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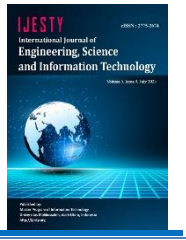

Sustainable Interior Design for Urban Cafés: Integrating Urban Culture and Smart Technology to Enhance Work-Oriented Comfort

Ruth Puji Setyaningrum[1], I Kadek Pranajaya[2]*, Ni Made Emmi Nutrisia Dewi[2]

[1]Interior Design, Bali Institute of Design and Business, Bali, Indonesia
[2]Master of Design, Bali Institute of Design and Business, Bali, Indonesia

**Corresponding author Email: pranajaya_@idbbali.ac.id*

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Abstract

The rise of urban culture and flexible work trends has redefined cafés as alternative workspaces, prompting the need for interior designs that are both sustainable and adaptive. However, many café environments still lack a holistic integration of local cultural values and emerging technologies to support prolonged, productive work. This study proposes a sustainable interior design model for urban cafés that combines cultural identity with innovative technological solutions to enhance user comfort. Using a qualitative methodology, the research involved field observations, semi-structured interviews, ergonomic evaluations, and digital environmental simulations, conducted in Renon, Denpasar—a vibrant urban area in Bali. Results indicate that incorporating cultural elements, such as material patterns, spatial layouts, and symbolic aesthetics, along with bright lighting, efficient ventilation, and ergonomic furniture, significantly improves functionality and user well-being. Users identified key comfort factors including lighting, furniture design, zoning, acoustics, and air quality. The study emphasizes the need for an interdisciplinary approach that fuses design engineering, local culture, and intelligent systems to create flexible, user-centered environments. Nine integrative design strategies are proposed to support both work productivity and cultural resonance. These findings provide practical insights for architects, designers, and café developers seeking to create meaningful and adaptable spaces in tropical urban settings. On a broader scale, the research contributes to the global discourse on non-traditional workspace design by presenting a replicable framework that aligns with sustainable urban development and the evolving work dynamics of the digital era.

Keywords: *Sustainable Interior Design, Urban Culture, Adaptive Space Design, Café Workspace, Flexible Working Environment.*

1. Introduction

The evolution of digital technology and shifts in global work patterns have significantly transformed how commercial spaces are utilized. The rise of remote working, increased mobility, and the growing demand for flexibility have contributed to the emergence of alternative work environments that not only provide comfort but also support productivity. One notable response to this trend is the transformation of urban cafés into hybrid spaces that serve as both social venues and informal workspaces. These coworking cafés have become popular in urban settings for their relaxed yet functional atmosphere, which accommodates the diverse needs of professionals, freelancers, students, and remote workers. [1]. Despite this growing trend, a disconnect remains between the new functional role of cafés as workspaces and the prevailing interior design approaches. Many café interiors still prioritize visual aesthetics and follow global design trends without fully addressing the physical and psychological comfort required for extended work activities. Elements such as ergonomics, lighting (both natural and artificial), air circulation, and digital connectivity are often underrepresented in current design practices. This imbalance has limited the potential of cafés to evolve into truly productive and inspiring environments.

Simultaneously, urban cultural dynamics in areas such as Renon, Denpasar, Bali, reflect a complex intersection between traditional local values and global modern influences. While urban culture in Bali maintains strong ties to indigenous traditions, it also incorporates elements of contemporary urban lifestyles. Unfortunately, in interior design practice, local cultural elements are often treated as superficial decoration rather than being conceptually integrated into spatial planning. When cultural values are integrated meaningfully into interior environments, they can enhance the sense of place and contribute to more memorable and identity-rich spatial experiences.

Within the broader framework of sustainable design, one of the primary challenges is to create interior environments that go beyond comfort and aesthetics by promoting user well-being, energy efficiency, and cultural relevance. Technological innovations such as automated lighting systems, smart ventilation, and the integration of Internet of Things (IoT) devices offer the potential to create responsive, efficient, and sustainable workspaces. [2]. However, the actual implementation of such technologies in café interiors, particularly in developing urban settings, remains limited and often disconnected from long-term design strategies.

This reality points to a clear research gap. There is currently no established interior design model for cafés that systematically integrates local urban culture and innovative technology within a sustainability-oriented framework. Previous studies tend to focus separately on cultural or technological aspects without exploring how they can be holistically combined to support user comfort in informal public workspaces such as cafés. The urgency of this research is underscored by the rising demand for flexible work environments that respond not only to functional and technological needs but also to local cultural contexts as part of spatial identity. Furthermore, the post-pandemic shift toward workplace decentralization has intensified the call for user-centered, non-traditional, and sustainable workspace design. [3].

This study makes a novel contribution by proposing an interior engineering model for cafés that integrates urban cultural values and innovative technologies to enhance work-oriented comfort within a sustainable framework. It presents a new perspective on interior design—reframing cafés not merely as social venues, but as productive, culturally embedded, and technologically responsive workspaces.

From a state-of-the-art standpoint, this research extends the scope of interior design engineering by positioning the interplay between culture-based design and intelligent systems as the foundation for developing adaptive public interiors. The findings underscore the importance of user preferences in achieving comfort, identifying critical factors in both indoor and outdoor café areas, such as thermal conditions, electrical facilities, acoustic levels, lighting systems, and furniture configuration, all of which are directly related to sustainable and technology-enhanced interior design. [4].

