UNIVERSITI TEKNOLOGI MARA

FACULTY OF BUSINESS AND MANAGEMENT (HONS)

HUMAN RESOURCE MANAGEMENT (BA243)

HRM 666

INDUSTRIAL TRAINING

(12 August 2024-24 January 2025)

PROJECT TITLE:

SWOT ANALYSIS OF INSTITUTE FOR SMART INFRASTRUCTURE AND INNOVATIVE CONSTRUCTION (ISIIC), UTM JOHOR BAHRU

PREPARED BY:

NAME	SYARIFAH AMIRA BINTI MOHD KAMAL
MATRIC ID	2022660394

CLASS:

BA243 6D

PREPARED FOR:

DR. HAINNURAQMA BINTI RAHIM

SUBMISSION DATE:

24th JANUARY 2025

SURAT KEBENARAN

Tarikh : 7 Januari 2025

Kepada :

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Maklumbalas (/)

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Nama Pelajar	SYARIFAH AMIRA BINTI MOHD KAMAL		
No. Matriks	2022660394	**Nama Program**	BA 243- FACULTY OF BUSINESS AND MANAGEMENT (HONS) HUMAN RESOURCE MANAGEMENT
Tajuk Laporan	SWOT ANALYSIS OF INSTITUTE FOR SMART INFRASTRUCTURE AND INNOVATIVE CONSTRUCTION (ISIIC), UTM JOHOR BAHRU	**Nama Syarikat**	INSTITUTE FOR SMART INFRASTRUCTURE AND INNOVATIVE CONSTRUCTION (ISIIC), UTM JOHOR BAHRU

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Yang Benar

DR. SHAHRULNIZAHANI MOHAMMAD DIN
Research Officer/ Pegawai Penyelidik
Institute for Smart Infrastructure and
Innovative Construction (ISIIC)
Universiti Teknologi Malaysia

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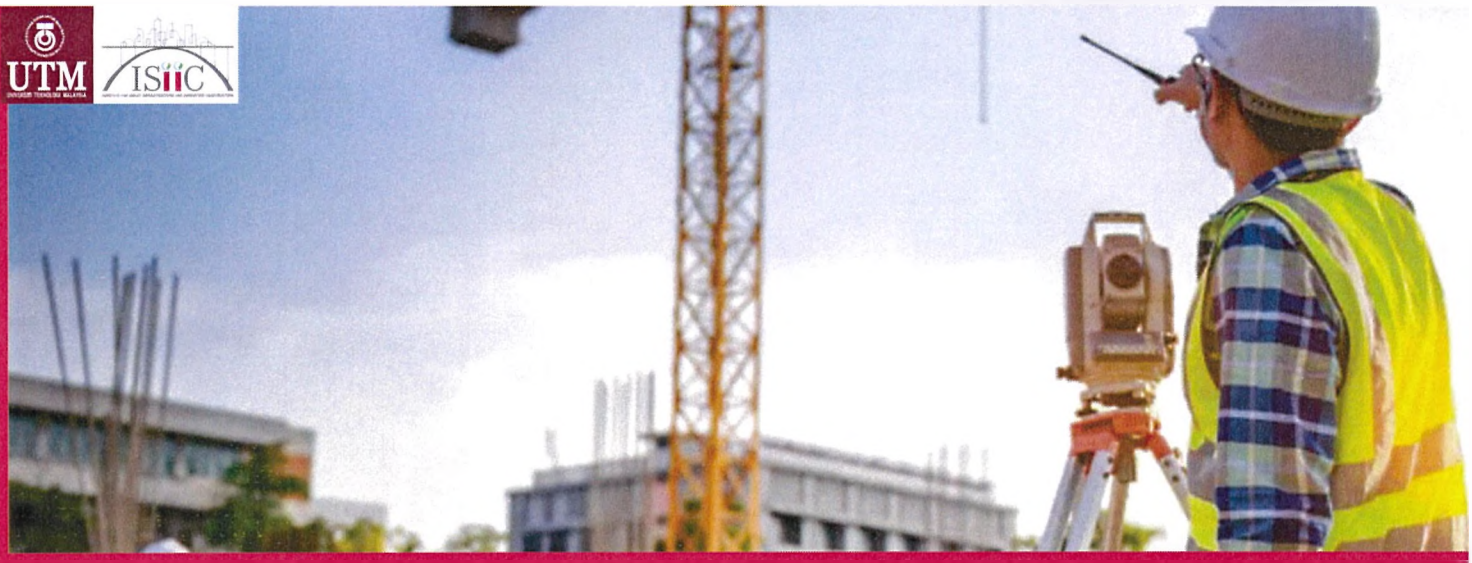
Nama Pegawai :
Jawatan :
No. Tel. :
No. Faks :

Cop jabatan/organisasi:



EXECUTIVE SUMMARY

This report presents an overview of my six-month internship under The Institute for Smart Infrastructure and Innovative Construction (ISiiC) at Universiti Teknologi Malaysia (UTM), which began on August 12, 2024, and ended on January 24, 2025. It highlights the duties, projects, and responsibilities I have had during this time, along with the important abilities and values I have gained.

The company's history, vision, mission, goals, organisational structure, and product or service offerings are all included in this report along with the student's resume. A thorough SWOT analysis of The Institute for Smart Infrastructure and Innovative Construction (ISiiC) is also covered in this report, along with valuable discussions and recommendations based on the analysis. The SWOT analysis evaluates the company's opportunities, threats, weaknesses, and strengths. It offers important information for strategic planning and decision-making in the future.

Additionally, this report gives a summary of my internship experience, particularly in The Institute for Smart Infrastructure and Innovative Construction (ISiiC). This internship has given me a new perspective on how human resources may motivate innovation and expansion in highly advanced technology sectors like construction and smart infrastructure. I will apply this knowledge in my future work, where I want to align people strategies with innovation-driven objectives to promote organisational excellence.

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ACKNOWLEDGEMENT

First and foremost, I thank Allah SWT for blessing me with patience, knowledge, and courage during my internship at The Institute for Smart Infrastructure and Innovative Construction. I'd like to express my heartfelt gratitude to The Institute for Smart Infrastructure and Innovative Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) Johor Bahru for offering me this invaluable internship. The experience has been transformative, providing me with a thorough understanding of the interactions between innovation, technology, and human dynamics in organisational settings.

I would like to express my heartfelt gratitude to the director and staff of ISiiC for their guidance, encouragement, and willingness to share their knowledge. Their mentorship has helped shape my understanding of how collaboration and shared vision foster innovation. As a human resources student, I am especially grateful for the opportunity to observe and contribute to the organisational processes at ISiiC. The hands-on experience with multidisciplinary teamwork, strategic planning, and fostering an innovation culture has increased my appreciation for the critical role HR plays in driving success in high-tech and innovative environments. I'd also like to thank ISiiC for providing a supportive and inspiring work environment in which I was able to improve my communication, problem-solving, and teamwork skills.

Finally, I would want to express my sincere gratitude to my professional mentors and coworkers for their constant backing and support during my internship. This experience has made me more determined to make a significant contribution to the human resources sector. I am thankful to my family and friends for their constant support and prayers. Their encouragement helped me stay focused and motivated throughout the journey. Once again, I extend my heartfelt gratitude to everyone who helped make my internship a wonderful and unforgettable experience.

STUDENT'S PROFILE

SYARIFAH AMIRA BINTI MOHD KAMAL

ABOUT ME

I am Syarifah Amira Binti Mohd Kamal, 23 years old fresh graduated with a Degree in Human Resources and Diploma in Banking Studies. Come with ability to work with multiple technical, have good communication skills and to gain experience. I got band 3.5 on Muet. I'm looking for a position in human resources.

EDUCATION

University Technology Mara, Bandaraya Melaka, (2022-2025) Present

- Degree in Human Resources (CGPA 3.36)

University Technology Mara, Segamat Johor (2020-2022)

- Diploma in Banking Studies (CGPA 3.57)

Sekolah Menengah Kebangsaan Taman Universiti 2 (2018)

- Sijil Pelajaran Malaysia 5A1B2C

SKILLS

- **Knowledge:** SWOT analysis, Teamwork, E-learning, Time management, Communication
- **Technical Skills:** Excel, Word, Power point, Canva, Gamma, Napkin AI, Slidesgo, Capcut

LANGUAGE

• MALAY	90%	Native
• ENGLISH	70%	Fluent
• ARABIC	20%	Writing

WORK EXPERIENCE

Kekalbu Zahrah – Counter Services (February 2022- August 2022)

- Prepare employee salary reports.
- Maintain quality control of incoming and outgoing goods.
- Improve the quality of interaction with customers.

Industrial Training- Internship, (August 2024- January2025)

The Institute for Smart Infrastructure and Innovative Construction (ISiiC)

- Assisting in the editing process, such as creating posters, brochures, certificates, card holder and videos
- Support the team in drafting the project proposal and ensuring all details are accurate
- Helping ISiiC in adjusting their office plan
- Participated in training on document studio, next-generation academic writing AI, and website creation.
- Performing the role of an auditor in the conduct of Moveable Asset assessments and cross-audit sessions.

STUDENT'S PROFILE

ACHIEVEMENT

- Dean's List Award in Diploma Banking in Semester 3, 4 and 5
- Dean's List Award in Degree Human Resources in Semester 2 and 5
- First place award in class during form 3

PROJECT

Handling events in universities about mental health problem (SULAM), 2022

- Conducted a problem and program.
- Giving talks on topic mental health problem
- conducted a question-and-answer session.

Program Khidmat Masyarakat Sihat - CSR,2023

- Develop valuable skills like communication, teamwork, event planning, and leadership through their participation.
- Help think critically about the root causes of problems and potential solutions.
- Help to build a stronger sense of community.
- Provide students with activities and teach them networking and teamwork skills.

Training Program- Oh My Cikgu, 2023

- Gain a deeper understanding of the subject matter and develop the ability to apply it in real-world situations.
- Mastering new skills and knowledge can significantly boost confidence.
- Provide training for IPG students.
- Handling this as an AJK Hadiah that prepares prizes and gifts for the winner and others.

Zootivity Volunteer Programmed, 2024

- Gain a deeper appreciation for the natural world.
- Collaboration Project with Afomasa Safari Wonderland
- Managing this project as an AJK logistics
- Engage in a variety of activities, such as painting the animal sanctuary and community projects.

Webinar The Role Of Talent "Onboarding" (TROTO), 2024.

- Managing webinars as an AJK activity
- Gain a deeper understanding of the onboarding idea.
- Improved communication and presentation skills while participating in Webinar.

REFERENCES

Puan Rozana Binti Othman

- Senior Lecturer Universiti Teknologi Mara, Kampus Bandaraya Melaka

COMPANY'S PROFILE

1.1 Company's name, logo, location, operation hour

- COMPANY'S NAME

The Institute for Smart Infrastructure and Innovative Construction (ISiiC)

Contact Us

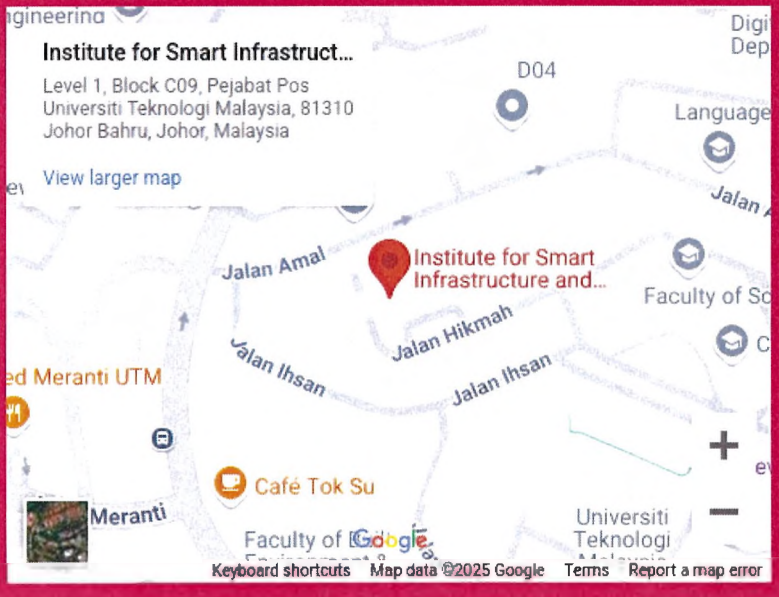
isiic@utm.my

https://www.facebook.com/isiicutm

- LOGO

- LOCATION

Institute for Smart Infrastructure and Innovative Construction, Level 1, C09, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, MALAYSIA



- OPERATION HOUR

SUNDAY- WEDNESDAY
8.00 AM - 5.00 PM

THURSDAY
8.00 AM - 3.30 PM

COMPANY'S PROFILE

1.2 Vision, Mission, Objective, Goals

VISION

To spearhead excellence in research and development through innovation and creation

MISSION

To be a world-class centre of research in smart infrastructure and innovative construction.

