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Research of the design-factor framework for sustainable community-based public building in Taiwan

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ABSTRACT

Cities are complex and dynamic environments that are constantly facing a range of issues with both historical and spatial dimensions. While there are several international design criteria for regenerative design and promoting community well-being, such as the Living Community Challenge (LCC), Living Building Challenge (LBC), and Placemaking (Power of 10+), there are no localized referable design criteria in Taiwan. Therefore, this research aims to explore and propose a new design-factor framework for sustainable community-based public building design through various reviews and suggestions from design experts based on national and international design criteria. It has three levels of factors based on the needs of the community, which are "Surviving and Living", "Happiness and Well-being", and "Mission and Pride", corresponding to 22 design elements and their measure indicators, which help develop a sustainable community in each of the developing stages. By adopting appropriate factors within the developed framework through public investigation, inspiration, and imagination, either government policies or community proposals could improve designs. This will enable private groups or governments to adopt environmental, social, and governance (ESG) practices easily in open spaces, public buildings, and surrounding communities.

Keywords: Adaptive renovation, Bioclimatic architecture, Design factor framework, Eco-neighbourhood, Sustainable community

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1. INTRODUCTION

A city is more than just a collection of buildings and infrastructure. It is a living entity that influences the lives of its residents. For a city to truly thrive, it must possess certain qualities that make it secure and sustainable. In order to achieve sustainable urban, community, and architectural development, some countries have created standardized building certification systems, such as Leadership in Energy and Environmental Design (LEED) developed in the U.S., Ecology, Energy Saving, Waste Reduction, and Health (EEWH) in Taiwan, Building Research Establishment Environmental Assessment Method (BREEM) in the UK, and Comprehensive Assessment System for Built Environment Efficiency (CASBEE) in Japan. Although these assessment tools are well-intentioned, they are suitable for post-completion assessment of individual buildings and sites. They are not tools to help communities or cities identify the most appropriate sustainable modes before design. But for a sustainable community, the most appropriate mode to obtain continuous resources for maintenance, operation, and renewal is the key to truly being "sustainable". However, today, many government units or private building owners like to pursue the highest level of green building design based on subjective consciousness without considering the living conditions and needs of residents in surrounding communities during the design process. So, community residents have no

willingness to protect, operate, and maintain the environment. If community residents cannot use or are unwilling to preserve them jointly, especially for public buildings, public spaces, and regenerative historical buildings, ultimately, even the highest-level sustainable buildings or environments can only last for a short period. Therefore, some international organizations have proposed design criteria or design factor frames to help architects, urban planners, and environmental engineers think from the perspective of community residents before conducting sustainable design to find the most suitable sustainable mode for the local area. These design criteria or design factor frames include Machizukuri, LCC, LBC, and Placemaking (Power of 10+).

1.1 Machizukuri

'Machizukuri' is translated by most commentators as 'place or city making' and mainly refers to the direct participation of citizens in urban planning and construction (Mavrodieva et al., 2019). Originating from Japan in the 1970s, this form of public participation in different urban renewal processes can provide them with a role in civil society and establish a more interconnected neighborhood, ensuring that issues of all aspects of urban, culture, and economy are discussed.

From urban renewal, this process can allow the local community to engage in the improvement of the living environments actively (Satoh, 2021). Many public spaces and buildings serve as a driving force for people to ensure that diverse voices are heard and actively participating in shaping the future of the neighborhood. Through advocacy, community engagement, and the contribution of knowledge from one generation to another, civil society plays a vital role in shaping our vibrant, inclusive, environmentally conscious urban spaces (Schwab, 2013) in Taiwan, where many of the issues, including affordable housing, social services accessibility, and cultural preservation as the main interests amidst rapid urbanization. Additionally, it can also act as a catalyst for building stronger foundations for cohesive and resilient communities and extend to economic considerations and the social well-being of people by implementing direct connections with ESG practices.

However, one of the main disadvantages for Machizukuri is that since there are no basic operational or design guidelines, which means that each regional unit can freely come up with ideas and proposals during the discussions and operation processes. It is easy to neglect other aspects due to the one-sided views of the proposer or integrator, resulting in different hierarchy plans and same-level plans not being fully considered.

1.2 LBC and LCC

LBC measures a project's sustainability according to a system designed to categorize and quantify key factors. (Zekos, 2012). It is also the system to rate the well-being of a building, which intends to move beyond LEED and bring the concept of net-zero energy closer to the world. This is also to maintain the high standards and inspirational visions that people and the community expect from the LBC (Vierra, 2023). To receive certification under the LBC, a building must meet all the Imperatives within each Petal (Fig. 1) and demonstrate compliance through rigorous documentation and ongoing performance monitoring (International Living Future Institute, 2019). The LBC also requires a building to be transparent about its operations, with regular reporting on its performance, and to engage the local community through educational and outreach initiatives.

