

Sales gallery adaptive reuse feasibility study into Indoor Hawker Centre in Penang

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received July 08, 2024 Received in revised form Oct. 10, 2024 Accepted December 15, 2024 Available online August 01, 2025</p> <p><i>Keywords:</i> Adaptive reuse Feasibility study Indoor Hawker Centre Sales gallery and Penang</p> <p>*Corresponding author: Muhammad Firzan bin Abdul Aziz Interior Architecture, School of Housing, Building and Planning, Universiti Sains Malaysia Email: firzan@usm.my ORCID: https://orcid.org/0000-0003-0866-9123</p>	<p><i>In the built environment, recycling can be practiced through a method known as "Adaptive Reuse" (AR). AR is an alternative to "recycling the existing structure", which significantly reduce the pollution and greenhouse gas generated during construction, seen from sustainable development aspects. It could be a strategy to achieve sustainable development goal, which repurpose a abandoned building based on the public demand. It is worth noting that the architectural aspects of a building are influencing the adaptive reuse decision, but the lack of previous studies cast a doubt on such transformation. This study examines the feasibility of converting a sales gallery in Penang into a hawker centre, with a primary objective, which is to explore the perceptions of related practitioners about the AR feasibility transforming sales gallery into indoor hawker centre on architectural aspects. The qualitative primary data of the research will be gathered through case study interviews with practitioners from diverse field related to build environment or food and beverage interior design expertise. Their perspectives on repurposing the chosen case study into a hawker centre, addressing site context and architectural aspects will be revealed through qualitative findings.</i></p>

Introduction

According to United States Environmental Protection Agency (EPA), recycling involves transforming materials that would otherwise be discarded as trash into a new product. Recycling is crucial to modern welfare standards, driven by the 21st century's emphasis on sustainability and the need for alternatives to conventional waste disposal. In the built environment, recycling can be practiced through a method known as "Adaptive Reuse" (AR). AR is an alternative to "recycling the existing structure", which significantly reduce the pollution and greenhouse gas generated during construction, seen from sustainable development aspects. Globally, adaptive reuse grows into a progressively popular subject to frontier research. Despite decades of

human contempt and ignorance in the context of resource depletion and environmental degradation, it can have a substantial influence on current trends in urban sustainable development. ASEAN, rapid urbanisation is unprecedented (Vardopoulos 2023). The ASEAN SUSTAINABLE URBANISATION STRATEGY 2021 forecasts an urban population of 365 million, straining resources and infrastructure like housing and food. Adaptive reuse (AR) emerges as a key strategy for sustainable urban development, repurposing existing buildings based on public demand (Kee 2014). Examples in ASEAN cities like Singapore (The Warehouse Hotel), Bangkok (Dusit Thani Hotel), and Kuala Lumpur (REXKL) illustrate how AR extends building life with new functions. In Malaysia, particularly on Penang Island, rapid

urban growth intensifies food and real estate demand. Temporary sales galleries in Penang, used for property promotion, often remain vacant after sales. Converting them into hawker centres could meet temporary space and food infrastructure needs, while lack of previous studies casts doubts on feasibility of adaptively reusing sales gallery as hawker centre. Hence, with a chosen sales gallery as case study, the study examines the AR feasibility on sales gallery into hawker centre with a primary objective: to explore the perceptions of related practitioners about the AR feasibility transforming sales gallery into indoor hawker centre on architectural aspects.

Literature review

Adaptive reuse

As defined by [Department of the Environment and Heritage \(2004\)](#), adaptive reuse is a process that transforms unused or inefficient items into new ones suitable for a different purpose. [Bullen \(2007\)](#) defines it similarly; the concept primarily involves repurposing a building's existing structure to prolong its lifespan while serving a different function. According to [Fein \(2011\)](#), there are two categories of AR strategies, which do not take aesthetic heritage value and take aesthetic heritage value into consideration during AR process. [Langston \(2008\)](#) believes “adaptive reuse is the future of the construction industry.” Because adaptive reuse is the only sustainable way to prolong the building’s lifetime ([Wilkinson 2018](#)). Through the phase of planning, design, construction, and operation, the adaptively reused building has the exact same lifespan as a newly constructed building. [Douglas \(2006\)](#); [Wong \(2022\)](#) mentioned that the phrase “adaptive reuse” specifically refers to modifications that encompass both functional and physical elements. Studies have increasingly focused on the physical aspects of buildings during the reuse process, which involves specific criteria. [Jasim and Ismael \(2023\)](#); [Bullen and Love \(2010\)](#) indicated that the physical aspects of a building are influencing the adaptive reuse decision. Over time, literature has increasingly acknowledged AR as an effective approach for sustainable construction practices ([Owojori and Okoro 2022](#)). It effectively prolongs the lifespan of existing buildings by enhancing them, resulting in lower costs compared to new construction in terms of materials, transportation, energy, and environmental impact ([Bullen 2004](#)).

