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# ISCU 2025

# 17TH RISM INTERNATIONAL SURVEYING CONFERENCE FOR UNDERGRADUATES

## Embracing Construction Revolution 4.0 (CR4.0): Transforming Malaysia's Built Environment

16th - 17th May 2025 | Friday - Saturday

### E-ISBN PROCEEDING VOLUME I



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Published by  
Royal Institution of Surveyors Malaysia  
3rd Floor, Bangunan Juurukur  
64 & 66, Jalan 52/4  
46200 Petaling Jaya  
Selangor

E- PROCEEDING 17th RISM ISCU 2025 Volume 1

Editors: Lizawati Abdullah, Nor Suzila Lop, Nor Nazihah Chuweni, Suriani Ngah Abdul Wahab,  
Hasnan Hashim

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eISBN 978-629-94789-0-4



(online)

## WELCOME SPEECH FROM THE CHAIRMAN

*RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)*

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ السَّلَام

عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed “*Embracing Construction Revolution 4.0: Transforming Malaysia’s Built Environment.*” On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

**Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'**

Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

## **WELCOME SPEECH FROM CO-CHAIRMAN**

*RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)*

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

**Associates Professor Dr. Nur Hisham Ibrahim, *PMP***

Co-Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

## **WELCOME SPEECH FROM THE PROJECT DIRECTOR**

*RISM 17th International Surveying Conference for Undergraduates 2025*

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

**Sr Dr. Nurul Fadzila Zahari**

*Project Director*

*RISM 17th ISCU 2025*

# **A STUDY OF KANSEI PRINCIPLE IN TEMPORARY RELIEF CENTRE (TRC) PLANNING: ENHANCING FUNCTIONALITY AND DESIGN.**

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## **ABSTRACT**

This study investigates the potential of adopting the Kansei principle into the design and planning of Temporary Relief Centers (TRC) to enhance user satisfaction and improve design quality. The research aims to identify key Kansei elements influencing user satisfaction whilst establishing a relationship between Kansei factors and design functionality towards, developing a Kansei-based evaluation framework for shelter design. A mixed methods approach was employed, combining qualitative data from in-depth interviews and case studies around Klang Valley and quantitative data from surveys. The targeted participants were local authorities and flood evacuees and victims. The study identified several key Kansei factors crucial for shelter acceptability, including privacy, social interaction opportunities, and a sense of security. Literature suggests that incorporating Kansei principles can significantly enhance user satisfaction and improve the overall effectiveness in designing and planning of Temporary Relief Centre (TRC). Anticipated results include improved user satisfaction and functionality of TRCs, which could lead to better living conditions for disaster victims. The potential contribution of this study lies in providing a comprehensive framework for integrating Kansei principles into shelter design, which can be further applied to future disaster relief efforts globally.

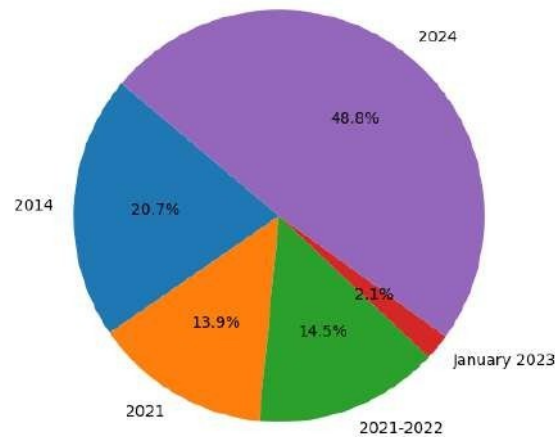
**Keywords:** Temporary Relief Centre, Kansei concept, Disaster management, Disaster preparedness.

## **I. INTRODUCTION**

Severe floods in Malaysia have claimed lives and caused damage amounting to billions of Ringgit (Malay Mail, 2024). The country's geographical location and climatic conditions, particularly during the monsoon seasons, make it highly susceptible to flooding (Chapman, 2024). While floods have traditionally affected states such as Kelantan, Terengganu, Pahang, and Kedah, they now increasingly occur in urban centres like Shah Alam and parts of Kuala Lumpur (Laman Web Rasmi Jabatan Meteorologi Malaysia, n.d.). The number of flood victims has continued to rise during the 2024–2025 Northeast Monsoon (MTL) season. As shown in Figure 1.0, flood victim numbers have increased significantly in recent years. Effective disaster management and properly equipped disaster shelters are crucial to ensuring the safety and well-being of affected communities (Alu, 2022). Most Temporary Relief Centres (TRCs) are located in community halls, schools, or other public buildings that can accommodate large numbers of people (Mail, 2022). These short-term shelters must be equipped with essential supplies such as food, water, and medical equipment to support evacuees during emergencies.

