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Surface Texture and User Interaction in Ceramic Tableware: Exploring the Dimensions of Tactile Experience

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ABSTRACT - Surface texture in ceramic tableware is a pivotal determinant of functional performance and tactile user experience. This paper examines the multifaceted role of surface texture in influencing tactile engagement, user interaction, and response within domestic ceramic contexts. Employing a comprehensive qualitative methodology grounded in literature analysis and case classification, the study systematically unpacks the material, aesthetic, and symbolic facets of surface texture. Findings demonstrate that tactile qualities are not merely decorative attributes but constitute core parameters that inform usability, sensory pleasure, and cultural meaning. Moreover, the nuanced interplay between texture and ergonomics elevates everyday tableware from utilitarian objects to vessels of personal and collective identity. By elucidating the theoretical and practical implications of surface texture, this research offers novel insights for designers and scholars seeking to advance the discipline of sensory driven ceramic design.

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INTRODUCTION

In the context of contemporary product design, the concept of tactile experience has emerged as a pivotal element in shaping user perception and satisfaction. This is particularly evident in the domain of ceramic tableware, where surface texture functions not only as a visual embellishment but also as a key element in defining how users physically and emotionally interact with an object. In the context of growing interest in sensory design, the tactile attributes of everyday objects, such as plates, bowls, and mugs, present significant opportunities for enhancing user engagement and emotional resonance (Spence, 2012).

The relationship between surface texture and user interaction has been a subject of considerable attention in material studies and human-centred design. According to previous research, textural cues have been shown to directly impact users' cognitive and emotional responses, thereby altering not only the perception of objects but also their utilisation (Lacey, 2009). For instance, coarse textures often convey rusticity and handcrafted authenticity, while smooth surfaces frequently communicate modernity and minimalism. These tactile signals influence how users grip, manipulate, and clean tableware, thereby affecting functional performance and emotional durability (Ertaş, 2025).

In this sense, ceramic tableware transcends its utilitarian role, becoming a medium of personal and social identity. Furthermore, studies on material aesthetics suggest that integrating visual and tactile elements in surface design can enhance the user experience by aligning physical properties with user expectations (Guo, 2025).

However, despite the prevalence of research focusing on the aesthetic and symbolic dimensions of tableware, systematic investigations into the tactile dimension remain limited. A significant lacuna exists in the existing literature regarding the interaction between surface texture, ergonomics, and emotional design, which influences user experience across domestic and cultural contexts (Gan, 2022). The present study aims to address this gap by providing a comprehensive examination of how ceramic surface textures influence user interaction, sensory pleasure, and cultural resonance.

MOTIVATION FOR THIS WORK

The impetus for this research stems from a growing awareness of the significance of sensory engagement and emotional resonance in product design, particularly in the realm of everyday objects, such as ceramic tableware. While surface texture has historically been regarded as an aesthetic or decorative element, recent advancements in sensory design, affective ergonomics, and material culture indicate that tactile qualities play a more substantial and emotional role in shaping user experience.

Ceramic tableware, as an object of daily use and intimate contact, offers a unique opportunity to investigate how surface texture influences both physical interaction and psychological perception. In an era increasingly shaped by industrial uniformity and digital interfaces, this research is driven by the desire to revalue tactile engagement and reintroduce material intimacy into the user–object relationship.

PROBLEM STATEMENT

Despite its inherent tactility, ceramic tableware is a product that is frequently utilised in daily life. However, the role of surface texture in product design research remains an underappreciated facet. The majority of studies prioritise visual aesthetics and cultural symbolism, while overlooking the functional and emotional value of texture in shaping user experience. This discrepancy hinders designers' ability to engineer emotionally durable, sensory-rich products that enhance everyday interactions. As tactile design becomes increasingly significant in affective ergonomics and user-centred design, it becomes essential to explore how surface texture functions as both a physical and emotional medium in ceramic design. A more profound comprehension of this dimension can inform more holistic and human-oriented product development (Gan, 2022).

RESEARCH AIM

This research aims to investigate the functional and emotional roles of surface texture in the design of ceramic tableware. It focuses on how tactile elements influence users' sensory perception, usability, and emotional attachment during everyday interaction. The study seeks to identify design strategies that enhance user experience through texture, bridging the gap between aesthetic form and ergonomic function. By integrating perspectives from design theory, material culture, and user-centred

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approaches, this research intends to provide insights that inform the development of more meaningful and sensorially engaging ceramic products.

