E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
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PREFACE

It is with great pleasure that we present the e-proceedings of International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), which compiles the extended abstracts submitted to the International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), held on 23 January 2025 at **PTDI, Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang.** This publication serves as a valuable resource, showcasing the intellectual contributions on the invention and innovation among students, academics, researchers, and professionals.

The International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), organized under the theme "Fostering a Culture of Innovation and Entrepreneurial Excellence," is designed to inspire participants at various academic levels, from secondary students to higher education students and professionals. The competition emphasizes both innovation and entrepreneurship, encouraging the development of product prototypes that address real-world problems and have clear commercialization potential. By focusing on technological and social innovations, i-TIEC 2025 highlights the importance of turning creative ideas into viable, market-ready solutions that can benefit users and society. The extended abstracts in this e-proceedings book showcase the diverse perspectives and depth of research presented during the event, reflecting the strong entrepreneurial element at its core.

We extend our sincere gratitude to the contributors for their dedication in sharing their innovation and the organizing committee for their hard work in ensuring the success of the event and this publication. We also appreciate the support of our collaborators; Mass Rapid Transit Corporation Sdn. Bhd. (MRT Corp), Universitas Labuhanbatu, Indonesia (ULB), Universitas Riau Kepulauan, Indonesia (UNRIKA) and IEEE Young Professionals Malaysia, whose contributions have been instrumental in making this event and publication possible.

We hope that this e-proceedings book will serve as a valuable reference for researchers, educators, and practitioners, inspiring further studies and collaborations in both innovation and entrepreneurship. May the knowledge shared here continue to spark new ideas and market-ready solutions, advancing our collective expertise and fostering the growth of entrepreneurial ventures.

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B-ST126: PENTAHELIX CO-WORKING SPACE FOR FISHERMEN WITH AN AQUATECTURE APPROACH

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ABSTRACT

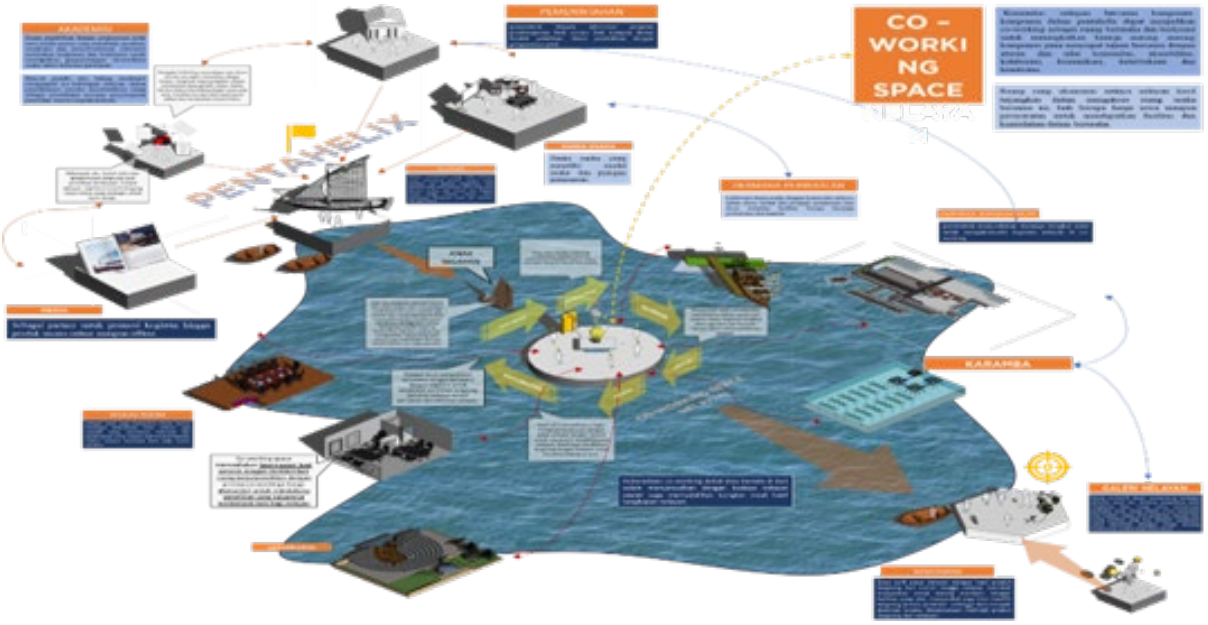
The collaboration of various parties in efforts to develop business diversification in the marine fisheries sector with a focus on small fisher households will help maintain the sustainability of fishermen's economic resilience by utilizing the capabilities and expertise of each party. In this case, it is necessary to develop an adaptable co-working space to meet the needs of the collaborative activities that occur. This co-working space is a forum for fishermen to gain access to information, knowledge, technology, capital, marketing networks, infrastructure facilities to support aquaculture activities and processing fishery products from the results of collaboration. The pattern of the relationship between fishermen's activities and the concept of pentahelix in joint business spaces has similarities with the values in co-working spaces by Stumpf (2013) and several other researchers. The design model of fishermen's co-working space in the sea area uses the principle of water architecture (aquatecture) as an adaptation to sea water conditions and sea level rise due to climate change and so that the designed buildings present the meaning of appreciation for the sea. Creating an adaptive space by accommodating the needs of pentahelix in collaborating for the sustainability of fishermen's lives and livelihoods requires the design of pentahelix co-working space for fishermen with an Aquatecture approach. The method used in this design is a descriptive qualitative method.

