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RESEARCH ARTICLE

Millennial experience through the utilization of feature technology in coffee shop interior design

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ABSTRACT

Advances in information technology have resulted in substantial changes in the way humans interact and communicate, especially within the millennial generation, which is widely identified as a generation that grew up in the digital age. One of the main impacts of the development of information technology is the shift from physical space to cyberspace. Excessive use of information technology can have negative effects, such as reducing face-to-face social interaction and creating feelings of loneliness or alienation. Therefore, it is very important for interior designers to consider the proper integration of information technology features to enhance the user experience in a particular space. This article aims to analyze the influence of feature technology in interior design for millennials, focusing on their behavior and social interactions in public spaces. This analysis is based on literature studies and direct observations of the use of technological features by millennials. The study's findings reveal that millennials express satisfaction with interior design that incorporates technology, building an emotional bond with space, especially in coffee shops. As a result, the use of technological features in interior design significantly impacts millennial preferences when choosing a space. Therefore, it is important to consider the integration of technological features in interior design as a key factor in creating an attractive space in a coffee shop for millennials. Furthermore, the results of this study can be a reference for future research related to millennial generation's preferences in choosing spaces that embrace technology in interior design.

Keywords: coffee shop; features technology; improve experiences; interior design; millennial generation

1. Introduction

Coffee shops are increasingly mushrooming, driven by the millennial generation's penchant for engaging in various activities in these places[1]. The term 'millennial generation' is widely known, derived from 'Millennials' coined by American historians and authors William Strauss and Neil Howe in their book entitled 'Generations'[2]. Spatial experience for millennials is inextricably linked to their attachment to a place within

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a coffee shop, which includes the emotional and psychological bonds they form with that space. For millennials, space isn't just a physical environment; It also encapsulates the values that significantly influence their perceptions and experiences. The millennial generation's attachment to space fosters a strong sense of connection, transforming space into more than just a physical location. It becomes a place that provides identity, comfort, and emotional satisfaction. In this context, the experience of space becomes deeply personal and profound, reflecting the intricate relationship between millennials and their environment.

Changes in lifestyle, technology use, social interaction, and urban environment significantly affect millennials' perception of space[3]. The millennial generation shows certain characteristics. They tend towards fast-paced dynamic lifestyles, rapid job changes, creativity, technological familiarity, and active engagement on social media[4]. With strong digital connections, millennials have shorter attention spans, and their communication styles and lifestyles are different from previous generations. Especially in urban environments, smartphones play an important role for millennials, serving as a primary necessity rather than a luxury item or status symbol. The increasingly busy and individualistic nature of their lifestyles means millennials have less free time, making them spend more time indoors.

In a variety of situations, the appearance and interior arrangement of a space can indicate the extent to which technology has become an integral part of everyday life. For example, the presence of electronic devices such as screens, computers, or automation systems offers insight into the degree of influence of technology on its occupants. Analyzing the interior of a space can help identify the technology used, the extent of its integration into interior design, and how it impacts the interactions and activities of millennials in the space[5]. The adoption of increasingly sophisticated technology has made millennials increasingly dependent on technology, thus reducing their interest in interacting directly in public spaces[6]. They are more likely to use online social media platforms to interact with friends and search for information than to spend time in physical space. Modern technologies such as social media, video games, and mobile apps can be addictive and challenging to avoid. Adam Alter shows how the tech industry intentionally designs products to grab our attention and keep us engaged[7]. The millennial generation often faces challenges related to technological features in interior design in the era of digital technology advancement. While millennials often have high expectations for technological features in a space, many fail to meet these expectations. Millennials often find themselves stuck in a daily routine filled with gadget use, indoor work, and virtual connections, leading to disconnection from physical space[8].

It is important to understand the impact of integrating technological features in interior design on the millennial experience in coffee shops. This understanding arises from the recognition that millennials are highly skilled users of technology who thrive in the digital age, integrating technology into all aspects of their lives. In coffee shops, which millennials perceive as places to work, study, and socialize[9], understanding how technology features in interior design can enhance their experience becomes crucial. These factors include the use of technology to support daily activities, create a creative atmosphere, and ensure accessibility to technology facilities. Therefore, the aim of the study was to investigate the depth of millennials' attachment to space and how the integration of technological features in coffee shop interior design might affect their perceptions and interactions, in the hope of creating an environment that effectively meets their needs. By comprehending the interaction between millennials and technological features in interior design, it is hoped that the results of this study can make a significant contribution to enhancing coffee shop design. This improvement aims to better align with the expectations and needs of the target visitor segment, namely the millennial generation, thereby increasing the attractiveness and quality of their experience in the environment where they spend their time.

2. Literature review

2.1. The character of the millennial generation in utilizing space

Millennials, born between 1981 and the 2000s and descending from the baby boomer and generation X cohorts, as defined by Strauss & Howe exhibit traits of a dynamic lifestyle marked by swift activities[10]. Recognized for their adeptness with technology, the millennial generation is commonly labeled the "gadget generation" due to their significant dependence on diverse electronic devices, integral elements in the contemporary information technology scene.

Almost all millennials now state that they use the internet, with 19% of them being dedicated smartphone internet users, meaning they own a smartphone but do not have broadband internet service at home[11]. The lifestyle of the millennial generation is becoming very clear as the physical environment and face-to-face interactions are increasingly being replaced by virtual worlds, especially due to the development of the Internet of Things (IoT)[12]. As a result, much of the millennial generation's activity in physical space is being replaced by virtual space, as illustrated in the initial comparison between reality space and virtual space in **Figure 1** below:

