficiency but also equity, ethical responsibility, and global adaptability.

Together, these cases suggest a way forward that combines legal guarantees, scalable technology, and community participation. To align with the principles of Society 5.0, technological innovation must advance not only efficiency but also equity, ethical responsibility, and global adaptability.

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CHALLENGE

04

Making Creative and Digital Skills Accessible for All

How can we build learning environments that make digital and creative skill-building easier to access and more inclusive for young people?

Challenge Overview

Description

As economies become more digitised and creativity-driven, gaps in access to digital and creative skills risk deepening social and economic inequalities. Young people who lack supportive learning environments, resources, or networks may be left behind in emerging job markets and innovation ecosystems. This challenge explores how inclusive hubs, flexible learning spaces, and low-cost training formats can open pathways for diverse youth to build future-ready skills. Inspired by Mereka (Malaysia), it highlights the role of partnerships and community-based spaces in nurturing talent and imagination.

Inspired by Mereka (Malaysia)

Mereka runs creative hubs and talent programmes where youth can learn practical skills for the future, supported by private and public partnerships.

Website: https://mereka.io/

Related SDGs:

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Introduction

Digital and creative skills have become essential for participation in today's societies and economies. However, access to these competences remains uneven and is shaped by factors such as geography, socio-economic status, age, and gender. Young people are particularly affected because they depend on schools, youth programmes, support networks and affordable infrastructure to acquire these skills. At the same time, young people stand at a formative stage in education and career development, meaning that limited access to digital and creative learning can have long-term consequences. Digital skills are defined here as both basic competencies, such as computer literacy and coding foundations, and more advanced knowledge in areas like data and artificial intelligence. Creative skills are understood as the ability to apply these tools in innovative ways for design, problem-solving, and self-expression.

Digitalisation is increasingly recognised as a driver of growth and innovation, yet significant gaps in access remain. At the same time, labour markets increasingly require basic digital competences, which exposes the paradox between growing demand for such skills and the limited ability of large parts of the population to access them (Jin, n. d.). Digital competences are not only crucial for future employability but also for active citizenship, creative self-expression, and the ability to adapt to rapidly changing social and technological environments. Therefore, supporting young people in developing these skills benefits society as a whole by reducing inequalities, fostering innovation, and preparing communities for the future. Creating learning environments that make the acquisition of digital competences easier and more inclusive has emerged as a central challenge, but also as a huge opportunity for the future.

In many lower-income contexts, infrastructure remains a critical barrier; limited internet connectivity leaves rural youth particularly disadvantaged (Jalli, 2020). Teacher shortages and limited resources further mean that even where connectivity exists, learning opportunities often remain narrow or inconsistent. In more developed contexts, by contrast, the challenge lies less in infrastructure and more in fostering creativity, motivation, and confidence, so that young people see themselves as active creators rather than passive users of technology. These structural barriers affect not only parts of Asia but also European countries, mainly outside the EU, where the absence of strong cooperation frameworks and funding mechanisms makes scaling more difficult and where urban–rural divides can be especially pronounced (Jalli, 2020).

Through a comparative analysis of cases from Asia and Europe, the report highlights pathways to make digital and creative learning more accessible, empowering, and sustainable for diverse groups of young people. This research examines how inclusive learning environments can lower entry barriers, reach underrepresented groups, and connect formal and non-formal education with opportunities for personal growth. The case studies are assessed in terms of how they address geographic inequalities, delivery formats, and the scope of their coverage, whether local, regional, national, or cross-border. Particular attention is paid to accessibility and inclusion, examining which groups benefit and which remain at risk of being left out.

CASE STUDY

Title	ReDI School of Digital Integration
Country, Region	Germany (Berlin, Munich, NRW, Hamburg); Denmark (Copenhagen, Aarhus); Sweden (Malmö), Europe
Organisation	ReDI School of Digital Integration (non-profit organisation)

Year started

2015.

What specific problem in the challenge does this case study tackle?

Barriers faced by refugees, migrants and other newcomers (language, cost, lack of networks/recognition) limit access to digital and creative skills and to quality jobs; at the same time, regions face tech-talent shortages. ReDI tackles this inclusion and employability gap.

How does the solution address the challenge?

The solution provides free, structured courses spanning basic computer literacy through to web development, data and AI, and cyber security, delivered over two semesters lasting 3 to 4 months each year. It integrates strong career support, including mentoring, career workshops, company visits, job matching, and talent summits that help participants access internships and employment opportunities. Courses are delivered by volunteer industry professionals from the tech and HR sectors, which both ensures labour market relevance and significantly reduces costs for learners. Access is ensured through a hybrid model combining multiple sites across Germany, Denmark, and Sweden with an online academy, "Cyberspace", enabling cross-border participation and scalable reach.

Who is involved?

→ Corporate partners (e.g., Accenture, Cisco, Deloitte, Microsoft) provide funding, career and hiring support, corporate volunteering opportunities for their employees, and programme support.
→ Volunteers and Technical Experts from the tech community who teach, mentor, run workshops, and share industry insights.
→ Government and Public Sector Agencies support scaling and accreditation efforts.

Impact & Outcomes

As of June 2024:
→ Around 25,271 participants trained since 2016, from 138 nationalities.
→ More than 5,000 volunteer trainers and mentors engaged, from 115 nations and around 100 partner companies.
→ 103 courses offered in Spring 2024. 2,827 participants in long courses; 1,133 in short courses and hackathons.
→ Model recognition: Highlighted as an EU good practice in digital inclusion, with 9 locations across Germany, Denmark and Sweden.
→ Certified under AZAV; recognised by the Financial Times among Europe's 100 most innovative initiatives.

What lessons or ideas can be applied in other countries or contexts?

→ Volunteer-plus-industry model scales quality teaching at low cost while keeping curricula market-relevant.
→ Twin-track digital basics and tech specialisations, supported by career services, speed the transition from learning to employment.
→ City hubs and the online campus blend community support with cross-border access, especially useful for mobile or recently arrived youth.
→ Equity by design, including a focus on women, multilingual support, and public-private partnerships, should be embedded from day one.

CASE STUDY

Initiative Name	Cambodia Digital Literacy Initiative (DLI)
Country, Region	Cambodia (rural areas: Battambang and Siem Reap Provinces), Asia
Key actors driving initiative	Swisscontact (implementing partner)

Period of time of implementation

2024 – 2025 (two-year programme).

What specific problem in the challenge does this case study tackle?

The initiative addresses the digital divide in rural Cambodia, where young people have limited access to digital tools, trained teachers, and opportunities for creative skills development. Students in provincial areas face barriers that prevent them from acquiring the skills needed to participate in the digital economy

How does the solution address the challenge?

The solution addresses the challenge by embedding coding into both core curricula and extracurricular activities. Learning is delivered through interactive, in-person classes that emphasise hands-on, project-based approaches, enabling pupils to apply technical concepts in practical and creative ways. A strong focus is placed on teacher training, with ongoing support to build local teaching capacity. To lower access barriers, the initiative provides essential hardware such as laptops and microcontrollers, although some gaps in availability remain. Coding clubs are established and strengthened to give pupils opportunities to develop technology-driven projects and take part in coding competitions.

Who is involved?

→ Youth: Direct beneficiaries who create digital projects.
→ Schools and TVET institutes: Implement classes and provide facilities.
→ ICT teachers: Trained to deliver coding and digital literacy.
→ Swisscontact and Dariu Foundation: Fund, design, and monitor the programme.
→ Ministry of Education, Youth and Sports (MoEYS) and Ministry of Labour and Vocational Training (MLVT): Support integration into curricula.

Impact & Outcomes

→ 2,291 students in grades 9–11 and vocational programmes were trained.
→ Student projects are from automated lighting systems to digital games and educational quizzes.
→ Students report higher confidence and creativity, e.g., “Learning to code has helped me develop problem-solving skills.” (feedback from participants).
→ Coding is now embedded into multiple schools with trained teachers.
→ Challenges: Too few ICT teachers (2–3 per 3,000 students) and not enough laptops for full participation.

What lessons or ideas can be applied in other countries or contexts?

→ Project-based methods foster engagement and creativity.
→ Teacher training is crucial for lasting impact.
→ Inclusivity must be intentional, with targeted outreach to disadvantaged groups.
→ Hardware gaps remain common, but partnerships with donors and the private sector can help address them.

CASE STUDY

Initiative Name	Elements of AI, MOOC (Massive Open Online Course)
Country, Region	Finland (available globally), Europe
Key actors driving initiative	University of Helsinki and MinnaLearn (former Reaktor)

Year started

2018.

What specific problem in the challenge does this case study tackle?

The initiative addresses the challenge that artificial intelligence is often perceived as overly complex and inaccessible to non-specialist audiences. Limited digital literacy and a lack of critical understanding prevent many learners from engaging meaningfully with AI and its growing influence on society. By simplifying core AI concepts and terminology, the solution enables learners to recognise real-world applications across sectors and to critically assess the societal impacts, ethical implications, and media narratives surrounding AI.

How does the solution address the challenge?

The solution is freely available with open global access and no entry requirements, ensuring broad participation. Translation into 20 languages significantly reduces language barriers, while the online, self-paced format requires minimal bandwidth and only basic internet access. Designed for beginners, the programme builds critical understanding of artificial intelligence and its societal benefits. Strong participation outcomes are evident, with women representing over 40 per cent of learners.

Who is involved?

→ The EU and the European Commission provide translations of the material into other languages, promote the course, and ticks their policy objective on digital literacy.
→ The University of Helsinki is a co-creator, handles academic content and tracks learner uptake, and covers the costs of academic staff.
→ Reaktor is a co-creator, innovation side of course, maintains and updates the course, and tracks user experience, provides the service free of charge (covers that cost).

Impact & Outcomes

→ One million were enrolled by 2022 from over 170 countries.
→ Survey after course for individuals reports increased confidence and digital awareness.
→ Surprisingly, 25% of the participants were over 45 years old, which showed a broader age range of interest than expected.
→ Ranked the best computer science course in 2019 by Class Central out of nearly 2000 courses.

What lessons or ideas can be applied in other countries or contexts?

→ This can be utilised by other Universities to make knowledge easily accessible and available.
→ Open knowledge can increase employability (as happened with this MOOC course, according to survey feedback).

CASE STUDY

Initiative Name	Programming Camp by Life is Tech
Country, Region	Japan, Asia
Key actors driving initiative	Life is Tech

Year started

2010.

What specific problem in the challenge does this case study tackle?

Japan has a severe shortage of IT-skilled workers, with over 70% of organisations reporting being understaffed in critical technology areas. This percentage is 52% higher in Japan than in other regions. This case tackles the lack of accessible, digital, and creative education opportunities for young students in Japan.

How does the solution address the challenge?

The initiative addresses the challenge by organising intensive programming camps during school breaks, providing young people with structured opportunities to develop practical technology skills outside the formal curriculum. It offers more than ten specialised courses, enabling participants to gain hands-on experience and present their creations. The camps are hosted at universities across Japan, exposing students to academic environments and potential future learning pathways. Flexible course formats ranging from three to eight days, combined with optional accommodation, ensure accessibility for students from different regions and socio-economic backgrounds.

Who is involved?

→ Life is Tech organises a programming camp.
→ Junior high school and high school students in Japan.
→ Undergraduate and graduate students participate in this camp as guides after being selected and completing training by Life is Tech.

Impact & Outcomes

→ Life is Tech offered IT skills to more than 52,000 students, and 99.6% of them responded that they “enjoyed learning”.
→ It has collaborated with a total of 39 universities and 20 local governments to date.
→ Life is Tech was selected by the Ministry of Economy, Trade and Industry in Japan as a Digital Talent Development and Recruitment Promotion Business in 2024.

What lessons or ideas can be applied in other countries or contexts?

→ Cooperation between business and educational institutions: In that way, we can approach a lot of young people.
→ Encouraging university students to guide younger students: In this case, university students can also have opportunities to utilise their strengths or gain more knowledge..
→ Using universities: Young participants can experience the atmosphere, along with gaining new knowledge.

Comparative Analysis

All four initiatives focus on building digital skills and inclusion. Each one prioritises accessibility and lowers barriers so learners from disadvantaged backgrounds are not left behind. ReDI School of Digital Integration offers tech education with clear career paths for newcomers (Larsen, 2022). The Cambodia Digital Literacy Initiative (DLI) embeds coding into remote schools while upskilling educators (Digital Literacy Initiative Cambodia, n. d.). Elements of AI provides a free, multilingual AI course that builds digital literacy at scale (Hao, 2022). Life is Tech gives secondary students exposure to programming through university camps and near-peer mentors. Shared across cases, the objective is to broaden participation in technology by simplifying entry points like cost and language and providing practical environments for skill development.

Despite these shared goals, target groups and implementation strategies vary across regional contexts. In Europe, many learners are immigrants or refugees, so ReDI pairs structured courses with job support to address social integration, while Elements of AI reaches large audiences through a multilingual MOOC. In Asia, challenges are more closely tied to infrastructure and local capacity. DLI works within schools by providing devices, training teachers, and integrating coding so rural students benefit. Life is Tech builds early confidence by hosting university camps with student mentors. This comparison suggests that European initiatives tend to emphasise scaling and cross-sector collaboration, whereas Asian initiatives prioritise addressing foundational constraints within classrooms and communities.

Viewed through a Society 5.0 lens, the cases reflect core values such as inclusion, sustainability, and ethical use of technology to varying degrees. Government partnership can strengthen sustainability because public funding and institutional backing are often steadier; for example, curriculum embedding and teacher training benefit from ministry support. However, this approach can be risky, as political volatility can disrupt even well-designed programmes. Funding cycles also matter: short grants create stop-start delivery and risk losing trained staff and momentum. Private partners contribute speed, expertise, and labour market relevance, but they also raise ethical questions about influence, data use, and equity. Clear rules, transparency, and safeguards are essential to mitigate potential conflicts of interest or exploitation. Across cases, the most durable strategy is local capacity building, whether through teacher training, mentor development, and open educational materials, so communities can continue with less funding. Elements of AI complements this by building critical judgment about technology’s social impacts.

Several innovations demonstrate strong potential for cross-border adoption. Multilingual design is the biggest driver. Elements of AI shows how a free, low-bandwidth course in various languages can scale to many countries with little change. ReDI’s volunteer-plus-industry model is also transferable, as it keeps costs low and aligns with labour-market needs, especially when paired with simple, modular curricula. In schools, DLI’s project-based clubs, open materials, and teacher training work well in low-resource settings. To address language diversity, particularly in Asia, AI-assisted translation, when created ensuring human review and ethical oversight, may accelerate the localisation of learning materials, interfaces, and support resources. Used responsibly, this approach could accelerate cross-border expansion while maintaining quality and inclusivity.

Together, these initiatives show that scalable, context-sensitive, and ethically grounded approaches are key to achieving inclusive and sustainable digital and creative skill-building across Asia and Europe.

Summary

This project demonstrates that access to digital and creative skills is shaped by a range of structural and contextual barriers across Asia and Europe. In the European Union, cross-border collaboration is easier thanks to established frameworks and strong infrastructure. Still, many young people lack equal opportunities, and refugees, as well as other disadvantaged groups, remain at particular risk of exclusion, underscoring the need for targeted initiatives such as those examined in this study. In lower-income contexts across Asia and Europe, projects are often more local and must place stronger emphasis on infrastructure gaps. These contrasts show that solutions must be tailored to regional contexts rather than applied uniformly.