Understanding physical characteristics of a building is important during the pre-project phase to allow for adaptive reuse ([van Laar et al. 2024](#)). The research on architectural characteristics that facilitate adaptive building reuse will provide guidelines for new construction ([Bowyer et al. 2022](#)).

To analyse the feasibility of adaptive reuse, the research will focus on the architectural aspects to be considered during AR, the criterion is summarised as below:

Table 1. Architectural aspects to be considered for adaptive reuse

Architectural aspects	Criterion related	Description
Location and Accessibility	Location	The location and site of the building should be suitable for adaptive reuse, with the public accessibility.
	Site layout	
	Accessibility	
Spatial organisation	Space layout	The space layout should be utilised to allow for spatial flexibility, accommodating potential future reuse.
	Space gain & change	
	Space dimension & distribution	
	Spatial form (function & circulation)	
Building sustainability	Function changeability	The potential and suitability of the building for adaptive reuse should be evaluated based on its capacity to serve a specific purpose.
	Potential & sustainability to be adapted	
	Capability	
Physical condition	Building finishes	The state of the building is essential for planning the building's adaptive reuse.
	Façade; building envelope	
	Size & shape	
	Exterior	

Source: ([van Laar et al. 2024](#); [Zhang and Zhang 2023](#); [Ragheb and Naguib 2021](#); [Mohd Abdullah, Suratkonv, and Mohamad 2020](#); [Mohamed and Alauddin 2016](#))

Commercial space

Commercial building space " describes a commercial aggregate where a range of retail and service facilities are grouped together in a structure or area to offer customers all-inclusive services ([C. Yang 2018](#)). A commercial space is a public area that caters to the material and spiritual requirements of customers while offering relevant goods, services, and facilities for commercial consumption activities ([Liu 2018](#)). Unlike other public building types, the design of a commercial building must additionally satisfy the interests of

others in terms of aesthetics, amusement, and entertainment, yet promise commercial profit as its top priority (Tan and Zhu 2016). In addition to serving as a venue for negotiations, commercial spaces often become gathering spots, communication hubs, and social points for the communities where they are situated (Jia 2022). These are the industries where certain building, health and safety, and unique requirements norms apply to each (Keane 2019). Commercial space quality is just as vital as commodity quality, and architectural space quality optimisation and enhancement are especially crucial.

Indoor Hawker Centre

Hawker centres (or known as food courts by Luna Puerta and Smith (2020)) were originally constructed to relocate and organise street vendors and hawkers, aiming to better manage public health and sanitation issues associated with street food vending. K. Lee et al. (2020); Leimgruber (2018) describes the immobilization of itineracy as the transition where a hawker stops traveling from one location to another and sets up a permanent stall in a designated area (Mufidah 2012). Mufidah 2012 claimed that urban residents who are too busy with their activities to cook or who don't have much time to sit down to eat with their families are increasingly choosing hawker centres. Scott (1993) highlighted the importances for interior designers and architect to recognise the physical traits that influence people's preferences for their immediate environment to develop flawlessly appointed spaces that encourage positive attitudes, behaviours, and ultimate well-being. Scott also underlined the necessity for more research on the applicability of determined framework in specific interior environments. Tuzunkan and Albayrak (2016) that the physical environment has been recognised as an issue impacting the satisfaction levels of customers while dining. A well-designed hawker centre will attract consumers with its diverse menu and quality atmosphere, providing an inviting space for activities such as family gatherings, business meetings, and social events.). Rabboh (2021) noted that visual elements, such as decor and lighting, play a significant role in attracting customers to food courts. This highlights the crucial importance for designers to pay careful attention to these aspects. Apart from the dining area, the physical condition of the cooking area should be considered as important factor to enhance the performance of stall vendors

(Yeh et al. 2022). A thoughtfully planned kitchen layout can reduce the workload for stall vendors and enhance their efficiency (Shimmura, Fujii, and Kaihara 2017).

Table 2. Architectural aspects of indoor hawker centre

Architectural aspects	Criterion related	Description
Spatial organisation	Space layout	Spatial organisation refers to the arrangement and spatial relationships of machinery, equipment, and furnishings within a space to optimize functionality and facilitate efficient performance.
	Function (Dining, kitchen, and fixture)	
	Circulation	
Ambience and comfort	Sound and acoustic	Ambience refers to the subtle, intangible qualities of an environment that influence the non-visual senses and can subconsciously affect customers.
	Thermal comfort	
	Ventilation	
	Lighting	
Aesthetics	Finishes	Aesthetics result from architectural design and interior décor, both of which enhance the attractiveness of the servicescape.
	Colour	
	Furniture	
	Decoration	

Source: (Sal Moslehian, Warner, and Andrews 2023; Ngah et al. 2022; Yang and Luo 2021; C. J. Lee, Wang, and Cai 2015; Malekshahi 2013; Ryu and Han 2011)

Methods

Using a case study methodology, this research used qualitative methodologies to investigate adaptive reuse alternatives for turning a sales gallery into hawker centres. The purpose of the qualitative research was to acquire nuanced viewpoints on the viability of transforming the selected case study into an indoor hawker centre and to thoroughly analyse industry insights.