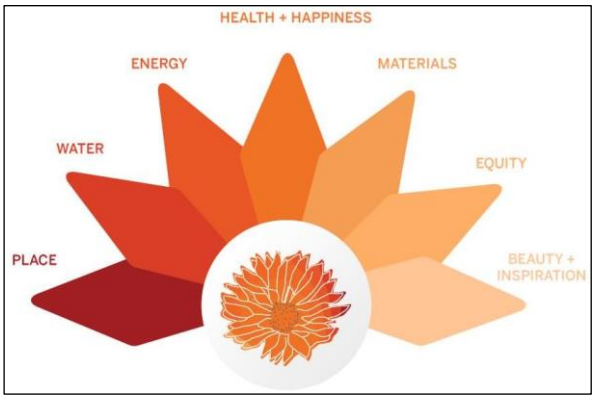

Fig. 1. LBC's 7 Petals (International Living Future Institute, 2019)

Based on the 7 petals from Fig. 1, LBC emphasizes buildings that can be sustainable, reusable, green, and net-zero energy while constructing, in usage within the community, and decommissioning (Ridder et al., 2008). The LBC is a philosophy, certification, and advocacy tool for Projects to move beyond merely being less bad and to become truly regenerative (Fig. 2).

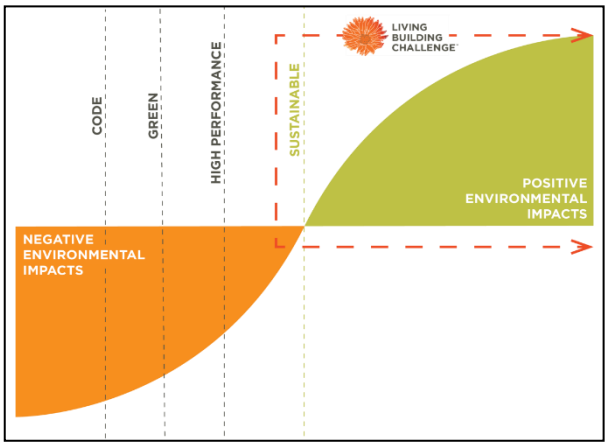

Fig. 2. Positive Environmental Impacts of LBC (International Living Future Institute, 2019)

The LCC is one of the methodologies or frameworks in master planning, designing, and constructing a liveable community – and a call-in action for governments, city or urban planners, developers, and local groups to create a more connected and beautiful place for the people to live

(International Living Future Institute, 2022). In the current standardization of LCC, there are the same 7 petals/categories as LBC, which include (1) Place, (2) Water, (3) Energy, (4) Health + Happiness, (5) Materials, (6) Equity, and (7) Beauty + Inspiration, with each category emphasizing their respective factors (different from LBC) to evaluate the community's welfare and contribution shown in Table 2. The LCC program provides a framework for designing, building, and operating communities, prioritizing health and well-being.

Table 1. LCC 1.2 with 7 petals and subdivided into 20 imperatives (International Living Future Institute, 2022).

Petals	No.	LCC 1.2
Place	1	Limits to growth
	2	Urban agriculture
	3	Habitat exchange
Place	4	Human-powered living
Water	5	Net positive water
Energy	6	Net positive energy
Health and happiness	7	Civilized environment
Water	8	Healthy neighborhood design
Energy	9	Biophilic environment
	10	Resilient community connections
Health and happiness	11	Living materials plan
Materials	12	Embodied carbon footprint
	13	Net positive waste
	14	Human scale + Humane places
Equity	15	Universal access to nature and place
	16	Universal access to community services
	17	Equitable investment
	18	Just organizations
Equity	19	Beauty + Spirit
Beauty	20	Inspiration + Education

Although LBC and LCC have classified primary and secondary design elements and have begun to consider the spiritual aspects of residents, their essence is still a post-assessment tool. Additionally, the attributes of the major classification items at the same level of LCC and LBC are not equivalent. For example, "Water", "Energy", and "Equity" are three different major items of the same level in classification. There is also confusion in LCC and LBC subitem attributes. For example, the subitem "Human Scale + Humane Places" is categorized under "Equity" instead of "Place".

1.3 Placemaking (Power of 10+)

Placemaking creates functional and attractive public spaces that reflect a community's unique character and needs. It involves a collaborative approach to designing and managing public spaces, focusing on community involvement and stakeholder engagement (Project for Public Spaces, 2007). It can include various activities, such as redesigning parks and streetscapes, creating public art installations, or transforming underutilized spaces into vibrant community gathering places. Placemaking aims to create spaces that are welcoming, accessible, and inclusive and that foster a sense of community and social interaction (Fig. 3).

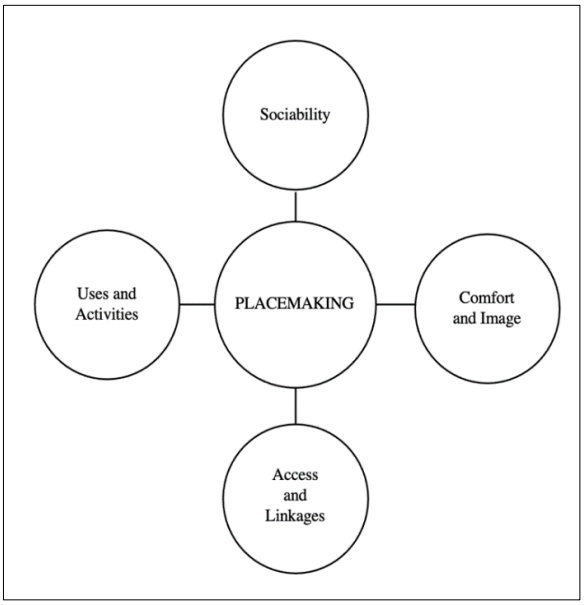

Fig. 3. Placemaking and its four attributes (elements)