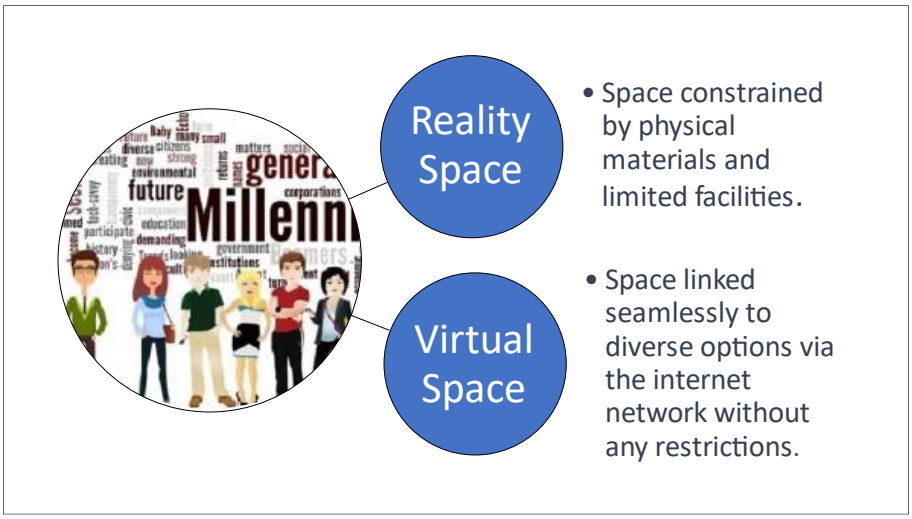

Figure 1. Reality space vs virtual space.

The millennial generation is characterized by a significant dependence on information technology. Key features of this dependency include high proficiency and skill in using digital devices, internet connections, and technology-based applications. This generation is growing and developing in an era where information technology plays a key role in everyday life[11]. They tend to rely on mobile devices, laptops, and other gadgets for communication, work, study, and access to information and entertainment. Reliance on social media is also an important aspect, influencing the way they interact and share experiences in the public space. In addition, millennials often seek new technological innovations and stay abreast of the latest developments, creating a culture that is highly connected to the digital and information world[13].

Millennials, who are used to incorporating technology into different aspects of their lives, have different preferences when it comes to utilizing space. They are looking for an environment that offers technology to facilitate their activities. Examples of technology-based spaces favored by the millennial generation include co-working spaces, smart parks, digital museums, object libraries, smart retail establishments, innovation hubs, online community spaces, and coffee shops equipped with technology facilities[14]. These spaces are specifically designed to support the modern, efficient, and digitally connected lifestyle that characterizes

millennials. In this context, technology is not only a tool but also an essential element in creating experiences that are relevant and meet the diverse needs of this generation in different types of public spaces. Equipped with various internet-based technology devices, especially smartphones with various applications, millennials are engaged in daily activities that are closely related to online shopping, social media interaction, and participation in various aspects of life. These substantial changes underscore significant changes in their communication, shopping habits, and daily activities, all of which manifest in the lifestyle patterns embraced by millennials[15].

As a generation that has grown up and lives in a technology-centric era, millennials are highly accustomed to incorporating technological features into their daily lives[16]. Consequently, they actively seek interior designs with technological features that enhance convenience and comfort. Having matured in an environment dominated by technology, millennials often expect technological integration in the interior design of public spaces. Their preferences lean towards open and flexible spaces that foster interaction and connection with others[17]. Additionally, they prioritize designs that prioritize comfort, incorporating environmentally friendly and health-conscious materials. Safety and cleanliness are significant considerations in the interior design of public spaces used by millennials. They prefer well-maintained and hygienic environments, often researching the safety and health policies implemented at a given location[18]. Millennials actively seek authentic and unique experiences, often prioritizing value and meaning in their purchases or consumption within public spaces[19], such as restaurants with distinctive themes or coffee shops with captivating interior designs. Their preference extends to public spaces that offer openness and flexibility, abundant seating, and fast, reliable internet access[20]. Accustomed to utilizing technological features, millennials look for public spaces that provide technology to facilitate their activities[21]. Cafes offering fast internet connections, power outlets, and a comfortable environment for working with laptops or mobile devices are particularly popular among millennials. Some cafes go a step further by providing additional technological features such as desks with wireless charging or dedicated spaces for meetings or presentations[22].

2.2. Features of technology in interior design

The development of information technology has influenced the incorporation of technological features in the interior design of public spaces. Technology is developed and utilized as a resource to enhance satisfaction in daily life[23]. The integration of information technology into various interior designs depends on the specific purpose and requirements of the respective space.

The integration of technology into interior design elements creates an enticing environment that aligns with millennials' preferences for public space. The utilization of technological devices, such as smart light sensors, intelligent audio systems, and digitally connected smart furniture, allows dynamic adjustments to the ambiance of a room. Smart and innovative technology features, such as customizable LED lighting, multimedia projection systems, the Internet of Things (IoT) connecting all aspects of the room, provide a more immersive and engaged experience within the public space[24].

Technology features can adjust or simplify the lighting system in a room according to the needs of activities and aesthetic appearance. Lighting should fulfill its basic function, providing enough light for indoor activities such as reading, eating, or working. The intensity of lighting should be adjusted to the specific indoor activity[25]. A room intended for reading or work requires higher intensity lighting than a room intended for relaxation or watching TV. The selection of light colors in interior design can affect the atmosphere of the room. Yellow or red light creates a warm and intimate atmosphere, while blue or white light gives a brighter and cooler impression. Interior design typically involves three main types of lighting: general lighting, task lighting, and accent lighting. In addition, the direction of lighting is very important in interior design, because

lighting from above gives different shades of lighting from the side or bottom. Light effects can be used strategically to create a certain atmosphere in a room, such as shadows or dramatic silhouettes, or to draw attention to specific objects or areas[25].

The air circulation feature in the interior design aims to control indoor air quality, ensure adequate oxygen supply, and reduce excess humidity. Indoor air can come from two main sources: natural sources such as windows and ventilation, and artificial sources such as air conditioning systems or fans. Ventilation is a system that circulates fresh air into a room and removes dirty air and pollutants (harmful substances) from the room. Ventilation can be natural air such as through a window, or artificial ventilation such as an exhaust fan. The AC system can also function as an air circulation system in the room. Air conditioning systems can help regulate room temperature and humidity so that indoor air is always fresh and healthy[26]. The use of the Internet of Things (IoT) in space design can help create smart spaces that are connected with technologies, such as smart lighting systems, room temperature regulation, and other electronic device controls, all of which can help create a comfortable and efficient atmosphere[27].