RESEARCH OBJECTIVES AND QUESTIONS

The objective of this research is to explore the critical roles of surface texture in enhancing both functional performance and emotional engagement in the design of ceramic tableware. The study is guided by three primary objectives: (1) to identify the key surface texture attributes that influence tactile perception and ergonomic usability in ceramic tableware. (2) to investigate the role of surface textures in influencing users' emotional responses and the development of long-term attachment to ceramic products. (3) to develop a design-oriented framework that integrates surface texture as a core component of user-centred ceramic product development. To achieve these objectives, the study addresses the following research questions: What are the functional and tactile factors that surface texture contributes to in ceramic tableware design? How does surface texture evoke emotional engagement and perceived product value among users? How can a structured framework be developed to guide designers in effectively applying surface texture to enhance both user experience and product meaning? By answering these questions, this study aims to provide a comprehensive understanding of how surface texture acts as a bridge between design functionality, sensory interaction, and emotional resonance in contemporary ceramic tableware.

SIGNIFICANCE OF THE STUDY

This study makes a significant contribution to the expanding discourse on multisensory and user-centred product design by highlighting the frequently overlooked role of surface texture in ceramic tableware. While ceramics have long been the subject of study due to their aesthetic form, material composition, and cultural symbolism, the tactile dimension remains underexplored. By examining how texture influences both functional interaction and emotional experience, this research provides critical insights into the physical and psychological engagement of users with everyday objects.

The findings are particularly significant for product designers, craft practitioners, and manufacturers seeking to create more meaningful and sensorially engaging products. The present study underscores the correlation between tactile attributes and emotional bonds, thereby substantiating the development of emotionally durable design. Such products, when used by consumers, foster long-term relationships, reduce waste associated with consumption, and promote sustainable practices.

Moreover, the proposed design framework provides practical guidelines for integrating texture as a fundamental design element. This contributes not only to academic theory in affective and sensory design but also informs industrial design strategies in contemporary ceramic development.

LITERATURE REVIEW

Tactile Perception in Product Design

The tactile dimension has been a central concern in the design of interactive products, particularly those intended for use in intimate settings. In the context of ceramic tableware, the surface texture exerts a pivotal influence on the initial user impression and subsequent physical engagement (Lacey, 2009). Surface features such as roughness, grain, or curvature directly affect haptic feedback, influencing the tactile experience of a piece of tableware. As Ren (2021) states, “in contemporary ceramic art, tactile aesthetics has become a vital channel that links material with emotion, and form with experience.” This insight supports the view that tactile design in ceramic tableware is central not only to usability, but also to the sensory and affective dimensions of the user experience.

Guo, Li, and Liu's (2025) research suggests that the tactile attributes of materials can influence cross-sensory experiences, impacting both visual perception and flavour perception during dining. Their findings indicate that a matte, slightly coarse finish on ceramic plates not only enhances tactile appeal but also intensifies the perceived aroma and satisfaction of food texture. This finding is consistent with the expanding corpus of research on cross-modal perception, which posits that the senses of touch, taste, and sight exert a reciprocal influence on one another (Spence, 2012).

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Surface Texture as A Functional and Emotional Medium

The surface texture is not merely a decorative element; rather, it contributes to both functionality and emotional durability. The concept of emotional durability, as introduced by Lacey, emphasises the long-term attachment users form with tactilely pleasing or symbolically rich objects (Lacey, 2009). Visually appealing elements, tactile textures, and product narratives deeply rooted in cultural values and emotions can significantly stimulate users' sensory and emotional responses (Haslinda, 2025). Surface irregularities, such as ridges or engraving, have been shown to enhance grip, reduce slippage during washing, and offer a sense of handmade authenticity that fosters emotional connection (Jones, 2022).

Ertaş's study examined the impact of porcelain texture on production quality and user perception (Ertaş, 2025). The research indicated that an optimised textural design enhances both the aesthetic and mechanical performance of the product, thereby increasing perceived product value (Figure 1). In a similar vein, Gan demonstrated that "pliable" or flexible ceramic design, while unconventional, can enhance user interaction through augmented tactility (Gan, 2022).