The "Power of 10+" concept is that places thrive when users have a range of reasons (10+) to be there. These might include a place to sit, playgrounds to enjoy, art to touch, music to hear, food to eat, history to experience, and people to meet. Ideally, some of these activities will be unique to that particular place, reflecting the culture and history of the surrounding community. Further, when cities contain at least 10 of these destinations or districts, their public perception shifts amongst locals and tourists, and urban centers can become better equipped for generating resilience and innovation (Project for Public Spaces, 2009). Overall, Placemaking and Power of 10+ are more like initiatives. Their advantage is that it is relatively suitable as a tool to help residents and designers think before designing. Many statements of "Placemaking is" and "Placemaking is not" and a "Place Diagram – What Makes a Great Place?" tool for the design of public spaces are proposed. However, their disadvantage is that the classifications in these discussions or the tool cannot tell which items/projects should be prioritized for communities or regions with different levels of development. Therefore, some communities or regions with insufficient development levels may adopt inappropriate, high-level development projects, resulting in the projects being unable to be implemented or sustainably operated.

Based on the above-discussed frameworks and methodologies, the following outlines their respective advantages and disadvantages in Table 2.

1

Table 2. Evaluations of the frameworks and methodologies

Methodology	Advantages	Disadvantages
Machizukuri	Involves community participation, adaptable to local contexts	Lacks basic operational/design guidelines, proposals can be in several stages and neglect others' aspects
LBC	Comprehensive sustainability framework, rigorous standards	Post-assessment tool, confusion in classifying major items/sub-items
LCC	Addresses both buildings and community-scale projects, promotes regenerative design	Similar to LBC, post-assessment tool, confusion in classifying major items/sub-items
Placemaking	Focuses on creating vibrant public spaces, emphasizes community input	Can be superficial if not implemented properly, and may lack depth in addressing broader environmental or infrastructural issues

2. RESEARCH METHODOLOGY

To verify the advantages and disadvantages of international design criteria and to construct a design-factor framework suitable for community-based public building design in Taiwan, this study uses an operational verification method to operate a verification design. The verification design takes the competition requirements of Chiayi Houses Design Competitions as the main requirements for regional characteristics. It also takes the Chiayi Railway Station public building as the design object to examine the design factor framework corresponding to the practice of socio-economic, cultural, historical, environmental, and urban issues.

2.1 Chiayi Houses Design Competitions

Chiayi County is rich in natural resources, history, and culture. But it also faces serious problems such as population outflow, aging, intergenerational support, and urban-rural disparity. To minimize the impact, some regional architects have held a series of design talent competitions to let them understand the characteristics of old rural settlement spaces and, through active publicity and promotion, let the public know how to live happily in Chiayi (Chen, 2013).

The competition requires participants to consider the urgent needs of local residents, such as the living functions of three generations living under one roof, the cultural preservation of Aboriginal and Hakka people, the application of local building materials, and architectural styles suitable for Chiayi's climate. This competition recognizes Chiayi's unique natural scenery, history, and culture and activates Chiayi's local economic development.

2.2 Verification Design - Chiayi Train Station Renovation

Chiayi City is in southwestern Taiwan, rich in history and culture. It used to be one of the largest cities in population during the early 19th century because of its flourishing timber industry. Therefore, we take the Chiayi Train Station renovation design as a challenge for design criteria validation.

The area of the design region is 33,300 m^2 (the red area coloured in Fig. 4.), comprising a central train station and mixed-use commercial and residential buildings used by the people for over 50 years. Hence, the considerations include the construction regulations, heritage preservation, and the effects on the neighborhood.

Since the original design of Chiayi Railway Station emphasized transportation functions, created the image of an urban entrance, and even shouldered the symbol of the authority and advancement of the Japanese Empire, the planning of the station building and surrounding environment was not based on local sustainable development, nor did it consider ecological green buildings, urban economy, life cycle, and related issues.

Fig. 4. Location of the design project

Therefore, in our verification design, the building of the train station and its surrounding areas have been retrofitted into a liveable public space for people. In the process, evaluation methods such as LBC, LCC, Placemaking (Power of 10+), and local government regulations are considered to ensure the feasibility of space function, materials, and resources and their economic viability.

The result of the design presented here is the masterplan proposal to build a community-sized town in the middle of

Chiayi City, where the spatial context is designed in a group form composed of the megastructure central station and conventional living zone (Ünal et al., 2022). Second, the design clarified the interactions of each sector between axial attributes and standard urban spatial parameters to describe the movement patterns in high-density building environments. The outcomes of the design are illustrated in Figs. 5, 6, and 7. The qualitative and quantitative explanations of the station building area are shown in Table 3. The whole design concepts are summarized as follows:

1. Contributions to an all-encompassing vision involve the creation of distinctive structures (renovation of the station building and construction of the main terminal) while maintaining the original façade, heritage context of the mega-structure, and interconnected road systems at varying depths, enhancing the effectiveness of the circulation system in the neighborhood. For example, axes from the station building are directly connected with the nearby landmarks around the city, the Central Fountain, Bus Terminal, Art Museum, etc.
2. Increased visual cohesion of expansive areas, especially at the strategic points or nodes, creating transitional zones within the group form, such as land functions, atriums, and open plazas. This results in an enhanced and more cohesive spatial arrangement within the complex, more open space to interconnect with one another, as well as attributing to the elements of placemaking.
3. The multidirectional observation of areas like intersections or open spaces, such as freely flowing alleys, aids users in acquiring improved spatial awareness and orientation within an unfamiliar architectural setting.
4. The station building's façade has been kept in its original form. The plaza has been cleared out for more integration with other axes from different sectors, as seen in Fig. 6. Henceforth, the front elevation of the original terminal building is kept to preserve the heritage of the local community, while redesigning the spatial forms, structures and rooms with different functions behind which need integrating with the neighborhood.