The case studies also revealed common lessons. Successful programmes go beyond teaching technical content: they build confidence, foster creativity, and give learners opportunities to apply their skills. Inclusion requires intentional strategies, such as outreach to women, youth and rural regions. Partnerships between schools, governments, NGOs, and private-sector companies are essential to maintain continuity and scale. Another central finding is that access to hardware and connectivity remains a precondition; without these basics, digital inclusion cannot be achieved.

Viewed through the lens of Society 5.0, the challenge is directly linked to leadership. Leaders must ensure that technology benefits all groups by promoting fairness, ethics, and long-term access in programme design and implementation. A promising path forward is to combine low-cost digital platforms with local mentoring and peer support, creating scalable yet context-sensitive opportunities for young people to build digital and creative skills.

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CHALLENGE

05

Bringing Healthcare to Remote Communities

How can we ensure people in rural or low-resource areas can get timely, reliable healthcare support?

Challenge Overview

Description

Geography, infrastructure gaps, and resource constraints still prevent many people in rural or low-resource areas from accessing timely and reliable healthcare. These barriers contribute to preventable illness, deepen inequalities, and strain already limited health systems. This challenge asks how digital health tools, low-barrier services, and context-sensitive delivery models can extend care to those who need it most. Inspired by Soowgood (Bangladesh), it shows how simple technologies and trust-building can bring quality healthcare closer to remote communities.

Inspired by Soowgood (Bangladesh)

Soowgood connects rural patients to doctors using simple mobile tools, reducing travel time and helping people access care more easily.

Website: https://soowgood.com/

Related SDGs:

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Introduction

Society 5.0 envisions a more sustainable, inclusive, and human-centric society where social challenges are addressed through the full integration of digital technologies merging the cyber- and physical space (UNESCO, 2024). Across Asia and Europe, there is a stark difference in healthcare services between both regions. World Bank indicators from 1960 to 2022 show 3 to 4 physicians per 1,000 people for Europe and Central Asia (World Bank Group, n.d.). In contrast, for East Asia and Pacific, the number is below 2 per 1,000 people, while for South Asia, it has varied between 0.73 to 1.1 physicians per 1,000 people. Across Europe and Asia, the inequalities in access and availability of healthcare services also manifest in urban-rural divides. This challenge is deconstructed through four case studies from the two continents, highlighting key challenges to healthcare equity in rural areas.

The World Health Organisation (WHO) defines rural areas by both geography and community norms such as religion and traditions (WHO, 2021). Living in such areas creates challenges in accessing social services, specifically health services, including long travel distances to healthcare facilities, limited access to specialised care, and cultural barriers. Although investments in digital infrastructure have expanded in many countries, health inequities persist because digital access and digital literacy remain uneven, particularly in rural communities. Hence, technology-driven initiatives can only be effective if basic digital literacy is also accentuated. To effectively support vulnerable groups, technological solutions must be paired with complementary investments that empower local communities.

From a holistic perspective, health is defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, n.d.). This view aligns with the notion that healthcare inequities cannot be addressed solely by increasing the number of doctors in rural areas or introducing advanced technologies, an approach that is already extremely difficult to sustain in the long term. Instead, indirect measures with downstream effects are often more impactful, as demonstrated by the examined cases: increasing health and digital literacy (Pakistan), engaging other healthcare professionals such as nurses (Australia), supporting mental as well as physical health (Northern Ireland), and improving timely diagnostics and preventive care through digital solutions (Germany).

Across all cases, prevention emerges as a central theme. Noncommunicable diseases (NCDs), shaped by genetic, physiological, environmental, and behavioural factors accounted for an estimated 43 million deaths in 2021 (WHO, 2024). By tackling risk factors early and promoting regular check-ups and preventive services, healthcare systems can significantly reduce downstream burdens. As societies transition into Society 5.0, equity must remain at the core of healthcare innovation. A large part of this equity relies on access to real-time data on various indicators of health services at a much more granular level. Based on the availability of data, more concrete, technologically advanced community-oriented actions can be taken. The cases illustrate this duality: while telehealth and online communication emerge as recurring themes, without human-centred safeguards such technologies risk excluding vulnerable populations. Of the 2.6 billion people globally who remain offline, 1.8 billion reside in rural areas (International Telecommunication Union, 2024). This underscores the need for rural health initiatives to balance digital innovation with inclusive, accessible solutions that reflect the realities of connectivity and infrastructure on the ground.

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

CASE STUDY

Initiative Name	Riayat Telehealth Service
Country, Region	Pakistan, Asia
Key actors driving initiative	Youth Action Hub (UNCTAD), Idara al Khair, Local teachers, Riayat, an all-female digital start-up.

Year started

2020 - 2021.

What specific problem in the challenge does this case study tackle?

In rural areas of Pakistan, access to healthcare services is very limited. This is due to a multitude of problems, ranging from low financial capability to dilapidated healthcare service infrastructure to lack of awareness, and more. In 2024, approximately 50% of Pakistanis had no access to primary health care (Ijaz, 2024). This initiative by Riayat aims to tackle that.

How does the solution address the challenge?

The main concept delivered by Riayat is telehealth (medical services using electronic information and telecommunication technologies). An e-clinic has been set up in the local schools where the local teachers of the rural areas were trained to use the e-health platform using virtual workshops. After two weeks, these teachers were then mobilised to go house to house, where the residents of the area were taught the logistics of using medical consultation on the e-health platform. The local teachers also collected data on the socio-economic profiles of the people involved, which was used to create a pricing model for the e-clinic.

Who is involved?

→ Riayat (Social Enterprise) leading the initiative of the telehealth model.
→ Idara al Khair (local NGO) partnering to support outreach for the initiative.
→ Youth Action Hub Pakistan (UNCTAD youth network)- mobilises young changemakers who advocate for digital literacy and digital inclusion.
→ Local teachers- trained to register patients and raise awareness about the e-clinic.
→ Doctors, Nurses, and Technicians- providing virtual consultations to the residents of the rural areas.
→ Community members- beneficiaries of the healthcare services.

Impact & Outcomes

→ 90 families visited, with 540 registered on the platform (UNCTAD, 2021).
→ Citizens got to know the correlation between physical health and mental health.
→ The collected data also showed that many people suffered from ear, nose, and throat diseases, which can become a foundation for new solutions.
→ E-clinic evolved into a subsidised medical center with doctors, nurses, and technicians.

What lessons or ideas can be applied in other countries or contexts?

The impact can be multiplied if the local capacity of the community members is enhanced. A diverse set of partnerships is essential to make any project successful, including a youth-led network, NGO, and communities.

CASE STUDY

Initiative Name	Bush Nursing Project
Country, Region	East Gippsland, Victoria, Australia, Asia
Key actors driving initiative	→ Victorian Government, Minister for Agriculture, and Minister for Health, funding through the Smarter, Safer Farms programme → Local Bush Nursing Centres and their Committees of Management (the pilot centres: Dargo, Ensay, Gelantipy District, Swifts Creek, Buchan, Cann Valley) (Prevention Victoria, 2022). → Prevention Victoria, regional health partners, local hospitals/regional services.

Year started

Announced and launched in 2021 (Thomas, 2021), with previous implementations as well.

What specific problem in the challenge does this case study tackle?

Low engagement with primary care among geographically isolated farmers and residents, driven by distance, workforce shortages, and recent crises (drought, bushfires, COVID), leads to delayed risk detection and limited access to screening and referrals.

How does the solution address the challenge?

The initiative delivers healthcare through a hybrid model that combines in-person services with digital support. Preventive health checks and portable diagnostic tools are provided through outreach visits to remote farms. Telehealth services are integrated with regional hospitals. Community-managed centres play a central role in building trust and encouraging regular use of services. Innovation is driven by strong cross-sector collaboration, supported by funding from the Smarter, Safer Farms programme. The model expands the autonomy of Remote Area Nurses (CRANA, 2021). By blending in-person and digital care, the programme has also strengthened resilience to disruptions caused by drought, bushfires, and the COVID-19 pandemic. Currently operating through six centres in East Gippsland, statewide context. Its design makes it transferable to other rural regions in Australia and aligns with established nurse-led rural health systems in contexts such as Canada, Alaska, and the Nordic countries.

Who is involved?

→ State government departments and ministers.
→ Funding programme Smarter, Safer Farms. Local Bush Nursing Centre (BNC) committees and Remote Area Nurses at centres.
→ Regional health partners: Gippsland PHN, Bairnsdale Regional Health Service / nearby hospitals, Royal Flying Doctor Service (RFDS) and outreach providers.
→ Community, volunteers, philanthropic/grant funders.

Impact & Outcomes

→ Six centres were funded for additional nurse days, allowing outreach and screenings without leaving clinics closed. The Dargo centre alone has a reach of 230 patients (CRANA, 2021).
→ Nurses delivered blood pressure, cholesterol, glucose checks and facilitated bowel cancer screening kits.
→ Farmers were more willing to engage with nurses during outreach, increasing awareness of preventive health and confidence in accessing follow-up care.
→ Pilot demonstrated the viability of cross-sector funding (agriculture to health) and informed Victorian Government planning for future rural health programs (Department of Health, Victoria, 2025).

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

What lessons or ideas can be applied in other countries or contexts?

Trusted, community-governed clinics ensure culturally responsive care, while expanding nurses' roles helps address workforce gaps. Integrating outreach with telehealth extends specialist access without straining staff, and cross-sector funding links health with rural development. Designing services for resilience strengthens support during droughts, disasters, or pandemics.

CASE STUDY

Initiative Name	Rural Support
Country, Region	Northern Ireland, United Kingdom, Europe
Organisation	Rural Support, an independent charity

Year started

2002

What specific problem in the challenge does this case study tackle?

1) The industry with the highest rates of fatal work accidents in the UK (HSE, 2024).
2) Higher suicide rates (Forbes, 2022).
3) Anti-social hours make traditional healthcare inaccessible (Health Watch, 2025).
4) Limited digital connectivity and mistrust of digital systems (NFU, 2024).
5) Low self-help seeking behaviour (King et al., 2023, 399).
6) Vulnerability to climate change and extreme weather (Case, 2025).

Rural Support's charitable purpose is the "relief of sickness and the protection and preservation of the physical and mental health of the rural communities" (Rural Support, n.d.-a).

How does the solution address the challenge?

Although they use digital tools such as YouTube, the charity maintains a strong physical and telephone presence. Printed materials, stands at farming events, and a 9 am - 9 pm helpline meet farmers where they are (issues 3 - 4). In recognition of high suicide rates (issue 2), Rural Support provides one-to-one professional therapy to farming families in crisis (Rural Support, n.d.-b). Its 'Boots on the Ground' initiative has trained over 820 frontline contacts (vets, insurance brokers, retailers) to spot signs of mental ill-health and offer initial support (Ross, 2025c). A befriending service over the phone offers additional support for loneliness (Ross, 2025d). To acknowledge farming accidents and suicides (issues 1-2), an annual remembrance service forms part of the 'Life Beyond' programme which offers ongoing support to bereaved families (Ross, 2025e). Rural Support also partners in 'Mission: FarmStrong', a multistakeholder project visiting markets to provide health checks (including breast cancer screening, pastoral care and signposting (Ross, 2025a).

Who is involved?

→ Families and farmers, agricultural businesses, volunteers, staff and government agencies including the National Health Service.

Impact & Outcomes

→ Demand for Rural Support's services rose by 55% in 2024 (Ross, 2024).
→ Its befriending service, launched during COVID-19, has made over 1,300 calls to farmers reporting loneliness(Ross, 2025d).

What lessons or ideas can be applied in other countries or contexts?

Low-tech approaches (phone helplines, YouTube playlists and printed resources) can still be effective tools. These can later be combined with high-tech tools to improve service delivery without adding barriers.

In farming communities, they are vets and feed-sellers, people who see farmers regularly and notice changes in wellbeing. Similarly, some domestic abuse charities train hairdressers since they are often a trusted point of contact for women at risk (TVVPP, 2021). Your 'boots on the ground' are rarely limited to healthcare professionals and will include community members who already have relationships with the location.

CASE STUDY

Initiative Name	Fraunhofer's 'Neighborhood Diagnostics'
Country, Region	Germany, Europe
Organisation	Fraunhofer Center for Digital Diagnostics

Period of time of implementation

2022-2025.

What specific problem in the challenge does this case study tackle?

Approximately 22 per cent of the German population lived in a rural location as of 2024 (World Bank Group, n.d.-a). A 2023 study projects roughly 11,000 unfilled rural GP posts by 2035, and around 40 per cent of rural areas risk shortages of doctors' services (Fraunhofer, 2023). In some regions of Germany, General Practitioner supply covers only 25 per cent of the population's needs (Dougherty, 2022). Moreover, the development and implementation of a health ecosystem taking into account strict data protection requirements, the complex landscape of medical care, and the creation of a concept for the autonomous use of health stations by citizens are the main challenges this project faces in its implementation.

How does the solution address the challenge?

With a total budget of € 3.4 million, the project creates a digital ecosystem that links smartphone-connected wearables, robot-operated health stations, and a central data platform. The initiative addresses this challenge by monitoring patient health and providing both preventive and acute medical consultations. It also enables on-site laboratory diagnostics, which helps ease the burden on existing medical facilities.

Potentially these autonomous stations will run 24/7 in public spaces and will perform on-site tests (Scherr et al., 2024). The system aims to facilitate early disease detection and reduce unnecessary doctor visits by providing fast and accurate diagnostics. A patient-centric approach ensures users have control over their data via a dedicated app.

Who is involved?

→ Fraunhofer Center for Digital Diagnostics and its constituent institutes, which lead the initiative.
→ Funded by the Centre for Digital Diagnostics of Fraunhofer (ZDD).
→ Experts: The Fraunhofer Institute for Experimental Software Engineering (IESE), Fraunhofer Institute for Cell Therapy and Immunology (IZI), Fraunhofer Institute for Cell Therapy and Immunology Branch Bioanalytics and Bioprocesses (IZI-BB).
→ Patients and physicians are also involved, as patients use the system and physicians receive shared data.

Impact & Outcomes

→ The system has the potential to significantly enhance the quality of healthcare by enabling faster and more accurate disease detection, diagnosis, and treatment.
→ It provides a roadmap for future expansion in three stages: from secure data exchange, to diagnoses, and finally to therapeutic recommendations.
→ The experts working on this project describe its main goal as the development and implementation of an open ecosystem that enables preventive and acute medical appointments, laboratory diagnostics, and the monitoring of chronic disease progression on a sound data basis.

What lessons or ideas can be applied in other countries or contexts?

This model demonstrates how a decentralised, digital health ecosystem can be a viable solution for regions with limited medical infrastructure. The human-centred design, which prioritises patient data control, is a crucial lesson for similar technology-driven healthcare solutions. The modular and adaptable design of the health stations is intended to facilitate quick implementation in response to local needs.

Comparative Analysis

The four initiatives, Riayat Telehealth Service (Pakistan), Bush Nursing Project (Australia), Rural Support (Northern Ireland), and Fraunhofer's Neighborhood Diagnostics (Germany), seek to improve access to healthcare services in rural areas. Whilst the cases are not representative of the continents as a whole, some regional distinctions can be drawn. Collectively, all four case studies reflect characteristics of Society 5.0, highlighting different human-centric technological solutions to addressing local challenges whilst valuing ethics, inclusion and sustainability.