OBJECTIVES

- **INDUSTRY PARTNERSHIP**

  The Institute for Smart Infrastructure and Innovative Construction (ISiiC) works closely with construction companies, technology providers, and industry stakeholders to design and implement smart solutions that address real-world project needs.

- **KNOWLEDGE EXCHANGE**

  The Institute for Smart Infrastructure and Innovative Construction (ISiiC) hosts conferences, seminars, and workshops to promote knowledge sharing, showcase best practices, and explore technological advancements with researchers, practitioners, and policymakers.

- **RESEARCH AND INNOVATION**

  The Institute for Smart Infrastructure and Innovative Construction (ISiiC) collaborates with academic institutions, industry leaders, and government agencies to advance groundbreaking research in smart infrastructure and innovative construction methods.

COMPANY'S PROFILE

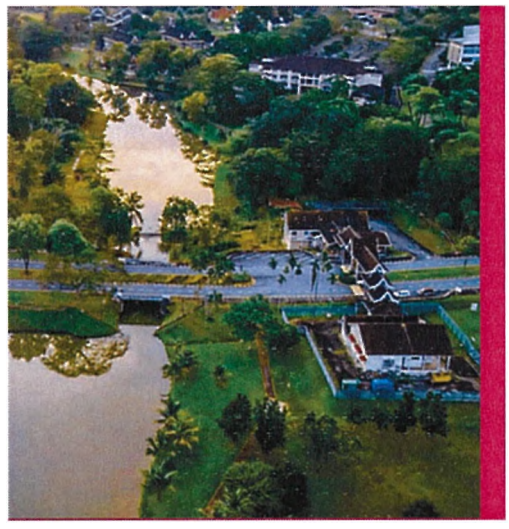
1.3 Background of Establishment

The Institute for Smart Infrastructure and Innovative Construction (ISiiC) was established in February 2015 and is currently managed by Senior Director Associate Prof. Dr. Izni Syahrizal Ibrahim. Bringing together the expertise of established research centers and the fresh perspectives of emerging researchers at UTM, ISiiC is home to five dynamic research centers: the UTM Construction Research Centre, the Center for Forensic Engineering, the Center of Built Environment in the Malay World, the Centre for Real Estate Studies, and the Center of Tropical Geoengineering. With a vision to become a global leader in smart infrastructure and innovative construction, ISiiC is committed to excellence in research and consultancy.

ISIIC oversees a wide range of research and consultancy activities, focusing on optimizing resources and streamlining operations to concentrate on key research areas. This strategic approach aims to enhance research output and strengthen its competitive edge. The institute's diverse research fields cover civil engineering, architecture, and real estate, including materials engineering, construction management, structural analysis, engineering geology, slope assessment, ground improvement, geotechnical studies, landscape heritage, and the real estate industry.

COMPANY'S PROFILE

1.3 Background of Establishment



ISiiC has five specialised research centres, each dedicated to advancing innovation and improving the efficiency, sustainability, and resilience of built environments. **The UTM Construction Research Centre (UTM CRC)** focuses on advanced construction technology, sustainable practices, smart infrastructure, innovative materials, and safety standards to enhance project management and ensure construction excellence.

The Forensic Engineering Centre (FEC) specializes in structural damage analysis, failure prevention, forensic engineering techniques, and legal and ethical aspects of forensics, aiming to improve safety and reliability in construction.

The Centre for Tropical Geoengineering (GEOTROPIK) addresses geotechnical challenges in tropical climates, focusing on soil and rock mechanics, slope stability, ground improvement, and environmental geotechnics. **The Centre for the Study of Built Environment in the Malay World (KALAM)** emphasizes preserving Malay cultural heritage through research on traditional architecture, urban planning, and heritage site conservation. Lastly, **the Centre for Real Estate Studies (CRES)** explores real estate development, property management, urban economics, and housing policy to promote sustainable urban growth and enhance urban living.

COMPANY'S PROFILE

1.4 Organizational Structure

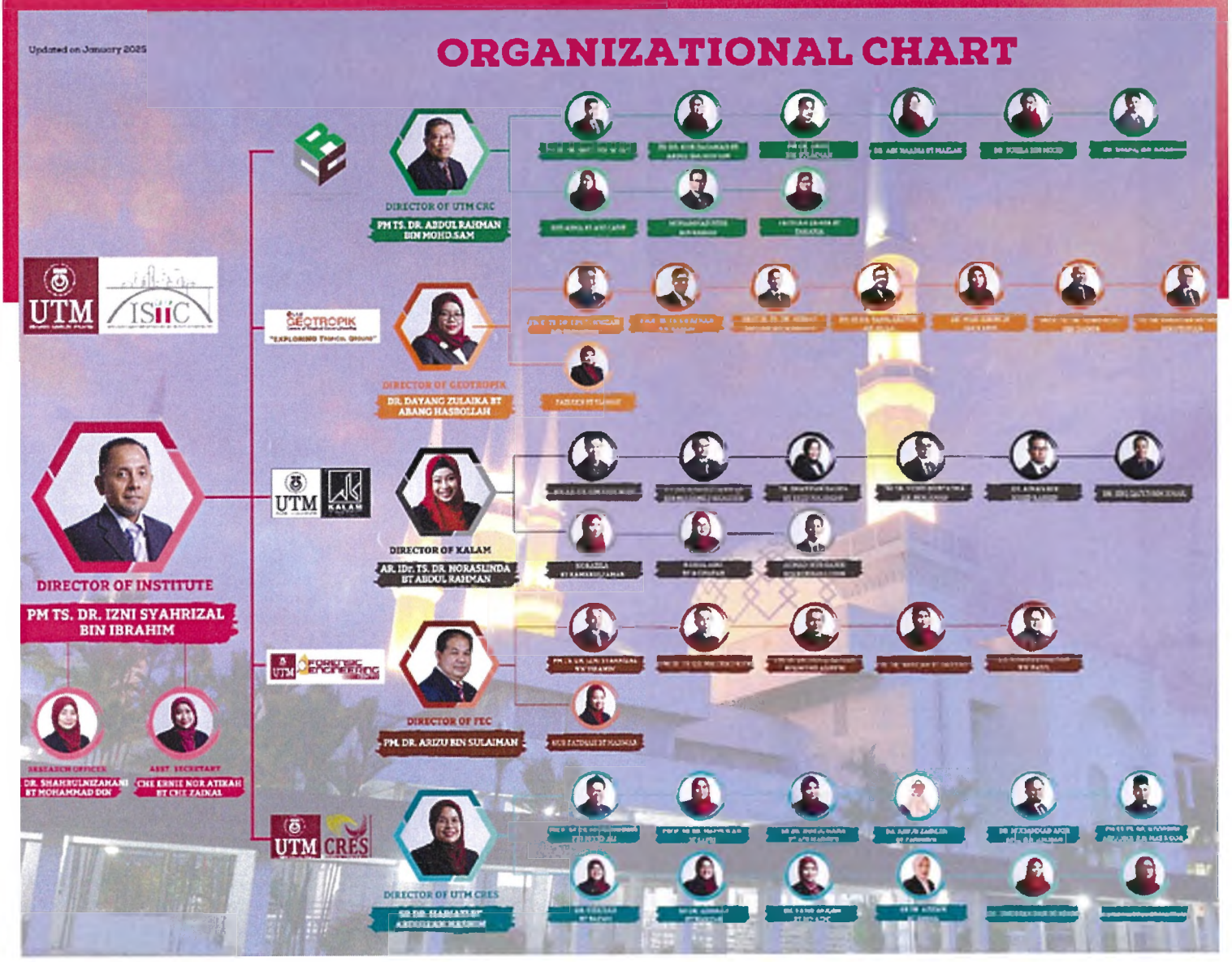


Figure 1 : Organizational Chart

COMPANY'S PROFILE

1.4 Organizational Structure

The organizational chart of the Institute for Smart Infrastructure and Innovative Construction (ISiiC) at UTM highlights its hierarchical structure. The institute is led by PM Ts. Dr. Izni Syahrizal Bin Ibrahim, who oversees several centers. Supporting the institute's operations are Ts. Dr. Shahrulnizahani Mohammad Din as the Research Officer and Puan Che Ernie Nor Atikah Che Zainal Abidin as the Assistant Secretary.The first Center is the UTM Construction Research Centre (CRC), directed by PM Ts. Dr. Abdul Rahman Bin Mohd Sam. Supporting him is Assoc. Prof. Ir. Dr. Shek Poi Ngian as the Deputy Director. The team also includes Ts. Dr. Nor Hasanah Bt Abdul Shukor Lim and Assoc. Prof. Ts. Dr. Arizu Bin Sulaiman as Research Fellows; Dr. Ain Naadia Bt Mazlan, Dr. Suzila Binti Mohd, and Dr. Shafiq Bin Ishak as Associate Research Fellows; Puan Siti Asma Bt Abd Latif as the Research Officer; Encik Muhammad Fitri Bin Rashid as the Assistant Engineer; and Puan Fatimah as the Research Assistant.

Secondly, Centre of Tropical Geoengineering (GEOTROPIK) which is directed by Dr. Dayang Zulaika Bt Abang Hasbollah. She is assisted by Prof. Ts. Dr. Edy Tonnizam bin Mohamad, Prof. Ir. Ts. Dr. Azman bin Kassim, Prof. Ir. Ts. Dr. Ahmad Safuan bin A Rashid and Assoc. Prof. Sr. Dr. Tajul Ariffin bin Musa as Research Fellows, Dr. Wan Anom bt Wan Aris, Prof. Ts. Dr. Mohd Rosli bin Hainin and Ts. Dr. Bakhtiar Affandy bin Othman as Associate Research Fellows, and Cik Fazleen bt Slamat as Research Officer.

The third center is the Centre for the Study of Built Environment in the Malay World (KALAM), led by Ar. Idr. Ts. Dr. Noraslinda Bt Abdul Rahman as the Director. Supporting her are Assoc. Prof. Ar. Dr. Lim Yaik Wah, Dr. Sharifah Salwa Bt Syed Mahdzar, Assoc. Prof. Dr. Mohd Murtadha Mohamad, Dr. Aiman Bin Mohd Rashid, and Dr. Iziq Eafifi Bin Ismail, who serve as Research Fellows. Additionally, Assoc. Prof. Dr. Khairul Anwar Bin Mohamed Khaidzir contributes as an Associate Research Fellow. The team is further strengthened by Puan Norazila Binti Kamarulzaman as the Social Research Officer, Nurul Aini Bt A. Ghafar as the P/O Administrative Assistant, and Ahmad Nur Banin Bin Borhanuddin as the Research Assistant.

COMPANY'S PROFILE

1.4 Organizational Structure

The fourth center is the Forensic Engineering Centre (FEC), led by Assoc. Prof. Ts. Dr. Arizu bin Sulaiman as the Director. He is supported by Assoc. Prof. Ir. Ts. Dr. Ma Chau Khun as the Deputy Director. The team includes Assoc. Prof. Ir. Dr. Mohd Azreen Bin Mohd Ariffin and Ir. Dr. Noor Nabilah Bt Sarbini as Research Fellows, Dr. Khairul Hazman Bin Padil as an Associate Research Fellow, and Puan Nur Fatimah Bt Marwaras the Research Officer.

Lastly, the Centre for Real Estate Studies (UTM CRES) is led by Sr. Dr. Hariati Binti Abdullah Hashim as the Director. She is supported by Prof. Sr. Dr. Hishamuddin Bin Mohd Ali, Prof. Sr. Dr. Maimunah Binti Sapri, and Sr. Dr. Nurul Hana Binti Adi Maimun as Senior Research Fellows. The team also includes Assoc. Prof. Sr. Ts. Dr. Noorsidi Aizuddin Bin Mat Noor, Dr. Muhamad Amir Afiq Bin Lokman, Dr. Fitriyah Binti Razali, Sr. Dr. Ezdihar Binti Hamzah, Dr. Ainur Zaireen Binti Zainudin, Sr. Dr. Azizah Ismail and Dr. Fatin Afiqah Binti Md Azmi as Associate Research Fellows. Supporting the center's operations are Ts. Umussaa'dah Binti Adam as the Research Officer and Puan Laily Marina Binti Mastan as the Senior Administrative Assistant.