These four goals are a part of standard procedures that lay the foundations of the design developments in this verification project, along with the setting of pathways, nodes, edges, landmarks and individual groups of buildings (districts).

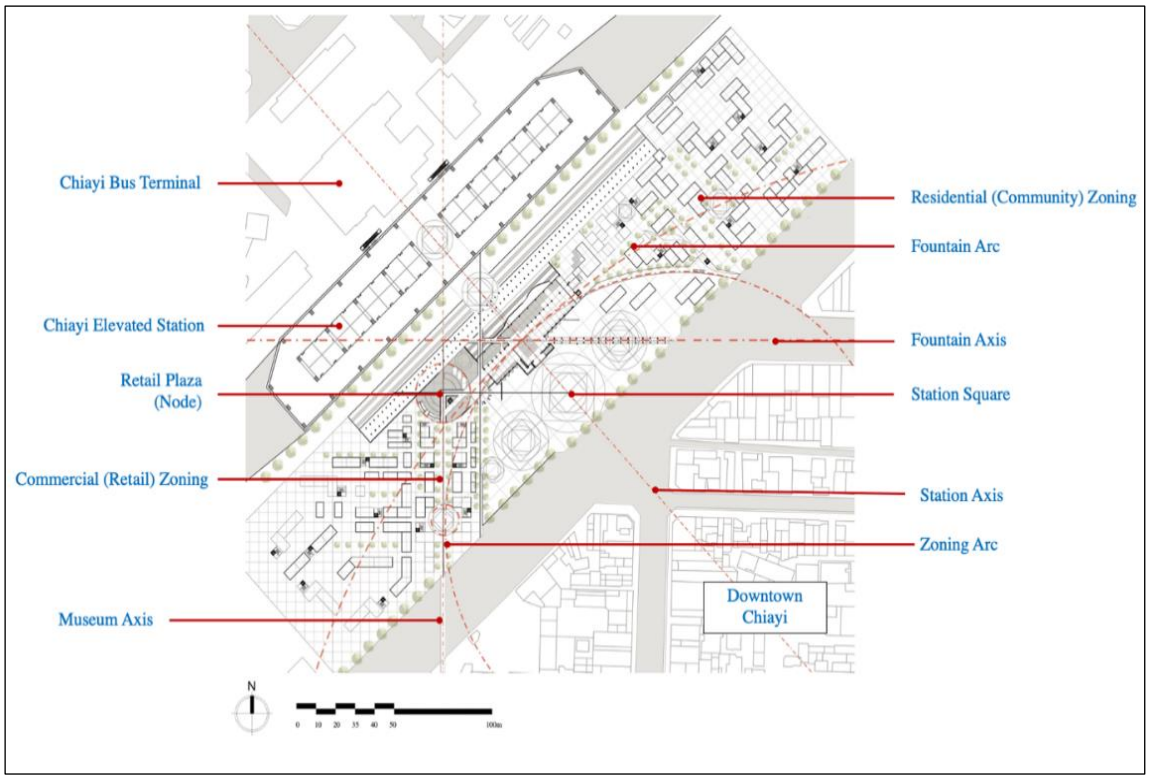

Fig. 5. Proposed community planning of Chiayi Station and its neighborhood