In Malaysia, having functional and well-planned disaster shelters or better known as TRC is essential, as the country faces floods almost every year. These shelters play a crucial role in protecting victims from harm and providing them with safe accommodation during flood events (UNHCR Malaysia). Organizations such as UNHCR and local NGOs contribute by setting up emergency shelters equipped with basic necessities, including food, clean water, and medical care. The TRCs are vital during crises, offering immediate protection and support (UNHCR Malaysia). Moreover, the shelters must be capable of accommodating a large number of flood victims and providing a comfortable environment with adequate facilities, especially as the number of victims continues to rise each year (Hongthanh Luu, 2020). Additionally, TRCs should be designed with thoughtful layouts to ensure that victims feel comfortable and secure in their surroundings.

The 'Kansei' principle, also known as 'Kansei Engineering', originated in Japan and refers to a product development methodology that focuses on incorporating users' emotions and experiences into the design process (Yamada Miho & Yamada Miho, 2025). It was developed by Professor Mitsuo Nagamachi in the 1970s. He described "Kansei" as the sensitivity or intuitive response to a product's appeal and functionality (Yamada Miho & Yamada Miho, 2025). The Kansei principle aims to bridge the gap between the technical aspects of product design and the emotional experience of users (Yamada Miho & Yamada Miho, 2025). By applying the Kansei principle during development, products can become more fulfilling and satisfying for users, while also achieving full functionality (Rousselle, 2024).



**Figure 1.0** Comparison of flood victims in Malaysia over the recent years  
Source: BERNAMA (2024)

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#### A. Problem Statement

Climate change has worsened Malaysia's flood problems, particularly during the monsoon season, which brings heavy rainfall that often leads to severe flooding (International Federation of Red Cross and Red Crescent Societies, 2021). Significant inadequacies in flood control and the provision of emergency shelters have further exacerbated the situation for affected victims. In many cases, roads become impassable, making it difficult to deliver essential supplies such as food, water, medical equipment, and sanitary products. This creates severe logistical challenges and results in shortages and poor living conditions for evacuees (The Star, 2021).

Furthermore, disaster shelters that are not strategically located may themselves be affected by floods. When shelters are situated too far from impacted communities, additional difficulties arise in accessing them (Berita Harian, 2021). During unplanned and intense flooding, these shelters often become overcrowded (The Star, 2021), forcing some evacuees to sleep on roadsides or seek temporary refuge in the unaffected homes of friends (Nurul Shafiqah, 2021). These alternative spaces typically lack proper infrastructure, leading to problems such as inadequate sanitation and insufficient living space.

Overcrowding in disaster shelters reduces privacy, increases stress levels, and decreases overall comfort. For example, shelters in Kelantan have been reported to be overly crowded, lacking privacy, and having an insufficient number of toilets to serve the large number of evacuees. Such conditions negatively impact the emotional well-being of the victims (The Star, 2024).

### *B. Aim & Objectives*

The aim of this research is to enhance the quality of Temporary Relief Centres (TRCs) by exploring the principles of Kansei to better address the emotional and psychological needs of users.

The following objectives are formulated in order to achieve the aim of this study:

- i) To identify the space design and management elements at the designated Temporary Relief Centre (TRC).
- ii) To evaluate the principles of the Kansei concept on the determination of space design and management at Temporary Relief Centre (TRC)
- iii) To propose recommendations for improving disaster shelter preparedness and management in Malaysia, based on the Kansei concept.