The integration of acoustic feature technology in interior design has an important role in achieving optimal sound quality in the room[28]. Sound and acoustics are important aspects in interior design because they can affect the overall sound quality of the room[29]. Sound-absorbing materials such as carpets, acoustic panels, or other sound-absorbing materials help absorb sound so that it does not sound too loud or resonate[30]. Reflective surfaces such as walls, floors, or ceilings can cause echoes or sounds that are too loud. To reduce this effect, it is feasible to consider the use of non-reflective surfaces such as acoustic panels or carpets. Sound insulation, which separates sound between rooms, can be achieved through soundproof partitions or walls. State-of-the-art speaker technology and sound systems, strategically placed in the room, can create optimal sound quality. Active noise control technology aims to eliminate noise by using microphones to pick up sound and produce counter-phase sound to reduce noise. The use of acoustic feature technology in interior design contributes to the achievement of optimal sound quality indoors[28].

The use of technology can be combined with the arrangement of furniture to enhance the user experience. Charging stations have technology that can be applied to furniture arrangements that allow users to charge electronic devices such as smart phones, tablets, or laptops[21]. This feature can be integrated into tables, chairs, or shelves to provide convenience and comfort for its users. Lighting that can be adjusted to the needs of users can increase comfort and productivity in the room. Customized lamps integrated into tables or shelves can provide optimal lighting for a specific area. The smart home integration feature allows users to control electronic devices in the home through mobile devices or voice assistants. Furniture such as chairs, tables, or shelves can be equipped with smart home integration technology to improve user comfort and efficiency. Wireless connectivity capabilities allow users to connect with other devices wirelessly[31]. Furniture such as tables, chairs, or shelves can be equipped with wireless connectivity capabilities such as Wi-Fi, Bluetooth, or NFC to increase user comfort and efficiency. Sensor technology can be used to detect the user's movement or position and provide a more personalized and ergonomic experience. Furniture such as chairs or tables can be equipped with sensor technology to optimize the user's position and provide optimal support for the user's body. The use of augmented reality can provide a more interactive user experience with furniture[32].

Accessibility in interior design is an important aspect to consider ensuring a space that is easily accessible and usable by everyone, including those with special needs. The use of accessibility technology can expand and facilitate access for users. For example, smart home technology can assist individuals with limited mobility in controlling their indoor environment through voice commands, ensuring convenience for users who have difficulty reaching electrical switches or buttons[31]. Modern elevators with large features and audio-visual signals provide significant assistance for those with limited mobility[33]. GPS systems can guide individuals

with visual impairments in navigating rooms and finding the shortest accessibility routes[34]. The use of wireless feature technology allows practical control of the home environment through mobile devices, including the management of security systems such as alarms and cameras[35]. Alternative communication technologies, such as text services and language translators, support easier communication for individuals with disabilities. The integration of these technological features in interior design helps create a more inclusive and accessible environment.

Technology features can help improve the aesthetics of space in interior design can create a more attractive and beautiful atmosphere. Some technological features that can be applied to interior design to improve the aesthetics of space include: LED lighting systems are features that can help create different atmospheres and strengthen design elements such as color[36], textures, and patterns so as to improve the aesthetics of the room. Projection System as one of the superior technologies that displays digital art with images, drawings, and 3D imagery to be projected on walls or ceilings, thus creating beautiful and creative works of art[37]. Augmented reality (AR) technology can be used to provide a real-time view of the desired space design, so users can see firsthand how the design looks in an actual room. Virtual Reality (VR) technology can aid in the process of designing spaces, allowing users to create accurate 3D models and view them in virtual reality, aiding in design decision making and providing a more interactive experience. Millennials grew up with easy access to technology and have high expectations for exciting and innovative experiences. Combining feature technology with biophilic design in public spaces can create and enhance millennials' interaction and participation in organizing and controlling aspects related to color, light, and materials, which provides a sense of ownership and involvement in creating the environment they love[38]. Digitally connected millennials are accustomed to the use of technology Integrating technological features into biophilic design allows millennials to stay connected to the digital world they know while enjoying the presence of nature around them. This can meet their need for digital connectedness that is important to their lifestyle[8].

Technological features play an important role in providing safety protection through fire extinguishing systems. Fire extinguishing technologies, such as smoke detectors and sprinkler systems, can effectively prevent fires and provide better protection for rooms[39]. Technology features that contribute to indoor health, such as smart ventilation technology systems, help regulate indoor air circulation, prevent poor air quality, and reduce the spread of viruses or bacteria[40]. Temperature monitoring technology helps in monitoring the temperature in the room, preventing the occurrence of unsafe and dangerous temperatures[41]. Social distancing technology, including proximity meters and motion sensors, plays an important role in ensuring social distancing indoors. They help limit the number of people entering the room, thereby preventing the spread of viruses or bacteria[42]. Technological security features, such as smart security systems that include CCTV camera systems, motion sensors, and smart door locking systems that can be controlled remotely, can significantly improve room security[43]. Alarm systems, as part of security technology, provide timely warnings in case of dangerous events such as fires or riots. Online security systems, as another aspect of security technology, contribute to online monitoring and control of room security. They allow granting access to authorized users, as well as tracking and logging activities that occur indoors[44].

3. Methods

This research details exploratory efforts utilizing in-depth observations and interviews to understand the views and utilization of feature technology by millennials in the context of coffee shop interior design. The research steps involved investigating millennials' preferences for space in coffee shops, focusing on interior design elements that could influence their experience. Furthermore, a literature review is conducted to gain a thorough understanding of the latest trends and developments in coffee shop interior design involving feature

technology. In addition, this study aims to identify relevant previous research, especially related to millennial user experience in the context of interior design and the use of its feature technology. Therefore, the study summarizes a series of systematic steps taken to explore key aspects in the relationship between millennials, feature technology, and coffee shop interior design.