Comparing the continents, in Asia, the case studies are more focused on improving access to services overall and digital literacy. This need is related to the percentage of the population that has access to services such as electricity and internet, either at home or in clinics. Digital connectivity is higher in Europe and Central Asia compared to the rest of Asia. For example, Riayat had to overcome more fundamental barriers, including awareness, affordability, and digital literacy before telehealth could scale. With these fundamentals in place, the Riayat initiative was able to focus on the relation between mental and physical health, a central theme reflected in the Rural Support project.

Unsurprisingly, inclusion emerges as the strongest common thread across the cases. Riayat, Rural Support and Bush Nursing Centres employ local professionals such as teachers, vets and nurses, respectively, to ground the solutions in the local community and context. While these cases focus on the community aspects of inclusion, Fraunhofer's diagnostic stations are designed for inclusion through accessibility and 24/7 use in shared public spaces. Closely related, ethics is another widely addressed value of Society 5.0, evident in the case studies through culturally sensitive and trust-building methods. For example, acknowledging the post-conflict setting in Northern Ireland, Rural Support is tailored to provide health services to a population living with historic trauma. The Bush Nursing project, through targeted community outreach to farmers and indigenous communities, addresses the lack of preventative care due to various historical factors. Riayat responds ethically by tackling the lack of digital literacy and affordability head-on, aiming to reach marginalised groups specifically. These choices illustrate that ethics manifests in different ways in Society 5.0, though primarily through building trust in communities where exclusion or trauma could have otherwise undermined the engagement of underserved groups.

Lastly, sustainability is key to the longevity of the proposed solutions in implementation and potential scaling. By training community members and initiating local partnerships, strong networks of health knowledge are forming across the communities in the case studies. Additionally, Bush Nursing demonstrates financial sustainability through cross-sector funding (linking health to agriculture) and by expanding nurses' roles to address workforce shortages. Finally, more technically oriented, Fraunhofer's diagnostics aim at systemic sustainability by reducing pressure on doctors and labs through automation, AI, and scalable digital platforms. The models show that sustainability can be achieved through either strengthening human capacity or optimising system efficiency, depending on the context.

Taken together, the case studies suggest that rural health innovations can be effectively adapted beyond their original contexts when they focus on principles rather than fixed models. Capacity-building at the community level, whether through teachers, nurses, or trusted intermediaries, can be replicated in settings where professional shortages limit access. Cross-sector funding mechanisms linking health to rural development offer pathways for sustainability in regions with similar economic structures. At the same time, scalable diagnostics and telehealth models highlight how technology can extend care if paired with investments in digital literacy and infrastructure. These insights show that while implementation must be tailored to local context, the underlying approaches hold strong potential for adoption in diverse rural contexts across Asia and Europe.

Summary

Eventually, research insights highlight that Society 5.0 can lead to improved access to healthcare services through technological advancements, but selected case studies show that this alone is not enough for the solutions to be sustainable. From investigating the different case studies, the research has further explored the importance of truly understanding the local context and engaging directly with community members. Thus, technology alone is insufficient; impact comes when digital tools are embedded in existing social and cultural practices. As a consequence, none of the case studies could be directly applied to a different local context, as they are tailored to the needs of the respective communities.

While all case studies balance the integration of advanced technology with human-centred approaches, the extent to which the elements are emphasised varies between the cases. The case studies have demonstrated the need to, for example, ensure the capacity of any rural community to learn the technology (digital literacy), have access to basic gadgets through which technology can be utilised, and generate interventions that are scalable and replicable to other local contexts. To illustrate, in Northern Ireland, the issue lies more in social and psychological barriers to healthcare, while in Pakistan, it is the lack of basic infrastructure. However, both initiatives incorporate aspects of technology with a human touch and highlight the importance of trusted intermediaries, such as vets or teachers, in bridging the gap between health systems and communities. Such solutions to the access to health services in rural areas demand a balance of bottom-up and top-down approaches whereby community members are the main stakeholders, supported by the government and/or the private sector.

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CHALLENGE

06

Making Waste Management More Inclusive and Effective

How can we build community centered systems that improve recycling and create decent jobs in waste management?

Challenge Overview

Description

Rapid urbanisation and rising consumption are generating increasing volumes of waste, often managed through systems that are inefficient, informal, and unjust. Many waste workers operate in precarious conditions, while communities struggle with pollution, health risks, and low recycling rates. This challenge examines how community-centered systems, incentives, and digital tools can improve recycling, enhance environmental outcomes, and create decent work in waste management. Inspired by Kepul (Indonesia), it underscores the potential of inclusive, tech-enabled models to make cities cleaner and more equitable.

Inspired by Kepul (Indonesia)

Kepul connects households and waste collectors through a digital platform that rewards recycling and promotes cleaner cities.

Website: https://www.instagram.com/kepul.id/

Related SDGs:

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Introduction

Waste management is one of the most pressing environmental and socio-economic challenges shared by both Asia and Europe. The world generates over 2.2 billion tonnes of solid waste annually, and this figure is projected to increase by about 70 per cent by 2050 if no urgent action is taken (World Bank, 2022). Beyond environmental impact, waste management raises critical social questions related to labour conditions, community participation, and access to economic opportunities. These challenges position waste management not only as a technical issue, but also as a human-centred system challenge aligned with Society 5.0 principles.

In Asia, rapid urbanisation, population growth, and inadequate infrastructure have led to severe waste leakage and informal dumping. Countries such as Thailand, Indonesia, and the Philippines face low recycling rates due to limited sorting infrastructure and insufficient public engagement. Informal waste collectors play a key role, but they often work under dangerous conditions and without fair compensation. In Europe, by contrast, the challenge lies less in collection and more in ensuring effective recycling and waste prevention in line with circular economy goals. Countries such as Denmark and Lithuania achieve relatively high recycling rates but face challenges related to overproduction and consumer waste, particularly in food and textiles.

This study explores how community-centred and inclusive waste management systems can transform waste from a burden into a resource, aligning with both environmental and social value. The scope of the analysis focuses on four subtopics: (1) food waste prevention through digital innovation, (2) incentive-driven recycling models, (3) community-based plastic recycling, and (4) consumer-driven reuse systems. Topics such as industrial waste and hazardous waste management are excluded, as the emphasis is on household and community-level initiatives. By analysing four case studies, Too Good To Go (Denmark), Trash Lucky (Thailand), Precious Plastic (Netherlands-based, global network), and Vinted (Lithuania), the study explores how cultural, technological, and policy differences shape inclusive and effective waste management systems in Asia and Europe.

CASE STUDY

Initiative Name	Too Good to Go App
Country, Region	Denmark, Europe
Organisation	Too Good To Go

Year started

2016.

What specific problem in the challenge does this case study tackle?

According to WWF (2021), 40 per cent of the food that we produce globally goes to waste. This means that 2.5 billion tonnes of food is wasted every year. In Denmark alone, around 700,000 tonnes of food are wasted annually. Large volumes of edible surplus food from restaurants, bakeries, and supermarkets continue to be discarded, highlighting systemic inefficiencies in food distribution, consumption, and recovery.

How does the solution address the challenge?

Too Good To Go tackles food waste by connecting businesses that have unsold surplus with consumers who are willing to buy it at a reduced price through a mobile app. The app's core method is the "magic bag" model, where mixed surplus food items are packaged and sold at a discount instead of being discarded. This digital marketplace makes waste prevention convenient and profitable, turning a disposal problem into a resource. The approach is highly innovative because it combines technology, consumer engagement, and retailer partnerships into a scalable system. What started locally in Copenhagen has grown to cover all of Denmark and now operates internationally in more than 17 countries.

Who is involved?

→ Private sector businesses, including restaurants, bakeries, and supermarkets such as Netto, SPAR, and Coop, supply their daily surplus food through the platform.
→ Consumers purchase and collect discounted "magic bags" using the app, with more than two million active users in Denmark alone.
→ Too Good To Go coordinates the platform's operations, develops partnerships, and leads awareness-raising efforts on food waste.
→ Large retail chains extend the initiative's reach through national-level collaborations.
→ Public institutions and non-governmental organisations play a complementary role by promoting food waste reduction and supporting an enabling environment for such solutions.

Impact & Outcomes

→ Globally, more than 120 million meals were saved in 2023, preventing an estimated 300,000 tonnes of CO_2 emissions (Briggs, 2024).
→ In Denmark, Coop saved over 1 million meals, while Netto's partnership is expected to reduce waste by 840 tonnes annually. SPAR contributes an additional 144 tonnes of food saved each year.
→ The app now counts more than 2.4 million Danish users, showing that it has shifted consumer behaviour and normalised "rescuing" food.

What lessons or ideas can be applied in other countries or contexts?

A key lesson is the value of strong partnerships with major retailers. The "magic bag" concept is highly adaptable across countries and food cultures and frames food waste reduction as a win–win: businesses cut disposal costs, consumers access affordable food, and environmental impact is reduced. The Danish case also shows that stronger links with community organisations, food banks, or job-creation schemes could improve inclusion and ensure benefits reach the most vulnerable groups.

CASE STUDY

Initiative Name	Trash Lucky
Country, Region	Bangkok, Thailand, Asia
Key actors driving initiative	Nattapak (Nat) Atichartakarn and Worrawit (Golf) Wonglek.

Year started

2019.

What specific problem in the challenge does this case study tackle?

Thailand's waste management system faces persistent challenges related to low public participation in waste separation, limited recycling rates, and widespread plastic leakage into urban environments and waterways. At the same time, independent waste collectors, who play a critical role in material recovery, often face economic inefficiency due to fragmented collection systems and unstable income, while large volumes of plastic waste continue to be sent to landfills or leak into the environment.

How does the solution address the challenge?

Trash Lucky combines smart IoT-enabled recycling bins with a lottery-based incentive system to increase public participation in waste separation. Recyclables are tracked by type and weight, earning users raffle entries via a digital platform, while real-time data optimises collection routes for waste collectors. By linking gamification, circular economy financing, and community-based participation, the model improves recycling rates, supports waste collectors' incomes, and reduces plastic leakage.

Who is involved?

→ Households participate as the primary actors in residential recycling, supported by community organisations that facilitate local implementation and sustained engagement.
→ The Bangkok Metropolitan Administration (BMA) provides policy support and integrates the initiative into the city's waste management system, with additional funding and technical assistance from the National Innovation Agency and the Digital Economy Promotion Agency, and financial backing from the Government Savings Bank.
→ Private-sector partners play a central role, with the Coca-Cola System in Thailand sponsoring incentive campaigns, Indorama Ventures recycling collected PET into plastic pellets, and retail partners.
→ WWF Thailand contributes grant funding and environmental expertise, while youth and schools engage through student-led recycling and education programmes involving Mahidol University, Chulalongkorn University, King Mongkut's University of Technology North Bangkok, and Prince of Songkla University.

Impact & Outcomes

→ There are over 80 active drop-off locations across 5 provinces, and campaign cycles reaching thousands of participants annually.
→ Over 70,000 kg of recycled materials, including 9,500 kg of post-consumer PET plastic (approximately 428,760 bottles) diverted from landfills and ocean pathways.
→ Documented shifts in household waste separation practices among participants. Over 4,400 prizes worth more than 2 million baht are distributed annually.

What lessons or ideas can be applied in other countries or contexts?

The model demonstrates that culturally adapted incentives, technology-enabled convenience, and multi-stakeholder collaboration can increase recycling participation and efficiency. While transferable across urban contexts, successful replication depends on local incentive design, basic digital infrastructure, supportive regulation, and access to recycling markets, with government backing and corporate sponsorship playing a key role in scalability.

CASE STUDY

Initiative Name	Plastic Community
Country, Region	Netherlands, Europe (global network)
Organisation	One Army Foundation

Year started

2013.

What specific problem in the challenge does this case study tackle?

The initiative addresses the limitations of large-scale, centralised recycling systems, which often fail to manage diverse plastic waste streams, particularly in developing countries and local communities. High transportation costs, low economic viability of certain plastics, and inadequate recycling infrastructure result in significant volumes of plastic being landfilled or leaked into the environment. These systemic gaps leave many communities without effective or affordable recycling options.

How does the solution address the challenge?

Precious Plastic responds by promoting a decentralised, community-based recycling model that enables local plastic recovery and value creation. The initiative provides free, open-source blueprints and step-by-step guides for building low-cost recycling machines using locally available materials. It focuses on plastic types that are typically uneconomical for industrial recyclers. Through a simple four-step process — collection, sorting and shredding, melting, and remoulding — communities can transform plastic waste into usable products, creating both environmental and economic benefits at the local level.

Who is involved?

The initiative operates as a decentralised global network rather than a single organisation.

→ Participants include community members, youth and student groups, individual entrepreneurs, small businesses, volunteers, and local activists.
→ Schools and universities integrate the model into education programmes, using it for hands-on learning in engineering, design, and environmental science.

Together, these actors contribute to machine-building, plastic collection, product development, knowledge-sharing, and community awareness.

Impact & Outcomes

→ In 2023, participating organisations reported recycling more than 1,400 tonnes of plastic. Reported revenues from recycled plastic products exceeded USD 3.7 million, with an average annual income of approximately USD 25,000 per project.
→ Creation of around 530 full-time jobs and engaged over 3,400 volunteers.
→ Operates more than 500 active workspaces worldwide and supports a global community of over 80,000 members.
→ In 2023, more than 1,175 recycling machines were built and sold, expanding local recycling capacity.
→ Participants also gain practical skills in engineering, manufacturing, and entrepreneurship.

What lessons or ideas can be applied in other countries or contexts?

This case demonstrates that decentralised, community-led approaches can effectively address waste challenges where formal infrastructure is weak or absent. Open-source knowledge, peer learning, and global community platforms strengthen adaptability and resilience across diverse contexts. The model shows how environmental action can be linked to skills development and local entrepreneurship, enabling sustainable income generation. Its combination of education, practical engagement, and economic opportunity offers a transferable framework for other environmental and social initiatives seeking locally grounded solutions.

CASE STUDY

Initiative Name	Vinted
Country, Region	Lithuania, Europe (operates across 22 European markets)
Key actors driving initiative	Milda Mitkutė and Justas Janauskas

Year started

2008.

What specific problem in the challenge does this case study tackle?

Vinted tackles the growing problem of textile waste and overconsumption. The fashion industry generates millions of tonnes of waste annually and accounts for an estimated 10 per cent of global CO_2 emissions. Recycling textiles is costly and limited, so much of it ends up in landfills or incinerators.

How does the solution address the challenge?

Vinted is a peer-to-peer digital marketplace that enables individuals to buy and sell second-hand clothing and accessories, supporting a shift from linear consumption to a circular economy. Through a free mobile app, users list unwanted items, while buyers purchase directly from other users, with secure payments and delivery integrated into the platform. A small Buyer Protection fee funds secure transactions, customer support, and dispute resolution, helping build trust and enable large-scale participation. Vinted integrates a dense network of pick-up and drop-off points (PUDO) through Vinted Go, which are less carbon-intensive than home delivery, and encourages the reuse of packaging. It now operates internationally, with more than 120 million members across Europe.

Who is involved?

→ The Group comprises the Vinted second-hand marketplace, Vinted Go (logistics), Vinted Pay (payments), and Vinted Ventures (circular-economy investments).
→ Consumers, especially youth and young adults.
→ Logistics partners provide delivery networks (lockers, postal services) that enable low-cost, lower-emission shipping.
→ Partners such as charities and environmental data organisations collectively shape its approach to reducing textile waste and addressing over-consumption.
→ Regulators and EU institutions shape consumer rights and circular economy policies that support scaling.