Targeted practitioners, who include local government officials, architects, and interior designers with more than ten years of experience, were interviewed for case studies to obtain the primary data. The trustworthiness of the research is increased by the wide range of participants chosen, which guarantees thorough insights. Adaptive reuse projects have the potential to be successful, and this was taken into consideration when crafting interview questions that were carefully considered after a thorough assessment of the literature.

Examining the chosen sales gallery's physical suitability for transformation into an indoor hawker center and going over the benefits and

drawbacks with practitioners was the first step in the interview process. The discussion then turned to spatial organisation, looking for ideas for optimal circulation and space design using the case study's blueprints as a guide. Thirdly, practitioners addressed acoustics, ventilation, thermal comfort, and lighting for both dining areas and food stalls, offering solutions for improving atmosphere and comfort throughout design and refurbishment. Finally, efforts to enhance the visual attractiveness were investigated, especially in the sitting areas. To assure compliance, every segment of the interview aimed to confirm the presence of guidelines and regulations. The acquired data is subsequently subjected to a thematic analysis.

Case study

Sunway Sales Gallery, a GBI gold-certified building designed and built by EOWON Design + Architects was chosen as the case study site. It is located at Jalan Anson, George Town, Penang, which is the heart of Penang capital city. The physical characteristics of the sales gallery were analysed through the information and documentation provided by Ar. Lui Sy Ying, the main architect and key stakeholder. Although some documents were confidential and only available for review, the materials provided offer critical insights into the structure and spatial planning of the case study. Additionally, a semi-structured interview with Ar. Lui Sy Ying delves into her perspectives and design intentions, highlighting challenges in adapting the space for reuse.



Figure 1 and 2. Shows the exterior view of Sunway Sales Gallery

Source: [EOWON Designs + Architects Official Website](#)

Table 3. Physical Characteristics of Sunway Sales Gallery

Physical characteristics	Background
Location and accessibility	Sunway Sales Gallery is strategically located in George Town (figure 3), benefiting from high foot traffic and surrounding amenities. Its corner lot enhances visibility and accessibility, making it a prominent destination in a diverse customer base. Well-designed pedestrian pathways and bicycle lanes promote eco-friendly transportation, while personal parking spaces add convenience. This prime location and thoughtful design make it ideal for businesses seeking to maximise accessibility and customer convenience.
Spatial organisation	The ground floor (figure 4) is designed for easy navigation and optimal merchandise display, enhancing accessibility and comfort. Secluded areas, like the event hall, are positioned at the back for privacy. Large windows and transparent partitions flood the double volume area with natural light. Subsequently, the first-floor (figure 5) features open workplaces, individual offices, meeting rooms, and communal areas, facilitating collaboration and productivity. Public activities are on the ground floor, while private office functions are on the first, ensuring efficient and comfortable use of space. Moreover, the efficient vertical circulation is achieved through well-placed staircases and a lift, ensuring easy navigation for all users. This thoughtful spatial organization enhances customer experience and fosters a productive working environment.

Physical characteristics	Background
Building sustainability	Its strategic location as corner lot beside the main road maximises visibility, accessibility, and natural light, enhancing its environmental performance and attractiveness. Pedestrian and cyclist lanes encourage eco-friendly travel, complemented by a private car park that adds convenience and reduces urban congestion. Incorporating GBI-certified vegetation further enhances sustainability by improving air quality, mitigating heat island effects, and supporting biodiversity. Correspondingly, the ground floor's double-volume space (figure 6 and 7) offers flexibility for communal dining and creates an inviting atmosphere with high ceilings, promoting natural ventilation and reducing energy use. The adaptable first floor layout allows for additional seating or facilities, preserving the building's structure and minimising environmental impact.
Physical condition	The building adopts a neutral grey colour scheme in line with contemporary architectural trends, complemented by a perforated exterior facade that maintains a modern style akin to other sales gallery branches. The car park is designed for efficient traffic flow, enhancing user experience. Inside, modern, sleek design elements include high ceilings and large windows that flood the space with natural light. A neutral colour palette creates a calm atmosphere, while accent lighting adds elegance. Contemporary and comfortable furniture combines functionality with aesthetic appeal.