COMPANY'S PROFILE

1.5 Product/ Services offered

Laboratories and Services

The Institute for Smart Infrastructure and Innovative Construction (ISiiC), lead in smart technology research for the construction industry. Its advanced labs provide specialized services focused on sustainability, efficiency, and and resilience. Equipped with cutting-edge tools, they offer testing, analysis, and innovative solutions for industry and academia.

ISiiC expert team collaborates with researchers and professionals to tackle the industry's toughest challenges, pushing the boundaries in construction and infrastructure. ISiiC is dedicated to shaping the future of the built environment with impactful, forward-thinking solutions.

For research laboratories, UTM CRC Column Fire Testing Laboratory assess structural columns under extreme fire conditions to ensure safety and durability. Services include Fire Resistance Testing, Temperature Simulation, and Material Analysis. Then, Measured Drawing Services by KALAM UTM precise documentation of structures and heritage sites, supporting preservation with advanced technology. Moreover, Civil Engineering Testing Unit (CETU) since 1998, CETU provides comprehensive testing and consultancy, including forensic investigations and construction materials testing.

COMPANY'S PROFILE

1.5 Product/ Services offered

Consultancy

The Institute for Smart Infrastructure and Innovative Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) offers a comprehensive range of consultancy services aimed at enhancing the efficiency, sustainability, and resilience of built environments. Leveraging the expertise of its five specialized research centers, ISiiC provides tailored solutions across various domains:

1. Advanced Construction Technologies: Through the **UTM Construction Research Centre (UTM CRC),** ISiiC offers consultancy in advanced construction methods, sustainable building practices, smart infrastructure systems, innovative construction materials, and construction safety and quality. Their experts assist in improving project management and ensuring high standards of construction excellence.

2. Forensic Engineering: **The Forensic Engineering Centre (FEC)** specializes in structural failure analysis, material forensics, building diagnostics, failure prevention strategies, and forensic engineering techniques. They provide critical insights to prevent future failures and enhance the safety and reliability of structures.

3. Geotechnical Engineering: **The Centre of Tropical Geoengineering (GEOTROPIK)** focuses on geotechnical engineering, soil and rock mechanics, slope stability analysis, ground improvement techniques, and environmental geotechnics. Their consultancy services address the unique challenges posed by tropical climates, ensuring that infrastructure in these regions is safe, stable, and sustainable.

COMPANY'S PROFILE

1.5 Product/ Services offered

Consultancy

4. Cultural and Historical Built Environments: **The Centre for the Study of Built Environment in the Malay World (KALAM)** offers expertise in traditional Malay architecture, urban planning, and the preservation of heritage sites. They aim to integrate cultural heritage with modern construction practices to create a harmonious built environment.

5. **Real Estate Development and Management: The Centre for Real Estate Studies (CRES)** conducts research and provides consultancy on real estate development, property management, urban economics, and housing policies. Their goal is to support sustainable urban development and improve the quality of life in urban areas.

High- Impact Publication

At the Institute for Smart Infrastructure and Innovative Construction (ISiiC), researchers are dedicated to producing work that not only meets good academic standards but also addresses real-world challenges, thereby contributing significantly to both the academic community and industry practices. Their approach to high-impact publications is centred on conducting solid research, fostering collaborations, targeting reputable journals, mentoring emerging researchers, and following to ethical standards to ensure our findings are relevant, credible, and widely distributed.

COMPANY'S PROFILE

1.5 Product/ Services offered

Seminars, Conference and Training

The Institute for Smart Infrastructure and Innovative Construction (ISiiC), regularly organize seminars and workshops that delve into current trends, challenges, and innovations in smart infrastructure and construction. These sessions provide participants with insights into the latest research findings and practical applications, fostering a deeper understanding of the field.

ISiiC conferences bring together experts from various disciplines to discuss and share advancements in infrastructure and construction. For instance, the Innovative & Sustainable Infrastructure International Conference (ISIIC2023) held on May 9-10, 2023, at Concorde Hotel Kuala Lumpur, focused on creative ideas and actions in facing economic challenges and climate change.

ISiiC also offer training programs designed to enhance the skills and knowledge of professionals in the construction and infrastructure sectors. These programs cover a range of topics, from advanced construction technologies to project management, ensuring that participants are well-equipped to meet industry demands.
Through these seminars, conferences, and training programs, ISiiC aims to bridge the gap between academia and industry, promoting the adoption of innovative solutions and best practices in smart infrastructure and construction

COMPANY'S PROFILE

1.5 Product/ Services offered

Commercialization and Innovation

At ISiiC, we are committed to turning innovative research into impactful solutions for society by focusing on commercialization, collaborating with industry partners, protecting intellectual property, and supporting entrepreneurial initiatives, all to advance smart infrastructure and construction.

Research and Development

R&D Focus Areas at the Institute for Smart Infrastructure and Innovative Construction (ISiiC) is firstly, advanced Construction Technologies. They explore cutting-edge construction methods and materials to improve building practices, ensuring they are more efficient, sustainable, and safe. Our research includes the development of smart infrastructure systems and innovative construction materials. Secondly, Geotechnical Engineering. They work in geotechnical engineering involves studying soil and rock mechanics, slope stability, and ground improvement techniques, particularly in tropical climates. This research ensures that infrastructure is built on solid foundations, capable of withstanding environmental challenges.

COMPANY'S PROFILE

1.5 Product/ Services offered

Research and Development

Thirdly, Forensic Engineering. They specialize in analyzing structural failures and material forensics to understand the causes of building defects or collapses. This knowledge helps in preventing future failures and improving the safety and reliability of structures. Fourthly, Cultural and Historical Built Environments. Through the study of traditional Malay architecture and urban planning, they aim to preserve cultural heritage while integrating it with modern construction practices, creating a harmonious built environment.

Lastly, Real Estate Development and Management. Their research also covers real estate development, property management, urban economics, and housing policies, providing insights that support sustainable urban development and improve the quality of life in urban areas.

ISiiC comprises five specialized research centres, each focusing on a specific area of expertise which is UTM Construction Research Centre (UTM CRC). Its dedicated to advanced construction technology and sustainable building practices. Then, Forensic Engineering Centre (FEC) that specializes in structural failure analysis and material forensics. Next, Centre of Tropical Geoengineering (GEOTROPIK) that focuses on geotechnical engineering challenges in tropical climates. Moreover, Centre for the Study of Built Environment in the Malay World (KALAM) that studies traditional Malay architecture and urban planning. Lastly, Centre for Real Estate Studies (CRES) that Conducts research on real estate development and urban economics. Through these centres, they collaborate with industry partners, academic institutions, and government agencies to translate our research into practical applications, driving innovation and excellence in the field of smart infrastructure and construction.

TRAINING REFLECTION

The Institute for Smart Infrastructure and Innovative Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) has accepted my internship application from August 12, 2024, to January 24, 2025. It consist of four person Dr. Shahrulnizahani, Dr. Izni Syahrizal, Puan Ernie and Puan Maznah. Before being accepted into the company, I had to go through an interview to meet their requirements. Working days run from Sunday to Thursday. Employees use the company calendar to plan their workdays. All departments' daily normal working hours are as follows:

DAY	WORKING TIME
Sundays to Wednesdays	8.00 am.- 5.00 pm
Thursdays	8.00 am.- 3.30 pm

Table 1.0: Table of Daily Working Hours

TRAINING REFLECTION

My internship at Universiti Teknologi Malaysia (UTM)'s Institute for Smart Infrastructure and Innovative Construction (ISiiC) gave me the opportunity to combine my academic background in human resources management with real-world experience in an innovative, technical setting. This experience gave me the opportunity to consider how important it is to humanise technological developments and promote cooperation amongst various stakeholders. As a Human Resources Management student, I observed firsthand how essential effective communication, collaboration, and organizational management are in a multidisciplinary research environment. I applied my knowledge in team dynamics and engagement by working with engineers, researchers, and administrative staff to ensure seamless coordination in project tasks.

Throughout my internship, I was assigned a variety of tasks. One of the tasks is I was assigned the task of checking ISiiC's email daily during working hours to stay updated on the latest information and I was also responsible for sending monthly emails to all ISiiC staff and centers, sharing safety tips to be practiced. I was also given responsibilities such as assisting in editing tasks, including correcting the ISiiC office plan by adding fire extinguishers to the layout, creating posters, brochures, certificates of appreciation, invitation cards, and video montages. I was the first person assigned the task of creating a brochure for ISiiC, as the company did not have a brochure to present to clients. I am proud of myself for successfully completing the task, even though my drafts received numerous comments and required multiple revisions.

TRAINING REFLECTION

Moreover, to request a program budget, I needed to create a project proposal and ensure that the information in the document was correct. I was also tasked with taking notes and preparing minutes of meeting on the issues discussed during the meetings. Through this task, I developed a deeper understanding of how human resources management principles apply to budgeting, communication, and organizational processes. Creating a project proposal reinforced the importance of attention to detail, accuracy, and clear communication skills that are vital in HR when preparing reports or proposals for employee programs or organizational initiatives. Taking notes and preparing minutes of meeting taught me the value of active listening, impartiality, and effective documentation skills that are crucial in HR for recording employee feedback, resolving conflicts, and maintaining transparent communication.

Aside from that, I was also given the opportunity to attend training sessions related to Document Studio, Next-Generation Academic Writing AI, and website creation. Attending these training sessions provided me with valuable skills that are highly relevant to human resources management. Document Studio enhanced my ability to efficiently manage and automate documentation processes, a critical aspect of HR work such as employee records and reports. The Next-Generation Academic Writing AI training taught me how to use advanced tools to create clear and effective written communication, which is essential for drafting policies, proposals, and employee engagement materials. Website creation training emphasized the importance of digital presence and communication, equipping me with skills to contribute to HR initiatives like designing user-friendly portals for employee resources or organizational updates. I'm being an AJK in Next-Gen Training session.

TRAINING REFLECTION

Then, I was also given the opportunity to participate in ISiiC's benchmarking visits to UKM and UiTM Shah Alam. Participating in ISiiC's benchmarking visits to UKM and UiTM Shah Alam provided me with valuable insights into organizational best practices and strategic collaboration. As a Human Resources student, this experience enhanced my understanding of how benchmarking can be used to evaluate and improve organizational processes by learning from other institutions. I observed how different organizations structure their teams, manage resources, and foster innovation, which deepened my knowledge of organizational culture and employee engagement strategies. I have also attended project meetings, which is the F4+ Project: Affordable Housing. Attending the F4+ Project: Affordable Housing meetings provided me with valuable insights into the challenges of affordable housing development, such as the significance of collaborating with different stakeholders, managing project timeframes, and assuring sustainability. This experience helped me gain a better knowledge of the practical problems in the area while also improving my communication skills in a professional setting. It inspired me to be more proactive in giving ideas and solutions, and it emphasized the need of simple and clear communication in achieving project success.

TRAINING REFLECTION

Furthermore, I was assigned the role of an auditor for the JTNCPI 2024 Movable Asset Inspection at IVAT, Level 1, Block P06, as well as conducting a cross-audit for the OSH (Occupational Safety and Health) compliance of ISiiC and its five centres: UTM Construction Research Centre (UTM CRC), Forensic Engineering Centre (FEC), Centre of Tropical Geoengineering (GEOTROPIK), Centre for the Study of Built Environment in the Malay World (KALAM), and Centre for Real Estate Studies (CRES). I also participated in EKSA (Eco-Friendly and Sustainable Workplace Environment) activities, which were mandatory for all departments to implement. As an HR student, these tasks allowed me to develop a deeper understanding of organizational compliance, risk management, and the importance of maintaining a safe and sustainable work environment. Conducting the JTNCPI Movable Asset Inspection and cross-auditing for OSH compliance gave me practical experience in assessing organizational practices, ensuring that they align with safety standards and regulations skills that are crucial in HR for promoting a safe and compliant workplace. My involvement in EKSA (Eco-Friendly and Sustainable Workplace Environment) activities provided me with valuable insights into the importance of fostering a sustainable and environmentally friendly workplace. I discovered that such initiatives could improve not only the physical environment, but also employee engagement and morale. Participating in EKSA activities helped me understand the role of human resources in promoting sustainability through policies and practices that align with both organizational goals and environmental responsibility. I also gained experience in collaboration and teamwork, as implementing EKSA initiatives necessitates coordination across multiple departments.

