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E-PROCEEDINGS

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

"Fostering a Culture of Innovation and Entrepreneurial Excellence"



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23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang

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CONTENTS

PREFACE	i
FOREWORD RECTOR	ii
FOREWORD ASSISTANT RECTOR	iii
PREFACE PROGRAM DIRECTOR	iv
ORGANIZING COMMITTEE	v
EXTENDED ABSTRACTS SCIENCE & TECHNOLOGY	1 - 618
EXTENDED ABSTRACTS SOCIAL SCIENCES	619 - 806

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.

B-ST112: SMART AUTOMATIC RAIN COVER CONTROL SYSTEM FOR ENHANCED FISH DRYING	530
B-ST118: ROBOHARVEST: AI-DRIVEN ROBOTIC SYSTEM FOR AUTOMATED LOOSE PALM OIL FRUITLET DETECTION AND COLLECTION IN PLANTATIONS.....	535
B-ST126: PENTAHHELIX CO-WORKING SPACE FOR FISHERMEN WITH AN AQUATECTURE APPROACH.....	545
B-ST127: DESIGN OF GEN-Z MEDITATION CENTER IN BATAM WITH ZEN ARCHITECTURE CONCEPT	550
B-ST129: DESIGNING A SPECIAL NEED SCHOOL TYPE C WITH A BEHAVIORAL ARCHITECTURE APPROACH IN BATAM CITY	555
B-ST130: SCREEN PRINTED GOLD ELECTRODE FOR BACTERIA PANICLE BLIGHT DETECTION FROM IN SILICO DESIGNED APTAMERS.....	560
B-ST131: INNOVATIVE LOW-COST FOGGING FOR DENGUE MOSQUITO ERADICATION AND CLEAN LIVING SPACE.....	565
B-ST132: MEDMATHEMATICA: ADVANCING CANCER SEGMENTATION THROUGH MATHEMATICAL MODELING.....	570
B-ST135: ENHANCEMENT OF SODIUM BISMUTH TITANATE (NBT) DIELECTRIC PROPERTIES THROUGH ALUMINUM (AL ³⁺) SUBSTITUTION FOR ENERGY STORAGE	575
B-ST137: HYDROPONICS: A SMART SOLUTION FOR GARDENING ON LIMITED LAND	583
B-ST143: WEB AI IN EDUCATION INTERACTIVE WEB-BASED TUTOR FOR SELF-DIRECTED LEARNING.....	587
B-ST145: SIAUMKM : WEB AND ANDROID MOBILE DESIGN MODEL IN STRENGTHENING MSME ACCOUNTING INFORMATION SYSTEMS WITH AN R&D MODEL	593
B-ST148: VE TESTER.....	599
B-ST149: UTILIZATION OF OIL PALM FRONDS INTO BIOCHAR TO SUPPORT SUSTAINABLE SOIL IMPROVEMENT	604
B-ST150: ULTILIZATION OF PALM FROND WASTE IN THE MANUFACTURE OF LIQUID SMOKE FOR SUSTAINABLE AGRICULTURE	609
B-ST152: ASTROTOURISM INNOVATING FOR ENTREPRENEURIAL EXCELLENCE: ENHANCING USER EXPERIENCES AND ADVANCING ASTRONOMY EDUCATION AT KUSZA OBSERVATORY, UNIVERSITI SULTAN ZAINAL ABIDIN	613

B-ST137: HYDROPONICS: A SMART SOLUTION FOR GARDENING ON LIMITED LAND

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ABSTRACT

The hydroponic system is an innovative solution to urban farming challenges, offering an efficient and sustainable method of vegetable cultivation. This system utilizes materials like rockwool, net pots, Rucika pipes, and various plumbing components to create a controlled environment for growing vegetables. The process begins with preparing the planting media and sowing vegetable seeds, followed by setting up the water distribution system and ensuring proper water flow. This system provides numerous benefits, including reducing reliance on traditional farming, promoting food security, and encouraging sustainable agricultural practices. It empowers individuals, particularly housewives and students, to engage in green agriculture, fostering self-reliance and enhancing community welfare. Additionally, the hydroponic system has entrepreneurial potential, opening doors for local businesses focused on fresh vegetable production and the sale of hydroponic systems.

Keywords: Hydroponic system, urban farming, sustainable agriculture

1. Product Description

In the hydroponic manufacturing sector, materials and equipment play an important role in the process. The materials used include the main materials for building hydroponic systems, such as pipes, planting media, and other supporting components. The equipment and materials used in this process include: 5 cm net pot, 7 cm net pot, rockwool, TDS meter, AB mix fertilizer for vegetables, vegetable seeds, paranet nets, Rucika 1.5" and 3" pipes, pipe glue, 1/2" elbow, 3" clean out, 1.5" tee, hoses, trays, buckets, and cables. The hydroponic system starts from preparing rockwool planting media, sowing vegetable seeds, to installing pipes and flowing water smoothly through hoses connected to water pumps. After the hydroponic device is well installed, the planting medium containing vegetable seedlings is transferred to a net pot that has been placed on the piping system. The system is then tested to ensure that the water flows properly throughout the hydroponic section.

2. Product Pictures



Figure 1. hydroponic systems

3. Benefit to Mankind

The development of hydroponic systems provides significant benefits to individuals and society. By introducing sustainable and efficient methods of growing vegetables, the system reduces reliance on traditional farming practices that may use harmful pesticides or require large tracts of land. This system allows locals, especially housewives, to grow their own fresh vegetables, reducing dependence on traditional agriculture. The system also empowers students with hands-on experience in green agriculture, encourages food security, encourages self-reliance, and encourages sustainable practices, as well as improving the quality of life of local communities.

4. Innovation and Entrepreneurial Impact

The creation of this hydroponic system brought about a transformative change in urban agriculture, low-tech but effective for agriculture. By utilizing readily available materials such as rockwool, mesh pots, and rucika pipes, the system allows individuals and communities to grow their own vegetables in a controlled, water-efficient environment. The impact of entrepreneurship lies in its potential to empower local communities, especially in

urban areas, to take control of their food production, ensuring access to fresh and healthy produce. The project not only supports individual empowerment but also opens the door for business ventures focused on fresh vegetable production and sales of fresh vegetables and hydroponic systems.

5. Potential Commercialization

This hydroponic system has great potential to be commercialized, especially in cities with limited land. This eco-friendly, water-saving, and soil-free system is suitable for growing vegetables practically. In addition to being used by individuals, this system can be adopted for commercial agriculture or urban rooftop gardens. With the support of NGOs, governments, or business partners, these innovations can support sustainable local food production and environmental conservation.

6. Acknowledgment

We would like to thank the Chairman of RT 2 for providing land for the hydroponic installation, as well as to the lecturers of the Faculty of Law who have provided guidance, input, and support during the implementation of this project. We also express our appreciation to the student team and volunteers for their dedication and hard work. Thank you to the local community and organizations for the active collaboration that has been very helpful in making this initiative a success.

7. Conclusion

The hydroponic system offers a sustainable, low-tech solution for urban agriculture, enabling individuals to grow fresh vegetables efficiently with minimal water usage. It empowers local communities, reduces reliance on traditional farming, and promotes food security. This system also opens entrepreneurial opportunities in urban farming and vegetable production, supporting sustainable practices and improving access to healthy food.

8. Authors' Biography



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