Against this backdrop, the primary objective of this research is to develop a sustainable interior design model for urban cafés that enhances work comfort through an integrative approach involving urban culture and innovative technology. Specifically, the study aims to identify contextually relevant urban cultural elements that can inform interior design strategies, assess user needs and preferences related to comfort in café-based workspaces, explore the potential of innovative technologies to enhance spatial quality, and formulate adaptive, contextual, and sustainability-driven design principles for interior environments. Adopting an interdisciplinary and qualitative approach, this research not only contributes to the theoretical advancement of contemporary interior design but also offers practical insights into the creation of culturally sensitive, functionally effective, and socially and environmentally sustainable public spaces. Furthermore, the proposed model is designed to be adaptable and replicable across various urban settings, making the study both locally grounded and globally relevant, as cities worldwide strive to design meaningful and intelligent work environments for the future.

2. Literature Review

Interior design strategies for urban cafés have the potential to integrate principles of indoor health and comfort, particularly as outlined by the Green Building Council Indonesia (GBCI). These principles emphasize critical aspects, including thermal and visual comfort, acoustic control, the use of non-toxic and health-supportive materials, carbon dioxide monitoring, enhanced fresh air circulation, and the establishment of smoke-free zones. Such a framework aims to create healthy and comfortable spaces that enhance user well-being. [5].

The growing application of green building standards has sparked increased scholarly interest in how environmental design can positively impact the quality of interior spaces. According to GBCI, optimal indoor environmental conditions involve providing natural lighting, improving indoor air quality, managing noise effectively, and utilizing low-emission building materials. In line with the green building paradigm, Indoor Environmental Quality (IEQ) has been consistently linked to occupant satisfaction, cognitive performance, and overall work productivity. [6]. Comfort in interior spaces emerges from a combination of multiple physical and psychological factors. These include thermal regulation, air purity, lighting quality (both natural and artificial), acoustic balance, and users' perceptions of the environment. [7]. Therefore, a high-performing interior environment is not defined by a single element, but rather results from the integration of various spatial components.

Urban cafés, which are increasingly serving as informal workspaces, cater to digital entrepreneurs, creative professionals, and freelancers who seek environments that allow for both flexibility and sociability. These hybrid users are drawn not only to technological features, such as fast Wi-Fi, accessible power outlets, and smart devices, but also to the café's cultural and spatial ambiance. The integration of urban culture, manifested in informal atmospheres, community-driven layouts, and localized design aesthetics, supports social interaction while fostering a relaxed work rhythm. [8]. Spatial organization that considers user comfort and privacy, including generous seating arrangements and ergonomic furniture, contributes to an environment conducive to extended work sessions. [9]

Research on workplace design has demonstrated that spatial configuration affects not only physical comfort but also employees' psychological responses and perceptions of task support. Design flexibility plays a crucial role in accommodating varying work preferences, particularly in settings that balance collaborative and focused work. Emphasize that adaptive spatial design is vital in supporting diverse work styles and ensuring user satisfaction within flexible environments. [10].

User experience within café interiors has been directly linked to return visits. Key factors that influence visitor loyalty include furniture design (in terms of structure, material, and quality), spatial configuration (including lighting, ventilation, acoustics, and movement flow), finishing elements (such as floor, wall, and ceiling design), and aspects of safety and privacy. [11]. Their findings confirm that higher levels of interior comfort are associated with a greater likelihood of repeat patronage. Negative spatial experiences, on the other hand, have driven an awareness of the importance of designing environments that are both functional and emotionally supportive. In a study by [12]Cafés that applied a modern design concept characterized by bright neutral tones, large windows, vinyl parquet flooring, and LED downlights were perceived as more open, comfortable, and engaging. The spatial layout, which included multiple functional zones across two floors and an outdoor area, was optimized for both circulation and user interaction. Furthermore, the use of high-quality materials and the implementation of computerized design tools enhanced both the accuracy and aesthetic value of the space.

Collectively, the literature suggests that achieving sustainable comfort in café interiors demands a holistic approach, one that combines spatial planning, innovative technologies, and local cultural identity. These insights form the foundation for exploring a more integrated model of interior design that not only supports productivity but also responds to contextual urban culture while meeting environmental and technological standards.

3. Methods

This research adopts a qualitative approach to explore in depth how the integration of urban culture and innovative technology is manifested in the interior engineering of cafés to enhance work-related comfort. A qualitative methodology was selected due to its strength in capturing contextual meanings, user perceptions, and lived experiences, which are often not fully represented through quantitative metrics. [13]. The study employs a case study strategy, focusing on selected cafés located in the urban districts of Denpasar, cities that exemplify dynamic urban lifestyles and technologically driven, flexible work cultures. Cases were chosen using purposive sampling, targeting cafés that explicitly provide supportive environments for working activities, such as high-speed internet access, ample power outlets, appropriate lighting, ergonomic seating, and interior atmospheres conducive to focus and creativity. Data collection was conducted through three primary methods: (1) semi-structured interviews, (2) non-participant observation of spatial usage and user behavior, and (3) visual and spatial documentation of interior design elements. The interviews were conducted with 45 informants, comprising active café users (including freelancers, remote workers, and university students), as well as café owners and interior designers. Interview protocols were designed to elicit participants' experiences with the space, their perceptions of comfort, and their responses to cultural and technological elements embedded in the interior design.