Keywords: Pentahelix, Co-Working, Fisherman, Aquatecture.

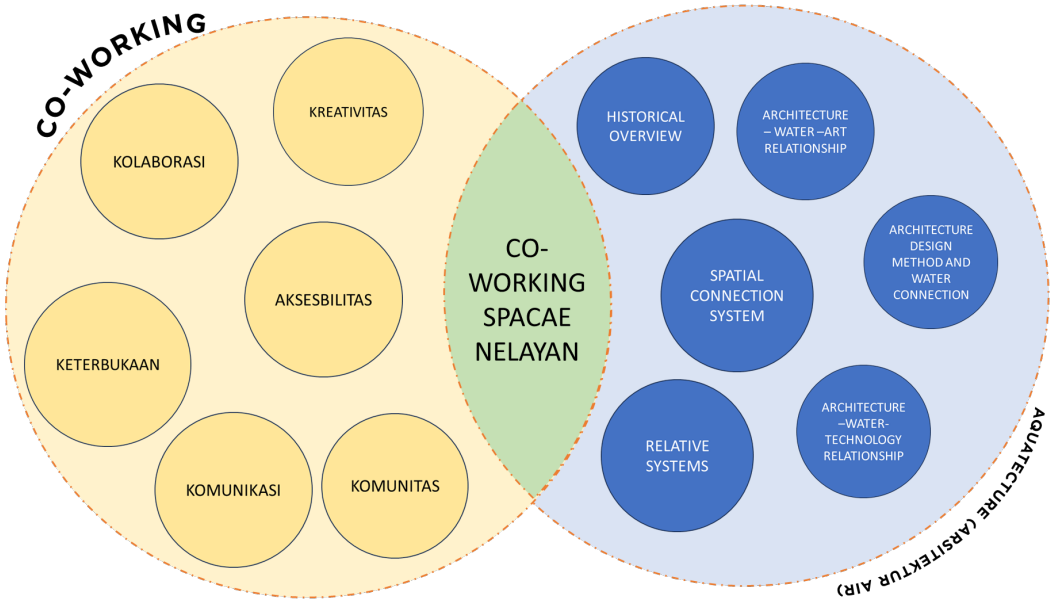
1. Product Description

The Pentahelix Co-Working Space for Fishermen with an Aquatecture Approach is an innovative design concept aimed at improving the livelihoods of small-scale fishing households. This adaptive co-working space integrates the principles of aquatecture to accommodate sea-level rise and coastal environmental challenges while promoting collaborative activities among various stakeholders. It serves as a platform for fishermen to access critical resources such as technology, knowledge, capital, and marketing networks. The design leverages the Pentahelix model, fostering synergy between academics, businesses, government, media, and the local community to enhance economic resilience and sustainability. Incorporating floating and elevated structures, the co-working space harmonizes with its marine environment, creating a functional and aesthetic workspace that aligns with traditional coastal values. This initiative is envisioned to support fishermen through economic diversification, innovation, and ecological adaptation.