Participants in this study were millennial individuals, both men and women, who were visitors to coffee shops. They had a birth range from 1982 to 2004, focusing on the age group between their 20s and early 30s. Participants came from a variety of backgrounds, including students, employees, and entrepreneurs who lived in urban environments and used the physical facilities of coffee shops both on weekdays and weekends, often spending more than 2 hours in coffee shops for various activities. In terms of residential location, around 55% of millennials live in urban areas. This trend is expected to continue to increase in 2023, where millennials in the 20–40 age range are expected to dominate a large portion of the urban population, becoming a highly productive age group. These changes reflect a general pattern in Indonesia, where the population tends to migrate from rural to urban. This transformation also has a significant impact on culture, social values, behavior, and mindset, creating a more open and multicultural urban society[45].

The selection of Starbucks at Grand Indonesia Mall, Central Jakarta, as the object of research was carried out because it was able to reflect special criteria as a favorite coffee shop of the millennial generation. This coffee shop is recognized as the first coffee shop with a modern concept and has a number of outlets spread throughout Indonesia[46]. This decision is based on references and observations from various online media, supported by unstructured interviews that explore the background of millennial preferences when choosing coffee shops, especially those that are in high demand for various activities.

In this methodology, emphasis is placed on the activities and behaviors of millennials related to their attachment to a place, especially coffee shops. The focus is to evaluate the relationship between space and individuals from the millennial generation who use this place as a space of various activities. This approach focuses on the formation of a place rather than focusing solely on its physical dimensions. The use of the term "setting" in this methodology highlights elements of human activity, including actors (participants), place (physical setting), type of behavior (activity), and time (duration of activity). This approach helps understand how millennials engage in activities and interact with their environment, especially in coffee shops.

Data obtained from observations and interviews show that feature factors play a very important role in shaping an individual's attachment to a coffee shop. This survey is designed to collect millennial views and preferences regarding coffee shop interior design that utilizes technological features, and interviews with coffee shop managers and millennial visitors were conducted to gain a deeper understanding. Common technologies applied in coffee shop interior design, such as interactive projection, smart lighting systems, or coffeehouse-related applications, were the focus in the study. Data analysis from case studies is used to illustrate real experiences and some other potential technological features in interior design that appeal to millennials.

These findings will be ascertained through an in-depth examination of the way various technological features are used in interior design. In addition, an explanation of how the use of this technology affects millennials' interaction and experience with the atmosphere in the coffee shop, which will be described through a concept.

4. Results and discussion

In applying the method of physical organization in coffee shops, six factors of place attachment were identified that provide deep insight into how millennials experience emotional attachment to a place. Natural

Factors emphasizes that millennials feel attached to places that have natural effects or natural elements, building emotional bonds through the presence of natural elements in space. The Odorscape factor addressing a particular odor or Odorscape in a coffee shop affects millennials' attachment to the place, with the identification of certain scents considered positive. Feature Factor discusses how technology features and facilities in coffee rooms support millennial generation activities by using gadgets, showing the effectiveness of technology in creating attachments. Personal factors include millennials' attachment to places that provide private areas in public spaces, with identification of the elements that make up private spaces. The Narcissistic Factor highlights that online popularity, and the best reviews influence millennials' emotional attachment to the place, focusing on viral reputation. Finally, Comfortability Factor explains that a comfortable, home-like atmosphere creates an emotional bond for millennials with the place, by identifying the elements that make up the comfort and atmosphere of home in a coffee shop. This approach has proven effective in providing rich, in-depth detail about how each place's attachment factors play an important role in shaping the relationship between millennials and the place, while still being efficient in conveying a comprehensive overall picture.

The results of the analysis of interviews with millennials about the attachment factors of public space in coffee shops paint an informative and detailed picture. Natural Factor with a percentage of 57.25% shows that the presence of natural elements in the coffee shop space forms an emotional attachment for the millennial generation. The Odorscape factor, at 57.3%, underscores the importance of a particular scent or Odorscape in creating an engaging experience and building a bond with visitors. The Feature factor achieved the highest engagement rate of 100%, indicating that technology features and facilities in the coffee shop optimally support the activities of the millennial generation using gadgets. The private factor, at 81.6%, suggests that having a private area in a coffee shop's public space provides a significant sense of attachment. The narcissistic factor, scoring 60.75%, suggests that online reputation and positive reviews also influence millennials' attachment to the venue. Meanwhile, the Comfortability factor reached a percentage of 85.6%, confirming that the cozy and grounded atmosphere in the coffee shop contributed significantly to the millennial generation's attachment to the place. This analysis provides an in-depth understanding of the role each factor plays in shaping millennial engagement in the coffee shop's public spaces.

The bar chart in **Figure 2** illustrates that feature factors have the highest level of place attachment for millennials, as observed in the coffee shop case study. Millennials, who are generally involved with tech features, typically look for spaces that offer technological convenience to support their activities and enhance their overall experience at the coffee shop.

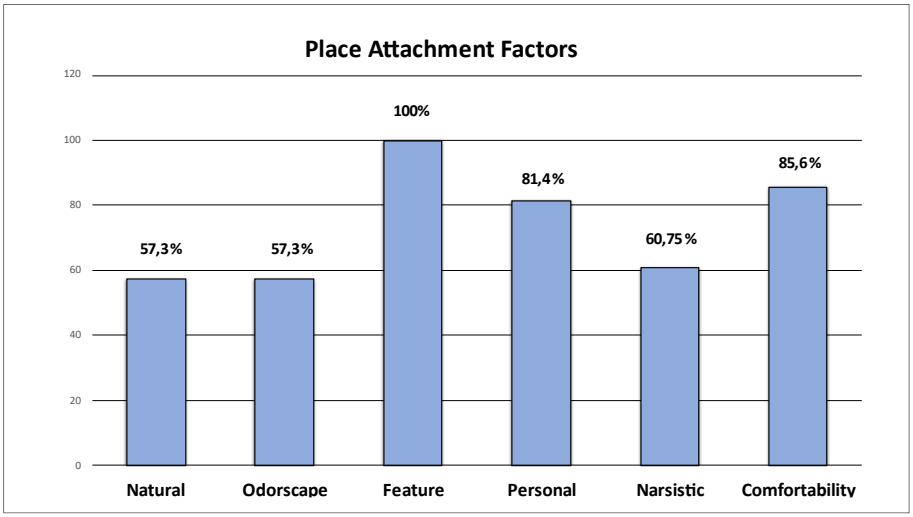

Figure 2. Place attachment factors level.