### *C. Scope of Research*

- i) This research investigates how users in temporary relief centres emotionally and psychologically respond to the design and functionality of these centres. It explores their needs, preferences, and emotional experiences during their stay.
- ii) The focus will be on temporary relief centre buildings located in the Klang Valley, an area frequently affected by floods. The selected centres will have large capacities, adequate facilities and amenities, and aim to provide a comfortable environment for evacuees.
- iii) The research also aims to develop design strategies that incorporate Kansei principles to enhance both the functionality and aesthetic appeal of temporary relief centres. This includes considerations for layout planning, movement coordination, and overall usability.

## **II. LITERATURE REVIEW**

### *A. The Temporary Relief Centre*

Most of the time, public spaces such as schools and community halls are selected to serve as evacuation centers and play a crucial role during the preparedness and response phases of a disaster (Sinar Harian, 2024). Although these facilities were originally built for their primary functions, they are often repurposed as temporary shelters during the emergency phase of disasters (SkyNews, 2024). Generally, with sufficient water and sanitation facilities, classrooms, and communal areas, these structures are capable of offering basic protection and are often considered child-friendly environments (Anderson & McFarlane, 2017). However, due to inadequate relief management practices and the structural unsuitability of these buildings for prolonged relief efforts, users frequently cause unintentional damage to the facilities and equipment, compromising the condition of public schools and community halls.

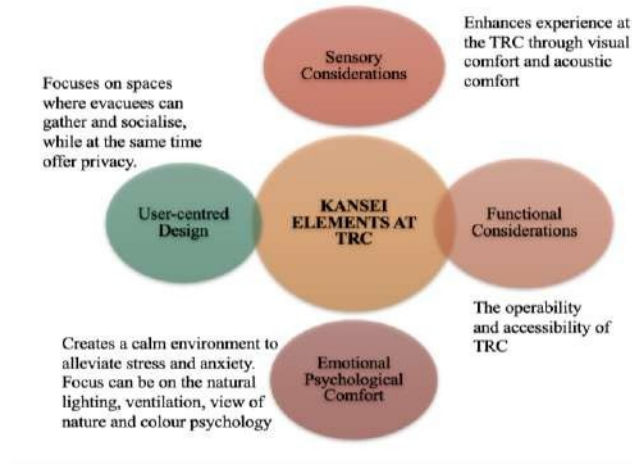
General design considerations for emergency shelters have been proposed based on official shelter guidelines reviewed and analyzed in this study. According to the Sendai Framework for Disaster Risk Reduction 2015–2030, the goal over the next 15 years is to significantly reduce disaster risks and minimize the damage caused to lives, livelihoods, and health, as well as to the economic, material, social, cultural, and environmental assets of individuals, organizations, communities, and nations (United Nations Office for Disaster Risk Reduction). The design and spatial planning of evacuation centres are primarily determined by site selection criteria, compliance with emergency shelter design standards, and the implementation of spatial and design measures as needed.

### *B. Kansei Concept Elements in Temporary Relief Centre (TRC)*

The core of the Kansei principle lies in understanding people's needs and emotions, aiming not only for functionality but also for user satisfaction (Monja, 2024). Applying Kansei principles to temporary relief shelters involves several key elements designed to enhance the emotional and psychological well-being of users (Yamada Miho & Yamada Miho, 2025). These elements include ensuring **comfort and safety** through the use of materials that are safe, durable, and comfortable for daily living.

**Aesthetic appeal** is also essential, whereby design elements such as colours, textures, and forms should evoke calmness and reassurance, fostering a positive emotional response. **Functionality and usability** are critical as well, requiring designs that efficiently utilize space, offer easy access to essential facilities, and incorporate user-friendly layouts.

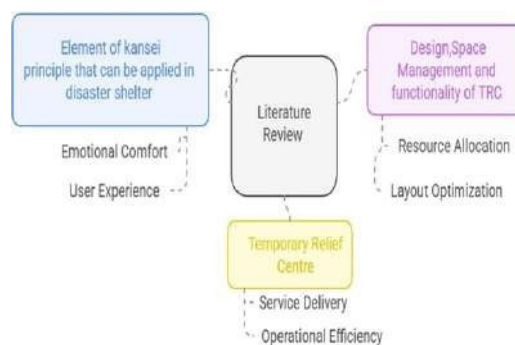
**Cultural sensitivity** is another important component, ensuring the design respects and accommodates the cultural preferences and practices of diverse users. Additionally, **personalization** allows individuals to adapt the space to feel more like their own, which helps build a sense of belonging and emotional comfort. Finally, **environmental integration** involves harmonizing shelter design with the surrounding environment, considering elements such as climate, natural light, and ventilation to create a more livable and pleasant space. By integrating these elements, Kansei principles contribute to the creation of temporary relief shelters that are not only functional, but also emotionally supportive, culturally sensitive, and conducive to overall well-being.