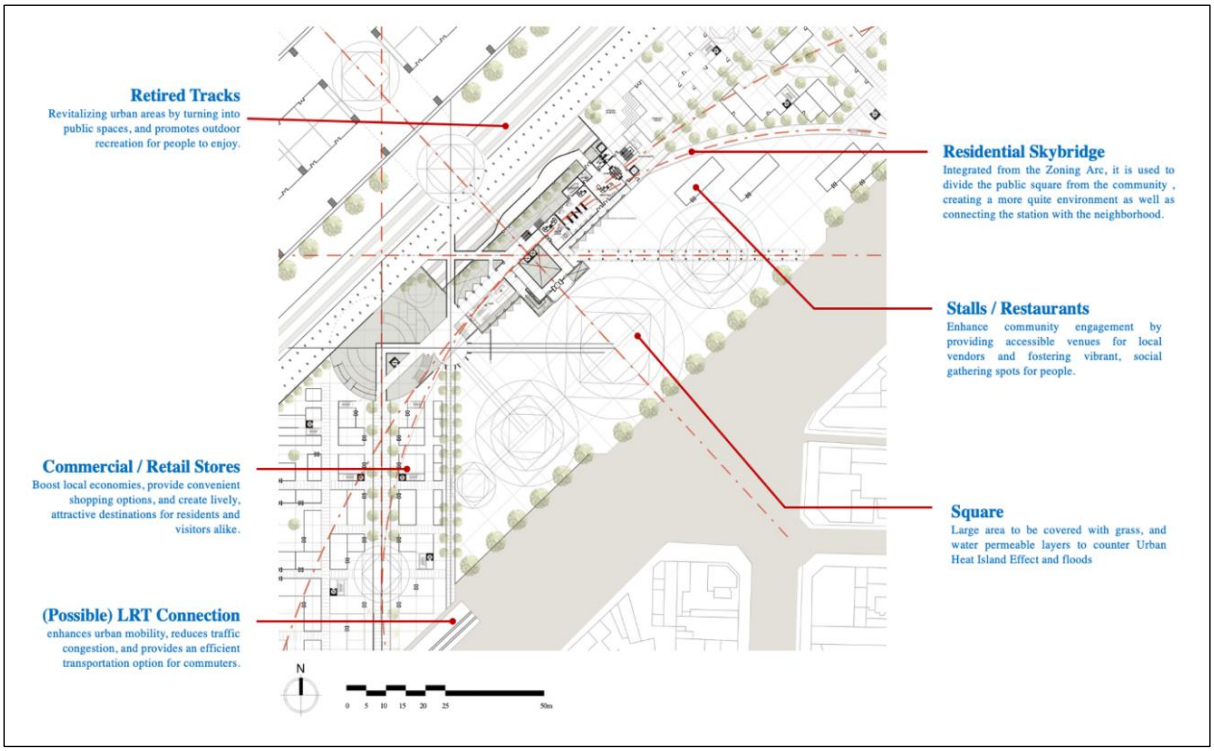

Fig. 6. Proposed site development analysis of Chiayi Station and its neighborhood

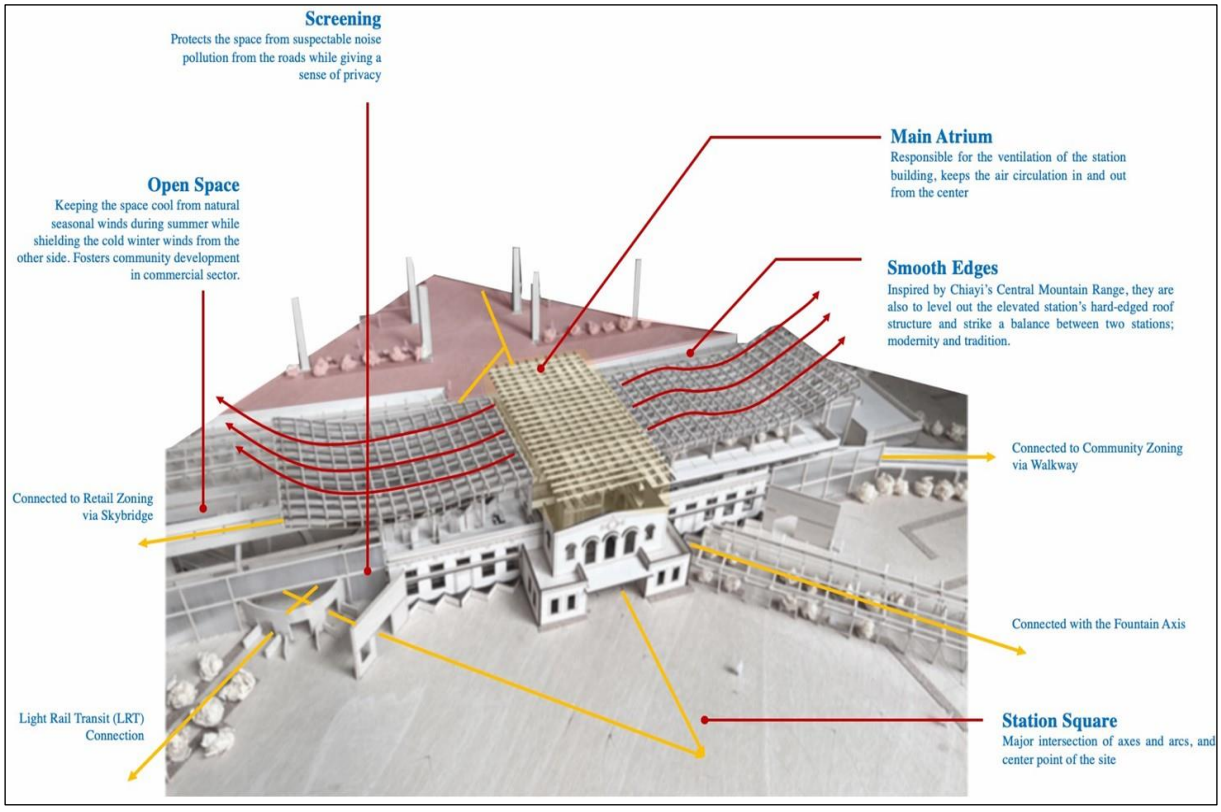

Fig. 7. Model analysis of the Chiayi Station renewal proposal

Table 3. The qualitative and quantitative explanation of the station building area.

