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Review

A Conceptual Hybrid Model for Transcultural Product Design Innovation

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ABSTRACT

In the current era of globalisation, cultural diversity is playing a critical role in shaping how individuals interpret, exchange, or adopt sociocultural traits from other cultures. In this context, creating a transcultural product has become a complex process that demands a keen understanding of user identity and cultural differences. The primary aim of this study is to develop a hybrid framework for designing culturally inclusive transcultural products. To achieve this goal, we have consolidated selected models of cultural and cross-cultural product design innovation. A systematic review of these models was conducted using reproducible research practices, following the PRISMA guidelines, to ensure a valid and reliable account of the existing literature. In conclusion, our study offers valuable insights into the intricate process of designing transcultural products, providing designers with a hybridised framework to create culturally inclusive products. This hybridised framework is a significant step towards transcultural product design innovation, and it has the potential to assist in the creation of products that cater to the needs of diverse cultural audiences.

Keywords: *cross-cultural product, design attributes, design model, transcultural product design(s) innovation*

INTRODUCTION

Culture refers to the logical discussion and evolution of notions impacted by many societal factors and is wholly taught, shared, and integrated with others (Manduhai 2012; Kennedy 2018; Hertz 1992). However, research shows that the diversity of cultures psychologically impacts how people exchange, borrow, or adopt sociocultural traits from others (Boonpracha 2021; Maehler et al. 2019). As a result, designing cultural products is becoming more complicated due to cultural diversity, trade secrets and user identity. Nevertheless, positive communication between two or more cultures leads to transculturation, which brings a new understanding and unfamiliar shared values, cognitive skills, and knowledge to the existing cultures, resulting

in the formation of an innovative culture (Boonpracha 2021). According to Bradley (2017), transculturation is a phenomenon in which individuals seek alternative solutions to their social and economic challenges by drawing positive inspiration from cultures outside their own. This process enables them to adapt to new situations and discover innovative approaches to problem-solving.

Against this background, Razzaghi et al. (2009) pointed out that it would be practically helpful for product designers to preserve cultural differences and identities by incorporating users' multicultural values into their product design features. Literature reveals that this approach protects cultural identity and redefines the needs and experiences of intended users (Razzaghi et al. 2009; Moon et al. 2013). Indeed, as product designers seek to understand and integrate multicultural design features into their products to meet the needs and experiences of global users, the importance and influence of transculturation principles become apparent (Razzaghi et al. 2009). To this effect, this research endeavours to delve into the intricate process of developing transcultural product design innovations capable of thriving in cross-cultural contexts. The approach involves a thorough review of existing literature aimed at identifying, translating, and transforming cultural product design attributes into innovative transcultural products.

Although the topic at hand holds great significance and has far-reaching implications, our study has brought to light that research documents covering this topic were few and far between, indicating a potential limited interest in this field. Upon further analysis, it was found that most of the reviewed articles lacked essential information and evidence to understand the content and potential impact of transcultural product design innovation development. This created a situation where the chain of evidence was often incomplete, with vital links missing, leading to inefficiencies in addressing problems related to transcultural product design innovation, thus limiting its potential impact in cross-cultural contexts. In response to the challenge at hand, this study has been developed to introduce a hybrid model that integrates the best practices of cultural and cross-cultural product design frameworks. A comprehensive report will be provided to outline the model's development and potential impact. This approach aims to facilitate a better understanding and appreciation of the field and its potential contribution to the globalisation of cultural product design.

The article is structured into four parts, each building on the previous one. The initial section describes the methodological process employed for selecting existing cultural and cross-cultural product design innovation models. It involves the criteria utilised for their evaluation and clarifies their contribution to the understanding of the phenomenon at hand. The second section provides an overview of established and emerging literature on cultural and cross-cultural product design innovation models. The third section introduces a hybridised transcultural product design innovation framework that combines and extends existing models, including an explanation of the framework's components, its theoretical foundation, design principles, and implementation guidelines. Finally, the study acknowledges research limitations, suggests promising avenues for further research, and discusses the implications of the study, culminating in a conclusion.

METHODS

From the onset, to ensure a valid and reliable account of existing literature using a reproducible research practice, a systematic review of cultural and cross-cultural product design development concepts was conducted, following the PRISMA guidelines (Page et al. 2021; Cash et al. 2023). This was to establish a firm ground for developing the concept of transcultural product design innovation. Given this aim, the data treatment plan was categorised into

three main stages: (1) the identification of cultural product design research articles proposing conceptual frameworks; (2) screening the recorded data for its validity and reliability according to pre-defined inclusion and exclusion criteria; and (3) inclusion of valid and reliable data in the final sample for further analysis. Hence, we searched for peer-reviewed research data from four indexed academic databases: Scopus, ScienceDirect, DOAJ, and JSTOR.

Additionally, relevant peer-reviewed articles from indexed journals were carefully searched and downloaded from the selected academic research databases between 8 January 2023 and 24 August 2023. With the selected academic research database, retrieved articles were screened using the terms "Cultural Product" and "Design" in conjunction with one or more of the following keywords: cultural structure, design features, design theory, transculturation design(s), cross-culture, material culture, craft-based design, and design concept. Furthermore, a snowballing search method was adopted to search and review the current works of leading authors.