Observations were carried out systematically to record user interactions with spatial features, including patterns of workspace usage, the extent of technology utilization, and behavioral expressions of comfort or discomfort. Visual documentation, such as photographs and spatial sketches, was used to support spatial analysis and enhance the interpretation of design elements that contribute to work-oriented comfort. The data obtained were analyzed thematically using a coding process that included open, axial, and selective coding stages.. [14]. This analytical process aimed to identify emerging patterns and relationships among urban cultural expressions, technological integration, and perceived comfort in café interiors. To ensure data credibility and analytical rigor, several validation techniques were employed, including triangulation of data sources and methods, member checking with informants, and an audit trail that documented each stage of the analysis. Ethical considerations were addressed by obtaining informed consent from all participants, ensuring confidentiality, and allowing participants to withdraw from the study at any stage. However, the study acknowledges several limitations. First, the research was geographically constrained to the Renon district in Denpasar, which may limit generalizability to other urban contexts. Second, the reliance on self-reported data introduces potential bias in participant responses. Lastly, as with most qualitative research, interpretation of findings may be influenced by the researchers' subjectivity, despite validation efforts. These limitations suggest the need for future research with a broader geographic scope and mixed-method approaches to strengthen external validity..

4. Results and Discussion

4.1. Interior Conditions of Cafés in Denpasar: A Case Study of Alternative Workspaces

Denpasar, as the central hub of economic and cultural activity in Bali, has undergone significant shifts in the utilization of public spaces, particularly in the use of cafés. No longer functioning solely as social gathering spots, many cafés have transformed into alternative work environments in response to evolving work cultures that emphasize flexibility, mobility, and the growing reliance on digital technology. This trend is evident among freelancers, students, and remote workers who require workspaces that are not only aesthetically pleasing but also functionally conducive to productivity. Within this context, interior design plays a pivotal role, not merely as an expression of style, but as a key determinant of user comfort and the quality of work experience. To explore this phenomenon, a series of observational case studies were conducted at four cafés in Denpasar, visually represented in Figures 1 to 4. Each café was analyzed for its interior design features, technological support, and environmental comfort. While many adopted urban modern design infused with subtle elements of Balinese aesthetics, the implementation of integrated workspace functionality varied significantly.

Fig. 1. Kunudhhani Coffee, Interior Design with a Semi-Formal and Relaxed Atmosphere
Source: Author

Café Figure 1 featured a minimalist interior with a dominant white palette and wooden accents on the ceiling, flooring, and furniture. This design conveyed a sense of cleanliness and tranquility conducive to focused work. Equipped with air conditioning for indoor areas, ceiling fans in outdoor sections, ample lighting from both natural and artificial sources, and high-speed Wi-Fi, the café appeared well-prepared to accommodate work activities. However, although electrical outlets were present at every table, they were awkwardly positioned and difficult to access, highlighting a shortfall in ergonomic design that undermines user convenience.

Fig. 2. Saga Coffee Renon, Building Designed with an Open-Space Concept
Source: Author

In Café Figure 2, an open-space concept prevailed, featuring soft seating, white flooring, and a gypsum ceiling with recessed white lighting. While the spatial layout encouraged informal discussions, the high level of background noise and intense midday sunlight in outdoor areas significantly detracted from user comfort. These shortcomings revealed a lack of passive thermal and acoustic control strategies. Integrating courtyard elements and green space, as recommended by [15]Could address these environmental issues while reinforcing local spatial values.

Fig. 3. Sai Coffee and Creative Space Interior Design Tailored to the Needs of Workers and Students
Source: Author

Café Figure 3 demonstrated a more harmonious balance between interior design and environmental quality. The indoor space was complemented by a green backyard filled with ornamental plants and bookshelves, creating a cozy, home-like atmosphere. A palette of soft green and white, paired with wooden flooring and furniture, strengthened the biophilic experience. The café utilized both natural ventilation and artificial cooling (AC), and also featured semi-private areas for introverted users who preferred minimal social interaction. However, the location's proximity to a busy road introduced considerable noise pollution, which diminished the overall acoustic comfort, a vital component of Indoor Environmental Quality (IEQ), as defined by [16].

Fig.4. Modern and Dynamic Café Anma Interior Design Concept
Source: Author

Café Figure 4 adopted a more experimental approach to interior aesthetics, combining bold orange-and-white contrasts with curved architectural elements and ceramic floors featuring white and black patterns. While visually stimulating, the space fell short in functionality. Seating lacked back and arm support, rendering it unsuitable for prolonged work sessions. This points to a disconnect between visual innovation and ergonomic functionality, a critical issue in designing productive third spaces.
These observations are summarized in Table 1, which outlines key characteristics and design challenges found in each location:

Table 1. Interior Design Features and User Comfort Evaluation in Denpasar Cafés
Source: Author's Analysis

Café Code	Design Concept	Strengths	Weaknesses	Design Improvement Potential
Fig.1	Neutral minimalist, wood accents	Clean, tranquil atmosphere; complete facilities (AC, Wi-Fi, power outlets)	Poor power outlet placement; limited user accessibility	Reconfigure outlet positioning and implement ergonomic seating
Fig.2	Open-plan space, dominant white palette	Spacious layout; informal seating areas	High ambient noise; uncomfortable direct sunlight in outdoor areas	Introduce courtyard elements and passive shading
Fig.3	Green biophilic, indoor-outdoor integration	Natural airflow, secluded areas, home-like atmosphere	Disturbance from traffic noise	Install acoustic barriers and vegetative buffers
Fig.4	Bold color contrast with curved architectural lines	Unique visual identity; well-lit interior	Lack of ergonomic support in seating; unsuitable for prolonged work	Redesign furniture in line with ergonomic workspace standards

Across all cases, it was evident that while some basic technologies, such as Wi-Fi and artificial lighting, were in place, more advanced, innovative technologies, like motion-activated lighting, adaptive temperature control, or digital workspace booking systems, were largely absent. The lack of these features indicates a missed opportunity to implement innovative spatial design strategies, which could significantly enhance both energy efficiency and user satisfaction. [17]. Furthermore, although traditional Balinese motifs and cultural

references were evident in murals, wood carvings, and local music, these elements were often superficial, serving more as decoration than as integrated components of the functional space. According to Third Place theory, cafés should create environments that strike a balance between sociability and productivity. [18]. When contextualized properly, local cultural elements can enrich the spatial identity and foster a more profound sense of place among users.