Figure 1. Carved Decorative Bowl
Source: (Taketoshi Ito,2025)

Multisensory Dining and Cross-Model Influence

Multisensory research has demonstrated that the materiality and texture of tableware significantly influence how people perceive the flavour of food and beverages (Spence, 2013). For instance, participants evaluated hot chocolate prepared in a coarse-textured mug as more aromatic and flavorful than the same beverage prepared in a smooth one (Figure 2). This phenomenon, termed sensation transference, illustrates how surface texture can shape cognitive and sensory interpretations beyond touch.

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Figure 2. Leaf Sculpture Ceramic Tea Tray
Source: (Manabu Suehiro,2025)

Furthermore, designers are beginning to explore how interactive patterns or embedded codes on the ceramic surface can provide multisensory storytelling (Benford, 2013). By combining ceramics with materials like wood, metal, or glass, designers can enrich the user's sensory experience and expand the expressive possibilities of ceramic tea sets (Zhong, 2024). These approaches integrate physical design with digital technology, resulting in responsive or "smart" ceramic tableware that transcends its passive utility.

Cultural and Symbolic Dimensions of Ceramic Texture

Furthermore, surface textures are known to carry symbolic weight. As Morris (2018) and Ma & Chao (2023) have observed, textures elicit cultural associations; for instance, rustic, handmade pottery often signifies heritage, while smooth, glazed surfaces may be indicative of modernity and formality. In traditional Chinese ceramic design, for instance, carved or incised patterns frequently reflect regional folklore and ceremonial use, thereby embedding cultural narratives into functional objects.

Nie (2025) underscores that texture conveys messages to users through both tactile and visual means. In East Asian contexts, particularly among younger consumers, texture plays a significant role in identity signalling, serving as a conduit between practical functionality and personal preferences. This phenomenon aligns with the overarching concept of design semiotics, wherein material surfaces function as cultural signifiers.

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RESEARCH METHOD

Introduction

This study employs a combined approach of literature analysis and primary data collection to systematically explore the tactile experience of ceramic tableware surface textures during user interaction. The subsequent aspects of the research are addressed in the following sections:

Initially, academic platforms such as China National Knowledge Infrastructure (CNKI) and Google Scholar were utilised to retrieve and organise university theses and research findings related to ceramic tableware. This process established a preliminary theoretical framework. Secondly, a systematic collection of the latest pictorial materials on ceramic tableware and tea sets was conducted through analysis of electronic publications and online image resources. This approach was taken to comprehensively capture the developmental trajectory and stylistic evolution of contemporary ceramic design. Thirdly, an exhaustive examination of specialised ceramic literature and monographs by ceramic artists was conducted, with a particular emphasis on representative works and creative philosophies of Jingdezhen ceramic experts. This study examined the specific impact of surface texture treatments on users' tactile perceptions.

The integration of diverse literary and material sources is employed to achieve a comprehensive exposition of the tactile experiences elicited by surface textures in ceramic tableware and their artistic expression characteristics. The objective of this study is to provide theoretical support and practical references for related fields, including, but not limited to, ceramic design, perception research, and user experience optimisation.