As a result, a review sampling that differs in terms of data suitability for combining different forms of article findings (i.e., input), their relevance for finding solutions to our research questions (i.e., process), and the article's proposed results (i.e., output) was developed. As Templier and Paré (2015) state, "one specific article can appear in all the different forms of your research objectives." Hence, articles that shared multiple essential features were placed into their proper multifaceted categorisations. Finally, various selected titles and abstracts were compared against the research purpose to determine their relevance to the study. Ultimately, a thorough evaluation of all the screened research studies was conducted to ensure greater transparency, avoid duplication, and adhere to the selected review approaches, as detailed in Figure 1, where *n* represents the number of records.

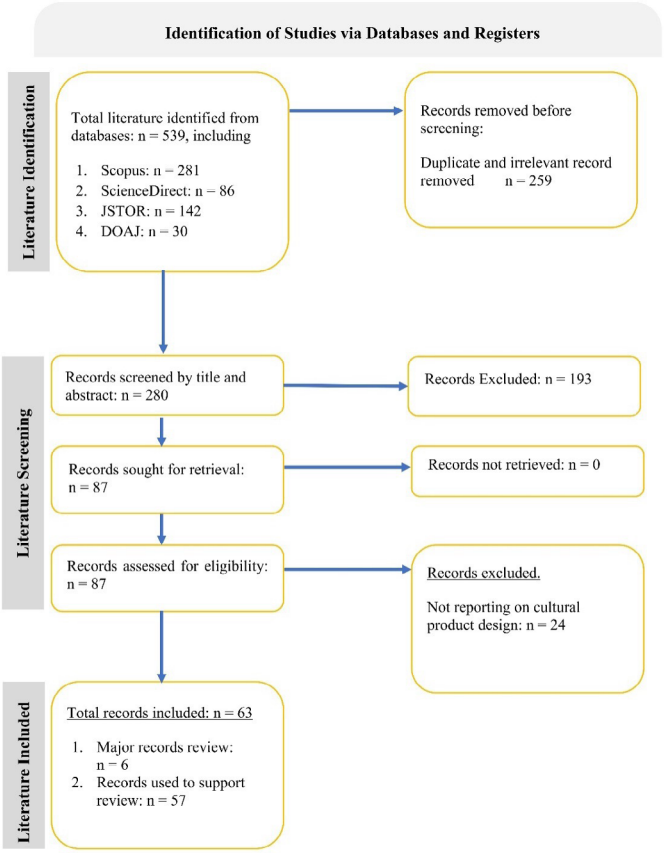
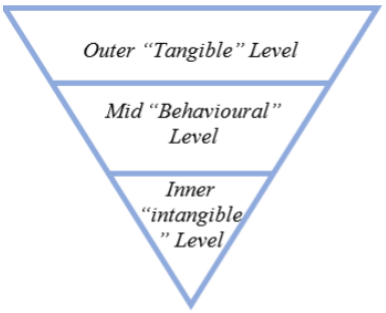


Figure 1 A PRISMA flowchart based on our systematic review approach

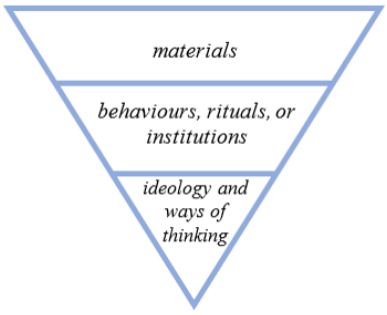
Source: Page et al. (2021); Cash et al. (2023)

Considering an initial total value of 539 identified literature from the selected databases, however, 259 (48.05%) records were excluded as duplicates and irrelevant data, resulting in 280 (51.95%) relevant reviewed research titles and abstracts at the first literature cross-examination. In the next step, attention was paid to scrutinising all the selected 280 citations and rejecting research studies that were not directly related to cultural product design development. Following this criterion, 193 (68.93%) studies were excluded, leaving 87 (31.07%) records essential to this research. Ultimately, after assessing the methodological quality of the retrieved and screened records, 63 (72.41%) research studies were selected for our review article, while 24 (27.59%) records were excluded. Next, these research studies were grouped based on their applicability to the information in our review. A total of 6 (9.52%) of the articles had direct literature on cultural product design development, and 57 (90.48%) represented other research studies used to support the write-up and provide a better understanding of the terms. This systematic approach was used to identify studies from 1992 to 2023 that suggest a novel contribution to knowledge.

DATA ANALYSIS AND DISCUSSION



a



b

Figure 2 (a) He's (1992) spatial perspective of culture; b) cultural elements based on the three levels of the "cultural space" framework

Source: Leong and Clark (2003)

In this section, the research explores the principles and developmental process of selected cultural product design frameworks. It commences with a concise discussion of cultural structure, utilising the concept of the three-step cultural levels. The term "level" denotes the degree to which cultural elements are perceptible and significant to the observer (Schein 2004). Strategically, in a dialogue between Leong and Clark (2003), Leong stated that the stratified framework, known as the spatial perspective of culture, proposed by He (1992), provides a practical way of capturing and visualising "the fluid concept of the worship of Chinese gods of nature."

As illustrated in Figure 2a, He's (1992) the inverted triangular framework divides the cultural structure into outer "tangible" level, mid "behavioural" level and inner "intangible" level. Generally, they represent sociocultural logical growth and advancements in human needs and wants (Leong and Clark 2003). However, the model was revised to provide a more nuanced understanding of cultural elements and their representative levels, as shown in Figure 2b. Accordingly, the outer level pertains to the material realm of culture, while the middle level encompasses human behaviours, rituals, or institutions of culture (Leong and Clark 2003). Also, the inner level represents the underpinning ideology and ways of thinking within a cultural context. Over time, each level has come to coexist concurrently, based on the trend at which we have found ourselves (Leong and Clark 2003).