Ultimately, this study highlights the importance of a design engineering approach that combines three key pillars: culturally grounded spatial identity, innovative adaptive technologies, and sustainable interior comfort. The cafés studied in Denpasar illustrate both the opportunities and challenges in transforming public social venues into efficient, comfortable, and culturally meaningful workspaces. As demand for flexible working environments rises in the post-pandemic era, this case provides valuable insights for other urban centers in developing countries facing similar design dilemmas.

4.2. User Perceptions of Café Interior Comfort

User perception plays a critical role in evaluating the effectiveness of café interiors as alternative workspaces. This study drew insights from in-depth interviews and field observations involving 15 regular café users in Renon, Denpasar, consisting of students, freelancers, and remote workers. Renon was selected due to its vibrant urban lifestyle and the prevalence of a flexible work culture that utilizes public and semi-public spaces, such as cafés. Findings reveal that while the interior designs of cafés in Renon incorporate elements of both contemporary and local urban culture, several key factors influencing user comfort are still under-optimized. Synthesized results from interview coding and thematic analysis identify six main aspects consistently mentioned by users as critical to achieving comfort while working in cafés. These factors are visualized in Figure 5, which presents the frequency of each aspect mentioned across the participant responses. As illustrated, lighting emerged as the most influential factor (85%), followed by furniture and ergonomics (78%), spatial layout and privacy (72%), acoustic conditions (65%), ventilation (60%), and dedicated work zones (58%).

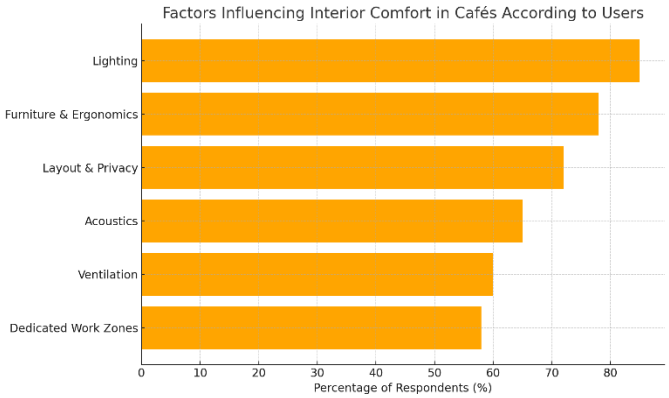

Fig. 5. Key Interior Factors Influencing User Comfort in Urban Cafés (Renon)
Source: Author

Lighting was the most frequently cited component contributing to either comfort or discomfort. Most users emphasized the importance of natural daylight entering through large windows for maintaining visual comfort during working hours. In contrast, the use of warm-colored artificial lighting was perceived to lower focus and concentration, especially among student users, who preferred cooler or neutral lighting to support academic activities. These findings align with those of Konstantzos et al. (2020), who assert that lighting quality has a significant impact on both psychological comfort and task performance in indoor environments. Furniture design and ergonomics also emerged as significant concerns. Respondents often reported that chairs lacked adequate cushioning and support, while work tables were frequently too small to accommodate both laptops and books. These issues highlight the importance of adopting ergonomically informed design strategies that align with health and comfort standards in flexible work environments.

Another prominent concern was the spatial layout. In many cafés, there was no clear separation between work zones and social seating areas, resulting in frequent distractions from ambient conversations and movement. Users suggested design interventions such as lightweight partitions, increased spacing between tables, or the incorporation of semi-private zones to mitigate noise and visual interruptions. Acoustic quality was also problematic, as many interiors lacked sound-absorbing materials. This caused reverberation and echoing, especially when background music was played at high volumes. For users engaged in cognitively demanding tasks, such noise levels significantly reduced productivity and comfort. Ventilation received similarly critical feedback. Several café zones were reported to feel stuffy, likely due to inadequate natural airflow and poorly distributed air conditioning. The implementation of intelligent ventilation systems capable of monitoring and adjusting indoor air quality in real time could provide a more responsive and comfortable indoor environment, as emphasized in their study of green building interiors. [5].

Lastly, there was a strong demand from users for dedicated work zones, separate from the general customer seating areas. Respondents expressed a need for quiet zones governed by clear behavioral expectations (e.g., no loud conversations or phone calls), where they could maintain concentration for extended periods. This aligns with user-centered design principles and underscores the need to reconfigure café interiors not only as social hubs but also as hybrid spaces that cater to diverse functional needs. Collectively, these findings underscore the need for café interiors to evolve through a research-based design approach that integrates innovative technology, local cultural values, and sustainability principles. Design solutions such as sensor-based lighting, ergonomic seating systems, flexible spatial zoning, and acoustic regulation are not only essential for enhancing user comfort but also for strengthening the competitive advantage of cafés as viable workspaces in the high-mobility, post-pandemic urban context.

This study supports [18]Perspective on the dual role of third spaces, like cafés, as social and productive environments. In line with global trends in work decentralization, especially in tropical urban regions, these findings contribute to the discourse on sustainable, culturally integrated, and user-responsive interior design.