Impact & Outcomes

→ The platform has avoided an estimated 678,000 tonnes of CO_2 emissions and has grown to over 120 million registered members across 22 markets, making it Europe's largest resale platform.
→ Avoidance of approximately 17 kilotonnes of CO_2 annually through the reuse of packaging and the widespread adoption of pick-up/drop-off (PUDO) delivery.
→ Survey data indicate that 65 per cent of users would not have resold their items without the platform, suggesting that it generates new reuse practices rather than merely shifting existing ones.
→ Users earn income through resale, with many reinvesting their earnings into purchasing additional second-hand items, reinforcing circular consumption patterns.

What lessons or ideas can be applied in other countries or contexts?

The case shows that integrated logistics and payment systems reduce user friction and can be replicated across regions, while third-party impact assessments (such as Vinted's collaboration with Vaayu) strengthen transparency and credibility. However, reliance on smartphones, internet access, and digital payments may exclude low-income or digitally disconnected users, suggesting the need for community-based access points. Moreover, while resale supports circularity, its convenience may encourage impulse buying, highlighting the need to balance platform growth with genuine waste reduction.

Comparative Analysis

Across the four cases, a shared emphasis on digital innovation, community participation, and circular economy principles demonstrates how waste management systems can become more inclusive and sustainable. Each initiative employs technology, such as mobile applications, IoT-enabled infrastructure, or open-source design platforms, to improve efficiency and lower barriers to participation. All cases transform waste into value, whether through food redistribution, plastic recycling, or clothing resale, and rely on active community engagement rather than passive consumption.

Despite these similarities, the cases follow distinct pathways shaped by regional economic structures and cultural contexts. European initiatives such as Too Good To Go and Vinted primarily leverage convenience, affordability, and environmental awareness to influence consumer behaviour. In contrast, Trash Lucky in Thailand integrates culturally specific incentives, notably lottery-based rewards, to encourage recycling. This difference highlights the importance of adapting behavioural strategies to local norms. The cases also vary in their problem focus: European models tend to prioritise waste prevention and individual responsibility, while Asian approaches place greater emphasis on strengthening collection systems and motivating participation in contexts where sorting infrastructure remains limited.

Governance and scaling models further differentiate the cases. Too Good To Go and Vinted scale through centralised, corporate-led platforms and cross-sector partnerships, while Precious Plastic operates as a decentralised, open-source network that enables grassroots innovation. Trash Lucky represents a hybrid public–private model, combining digital infrastructure with community engagement and institutional support. These variations illustrate multiple routes to achieving inclusive waste management, depending on institutional capacity and local needs.

Sustainability outcomes are evident across all initiatives, though achieved through different mechanisms. Too Good To Go reduces food waste and associated CO_2 emissions, Trash Lucky diverts plastic waste from landfills and waterways, and Precious Plastic supports local circular economies by transforming plastic waste into new products. In terms of inclusion, the initiatives engage marginalised actors such as informal waste collectors, small entrepreneurs, and low-income consumers. However, accessibility for persons with disabilities and digitally excluded groups remains a potential gap across several models. Ethical considerations also vary, with Precious Plastic's open-source approach emphasising collective knowledge and shared responsibility over profit maximisation.

Summary

The comparison of the four case studies from Asia and Europe demonstrates that effective waste management solutions must be grounded in local social, cultural, and economic contexts. This means sustainability and inclusion are mutually reinforcing rather than competing objectives. Among the initiatives examined, Precious Plastic emerges as a particularly transformative model by enabling communities to locally recycle plastic and generate economic value, aligning closely with the Society 5.0 principle of technology serving human well-being. Trash Lucky further demonstrates how culturally embedded incentives can drive behavioural change at scale, while Too Good To Go and Vinted highlight the potential of digitally enabled platforms to normalise sustainable practices through market-based mechanisms and broad user adoption.

Technological innovation alone is insufficient without mechanisms that align with behavioural norms and address structural inequalities. This can be seen with the regional difference between the case studies. The European initiatives primarily emphasise waste prevention and consumer responsibility through convenience-driven digital platforms. However, the Asian initiatives place greater focus on improving collection systems and social inclusion. This demonstrates that the most successful implementation of Society 5.0 principles to improve waste management would be through combining technology with culturally resonant incentives.

Overall, our findings from exploring these case studies suggest that leadership within a Society 5.0 framework requires integrating technology with an inclusive lens and consideration of ethical consequences. More than just focusing on technological deployment, this can allow leaders to support individuals and communities to be active participants in initiatives, rather than passive users.

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CHALLENGE

07

Smart Solutions for Clean Energy Access

How can we harness digital tools and innovation to make clean energy affordable, accessible, and people-centered?

Challenge Overview

Description

Access to affordable, reliable, and clean energy is essential for development, yet many households and communities still depend on costly or polluting energy sources. Digital innovation offers new ways to produce, store, and manage energy more efficiently, but benefits are unevenly distributed. This challenge explores how tools such as data platforms, AI, and IoT can expand clean energy access, reduce costs, and cut emissions, particularly for underserved communities. Inspired by Alternō (Vietnam), it highlights how smart clean energy solutions can contribute to both climate action and social inclusion.

Inspired by Alternō (Vietnam)

Alternō is a climate-tech startup that uses sand-based thermal batteries to store and deliver zero-emission heat. Their systems are designed for industrial and agricultural use, providing a cleaner, scalable alternative to fossil fuels.

Website: https://alterno.net/

Related SDGs:

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Introduction

The clean energy transition is one of the defining challenges of the 21st century. While renewable technologies are advancing rapidly, ensuring that clean power is affordable, accessible, and people-centred remains a global concern. Both Asia and Europe, two regions with vastly different social, political, and economic contexts, face the dual challenge of decarbonising their energy systems while ensuring that electricity remains reliable, inclusive, and affordable.

In Europe, the transition has been accelerated by ambitious climate targets, most notably the European Green Deal, which commits the European Union to climate neutrality by 2050 (European Commission, 2019). The share of renewable energy in gross final energy consumption reached 22.5 per cent in 2022, up from 9.6 per cent in 2004 (Eurostat, 2023a). Despite this progress, structural barriers persist. Citizens living in rental housing or shared buildings often lack the ability to install rooftop solar systems, while low-income households face disproportionate energy costs. In 2022, 9.3 per cent of the EU population reported being unable to keep their homes adequately warm, highlighting the persistence of energy poverty even in advanced economies (Eurostat, 2023b). The recent energy price crisis following Russia's invasion of Ukraine further demonstrated how fragile affordability and access to energy remain despite technological progress (International Energy Agency [IEA], 2023).

Asia, by contrast, is the largest and fastest-growing energy consumer globally, accounting for nearly 50 per cent of total global energy demand in 2022 (IEA, 2023). China leads globally in renewable energy deployment, installing 217 GW of new renewable power capacity in 2023 alone, representing almost 60 per cent of global additions (International Renewable Energy Agency [IRENA], 2024). India has similarly ambitious objectives, aiming to reach 450 GW of renewable energy capacity by 2030 (Government of India, 2021). However, these impressive aggregate figures mask significant inequalities across the region. More than 350 million people in Asia still lack reliable access to electricity, while many others face affordability challenges due to outdated grid infrastructure, technical losses, and volatile energy prices (World Bank, 2023). Furthermore, Asia is particularly vulnerable to climate-related disasters such as typhoons, heatwaves, and floods, making the development of resilient clean energy systems a matter of social and economic security rather than a discretionary choice.

This study focuses on the challenge of making clean energy affordable, accessible, and people-centred. Affordable refers to the ability of households, institutions, and industries to adopt or benefit from renewable energy without disproportionate financial burden, while accessible encompasses both physical access to energy infrastructure and the regulatory and institutional frameworks that enable broad participation. People-centred approaches emphasise the active role of citizens, communities, and end-users in shaping energy systems rather than remaining passive consumers. The analysis is deliberately limited to initiatives that combine technological and social innovation, including tools such as artificial intelligence (AI) forecasting, digital twins, real-time monitoring, and grid optimisation, alongside inclusive models such as cooperatives, citizen ownership, and public–private collaboration. Debates on fossil fuel phase-out, nuclear energy, and purely financial mechanisms such as carbon markets fall outside the scope of this study. By examining case studies from Europe (Denmark and Ireland) and Asia (China and India), the report illustrates how regional contexts shape the design and implementation of clean energy solutions while revealing shared challenges and transferable lessons. Through a comparative lens grounded in Society 5.0 values of ethics, inclusion, and sustainability, the analysis demonstrates how digital tools can be harnessed not only to improve efficiency, but also to create cleaner, fairer, and more inclusive energy systems.

CASE STUDY

Initiative Name	Aarhus University Solar Community Project (Universitetets Energifællesskab F.M.B.A., UEF)
Country, Region	Aarhus, Denmark, Europe
Organisation	Aarhus University (AU), AURORA EU Project, students and staff, local residents (UEF cooperative)

Period of time of implementation

2022–2023.

What specific problem in the challenge does this case study tackle?

This case study addresses the challenge that many students, staff, and local citizens cannot install rooftop solar panels because they live in rental or shared housing or lack access to suitable rooftops. It also tackles the issue of high upfront investment costs that prevent broad participation in renewable energy.

How does the solution address the challenge?

The Aarhus University Solar Community is organised as a cooperative ownership model in which students, staff, and local residents purchase shares in rooftop photovoltaic (PV) installations located on university buildings. The electricity generated is consumed directly by Aarhus University under Denmark's third-party self-consumption framework, while cooperative members receive annual financial returns. Digital monitoring systems provide real-time performance data, ensuring transparency and enabling the campus to function as a living laboratory for research, education, and public engagement.

Innovation, scale, and key methods

The project represents the first crowdfunded PV installation on a Danish university campus and enables renewable energy participation for individuals without private rooftops. It operates primarily at a local scale through rooftop installations at Aarhus University, but has wider relevance through the EU-funded AURORA consortium, which explores similar citizen energy community models across Europe. At an international level, it contributes to Horizon 2020 objectives by positioning universities as frontrunners in people-centred clean energy transitions.

Who is involved?

→ Students and staff are cooperative members and investors.
→ Local residents participate in the cooperative.
→ Aarhus University is the host of the installations and consumer of the electricity.
→ The AURORA project is a supporting research and scaling framework.
→ External contractors are responsible for installation and maintenance.

Impact & Outcomes

→ The project sold 900 cooperative shares across 98 kW of rooftop solar installations to 121 individuals and organisations.
→ The system is expected to generate approximately 86,000 kWh annually, equivalent to the electricity consumption of around 20 households.
→ Beyond emissions reduction, the project has strengthened public awareness of energy communities and demonstrated a replicable model for other universities and public institutions.

What lessons or ideas can be applied in other countries or contexts?

Community-based solar cooperatives can democratise access to clean energy, particularly for renters and students. Shared ownership models lower financial barriers, while universities provide trusted spaces for experimentation and public engagement. Supportive regulatory frameworks for shared self-consumption are essential, and linking research, education, and citizen participation significantly enhances societal impact.

CASE STUDY

Initiative Name	Ocean Energy Buoy (OE Buoy)
Country, Region	Galway Bay, Ireland, Europe
Organisation	OceanEnergy (Ocean Energy Ltd.)

Period of time of implementation

Development initiated in the early 2000s. Major testing phases 2006–2009. Current large-scale demonstration phase 2024–2027.

What specific problem in the challenge does this case study tackle?

Wave energy has long been recognised for its significant and predictable potential, yet it has struggled to scale due to high costs, technological complexity, and uncertainty regarding grid integration and durability in harsh marine environments. These barriers have limited its contribution to affordable and accessible clean energy, particularly for coastal communities.

How does the solution address the challenge?

The Ocean Energy Buoy addresses these challenges through a floating oscillating water column wave energy converter supported by advanced digital tools. The system uses wave motion to compress air and drive a turbine, with a simplified design that reduces mechanical complexity and maintenance requirements. Digital wave-to-wire simulation tools are used to optimise system performance before deployment, while real-time monitoring supports predictive maintenance and operational efficiency. Electricity generated offshore is exported directly to the grid via subsea cables, making wave energy accessible to households and businesses.

Innovation, scale, and key methods

The OE Buoy represents a major innovation in marine renewables as the world's largest capacity floating wave energy device, designed to generate up to 1 MW of electricity. By demonstrating grid-connected operation at utility scale, the project provides a credible pathway from pilot testing to commercial deployment.

Who is involved?

→ OceanEnergy is the primary developer.
→ Universities and research centres contribute to modelling and testing.
→ Irish public agencies provide test sites and regulatory support.
→ European funding bodies and manufacturing partners are responsible for full-scale construction.

Impact & Outcomes

→ The project has achieved a 1 MW grid-connected demonstration and demonstrated a significant cost-reduction trajectory, with project materials indicating reductions of over 30 per cent.
→ During Irish sea trials, the device successfully withstood extreme conditions, including waves exceeding eight metres, without structural damage. These outcomes strengthen confidence in wave energy as a resilient and scalable clean energy option.

What lessons or ideas can be applied in other countries or contexts?

The OE Buoy illustrates how digital modelling and real-time monitoring can reduce risk and accelerate the commercialisation of emerging renewable technologies. The phased development pathway from testing to grid integration is transferable to other wave-rich regions, including parts of Asia. Strong regional collaboration and public funding play a critical role in de-risking innovation and enabling long-term scalability.

CASE STUDY

Initiative Name	AI-Driven Virtual Power Plant (Zhejiang)
Country, Region	Zhejiang Province, China, Asia
Organisation	State Grid Zhejiang Power Supply Company

Year started

2011.

What specific problem in the challenge does this case study tackle?

Zhejiang Province has experienced rapid industrial growth, placing increasing strain on electricity systems. Peak demand shortages, variable industrial loads, and under-utilised demand-side flexibility have threatened supply reliability. Expanding generation capacity alone would be costly and carbon-intensive, highlighting the need for smarter, more efficient grid management solutions that support clean energy integration while maintaining affordability and reliability for industry.

How does the solution address the challenge?

The Zhejiang Virtual Power Plant aggregates controllable industrial electricity loads and treats them as dispatchable resources managed in real time. AI-based forecasting analyses operational data from participating enterprises to predict demand peaks and optimise load shifting. Digital twin simulations replicate industrial demand patterns and grid behaviour, enabling scenario testing and optimisation. Together, these tools reduce peak stress on the grid while supporting renewable integration.

Innovation, scale, and key methods

The initiative represents one of the first province-level virtual power plants in China focused on industrial clusters. It combines AI forecasting, digital twins, and real-time industrial cooperation at scale.

Who is involved?

→ The State Grid Zhejiang Power Supply Company is an organiser and operator.
→ Industrial enterprises provide flexible loads.
→ Local government bodies support regulatory alignment.
→ Technology providers supply AI forecasting and monitoring systems.

Impact & Outcomes

→ The project has reduced peak electricity shortages, improved supply stability for industrial users, and increased grid efficiency.
→ While its people-centred impact is indirect, it contributes to broader system reliability and emissions reduction.

What lessons or ideas can be applied in other countries or contexts?

Virtual power plants can unlock significant demand-side flexibility in industrial regions. Their success depends on robust data infrastructure, clear incentives for participation, and supportive regulatory frameworks, making them transferable to other industrial economies.

CASE STUDY

Initiative Name	Tata Power's Real-Time Data and AI Transformation of India's Power Grid
Country, Region	Mumbai, Delhi, major urban centres, India, Asia
Organisation	Tata Power (utility), BluWave-ai (AI platform), Indian government/regulators, Tata Power Skill Development Institute

Period of time of implementation

Early 2020s; ongoing with expansion planned towards 2030.