Leong and Clarks' (2003) "Matrix" Spatial Structure Model

Considering the principles of the above cultural structure, Leong and Clark (2003) cited He (1992), stating that his three-level cultural space model provided a practical, theoretical framework for identifying and analysing cultural elements needed to control their research work. Leong and Clark (2003) improve upon He's (1992) model by developing a new framework known as the "matrix" spatial structure of culture. Their enhanced new model is a four-quadrant (Leong and Clark 2003). As illustrated in Figure 3, Leong and Clark (2003) explained that the vertical axis represents materials (top axis) to immaterial (down axis), while the horizontal axis represents thoughts (left axis) to behaviour (right axis).

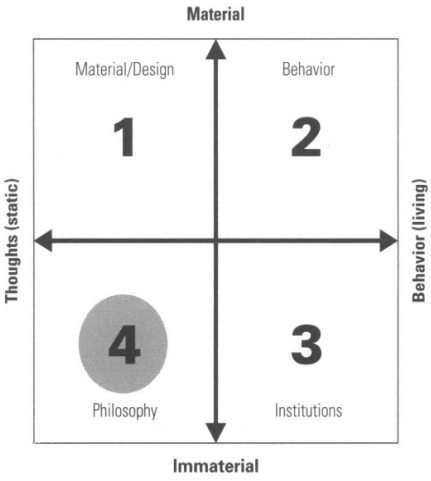


Figure 3 Leong's (2003) "matrix" spatial structure of culture

Source: Leong and Clark (2003)

They further indicated that the first quadrant represents the material/design generated from visual culture; the second quadrant forms the behaviour caused by individual attitudes and the effects of artefacts on social interaction. The third quadrant includes the development of institutions due to cultural customs and traditions learned since birth; the fourth quadrant represents philosophy generated from accumulated concepts within a given period. Significantly, Leong and Clark's (2003) "matrix" spatial structure model connects product design and culture, thereby viewing culture as the central source of knowledge that guides them in producing innovative artefacts with cultural identity and value. Nonetheless, in their dialogue, Clark asked Leong to elaborate on how his model guided him throughout his design research (Leong and Clark 2003).

Lee's (2004) Methodological Framework for Cross-Cultural Design Study

After reviewing existing design attributes models, Lee (2004) identified and defined design attributes by stating that the primary attributes of design include functionality attribute, which appears to be an essential attribute of product design expected to fulfil an observational purpose with an objective measurement and quantification; aesthetic design attribute, an intangible and subjective or motivational attribute of a design that connects the feelings of users to the concrete/tangible attribute of a product design. The symbolic feature is an abstract attribute that we cannot consciously evaluate; however, it creates meaning that connects users to the aesthetic and functional aspects of product design (Lee 2004; Lenau et al. 2003).

Nevertheless, Lee (2004) stated that culture possesses a dual-layered structure consisting of "implicit" and "explicit" elements. He explained, on the one hand, that the explicit layer refers to the overt culture, which is visible to the naked eye and can be easily understood. On the other hand, the implicit layer is the covert culture, which remains hidden and presents difficulties even for experienced observers to comprehend (Lee 2004). In simpler terms, culture is not just what is visible but also what lies beneath the surface. Hence, it is essential to note that product design attributes are not limited to the explicit cultural layer, including function, aesthetics,

and symbolism (Lee 2004). He explained that the underlying implicit layer of culture must be considered when analysing cultural product design attributes. As shown in Figure 4, this layer encompasses cultural variables that are less easily observable but are vital to understanding the cultural significance of a product's design (Lee, 2004). Figure 4 illustrates the concepts of Function, Aesthetics, and Symbolism, denoted by the letters F, A, and S, respectively.

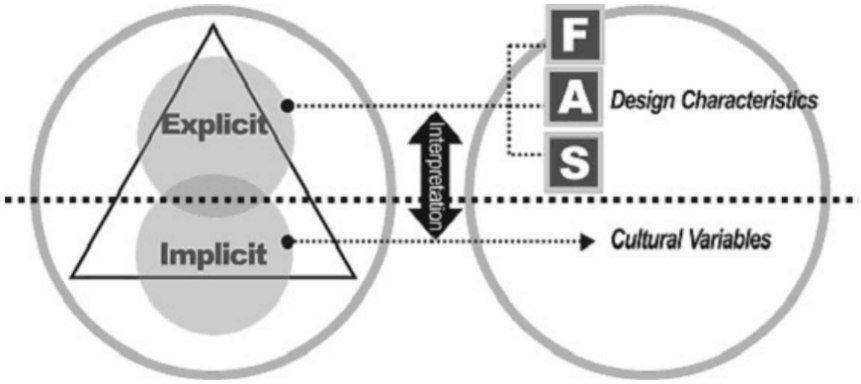


Figure 4 The methodological framework for cross-cultural design study

Source: Lee (2004)

Moalosi (2007) Culture-Oriented Design Model

Lee's (2004) study has highlighted that the predominant discussions on cultural product design mainly focus on identifying and utilising aesthetic stereotypes while neglecting other essential aspects of cultural product design. According to Moalosi (2007), this approach is limiting and highlights the need for a well-defined framework from Botswana's perspective. Such a framework would help designers address the numerous unanswered questions and issues associated with integrating cultural elements into design attributes. Moalosi (2007) proposed a culture-oriented design model emphasising the importance of considering cultural factors at the conceptualisation stage of product design to create innovative products to address this gap. As illustrated in Figure 5, Moalosi's (2007) model is in three processual stages, including:

1. Sociocultural factors are categorised within the user's domain as they encompass their social and cultural requirements. The user's environment includes a range of traditional and modern sociocultural factors, including social practice, emotional reactions, tangible assets, and technological or design factors (Moalosi 2007).