4.3. Integrative Design Strategies: Harmonizing Urban Culture and Technology Within a Unified Interior Framework

Based on the synthesis of field observations, in-depth interviews, and supporting literature, this study proposes nine integrated design strategies for creating sustainable and productive café interiors. These strategies aim to balance the practical demands of modern work environments with the cultural nuances of urban identity and the seamless use of innovative technologies. To support the complexity and relevance of this design scenario, the proposed framework was evaluated through simulated expert synthesis. A panel of professionals rated the perceived importance of each strategy based on its potential to enhance comfort, productivity, and contextual responsiveness. The prioritization results are illustrated in Figure 6.

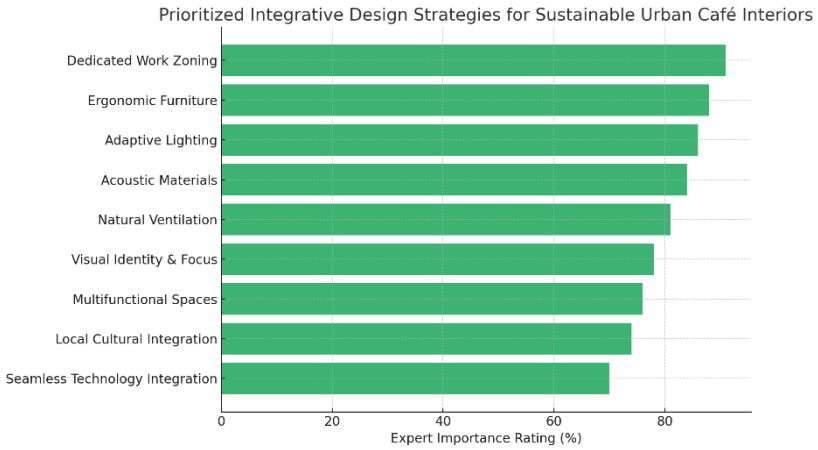

Fig.6. The prioritization results are illustrated.
Source: Author

1. Dedicated Work Zoning
   Establishing designated work areas emerged as the highest-priority strategy. Locating these zones near natural light sources and separating them from social areas helps support focused activity while preserving the open-plan atmosphere through the use of transparent partitions. This zoning approach aligns with those who emphasize the psychological benefits of spatial clarity and boundary definition in mixed-use environments. [20].
2. Ergonomic Furniture Systems
   The inclusion of task-appropriate furniture is essential. Comfortable seating with back and arm support, coupled with work tables of minimum 80×75 cm dimensions, contributes to postural well-being. Integrating electrical outlets and USB ports directly into workstations aligns with the expectations of mobile and tech-savvy users.
3. Adaptive Lighting Design
   Lighting solutions should combine neutral LED lights (4000–4500K) with localized task lighting to support the diverse needs of users. A smooth transition between natural and artificial lighting enhances visual health and psychological comfort, supporting circadian alignment and productivity. [21].
5. Acoustic Comfort Materials
   Sound absorption techniques, such as acoustic wall panels, insulated drop ceilings, and localized carpeting, are essential for minimizing noise disturbance, especially in open or high-traffic areas. This is particularly relevant given the findings in Section 4.2, where acoustics were frequently cited as a significant discomfort factor.
6. Natural Ventilation and Airflow
   Cross-ventilation, large operable windows, and ceiling fans improve indoor air quality and reduce dependency on mechanical cooling systems. The inclusion of indoor plants not only enhances air purification but also introduces a biophilic aesthetic, promoting cognitive restoration and well-being.
7. Visual Identity Supporting Focus
   Interior color schemes should prioritize calming tones, such as off-white, light gray, and natural wood, to reduce visual fatigue and overstimulation. Minimalist decoration enhances cognitive focus by minimizing distractions, according to [19] Theory on productive third places.
8. Adaptive and Multifunctional Layouts
   Flexible layouts that allow transformation from individual workstations to collaborative or social spaces are highly recommended. Movable furniture that maintains spatial coherence enables user-driven reconfiguration, echoing the user's needs. [22], who found that mobility in layout enhances social dynamics and functional adaptability.
9. Cultural Expression Through Local Design
   Urban cafés should integrate cultural identity not only through ornamentation but also through spatial planning, furniture design, and material usage. Using locally inspired composite materials such as precast concrete, synthetic parastone, GRC panels, or natural fiber composites contributes to cultural continuity while supporting sustainable practices. [23].

10. Seamless Technology Integration
    Technological systems should be embedded discreetly within the space to support productivity without disrupting aesthetic harmony. Examples include automated lighting controls, time-scheduled AC systems, and wireless charging solutions integrated into tabletops. These innovations reflect human-centered, clever design that enhances usability without visual intrusion.

Collectively, these nine strategies provide a comprehensive design framework that transcends superficial aesthetic enhancement by integrating spatial comfort, contextual identity, and advanced technology into a single, cohesive interior concept. The integration of culture and innovative design is not only desirable but necessary to meet the evolving demands of flexible work in tropical urban settings. Aligned with the central aim of this study, these findings reaffirm that sustainable café interiors must be conceived through a multidisciplinary lens—one that combines ergonomic function, cultural relevance, and responsive technology into a single architectural narrative. In doing so, urban cafés can effectively serve as dynamic third spaces that support creativity, concentration, and social belonging in equal measure.

4.4. Principles of Contextual and Adaptive Design for Non-Conventional Workspaces

Designing non-conventional workspaces such as cafés that double as alternative work environments demands a level of flexibility beyond what traditional offices provide. These spaces must accommodate the high mobility of urban professionals, particularly digital nomads and freelancers, while maintaining a distinct local cultural identity to differentiate them from mainstream commercial cafés. Contextual design emphasizes the alignment of spatial arrangements with local socio-cultural and climatic realities. In Denpasar, for example, the integration of Balinese urban culture—evident through the use of natural materials, modern ethnic ornamentation, and open-plan layouts—enhances both the aesthetic value and emotional comfort of users. These elements also address tropical design challenges by promoting natural cross-ventilation and daylighting. [4].