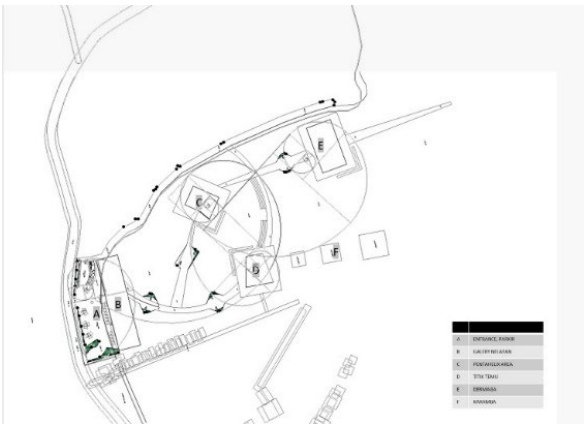
2. Pictures



Picture 1. Activity Scheme Model for Fishermen's Co-Working Space



Picture 2. Fishermen's Co-Working Space



Picture 3. Site Sirculation Plan

3. Novelty and uniqueness

This study introduces a novel concept of integrating the Pentahelix collaboration model with aquatecture to address the socio-economic challenges faced by small-scale fishing households. The unique approach lies in its focus on creating adaptive co-working spaces on marine environments, which are designed to accommodate sea-level rise and promote sustainable living for coastal communities. By blending aquatecture principles with the collaborative framework of the Pentahelix model, the study highlights innovative strategies to foster synergy among academics, businesses, government, media, and local communities. This dual-focus design not only emphasizes environmental adaptation but also enriches the cultural and economic resilience of fishermen by creating a platform for resource sharing, collaboration, and innovation. The integration of floating architecture and community-centric spaces underscores its distinctiveness in bridging traditional coastal practices with modern architectural solutions.

4. Benefit to mankind

The proposed Pentahelix Co-Working Space with an Aquatecture approach offers significant benefits to humanity, particularly for vulnerable coastal communities. By addressing socio-economic disparities among small-scale fishing households, the design promotes sustainable livelihoods and enhances economic resilience. The integration of adaptive architecture with collaborative spaces empowers fishermen to access critical resources, such as knowledge, technology, and financial networks, fostering innovation and self-reliance. Additionally, this initiative supports environmental conservation by promoting structures that harmonize with marine ecosystems, mitigating the adverse impacts of climate change and sea-level rise. The collaborative framework, involving academia, government, businesses, media, and local communities, strengthens social cohesion and fosters inclusive development. Ultimately, this project not only uplifts marginalized coastal populations but also contributes to global sustainability goals, offering a scalable model for resilience in other vulnerable regions.

5. Innovation and Entrepreneurial Impact

The integration of the Pentahelix model with an aquatecture exemplifies a groundbreaking innovation in fostering entrepreneurial growth within coastal communities. By providing fishermen with an adaptive co-working space, this design enables collaborative innovation, blending traditional knowledge with modern technological advancements. The model facilitates the creation of new economic opportunities through diversification of income sources, including aquaculture, fish processing, and eco-tourism initiatives. Moreover, the platform encourages entrepreneurial ventures by connecting local fishermen with businesses, academic institutions, and governmental support, driving the commercialization of innovative ideas. The co-working space acts as an incubator for small enterprises, enhancing market accessibility and promoting sustainable business practices

6. Potential commercialization

The Pentahelix Co-Working Space with an Aquatecture approach presents substantial potential for commercialization by leveraging its innovative design and collaborative framework. The adaptive architecture, tailored for marine environments, offers opportunities for replication in various coastal regions globally, particularly those affected by sea-level rise and climate change. The co-working space model can be commercialized as a scalable solution for eco-tourism hubs, sustainable aquaculture facilities, or maritime trade centers. Additionally, its integration with the Pentahelix framework enables partnerships between local businesses, academic institutions, and government bodies, facilitating investments in technology, marketing, and infrastructure. The design's appeal to diverse stakeholders, including private investors and international organizations, further enhances its commercial viability. By fostering sustainable economic activities and bridging gaps between traditional practices and modern innovation, this concept has the potential to generate significant economic returns while addressing global environmental and social challenges.

7. Acknowledgment

The authors extend their sincere gratitude to the Faculty of Engineering, Universitas Riau Kepulauan, for their invaluable support and resources throughout this research. Special thanks are also due to the local fishermen and communities in Kelurahan Kawal, Kabupaten Bintan, for their participation, insights, and cooperation during the field studies and interviews. Additionally, the authors acknowledge the contributions of government agencies, businesses, academic institutions, and media representatives involved in the Pentahelix framework for their constructive feedback and collaborative efforts. This research was made possible by the dedication of all stakeholders who share the vision of fostering sustainable development and innovation in coastal communities.

8. Authors' Biography

Indri Astuti Maulana, S.T., M.T., is the Head of the Architecture Study Program at Universitas Riau Kepulauan. She specializes in urban architecture and behavioral architecture, focusing on the connection between humans, activities, and space identity in cities. She has authored several nationally accredited journals, one of which is titled "A Study of the Genius Loci/Spirit of Place Theory Through the Dimension of Philosophy of Science."

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