What specific problem in the challenge does this case study tackle?

India's urban power grids face renewable variability, high technical and commercial losses, and rapidly growing demand. Ensuring affordable, reliable, and clean electricity for millions of urban residents requires advanced digital solutions capable of stabilising grids while enabling large-scale renewable integration.

How does the solution address the challenge?

Tata Power has implemented an integrated digital transformation strategy combining AI-driven forecasting, digital twins, and advanced distribution management systems. GIS and satellite mapping optimise renewable siting, while AI-based weather forecasting improves dispatch decisions. Digital twins support predictive maintenance and faster fault restoration. Battery storage and vehicle-to-grid pilots further enhance system flexibility.

Innovation, scale, and key methods

The initiative operates at a large urban scale and integrates multiple digital tools into a single operational framework. Its modular design allows replication across regions, supporting long-term scalability as infrastructure and skills develop.

Who is involved?

→ Tata Power is a system operator.
→ Technology partners supply AI and forecasting platforms.
→ Government bodies provide regulatory oversight.
→ Training institutions build technical capacity.
→ Urban consumers benefit from improved reliability and affordability.

Impact & Outcomes

The transformation reduced grid losses in Delhi from over 50 per cent to approximately 6 per cent, increased solar output by 7–10 per cent, and improved power reliability for millions of consumers.

What lessons or ideas can be applied in other countries or contexts?

AI-enabled grid management and digital twins offer scalable solutions for renewable-heavy urban systems worldwide. Success depends on partnerships, skills development, and regulatory support, making the approach adaptable to other developing and emerging economies.

Comparative Analysis

The four case studies — Tata Power's Real-Time Data and AI Transformation of India's Power Grid (India), the AI-Driven Virtual Power Plant (China), the Aarhus University Solar Community (Denmark), and the Ocean Energy Buoy (Ireland) — all grapple with the challenge of making clean energy reliable and affordable while integrating new technologies into existing energy systems and grids. Across the cases, innovative digital tools such as AI, digital forecasting, and modelling are recurring elements. These are particularly evident in China's Virtual Power Plant, India's Tata Power initiative, and Ireland's wave energy project. Denmark, by contrast, takes a different approach and demonstrates how digital technology can support more community-oriented solutions through crowdfunding and cooperative ownership.

In the Asian cases, projects are typically state- or industry-led. China's Virtual Power Plant and India's Tata Power system rely on utilities and large-scale deployment strategies. These approaches prioritise rapid implementation, grid optimisation, and system reliability, but they offer more limited opportunities for direct citizen participation. In contrast, the European initiatives illustrate alternative governance models. Denmark's solar cooperative shows how digital tools can support cooperative ownership and community financing, while Ireland's wave energy project reflects a government-supported pilot approach that balances technological experimentation with public oversight. In this sense, the Asian cases largely follow top-down models, whereas the European cases place stronger emphasis on bottom-up, citizen-focused participation.

Society 5.0 values are reflected unevenly across the four cases. Ethical considerations and trade-offs are present in both regions but take different forms. Asia's AI-driven initiatives raise questions related to data governance, transparency, and privacy, while Denmark's solar cooperative raises questions about who can afford to participate financially, even within an inclusive framework. From an inclusivity perspective, Denmark's cooperative system performs particularly strongly, as it enables participation by renters and students who would otherwise be excluded from renewable energy ownership. India's case has the potential for broader urban inclusion if scaled effectively, while China's Virtual Power Plant remains comparatively less people-centred, as it is primarily designed for industrial purposes. In terms of sustainability, all four initiatives contribute to emissions reduction, whether through efficiency gains in China, smarter and more digitalised grids in India, local solar generation in Denmark, or marine renewable energy in Ireland.

Across the cases, demand-side management and crowdfunding emerge as broadly transferable lessons. However, persistent barriers remain, including regulatory inertia, cultural expectations around ownership, and differences in financial capacity to absorb upfront costs. Opportunities for cross-border adoption do exist, but they are strongly shaped by local regulatory, institutional, and social contexts. For example, China's AI-based demand-side flexibility could be beneficial in European industrial hubs, but would require regulatory reforms to enable closer cooperation between utilities and industry. Similarly, Denmark's cooperative ownership model could offer value in Asian urban contexts or university campuses, yet financial constraints and the absence of enabling legal frameworks pose significant challenges. Overall, while technologies may be transferable, successful implementation depends on adapting solutions to local conditions.

Summary

In conclusion, the four case studies illustrate that making clean energy affordable, accessible, and people-centred remains a complex challenge across both Asia and Europe. Ensuring reliable and affordable clean power while integrating new technologies into existing energy systems is far from straightforward, and all cases highlight the ongoing difficulty of balancing innovation with inclusivity.

The analysis shows that digital innovation alone is insufficient to close the clean energy gap. While tools such as AI forecasting, digital twins, and advanced grid management will play an important role, the case studies demonstrate that social design, governance structures, and community engagement can be equally powerful. This is evident in the Danish solar cooperative, where shared ownership enhances accessibility, and in the Ocean Energy Buoy project, which illustrates how a locally rooted initiative can scale into a resilient European collaboration. The cases also highlight that leadership for a Society 5.0 future operates at multiple levels. Governments enable innovation through regulation, industry drives large-scale deployment, and universities and citizens foster participation and experimentation, as shown by the Aarhus University Solar Community functioning as a living laboratory.

Looking ahead, the greatest opportunity lies in combining these strengths. Integrating large-scale digital optimisation with inclusive governance and community participation can deliver both efficiency and equity. Ultimately, Society 5.0 leadership means using technology not only to optimise systems, but to empower people and communities, ensuring that the clean energy transition is sustainable and inclusive.

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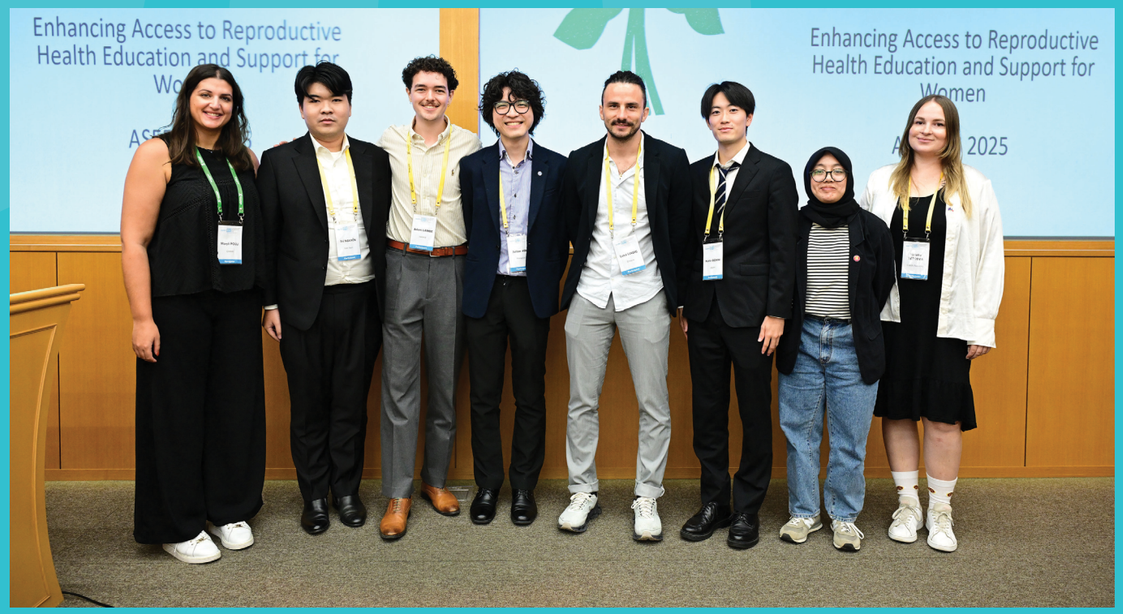
CHALLENGE

08

Enhancing Access to Reproductive Health Education and Support for Women

How can we improve access to comprehensive reproductive health education and support for women and adolescents, particularly in underserved areas?



Challenge Overview

Description

Many women and adolescents, especially in underserved areas, still face gaps in reproductive health information, services, and social support. These gaps can lead to misinformation, preventable health risks, and experiences of stigma or isolation. This challenge focuses on how innovative digital platforms and community-based approaches can provide comprehensive, accurate, and culturally sensitive reproductive health education and support. Inspired by MommyKidz (Bangladesh), it points to the power of safe, non-judgmental spaces where users can access guidance, track their health, and connect with professionals and peers.

Inspired by MommyKidz (Bangladesh)

MommyKidz is a family wellbeing app that provides a non-judgmental, safe space for women and parents through puberty, pregnancy, and parenting. The platform offers personalized healthcare advice, educational resources, and a supportive community to ensure users and their families thrive. Features include pregnancy and baby growth trackers, period and ovulation tracking, access to healthcare professionals, and a library of educational content. By integrating technology and community support, MommyKidz addresses the gaps in reproductive health education and services.

Website: https://mommykidz.com/

Related SDGs:

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Introduction

Globally, gaps in comprehensive sexuality education (CSE) and reproductive health (SRH) support remain a persistent challenge. While Asia and Europe face different structural and cultural barriers, both regions continue to experience shortcomings in access to accurate information, youth-friendly services, and inclusive support systems. These gaps affect health outcomes, educational attainment, gender equality, and long-term socioeconomic participation. Addressing SRH access, therefore, represents a key Society 5.0 challenge, requiring human-centered, ethical, and technology-enabled approaches that place individual well-being at the center of system design.

In the Asia Pacific, home to more than 60 per cent of the world's youth, the region sees roughly 3.9 million adolescent pregnancies annually, nearly half of which are unintended. Less than half of young people receive sexuality education that meets international standards. Challenges are compounded by poor transport infrastructure, high out-of-pocket costs, and cultural stigma, particularly in rural and marginalised communities (UNFPA Asia & the Pacific, 2025).

In Europe, despite generally stronger health systems, access to comprehensive reproductive health education remains uneven. While many countries mandate sexuality education, implementation is often limited to biology, excluding topics such as consent, gender diversity, and inclusion. Protective behaviours are declining, with condom use among 15-year-olds falling by nearly 10 percentage points between 2014 and 2022, and about 30 per cent of adolescents reporting no contraception at last intercourse (WHO Europe, 2024). Vulnerable groups such as low-income, refugee, and migrant youth face additional legal and financial barriers, while resistance from parents and policymakers, combined with judgmental providers and restrictive consent rules, leaves many young people without essential information or support.

This study focuses on two target populations: women of reproductive age, including those who are pregnant or planning pregnancy and adolescents aged approximately 10 to 19, with emphasis on girls and gender diverse young people in underserved areas. In this context, underserved refers to individuals in rural, peri-urban, or socio-economically marginalised settings and to those with limited geographic, financial, legal, or social access to schools, clinics, or reliable digital services.

CASE STUDY

Title	Vyhonit ďábla
Country, Region	Czech Republic, Europe
Key actors driving initiative	Zuzana Kašparová and Tereza Fejrančeková, independent creators and educators.

Year started

2019.

What specific problem in the challenge does this case study tackle?

Comprehensive reproductive and sexual health education in Czech Republic remains limited, with many taboo topics absent from school curricula. Shame, stereotypes, and a lack of inclusive discourse leave young people without knowledge on issues such as consent, body image, menstruation, masturbation, or non-heteronormative relationships.

How does the solution address the challenge?

The initiative began as a weekly podcast and quickly evolved into a broader multimedia platform focused on sexual and reproductive health education. Through candid conversations with a wide range of guests, including activists and sex workers, it uses humour and everyday language to normalise sensitive and often taboo topics. Beyond the podcast, the team delivers school-based workshops, has published a book, and co-created a television programme (Na Záchodcích) for Czech Television. Its innovation lies in using informal media as a trusted space for discussion, combining digital engagement with in-person education, and placing inclusivity, consent, and open dialogue at the centre of its approach.

Who is involved?

→ Zuzana and Tereza, creators and content leaders.
→ Youth / Listeners is a large audience of adolescents and young adults, active via social media.
→ School hosts provide workshops and discussions directly in classrooms.
→ Guests who are experts, activists, and people with lived experience broaden perspectives.
→ Media partners are Czech Television, publishers, podcast platforms.

Impact & Outcomes

→ Over 240 podcast episodes since 2019.
→ Thousands of regular listeners and a strong youth following via social media.
→ School workshops directly engage students in discussions missing from formal curricula.
→ Published book and a national TV programme.

What lessons or ideas can be applied in other countries or contexts?

→ Podcasts and digital media are effective, low-barrier tools to provide reproductive health education beyond schools.
→ Humor, authenticity, and everyday language reduce stigma and increase engagement.
→ Combining online content with direct outreach (e.g., school visits) strengthens credibility and real-life impact.
→ Collaboration with mainstream institutions (publishers, broadcasters) expands reach and legitimacy.
→ The model can be adapted in other cultural contexts by using local languages, relatable hosts, and partnerships with schools or youth organisations.

CASE STUDY

Title	セイシル - Seicil
Country, Region	Japan, Asia
Organisation	TENGA Healthcare

Year started

2019.

What specific problem in the challenge does this case study tackle?

Sex education in Japan is biased toward biological aspects and does not cover the sexual act itself, its enjoyment, or its diversity. Lack of teaching materials and instructional sources for those to teach sex education.

How does the solution address the challenge?

Seicil provides a nationwide online Q&A platform where teens can post questions anonymously. Multiple experts provide scientifically based answers on topics such as physical changes during puberty, sexual safety, consent, and sexual diversity. The platform prioritises anonymity, expert supervision, and an easy-to-use digital design to ensure accessibility and trust for young users.

In addition, Seicil offers products for sex education activities and offers columns and news content on sex education.

Who is involved?

→ TENGA Healthcare as a creator, with guidance from Asuka Someya (NPO Pilcon).
→ Production Partners: Charitsumo Inc., Sora, organiser of sexual workshops “Amo-kai”.
→ Educators / Schools collaborate with teachers and schools to provide resources, workshops, and classroom activities.

Impact & Outcomes

→ Cumulative 10 million page views by 2022.
→ Classroom practices using Seicil-provided tools (e.g. “ふれあいの12段階”) have been conducted; students share reflections such as “people have different ideas of what closeness means,” “I realise it’s okay to say no,” etc (with セイシル).

What lessons or ideas can be applied in other countries or contexts?

→ Providing an anonymous online platform for young people to ask questions about sexuality makes it easier to discuss sensitive topics rarely addressed at school or at home.
→ Offering user-friendly teaching materials and lesson plans lowers the barrier for educators and helps normalize comprehensive sexuality education.

CASE STUDY

Title	Bellabeat
Country, Region	Croatia/Slovenia, Europe
Key actors driving initiative	Founded by Urška Sršen (Croatia) and Sandro Mur (Slovenia).

Year started

2013.

What specific problem in the challenge does this case study tackle?

Digital health technologies have historically prioritised general fitness metrics, such as steps and calorie tracking, while overlooking women’s broader health needs, including reproductive health, stress, hydration, and long-term wellbeing. Bellabeat tackles this challenge by designing technology that empowers women to take charge of their health, contributing to inclusivity in the wellness technology sector and promoting preventive healthcare.

How does the solution address the challenge?