The results of direct observations and in-depth interviews with millennials who can take advantage of public space information technology features, especially in coffee shops, which can provide valuable insights to improve user experience. Several aspects need to be considered in this context. First, it is important to pay attention to room arrangements that facilitate the use of technology by providing power plugs around the table, USB socket placement, or table arrangement with a design that supports the use of laptops. In addition, the technological devices and systems applied in interior design are preferably designed with good compatibility and integration, to ensure easy and smooth use. Technological equipment, such as power outlets, chargers, or Wi-Fi connections, should be well available, easily accessible, and ensure the internet connection at the coffee shop is stable and has adequate speed. Good connection quality is very important to support the use of technological devices by millennials. Understanding the needs of users regarding their electronic devices can improve the comfort and functionality of the coffee shop interior. Second, given that coffee shops target millennials who tend to work or study in public spaces, in particular, it's important to consider workspace designs that support collaboration. This can include desks with adequate power sockets and facilities for presentations or group discussions. Third, it is important to provide a separable area between those who want to work or study and those who come to socialize. This can include quieter work areas and more crowded recreation areas, although some millennials may feel comfortable working in crowded environments.

Figure 3. Various applications relying on internet connections.

The millennial generation routinely utilizes various applications that rely on internet connections when in a coffee shop environment, as clearly illustrated in the illustration in **Figure 3**. In this context, the use of applications includes various activities, ranging from communicating through social media, carrying out work or online studies, to enjoying digital entertainment. This reflects how millennials are integrating technology

and internet connectivity into their experience at coffee shops, demonstrating a significant reliance on the internet facilities available at the venue.

Based on in-depth observations and interviews with millennials, it can be concluded that they are highly skilled users of technology in everyday life. These results reveal that millennials, who grew up and live in the digital age, are heavily influenced by the role of technology in their routines. Therefore, the findings from this interview highlight millennials' strong tendency towards technological features in interior design, as they expect benefits such as comfort and convenience in various aspects of their lives. Millennials tend to look for effective technology solutions to save time and increase efficiency in living their daily lives. One of the main approaches they chose to achieve this goal was to use an intelligent control system integrated with their mobile devices. Using mobile devices, they can manage various aspects of their surroundings, including setting up lighting systems, controlling room temperature, and monitoring security systems. Through the integration of these technologies, millennials can live their daily lives more easily, practically, and efficiently, helping them optimize the use of time and ensure comfort and safety in their environment.

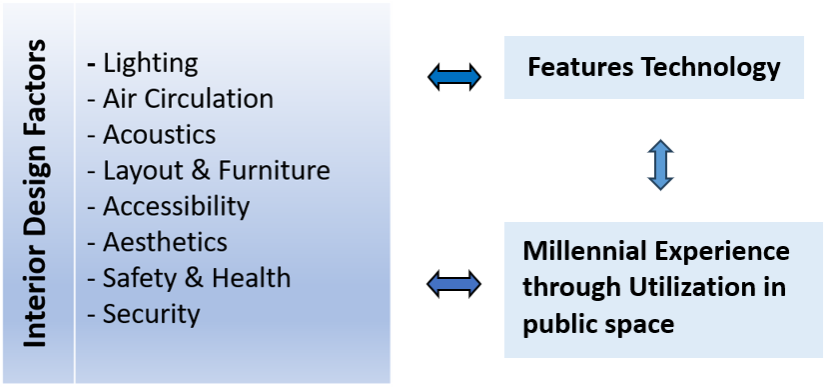

Figure 4. Relationship between feature technology, interior design factors, and the millennial generation.

4.1. Lighting

The millennial generation's preference for technological features is reflected in the use of smart lighting systems that are automatically adjusted to the time of day, weather, or activity within the coffee shop, ensuring the appropriate atmosphere. The color-changing LED lights dynamically create a colorful atmosphere according to the mood or theme, according to the tastes of millennials who value creative visual experiences. Lighting systems that interact with visitors, such as lights that respond to music or are controlled via mobile devices, provide an interactive experience that fits the millennial generation's tendency to prioritize engagement in the surrounding environment. Lighting zoning in coffee shops, such as work, relax, or socializing zones, provides ambiance options according to visitor activities, reflecting millennials' desire for flexibility in the atmosphere of their place. Work areas equipped with sufficient lighting to support work or study activities create a comfortable and productive environment, in accordance with the multitasking lifestyle generally adopted by the millennial generation. The integration of natural light sensors that regulate the intensity of lighting based on available natural light creates a natural atmosphere, especially during the day, providing an ecological touch that is in line with the environmental awareness that millennials often have.

4.2. Air conditioner

Millennials show a high preference for features related to air conditioning (AC) systems or air circulation in coffee shops, which play an important role in creating a comfortable environment for them. The use of smart air conditioners that automatically adjust room temperature and visitor attendance levels, without the need for

manual intervention, is in accordance with the practical and efficient lifestyle generally adopted by the millennial generation. Individual temperature control in multiple areas or tables gives visitors the flexibility to set the temperature according to personal preferences, meeting millennials' desire for a customized experience. The integration of sensors to monitor air quality and improve air circulation demonstrates the coffee shop's commitment to environmental health and hygiene, values valued by millennials. The choice of eco-friendly air conditioners and ventilation systems specific to specific areas reflects a concern for sustainability, in line with millennials' interest in environmentally responsible business practices. By utilizing air conditioners equipped with high air filters and real-time air quality monitoring systems, coffee shops can provide a positive experience in line with millennial expectations, ensuring fresh air and comfortable temperatures throughout the room.