2. The integration phase, or the designer domain, explores how to translate sociocultural factors into product design. This stage involves integrating users' needs within a sociocultural context and designers' experiences, resulting in culturally oriented and user-acceptable product designs. In this domain, designers will focus on translating sociocultural factors into mediation, function, aesthetics, signification, gender, and knowledge (Moalosi 2007). The designer will deliver the final product to users with one or more of these attributes at the three different cultural levels (Moalosi et al., 2005; Christiaans et al., 2009).

3. Cherishable culturally oriented products, called the product's domain, focus on two product design objectives (Moalosi 2007). These include the generation of innovative design concepts that are acceptable to the user's cultural and contextual needs, and, secondly, the production of a cultural identity product or a recognisable symbolic product embedded with invisible narratives that facilitate user acceptance easily

(Moalosi et al. 2010). Generally, the product interface must be understandable and express the user's aspirations and cultural identity. The cherishable, culturally oriented products stage has design requirement attributes such as novel design concepts, narrative abstract product features (symbolism), product acceptance, and user self image (Moalosi et al. 2005).

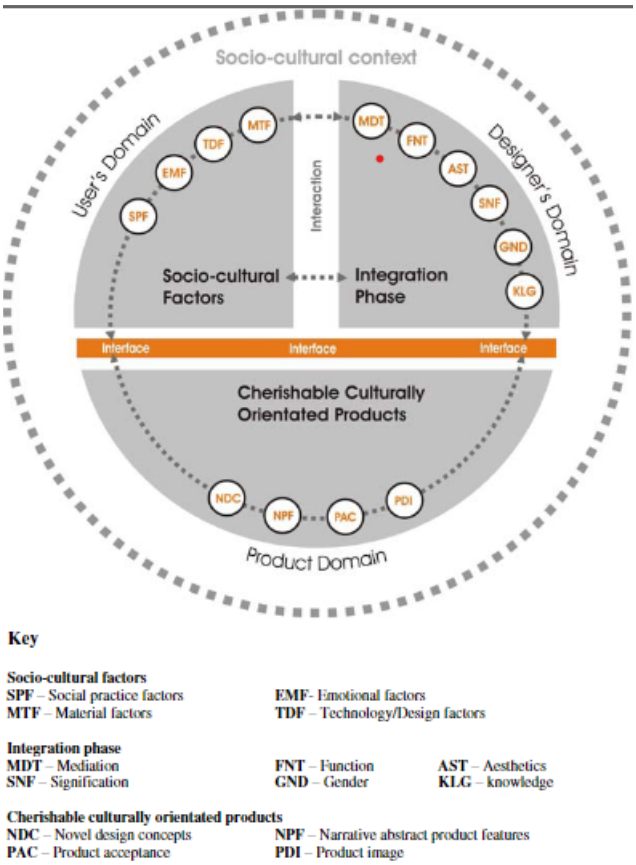


Figure 5 Moalosi's (2007) cultural-oriented design model

Source: Moalosi (2007)

In brief, Moalosi (2007) indicated that his model features a user interface that enables designers to interact with users based on their beliefs, values, perceptions, behaviours, and needs regarding existing design attributes. This model enables product designers to combine traditional and technologically advanced design skills and knowledge. As a result, the culture-oriented design model focuses on creating innovative design concepts that practically integrate with the user's contexts (Moalosi et al. 2010; Moalosi et al. 2005).

Lin's (2007) Three Layers and Levels of Cultural Objects and Design Features

Following Leong and Clark (2003), Lin (2007) mentioned that cultural objects can be studied based on three classifications of cultural objects at three levels: the tangible, representing the outer level; the behavioural, representing the mid-level; and the intangible, representing the inner level. However, upon closer examination of the dialogue between Leong and Clark (2003), it becomes evident that Leong derived the three levels of culture from He's (1992) "spatial perspective of culture." As per the discussion between Leong and Clark (2003), He's (1992) model provided Leong with a comprehensive framework to visualise and comprehend the fluid concept

of culture. This, in turn, facilitated his ability to identify the core focus of his research precisely. Leong's research delves into the "inner" level of traditional Chinese culture, using He's (1992) spatial perspective of culture framework to guide his study. Through this framework, Leong discovered the concept of "value orientation," which became the foundation for his four vital criteria: life-centring, totality, reflectivity, and unification. Leong and Clark (2003) elaborated that, upon reaching the cultural integration design method stage, Leong employed He's (1992) model to refine his design approach. Drawing from earlier studies by Lee (2004) and Leong and Clark (2003), Lin (2007) developed a framework for analysing and developing cultural artefacts, as summarised in Figure 6.

Lin's (2007) framework presents a comprehensive methodology for analysing cultural elements by categorising them into three distinct layers based on He's (1992) "Spatial Perspective of Culture" in Leong and Clarks' (2003) dialogue, which provides a simplified perspective on how cultural objects can be analysed, as follows (Lin 2007; Leong and Clark 2003):

1. Physical or material layer representing garments, food, craftwork and related tangible objects.
2. A behavioural or social layer represents social organisation and relationships with human society.
3. The ideal culture or spiritual layer represents religious beliefs and some art forms.