Bellabeat integrates wearable technology, data analytics, and design to create health solutions that are both functional and appealing. Its products include the Leaf (a wellness tracker worn as jewellery), the Time (a smart wellness watch), the Spring (a smart water bottle), and the Bellabeat app, which unifies data on activity, sleep, hydration, menstrual cycles, and stress. Key methods include data-driven algorithms for personalised recommendations and a user-friendly design to encourage everyday adoption. Innovation lies in merging aesthetics with functionality, offering women-centred wellness tools that go beyond conventional fitness tracking.

Who is involved?

→ Bellabeat Inc. leads product design, development, and global distribution of the devices and digital platform.
→ A global community of women use the devices and app to monitor health, well-being, and lifestyle indicators.
→ Providers and organisations benefit indirectly through the promotion of preventive health behaviours and improved health awareness.
→ Investors and strategic partners support Bellabeat’s growth, innovation, and international expansion.

Impact & Outcomes

→ Bellabeat has sold millions of devices worldwide, establishing a large and engaged global user community.
→ The initiative has increased awareness of holistic wellness, showing how design and data can support positive lifestyle changes.
→ Users report benefits including improved stress management, better sleep awareness, hydration tracking, and reproductive health monitoring.
→ Bellabeat has been recognised as a leading European wellness technology start-up, inspiring further innovation in digital health and gender-focused technology.

What lessons or ideas can be applied in other countries or contexts?

This case highlights the importance of inclusive design in health technology, ensuring products address the specific needs of different user groups. It shows how combining aesthetic appeal with functionality can increase adoption. The emphasis on holistic wellness demonstrates that health solutions should move beyond fitness to cover the full spectrum of wellbeing. Similar approaches can be replicated in other contexts where underserved populations lack tailored digital health solutions.

CASE STUDY

Title	SPOT Community Project
Country, Region	Malaysia, Asia
Organisation	SPOT Community Project Malaysia (Grassroots, youth-led initiative)

Year started

2015.

What specific problem in the challenge does this case study tackle?

In Malaysia, comprehensive sexuality education (CSE) is not consistently integrated into school curricula. The national curriculum primarily focuses on biological reproduction and avoids sensitive but essential topics such as consent, body boundaries, healthy relationships, gender-based violence, and gender equality. Discussions about sexuality are often considered taboo, resulting in girls growing up with limited knowledge about their bodies and lacking safe spaces to ask questions. This is especially challenging for underserved groups, including students in public schools, lower-income communities, and rural areas, who have even fewer opportunities to access accurate and age-appropriate guidance.

How does the solution address the challenge?

SPOT delivers age-appropriate, girl-centred sexuality education through interactive school and community-based workshops, providing reliable knowledge while respecting cultural sensitivities. Lessons rooted in UNESCO and international CSE frameworks but redesigned to fit Malaysian cultural norms, ensuring acceptance by schools and parents. Key topics include puberty, menstruation, consent, body autonomy, emotional literacy, healthy friendships, gender norms, and safety. Girls aged 9–16 receive information from trained facilitators in non-judgmental environments where questions are encouraged. Sessions in schools, community centres, and NGOs reach marginalised groups with little access to formal reproductive health education. SPOT relies on trained volunteers who serve as relatable role models for younger girls.

Who is involved?

→ Girls aged 9–16, particularly from public schools and underserved communities, are primary participants.
→ Trained young women volunteers (“SPOT facilitators”) deliver workshops and provide mentorship.
→ Public schools, community schools, and alternative learning centers collaborate to conduct CSE sessions.
→ Organisations working on gender equality, children’s rights, and anti-violence initiatives.
→ Parents & Guardians engaged through communication materials that build trust and cultural acceptance.

Impact & Outcomes

→ Thousands of girls engaged across Malaysia through structured, age-appropriate workshops.
→ Expansion from urban areas into rural and semi-urban communities.
→ Participants report greater confidence in understanding their bodies, setting boundaries, and recognising unsafe situations and increased ability to speak about menstruation and bodily changes without shame.
→ Contributes to the prevention of gender-based violence by empowering girls with knowledge about personal safety and rights.

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

What lessons or ideas can be applied in other countries or contexts?

Cultural adaptation is essential for effective comprehensive sexuality education, as programmes are more successful when they reflect local cultural and religious contexts. Women-led and youth-led models help build trust, with young facilitators creating safe and relatable spaces where girls feel comfortable asking questions. Community-based education plays a crucial complementary role to formal schooling by addressing sensitive topics that are often omitted from national curricula. Early intervention is particularly important, as engaging girls before adolescence equips them with the knowledge and confidence to navigate puberty safely. Volunteer-based, school-partnership models can be adapted across Asia and other conservative or underserved contexts.

Comparative Analysis

The four case studies illustrate both convergences and divergences in how Asian and European contexts address reproductive health, sexuality education, and women-centred wellness. European initiatives, such as Vyhonit ďábla (Czech Republic) and Bellabeat (Croatia/Slovenia), emerge from relatively liberal societies where public discourse around sexuality and digital technologies face fewer social constraints. As a result, these projects focus on destigmatising taboo topics and leveraging design-driven innovation to normalise conversations around sexual health and wellbeing. In contrast, Asian initiatives like Seicil (Japan) and SPOT (Malaysia) address different structural and cultural barriers. In Japan, social hierarchies and stigma discourage open discussion, making anonymous digital platforms and effective solutions. In Malaysia, cultural sensitivities and the lack of formal CSE push organisations like SPOT to create safe, community-based learning environments specifically for adolescent girls. SPOT focuses on early intervention, cultural adaptation, and community partnership to deliver essential knowledge often missing from formal curricula.

Name	Country	Core Innovation	Key Barrier Addressed	Society 5.0 Pillar
Vyhonit ďábla	Czech Republic	Media (Podcast/ TV)	Social Taboo/ Shame	Inclusion & Ethics
Seicil	Japan	Anonymous Q&A	Social Hierarchy/ Stigma	Human-centered Tech
Bellabeat	Croatia	Wearable Tech	Data Invisibility	Wellbeing & Data
SPOT	Malaysia	Grassroots Education	Cultural Sensitivity	Social Sustainability

Despite these contextual differences (see table), all four initiatives address underserved needs, whether filling curricular gaps in sexuality education or creating women-centred health technologies. Each blends digital or interactive tools with human-centred approaches, including podcasts and workshops in Czech Republic, expert-supervised Q&A in Japan, inclusive wearables in Europe, and culturally adapted community education in Malaysia. Inclusivity and local relevance are central across all models, ensuring that interventions respond to the lived realities of women and adolescents rather than applying generic solutions.

Viewed through a Society 5.0 lens, the cases collectively reflect core values of ethics, inclusion, sustainability, and responsible technology use. Ethical practice is evident in initiatives such as Vyhonit ďábla and Seicil, which communicate sensitive information in ways that empower young people without reinforcing stigma. Inclusion is operationalised through Bellabeat's focus on women's holistic health needs and SPOT's efforts to reach girls in conservative or underserved communities. Sustainability is pursued through long-term behaviour change rather than one-off interventions, supported by continuous engagement via media platforms, trusted digital services, and community education. Technological integration varies from low-data digital tools to advanced wearable analytics, demonstrating that both high- and low-tech solutions can contribute to social wellbeing.

These cases illustrate that while solutions must be shaped by cultural and institutional context, they converge in their pursuit of ethical, inclusive, and sustainable approaches to reproductive health and wellbeing. Cross-border learning through adaptation rather than replication can accelerate progress towards a more equitable and human-centred Society 5.0. Several innovations show strong potential for cross-border adoption. The hybrid digital and in-person model used by Vyhonit ďáblacould inform similar approaches in Asian contexts. Seicils's anonymous Q&A format offers a transferable solution for regions where stigma inhibits open conversation, including conservative or underserved European settings. Bellabeat's women-centred wellness design demonstrates how health technology can expand beyond fitness, while SPOT's volunteer-based, culturally adapted education model demonstrates how community-led initiatives can succeed even in conservative or resource-constrained environments.

Taken together, these cases reveal that while approaches diverge according to cultural and infrastructural contexts, they converge in their pursuit of more inclusive, ethical, and sustainable solutions. Cross-border learning through adaptation rather than replication can accelerate progress towards a more equitable and human-centred Society 5.0.

Summary

Through our analysis of Vyhonit ďábla, Seicil, Bellabeat, and SPOT, the authors have bridged the gap between digital innovation and societal leadership. Our research reframes the reproductive health challenge: technology is not the solution, but the vehicle. While we initially viewed this as a technical hurdle, it is fundamentally a cultural one.

We have identified that the "infrastructure" of women's health is built on trust, anonymity, and cultural translation. By comparing European and Asian contexts, we found that while stigma manifests differently—as social hierarchy in Japan or curricular gaps in Malaysia and Czech Republic—the remedy remains constant: human-centered design.

True leadership in the Society 5.0 era requires moving beyond technical expertise to embrace ethical sensitivity and cultural intelligence. These case studies prove that innovation only succeeds when it is adapted to local realities. Whether through the anonymity of a digital Q&A or the grassroots empowerment of a youth workshop, these initiatives dismantle barriers by prioritising the user's safety and social context over the tool itself.

Sustainable progress in reproductive health demands a radical alignment of digital tools, ethical leadership, and long-term social impact. Technology must serve the community, not the other way around. By integrating these lessons, we can build a future where comprehensive health education is not a privilege of geography but a global standard of inclusion.

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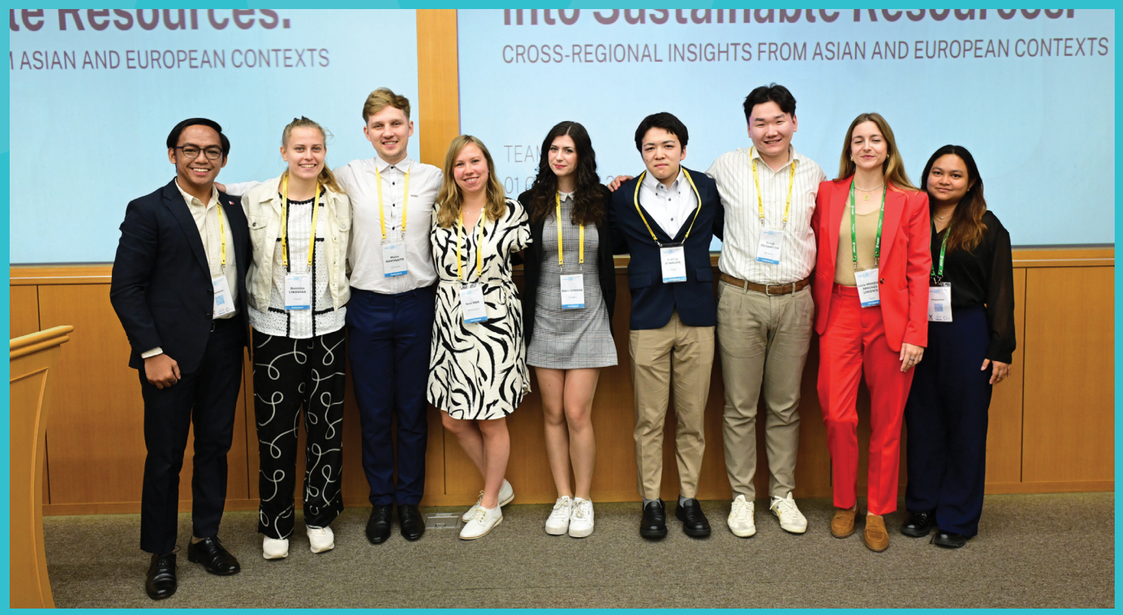
CHALLENGE

09

Turning Sensitive Waste into Sustainable Resources

How can we use innovation to transform hard-to-handle waste, such as menstrual products, into safe and sustainable resources that protect public health and promote responsible consumption?



Challenge Overview

Description

Certain waste streams—such as menstrual products and other sensitive materials—are difficult to manage safely and often carry social stigma. Traditional disposal methods can pose health risks, harm the environment, and reinforce taboos that limit open discussion and innovation. This challenge explores how circular economy principles and new technologies can transform such waste into safe, usable resources while protecting public health. Inspired by PadCare Labs (India), it demonstrates how rethinking waste systems can advance both sustainability and dignity.

Inspired by PadCare Labs (India)

PadCare Labs addresses the critical issue of menstrual waste disposal by introducing the world's first smokeless sanitary napkin disposal and recycling system. Their patented 5D technology—comprising Disinfection, Deodorization, Decolorization, Disintegration, and Deactivation—enables the safe and efficient processing of used sanitary pads. This process not only mitigates health risks associated with traditional disposal methods but also contributes to environmental sustainability by converting waste into reusable materials like paper and plastic products.

Website:https://www.padcarelabs.com/

Related SDGs:

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Introduction

Hard-to-handle waste, such as menstrual products, poses a growing global environmental and public health challenge. Disposable pads and tampons are typically composed of plastics, superabsorbent polymers, and cellulose, materials that are rarely recyclable, take centuries to decompose, and pose risks through landfill accumulation, incineration, and sewage blockage (Fourcassier et al., 2022; Aujla et al., 2024; Blignaut et al., 2025). In the European Union (EU), an estimated 49 billion menstrual products were consumed in 2017 alone, generating around 590,000 tonnes of waste, 87 per cent of which ended up in landfills (Cabrera and Garcia, 2019; Cabrera, 2020). In Asia, the problem is compounded by scale: India alone produces about 12.3 billion sanitary pads annually, most of which are burned or dumped, releasing toxic pollutants or clogging sewage systems (Down to earth, 2021; Tewari and Biswas, 2022). Addressing menstrual waste requires innovation that integrates sustainability, public health, and responsible consumption. This report explores how innovation can transform menstrual waste into safe and sustainable resources by analysing four initiatives from Asia and Europe: Blood and Modibodi in Asia-Pacific, and Snuggs and RePAiD in Europe. These cases illustrate diverse approaches to reduce menstrual products' waste and emissions, namely biodegradable design, reusable alternatives, advanced recycling, and circular business models.

In Southeast Asia, the Singaporean-based brand Blood has pioneered biodegradable menstrual pads made from corn-based materials that decompose faster than conventional plastic products. By combining user-friendly design with bold campaigns to challenge menstrual stigma, Blood addresses both the physical waste problem and cultural taboos that limit sustainable adoption (Ying and Leow, 2014). Similarly, Modibodi, founded in Australia and active across the Asia-Pacific region and beyond, markets reusable period underwear that can replace single-use products. Independent life-cycle assessments show that Modibodi products can reduce greenhouse gas emissions by up to 77 per cent over four years compared with disposable alternatives (Chong, 2013).

In Europe, solutions emphasise recycling and lifecycle sustainability. The Czech company Snuggs produces reusable period underwear and integrates circularity into its supply chain by using recycled materials and conducting scientific life-cycle assessments. Results indicate that Snuggs products generate 3.5 times less environmental impact and nearly 10 times less waste than traditional pads (Šejdová and Zahradnik, 2018). In the Netherlands, RePAiD demonstrates how absorbent hygiene products (AHPs), such as diapers, can be recycled at scale. Through thermal pressure hydrolysis (TPH), plastics, cellulose, and superabsorbents are separated and recovered, with recovery rates of up to 90 per cent (RIVM, 2019). While focused on diapers, the model is highly relevant for menstrual waste, providing a solution for turning mixed waste streams into valuable raw materials.

These case studies demonstrate how innovation can transform menstrual waste into safe and sustainable resources, scalable and applicable to both Asian and European contexts. Biodegradable products reduce long-term pollution, reusable solutions minimise waste at the source, and advanced recycling enables material recovery. Beyond environmental benefits, these approaches protect public health and encourage responsible consumption through user-centred design and cultural change.