In parallel, adaptive design principles require spatial configurations to respond dynamically to the changing needs of users. This includes flexible furniture arrangements, varied seating (ranging from individual chairs to collaborative sofas and semi-private booths), and the incorporation of digital infrastructure such as high-speed Wi-Fi and accessible power outlets. Such flexibility enables both solo work and collaborative tasks without undermining the café's social function. User-experience-driven design is also central to this framework. Ergonomic seating, controlled lighting, acoustic management, and user autonomy in selecting preferred zones contribute to long-term productivity and well-being. This aligns with human-centered design theory, where comfort and personalization drive functionality. Moreover, the café is reconceptualized as a collaborative ecosystem, not merely a workspace. Informal discussion corners, a digitally connected atmosphere, and interactive design elements promote social exchange and community building. [24]This finding is supported by their study of public learning spaces, which found that adaptable, user-focused environments significantly enhance cognitive engagement and the overall experience. Figure 7. Core Principles of Adaptive Urban Café Workspace Design. This figure illustrates the integration of four foundational design principles — contextual, adaptive, user experience, and collaborative ecosystem — as essential elements in the development of productive and culturally grounded café workspaces.

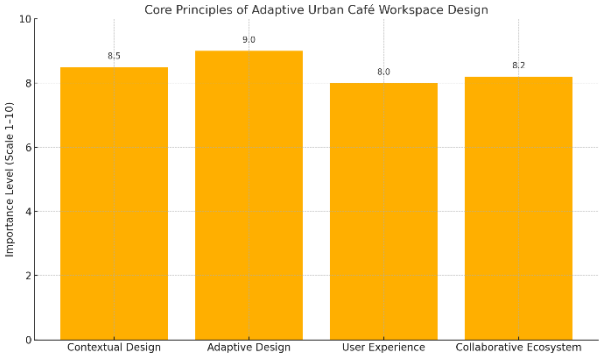

Fig. 7. Core Principles of Adaptive Urban Café Workspace Design
Source: Author

Figure 1 illustrates the integration of the four foundational principles — contextual, adaptive, user-experience, and collaborative ecosystem — as core elements of workspace design in urban cafés. Hence, applying contextual and adaptive principles simultaneously transforms the café into a productive yet culturally grounded workspace. These findings serve as a design reference for flexible workspaces in other tropical urban areas worldwide..

4.5. Global Contribution: A Culture-Driven and Tech-Enabled Alternative Workspace Model for Urban Contexts

The evolution of digitalization and the widespread adoption of flexible work patterns globally have given rise to hybrid workspaces, such as coworking cafés, third places, and creative hubs. Modern professionals increasingly demand spaces that accommodate high mobility, support personal comfort, and reflect cultural authenticity. This research proposes an interior design model for cafés that harmonizes local cultural values with intelligent technologies to create alternative workspaces that are not only efficient but also emotionally resonant. In Denpasar, this is evident in the adaptation of open layouts and natural airflow, aligning with Bali's communal living philosophy. [25]. The model's global relevance lies in its ability to resist the homogenization of modern coworking aesthetics. Urban culture is not treated as superficial décor but is embedded within spatial narratives, materiality, and ambiance. In European cities, for instance, adaptation may involve incorporating traditional fabrics, local architectural motifs, or historically resonant design patterns. Technology plays a complementary role in this model. Intelligent systems such as IoT-based lighting, automated ventilation, energy-efficient climate control, and digital booking apps enhance both operational efficiency and user satisfaction. Additionally, a robust digital infrastructure, including high-speed Wi-Fi, multiple charging stations, and video conferencing tools, is essential for remote and hybrid work modes. [26].

Table 2. Integrative Model of Culturally-Tailored and Tech-Enabled Workspace Design

Source: Author's Analysis

Design Component	Key Features	Impact on Users
Cultural Integration	Local materials, traditional motifs, and emotional zoning	Sense of belonging, cultural engagement
Smart Technology	IoT lighting, automated climate control, and smart booking	Seamless work experience, convenience
User Comfort	Ergonomics, acoustics, ambiance, and emotional resonance	Higher satisfaction, longer stay duration
Operational Efficiency	Energy efficiency, optimized layout, and usage tracking	Reliability, consistent performance
Global Adaptability	Modular design, scalable tech, cross-cultural sensitivity	Customization across different urban contexts

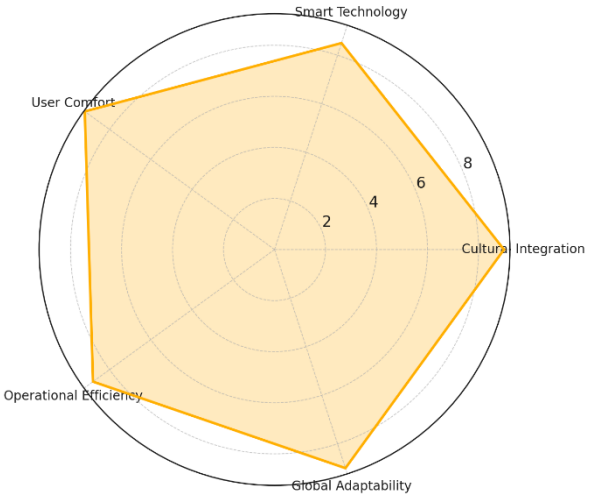

Fig. 8. Synergy of Culture and Technology in Workspace Design
Source: Author

Figure 8 visualizes the synergy between cultural identity and innovative technology integration, illustrating their mutual influence on user comfort and workspace effectiveness. Field data from Denpasar reinforces that users feel more comfortable and focused in cafés that combine cultural ambiance with comprehensive tech facilities. Users report higher satisfaction, better concentration, and increased loyalty to such environments. Practically, this model is applicable for café owners, interior designers, and coworking space developers in various cities worldwide. Its modular nature allows adaptation to different cultural contexts without compromising global technological standards, contributing to SDG 11 (Sustainable Cities and Communities) and SDG 8 (Decent Work and Economic Growth). Academically, the model bridges disciplines such as interior architecture, cultural studies, and urban informatics, and invites cross-national research collaborations to test its scalability in diverse urban settings.