However, Lin's (2007) framework helps researchers analyse cultural artefacts in more detail. It focuses on understanding the different layers and levels that make up design features. Lin (2007) adapted Norman's (2002) three levels of emotional design to study design features across different cultural levels and layers. The integration resulted in three distinct design features (Lin 2007):

1. Visceral design features include product form, colour, line quality, texture, and decorative patterns.
2. Behavioural design features represent perceived usefulness/usability, function, operational concerns, and safety.
3. Reflective design features containing attributes such as emotional durability, cultural identities, self-image, affection, and others.

The model proposed by Lin (2007), as shown in Figure 6, illustrates a process for incorporating cultural elements into product design. This assists product designers in understanding the cultural meaning of existing objects in society and helps them create culturally oriented objects that end-users will appreciate (Hsu et al. 2011).

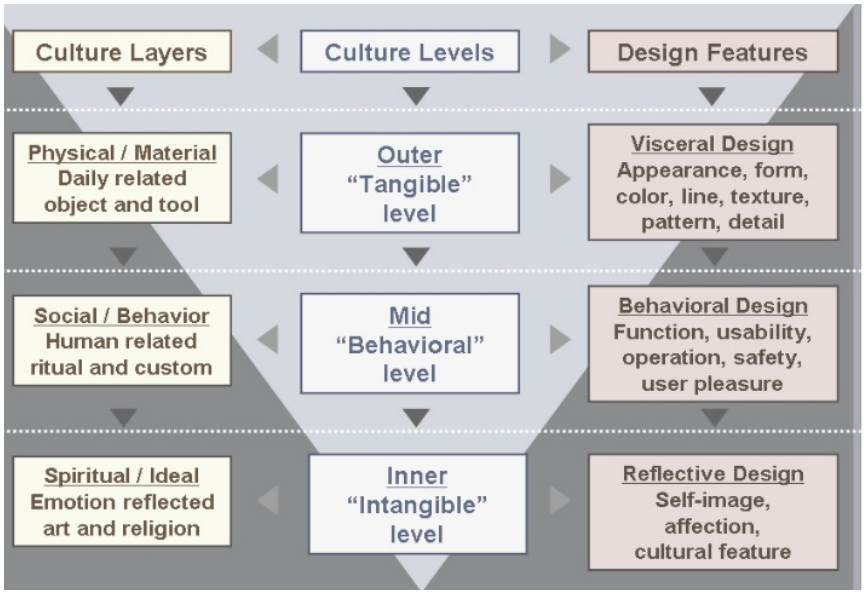


Figure 6 Lin's (2007) three layers and levels of cultural objects and design features

Source: Lin (2007)

In summary, our research reveals that it is feasible to develop groundbreaking transcultural product designs that pay homage to and embody cultural values. Our findings outline specific methodologies for seamlessly integrating cultural elements into designs, resulting in products that deeply resonate with diverse cultural groups. This serves to preserve and promote cultural heritage globally, significantly enhancing user satisfaction. Effectively, the influence of cultural inspiration on creative design is substantial, underscoring the importance of incorporating various cultural elements to achieve genuinely innovative transcultural product designs. Hence, this research marks a significant progression towards fostering a more inclusive, adaptable approach to developing novel models for transcultural product design innovation.

Development of Transcultural Product Design Innovation Model

The proposed Transcultural Design Innovation Model has four design domains containing cultural product design decision-making and entities. These domains involve determining what researchers aim to achieve in various cultural contexts and how they plan to accomplish it. The interaction between the "What" and "How" in the transcultural design innovation domains means analysing existing cultural product design features and improving user-context requirements. Figure 8 illustrates that existing cultural mosaic product design features and transculturation represent the goals that product designers aim to achieve. In contrast, modern technology value-addition and context of use represent how designers plan to achieve it. The interaction process between these design domains creates conceptual boundaries, which are based on adapted design theories from Lin (2007), Lee (2004), and Moalosi (2007).

Lin's (2007) model and the explicit aspect of Lee's (2004) model serve as our point of departure for providing new cultural product design features analysis, knowledge, and methods in cultural product design thinking. Simultaneously, Moalosi's (2007) model provided us with the conceptual tools for product design value-addition and product development, helping us to analyse and enhance results from cultural product design. As illustrated in Figure 7, the Transcultural Design Innovation Model takes the form of hierarchical mapping of cultural elements (which involves an adapted Lin's (2007) three layers and levels of cultural objects and the explicit layer of Lee's (2004) methodological framework for cross-cultural design study) and

flow diagram of the transcultural design development process (which attracted the concept of Moalosi (2007) cultural-oriented design model processual format). While the hierarchical mapping of cultural elements captures the influence of cultural factors on product design attributes, the flow diagram of the transcultural design process will serve as the roadmap for developing innovative product designs with acceptable contextual and cultural identities.