Figure 3. Shows the location of Sunway Sales Gallery in George Town Penang

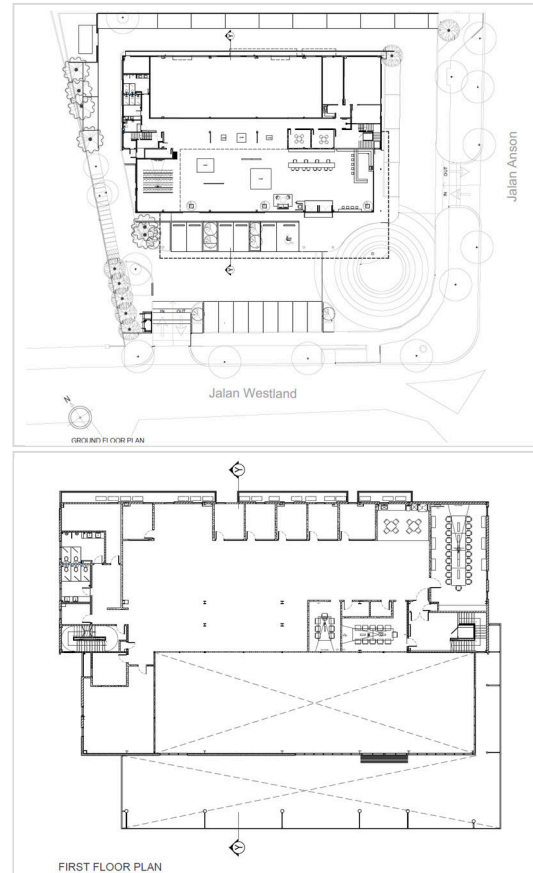


Figure 4 and 5. Show the ground floor and first floor plan of Sunway Sales Galley respectively
Source: [EOWON Designs + Architects](#)



Figure 6 and 7. Shows the interior space of the ground floor with double volume area and sufficient daylight penetrated from the glass panel
Source: [EOWON Designs + Architects Official Website](#)

Results and discussion

Key informant profiles

The architect, interior designer, and representative of the local authority, each with over 10 years' experience, were selected as key informants for their ability to provide professional insights into the feasibility of this transformation based on their expertise.

Table 3. Key informant profiles

Practitioner	Name with title (If any)	Background
P1	Ar. Sam Chin Yee	P1 is a registered architect and the founder of CYS Architect. P1 has more than 10 years in architecture firm, focusing the commercial space design. With over a decade of experience, P1 excels in spatial planning and architectural form exploration, evident in signature F&B projects such as Aeon Midtown Foodhall and Mamarai Local Delight Café.
P2	IDr. Kalvin Ting Lik Wen	P2 is a registered interior designer and the founder of Think Studio. P2 has over 18 years' experience in interior design field and expertise in the F&B design. P2 is also award-winner in MIID REKA. The representative F&B design projects done includes Food Court, UNITAR Kelana Jaya and PLAN B by journal.
P3	Ami Azlimi Bin Ahmad	P3 serves as the Senior Assistant Officer in the Building Department of the City Council of Penang Island for Area A (George Town). With extensive experience, P3 is well-versed in George Town's town planning intricacies, including its strengths and weaknesses. P3 is capable of analysing the suitability of chosen sales gallery based on their physical aspects, leveraging deep understanding of the site.

Practitioners' insight on a characteristic of chosen sales gallery

Table 4. Practitioners' insight on physical characteristics of chosen sales gallery

Practitioner	Summarised insight
P1	P1 noted that the chosen since the sales gallery chosen is in bustling town area of George Town, it has the potential to be a tourist spot with high visibility and accessibility. The existing landscape surrounding the exterior space could serve as a distinctive feature of the building.

Practitioner	Summarised insight
P2	P2 noted that the current car park meets the needs of staff and food vendors, though it may not fully accommodate all customers. They highlighted the importance of nearby parking facilities in enhancing customer retention. Overall, the strategic location of the case study in Town area underscores competitive strength.
P3	P3 highlighted the attractiveness of the case study due to its location on Jalan Anson, a prominent road in George Town, and its status as a corner lot. While the building has no heritage value, its structural integrity can be preserved, allowing for renovation of the interior space. However, limitations exist on renovating the existing exterior structure and facilities, which suggests potential for adaptive reuse with focus on interior enhancements.

Practitioners' insights on the architectural aspects of an indoor hawker centre

Spatial organisation

Table 5. Practitioners' insight on spatial organisation for an indoor hawker centre

Practitioner	Summarised insight
P1	For the ground floor, P1 highlighted the double-volume front area (FOH) for themed dining spaces to utilise the view and daylight. The back area (BOH) could host food stalls with heavy cooking and essential facilities like loading areas, storage, and cleaning zones. The building's corner, away from the main road, is ideal for a loading area, refuse chapel, and M&E room, accessible from the back lane. On the first floor, P1 recommended additional dining areas, supported by a dumbwaiter for food delivery. The BOH could be converted to accommodate more food stalls for additional vendors. P1 suggested multiple entrances and retained the existing Bomba-approved staircase and lift as vertical circulation. In the absence of specific guidelines, spatial organisation would rely on basic knowledge, experience, and client requirements.