ID	Department	Program criteria			Program	
		Floor	Type	NSF	Units	Total NSF
A1	Entrance	1F	PU	20	1	20
A2	Multi-purpose space	1F	PU	200	1	200
A3	Main lobby	1F	PU	100	1	100
A4	Exhibition space					
a	Tentative exhibition	2F	PU	250	1	250
b	Visitor's center	1F	PU	100	1	100
c	Permanent exhibition	B1	SP	250	1	250
A5	Art gallery	B1	SP	250	1	250
A6	Restaurant					
a	Stage	B1	PU	50	1	50
b	Café	B1	PU	200	1	200
c	Kitchen	B1	PR	100	1	100
A7	Roof-farming Space	3F	PU	200	1	200
A8	Community rooms	2F	PU	50	4	200
A9	Library	1F	PU	250	1	250
A10	Retail space	B1/1F	PU	50	8	400
A11	Meeting room (seminar)	1F	WS	150	2	300
A12	Director's office	1F	WS	60	1	60
A13	Reception	1F	WS	40	1	40
A14	Open staff office	B1/1F	WS	250	1	250
A15	Mechanical	B1	PR	100	2	200
A16	Storage	B1	PR	100	2	200
	TOTAL NSF (m^2)					3620
	TOTAL NOSF (m^2) (NSF+30% for Circulation)					4700

The renewed station integrates several innovative and sustainable architectural features aimed at enhancing both functionality and aesthetics at the same time. To bring more efficiency in using space, materials, and resources. Through various critiques and broad discussions with design experts, we have found that the engagement and initiative opinions of people in the neighborhood are vital to the success of a healthy, beautiful, and fair community. While Green Building Certification Systems (GBCS) such as LBC examine the sustainability of worldwide projects and are updated to reflect the sustainable building development trend (Ding et al., 2018; He et al., 2018), there is still a lack of criteria for evaluating local public buildings that can be different in cultural context, and how the people in the community can develop their "self-identity" within the neighborhood which is unique to others. Henceforth, the additional requirements for locality are essential for the building not just to be physically sustainable but also to keep in people's minds the connections to the building along its historical context and heritage. Therefore, design experts suggested we further consider the issues for Creative Placemaking.

Fig. 8 shows that Creative Placemaking is essential for public well-being and sustainability where fast-paced changes occur. Creative Placemaking emerges as an evolving field of practice that intentionally leverages the power of the arts, culture, and creativity to serve a community's interest while driving a broader agenda for change, growth, and transformation of cities and places. The concept of Creative Placemaking supports the Sustainable Development Goals (SDGs), promoting an environment that is inclusive, safe, and resilient environment.

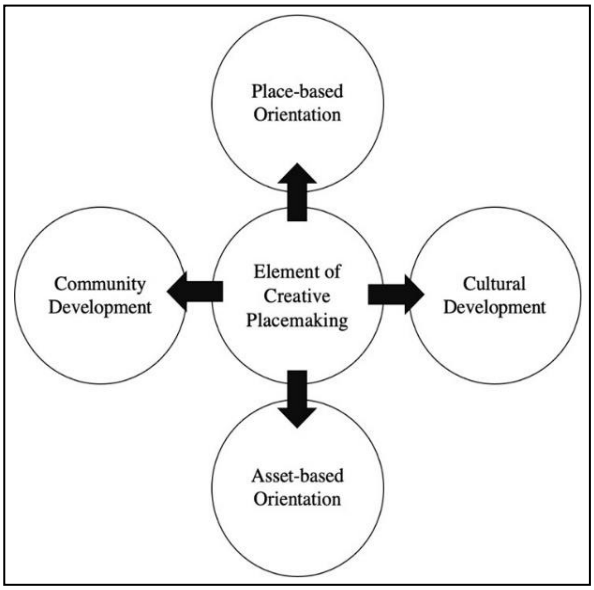

Fig. 8. Creative Placemaking and its elements (Ramli and Ujang, 2020)

However, Creative Placemaking also has its

shortcomings, such as the insufficient consideration of motivating residents while implementing sustainable goals in the community design. For instance, one of the sustainable supports could be from the appropriate "vernacular economy" or "urban economy" participated by residents so the planning project could be sustainably maintained and updated.

3. RESULTS AND DISCUSSION

In the previous chapter, we introduced the Chiayi Houses Design Competition requirements and used the Chiayi Railway Station public building design as the verification design. While applying some international design criteria and frameworks, we found that Machizukuri has no basic operational or design guidelines, so it is challenging to help designers obtain a complete and comprehensive view of all the factors that influence a project in the beginning; LBC and LCC are still a post-assessment tool, and some attributes of the major items and subitem are confusing; Placemaking and the Power of 10+ cannot help the designer define which items/projects should be prioritized for communities with different levels of development; Creative Placemaking lacks considering the motivative power for residents to support the sustainable projects.

According to the previous analysis, it can be found that "What Makes A Great Place?" proposes many measurable indicators for various factors. This is a method applicable to various cities around the world, so we adopt it. However, it cannot identify the factors that should be given priority in communities or regions with different development levels.

Consequently, in the framework presented in this study, we adjust the design factors based on different development stages and broaden the range of factors and indicators based on reviewer feedback for the proposed Chiayi Railway Station design. It has clear level classifications, a comprehensive scope of considerations, and practical measurement indicators for motivating residents to support sustainable development. We propose the framework to provide architects, urban planners, environmental engineers, government units, and community residents with practical assistance to drive the design process. The whole design-factor framework is shown in Fig. 9 to Fig. 12.