Research Method Framework

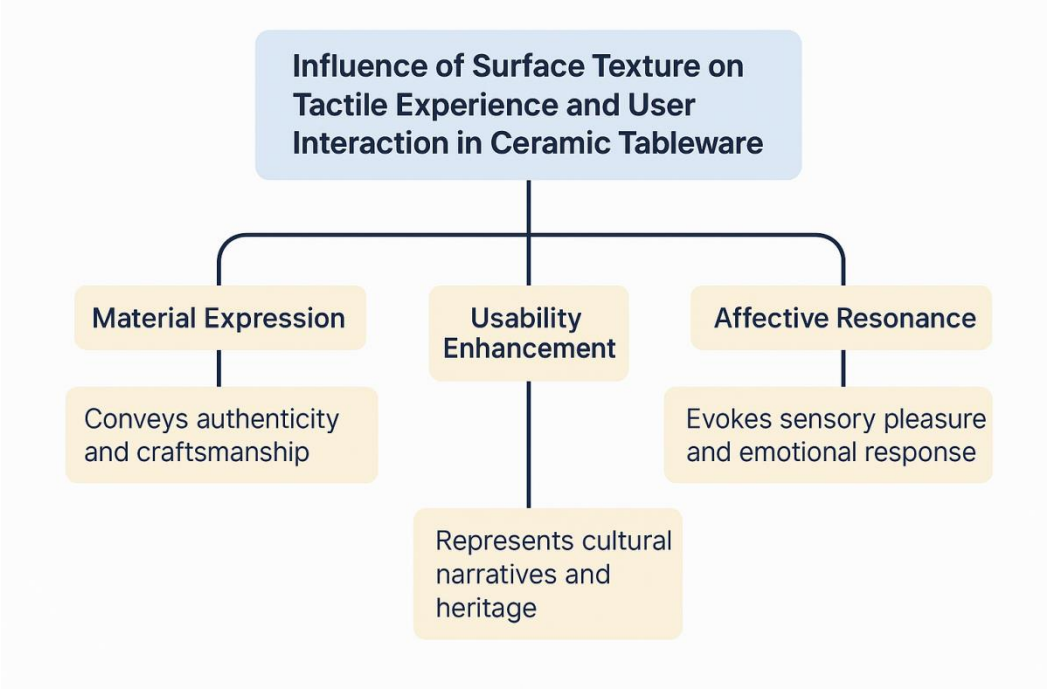

Figure 3. Research Method Framework
Source: (Author, 2025)

FINDINGS

Figure 4 shows that the present study yielded four significant findings concerning the impact of surface texture on tactile experience and user interaction in ceramic tableware. These findings include material expression, usability enhancement, affective resonance, and cultural symbolism. These findings were derived from a cross-case thematic analysis and a comparative review of extant design literature.

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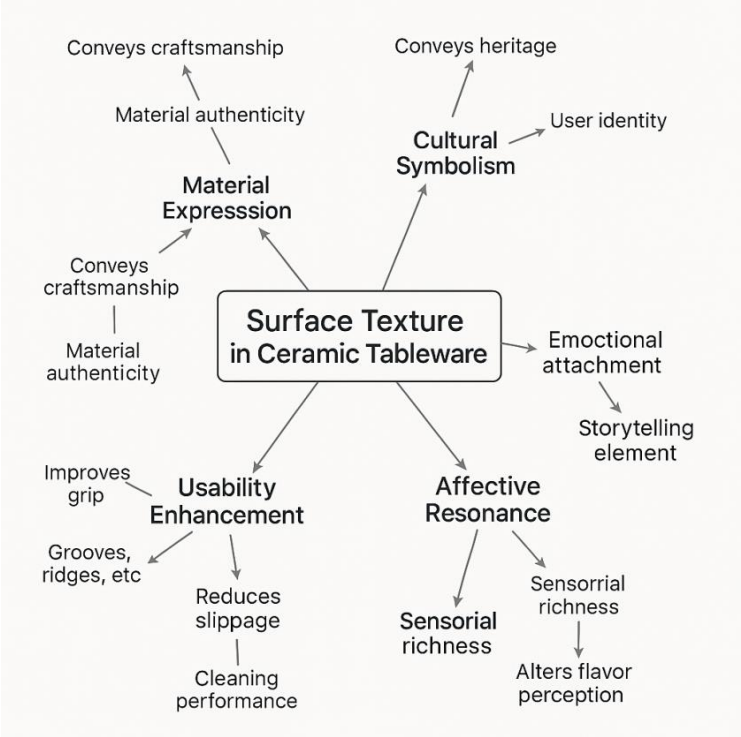

Figure 4. Surface Texture in Ceramic Tableware
Source: (Author, 2025)

Surface Texture as Material Expression

Across the sampled literature and categorised design cases, surface texture emerged as an element that communicates material authenticity and design intention. Figure 5 used textures created through hand carving, imprinting, or glazing that were not merely decorative; they conveyed tactile narratives about the material's origin and the craftsmanship involved (Lacey, 2009). For example, Fay Morris's work emphasized that different textural finishes evoke various associations: gloss suggests cleanliness and precision, while matte or grainy textures signal earthiness and natural form (Morris's, 2018).