Practitioner	Summarised insight
P2	P2 recommended placing the dining area in the FOH on the ground floor, utilizing the double-volume space for natural daylight through existing glass panels. The BOH was designated for food stalls, loading areas, storage, and cleaning zones, with careful consideration given to space for food stalls. Worker pathways behind each food stall were suggested for staff access to loading and storage areas. On the first floor, P2 proposed using the FOH for dining and the BOH for additional food stalls, supported by a dumbwaiter for food delivery. Safety measures included at least three public entrances for fire escape routes and fire safety equipment for each food stall. P2 suggested retaining the existing Bomba-approved staircase and lift. P2 highlight that spatial organisation would be guided by client requirements and experience due to the absence of specific guidelines or regulations.
P3	P3 highlighted that the FOH is best suited for the dining area, with the BOH designated for food stalls, loading areas, and essential facilities. P3 suggested considering demolishing the first-floor structure to create a high-ceiling indoor hawker centre for enhanced comfort. However, retaining the floor would maximise the dining area and accommodate additional food stalls. P3 noted the importance of multiple entrances for fire safety and recommended keeping the existing Bomba-approved staircase and lift, though they could be renovated. P3 mentioned that there are no specific government guidelines for the spatial organisation of an indoor hawker centre, as it depends on the designer's experience and the client's requirements.

Both practitioners strongly advocated for flexible spatial organisation in converting the chosen sales gallery into an indoor hawker centre. They agreed on the optimal space planning, suggesting the front-of-house (FOH) as an ideal dining area and the back-of-house (BOH) for food stalls, loading areas, stores, and essential facilities across both floors. P1 highlighted the suitability of placing the loading area at the building's corner, away from the main road and accessible from the back lane (figure 4 and 5). Both noted to have multiple entrance to ensure fire safety. They also supported retaining the existing vertical circulation (staircase and lift), approved by Bomba. Given the absence of specific guidelines or regulations, they noted that spatial organisation decisions for the indoor hawker centre rely on the designer's expertise and client requirements. In conclusion, both practitioners affirmed that the chosen sales gallery is feasible for conversion into an indoor hawker centre due to its adaptable layout.

Ambience and comfort

Table 6. Practitioners' insight on ambience and comfort for an indoor hawker centre

Practitioner	Criteria	Summarised insight
P1	Acoustic comfort	P1 noted that noise is inherent to an indoor hawker centre and is not a major issue that requires focus.
	Ventilation for odour and thermal comfort	P1 highlighted that ventilation needs are less critical for the dining area compared to the food stall zone. The high-volume-low-speed (HVLS) fans was recommended for thorough air circulation in the double-volume space. P1 also advised considering air conditioning, particularly where natural ventilation is inadequate, based on insights and calculations from M&E specialists. Additionally, they emphasized the meticulous planning of heavy-duty kitchen exhaust systems for each food stall to efficiently manage odour and heat dispersion, crucial for enhancing the overall dining experience.
	Lighting	P1 emphasised the significance of functional lighting, recommending warm lighting for dining areas and warm white lighting for food stalls to improve visibility. Indirect lighting was suggested for dining areas to minimize glare. P1 also noted the potential to utilize existing daylighting to seamlessly integrate the exterior with the interior. They stressed the importance of ensuring that lighting fixtures align with the dining area's design concept. However, P1 pointed out the absence of specific guidelines or regulations governing lighting standards for indoor hawker centres.
P2	Acoustic comfort	P2 acknowledged that noise is inherent to an indoor hawker centre. However, it can be mitigated through the application of acoustic ceiling panels.
	Ventilation for odour and thermal comfort	P2 advocated for careful differentiation in the ventilation mechanism should be carefully differentiated between dining area and food stall zone. P2 recommended installing HVLS fan in the double-volume dining area to improve air circulation. Subsequently, the installation of air conditioning must comply with the advice of the M&E specialist and their calculations. Concurrently, P2 underscored the importance of meticulous planning for the heavy-duty kitchen exhaust systems in each food stall to effectively reduce the dispersion of odours and heat, thereby enhancing the overall dining experience.

Practitioner	Criteria	Summarised insight
	Lighting	P2 suggested utilising daylighting at double-volume dining area to reduce the usage for artificial lighting if the indoor hawker centre operates during the day. However, the warm lighting could be applied for the dining area. Conversely, the food stalls and working areas must be brightly lit to ensure visibility for work. Additionally, P2 mentioned that the lighting fixtures would be chosen to fit the design theme. P2 also noted that there are no lighting standards in any guidelines or regulations to refer to.
P3	Acoustic comfort	P3 noted that noise is inherent to an indoor hawker centre and is not a major issue that requires focus.
	Ventilation for odour and thermal comfort	P3 emphasised the double-volume dining area at the FOH could be beneficial for ventilation with the application of HVLS fan. Nevertheless, P3 stipulated that the installation of air conditioner in the dining area and heavy-duty kitchen exhaust systems at the food stall must refer to the M&E specialist for the proper calculation as it much depends on the chosen mechanisms.
	Lighting	P3 highlighted the sufficient daylighting could be utilised since there are no obstacles blocking the facade from the main road, reducing the dependence of artificial lighting for the double-volume area for dining. P3 suggested using warm white light in the BOH as less daylight could be accessed. Moreover, P3 asserted that the lighting temperature and lighting fixture proposed would base on the designers' decision during the design process since there are no guidelines or regulations for the lighting standard.