From a policy standpoint, the model informs municipal strategies aimed at enhancing the quality and inclusivity of public workspaces. Cities aiming to foster human-centric and productive urban ecosystems may benefit from implementing such culturally embedded, tech-enabled design frameworks. Although centered on Denpasar, the proposed model is adaptable across cultures. Design strategies such as emotional zoning, local material wisdom, and invisible technologies provide a global design language rooted in sustainability and cultural sensitivity. In conclusion, this study presents a viable framework for transforming cafés into strategic public workspaces that strike a balance between comfort, technology, and cultural identity. It supports the shift toward mobile, collaborative, and sustainable work environments that enhance both urban livability and creative productivity.

5. Conclusion

This study confirms that achieving sustainable interior design for urban cafés necessitates the strategic integration of local cultural values with innovative technologies to create an environment conducive to productive and adaptable work. Drawing on case studies of cafés in Denpasar, the findings reveal that public spaces, such as cafés, hold significant potential as alternative work environments that cater to the increasing mobility of urban professionals, including digital nomads, freelancers, and students. The contextual design approach is reflected in the use of locally sourced materials, modernized ethnic ornamentation, and spatial layouts that respond to tropical climates through features such as cross-ventilation and natural daylighting. In parallel, adaptive design strategies enable dynamic responses to users' evolving needs through flexible furniture, configurable zones for collaboration and focused work, and robust digital infrastructure, including high-speed Wi-Fi, accessible charging points, and automated lighting systems. Furthermore, user experience emerges as a central axis of design quality. Users' perceptions of key comfort factors such as lighting, furniture ergonomics, spatial layout, acoustic control, and air circulation directly influence their productivity and satisfaction. The subtle integration of technology, such as hidden charging ports and sensor-based systems, ensures both aesthetic harmony and functional performance.

From a global perspective, the proposed model of culturally rooted and tech-enhanced workspace design offers a non-homogeneous yet globally adaptable solution, tailored to diverse urban contexts. This model aligns with the challenges of the digital era and contributes to achieving the Sustainable Development Goals (SDGs), particularly Goals 11 (Sustainable Cities and Communities) and 8 (Decent Work and Economic Growth). In essence, this research concludes that the effectiveness of café interiors as alternative workspaces in urban environments depends on achieving a delicate balance between cultural authenticity and technological efficiency, grounded in a thorough understanding of user needs and expectations. By adopting a sustainable, inclusive, and responsive design approach, urban cafés can be reimagined as collaborative public workspaces that foster comfort, creativity, and productivity in an era of global flexible work.

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References

[1] K. Fast and A. Jansson, “Working in the comfort zone: Understanding coworking spaces as post-digital, post-work and post-tourist territory,” *Digital Geography and Society*, vol. 7, p. 100103, Dec. 2024, doi: 10.1016/j.diggeo.2024.100103.

[2] L. Jessica and T. I. W. Primadani, “Implementation of Eco-Interior Cafe Design in The New-Normal Era in Malang City,” *E3S Web of Conferences*, vol. 388, p. 01023, May 2023, doi: 10.1051/e3sconf/202338801023.

[3] I. G. A. Canny Utami, I. W. Yogik Adnyana Putra, and N. W. Ardiarani Utami, “Designing for Digital Influence: The Impact of Gigi Susu’s Facade on Social Media Branding,” *International Journal of Engineering, Science and Information Technology*, vol. 5, no. 1, pp. 388–394, Jan. 2025, doi: 10.52088/ijesty.v5i1.784.

[4] P. N. Iswaridewi, O. A. Tanadda, and S. B. Astuti, “Identifikasi Faktor Pemilihan Area Indoor dan Outdoor di Concept Café Berdasarkan Kenyamanan Aktivitas Pengunjung,” *Serat Rupa Journal of Design*, vol. 8, no. 1, Jan. 2024, doi: 10.28932/srjd.v8i1.6818.

[5] A. L. Santoso and S. Susan, “Perancangan Kafe, Ruang Kerja, dan Ruang Serbaguna Dengan Pendekatan Indoor Health and Comfort oleh Filostudio,” *KREASI*, vol. 9, no. 2, pp. 1–16, Aug. 2024, doi: 10.37715/kreasi.v9i2.5026.

[6] L. Lendra, J. Jesica, M. Agung Wibowo, J. U. D. Hatmoko, and A. Andi, “Green building assessment tools in Indonesia: A systematic literature review and comparative analysis,” *E3S Web of Conferences*, vol. 605, p. 03023, Jan. 2025, doi: 10.1051/e3sconf/202560503023.

[7] L. Bourikas, S. Gauthier, N. Khor Song En, and P. Xiong, “Effect of Thermal, Acoustic and Air Quality Perception Interactions on the Comfort and Satisfaction of People in Office Buildings,” *Energies (Basel)*, vol. 14, no. 2, p. 333, Jan. 2021, doi: 10.3390/en14020333.