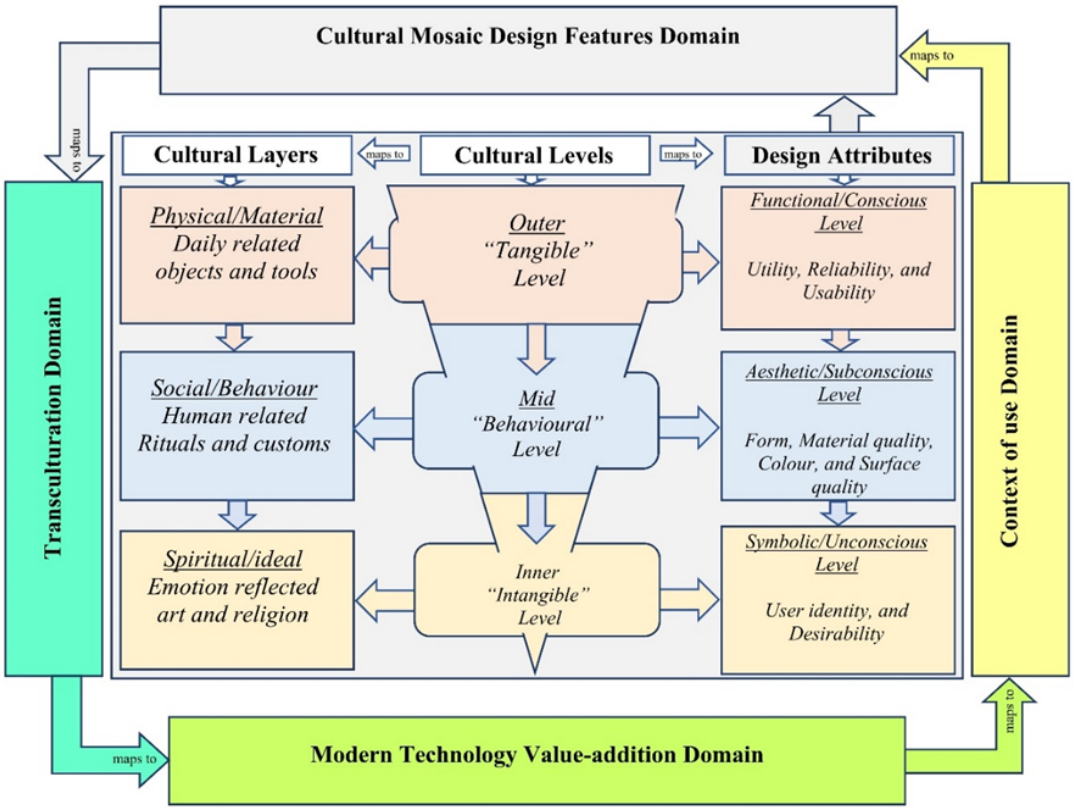


Figure 7 The Transcultural Design Innovation Model

Source: Illustrated by the authors

Domains' Elaborations

For a better understanding of the Transcultural Design Innovation Model, it is essential to delve into its four domains. These domains comprise cultural mosaic design features, transculturation, modern technological value-addition, and context of use.

Cultural Mosaic Design Features Domain

Within the scope of this research, the term "cultural mosaic" describes a domain encompassing distinctive design features that serve to represent diverse cultures. The cultural mosaic design features domain that comprises the following underlying components: cultural layers, cultural levels, and design attributes.

Cultural Layers

More precisely, from our point of departure in the cultural mosaic product design features domain, it is illustrated in Figure 7 that when product designers encounter a cultural product, its three cultural layers are analysed, described, and classified as physical/material, behavioural/

social and spiritual/ideal layers (Lin 2007). In the description, the physical/material layer includes identifying daily-related objects and tools, including domestic utilitarian use in everyday life (Lin 2007).

In effect, this shows in the model that knowing the physical/material features of the first cultural layer helps designers determine how they function. Notwithstanding this description, designers always step downward to study the behavioural/social layer, which Lin (2007) describes as human-related customs and rituals. Alternatively, this layer refers to the action of attraction, feelings, and reactions that users display toward a cultural product, contributing to its overall everyday societal perception and satisfaction. Hence, this cultural layer guides product designers in identifying users' aesthetic experiences within a given cultural context. On the same note, from the spiritual/ideal layer of culture, the model presents to designers the ideal emotions of cultural products reflected in utilitarianism and the reflection of the spiritual relationship between artefacts and their users, ancestors, nature, and context. Indeed, this layer serves the designer better when searching for the symbolic meaning of a cultural product. Overall, these layers always lead the designer to understand what brought the artefact into existence, what makes users feel toward it, and how it coexisted with users in their contexts to create symbolic meanings.

Cultural Levels

Designers often encounter the challenge of visualising and comprehending the intricate and constantly evolving concept of culture. The cultural level gives them a practical and effective approach to overcoming this challenge. It equips designers with a simple yet comprehensive framework that enables them to understand cultural dynamics and develop a clear direction for their research and design approach (Leong and Clark 2003). This cultural level comprises three sets of tools designers can use to conduct research and develop a design approach informed by their findings. According to Leong and Clark (2003) and Lin (2007), these tools include the outer, mid, and inner levels of culture, which are used in visualising and interpreting data, such as product design trend mapping and cultural analysis, as illustrated in Figure 7. By utilising these tools, designers can gain valuable insights into their target audience's values, beliefs, and preferences, as well as the broader cultural context in which they operate. They can then use this knowledge to analyse functional, aesthetically appealing, and symbolically meaningful designs. Ultimately, the cultural level enables designers to bridge the gap between their creative vision and the cultural realities of their audience, leading to more successful design outcomes.

Design Attributes

In an advancement, cultural product design features consist of experiences caused by a systematic interaction between cultural products and users, with the rate at which the product satisfies the user's utility needs (functionality), the sensories gladdened by feelings (aesthetics), and meanings are attached to product designs (symbolic) (de A. Campos et al. 2012). As demonstrated in Figure 7, these three essential design attributes can be visualised and interpreted when mapped from the three levels of culture (Lee 2004), as detailed in the explanation that follows.