Figure 5. Frank Stella Mug
Source: (Jessica Thompson-Lee, 2024)

In many artisanal ceramics, surface imperfections were celebrated as markers of individuality, establishing texture as a signature of authorship and authenticity (Nie, 2025). These qualities shaped the way users interpreted and emotionally engaged with objects even before touching them.

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Ergonomic and Functional Impacts of Texture

Surface texture significantly contributes to the functional ergonomics of ceramic tableware. Tactile elements, such as grooves, ridges, and satin finishes (Figure 6, Figure 7), have been shown to improve grip and reduce slippage, especially among elderly users or when hands are wet (Djekić, 2025). Gan demonstrated that flexible or deformable surface treatments, even unconventional ones, enhanced ease of handling and encouraged experimentation by users (Gan, 2022). As Huang (2009) emphasises, "a product should be viewed as an extension of the hand, a tool to be operated with tactile fluency." This perspective aligns with the view that surface texture design should not be merely visual or decorative but deeply integrated into the physical and ergonomic experience of holding and using an object.

Figure 6. Nuka Glaze Yunomi
Source: (Akira Satake, 2024)

Figure 7. Natural Ash Tea Bowl
Source: (Akira Satake, 2024)

Additionally, certain textures improved cleaning performance and helped conceal signs of wear, thereby extending the product's usable lifespan. These findings reinforce the idea that surface design is not just aesthetic but also integral to functionality and user safety (Ertaş, 2025).

Affective and Emotional Resonance

The findings underscore the fact that tactile interaction with ceramic textures triggers an emotional response and sensory pleasure. Users reported a deeper emotional connection to tableware with tactile depth or irregularity, as opposed to mass-produced, smooth finishes. These results align with Lacey's theory of "emotional durability," which posits that sensorial richness fosters long term attachment (Lacey's, 2009).

Spence also found that textured ceramics can affect how taste and smell are perceived during a meal through sensation transference, whereby the sensation of the surface alters how flavours are interpreted. For instance, textured cups can make beverages seem warmer and more substantial (Spence, 2013).

This emotional dimension establishes surface texture as a design language of intimacy, rendering everyday objects more emotionally engaging and memorable.

Culture and Symbolic Roles of Texture

Finally, texture plays a symbolic role in conveying cultural heritage, ritual significance, and user identity. In Chinese and Japanese tableware traditions, textured motifs often reference natural elements, such as waves, bamboo, and stone, linking eating practices to nature and spiritual order (Ma & Chao, 2023). Contemporary Western ceramics with rough or hand-marked textures convey a sense of slow living, artisanal values, and environmental consciousness (Morris, 2018).

The symbolic power of texture lies in its ability to represent tactile qualities, cultural positioning, and social messaging. For example, young users in Asia were found to associate certain textures with

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trendiness and individuality (Nie, 2025). Thus, texture operates as both a material affordance and a semiotic carrier.

DESIGN IMPLICATIONS

The findings of this study have valuable implications for practitioners, designers, and researchers in the field of ceramic tableware design. Since surface texture plays a vital role in tactile interaction, functionality, and emotional connection, this chapter presents four recommendations for leveraging texture as a core design strategy.

Prioritise Tactile Feedback in Early Prototyping

Rather than treating tactile qualities as a secondary decorative feature, ceramic designers should treat them as a primary design input. During the initial ideation and prototyping stages, they should consider the texture's friction, softness, and responsiveness to the human hand. Designers can test user reactions before production by integrating touch-sensitive exploration tools, such as 3D printed texture swatches or haptic simulation renders (Gan, 2022).

Designers can enhance not only usability but also comfort and safety by focusing on ergonomically sensitive surfaces, such as grooves or soft ridges, particularly for older adults or individuals with reduced grip strength (Djekić, 2025).

Leverage Texture as an Emotional Connector

Beyond function, tactile richness fosters emotional attachment. Textures that reference nature, craft, or memory, such as raw clay finishes, incised lines, or fingerprint-like impressions, can evoke personal connections and encourage storytelling (Lacey, 2009). As Yan and Liu (2011) put it, “the essence of feel aesthetics lies in making products more perceptible, fulfilling emotional needs, and ultimately delivering a beautiful inner experience.” This aligns with the emotional value embedded in textured ceramic tableware, where tactility becomes a medium of psychological comfort. Designers are encouraged to incorporate these emotionally evocative elements to promote a longer product lifespan and reduce consumer detachment.