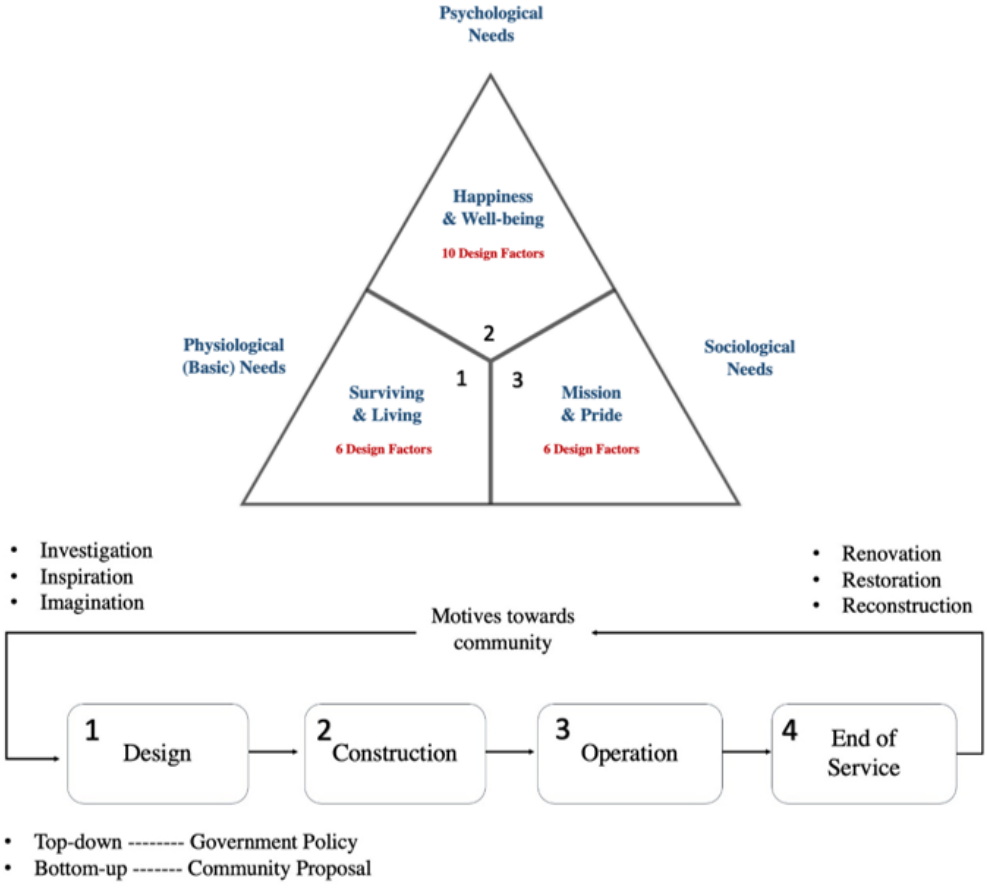

Fig. 9. The design factor framework of community-based public building design.

The design factor framework for public buildings is developed to fulfill all the needs of people, whether in physiological (Surviving and Living), psychological (Happiness and Well-being), and sociological (Mission and Pride) to develop dynamic principles in the community. Based on the motives in each setting, the framework can be

used in any process of renovation, restoration and reconstruction to investigate, imagine, and inspire the community of how it can be. We believe that it can either be a top-down approach, a direct policy from the government for the public or the other way around; the bottom-up where the community will make proposals for their homes and public spaces to the local authorities, similar to the Machizukuri process where people come together to gather ideas.

Fig. 10. Six design factors of Motive 1, Surviving and Living, and the measurements.

Table 3. The elements and their descriptions for Surviving and Living

Element	Description / indicators
Safe and secure	Based on the crime statistics, and making sure of the safety in the neighborhood, improving the existing infrastructures to mitigate the risks of accidents for people of all ages within the community / Crime statistics
Resilience against disasters	Looking at the infrastructure ratings in accordance with the local rules and regulations / Building conditions / Sanitation rating / Infrastructure rating
Healthy and clean	Making sure that sanitation and cleanliness are up to standards / Population of disadvantaged groups / Sanitation rating / Infrastructure rating
Sufficient resources	The community can self-sustain itself in terms of its basic needs in food, water, and sanitation / Energy consumption data / Land-use patterns
Accessibility within the neighborhood	Using traffic data, and land use patterns to connect with each other in the neighborhood / Infrastructure rating / Transit usage and mode splits / Traffic data
Vibrant economy	Property values, rent levels, and retail sales are in accordance with the current market prices, along with local business ownership / Local business ownership / Property values / Rent levels / Retail sales

Fig. 11. Ten design factors of Motive 2, Happiness and Well-being and the measurements.