4.3. Acoustics

The millennial generation's preference for technological features is clearly reflected in the features implemented in acoustic systems in coffee shops, which can significantly improve the visitor experience. Smart audio systems provide the ability to organize music by time or atmosphere, in line with the wishes of millennials who value personalized audiovisual experiences. The noise-cancelling feature adds comfort to those working or relaxing in the coffee shop, creating a focused and comfortable environment in line with millennials' multitasking preferences. The selection of software that supports zoning allows visitors to choose an atmosphere that suits their mood or activity. Sensors that monitor noise levels and regulate room acoustics automatically provide greater flexibility in creating an appropriate environment. Interior design and materials that support good acoustics further highlight the role of technology-features in creating a comfortable space and in accordance with the preferences of the millennial generation. The existence of small spaces with technology features for video calls or conferences adds a work and social dimension for millennials who often work flexibly. The customizable selection of music selections and live-streamed events demonstrate the coffee shop's efforts to remain relevant and engaging to millennials who value variety and uniqueness in their experiences. By applying this technology, the coffee shop managed to create an environment that is not only comfortable but also attractive to millennial visitors, resulting in a satisfying and memorable experience at the venue.

4.4. Layout and furniture

The millennial generation's tendency towards technological features is particularly evident in the integration of technological features into coffee shop furniture layouts and systems, encouraging flexible and convenient experiences. Smart furniture equipped with sensors enables automatic configuration, enabling the arrangement of versatile layouts tailored to specific needs or types of events, offering the flexibility millennials are looking for who value personalized experiences. Augmented reality applications that allow customers to select their seats through 3D viewing on their smart devices introduce interactivity and enhance seating comfort. Real-time seat availability monitoring, app-based reservations, and smart desk functions such as wireless charging or interactive touchscreens contribute to increased productivity and spatial comfort. The adoption of modular furniture that can be easily reconfigured as needed forms a dynamic environment capable of accommodating diverse activities preferred by millennials. Through the incorporation of these technologies, coffee shops not only increase their appeal but also provide a better experience that aligns with millennials' preferences, meeting their expectations of innovation and convenience in every visit.

4.5. Accessibility

Millennials show a strong preference for accessibility technology features in coffee shop interior design, with the goal of creating a welcoming and inclusive environment. The priority of online connectivity makes

the availability of fast and secure Wi-Fi crucial to ensure a smooth experience in utilizing online accessibility applications or devices. Features such as desks equipped with wireless charging or USB ports are greatly appreciated, providing convenience for millennials who rely heavily on their online devices. Smart desks with touch screens improve accessibility, allowing millennials to interactively read menus, place orders, and pay bills. The coffee shop's mobile app, designed with accessibility features such as screen readers, high contrast, and resizable text options, ensures user-friendly accessibility for all. An auto-height desk meets the needs of wheelchair users or individuals of varying heights, while automatic sensor doors make it easy to get in and out for those using mobility devices. The integration of these features not only contributes to a more inclusive coffee shop, but also provides a pleasant and easy experience for millennials as coffee shop customers, according to their technology preferences.

4.6. Aesthetic

Technological features in the aesthetics of coffee shops create an engaging experience for millennials as visitors. By creating aesthetically pleasing corners and interior décor, coffee shops can encourage visitors to share their experiences on social media, creating a domino effect and increasing online presence among millennials. The use of digital walls that can display changing content, such as digital artwork or dynamic visual displays, gives a futuristic and contemporary feel. The selection of furniture and interior design in accordance with the latest trends adds to the impression of modern and contemporary, while smart tables or ergonomic chairs with attractive designs can be an additional attraction. Digital projection technology creates dynamic wall art, while interactive wall art that responds to visitor movements adds interactive and modern aspects. Augmented Reality (AR) apps provide an additional element by allowing users to see additional information about their coffee or order through the phone's camera, giving a new dimension to their experience. The application of this technology in coffee shops not only pampers the taste buds of visitors, but also creates an attractive visual and atmospheric experience for millennials as users or visitors.

4.7. Safety and health

Safety and health systems in coffee shop interior design are increasingly emphasized, especially in the pandemic era and when targeting millennials as users or visitors. The selection of surface materials that are easy to clean and resistant to disinfectants, such as countertops with antibacterial surfaces or floors that are easy to clean, can contribute greatly to cleanliness. The application of access control technology, including automatic doors or the use of smart cards, helps in managing and restricting access to certain spaces. Thermal systems to monitor the body temperatures of visitors and staff can identify potential illnesses, ensure individuals with fever are prevented from entering interior areas, and help regulate the number of people inside. Sensors to monitor room capacity and ensure physical distancing, as well as automatic notifications through applications or indicator lights, can support the enforcement of health protocols. Consideration may be given to non-smoking areas or the presence of special spaces for smokers. Built-in air quality sensors can monitor pollution levels and air cleanliness, triggering management actions such as improved ventilation. Easily reconfigurable modular tables and chairs guarantee physical distancing without sacrificing interior design. Mobile apps for contactless ordering and payments contribute to reduced physical contact, creating a safer and more convenient experience. The integration of this technology into the interior design of coffee shops not only answers the needs of safety and health but also forms an environment that is futuristic, innovative, and in accordance with the preferences of the millennial generation as users or visitors.

4.8. Security

The security system in coffee shop interior design plays a crucial role in providing a sense of security and comfort to the millennial generation as users or visitors. The use of advanced CCTV systems with high image

quality and optimal recording capabilities enables monitoring of public areas and provides clear footage in security situations or incidents. Wi-Fi networks in coffee shops use strong encryption protocols to protect customer data and financial information from potential cyber threats; Thus, good Wi-Fi security can also maintain the confidentiality of users' personal information. The installation of a security alarm system connected to a security service provider can provide an extra layer of protection, and the use of door and window sensors, motion detectors, and leak sensors can be used to enhance these systems. By incorporating these safety features, coffee shops can create an environment that instills a better sense of safety for millennials and other diners, while building a comfortable atmosphere for relaxation and work, aligned with millennials' safety preferences.