Case Studies for Ethical, Inclusive, and Sustainable Societies in Asia and Europe

CASE STUDY

Initiative Name	Blood – "Revolutionising Menstrual Care"
Country, Region	Southeast Asia (Indonesia, Malaysia, and the Philippines)
Organisation	Blood (Singapore-based menstrual care brand)

Year started

2014.

What specific problem in the challenge does this case study tackle?

Blood addresses the environmental burden caused by disposable menstrual product waste and the persistent stigma surrounding menstruation in Southeast Asia, which limits the adoption of sustainable and healthy menstrual care solutions.

How does the solution address the challenge?

The initiative develops biodegradable menstrual pads made from corn-based materials that decompose more sustainably than conventional plastic products. It combines user-centred product design with bold, stigma-challenging communication campaigns and social media outreach to normalise conversations around menstruation and promote responsible consumption.

Who is involved?

→ The founding team and product designers.
→ Retail partners enabling wide distribution (Guardian, Watsons, and NTUC FairPrice).
→ Women and girls across Southeast Asia as end users.
→ Online and community audiences engaged through education and awareness campaigns.

Impact & Outcomes

→ Environmentally, the availability of biodegradable menstrual pads has reduced the long-term burden of plastic waste.
→ For consumers, healthier alternatives built from natural ingredients present a safer, more sustainable option.
→ Socially, Blood campaigns have helped to raise awareness about menstrual health and sustainability, gradually shifting consumer expectations and behaviour.
→ The brand's growing market share reflects a regional appetite for eco-conscious solutions and validates the commercial viability of sustainable menstrual products.

What lessons or ideas can be applied in other countries or contexts?

The case shows that sustainable materials and user-driven design can reduce environmental impact without compromising comfort or accessibility. Combining retail distribution with community education and stigma reduction enables large-scale behavioural change. The model is transferable to other regions where menstrual stigma and waste management challenges intersect.

CASE STUDY

Initiative Name	Modibodi
Country, Region	Oceania, Southeast Asia, and select global markets
Organisation	Modibodi

Year started

2013.

What specific problem in the challenge does this case study tackle?

Modibodi addresses the environmental impact of single-use menstrual products, social taboos surrounding menstruation, and period poverty by reducing reliance on disposable feminine hygiene products and expanding access to sustainable alternatives.

How does the solution address the challenge?

The initiative develops reusable menstrual and incontinence underwear made from certified fabrics, supported by carbon audits and life-cycle assessments. These products replace single-use items and significantly reduce waste and emissions. Modibodi also integrates sustainability into its governance and operations through ethical sourcing, low-emission logistics, and transparency standards.

Who is involved?

→ Global consumers purchasing reusable apparel.
→ Certified suppliers ensuring ethical production.
→ NGOs distributing donated products to vulnerable populations.
→ Sustainability auditors and certification bodies.
→ Modibodi's internal design, sustainability, and outreach teams.

Impact & Outcomes

→ Life-cycle assessments show that Modibodi products can reduce greenhouse gas emissions by 33–77 per cent over a four-year period compared with disposable alternatives, with each item lasting over 100 washes.
→ The company has donated more than 219,000 reusable products globally through its Give A Pair initiative and reduced shipping-related emissions by approximately 30 per cent by shifting 95 per cent of transactions to freight shipping.
→ As a certified B Corporation, Modibodi demonstrates how commercial success can align with verified environmental and social impact.

What lessons or ideas can be applied in other countries or contexts?

Reusable menstrual products can substantially reduce waste and emissions at scale when supported by robust life-cycle assessments. Embedding sustainability into governance, as demonstrated through B Corp certification, strengthens accountability and trust. Partnerships with NGOs and donation programmes show how private-sector innovation can advance period equity while remaining commercially viable.

CASE STUDY

Initiative Name	Snuggs – Reusable Period Underwear
Country, Region	Czech Republic, Europe, and the United States of America
Organisation	Snuggs

Year started

2018.

What specific problem in the challenge does this case study tackle?

Snuggs, a Czech Republic-based menstrual care company, addresses the environmental impact of disposable menstrual products, including plastic waste, high carbon emissions, and water consumption. It also responds to social barriers around menstruation, particularly embarrassment and discomfort that can limit participation in physical activities, especially among girls and young women.

How does the solution address the challenge?

The initiative replaces single-use pads and tampons with washable, reusable period underwear designed for comfort, performance, and durability. Snuggs maintains local production and close supply-chain control to ensure ethical standards, efficiency, and quality. Sustainability is further strengthened through recycled packaging and long-lasting product design, making eco-friendly menstrual care accessible to a broad consumer base.

Who is involved?

→ The founding and production teams at Snuggs.
→ Environmental researchers conducting life-cycle assessments; consumers using reusable menstrual products.
→ Sports organisations and youth athletes engaged through education and product donations.
→ Retail and logistics partners.

Impact & Outcomes

→ Using the Product Environmental Footprint methodology recommended by the European Commission, life-cycle assessments show that Snuggs underwear has a 3.5 times lower overall environmental impact than traditional pads.
→ It produces 2.5 times lower carbon emissions, uses 7.9 times less water, consumes 3.3 times less fossil fuel, and generates 9.6 times less waste.
→ At the individual level, one user saves an estimated 3.70 kg of CO_2, 2,366 litres of water, 77.9 MJ of fossil fuel, and 1.04 kg of waste annually.
→ Socially, partnerships such as the collaboration with Manchester City Women's FC support girls' participation in sport by reducing menstrual-related barriers.

What lessons or ideas can be applied in other countries or contexts?

Eco-friendly product innovation, when paired with local production, supply chain control, and sustainable packaging, can create scalable solutions with measurable environmental benefits. This integrated approach provides a replicable model for other contexts seeking to reduce menstrual waste while ensuring comfort and accessibility.

CASE STUDY

Title	RePAiD – Cutting-Edge Technology for Recycling Absorbent Hygiene Products
Country, Region	The Netherlands, Europe
Organisation	RePAiD; Elsinga Beleidsplanning en Innovatie B.V.; ARN B.V. (facility operator)

Year started

2010.

What specific problem in the challenge does this case study tackle?

RePAiD addresses the environmental and public health challenges posed by hard-to-handle hygiene waste, particularly diapers and incontinence products, which account for approximately 400,000 tonnes of waste annually in the Netherlands and are predominantly incinerated due to their complex composition. The case is highly relevant to menstrual waste, which shares similar material challenges.

How does the solution address the challenge?

The initiative employs Thermal Pressure Hydrolysis (TPH) to sterilise and separate composite hygiene products into recoverable materials. Cellulose fibres are reused in paper or insulation, plastics are recycled, and super-absorbent polymers are reintegrated into production cycles. Remaining residues are directed to energy recovery, ensuring minimal waste and supporting circular economy objectives.

Who is involved?

→ Retail and logistics partners.Retail and logistics partners.
→ Municipalities organising collection systems and citizens engagement.
→ ARN B.V. operating the recycling facility.
→ Technical partners supplying specialised components.
→ Government bodies shaping regulatory frameworks through Extended Producer Responsibility (EPR).
→ Public health authorities providing safety and risk guidelines.

Impact & Outcomes

→ RePAiD has demonstrated recovery rates of up to 90 per cent of material inputs, significantly outperforming conventional incineration.
→ Life-cycle assessments indicate substantial CO2 reductions, while municipalities report increased public participation in separate collection systems.
→ The initiative contributes to national circular economy targets and aligns with multiple UN Sustainable Development Goals related to waste, health, and climate action.

What lessons or ideas can be applied in other countries or contexts?

RePAiD showcases how continuous technological development and policy alignment can yield a replicable circular solution. The model highlights opportunities for other regions to integrate TPH technologies, strengthen municipal engagement, and adapt EPR policies to promote corporate accountability. For the menstrual hygiene sector specifically, these techniques point to future pathways where absorbent pads and similar products could be systematically recycled, advancing holistic strategies for sustainable menstrual care.

Comparative Analysis

Across Asia and Europe, the initiatives presented demonstrate how innovation in menstrual and hygiene products can drive both environmental and social impact. While all four cases address the challenge of hard-to-handle waste, their approaches diverge depending on regional contexts, available technologies, and prevailing social challenges.

A clear similarity across all four cases is their dual focus on addressing environmental concerns and social needs (Nuffield Health, n.d; Knevett, 2025). The European organisations aim to reduce waste from single-use hygiene products through reusable alternatives and advanced recycling systems. The Asian counterparts also focus on reducing plastic and carbon footprints, although their focus lies in providing more sustainable single-use alternatives or reusable menstrual products rather than development of recycling technologies.

Despite common goals, the approaches vary according to regional context. European cases are predominantly product- and system-focused, addressing waste streams and supply chains through technological or efficiency-based solutions. Snuggs relies on product life-cycle assessment and localised production to ensure sustainability (Snuggs, 2025), while RePAiD exemplifies systemic collaboration across municipalities, businesses, and regulators to recycle complex absorbent hygiene products (Klinger, 2021). In contrast, Asian cases place greater emphasis on social transformation. Blood not only designs biodegradable menstrual pads but also actively works to dismantle stigma around menstruation by engaging youth and normalising open conversations (Ying and Leow, 2014). Modibodi, meanwhile, extends its mission beyond product development by embedding ethics in its operations as a certified B Corporation (B Corporation, n.d), and advancing menstrual equity through donation programmes and partnerships with NGOs (Chong, 2013; Plan International, n.d). These differences reflect regional realities, where cultural taboos and period poverty remain more prominent barriers in Asia.

All four initiatives reflect key Society 5.0 values of ethics, inclusion, and sustainability. Ethical practice is evident in Modibodi's transparent governance and Snuggs' use of the Product Environmental Footprint methodology (Modibodi, 2021, n.d.-a, n.d.-b; Snuggs, 2025). Inclusion is promoted through Blood's efforts to normalise menstruation and Modibodi's donation programmes that expand access to sustainable products (Ying and Leow, 2014; Modibodi, 2021, n.d.b, n.d.c; Wightman-Stone, 2025). Sustainability underpins each case: RePAiD recovers up to 95 per cent of material inputs (Repaid, n.d), Snuggs significantly reduces environmental impact compared with disposables, Blood lowers plastic pollution through biodegradable materials, and Modibodi's reusable products cut greenhouse gas emissions by up to 77 per cent (Modibodi, n.d.-a).

Several approaches stand out for their transferability. RePAiD's TPH technology could be scaled globally to tackle complex absorbent hygiene waste streams. Snuggs' combination of eco-innovation with local production and sustainable packaging offers a model adaptable to other low-waste sectors. Modibodi's B Corp-certified model, blending ethical governance with NGO partnerships, demonstrates how businesses can balance profit with social contribution and transparency. Finally, Blood's culturally sensitive communication strategies provide inspiration for addressing menstrual stigma in diverse contexts, reinforcing the link between design, storytelling, and social change.

Summary

This research highlights how menstrual and hygiene care can be reimagined as both an environmental and social challenge. Across Asia and Europe, the discussed initiatives demonstrate that innovation in this sector extends beyond product development, necessitating realignment of cultural attitudes, embedding ethics into governance, and advancing systemic change in waste management.

A key finding is the contrast in regional approaches. European cases, Snuggs and RePAiD, focus strongly on product efficiency and system-level solutions, whether through life cycle assessments or large-scale recycling technologies. Asian cases, Blood and Modibodi, while equally committed to sustainability, place stronger emphasis on inclusivity and stigma reduction, recognising that cultural barriers and period poverty remain pressing challenges in their context.

From a Society 5.0 leadership perspective, these initiatives demonstrate how ethics, inclusion, and sustainability can be embedded in practice. Ethical leadership is reflected in transparent governance and accountability mechanisms; inclusion is advanced through efforts to normalise menstruation and expand access to sustainable products; and sustainability is achieved by reducing long-term environmental burdens. Leadership in this space is not confined to corporate actors but also emerges through community engagement, policy alignment, and cross-sector collaboration.

Looking forward, the challenge calls for leaders who can bridge technological, cultural, and policy innovations across borders. The European cases highlight the power of system-wide technological solutions, while the Asian cases underscore the importance of social change and inclusivity. A future pathway may therefore lie in integrative leadership: uniting technical expertise with cultural sensitivity to create a resilient and equitable model of menstrual and hygiene care.

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CHALLENGE

10

Rethinking Housing for Sustainable Cities

How can we use innovation and technology to design affordable, sustainable housing that reduces environmental impact and makes cities more resilient?

Challenge Overview

Description

Cities face mounting pressures from population growth, climate change, and housing insecurity, making the need for affordable and sustainable housing more urgent than ever. Conventional construction often carries high environmental costs and does not always meet the resilience needs of vulnerable communities. This challenge asks how innovation and technology can reshape housing materials, design, and delivery models to support more inclusive and sustainable urban futures. Inspired by Eco-Bricks (Cambodia), it highlights how reimagining building materials and systems can reduce environmental impact while expanding access to decent housing.

Inspired by Eco-Bricks (Cambodia)

Eco-Bricks, is a Cambodian enterprise that recycles 5 to 10 tonnes of plastic waste per month into high-strength bricks for the construction industry. Each brick incorporates approximately 2 kilograms of plastic waste, combined with soil, sand, and cement, resulting in products that are five to six times stronger than traditional red clay bricks and have a lifespan exceeding 100 years. The production process avoids the use of kiln-dried wood, thereby preventing deforestation and reducing environmental impact.

Website: https://ecobricks.org/en/

Related SDGs:

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Introduction

Housing is becoming one of the biggest challenges of the 21st century, especially as cities grow quickly and climate change becomes more serious. Across Asia and Europe, people are struggling to find homes that are affordable, safe, and environmentally sustainable. These challenges extend beyond shelter provision, raising broader questions about urban resilience, social equity, and environmental impact (UN-Habitat, 2022). This study looks at how innovation and technology can help solve these problems by creating housing that not only meets basic needs but also supports long-term resilience and environmental goals.

In Asia, rapid urban growth in cities such as Mumbai, Jakarta, and Manila has contributed to the expansion of informal settlements, where millions of people lack reliable access to clean water, electricity, and safe infrastructure. In Southeast Asia, Vietnam stands out as an example of how rising housing costs have outpaced income growth, leaving many young people unable to enter the housing market. At the same time, cities are facing growing risks from flooding and sea-level rise linked to climate change (IPCC, 2022). While government housing policies often focus on affordability, they do not always address environmental sustainability or long-term resilience, creating gaps that place both communities and ecosystems at risk.

In Europe, housing challenges take a different but equally urgent form. Many households now spend more than 30 to 40 per cent of their income on housing, which makes it difficult for low- and middle-income groups to live in cities. Urban areas are becoming more crowded, while some rural areas are facing population decline and abandoned housing. In addition, much of Europe's housing stock is ageing and energy-inefficient, which contributes to high energy consumption and carbon emissions (Eurostat Housing in Europe Report, 2024). Although renovating buildings with low-carbon technologies is essential to meeting climate targets, progress has been uneven and slow. This highlights a growing need for new approaches that combine technology, affordability, and community needs.

For the purpose of this report, affordable housing is defined as housing costs that do not exceed 30 per cent of household income. Sustainable housing refers to housing that minimises environmental impact through energy-efficient systems and the use of eco-friendly materials. Resilient cities are understood as cities that can adapt to and recover from challenges like natural disasters, economic shocks, and social pressures (Cutter et al., 2014).