First, the outer/intangible level of culture maps onto the functional/conscious level of design features. Thus, the design attributes derived from the outer level of the tangible artefacts contain physical/technical features such as utility, reliability, usability, and others. Indeed, the functionality of a cultural product is valuable when it satisfies user utility needs. Failure of a cultural product's utility means failure in its reliability and usability. On the other hand, reliability

refers to the ability of a cultural product to perform perfectly and independently without any problem, leading to the enhancement of user confidence and an improvement in user-product engagement (Babich 2020; Chamorro-Koc and Popovic 2008). In addition, a cultural product's usability refers to a user's ability to learn and use it efficiently (Chamorro-Koc and Popovic 2008). Following these explanations, enhancing a cultural product's functionality requires the designer to understand the user's experience with the product functionality.

Second, the mid-level culture also maps onto a design attribute's aesthetic/subconscious level. The design attribute of this level focuses on users' judgement of the attractiveness of existing cultural product design. Thus, this model challenges cultural product designers to shift their concept of designing utilitarian products to one that incorporates aesthetic attributes. To satisfy users at this level, product designers must carefully study the existing cultural product design aesthetic qualities in terms of user perception of beauty, attention/attractiveness, and higher cognitive processes. Thus, at this level, the analyses of aesthetic qualities will be based on the cultural product form (such as size, shape, and proportion), material quality (sense of delightfulness caused by the use of materials such as clay, metal, wood, fabric, and others), surface quality (aesthetic finishing regarding the feel of smoothness, glossiness, and others) and colour (sense of attraction regarding, cold colours, warm colours, and others).

Last, the inner/invisible level of culture, which contains the user's emotional experience, maps onto the symbolic/unconscious level of design attributes. At this level, the domain gives designers a sharp focus on the meanings derived from cultural elements that communicate the user's status/social role, self-image, user desirability, user self-affiliation to individuals/social groups and user-product loyalty through cultural product design features. Effectively, when users place a higher ego on a cultural product design, its symbolic meaning becomes essential to the context and the user (Brunner et al. 2016). Indeed, the symbolic level of cultural product design features, which shows the symbolic meaning of a product design, serves as a medium for motivating customer behaviour to acquire it in a societal context (Gilal et al. 2018; Brunner et al. 2016). Following this, the symbolic design features are associated with a unique level that supports the cognitive learning process and long-term storage in the users' minds.

In conclusion, the cultural mosaic design features domain is a source of inspiration that influences the designer's understanding of cultural product design, including its failure or success, in a social context. Each cultural layer and level is connected to form a design attribute that reflects the user's experience with a cultural product.

Transculturation Domain

Previously, the model began by informing designers to widely explore cultural elements related to existing product design attributes, which fulfil functional, aesthetic, and symbolic requirements. Results obtained from this exploration will be used in this domain to enlighten designers about existing cultural mosaic product design features that need enhancement through transcultural product design innovation. Outlined this way, the model will guide designers to use transculturation to bridge the gap between two or more cultures. In addition, the model will guide cultural product designers to create the possibility of forming new cultural elements by combining two or more existing cultural structures from different contexts. In this case, blending various cultural mosaic product design features will result in entirely new cultural product design features appropriate for use in the context of the existing ones.

With these considerations in mind, there will be no superimposition of cultural elements on one another; the meanings of each element from the foundational cultures will remain immutable, leading to the formation of an innovative cultural structure (West-Durán 2005). Granted, this

model requires designers to be listeners (in order not to misrepresent the original meanings of cultural elements), transparent and fair to all cultures involved. This study acknowledges that transculturation is a form of cultural appropriation which magnifies the knowledge of openness of listening as a code of ethics (West-Durán 2005).

As illustrated in Figure 8, consider the following hypothetical design scenario: A functional and symbolic attribute from the outer and inner levels of culture "Y" is integrated with a product design's aesthetic attributes derived from the middle levels of culture "B."

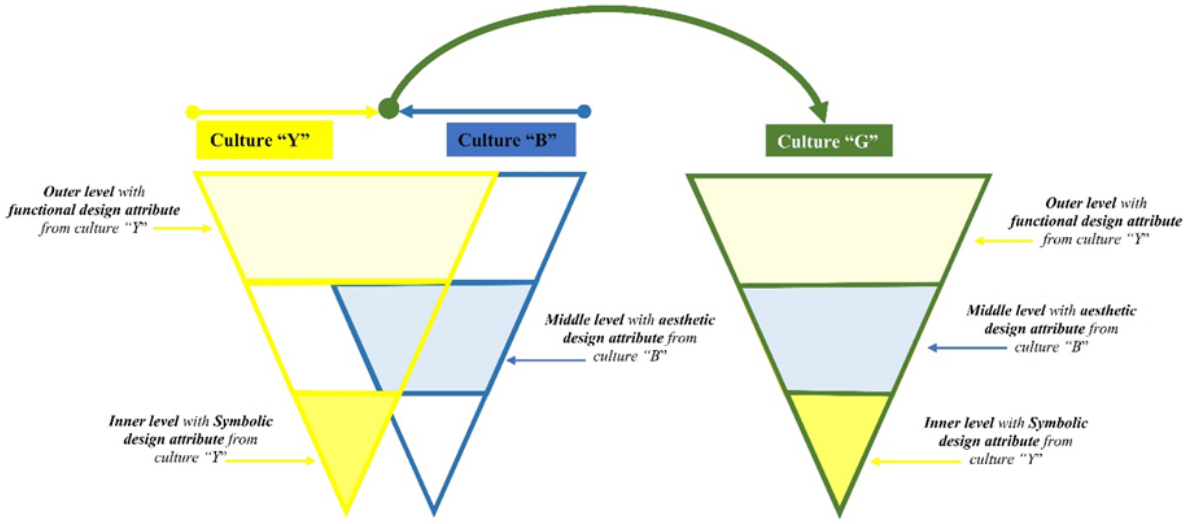


Figure 8 The design scenario of the transculturation process

Source: Illustrated by the authors

Concerning Figure 8, it is essential to note that the culture denoted by "Y" corresponds to Yellow, the culture designated as "B" represents Blue, and the culture indicated by "G" stands for Green.