Both practitioners emphasised a balanced approach to transforming the selected sales gallery into an indoor hawker centre, focusing on enhancing ambience and comfort. They appreciated the vibrant atmosphere typical of hawker centres and highlighted tailored ventilation strategies for dining areas and food stalls. They collectively recommended HVLS fans for improved air circulation in spacious dining sections and stressed the necessity of expert-designed air conditioning and kitchen exhaust systems to manage odour and heat effectively, therewith enhancing dining experience. For lighting, they favoured warm tones for ambience and emphasised using daylight (figure 6 and 7) to reduce reliance on artificial lighting. Design choices were flexible and guided by client preferences. Additionally, all three practitioners noted the absence of specific

guidelines or regulations and underscored the importance of consulting M&E specialists for ventilation system calculations.

Aesthetics

Table 7. Practitioners' insight on aesthetics for an indoor hawker centre

Practitioner	Summarised Insight
P1	P1 stated that the design style is primarily determined by the client, and then design guidance is given about the colour scheme and materials. P1 mentioned that as there are no rules or norms to adhere to, the kind of materials selected will depend on their compatibility. Subsequently, P1 went on to highlight the sales gallery's versatility and flexibility, pointing out that it allowed for seating sections with various themes to break up monotony and improve the interior space's aesthetic value.
P2	P2 noted that the design style is primarily influenced by the client's preferences and the type of food sold at the stalls, providing advice on colour schemes and materials. P1 explained that material selections are made based only on suitability due to the absence of specific guidelines or regulations. Furthermore, P2 emphasised the flexibility and adaptability of the chosen sales gallery, which allowed for themed seating sections to break up monotony and improve its aesthetics. P2 suggested a modern design theme for the first floor to appeal to youth and a vintage design concept for the ground floor to accommodate seniors who have mobility issues.
P3	P3 pointed out that the client decides on the design approach, with the designer offering guidance on color palette and material selections after that. P3 stressed the importance of designer on proposing the suitable material to the clients as there are no guidelines or regulations to follow regarding material options. Moreover, P3 underlined the flexibility and adaptability of the chosen sales gallery, giving the designer creative freedom to rework the interior space—especially when it comes to sitting arrangements, considering the area's potential to draw tourists.

P1, P2, and P3 agreed that the indoor hawker centre's design should suit the type of food being served and convey the preferences of the customers. They stressed how essential it is to use appropriate materials, particularly given the lack of strict guidelines or regulations. They also highlighted the adaptability the selected sales gallery is, enabling the addition of variously designed seating sections to improve the aesthetic appeal of the space and avoid monotony.

Conclusions

This research evaluates the feasibility of converting a sales gallery in Penang into an indoor hawker centre, focusing on practitioners' architectural perspectives. The three practitioners agreed on the AR potential of the gallery, highlighting its strategic location in George Town as a potential tourist attraction if well-designed.

They assessed three key criteria: spatial organisation, ambience and comfort, and aesthetics. Firstly, for spatial organisation, the double-volume front area (FOH) is deemed ideal for dining, while the back area (BOH) should host food stalls and essential facilities, accessible from the back lane. Multiple entrances are necessary for fire safety, and all three agreed retaining the Bomba-approved staircase and lift for vertical circulation. Second, while noise is inherent in a hawker centre, ventilation for scent and thermal comfort, along with lighting, are critical aspects to address. It is essential to match lighting and ventilation to the intended use of the area dining rooms versus food stalls. Ventilation is crucial for air circulation in the dining area, and lighting should enhance the dining atmosphere. Glass panels that let in daylight can reduce the need for artificial lighting. Expertly designed ventilation systems are essential for food stalls to reduce heat and odour dispersion, thereby improving the dining experience. Bright lighting is also necessary for visibility when working. They emphasised the importance of consulting M&E specialists for accurate ventilation system calculations. Lastly, aesthetic value is key to attracting customers. Both pointed out that the colour scheme and material choice will be determined by the client's desired design style. However, in order to prevent monotony and improve overall aesthetic appeal, seating places with a variety of themes are necessary.

Overall, the practitioners agree that the sales gallery can feasibly be converted into an indoor hawker centre, offering a vibrant and well-organised space that balances practicality and aesthetic value, catering to the demands of both vendors and consumers.