Positioned within a Society 5.0 framework, this study explores how innovative construction methods, smart technologies, and community-centred planning can support affordable, sustainable, and resilient housing. Rather than focusing on luxury real estate or temporary shelters, the case studies will highlight long-term, inclusive solutions. Examples include Vietnam's housing challenges for young urban residents, Japan's community-based and disaster-resilient housing models, and Freiburg in Germany as a reference point for affordable, solar-powered housing (Cabinet Office, 2019). Selected cases illustrate how technology, design, and citizen participation can be combined to rethink housing systems and support more resilient cities for future generations.

CASE STUDY

Title	Japan - Kashiwa no-ha Smart City
Country, Region	Chiba Prefecture (Kashiwa City), located in the Tokyo metropolitan area's suburbs), Japan, Asia
Organisation	Mitsui Fudosan

Year started

2005.

What specific problem in the challenge does this case study tackle?

Urban housing systems face growing environmental pressures due to rising energy consumption and CO_2 emissions, while cities such as the Tokyo metropolitan area are increasingly vulnerable to natural disasters, including earthquakes and typhoons. At the same time, demographic ageing is placing additional strain on housing and care systems, highlighting the need for housing solutions that support healthy ageing and reduce the long-term burden of elderly care (Cabinet Office, 2020).

How does the solution address the challenge?

The solution tackles the challenge by integrating renewable energy, energy-efficient housing, smart systems, and resilient community planning. Using solar and geothermal power helps produce lower emissions and strengthens household energy security. Zero Energy Houses (ZEH) also minimise energy demand by generating as much energy as they consume, reducing costs and environmental impact of the housing. At the same time, IoT-based energy management systems optimise energy use in real time and prevent household waste. On a larger scale, districts designed to serve as disaster-response hubs, ensuring critical services remain functional during emergencies, and providing reliable power and support to communities. Citizen participation is also a focus of this solution, helping to build sustainable communities by incorporating residents' input.

By promoting renewable energy and efficient systems, the solution reduces emissions while improving local energy self-sufficiency. Communities benefit from a secure and stable electricity supply, even during disasters, which enhances resilience and safety. It also enables the integration of community-based support services for an ageing population, contributing to more affordable, resilient, and socially inclusive cities over the long term.

Who is involved?

→ Kashiwa City provides urban planning coordination and public services to support the development of the initiative.
→ The University of Tokyo and Chiba University contribute academic expertise, introduce new technologies, and lead social experimentation.
→ The Urban Renaissance Agency (UR) supports land development and provides the institutional and regulatory frameworks required for implementation.
→ Residents and local community groups participate through citizen-led urban development and co-creation activities.

Impact & Outcomes

→ Reduction of emissions and improved local energy self-sufficiency.
→ Stable energy supply during disasters with reduced blackout risks.
→ Expansion of elderly care services such as health support centers, ICT-based monitoring systems.
→ Recognition as an international model city, with numerous overseas delegations and study visits.

What lessons or ideas can be applied in other countries or contexts?

The tripartite collaboration model of public, private, and academic sectors can be applied to other countries' urban development. Especially effective for resilience enhancement in disaster-prone regions.

CASE STUDY

Initiative Name	Vietnam Social Housing Programme
Country, Region	Vietnam – Nationwide (with focus on major urban areas such as Hanoi and Ho Chi Minh City), Asia
Organisations	Government of Vietnam (Ministry of Construction, State Bank, local People's Committees),

Year started

In 2000. Major acceleration under the National Housing Development Strategy 2011–2020 and renewed commitment in the Housing Law 2023 (effective from August 2024).

What specific problem in the challenge does this case study tackle?

The Vietnam Social Housing Programme addresses the housing affordability crisis facing young and low-income urban residents, many of whom fall into a "missing middle" unable to access either social or commercial housing. At the same time, it promotes social inclusion by prioritising vulnerable groups such as people with disabilities, ensuring homes are both affordable and accessible. By expanding supply, revising eligibility, and embedding universal design, the programme reduces inequality and supports more resilient, sustainable urban development.

How does the solution address the challenge?

The Vietnam Social Housing Programme reduces housing barriers by expanding affordable apartment supply, revising income thresholds, and offering preferential mortgage packages (5.9 per cent for five years from 2025) to young first-time buyers. Built on a public–private partnership model, it combines state incentives, private investment, and NGO support to deliver both affordability and inclusivity, including accessible design for people with disabilities. Implemented nationwide, with a focus on Hanoi, Ho Chi Minh City, and industrial zones.

Who is involved?

→ The Government (Ministry of Construction, State Bank, and local authorities), with private developers incentivised to build affordable housing and financial institutions offering preferential loans for young buyers.
→ Youth and low-income groups are the main beneficiaries.

Impact & Outcomes

→ By 2023, over 7 million m² of social housing, supporting hundreds of thousands of households in major cities and industrial zones.
→ The 2025 low-interest mortgage package is expected to help tens of thousands of young families access homes more sustainably.
→ Beyond affordability, the programme enhances social inclusion by prioritising people with disabilities through accessible design, while also reducing the risk of a "generation without homes," stimulating the construction sector, and fostering more resilient and sustainable cities.

What lessons or ideas can be applied in other countries or contexts?

Vietnam's experience shows that affordable housing programmes are most effective when they combine financial accessibility, supportive policies, and inclusive design. Expanding social housing supply alongside preferential credit packages reduces barriers for young and first-time buyers, while public–private partnerships mobilise resources beyond state budgets. Equally important, integrating universal design standards ensures homes are accessible to people with disabilities, and linking housing policy with demographic goals helps address broader social challenges. These practices provide a replicable model for other rapidly urbanising countries facing affordability gaps and social inequality.

CASE STUDY

Initiative Name	Schoonschip - Floating Sustainable Neighbourhood
Country, Region	Amsterdam-North, The Netherlands, Europe
Key actors driving initiative	→ Schoonschip Cooperative (resident-led initiative founded in 2010) → Marjan de Blok (Dutch filmmaker)

Year started

In 2011. The idea was initiated in 2008 by Marjan de Blok in her documentary on sustainable houseboats (GeWoonboot). It was formalised as the Schoonschip Corporation in 2011, received building approval in 2013, and was completed in 2021.

What specific problem in the challenge does this case study tackle?

Schoonschip tackles the challenge of sustainable and climate-resilient housing in urban areas facing rising sea levels and ecological pressures. Much of the Netherlands lies below sea level and is historically vulnerable to flooding, making this challenge particularly urgent. Dutch authorities and international agencies emphasise the urgency due to climate change, which increases the threat by raising sea levels and intensifying rainfall. The subtopic here is integrated sustainability in housing, covering renewable energy, waste recycling, water management, and shared mobility while fostering community participation and affordability.

How does the solution address the challenge?

The solution addresses the challenge through a combination of climate-resilient design, sustainable construction, and smart, circular systems. Floating housing enables homes to adapt to rising sea levels and flooding, providing a viable response to climate risks in densely populated urban areas. Buildings are constructed using eco-friendly materials, high levels of insulation, and no gas connections, with heating supplied through heat pumps and passive solar design, while solar water heaters provide hot water. Energy use is optimised through a smart microgrid that integrates rooftop solar panels, household batteries, and real-time energy management, improving efficiency and local energy self-sufficiency. Circular water and waste systems further reduce environmental impact by separating grey and black water streams and piloting wastewater treatment technologies that recover energy and nutrients.

Who is involved?

→ Schoonschip Cooperative.
→ Dutch architecture practice Space&Matter for urban masterplan and housing design.
→ Private companies and advisors for technical expertise and financial support.
→ The City of Amsterdam and Waternet for project management, sanitation pilots, and regulatory support.

Impact & Outcomes

→ 46 households (144 residents) connected via a smart grid.
→ Green roofs covering at least one-third of roof surfaces.
→ Community-driven governance for energy, water, mobility, and ecology.
→ Global recognition as Europe's most sustainable floating neighbourhood.

Beyond its technical achievements, its success strengthens the Netherlands' role as a global reference point for sustainable urban housing in flood-prone regions.

What lessons or ideas can be applied in other countries or contexts?

Schoonschip shows how sustainable and resilient housing can integrate environmental, social , and economic benefits. Key takeaways for cross-border adoption include: 1) Community-driven design; 2) Energy and water self-sufficiency; 3) Cooperative management and shared mobility reduce expenses, offering a model for affordability in innovative housing; 4) Climate adaptive urban design.

CASE STUDY

Initiative Name	The Solar Settlement (Solarsiedlung) and Sun Ship (Freiburg, Germany)
Country, Region	Freiburg, Southwest Germany (Vauban district), Europe
Key actors driving initiative	Rolf Disch Solar Architecture, supported by Freiburg Solar Funds, local authorities, residents, and tenants

Year started

Planning in 1990s. Construction began between 1999 and 2006.

What specific problem in the challenge does this case study tackle?

The project responds to climate change, fossil fuel dependency, and rising energy costs by proving that entire communities can be energy-positive, CO_2-neutral, and economically viable. It tackles the challenge of creating housing and commercial spaces that combine ecological performance with urban attractiveness, showing that sustainability can be integrated into everyday life without sacrificing comfort, aesthetics, or profitability.

How does the solution address the challenge?

The Solar Settlement and Sun Ship in Freiburg tackle climate change and urban energy waste with the PlusEnergy concept, where buildings produce more energy than they consume. This is realised through 445 kWp of roof-integrated photovoltaics, passive house insulation, heat recovery ventilation, latent heat storage, and ecological materials such as local timber.

The project also pioneered the Freiburg Solar Fund, aligning ecological goals with investor returns. As the world's first large-scale PlusEnergy community (59 homes + Sun Ship), it integrates housing, offices, commerce, and leisure in one model, proving that climate-neutral design can be both functional and profitable.

Who is involved?

→ Rolf Disch, the architect, leads the project design and vision, integrating energy-positive and sustainable urban architecture.
→ Solarsiedlung GmbH develops and manages the project, coordinating construction, operations, and long-term sustainability goals.
→ Sustainably managed companies and institutions occupy the buildings as tenants, contributing to the economic viability of the energy-positive model.
→ Investors, participating through the Sun Ship Fund, provide financial backing to support development and long-term operation.
→ Residents of the Solar Settlement and the wider Vauban district benefit from affordable, low-energy housing and improved urban sustainability outcomes.

Impact & Outcomes

→ The project delivers a net-positive energy balance, generating a yearly surplus equal to 200,000 liters of oil.
→ Creates additional income for tenants and investors, making sustainability financially attractive.
→ The project benefits 170 residents and businesses through low energy costs and healthier living environments.
→ It has contributed to establishing Freiburg's Vauban district as a reference model for sustainable urban planning.
→ The initiative has informed national renewable energy policy by demonstrating that PlusEnergy concepts can be implemented at scale.

What lessons or ideas can be applied in other countries or contexts?

The Sun Ship serves as a role model, demonstrating that ecological and ethical projects can also be economically viable and profitable. The PlusEnergy concept makes communities less dependent on global energy prices, showcasing how integrating a commercial centre with a residential community can create a symbiotic relationship, providing a functional infrastructure and an animated environment for both.

Comparative Analysis

All four case studies have some focus on environmental sustainability and resilience. Japan's Kashiwa no-ha Smart City and Germany's Solar Settlement integrate renewable energy systems to minimise CO_2 emissions and secure local power supply. Vietnam's Social Housing Programme, while driven by social policy objectives, supports sustainability by promoting universal design and durable, low-impact construction materials in affordable developments. The Netherlands applies advanced flood risk management and water resilience technologies to create sustainable urban environments through resident-led initiatives. Each case study relies on a multi-dimensional sustainability model that promotes sustainable urban development, and a collaborative governance model that brings together private developers, academia, and local communities to co-create solutions. Citizen participation and academic expertise support the decision-making process, ensuring that technological innovations align with social needs and long-term urban viability.

Although they shared similar models, regional contexts shape different approaches for each case, and each applies different technologies in response to a localised challenge. In Japan, the focus is on disaster resilience and longevity ageing, such as IoT-enabled Zero Energy Houses (ZEH) and earthquake-proof district hubs, which address both energy security and an ageing population. Vietnam focuses on affordability and social inclusion through financial incentives by prioritising young, low-income households and people with disabilities. Germany's PlusEnergy demonstrates how climate-neutral housing can also be economically viable at the neighbourhood scale, while Schoonschip in the Netherlands represents a smaller-scale, experimental model centred on community participation and adaptive design in response to flood risk. These differences highlight how housing solutions respond to localised societal challenges, whether demographic ageing, affordability gaps, or climate vulnerability.

Viewed through a Society 5.0 lens, the cases illustrate how technology can be aligned with human-centred values, ethics, and inclusion. Vietnam's accessible housing standards support ethics and inclusivity, ensuring marginalised groups have access to stable homes. Germany and Japan highlight environmental responsibility through sustainable models for carbon neutrality and disaster-resilient infrastructure. In the Netherlands, Schoonschip shows how participatory, community-led flood management and resilient urban design combine sustainability with social inclusion. All initiatives support social inclusion and ethical practice in long-term strategy by designing inclusive communities. This aligns with the Society 5.0 values of the sustainability principle, in which technology brings all communities together and helps build a more resilient society and ecosystem. This includes the recommendation that Asia-Europe partnerships should evolve into mutual innovation platforms where both regions co-create solutions through genuine cooperation, not just one-sided development aid.

There are elements of these cases that are particularly impactful and have potential for cross-border application. For example, the approach and technologies deployed in the Japanese and German cases could be applied in the Vietnamese example. Japanese smart housing technologies and Germany's passive solar design in Vietnam's social housing framework could enhance both inclusivity and resilience, which would ensure that affordable housing meets the diverse needs of vulnerable groups across communities. More broadly, the analysis suggests that Asia–Europe cooperation should evolve into mutual innovation platforms, where solutions are co-developed and adapted collaboratively rather than transferred as one-size-fits-all models.

Summary

This research demonstrates that innovative housing solutions play a critical role in advancing affordability, sustainability, and urban resilience. Ensuring an affordable housing supply is a universal challenge, and one of the most significant policy challenges in Society 5.0. This is especially because housing has a far-reaching effect on society – investment in sustainable housing can address multiple challenges, including socioeconomic development, human rights, disaster resilience, climate change, and social inclusion.

Across both Asia and Europe, the case studies highlight the need for housing systems that are reliable, affordable, resilient, and environmentally sustainable. In Vietnam, the social housing programme is driven by the need to ensure affordable and inclusive housing, especially for young people and marginalised communities. In Japan, a country with an ageing population that is prone to natural disasters, the core focus is on resilience and environmental sustainability. The German case study illustrated a primary focus on carbon neutrality and energy independence. The Dutch case study similarly focused on environmental sustainability and resilience, in light of their particular vulnerability to climate change. The analysis also underscores the value of partnership-based approaches to sustainable housing development. Rather than relying on traditional, one-directional development models, collaboration between countries such as Germany, Japan, the Netherlands, and Vietnam offers opportunities for mutual learning and co-creation. European experience in energy-efficient housing and circular construction, combined with Japan's expertise in disaster-resilient and smart housing, can inform context-sensitive solutions in rapidly urbanising settings such as Vietnam. Such cooperation moves beyond aid-based frameworks towards shared responsibility for achieving climate and sustainability goals.

Before this research, no one in our team had prior experience or much knowledge on the topic of sustainable housing. But as we began the research, we realised how cross-cutting this issue is, and that it had broader relevance to areas of work we were more familiar with. The project has been a valuable opportunity to deepen our knowledge about a critical challenge facing society, work across different regional contexts to understand their similarities and differences, and understand how we can most effectively lead in Society 5.0.

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