TRAINING REFLECTION

Although being an HR student, I was given the opportunity to gain experience creating engineering drawings at ISiiC. This enabled me to learn something new while successfully completing the tasks assigned to me. This experience taught me valuable skills in adapting to new fields and improving my technical proficiency, both of which will help me in my future career. Engineering drawings require precision and accuracy, which can help me improve my attention to detail, which is essential for HR roles such as reviewing resumes, contracts, and compliance documents.

The Institute for Smart Infrastructure and Innovative Construction (ISiiC) has provided numerous intrinsic and extrinsic benefits for the internship. One of the most exciting benefits is receiving a monthly allowance from the company for 6 months. ISiiC has taught me how to multitask effectively, leading to increased productivity and completion of tasks. Upon completion of the internship, I submitted all assigned tasks to the supervisor. I enjoy daily challenges that help me improve my skills. ISiiC also offers a pantry with snacks, instant coffee, and Cuckoo, as well as a prayer space for department staff. Throughout my time here, I've acquired useful skills like multitasking, punctuality, and the value of collaboration. These events affected my approach to work, emphasizing the importance of cooperation and time management in attaining success.

SWOT ANALYSIS

S

Strengths

- Research Excellence
- Industry Collaboration

W

Weaknesses

- Resource / Staff Limitations
- Administrative Dependency

O

Opportunities

- Technological Advancement
- Global Collaboration

T

Threats

- Competitive Landscape
- Economic Instability

RESEARCH EXCELLENCE

To establish credibility, draw partnerships, and promote innovative research, the Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) leverages the university's established reputation in engineering and innovation. The research and development (R&D) capabilities of UTM and ISiiC work in combination to greatly advance smart infrastructure technologies. UTM is one of Malaysia's top higher education institutions, especially for its engineering programs. It has consistently been ranked as one of the best engineering schools in Malaysia and Southeast Asia. According to the QS World University Rankings and the Times Higher Education (THE) rankings, UTM is a global leader in engineering, technology, and innovation (Idiana, 2024). The Institute of Smart Infrastructure and Construction (ISiiC) was founded to strengthen UTM's position as the leader in engineering research and innovation. ISiiC develops smart infrastructure solutions using advanced technologies, with a focus on data-driven approaches, IoT (Internet of Things), artificial intelligence (AI), and machine learning in infrastructure systems. It has reached 500 research projects and more than 1000 publication (cumulative 5 years).

ISiiC's research initiatives have made significant contributions to the local and global research ecosystems, beginning with publications and patents. The institute has published numerous high-impact research papers and patents in the fields of civil engineering, construction, and smart technology. The quality of publications is an important indicator of research excellence, and it has helped UTM achieve high rankings in engineering and technology. ISiiC organizes and attends international conferences, workshops, and forums where researchers, policymakers, and industry leaders share knowledge about the most recent advances in smart infrastructure and construction technologies.

STRENGTHS

RESEARCH EXCELLENCE

It has strong links with industry stakeholders, which allows its research to be directly applicable to real-world challenges. These collaborations create opportunities for applied research and the development of practical solutions that can be implemented in the industry, thus enhancing the relevance and impact of ISiiC's research. ISiiC's research excellence is evidenced by its high-quality publications in internationally recognized journals and conferences. These publications are the result of careful investigation, peer-reviewed studies, and the dissemination of innovative findings to the global academic community. The visibility of ISiiC's research helps it to attract funding, collaborations, and recognition from global research institutions.

In conclusion, ISiiC's success and research excellence are intimately related to UTM's strong reputation for engineering and innovation. By leveraging UTM's established research infrastructure, faculty expertise, and global collaborations, ISiiC has established itself as a key player in the advancement of smart infrastructure solutions. The institute's work not only raises UTM's profile in the international academic community, but it also helps to address some of the most pressing issues in urban development, sustainability, and infrastructure resilience.

RECOMMENDATION

RESEARCH EXCELLENCE

ENHANCE INTERDISCIPLINARY RESEARCH

Here recommendations to improve research excellence. Enhance Interdisciplinary Research. By fostering interdisciplinary research teams that integrate engineering with other disciplines, it can enhance innovation and collaboration. Studies have shown that interdisciplinary approaches significantly boost research impact (Marijan, 2022). Interdisciplinary research brings together insights, methodologies, and perspectives from various disciplines to address complex real-world problems. It's can generate innovative solutions by bringing together researchers from various backgrounds, which would not be possible within the confines of a single discipline. The major advantages of interdisciplinary research include enhanced creativity and innovation. When experts from various industries collaborate, they bring different perspectives and methodologies, which frequently result in novel ideas and ground-breaking innovations. For example, combining engineering expertise with data science and AI can result in the creation of more advanced smart infrastructure solutions.

Research studies have consistently shown that interdisciplinary approaches improve the impact and quality of research. For example, Marijan (2022) emphasizes the importance of interdisciplinary collaboration in driving research excellence, particularly in fields such as engineering and technology. The study shows that interdisciplinary research leads to higher citations and recognition. Papers produced through interdisciplinary collaborations frequently receive higher citation rates. This is because they address broader, more comprehensive issues that are of interest to a variety of research communities. Then increased research funding. Interdisciplinary research frequently attracts a variety of funding sources, ranging from government agencies to private sector investment, because it aligns with national and global priorities such as sustainability, smart cities, and technological innovation. ISiiC should foster a culture of collaboration among researchers from various disciplines. This can be accomplished by organizing joint seminars, workshops, and conferences that bring together experts from various fields to discuss shared research topics.

RECOMMENDATION

RESEARCH EXCELLENCE

ENHANCE INTERDISCIPLINARY RESEARCH

While interdisciplinary research has many advantages, it also has drawbacks, such as disparities in academic language, methodologies, and research priorities across disciplines. ISiiC can address these challenges by promoting interdisciplinary training programs that teach researchers how to collaborate across disciplines and bridge the gap between academic cultures. One of the most effective strategies to improve research output, especially in multidisciplinary areas, is to increase research funding opportunities. ISiiC (Institute of Smart Infrastructure and Construction) at Universiti Teknologi Malaysia (UTM) can greatly boost the volume and quality of research output by providing incentives for interdisciplinary projects and support systems for faculty members seeking research grants. Bing Li highlights that increasing funding and providing incentives for interdisciplinary collaboration can spur innovation, raise the profile of research, and result in significant answers to difficult problems in society (Bing Li, 2024).

Governments frequently provide significant funding for research into national priorities such as smart cities, sustainable infrastructure, and climate change. ISiiC can participate in government-sponsored research programs that emphasize interdisciplinary approaches. For example, Malaysia's Ministry of Higher Education (MOHE) and agencies such as Science, Technology, and Innovation (MOSTI) have research programs that necessitate cross-disciplinary collaboration. Furthermore, international funding bodies such as the European Union's Horizon Europe and UNESCO frequently support projects that bring together multiple disciplines to address global challenges. It can help researchers navigate the application process for these competitive funding programs.

STRENGTHS

INDUSTRY COLLABORATION

The Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) is known for its strong partnerships with key industry stakeholders. These collaborations are critical for translating theoretical research into practical, real-world applications, addressing complex social problems, and providing a variety of funding opportunities. Its strong ties with industry increase its research impact, accelerate the translation of academic innovation into market-ready solutions, and attract funding from a variety of sources. By working with key industry stakeholders, ISiiC increases the relevance and impact of its research, promotes the development of smart infrastructure technologies, and generates a variety of funding opportunities to sustain and expand its research activities. ISiiC also works with local and national governments, providing research and solutions to meet public infrastructure needs. Partners with academic institutions worldwide to conduct joint research, share knowledge, and collaborate on large-scale infrastructure projects. These collaborations may encompass urban planning, sustainability, and resilience in the context of public infrastructure. Also works with non-governmental organizations (NGOs) and international organizations to address global infrastructure challenges such as climate change, urbanization, and sustainable development goals (SDGs). Among the industries, ISiiC has collaborated with Perbadanan Kemajuan Perumahan Negeri Johor (PKPJ), Johor Land Berhad, Cahaya Jauhar, Tenaga Nasional, Johor Port, Yayasan Warisan Johor, Tourism Perak Malaysia, Ikram Works Sdn Bhd, Jabatan Kerja Raya, Universiti Sains Islam Malaysia, JCorp company, RTM, CIDB Malaysia, Jambatan Kedua Sdn Bhd, Majlis Perbandaran Kulai, Department of Occupational Safety and Health, and Ministry of Human Resources.

One of the most significant benefits of industry collaboration is the ability to apply academic research to real-world problems. ISiiC's focus on smart infrastructure and construction technologies necessitates the development of innovative solutions that can be implemented in real-world construction projects, transportation systems, or urban planning initiatives. ISiiC's partnerships with companies in the construction, engineering, technology, and related sectors fund large-scale research projects, pilot studies, and product development. These collaborations help to secure grants and investments that would be difficult to obtain through academic funding alone. Industry partners frequently provide in-kind resources like technology, tools, and expertise.

STRENGTHS

INDUSTRY COLLABORATION

This access to cutting-edge tools and technologies enables ISiiC's researchers to work on the most recent innovations and methodologies. This improves the overall quality of the research and allows to stay on the cutting edge of technological advances in the infrastructure sector. Working closely with industry partners, ISiiC ensures that its research is relevant to the needs and challenges of the construction and infrastructure sectors. This collaboration results in the creation of novel solutions that are not only theoretically sound, but also practical and scalable in real-world applications. ISiiC's research and development expertise, combined with the practical knowledge and resources of industry partners, yields innovative infrastructure solutions. For example, collaborates with construction firms to develop smart building materials and with technology companies to create IoT-enabled infrastructure that improves urban management. ISiiC's global reputation and competitiveness are enhanced through industry collaboration. Successful collaborations with leading industry partners not only provide funding but also raise the profile of ISiiC's research output. This, in turn, attracts more collaboration opportunities with both local and international companies, strengthening the institute's position as a pioneer in smart infrastructure and construction innovation (Mascarenhas, 2022). ISiiC works with industry leaders in urban development to create and implement smart city technologies. Intelligent transportation systems, smart grids, and sustainable building technologies are examples of technologies that improve urban living conditions while reducing environmental impact. ISiiC's research into green infrastructure technologies, such as energy-efficient buildings, sustainable materials, and waste reduction techniques, is frequently supported by industry partnerships with companies in the construction, energy, and environmental sectors.

To summarize, industry collaboration is a major strength of ISiiC at UTM, allowing the institute to apply cutting-edge research to real-world challenges, attract diverse funding sources, and foster innovation in smart infrastructure. These collaborations ensure that research is both academically rigorous and practically relevant, as well as commercially viable. By collaborating with industry partners, increases research impact, contributes to the development of sustainable and smart infrastructure, and turns its position as a global research leader.

RECOMMENDATION

INDUSTRY COLLABORATION

STRUCTURED RESEARCH NETWORK

One of the key recommendations for improving industry collaboration at the Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) is to establish structured research networks within the academic institution. Structured research networks can significantly improve interdisciplinary collaboration, knowledge sharing, and engagement with industry partners, ultimately driving research excellence and fostering innovation in smart infrastructure and construction. Structured research networks are formalised collaborations between researchers, academic institutions, industry partners, and other stakeholders that focus on specific research themes, challenges, or technologies. These networks are intended to facilitate knowledge exchange, interdisciplinary research, and collaborative problem solving. ISiiC can strengthen its collaborations with industry, attract more funding, and accelerate the translation of research findings into practical, real-world solutions by establishing formal networks that bring together researchers from various academic disciplines and industry stakeholders (Buckingham, 2023). This recommendation is based on successful examples such as the University of Queensland (UQ), which established structured research networks to improve cross-disciplinary collaboration and foster stronger industry partnerships.