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References

- Bowyer, E C, V Stephenson, W Hawkins, and T Ibell. 2022. "New Angles for Adaptive Building Reuse Research." *IOP Conference Series: Earth and Environmental Science* 1078 (1): 012022. <https://doi.org/10.1088/1755-1315/1078/1/012022>.
- Bullen, Peter A. 2004. "Sustainable Adaptive Reuse of the Existing Building Stock in Western Australia." *20th Annual ARCOM Conference 2* (September):1387–97.
- Bullen, Peter A. 2007. "Adaptive Reuse and Sustainability of Commercial Buildings." *Facilities* 25 (1/2): 20–31. <https://doi.org/10.1108/02632770710716911>.
- Bullen, Peter A., and Peter E.D. Love. 2010. "The Rhetoric of Adaptive Reuse or Reality of Demolition: Views from the Field." *Cities* 27 (4): 215–24. <https://doi.org/10.1016/j.cities.2009.12.005>.
- Department of the Environment and Heritage. 2004. "Adaptive Reuse: Preserving Our Past, Building Our Future." <https://www.dccew.gov.au/Parks-Heritage/Heritage/Publications/Adaptive-Reuse>. 2004.
- Douglas, James. 2006. *Building Adaptation*. 2nd ed. Elsevier.
- Fein, Zachery E. 2011. "The Aesthetic of Decay: Space, Time, and Perception." Master's Thesis, University of Cincinnati.
- Jasim, Suroor Abdulghafoor, and Emad Hani Ismaeel. 2023. "The Most Appropriate Reuse of Historic Buildings." *International Journal of Sustainable Development and Planning* 18 (6): 1865–75. <https://doi.org/10.18280/ijstdp.180622>.
- Jia, B. 2022. "Generation of Phenomenal Interior Quality from Refurbishment of Commercial Spaces in Residential Areas." *IOP Conference Series: Earth and Environmental Science* 1101 (4): 042037.

- <https://doi.org/10.1088/1755-1315/1101/4/042037>.
- Kee, T. 2014. "Adaptive Reuse of Industrial Buildings for Affordable Housing in Hong Kong." *Journal of Design and Built Environment* 14 (1): 1–14.
- Laar, Brian van, Angela Greco, Hilde Remøy, and Vincent Gruis. 2024. "What Matters When? – An Integrative Literature Review on Decision Criteria in Different Stages of the Adaptive Reuse Process." *Developments in the Built Environment* 18 (April):100439. <https://doi.org/10.1016/j.dibe.2024.100439>.
- Langston, C. 2008. "The Sustainability Implications of Building Adaptive Reuse." *The Chinese Research Institute of Construction Management (CRIOCM) International Symposium, Beijing, China*.
- Lee, Chih Jen, Yu Chia Wang, and Deng Chuan Cai. 2015. "Physical Factors to Evaluate the Servicescape of Theme Restaurants." *Journal of Asian Architecture and Building Engineering* 14 (1): 97–104. <https://doi.org/10.3130/jaabe.14.97>.
- Lee, Ken, Mina Zhan, Elyssa Kaur Ludher, Thinesh Kumar Paramasilvam, and Viknesh Gnanasagaran. 2020. "Singapore: Enhancing Urban Health and Vibrancy by Leveraging Streets, Park Connectors, and Marketplaces." In *The Hidden Wealth of Cities: Creating, Financing, and Managing Public Spaces*, 349–86. The World Bank. https://doi.org/10.1596/978-1-4648-1449-5_ch15.
- Leimgruber, Jakob R. E. 2018. "Itineracy Immobilised." *Linguistic Landscape. An International Journal* 4 (2): 178–99. <https://doi.org/10.1075/li.17035.lei>.
- Luna Puerta, L., and H. E. Smith. 2020. "The 'PPI Hawker': An Innovative Method for Patient and Public Involvement (PPI) in Health Research." *Research Involvement and Engagement* 6 (1): 31. <https://doi.org/10.1186/s40900-020-00205-6>.
- Malekshahi, Armita. 2013. "Investigation on Restaurant Layout Design." Institute of Graduate Studies and Research.
- Mohamed, Noorzalifah, and Kartina Alauddin. 2016. "The Criteria for Decision Making in Adaptive Reuse Towards Sustainable Development." *MATEC Web of Conferences* 66 (July):00092. <https://doi.org/10.1051/mateconf/20166600092>.
- Mohd Abdullah, Muhamad Shahril, Azeanita Suratkonv, and Syed Burhanuddin Hilmi Syed Mohamad. 2020. "Criteria for Adaptive Reuse of Heritage Shop Houses Towards Sustainable Urban Development." *International Journal of Sustainable Construction Engineering and Technology* 11 (1): 42–52.
- Mufidah, Nur Lailatul. 2012. "Pola Konsumsi Masyarakat Perkotaan: Studi Deskriptif Pemanfaatan Foodcourt Oleh Keluarga." *Jurnal Bio-Kultur* 1 (2): 157–78.
- Ngah, Haslina Che, Nur Fatin Mohd Rosli, Muhammad Harraz Mohammad Lotpi, Azlina Samsudin, and Jazira Anuar. 2022. "A Review on the Elements of Restaurant Physical Environment towards Customer Satisfaction." *International Journal of Academic Research in Business and Social Sciences* 12 (11). <https://doi.org/10.6007/IJARBS/v12-i11/15621>.
- Owojori, Oluwatobi Mary, and Chioma Okoro. 2022. "Making the 'Available Desirable' Using Adaptive Reuse (AR) In Sustainable Construction: A Systematic Review and Directions from Case Studies." *Conference: The Twelfth International Conference on Construction in the 21st Century (CITC-12)*, October.
- Rabboh, Emad H. 2021. "The Influence of Architectural Elements of Food Courts on Users Visiting Behavior: A Questionnaire Survey." *Journal of the Egyptian Society of Engineers* 60 (1): 9–16.
- Ragheb, Ghada A., and Ingy M. Naguib. 2021. "Empowering Criteria for Effective Adaptive Reuse of Heritage Buildings in Egypt." *International Journal of Sustainable Development and Planning* 16 (6): 1061–70. <https://doi.org/10.18280/ijstdp.160607>.
- Ryu, Kisang, and Heesup Han. 2011. "New or Repeat Customers: How Does Physical Environment Influence Their Restaurant Experience?" *International Journal of Hospitality Management* 30 (3): 599–611. <https://doi.org/10.1016/j.ijhm.2010.11.004>.
- Sal Moslehian, Anahita, Elyse Warner, and Fiona Andrews. 2023. "The Impacts of Kitchen and Dining Spatial Design on Cooking and Eating Experience in Residential Buildings: A Scoping Review." *Journal of Housing and the*