**Figure 2.0** Kansei principal elements  
 Source: (Yamada Miho & Yamada Miho, 2025)

To ensure that the temporary relief center meets the needs of victims, it must incorporate sensory considerations (Yamada Miho & Yamada Miho, 2025). Figure 2.0 presents the Kansei elements that can be adopted at TRC. This includes enhancing visual and acoustic comfort. For example, spaces should be designed to minimize noise disruptions, ensuring that sleeping areas are shielded from noise in communal spaces (International Rescue Committee). Additionally, user-centered design plays a key role, focusing on spaces where people can gather and engage in activities together. These spaces might include eating areas, prayer spaces, communication zones, and areas for children to play. Such design elements promote a sense of unity, allowing victims to support, talk to, and help one another, which can alleviate stress and emotional disruptions (Hartono, 2020). Moreover, emotional comfort can be enhanced by incorporating natural ventilation and lighting into the shelter. Lastly, functional considerations should be addressed, ensuring that facilities like toilets and shower rooms are accessible to all users, including disabled individuals, children, the elderly, and pregnant women.

The study explores to three main scopes of literature review, namely kansei elements that can be applied in disaster shelters, the service delivery and operational efficiency of TRC and the design and the design, space management and functionality of TRC. This is illustrated in the study research framework as shown in Figure 3.0 below.



**Figure 3.0** Research Conceptual Framework

### III. METHODOLOGY

This study adopts a mixed-methods approach, combining both qualitative and quantitative research methods to provide a comprehensive understanding of the subject matter. The primary methods employed include interviews, case studies, and questionnaire surveys, which together offer in-depth insights into participants' experiences and perspectives.

The qualitative methodology consists of interviews and case studies, allowing for detailed exploration of design elements, user experiences, and contextual factors related to TRCs. These methods are particularly appropriate for this research, as they enable the collection of rich, descriptive data aligned with the study's aim. The quantitative methodology involves distributing questionnaire surveys to targeted respondents. This helps to gather measurable data on users' preferences, satisfaction levels, and emotional responses related to TRC design and functionality.

In addition to primary data collection, secondary data which includes literature, official reports, and shelter design guidelines are reviewed to support and contextualize the findings. The collection of secondary data precedes the gathering of primary data to inform the research design and ensure a focused approach. By integrating both qualitative and quantitative methods, this research design ensures a holistic understanding of the topic and strengthens the validity and reliability of the findings.

#### A. Interview and Questionnaire Survey

To gather the necessary data, this study employs both interviews and a questionnaire survey. Interviews will be conducted with two key groups:

1. Evacuees who have previously stayed at a Temporary Relief Centre (TRC), and
2. Government agencies responsible for the management and operation of TRCs.

The selected government interviewees will be individuals in higher-level positions who are familiar with the procedures and scope of work involved in setting up and managing TRCs. These participants can provide detailed insights into operational challenges and decision-making processes. On the other hand, flood victims selected for interviews must have firsthand experience living in a TRC during a disaster, allowing for the exploration of their emotional, psychological, and physical experiences within the centre.

A questionnaire survey will also be administered to collect quantitative data regarding satisfaction levels with TRC conditions. The primary respondents for the survey are flood victims who did not stay in a TRC, either because the flood impact was less severe or they had alternative accommodations. This approach allows the study to explore public expectations and perceptions of TRCs.

The questionnaire is distributed to the general public across Malaysia to broaden the understanding of user needs and expectations. A Likert scale is used in the survey to measure satisfaction levels concerning key aspects of TRC design, layout, and functionality.

#### B. Case Study

In this study, which explores the application of Kansei principles in the planning of TRCs, a case study approach is employed to gain in-depth, contextual understanding. Specific TRCs located near the Klang Valley, a region frequently affected by floods will be selected for detailed investigation. These centres are chosen based on their potential to be evaluated or improved using Kansei principles.