[8] K. Dovey and R. B. Recio, “Inventraset assemblages: The spatial logic of informal street vending, transport and settlement,” *Urban Studies*, vol. 61, no. 12, pp. 2265–2289, Sep. 2024, doi: 10.1177/00420980231223060.

[9] Y. Bai, K. M. Kamarudin, and H. Alli, “A systematic review of research on sitting and working furniture ergonomic from 2012 to 2022: Analysis of assessment approaches,” *Heliyon*, vol. 10, no. 7, p. e28384, Apr. 2024, doi: 10.1016/j.heliyon.2024.e28384.

[10] J. Pan, T. Y. Cho, M. Sun, K. Steemers, and R. Bardhan, “Environmental and spatial dynamics in a flexible workspace for hybrid work: A data-driven design framework,” *Build Environ*, vol. 270, p. 112544, Feb. 2025, doi: 10.1016/j.buildenv.2025.112544.

[11] G. Gopan, “Sensory Inclusivity in Retail Environments: A Design-Oriented Approach,” *J Inter Des*, Apr. 2025, doi: 10.1177/10717641251327928.

[12] Wendhi Agusdi and Heldi Heldi, “Re-Design Interior Cafe ‘Aicon Coffe And Donuts’ Dengan Konsep Modern Minimalis,” *Abstrak : Jurnal Kajian Ilmu seni, Media dan Desain*, vol. 1, no. 4, pp. 102–117, Jul. 2024, doi: 10.62383/abstrak.v1i4.202.

[13] M. Ishtiaq, “Book Review: Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.). Thousand Oaks, CA: Sage,” *English Language Teaching*, vol. 12, p. 40, Apr. 2019, doi: 10.5539/elt.v12n5p40.

[14] D. Byrne, “A worked example of Braun and Clarke’s approach to reflexive thematic analysis,” *Qual Quant*, vol. 56, no. 3, pp. 1391–1412, Jun. 2022, doi: 10.1007/s11135-021-01182-y.

[15] J. Zong, W. S. Wan Mohamed, M. F. Zaky Jaafar, and N. Ujang, “Sustainable development of vernacular architecture: a systematic literature review,” *Journal of Asian Architecture and Building Engineering*, pp. 1–17, Sep. 2024, doi: 10.1080/13467581.2024.2399685.

[16] H. S. Abdulaali, I. M. S. Usman, M. Alawi, and S. Alqawzai, “Research on guest comfort and satisfaction with indoor environmental quality in former GBI-certified green hotels: a case study from Malaysia,” *Front Built Environ*, vol. 11, Feb. 2025, doi: 10.3389/fbuil.2025.1544177.

[17] F. Garzia, S. Verbeke, C. Pozza, and A. Audenaert, "Meeting User Needs through Building Automation and Control Systems: A Review of Impacts and Benefits in Office Environments," *Buildings*, vol. 13, no. 10, p. 2530, Oct. 2023, doi: 10.3390/buildings13102530.
[18] A. Widyaningsih, P. Kusumawardhani, and D. Zerlina, "Coffee Culture and Urban Settings: Locating Third Place in the Digital Era. The Cases of About Life Coffee Brewers in Tokyo and Kopi Tuku in Jakarta," 2021. doi: 10.2991/assehr.k.211126.014.
[19] I. Konstantzos, S. A. Sadeghi, M. Kim, J. Xiong, and A. Tzempelikos, "The effect of lighting environment on task performance in buildings – A review," *Energy Build*, vol. 226, p. 110394, Nov. 2020, doi: 10.1016/j.enbuild.2020.110394.
[20] M. Modaresnezhad and A. Nezamdoost, *Daylight-based Partition Design in Side-lit Open Plan Offices*. 2017.
[21] L. Bellia, U. Błaszczak, F. Diglio, and F. Fragliasso, "Light-environment interactions and integrative lighting design: Connecting visual, non-visual and energy requirements in a case study experiment," *Build Environ*, vol. 253, p. 111323, Apr. 2024, doi: 10.1016/j.buildenv.2024.111323.
[22] M. Forooraghi, E. Miedema, N. Ryd, H. Wallbaum, and M. Babapour Chafi, "Relationship between the design characteristics of activity-based flexible offices and users' perceptions of privacy and social interactions," *Building Research & Information*, vol. 51, no. 5, pp. 588–604, Jul. 2023, doi: 10.1080/09613218.2023.2180343.
[23] I K. Pranajaya and N. M. E. N. Dewi, "Composite Material Engineering Analysis Based on Circular Economy for the Conservation of Interior Ornaments and Traditional Balinese Architecture," *International Journal of Engineering, Science and Information Technology*, vol. 5, no. 3, pp. 146–155, May 2025, doi: 10.52088/ijesty.v5i3.919.
[24] S. F. Anjaeni, F. Hendrawan, and N. M. E. N. Dewi, "What Brings Gen-Z to the Library? An Investigation of Interior Design Elements in Denpasar City's Libraries," *International Journal of Engineering, Science and Information Technology*, vol. 5, no. 3, pp. 92–102, May 2025, doi: 10.52088/ijesty.v5i3.889.
[25] A. Gandini and A. Cossu, "The third wave of coworking: 'Neo-corporate' model versus 'resilient' practice," *European Journal of Cultural Studies*, vol. 24, no. 2, pp. 430–447, Apr. 2021, doi: 10.1177/1367549419886060.
[26] M. Orel, "Coworking environments and digital nomadism: balancing work and leisure whilst on the move," *World Leisure J*, vol. 61, no. 3, pp. 215–227, Jul. 2019, doi: 10.1080/16078055.2019.1639275.