5. Conclusion

Millennials have integrated technology into their lifestyles with more significant impact than previous generations. Some technological features have become very commonly used by this generation, where the speed and stability of internet access are basic needs in carrying out various aspects of daily life. A reliable internet connection is essential for activities such as work, study, and social interaction online. Therefore, Wi-Fi access facilities that provide fast and stable connections are one of the features that are highly appreciated by the millennial generation, with adequate internet access quality being a key factor in meeting their needs in various situations.

Millennials appreciate the features of technology in interior design because it provides benefits to their lives and increases comfort levels. Features such as fast and stable internet connection, intelligent control systems, portable electronic devices, sound, and multimedia systems, as well as smart lighting systems are considered in-demand options in interior design for millennials. When designing the interior design of public spaces with technological features, it is important to consider the availability of already existing infrastructure. For example, if a public space wants to provide wireless internet access, it is necessary to ensure that there is an adequate and stable internet network around it so that users can access it smoothly. Interior designers must also consider the use of information technology features that suit user needs and the availability of surrounding infrastructure, while still paying attention to aspects of user security and privacy. By considering all these aspects, interior design of public spaces that utilize information technology can provide a positive user experience, while reducing negative impacts such as disruption of social interaction or data security risks.

The application of technological features in the interior design of public spaces has a significant influence on the millennial generation's experience. Therefore, technological features have an important role in improving the aesthetic aspects of space in interior design. The use of technology needs to be directed according to the needs and goals of interior design, while still paying attention to aspects of social interaction as an important element in utilizing space and creating positive experiences for millennials.

The chart in **Figure 4** explains that by identifying elements of interior design that involve the use of technology-features, it can provide an understanding of how millennials see and use technology in space interior design. The potential influence of these technologies on the millennial generation's experience of using space is a major highlight. The findings from this study have significant value in providing valuable input to interior designers. The information found in this study can be used to develop technology-features in interior design that better suit the needs and preferences of millennials, thus creating a more satisfying and relevant experience for them in utilizing space in coffee shops.

They have high expectations of features in public spaces, particularly in coffee shops. Their hope is that interior design that adopts technological features will help simplify various aspects of life, including work, study, socializing, and entertainment. Millennials want experiences that integrate with technology to make life

more efficient, practical, and enjoyable. In other words, the interview results confirm that millennials tend to prefer interior design of coffee shop public spaces that utilize technological features to meet their needs and preferences, allowing them to live their daily lives more smoothly, comfortably, and efficiently. This reflects how technology features are becoming an important element in creating a better experience for millennials in utilizing space. Technology not only improves visual comfort, but also creates a unique atmosphere that suits the wants and needs of its residents. Thus, integrating technology into interior design not only enhances the practical function of a space, but also creates an artistic appeal and unforgettable experience for millennials, who increasingly value innovation and interactivity in their environment.

The study concluded that technological features in interior design influence millennials' preferences in choosing space to meet the needs of their activities. Spaces that offer technology features can provide a more modern, interactive, and efficient experience for millennials who are already familiar with technology. Thus, it can be a more interesting place and provide experience and facilitate their activities. Therefore, interior designers need to consider the use of technological features in interior design as an important factor in creating an attractive space for millennials. In addition, the results of this study can also be a reference for the development of further research on the preferences of the millennial generation in choosing spaces with technological features in interior design.

Author contributions

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Conflict of interest

The authors declare no conflict of interest.

References

1. Grind PD. Exploring millennial trends in specialty coffee. Available online: https://perfectdailygrind. com/2020/02 …, 2020 (accessed on 11 November 2023).
2. Strauss W, Howe N. Generations: The history of America's future, 1584 to 2069. Quill New York; 1991.
3. McDonald NC. Are Millennials Really the "Go-Nowhere" Generation? Journal of the American Planning Association. 2015, 81(2): 90-103. doi: 10.1080/01944363.2015.1057196
4. Sebastian Y, Amran D. Generasi langgas: millennials Indonesia. GagasMedia; 2016.
5. Au-Yong-Oliveira M, Gonçalves R, Martins J, et al. The social impact of technology on millennials and consequences for higher education and leadership. Telematics and Informatics. 2018, 35(4): 954-963. doi: 10.1016/j.tele.2017.10.007
6. Haeger DL, Lingham T. A trend toward Work–Life Fusion: A multi-generational shift in technology use at work. Technological Forecasting and Social Change. 2014, 89: 316-325. doi: 10.1016/j.techfore.2014.08.009
7. Alter A. Irresistible: The rise of addictive technology and the business of keeping us hooked. Penguin; 2017.
8. Kellert SR, Heerwagen J, Mador M. Biophilic design: the theory, science and practice of bringing buildings to life. John Wiley & Sons; 2011.
9. Rikleen L. Millennials and technology in today's workplace. PD Quartlerly; 2014.
10. Strauss W, Howe N. Millennials rising: The next great generation. Vintage Books New York; 2000.
11. Vogels EA. Millennials stand out for their technology use, but older generations also embrace digital life. 2019.
12. Sulistyawati D, Santosa I. The Effect of Cyberculture Development on Visual Space for Generation of Millennials in Indonesia. Proceedings of the 1st International Conference on Intermedia Arts and Creative Technology; 2019. doi: 10.5220/0009192401720175
13. Mohd NS, Ismail HN, Isa N, et al. Millennial tourist emotional experience in technological engagement at destination. International Journal of Built Environment and Sustainability. 2019, 6(1-2): 129-135. doi: 10.11113/ijbes.v6.n1-2.396
14. Berger R. Millennials: The Generation Reshaping Travel and Shopping Habits. Parigi Glob. Blue; 2018.