- Built Environment* 38 (3): 1983–2003. <https://doi.org/10.1007/s10901-023-10027-z>.
- Scott, Suzanne C. 1993. “Visual Attributes Related to Preference in Interior Environments.” *Journal of Interior Design Education and Research* 18 (1–2): 7–16. <https://doi.org/10.1111/j.1939-1668.1993.tb00067.x>.
- Shimmura, Takeshi, Nobutada Fujii, and Toshiya Kaihara. 2017. “Staff Motion Reduction at a Japanese Restaurant by Kitchen Layout Redesign after Kitchen Simulation.” *Procedia CIRP* 62:106–10. <https://doi.org/10.1016/j.procir.2016.07.007>.
- Tan, Wendi, and Li Zhu. 2016. “Design of the Internal Space of the Commercial Building.” In *Proceedings of the 2016 5th International Conference on Sustainable Energy and Environment Engineering (ICSEEE 2016)*. Paris, France: Atlantis Press. <https://doi.org/10.2991/icseee-16.2016.57>.
- Tuzunkan, Demet, and Asli Albayrak. 2016. “The Importance of Restaurant Physical Environment for Turkish Customers.” *Journal of Tourism Research & Hospitality* 05 (01). <https://doi.org/10.4172/2324-8807.1000154>.
- Vardopoulos, Ioannis. 2023. “Adaptive Reuse for Sustainable Development and Land Use: A Multivariate Linear Regression Analysis Estimating Key Determinants of Public Perceptions.” *Heritage* 6 (2): 809–28. <https://doi.org/10.3390/heritage6020045>.
- Wilkinson, Sara. 2018. “The Context for Building Resilience through Sustainable Change of Use Adaptation.” In *Building Urban Resilience through Change of Use*, 1–20. Wiley. <https://doi.org/10.1002/9781119231455.ch1>.
- Wong, Liliane. 2022. “Adaptive Reuse of the Built Heritage: Concepts and Cases of an Emerging Discipline. By Bie Plevoets and Koenraad Van Cleempoel. Routledge, London, 2019. 256 Pp. £36.99. ISBN9781138062764.” *Built Heritage* 6 (1): 6. <https://doi.org/10.1186/s43238-022-00054-0>.
- Yang, Mian, and Shixian Luo. 2021. “Effects of Rural Restaurants’ Outdoor Dining Environment Dimensions on Customers’ Satisfaction: A Consumer Perspective.” *Foods* 10 (9): 2172. <https://doi.org/10.3390/foods10092172>.
- Yeh, Shih-Shuo, Ku-Ho Lin, Tai-Ying Chiang, Cheng-Fa Lin, and Tzung-Cheng Huan. 2022. “Exploring the Impact of Restaurants’ Physical Environment on Kitchen Employees’ Creativity.” *Tourism Management Perspectives* 44 (October):101023. <https://doi.org/10.1016/j.tmp.2022.101023>.
- Zhang, Yan, and Qi Zhang. 2023. “A Model Approach for Post Evaluation of Adaptive Reuse of Architectural Heritage: A Case Study of Beijing Central Axis Historical Buildings.” *Heritage Science* 11 (1): 57. <https://doi.org/10.1186/s40494-023-00902-x>.

Author(s) contribution

Goo Wan Qian contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Muhammad Firzan contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

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