Table 4. The elements and descriptions for Happiness and Well-Being

Element	Description / indicators
Welcoming and friendly	Community participation and connecting with people, engaging in activities / Parking Usage Patterns / Pedestrian activity / Evening use / Street life
Beautiful and delightful	Investigating the underlying attitudes and values of aesthetics in the neighborhood
Efficient public services	Delivering public services, programs, and projects that are efficient, effective, and fair for the community / Parking Usage Patterns
Convenience	Direct connections and walkable pathways with clear signage allow better access / Parking Usage Patterns / Pedestrian activity
Creativity	Making a significant contribution to the health and well-being of local communities through creative arts programs and projects / Evening use / Street life
Well-protected environment	Governance and management of conserving the environment through community work / Environmental data / Population of disadvantaged groups
Biophilic and bioclimatic	Focusing on the impact of human needs on the creation process and assessing the concept of value in architectural hypotheses based on connections between nature and buildings / Energy consumption data / Population of disadvantaged groups
Fair social systems	Community promotion through a shared system view among different societal actors / Social networks
Capability of spiritual sustenance	Exercising sensitivity, caution, tolerance, and acceptance of values towards people
Sound social supports	Reducing distress and buffering the effects of other related stresses through social networks and volunteerism

Fig. 12. Six design factors of Motive 3, Mission and Pride, and the measurements.

Table 5. The elements and their descriptions for Mission and Pride

Element	Description / indicators
Sustainable and net-zero lifestyle	Implementation of the ISO14000 environmental management：ISO 14067 - carbon footprint of products, ISO 14040 lifecycle assessment, etc.
Well-protected culture and history	Preserving famous landmarks / sites /specialties / activities / people and their stories, maintaining the current tangible heritage that were passed down from the past.
Positive local identity	Media coverage promoting the culture and traditions of the community / Positive media coverage
Initiative dedication and self-stewardship	Cultivating the skills and dedicating them for the future / Education policies / Volunteerism
Positive and affective atmosphere	Directing public emotions through practical actions, actively shaping forms of affective governance / Education policies / Volunteerism
Advanced practices to promote human society	Jointly creating the spiritual value of the community based on the spirit of fairness, kindness, and reciprocity / Education policies / Volunteerism

Along with the three categories, the features of the design-factor framework are as follows:

1. Classifying design factors based on the motives (needs) of community residents can ensure long-term design goals can obtain the community's continued support and sustainable execution energy in the present and future moments.
2. Classify design factors based on the motives of community residents so the classification principle is single, concise, and clear to the residents. Hence, design factors could avoid overlapping with other methodologies and confusions.
3. Various quantifiable measurement indicators are listed for the motive category to which each design factor belongs. This can help designers (including the government and the community) conduct more accurate dynamic assessments based on data at different times and regions.
4. Since appropriate design factors are selected based on local quantitative data of indicators and the needs of the residents that are associated with different time periods, this framework can be applied at the beginning of the design or any stage in the construction lifecycle and is not limited to the assessments after the community construction is completed.
5. The framework can be connected and embedded with existing local building codes or sustainable criteria such as EEWH of Taiwan and international standards such as ISO. It can also echo the initiatives of international organizations, such as ESG, SDGs, etc., for the future development of the community in any region around the world.

The involvement of community residents is an essential element for the successful implementation of the proposed design-factor framework in this study. It is advisable to consult the comprehensive practical measures outlined by Jain (2023) and to consider the adoption of the following strategies to promote community engagement.

1. Resident surveys and feedback: Gathering feedback through regular surveys on proposals, services, or design plans. Taking residents' feedback into account, implementing changes, and ensuring effective communication with the community.
2. Community outreach programs: Working together with local nonprofits or organizations to create community service projects or programs that tackle local needs.
3. Online communities and social groups: Participating in online forums or discussion groups focused on community issues. Organizing questions-answer sessions or expert panels on online platforms.
4. Educational measures: Conducting webinars or workshops aimed at educating the community on pertinent subjects. Producing and distributing educational material, such as blog posts, articles, or videos.
5. Volunteer involvement: Encouraging residents to volunteer in community projects. Showcasing the involvement of residents in community activities through community communications.
6. Community advisory boards: Establishing advisory boards or focus groups to collect community insights and opinions. Community members' input is being sought on decision-making processes.

In the entire life cycle of public buildings, community organizations, design units, operating units, and government units are the four most important participating units. In particular, community organizations and government units take part throughout the life cycle. To ensure the development or transition between each life cycle stage, it is necessary for government units and community organizations to continue promoting community

participation through the above-mentioned community participation strategies to achieve seamless integration of the entire life cycle.

4. CONCLUSION

In this research, we proposed a new design-factor framework for sustainable community-based public building design projects. It classifies design factors based on community residents' motives to ensure long-term design goals can obtain the community's continued support and sustainable execution energy. Its classification principle is single and clear, and design factors will not overlap and be confusing.

Among the design-factor framework, various quantifiable measurement indicators are listed for the motive category to which each design factor belongs. This can help designers (including the government and the community) conduct more accurate dynamic assessments based on data at different times and regions. Therefore, this framework can be applied at the beginning of the design or any stage in the construction lifecycle and is not limited to the assessments after the community construction is completed. The framework was established to connect with existing local or international standards and echo global organizations' initiatives for humankind's future development.

To promote inclusive and sustainable development, ESG practices have been incorporated into the design-factor framework. This design-factor framework helps to have open lines of communication with frequent updates and channels for feedback between the policymakers and the community. They all can empower the system through many events such as community programs, co-design sessions, and participatory workshops. As the city and its communities evolve, we need to consider how to approach the issues with flexible structures and frameworks that can benefit all people within. The proposed framework in this paper can be used as a set of recommendations for any organization, entity, or government to consider better criteria for people's way of living. This also can be deemed necessary for creating a more sustainable and improved sociality amongst the people within the community in the future, not just in Taiwan but also around the world.

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