This is particularly relevant in the context of sustainable design. Since emotionally engaging objects tend to be preserved longer, well-textured ceramics can resist disposability and align with circular design principles (Morris, 2018).

Embed Cultural and Narrative Symbolism

Designers working within specific cultural contexts should incorporate symbolic meanings into textured surfaces to reinforce rituals, identities, or regional heritages. As demonstrated by traditional East Asian tableware, textures can reflect cultural codes, such as the seasons, mythology, or religious motifs (Ma & Chao, 2023). In Western artisan ceramics, rough, imperfect textures often symbolise a slow-paced lifestyle and meticulous craftsmanship (Nie, 2025).

These symbolic dimensions enhance user identification with the product and strengthen brand narratives. Ceramic brands can benefit from collaborating with anthropologists or cultural designers to uncover the more profound, symbolic meanings encoded in their surface aesthetics. As Zeng (2023) pointed out, “the surface texture of ceramic products not only enhances their visual and tactile appeal but also serves as a vital medium for conveying emotional and cultural meanings.” This view supports the argument that texture functions beyond aesthetics, acting as a semiotic tool in design.

Encourage Multisensory Dining Innovation

Due to the demonstrated cross-modal effects of texture on flavour perception, designers and chefs are encouraged to explore how surface finishes alter the dining experience. For instance, matte textures may enhance aroma perception, whereas glossy surfaces may be more appropriate for acidic or delicate dishes (Spence, 2013).

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CONCLUSION

This study demonstrated that surface texture in ceramic tableware is a powerful, multidimensional design element that transcends mere decoration. Through a synthesis of design literature and case analysis, four major functional roles of texture were identified: enhancing tactile perception, improving usability, fostering emotional resonance, and conveying cultural symbolism. From a tactile and ergonomic standpoint, textures such as ridges, grooves, and matte finishes improve grip, comfort, and safety during use, especially for older adults or individuals with reduced motor strength. As previous research has demonstrated, this tactile optimisation significantly contributes to usability and user satisfaction.

Emotionally, surface texture plays a crucial role in fostering meaningful and lasting relationships between users and everyday objects. Natural imperfections, handmade marks, and organic finishes evoke feelings of authenticity and intimacy. Texture serves as a sensory bridge, shaping how users perceive taste and smell through cross-modal interactions. The tactile quality of a cup or plate, for example, can enhance flavour perception, demonstrating that well-designed textures elevate not only touch, but also the entire dining experience. Culturally, texture functions as a symbolic language embedded in material. In traditional East Asian ceramics, for example, texture can reflect seasonal cycles, spiritual meanings, or regional identity.

Taken together, these insights suggest that designers should treat texture as a central interface between users and objects. From the earliest design stages, surface texture should be considered not only for aesthetic purposes but also for ergonomic, emotional, and cultural expression. This approach fosters more user-centric, sustainable, and experientially prosperous ceramic designs.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHORS' CONTRIBUTION

All authors contributed to the design of the research and the preparation of the study. The data cleaning and tabulation were undertaken by University Teknologi MARA. All authors have read and approved the final manuscript.
CRediT author statement: **Jiang Wukai**: Writing, Research Design and Findings. **Siti Maryam Ali Yasin**: Research Supervision and Corresponding Author Responsibilities. **Siti Ermi Syahira Abdul Jamil**: Research Supervision.

AVAILABILITY OF DATA AND MATERIALS

The data on which the research results of this article are based have been listed in the article. Should further information be required, the corresponding author is available to provide it upon reasonable request.

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DECLARATION OF GENERATIVE AI

During the process of writing this manuscript, the author utilised ChatGPT (OpenAI) to assist with the literature search. After the article was completed, Grammarly was used to check grammar and language clarity. The final interpretation, structure, and writing were all handled by the author alone, and they are fully responsible for the content and its originality.

ETHIC STATEMENTS

This research is based solely on secondary literature and case analysis. It did not involve any human subjects, personal data, or experimental procedures that require institutional ethical approval. Hence, no ethics review was necessary for the completion of this study.

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