The University of Queensland (UQ) in Australia provides a relevant example of how structured research networks can enhance interdisciplinary collaboration and industry partnerships. UQ has established several formal research networks that bring together academic researchers, industry partners, and government agencies to address pressing challenges in fields such as sustainability, healthcare, engineering, and energy. Industry collaboration can be separated or inconsistent, with companies working with academia on a project-by-project basis. However, by establishing a structured research network, ISiiC can form long-term collaborations with industry players that extend beyond individual projects. This sustained engagement enables academic researchers and industry partners to align their goals and efforts over time, resulting in more meaningful and impactful collaborations (The Australian, 2024).

RECOMMENDATION

INDUSTRY COLLABORATION

STRUCTURED RESEARCH NETWORK

ISiiC can strengthen its industry collaboration by implementing structured research networks similar to those at UQ. ISiiC could establish research clusters around key themes such as smart cities, sustainable infrastructure, construction automation, and data-driven urban management. These clusters would bring together researchers from various disciplines, as well as industry partners, to work towards common goals. Then, formalize industry partnerships. ISiiC should enter into formal agreements with industry partners to foster long-term collaborations. These collaborations should include joint research projects, funding agreements, and technology commercialization initiatives (The Australian, 2024).

Regular workshops, conferences, and collaborative events can be organized within the networks to ensure that ISiiC researchers and industry partners continue to share their knowledge. ISiiC should actively pursue external funding for its research networks, such as grants from government agencies, international organisations, and industry sponsorships. Furthermore, to better reflect the practical impact of its research, ISiiC should use alternative metrics that capture the engagement of non-academic audiences such as industry professionals, policymakers, and the public (Wylie, 2024). Research that attracts the attention of industry professionals and practitioners is often more applicable in real-world scenarios because it addresses the challenges and needs that industries face. By assessing research impact in terms of industry relevance, practical application, and real-world influence, ISiiC can better align its research with industry demands and demonstrate the societal value of its innovations. This approach would not only improve industry collaboration but would also establish ISiiC as a leader in conducting research that bridges the gap between academic theory and practical solutions for smart infrastructure and construction technologies.

RESOURCE / STAFF LIMITATIONS

Given its position as a relatively small research entity within a larger academic institution, the Institute of Smart Infrastructure and Construction (ISiiC) faces a significant challenge due to its limited resources. The availability of personnel is ISiiC's most urgent constraint. Due to this shortage, researchers and administrative personnel must manage a variety of responsibilities, such as operational, financial, and research tasks. The effectiveness of research efforts, the quality of results, and the general capacity to grow and scale operations may all be negatively impacted by this limitation. Due to the limited number of staff at ISiiC, employees must take on multiple roles to ensure that research projects, administrative tasks, and financial management are all completed. Staff typically perform research-related tasks such as conducting experiments, gathering data, writing research papers, and managing academic projects. Financial management entails handling budgets, applying for grants, managing research funds, and ensuring compliance with financial regulations. Operations and administrative tasks include logistics coordination, research infrastructure maintenance, ensuring compliance with university policies, and day-to-day operations management. There is only one research officer at ISiiC, one for each of the following centres: UTM Construction Research Centre (CRC), Centre of Tropical Geoengineering (GEOTROPIK), Centre for the Study of Built Environment in the Malay World (KALAM), Forensic Engineering Centre (FEC), and Centre for Real Estate Studies (UTM CRES), with no more than 50 employees per centre. Therefore, it is assisted by outside researchers. While multitasking may be necessary in resource-constrained environments, it can result in burnout, and decreased productivity. Researchers who are also responsible for administrative and financial tasks may struggle to balance the demands of high-level academic work with routine operational responsibilities.

A study by Mohd Abass Bhat, adds to the evidence that multitasking across research, financial management, and administrative duties can lead to burnout and decreased job satisfaction. The study emphasizes the importance of resource management and strategic staffing in allowing academic staff to focus on their primary responsibilities, which are research and innovation, without being overburdened by operational duties (Mohd Abass Bhat, 2022).

WEAKNESSES

RESOURCE / STAFF LIMITATIONS

Administrative duties (such as reporting, compliance, and logistics) can be overwhelming when working with a small team. These tasks are necessary for ensuring that research is conducted ethically and within institutional guidelines, but they may take time from actual research activities.

As a small research unit, it may not receive the same level of funding as larger research centres or institutes. Without adequate funding, ISiiC may be unable to hire additional researchers or administrative personnel to support its projects, resulting in overburdened staff and inefficiencies. In addition to staffing and financial constraints, ISiiC's small size may present operational challenges, affecting administrative efficiency and research output. Small academic institutions frequently face the challenge of insufficient administrative support, which leads to inefficiencies in research management.

RECOMMENDATION

RESOURCE / STAFF LIMITATIONS

STRATEGIC RESOURCE AND TALENT MANAGEMENT PLAN

One of the most significant challenges that ISiiC, like many other research institutes, faces is a lack of resources and staff, particularly availability, expertise, and workload distribution. Given the interdisciplinary nature of smart infrastructure and construction research, ISiiC must have an appropriate mix of skilled personnel, technology, and resources to address emerging challenges in the field. As a result, a comprehensive Strategic Resource and Talent Management Plan can assist ISiiC in optimizing employee utilization, increasing productivity, and ensuring the long-term viability of its research output (Cania, 2024). Staff multitasking is frequently required in smaller organizations such as ISiiC, but it can lead to burnout and inefficiencies. A strategic resource management plan would assist in identifying key priorities, streamlining processes, and ensuring that employees are assigned to projects based on their strengths and expertise. This approach would avoid overburdening researchers and ensure that projects are managed effectively. ISiiC can direct its limited resources towards high-impact projects by strategically identifying the most important research areas that align with industry needs and global trends (for example, sustainable construction technologies, smart city solutions). This would help to reduce the risk of dividing efforts across too many research areas.

Staff recruitment and development should prioritize attracting highly specialized talent in areas where ISiiC has gaps. For example, researchers with expertise in data science, artificial intelligence (AI), or the Internet of Things (IoT), all of which are critical to smart infrastructure, could be targeted. Furthermore, providing continuous training on emerging technologies to existing employees will help them stay relevant and productive. Given the fluctuating demands of research projects, ISiiC may consider contractual or project-based hires to provide specialized expertise for short-term projects. This would enable ISiiC to access specialized knowledge without committing to permanent hires (Sherif, 2021).

RECOMMENDATION

RESOURCE / STAFF LIMITATIONS

STRATEGIC RESOURCE AND TALENT MANAGEMENT PLAN

Using digital tools for project management, collaboration, and research can help streamline workflows, reduce manual tasks, and increase the efficiency of current employees. AI-powered research assistants, data analytics platforms, and cloud-based collaboration systems can automate repetitive tasks, allowing researchers to focus on more valuable activities. ISiiC can also invest in collaborative research platforms, which allow researchers to share resources, data, and tools. This can help reduce individual researchers' workloads while also promoting cross-disciplinary collaboration. In some cases, ISiiC may consider outsourcing non-core activities (such as administrative, data processing, or technical tasks) to third-party service providers. This enables ISiiC's internal staff to concentrate on high-priority research projects while maintaining high productivity.

Encourage knowledge sharing among staff, both within ISiiC and with external collaborators, to help reduce staff limitations and ensure that expertise is not siloed. Mentorship programs, internal workshops, and cross-departmental collaborations can help existing staff improve their skills and ensure that critical knowledge is effectively transferred across teams. In some cases, ISiiC may consider outsourcing non-core activities (such as administrative, data processing, or technical tasks) to third-party service providers. This enables ISiiC's internal staff to concentrate on high-priority research projects while maintaining high productivity. A recent study on strategic human resource management in research organizations emphasizes the importance of effective resource and talent management in improving research institutions' performance, particularly when resources are limited. The study discovered that strategic planning in resource allocation and staff development assists organizations in balancing workloads and improving research productivity without burdening employees (Suman Kamal, 2023).

RECOMMENDATION

RESOURCE / STAFF LIMITATIONS

STRATEGIC RESOURCE AND TALENT MANAGEMENT PLAN

To summarize, implementing a Strategic Resource and Talent Management Plan can significantly assist ISiiC in overcoming its resource and staff limitations by ensuring that existing resources are optimally utilized and addressing gaps through strategic recruitment, training, and industry collaboration. This plan will not only reduce the workload on staff, but will also improve ISiiC's research output, resulting in more significant contributions to the fields of smart infrastructure and sustainable construction. Despite the constraints of limited resources, ISiiC can establish itself as a leader in research innovation by investing in the right tools, technologies, and partnerships.

WEAKNESSES

ADMINISTRATIVE DEPENDENCY

The Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) suffers from a significant administrative dependency on UTM's overarching governance structure. While a large institution's governance framework, such as UTM, provides critical oversight and structure, it can also cause delays and inefficiencies in decision-making, particularly for specialized entities like ISiiC. These delays can have an impact on the institute's ability to respond quickly to new research opportunities, adapt to industry needs, and manage research projects efficiently. ISiiC, as part of UTM, must stick to the university's overall governance and approval processes. While this structure ensures accountability and compliance, it can slow down decision-making, especially in the fast-paced world of smart infrastructure and construction research, where opportunities and industry demands change quickly. Decisions about funding allocations, research proposals, and project management frequently require multiple levels of approval within the university, which can be time consuming. ISiiC, as a specialized research entity, may have to wait for approvals from UTM's central administration, which may not always be in line with the immediate requirements of specific research projects. The governance process may limit ISiiC's ability to move quickly in response to emerging opportunities, such as collaboration with new industry partners or the adoption of new technology. For example, a delay in finalizing a new industry partnership due to lengthy administrative procedures may result in missed opportunities and decreased industry relevance.

Financial decision-making and budget allocation may also be challenging for ISiiC. The flexibility required by ISiiC to efficiently manage its own budgets may be restricted by its reliance on UTM's central administration for financial decisions, especially when funds must be promptly reallocated in response to modifications in the project's scope or outside circumstances. For instance, ISiiC may experience delays in obtaining approval from UTM's central finance office if it needs to reallocate funds from one project to another because of unanticipated circumstances such as changes in the scope of the research or the requirement for additional resources.

RECOMMENDATION

ADMINISTRATIVE DEPENDENCY

INDEPENDENT RESEARCH STEERING COMMITTEE

To address the weakness of administrative dependency at ISiiC (Institute of Smart Infrastructure and Construction), I recommend establishing an Independent Research Steering Committee. This committee would be able to make strategic decisions about research priorities, funding allocation, industry partnerships, and collaborations without having to seek approval from the larger university governance structure. This approach would allow ISiiC to act more independently while remaining consistent with the overall mission and vision of Universiti Teknologi Malaysia. The Independent Research Steering Committee (IRSC) would be composed of ISiiC leadership, senior faculty members, and external industry experts. Senior faculty members, outside industry experts, and ISiiC leadership would make up the Independent Research Steering Committee (IRSC). This group would be in charge of daily decisions about partnerships, project funding, and research direction, lowering ISiiC of the delays brought on by administrative procedures that are carried out across the university. With this empowerment, ISiiC would be able to make decisions more quickly, which is essential for maintaining its competitive advantage in quickly changing industries like technology integration, smart infrastructure, and sustainable building.

By concentrating on research excellence, the IRSC would make sure that high-priority projects are recognized and given sufficient funding without being constrained by the need to wait for central administration approval at UTM. As a result, ISiiC would be able to focus on high-impact research that meets industry demands and academic objectives. Additionally, the IRSC would ensure that research outcomes have both theoretical accuracy and practical applicability by assisting in maintaining a balance between academic goals and industry relevance (Chiclana, 2023).

RECOMMENDATION

ADMINISTRATIVE DEPENDENCY

INDEPENDENT RESEARCH STEERING COMMITTEE

The IRSC may also be in charge of promoting international alliances and industry cooperation. ISiiC could establish collaborations with top research institutes and industry players more quickly with a more flexible governance structure, which would promote funding opportunities, knowledge sharing, and cooperative research initiatives. The committee might concentrate on forming international partnerships, which are crucial for raising the profile of research worldwide and positioning ISiiC as a pioneer in sustainable building and smart infrastructure. The IRSC's creation would also guarantee clear accountability for the distribution of resources and the results of research. In order to ensure that resources are used transparently, the committee would be responsible for supervising the entire research process, from determining high-priority areas to allocating funds and carrying them out. The committee's autonomy guarantees that operational decisions are made, enabling ISiiC's leadership to take swift action while still being answerable to the university's overarching goal. The advantages of having an Independent Research Steering Committee that can make decisions that affect project outcomes are discussed by Jan Terje Karlsen (Jan Terje Karlsen, 2020).