15. Sulistyawati D, Santosa I, Wahyudi D. The Social Interaction of Millennials in Real Space Due To the Development of Information Technology. Proceedings of the Proceedings of the 1st Conference of Visual Art, Design, and Social Humanities by Faculty of Art and Design, CONVASH 2019; 2 November 2019; Surakarta, Central Java, Indonesia. doi: 10.4108/eai.2-11-2019.2294919
16. Jain A, Dutta D. Millennials and Gamification: Guerilla Tactics for Making Learning Fun. South Asian Journal of Human Resources Management. 2018, 6(1): 29-44. doi: 10.1177/2322093718796303
17. Hershatter A, Epstein M. Millennials and the World of Work: An Organization and Management Perspective. Journal of Business and Psychology. 2010, 25(2): 211-223. doi: 10.1007/s10869-010-9160-y
18. Eyles J, Williams A. Sense of place, health and quality of life. Ashgate Publishing Ltd., 2008.
19. Utomo WP, Noormega R. Indonesian Millenial Report 2020: Understanding Millennials' Behaviours and Demystifying Their Stereotypes. Research, IND Research Institute & Neilsen, Jakarta: IDN Media. 2020.
20. Gross TS. Millennial rules: How to connect with the first digitally savvy generation of consumers and employees. Simon and Schuster; 2013.
21. McMahon M, Pospisil R. Laptops for a digital lifestyle: Millennial students and wireless mobile technologies. Proc. Australas. Soc. Comput. Learn. Tert. Educ. 2005, 2: 421–431.
22. Jeon J, Yoo M, Christodoulidou N. The impact of Wi-Fi service on millennial diners. Journal of Hospitality and Tourism Technology. 2019, 10(3): 383-400. doi: 10.1108/jhtt-11-2017-0133
23. Basalla G. The Evolution of Technology. 1989. doi: 10.1017/cbo9781107049864
24. Youssef Wahba Ali Karrar S. Modern technology and its impact on the concept of contemporary interior design. International Journal of Artificial Intelligence and Emerging Technology. 2019, 2(1): 9-24. doi: 10.21608/ijaiet.2019.181424
25. Ching FDK. Architecture: Form, space, and order. John Wiley & Sons; 2023.
26. Binggeli C. Building systems for interior designers. John Wiley & Sons; 2003.
27. Alsamani B, Chatterjee S, Anjomshoae A, et al. Smart Space Design–A Framework and an IoT Prototype Implementation. Sustainability. 2022, 15(1): 111. doi: 10.3390/su15010111
28. Mahmoud NSA. Acoustics from Interior Designer Perspective. In: Acoustics of Materials. IntechOpen; 2019.
29. Ching FDK, Binggeli C. Interior design illustrated. John Wiley & Sons; 2018.
30. Asdrubali F. Survey on the acoustical properties of new sustainable materials for noise control. Proceedings of Euronoise; 2006. pp. 1–10.
31. Chan M, Estève D, Escriba C, et al. A review of smart homes—Present state and future challenges. Computer Methods and Programs in Biomedicine. 2008, 91(1): 55-81. doi: 10.1016/j.cmpb.2008.02.001
32. Xin C. Exploring the effectiveness of VR-based product demonstrations featuring items of furniture. Library Hi Tech. 2022. doi: 10.1108/lht-01-2022-0001
33. Al-Kodmany K. Tall Buildings and Elevators: A Review of Recent Technological Advances. Buildings. 2015, 5(3): 1070-1104. doi: 10.3390/buildings5031070
34. Cabannes T, et al. The impact of GPS-enabled shortest path routing on mobility: a game theoretic approach 2. Univ. California, Berkeley. 2017, 29.
35. Blaise OO, D. Olujimi A. A Comparative Review of Emerging Wireless Technology. International Journal of Scientific Research in Computer Science, Engineering and Information Technology. 2020, 163-175. doi: 10.32628/cseit206536
36. Xie X, Cai J, Fang H, et al. Effects of colored lights on an individual's affective impressions in the observation process. Frontiers in Psychology. 2022, 13. doi: 10.3389/fpsyg.2022.938636
37. Rowe A. Designing for engagement in mixed reality experiences that combine projection mapping and camera-based interaction. Digital Creativity. 2013, 25(2): 155-168. doi: 10.1080/14626268.2013.835737
38. McGee B, Park NK. Colour, Light, and Materiality: Biophilic Interior Design Presence in Research and Practice. Interiority. 2022, 5(1). doi: 10.7454/in.v5i1.189
39. Liu X, Zhang H, Zhu Q. Factor Analysis of High-Rise Building Fires Reasons and Fire Protection Measures. Procedia Engineering. 2012, 45: 643-648. doi: 10.1016/j.proeng.2012.08.216
40. Elsaid AM, Ahmed MS. Indoor Air Quality Strategies for Air-Conditioning and Ventilation Systems with the Spread of the Global Coronavirus (COVID-19) Epidemic: Improvements and Recommendations. Environmental Research. 2021, 199: 111314. doi: 10.1016/j.envres.2021.111314
41. Livshitz A, Chudnovsky BH, Bukengolts B, Chudnovsky BA. On-line temperature monitoring of power distribution equipment. In: Record of Conference Papers Industry Applications Society 52nd Annual Petroleum and Chemical Industry Conference; 2005. pp. 223–231.
42. Murad SS, Yussof S, Badeel R. Wireless Technologies for Social Distancing in the Time of COVID-19: Literature Review, Open Issues, and Limitations. Sensors. 2022, 22(6): 2313. doi: 10.3390/s22062313
43. Win SZZ, Htun ZMM, Tun H. Smart security system for home appliances control based on internet of things. Int. J. Sci. Technol. Res.2016, 5(6): 102–107.
44. Bangali J, Shaligram A. Design and Implementation of Security Systems for Smart Home based on GSM

technology. International Journal of Smart Home. 2013, 7(6): 201-208. doi: 10.14257/ijsh.2013.7.6.19
45. Mauluddin A. Urban millennial: Analysis of urban socio-spatial policy for "gen-y" in indonesia. JCIC : Jurnal CIC Lembaga Riset dan Konsultan Sosial. 2019, 1(1): 15-26. doi: 10.51486/jbo.v1i1.2
46. Nurhasanah S, Dewi C. Defining the Role of Multinational Corporations: Starbucks and Coffee Culture in Indonesia. Jurnal Sentris. 2020, 2(2): 63-77. doi: 10.26593/sentris.v2i2.4181.63-77