The case study will involve comprehensive observations and evaluations of the selected TRCs, with particular attention to design elements and current conditions that may influence the emotional and psychological well-being of users. Data will be gathered through direct on-site observations, as well as collection of supporting documents such as evacuation plans, floor plans, and facility layouts. Input from management staff and local authorities involved in the operation of these centres will also be obtained to better understand design intent, functionality, and limitations.

The analysis will focus on identifying patterns and correlations between design features (e.g., layout, materials, spatial organization) and users' emotional responses. By comparing findings across the different case study locations, the research aims to highlight both the benefits and challenges of implementing Kansei principles in TRC design.

This approach not only provides a rich and grounded understanding of real-world TRC environments but also offers practical insights and recommendations for enhancing their functionality and emotional support capabilities in future planning.

### IV. FINDINGS

This study anticipates that integrating the Kansei principle into the design and planning of TRCs will significantly enhance user satisfaction, emotional comfort, and design functionality, especially in the context of flood-related disasters in Malaysia. Based on prior literature, field observations, case studies, and interviews with evacuees and authorities, several key findings are expected to emerge.

*i) Identification of Key Kansei Elements*

It is anticipated that the study will identify **critical Kansei elements** that directly influence user experience and satisfaction in TRCs. These may include:

- a) **Privacy:** As reported by both evacuees and literature, lack of personal space and overcrowding in shelters contributes to stress, discomfort, and loss of dignity.
- b) **Safety and Security:** Shelters that incorporate secure entry points, appropriate lighting, and gender-sensitive facilities are anticipated to improve feelings of safety, particularly for women, children, and vulnerable populations.
- c) **Social Interaction Opportunities:** TRCs that facilitate communal interactions through well-defined social spaces (e.g., dining areas, prayer zones, children's play areas) are expected to promote emotional well-being and psychological resilience.
- d) **Aesthetic and Sensory Comfort:** Design elements such as calming colours, noise control, natural lighting, and proper ventilation are anticipated to contribute to a more pleasant and reassuring shelter environment.

*ii) Relationship Between Kansei Factors and Functional Design*

This study expects findings that demonstrate a strong correlation between emotional factors and physical design features. This may include:

- a) Clear and intuitive **layout planning** may ease navigation and reduce confusion during emergencies.
- b) **Functional spatial zoning**—separating sleeping, sanitation, and communal areas—could enhance privacy and usability.
- c) TRCs with **adaptive infrastructure** (such as movable partitions or designated family zones) may be more effective in accommodating different user needs.

*iii) Variation in User Expectations*

Quantitative survey data is likely to reveal that evacuees who did not stay in TRCs have differing expectations compared to those with prior experience. This distinction may highlight gaps between perceived vs. actual shelter performance, helping to shape more realistic and inclusive design standards.

*iv) Challenges in Kansei Implementation*

While the benefits of the Kansei approach are expected to be evident, the study may also uncover **challenges**, such as there might be **logistical constraints** in modifying existing infrastructure, as well as **budgetary limitations** in implementing user-centred design features.

It is also anticipated that the selection of TRCs is predominantly limited to public facilities like schools and multipurpose halls, which, while functional for short-term shelter, often lack design features that support emotional comfort, privacy, and user well-being as emphasized in Kansei principles. These limitations can help inform practical recommendations for policy and future TRC planning frameworks.

*v) Development of a Kansei-Based Evaluation Framework*

One of the outcomes of this study will be the development of a Kansei-based evaluation framework. This framework will provide a structured guide for assessing TRC design based on emotional, sensory, and functional parameters. It will also serve as a tool for local authorities and nongovernmental organisations (NGOs) to systematically incorporate user feedback and Kansei factors into shelter planning. Ultimately, it has the potential scalability for application in other disaster-prone regions within Southeast Asia and beyond.

Overall, the study is expected to confirm that Kansei-informed TRC design leads to better living conditions, higher evacuee satisfaction, and improved emergency preparedness. The anticipated findings aim to bridge the gap between structural adequacy and emotional experience in temporary shelter environments. The insights gained will contribute to policy improvements, design innovation, and disaster resilience planning at both national and global levels.

## ACKNOWLEDGMENTS

The authors would like to express their gratitude to Sumitomo Foundation (IF048-2024) for the award of funding for this the research project.

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