Finally, the establishment of an Independent Research Steering Committee (IRSC) would give ISiiC the independence it needs to make faster, more informed decisions about research priorities, funding allocation, and industry partnerships. By reducing its reliance on UTM's broader governance structure, ISiiC would be better positioned to respond quickly to industry needs, capitalise on emerging research trends, and increase its global competitiveness. This semi-autonomous governance model keeps ISiiC agile, innovative, and focused on its research goals, ultimately advancing its mission in the fields of smart infrastructure and sustainable construction.

OPPORTUNITIES

TECHNOLOGICAL ADVANCEMENT

The Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) has the perfect opportunity to benefit from technological advancements in infrastructure development. With the global trend towards smart cities, sustainability, and advanced construction techniques, ISiiC has significant opportunities to promote innovation and create impactful solutions by leveraging cutting-edge technologies such as artificial intelligence (AI), the internet of things (IoT), big data, and sustainable materials. The global infrastructure landscape is undergoing a transformative shift, generated by technological advances. As cities around the world aim to become more sustainable, resilient, and efficient, there is an increasing demand for smart infrastructure solutions that can address urbanization, climate change, and resource management issues. ISiiC, which focusses on smart infrastructure and construction innovation, is at the centre of this global movement.

The growing global focus on sustainability and climate resilience has resulted in the development of cutting-edge technologies such as green building materials, energy-efficient construction methods, and climate-adaptive infrastructure. ISiiC's research into sustainable materials and climate-resilient infrastructure opens significant opportunities for technological advancement (Kumar, 2021). ISiiC benefits from the research excellence and technological infrastructure of UTM, one of Malaysia's leading engineering and technology universities. The institute has access to cutting-edge research facilities and employs a team of experts in smart infrastructure, artificial intelligence, Internet of Things, and sustainability. ISiiC's research in smart cities, IoT-enabled infrastructure, and AI applications establishes it as a pioneer in the development of new infrastructure solutions. The institute's ability to combine engineering expertise with cutting-edge technologies gives it a competitive advantage in influencing the future of infrastructure. ISiiC has access to a variety of advanced research labs, including those specializing in construction materials, structural health monitoring, and energy-efficient systems. These facilities allow ISiiC to conduct high-impact research and help develop new technologies for sustainable infrastructure.

OPPORTUNITIES

TECHNOLOGICAL ADVANCEMENT

ISiiC's strong network of industry partners allows it to remain at the cutting edge of technological innovation. Working closely with construction firms, technology companies, and government bodies, ISiiC can translate research into real-world applications that address global infrastructure challenges. IoT sensors can provide real-time data on the health of infrastructure, such as bridges, roads, and buildings, allowing for early detection of problems like cracks or structural damage. ISiiC can spearhead research into IoT-enabled smart infrastructure, which continuously monitors and optimizes infrastructure systems for efficiency and security. There is a strong global focus on developing sustainable, resilient, and climate-adaptive infrastructure. As climate change accelerates, governments and organizations around the world are putting more emphasis on green infrastructure and climate-resilient construction practices. ISiiC's research into sustainable materials, energy-efficient buildings, and climate-adaptive infrastructure enables it to contribute to these global initiatives. The development of low-carbon and recyclable building materials is critical for lowering the environmental impact of construction. ISiiC can conduct research on environmentally friendly materials and green construction technologies that reduce carbon emissions and waste. ISiiC's research on energy-efficient buildings and smart grids can make a significant contribution to global efforts to reduce urban energy consumption. Sustainable infrastructure requires technologies such as solar panels, smart meters, and energy-efficient HVAC systems.

ISiiC at UTM is well-positioned to use technological advancements to drive innovation in smart infrastructure and construction. ISiiC's strong research capabilities, as well as its alignment with global trends in sustainability, AI, IoT, and resilience, position it to lead the way in developing cutting-edge solutions to meet the growing demand for smart cities, green buildings, and climate resilient infrastructure. By capitalizing on these technological opportunities, ISiiC can help to transform global infrastructure and establish itself as a leader in technological innovation in the infrastructure sector.

RECOMMENDATION

TECHNOLOGICAL ADVANCEMENT

USING ARTIFICIAL INTELLIGENCE (AI) AND INTERNET OF THINGS (IOT)

Given that technological advancement presents an opportunity for ISiiC (Institute of Smart Infrastructure and Construction), the institute should focus on using Artificial Intelligence (AI) and Internet of Things (IoT) technologies to develop smart infrastructure. These technologies have the potential to significantly improve the efficiency, sustainability, and resilience of infrastructure systems. ISiiC has the potential to become a leader in developing intelligent infrastructure that addresses modern urban challenges such as traffic management, energy consumption, and resource optimization by incorporating AI and IoT technology. IoT technology allows for the collection of real-time data from sensors embedded in infrastructure systems such as roads, bridges, and buildings. ISiiC can use IoT to monitor infrastructure health, track resource consumption, and improve performance. Smart sensors, for example, can detect damage on bridges and monitor traffic flow on highways, thereby preventing accidents and lowering maintenance costs. This real-time data can be given into artificial intelligence systems, allowing for predictive maintenance and automated decision-making. Using big data analytics, ISiiC can improve infrastructure management and planning, lowering costs and increasing sustainability (Antonio, 2023).

Furthermore, ISiiC can use AI-powered algorithms to process massive amounts of data collected from IoT sensors. AI can be used to develop predictive models for infrastructure management, such as predicting when a road or bridge will need maintenance or identifying patterns in energy consumption across smart buildings. This would enable data-driven decisions to improve the efficiency and lifespan of infrastructure. AI technologies, including machine learning (ML) and deep learning, can also be used to improve traffic flow, energy distribution, and waste management in urban areas. These advancements will enable smart cities to manage resources more efficiently and reduce their carbon footprints.

RECOMMENDATION

TECHNOLOGICAL ADVANCEMENT

USING ARTIFICIAL INTELLIGENCE (AI) AND INTERNET OF THINGS (IOT)

To fully understand the potential of AI and IoT, ISiiC should form strategic alliances with industry leaders in technology, construction, and urban planning. ISiiC can ensure that its research meets industry needs and is effectively commercialized by collaborating with technology companies, construction firms, and government agencies. These collaborations would also give ISiiC access to cutting-edge IoT devices, AI platforms, and smart infrastructure tools, which are required to implement and scale novel solutions. To support this initiative, ISiiC should invest in training programs and research fellowships in AI and IoT technologies. ISiiC can keep its work at the forefront of technological advancement by developing the skills and expertise of its researchers and students. Furthermore, establishing a dedicated AI and IoT research centre could attract top talent and international collaborations, cementing ISiiC's position as a leader in smart infrastructure development. A recent study by Rohit on smart infrastructure and AI emphasizes the growing importance of AI and IoT in developing intelligent infrastructure systems that improve sustainability and efficiency. According to the study, AI-powered predictive analytics can be used to improve urban systems such as traffic management, water distribution, and energy use, thereby making cities more resilient and resource efficient (Rohit, 2021).

Finally, relying on AI and IoT technologies provides a significant opportunity for ISiiC to improve its capabilities in smart infrastructure and sustainability. By combining these technologies, ISiiC can improve predictive analytics, data collection, and decision-making, resulting in more efficient, resilient, and sustainable infrastructure. Collaboration with industry leaders and technology providers will keep ISiiC at the cutting edge of technological advancement, allowing it to develop innovative solutions for smart cities and sustainable construction. This will not only improve ISiiC's research output but will also position it as a leader in the growing area of intelligent infrastructure.

OPPORTUNITIES

GLOBAL COLLABORATION

The growing demand for resilient and sustainable infrastructure around the world presents a unique opportunity for Institute of Smart Infrastructure and Construction (ISiiC) to broaden its global collaboration efforts. Infrastructure solutions that are not only profitable but also socially and environmentally responsible are becoming more and more necessary as the world deals with both the challenges of climate change and rapid urbanization. To support the global infrastructure agenda, this provides ISiiC with the perfect setting for international partnerships, research collaborations, and funding opportunities. ISiiC's research in sustainable infrastructure can help to shape international discussions about climate-resilient and resource-efficient infrastructure. ISiiC can help shape global sustainable construction standards and practices by collaborating with international research organizations, governments, and development agencies. There is an increasing demand for innovative infrastructure technologies that incorporate AI, IoT, and green materials. ISiiC's research focus on smart infrastructure and sustainability positions it well for meeting this demand and contributing to global projects. (Rohit, 2021).

One of the primary benefits of an increasing global emphasis on sustainable infrastructure is increased opportunities for international collaboration. These collaborations enable ISiiC to share its expertise, gain access to cutting-edge technologies, and work on large-scale infrastructure projects that help to achieve global sustainability goals. This includes collaborating with organizations such as the International Telecommunication Union (ITU) and ISO to develop global guidelines for smart city development. UTM and ISiiC have built a strong reputation for smart infrastructure and innovation. This reputation makes them an appealing partner for international collaborations, particularly in the setting of emerging technologies such as IoT, AI, and environmentally friendly building materials.

OPPORTUNITIES

GLOBAL COLLABORATION

ISiiC collaborate with governments and non-governmental organizations (NGOs) to advocate for global policies that promote sustainable infrastructure, climate resilience, and green building practices. UTM, Malaysia's leading technological university, has a strong reputation for engineering and innovative research. ISiiC's partnership with UTM lends credibility and visibility to the global research ecosystem, making it an appealing partner for international collaborations in infrastructure development and technological innovation (Memon, 2021). ISiiC benefits from UTM's strong international connections to universities, research centres, and industry leaders around the world. These collaborations can lead to joint research projects, funding opportunities, and access to global markets for infrastructure innovations. ISiiC is part of a growing global research community dedicated to smart infrastructure, sustainability, and climate resilience. Many countries and institutions are now focusing on interdisciplinary research and cross-border collaborations to address urbanization, resource management, and climate change. UTM attracts students and researchers from all over the world. This is an excellent opportunity for ISIIC to promote international collaboration through student exchanges, joint research projects, and global academic networks.

ISiiC at UTM offers significant opportunities for global collaboration due to its alignment with global trends in sustainable infrastructure, climate resilience, and smart cities. The strategic location of Malaysia, combined with UTM's research excellence, technological expertise, and active participation in international networks, positions ISiiC to form valuable partnerships and make significant contributions to global infrastructure solutions. ISiiC can benefit from these collaborations by leveraging funding opportunities, gaining access to cutting-edge research and technologies, and strengthening its position as a global leader in smart infrastructure.

RECOMMENDATION

GLOBAL COLLABORATION

INTERNATIONAL COLLABORATIVE RESEARCH NETWORK

To capitalize on global collaboration, ISiiC (Institute of Smart Infrastructure and Construction) should establish international collaborative research networks focusing on smart infrastructure, sustainable cities, and emerging technologies in the construction and urban planning industries. These networks may include universities, research centres, technology providers, and governments from around the world. Participating in such global networks allows ISiiC to gain access to international expertise, secure joint funding opportunities, and collaborate on solutions to global urban challenges. ISiiC can establish international research networks to collaborate with leading institutions in smart infrastructure, urban sustainability, and innovative construction technologies. These collaborations would enable ISiiC to share knowledge about best practices, new methodologies, and innovative technologies being developed around the world. Engineering, architecture, urban planning, environmental science, and technology are all examples of disciplines that can be combined in collaborative projects. This multidisciplinary approach would strengthen ISiiC's ability to address complex urban challenges such as climate resilience, traffic management, and resource optimization in cities (Jun Hou, 2022).

International research networks frequently provide access to global funding sources, including Horizon Europe, World Bank initiatives, and industry-sponsored funding (Chux Daniels, 2022). Participation in these networks enables ISiiC to apply for large-scale, multi-institutional research grants, allowing for more determined, impactful research projects. ISiiC would benefit from global funding to develop cutting-edge solutions for smart cities, such as IoT-enabled infrastructure, energy-efficient buildings, and sustainable transportation systems. These research projects could also lead to commercialisation opportunities, allowing ISiiC's innovations to be scaled and implemented globally.