During this process, the functional and symbolic attributes from culture "Y" are carefully selected to complement the aesthetic attributes of the product design derived from culture "B." The goal is to enhance the overall quality and appeal of the new product by incorporating the best design attributes from both cultural contexts. This transculturation process requires a deep understanding of the cultural nuances and an ability to navigate cultural differences with sensitivity and respect. When effectively done, this process results in a revitalised cultural product (Culture "G") that reflects the synergy between the two cultural elements. Thus, the product is enriched with new meanings and values beyond individual cultures' boundaries. This new cultural product creates mutual benefits for both cultures involved, as it expands cultural knowledge and appreciation while also providing a valuable and unique product for a broader global audience. It also helps preserve cultural heritage and promotes cultural exchange and understanding. Finally, it encourages designers to think beyond their cultural boundaries and embrace different design attributes from other cultures, creating truly unique and innovative designs.

Modern Technology Value-addition Domain

Under globalisation, the application of scientific and innovative materials, forming, and finishing techniques in modern technology are what state-of-the-art users refer to as technologically advanced product designs (Hannay and McGinn 1980; Zheng 2015). However, some of these

technologically advanced product designs were once cultural elements built upon the fundamentals of the three levels of culture (Shuang 2018; Su and Hao 2010; Zheng 2015). Essentially, the advancement of product design technology with global high-tech production and high-touch finishing features (which match users' expectations) are the advantages that modern product designs have gained as a superior competitor over cultural product design (Zheng 2015; Yang et al. 2022). We also agree that cultural product design involves folk production processes and rustic finishing techniques.

Nonetheless, incorporating modern technology into cultural product designs will help designers enhance the aesthetic qualities, functionality, and meaningful symbols of their craftwork (Shuang 2018; Zheng 2015). Hence, based on available raw sustainable materials and environmental sustainability, the modern technology value-addition domain in Figure 7 will inform cultural product designers about the possibility of emphasising high-tech and high-touch value-added product designs using modern technology. From our perspective, we understand that creating value-added cultural product designs through modern technology will not change the transcultural product's symbolic meaning, spiritual feelings, or cultural identities. Instead, this domain will help cultural product designers develop acceptable artefacts in a global context that reflect various functionalities, aesthetic qualities, and cultural identities, matching them with the trends of their consumption period.

Context of Use Domain

Transcultural product designs will only wholly reflect their practical application once placed in a context where users experience their functions, aesthetics, and symbolic meanings. The reason for discussing the context of use is that the design attributes of the resulting transcultural product should play a recognisable role in varied contexts other than its current surroundings (Krippendorff and Butter 2007). Indeed, transcultural product designs can only be considered functional, aesthetic, or symbolically meaningful when accepted in varied contexts. The fact is that, in exploring user experience, the meaning and usability of a transcultural product design should be diversely interpretable for different users of varied cultures in varied environmental conditions (Krippendorff and Butter 2007).

Following the processes of the Transcultural Product Design Innovation Model, designers can create products that can occur in a reasonable number of contexts without user constraints. The researchers agree that people can have different meanings for different transcultural product designs when using them in various contexts. Hence, the context of use domain in this model proposes that without exploring the appropriate choice of a product design context, designers and producers will often fail after production, as the understanding and interpretation of product usability and symbolic meaning will be difficult for users living in different contexts. Significantly, if cultural product designs could occur everywhere, anywhere, at any time for everybody, there would not be anything special about the context of product use and user experience (Krippendorff and Butter 2007; Chamorro-Koc et al. 2004).

Indeed, user-artefact interaction does not occur in a blank but in a defined context (Trivedi and Khanum 2012). Notwithstanding this, the context influences people's behaviour among the cultural elements, design, value-added features, and user experiences (Trivedi and Khanum 2012). They added that, although users are the major elements of the context of use, people within the context who are not involved in product usability may tremendously influence the meaning and usability of the product. Technically, this indicates that transcultural product design innovation is a continuous process, as illustrated in Figure 7, with the arrows connecting the four domains in an anticlockwise direction. Indeed, as human behaviour evolves, so does the process of transcultural product design innovation infers. That

is, it is a dynamic process that constantly evolves with the addition of new features, resulting in the creation of new transcultural product designs tailored to the people at that time and in their specific context of use.

CONCLUSION

> Ready or not, a "transcultural" era is upon us. (Slimbach 2005)

In conclusion, this study acknowledges that the dynamism of transcultural product design innovation has evolved from human survival to necessity through the periods of art and craft to the advanced modern technology of mass production, high-tech, high-touch, and globalisation. Essentially, this study is a systematic review that explores the fundamental principles of cultural product design models and their potential impact on developing a transcultural product design innovation framework. After conducting an in-depth analysis, a hybridised transcultural product design innovation framework was crafted to integrate tools from these theories selectively. This framework offers a valuable resource for those seeking to enhance their product design process and create culturally relevant products that are more inclusive, accessible, and appealing to a broader range of users. Its implementation can enhance the quality and relevance of products in a global marketplace. Overall, the proposed framework has the potential to revolutionise design practices by providing a more comprehensive approach that considers the intricacies of different cultural contexts. However, to fully realise this potential, it is imperative to conduct further research and testing to ensure its practicality and effectiveness in real-world transcultural product design innovation scenarios.

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