RECOMMENDATION

GLOBAL COLLABORATION

INTERNATIONAL COLLABORATIVE RESEARCH NETWORK

ISiiC can form long-term collaborations with world-class universities, leading research organizations, and multinational corporations in the construction and technology sectors. These collaborations could result in joint research centres, shared facilities, and multi-year projects that promote innovation and speed up the development of smart infrastructure solutions. Additionally, by providing faculty development opportunities, student exchange programs, and international mobility for researchers, these collaborations can help ISiiC remain at the forefront of academic and technological advancements in infrastructure research. By taking part in international research networks, ISiiC will become more well-known throughout the world and establish itself as a leader in the areas of sustainable urban development and smart infrastructure. This improved standing has the potential to draw top talent, business alliances, and worldwide recognition, thereby strengthening ISiiC's place in the world of research. The institute's participation in international partnerships can also help it become more well-known at industry gatherings, international academic conferences, and research publications, which will increase its reputation and impact in the field. According to Marcus, participation in collaborative networks can be an important driver of innovation for science in the public sector and technological organizations. A key resource in a regional innovation system is the network that allows knowledge to be transferred between regional organizations (Marcus, 2024).

To summarize, global collaboration represents a significant opportunity for ISiiC to expand its research into smart infrastructure and sustainable cities. By establishing international research networks, ISiiC can gain access to global expertise, secure international funding, and collaborate on innovative solutions to using urban challenges around the world. This approach will not only improve the institute's technological capabilities, but also its global visibility and reputation, establishing it as a leader in smart infrastructure research and sustainable urban development.

COMPETITIVE LANDSCAPE

The Institute of Smart Infrastructure and Construction (ISiiC) at Universiti Teknologi Malaysia (UTM) faces a significant threat in the form of a competitive environment with other global research institutions. As the demand for smart infrastructure, sustainable urban development, and climate-resilient construction solutions grows, many top academic and research institutions around the world are shifting their focus to these areas. This competitive environment may test ISiiC's ability to establish itself as a field leader and make significant contributions to cutting-edge innovations. Research institutions and universities around the world are prioritizing smart infrastructure and sustainable development, resulting in high levels of competition in the fields that ISiiC is targeting. Smart cities, green building technologies, IoT integration, AI-driven infrastructure, and sustainable materials are becoming strategic priorities for many of the world's top universities and institutes. Institutions such as the Massachusetts Institute of Technology (MIT), Stanford University, ETH Zurich, Imperial College London, and the National University of Singapore (NUS) are world-renowned for their innovative work in smart cities, sustainable infrastructure, and climate resilience. These institutions have developed significant global reputations, substantial funding, and cutting-edge research capabilities. (Mc Kinley, 2021) Leading research universities receive significant funding through international grants, industry partnerships, and government initiatives. it may struggle to compete for the same funding opportunities as more established institutions with higher visibility and track records of successful project outcomes. Top universities and research institutes frequently attract the best talent from around the world, including renowned researchers, professors, and students. ISiiC, as a smaller institution, may struggle to attract and retain top-tier talent for its research programs.

Moreover, global institutions frequently have strong collaborations with technology companies like IBM, Google, Siemens, and Bosch, which provide them with cutting-edge technologies and data for real-world applications. This industry collaboration accelerates R&D, giving these institutions a competitive advantage.

COMPETITIVE LANDSCAPE

As technological advancements accelerate, ISiiC must continue to invest in cutting-edge technologies to ensure that its research remains relevant and impactful. If ISiiC cannot keep up with innovations from more established competitors, it risks falling behind. Without strong partnerships with global tech firms and industry leaders, ISiiC may struggle to gain access to the latest IoT devices, AI tools, and sustainable materials required to advance its research. One of the most major risks posed by the competitive landscape is access to funding. Global research institutions, particularly those with established reputations, frequently have significant advantages when seeking funding for their research projects. These institutions can secure public funding, industry sponsorships, and private investments for smart infrastructure and sustainability projects. ISiiC, as a smaller institution, may face challenges in obtaining funding from global research programs, particularly when competing with larger, more established universities with a proven track record. ISiiC may face resource constraints in the form of research staff, laboratories, and technology infrastructure when compared to larger institutions, limiting its ability to conduct large-scale, cutting-edge research.

Competing with established institutions for global research partnerships and collaborative opportunities may be a significant barrier for ISiiC, limiting its ability to scale its research and make a significant impact. The competitive landscape poses a significant threat to ISiiC's efforts to position itself as a leader in smart infrastructure and sustainable construction. To remain competitive on a global scale, ISiiC must continuously innovate, build strategic alliances, and enhance its research capabilities to gain access to funding, secure industry partnerships, and compete for grants.

RECOMMENDATION

COMPETITIVE LANDSCAPE

STRATEGIC PARTNERSHIP

To address the competitive landscape threat, ISiiC (Institute of Smart Infrastructure and Construction) must focus on strategic partnerships with industry leaders, global research institutions, and smart infrastructure technology innovators. By using these industry collaborations, ISiiC can differentiate itself from competitors, gain access to cutting-edge technologies, secure additional funding, and ensure that its research is relevant to real-world challenges. These collaborations will not only strengthen research capabilities, but will also open up opportunities for joint ventures, technology commercialization, and real-world testing, all of which are critical for remaining competitive in a rapidly changing field. Collaborating with industry leaders in construction, engineering, and technology gives ISiiC access to innovative solutions that are already in use in the market. Partnerships with companies working on smart cities, sustainable materials, or AI-powered infrastructure systems, for example, would allow ISiiC to stay on top of technological advancements. Industry collaborations provide a direct link to the market, ensuring that research is relevant to industry needs and global trends. This ensures that the research is both academically sound and practically applicable, increasing the chances of successful commercialization and widespread adoption.

Creating collaborative research projects with global research institutions and companies can significantly increase ISiiC's research funding opportunities. Many government-sponsored programs and private-sector investments involve a collaborative approach, in which universities work with industry or other research institutions to address complex infrastructure challenges. Strategic partnerships enable to move beyond academic research and into commercialization. Collaboration with industry partners can help transform innovative research findings into marketable products and solutions. For example, ISiiC could collaborate with construction companies to implement smart infrastructure solutions developed in its laboratories. Furthermore, industry partners can provide resources such as testing environments, data, and real-world challenges to help innovations and prepare for commercial deployment.

RECOMMENDATION

COMPETITIVE LANDSCAPE

STRATEGIC PARTNERSHIP

According to Yanling Yang, in the setting of the digital economy, establishing close strategic partnerships to deal with market uncertainties is an important strategic choice for companies seeking to achieve sustainable development in developing countries (Yang, 2022).

Collaboration with well-known organizations will boost global visibility and reputation as a leader in smart infrastructure research. Being a part of high-profile partnerships will attract the attention of industry professionals, researchers, and investors, establishing ISiiC as a leader in the smart infrastructure area. By participating in global research networks and international collaborations, it will gain a competitive advantage in attracting talent, partners, and funding from around the world. As stated by Saleh R. Almarri, strategic partnerships positively impact technology by acquiring software, operating machines, sharing information, and solving problems. It significantly improves organizational performance, making them a crucial variable. Firms should form partnerships with various parties to improve their performance across industries (Saleh R. Almarri, 2024). Through industry collaboration, can ensure that its research is in line with market demands. Collaborations can help ISiiC focus on practical issues that are critical to the development of smart cities and sustainable infrastructure, both of which are high priority areas for the global economy. These collaborations also help to ensure that research is relevant and targeted, increasing its market appeal and competitiveness.

To address the threat of the competitive landscape, ISiiC should prioritize strategic partnerships and industry collaborations. These collaborations will enable to depend on external expertise, gain access to cutting-edge technologies, secure global funding, and commercialize its research. By aligning its research with market needs and global challenges, ISiiC can differentiate itself from competitors, improve its global reputation, and ensure that its research remains relevant and influential. This strategy will help ISiiC maintain its competitive advantage in the rapidly evolving field of smart infrastructure and sustainable construction.

ECONOMIC INSTABILITY

Economic instability is a significant threat to ISiiC (Institute of Smart Infrastructure and Construction) at Universiti Teknologi Malaysia (UTM), as it can undermine the institute's ability to secure consistent funding, impacting the continuity of its research projects and development initiatives. Economic downturns or recessions can lead to reductions in both government funding and private sector investments, two primary sources of financial support for research and infrastructure development. Governments frequently experience budgetary constraints during times of economic instability as a result of falling tax revenues, rising social welfare spending, and the need to close fiscal deficits. As a result, the government spends less on non-essential areas, such as research and development (R&D), especially in industries that need large, long-term investments, like construction and infrastructure. Funding for research organizations like ISiiC may be reduced by governments, particularly if they are under pressure to balance their budgets. This might result in less funding for current research initiatives in climate-resilient technologies, sustainable building practices, and smart infrastructure.

During an economic downturn, the private sector, which includes corporations, technology companies, and investors, becomes more unwilling to take risks. Long-term research projects, particularly those in infrastructure and innovation, are frequently viewed as less immediately profitable during periods of financial uncertainty. In uncertain economic times, businesses may postpone or reduce their commitment to innovation, preferring to focus on cost-cutting measures over investing in future-oriented technologies such as AI, IoT, or sustainable materials. As a result, ISiiC may have difficulty obtaining private funding for innovative smart infrastructure projects or sustainability research. Many research projects at ISiiC may involve start-ups or collaborations with new technology companies. Economic downturns can reduce the availability of venture capital and private equity, both of which are required to fund high-risk, high-reward infrastructure and innovation projects (Zhang, 2022).

THREATS

ECONOMIC INSTABILITY

During economic downturns, both government and private sector funding become more difficult to come by, increasing competition among research institutions, universities, and organizations for these limited resources. ISiiC will face increased competition from other global research institutions with larger budgets, stronger reputations, and more robust funding processes. Institutions with larger budgets, better reputations, and more difficult funding processes. ISiiC, for example, will compete with global research giants such as MIT, Stanford, ETH Zurich, and other top-tier universities and research institutes for infrastructure and smart city funding. During times of economic instability, competition for grants and funding opportunities heats up, and ISiiC may struggle to secure the proper number of resources. ISiiC's research frequently focusses on smart infrastructure solutions and the integration of advanced technologies into urban development. Economic instability, on the other hand, can cause infrastructure projects to be delayed or cancelled, particularly those requiring large upfront investments. When the economy is unstable, governments and the private sector tend to become less willing to take risks, which can delay the adoption of new infrastructure technologies. This can cause delays in the deployment of ISiiC's innovations and solutions, limiting the research's practical impact.

Because it limits funding and resources, economic instability directly threatens ISiiC by limiting the continuation of research initiatives and the deployment of creative infrastructure solutions. Securing the funding required to keep ISiiC at the top of smart infrastructure and sustainable construction research is becoming increasingly difficult as government budgets get tighter, private sector investments decline, and competition for limited funds increases.

RECOMMENDATION

ECONOMIC INSTABILITY

PUBLIC PRIVATE PARTNERSHIPS

The Institute of Smart Infrastructure and Construction (ISiiC) should concentrate on developing and improving public-private partnerships (PPPs) as a long-term strategy for maintaining sustainable funding in order to reduce the effects of economic instability. ISiiC can secure a regular supply of funding, reduce its dependence on inconsistent government funding, and guarantee the continuation of important research projects even in times of economic downturn by collaborating with both public and private sector organizations. These collaborations can aid ISiiC in risk sharing, utilizing industry knowledge, and promoting the commercialization of its research innovation. ISiiC can obtain industry funding and access cutting-edge technologies and knowledge by collaborating with private sector companies (construction firms, technology providers, or energy companies). At the same time, government involvement can provide public funding and policy support for research in areas relevant to national development goals, such as sustainable cities and climate resilience.

Leeshinka stated that the rapid rate of global urbanization has forced governments worldwide to develop sustainable cities through Public Private Partnerships (PPPs), which appear to offer suitable solutions to overcome the shortage of public finance and cuts in public spending (Leeshinka, 2023). One significant advantage of PPPs is that they provide financial growth, which is important during periods of economic instability. If government funding is reduced or becomes more competitive, private sector partners can step in to provide the necessary resources. Furthermore, private companies typically have more funding flexibility than government agencies, which may face budget constraints during economic downturns. These collaborations can also provide access to international funding from organizations such as the World Bank, UNESCO, and EU-funded programs that promote sustainable infrastructure and smart city initiatives around the world. These international partnerships may support ISiiC's efforts and provide additional financial resources, reducing the need for national or local government funding.

RECOMMENDATION

ECONOMIC INSTABILITY

PUBLIC PRIVATE PARTNERSHIPS

In a PPP model, the public and private sectors share the project's risks and rewards. This structure fosters innovation and commercialization by encourage private companies to contribute innovative technologies or solutions to the partnership. This includes access to new technologies, industry networks, and testing environments that can help advance research into smart infrastructure and sustainable urban solutions. For example, if ISiiC develops new smart building materials or IoT-enabled infrastructure solutions, private sector partners can assist in testing and commercializing these innovations, ensuring that research is both technically valid and market-ready. Additionally, discussions at international forums have emphasized the importance of reforming global financial structures in order to effectively address the growing climate crisis. The Bridgetown Initiative, for example, proposes using combined financing to reduce the risk of private investments and increase capital mobilization, focusing on PPPs' potential for increasing funds for sustainable development (Frederiksen, 2024). By making long-term partnerships, ISiiC can secure multi-year funding commitments that ensure financial stability. This is especially important for projects that require long-term investment, such as climate adaptation research, sustainable building practices, and smart city technologies. Long-term contracts with industry partners can help secure the resources it needs to continue its research even when government funding is uncertain.

In order to address the threat of economic instability, ISiiC should prioritize long-term public-private partnerships (PPPs) and diversify its funding sources. ISiiC can secure long-term financial support, reduce its reliance on government funding, and ensure research project continuity by collaborating with both public and private sector partners. PPPs provide a framework for risk sharing, innovation, and commercialisation, allowing ISiiC to remain at the forefront of smart infrastructure and sustainable urban development even during economic downturns. These collaborations will provide financial stability, access to cutting-edge technologies, and long-term growth prospects for ISiiC's research and innovation initiatives.

CONCLUSION

My internship at the Institute of Smart Infrastructure and Construction (ISiiC), was an extremely valuable learning experience, exposing me to a wide range of activities that improved both my HR knowledge and practical skills. This opportunity allowed me to apply my academic knowledge in a practical setting, and I am grateful for the opportunity to contribute to the organization's administrative tasks while also learning about the integration of technology and management processes within a research-focused institution. Throughout my internship, I participated in a variety of key activities that helped me gain a better understanding of an institution's operational aspects as well as the HR-related processes that support organizational efficiency. This internship has been a transformative experience for me, allowing me to develop both personally and professionally. I've built a solid foundation of project management, communication, and organizational skills, all of which are essential for success in the HR field. Furthermore, my participation in the audit process has improved my ability to think critically and make informed decisions, which is a necessary skill for HR professionals dealing with employee relations and resource allocation.

In the next five years, I imagine myself taking on a leadership role in HR, possibly as an HR Junior or HR business partner, to help shape the organization's strategic direction. I am particularly interested in the intersection of human resources and technology, and I hope to work on projects that combine digital HR solutions, employee experience, and data-driven decision-making to improve organizational effectiveness. I also intend to further my education in HR management or organizational behavior in order to broaden my knowledge and stay current on industry trends and best practices. In addition, I am interested in pursuing certifications in HR technology and digital transformation to better prepare for the HR industry's evolving demands.

CONCLUSION

To sum up, I would say that my internship at ISiiC has been a very fulfilling experience that has given me the chance to put my knowledge to use in a real-world situation and acquire insightful knowledge about the workings of an organization that prioritizes research. As I continue to pursue my career in human resource management, the communication, project management, digital tool, and auditing skills I have acquired will be a strong basis. I am excited about the future and ready to support companies that are dedicated to encouraging creativity, teamwork, and staff development. This internship also motivated me to work towards a career in which I can use technology integration and strategic HR practices to influence the workplaces of the future.

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APPENDICES

CERTIFICATE
OF COMPLETION

This is to certify that

Ms. Syarifah Amira binti Mohd Kamal
I/C No.: 010629-01-0302

has completed the Industrial Training at

Institute for Smart Infrastructure and Innovative Construction (ISIIC), Universiti Teknologi Malaysia

from 12 August 2024 to 24 January 2025

ASSOCIATE PROF. TS. DR. IZNI SYAHRIZAL BIN IBRAHIM
DIRECTOR OF INSTITUTE

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Tarikh: 5 November 2024

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UTM Johor Bahru

Che Ernee Nor Atikah Che Zainal Abidin
Syarifah Amira Mohd Kamal
Institute for Smart Infrastructure and Innovative Construction (ISIIC)
UTM Johor Bahru

Saudari

PELANTIKAN SEBAGAI AHLI JAWATANKUASA PENGANJUR KURSUS NEXT-GEN WRITING: AI FOR ENGINEERING SCHOLARS

Dengan hormatnya perkara di atas adalah dirujuk.

2 Dimaklumkan bahawa Pusat Kepunteraan Forensik - Forensik Engineering Centre (FEC) akan menganjurkan kursus Next Gen Writing: AI for Engineering Scholars seperti butiran berikut:

Kursus	Kursus Measurement Uncertainty
Tarikh	4 November 2024
Tempat	Bilik Seminar, Blok M50, FKA, UTM Johor Bahru

3 Sehubungan itu, Saudari adalah dilantik sebagai Ahli Jawatankuasa Penganjur kursus ini.

4 Kerjasama serta komitmen pihak Saudari amatlah dihargai dan dialukukan dengan lafaran kasih.

Sekian, terima kasih.

"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA KERANA ALLAH"

Saya yang menjalankan amanah,

(PROF. MADYA TS. DR. IZNI SYAHRIZAL BIN IBRAHIM)
Menjalankan Tugas Pengarah
Pusat Kepunteraan Forensik / Forensik Engineering Centre (FEC)
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Assalamualaikum wrt. wbth. / Salam Sejahtera,

Saudara,

KELULUSAN MENJALANI LATIHAN INDUSTRI DI UNIVERSITI TEKNOLOGI MALAYSIA

Dengan segala hormatnya saya merujuk kepada perkara di atas.

2 Sukacita dimaklumkan bahawa pihak Universiti telah **bersetuju** menerima pelajar saudara, **Syarifah Amira binti Mohd Kamal** untuk menjalani latihan industri bermula pada **12 Ogos 2024 hingga 24 Januari 2025**.

3 Sehubungan dengan itu, pelajar saudara adalah diminta untuk melapor diri secara fizikal di **Institute for Smart Infrastructure and Innovative Construction (ISIIC), UTM Johor Bahru** pada pada jam 8:00 pagi. Pegawai penyelia yang boleh dihubungi ialah **Dr. Shahrulnizahani binti Mohammad Din (e-Mel Rasmi: hani-md@utm.my, No Tel: 012-7207976)**.

4 Untuk makluman, pelajar tersebut adalah tertakluk kepada syarat-syarat seperti berikut :

a) Hadir ke pejabat seperti waktu pejabat berikut:

Hari & Waktu Bekerja	Ahad hingga Rabu (8:00 pagi - 5:00 petang)
	Khamis (8:00 pagi - 3:30 petang)

b) Waktu rehat tengah hari ialah jam **1:00 petang hingga 2:00 petang**.

c) Pelajar hendaklah mengikuti peraturan yang ada di Universiti ini termasuklah peraturan lalu lintas dan peraturan-peraturan lain yang berkaitan.

d) Pelajar tidak dibenarkan membocorkan segala maklumat rasmi yang diperolehi semasa menjalani latihan industri kepada mana-mana pihak yang tidak berkenaan.

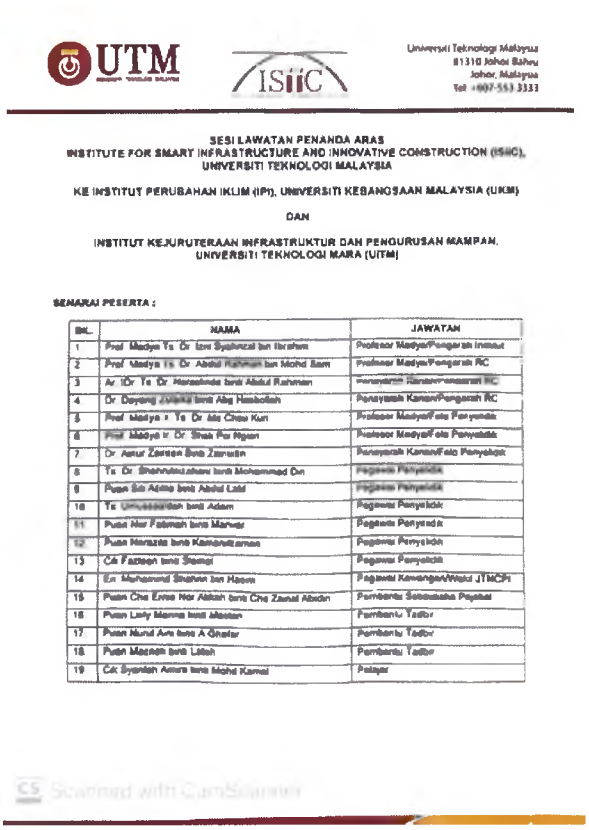
e) Bayaran elaun pelajar adalah tertakluk kepada jabatan / unit yang menguruskannya dan **pelajar berkenaan tidak akan dikenakan sebarang bayaran** semasa tempoh tersebut.

f) Sebagai pelatih latihan industri, pelajar tidak layak mendapat apa-apa kemudahan seperti mana yang dinikmati oleh staf dalam perkhidmatan awam seperti perubatan, cuti rehat dan perjalanan.

1/2

1. **CERTIFICATE OF INTERNSHIP AT THE INSTITUTE FOR SMART INFRASTRUCTURE AND INNOVATIVE CONSTRUCTION (ISIIC) AND BEING AN AJK NEXT-GENERATION ACADEMIC WRITING AI TRAINING, OFFER LETTER**

APPENDICES



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KE INSTITUT PERUBAHAN IKLIM (IPI), UNIVERSITI KEBANGSAAN MALAYSIA (UKM)

DAN

INSTITUT KEJURUTERAAN INFRASTRUKTUR DAN PENGURUSAN MAMPAN, UNIVERSITI TEKNOLOGI MARA (UITM)

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6	Prof. Madya Ir. Dr. Shek Poi Ngian	Profesor Madya/Felo Penyelidik
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8	Ts. Dr. Shahrulniahsni bin Mohammad Din	Pegawai Penyelidik
9	Puan Siti Asma binti Abdul Latif	Pegawai Penyelidik
10	Ts. Umaisarahan binti Adam	Pegawai Penyelidik
11	Puan Nur Fatimah binti Marwar	Pegawai Penyelidik
12	Puan Nurazda binti Kamaruzaman	Pegawai Penyelidik
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16	Puan Lady Marina binti Mastan	Pembantu Tadbir
17	Puan Nurul Ain binti A Ghafar	Pembantu Tadbir
18	Puan Maizah binti Lidah	Pembantu Tadbir
19	Cik Syarifah Amira binti Mohd Kamal	Pelajar

2. BRENCHMARKING VISIT AT UKM AND UITM SHAH ALAM

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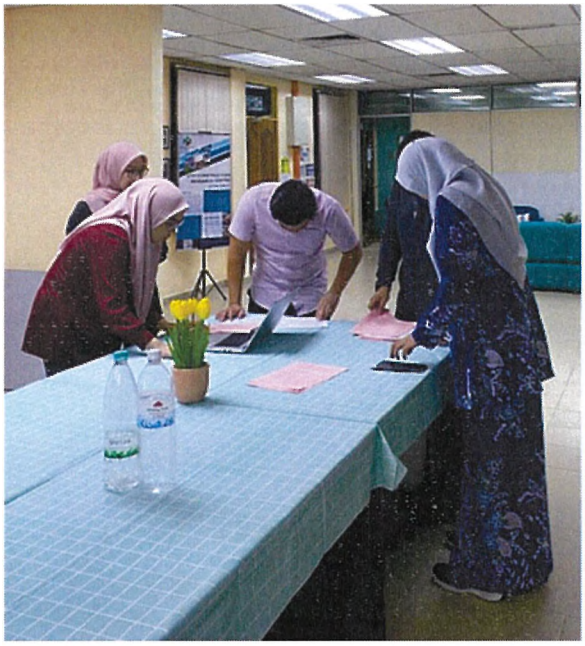

3. AUDITOR FOR THE JTNCPI 2024 MOVABLE ASSET INSPECTION AT IVAT, LEVEL 1, BLOCK P06,

APPENDICES

4. FAREWELL AS AN INTERNSHIP STUDENT