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Constructing a Framework for Economic Value of Urban Renewal in Taiwan

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Abstract. Following a phase of early prosperity, Taiwan's urban centers have slowly declined, resulting in the hollowing-out of business districts and declining populations, and prompting widespread interest in urban redevelopment. To improve the quality of urban environments, not least in terms of disaster prevention, the central government's urban-renewal policy is aimed at re-inspiring local development via the introduction of funds and dynamism from the private sector. However, progress has been slow because potential private-sector partners tend to measure projects' merit and performance chiefly in financial terms, and the economic value of urban renewal remains notoriously difficult to quantify. Accordingly, this study proposes a complete economic-value framework for urban renewal in Taiwan through secondary-data methods. Specifically, this framework consists of three facets and six factors, of which the land-use value facet (comprising the land and real-estate value factors) relates to the strength of the local economy; the energy-conservation value facet's two factors are energy-use and carbon-emissions reductions; and the disaster-prevention value facet consists of reducing the likelihood of disasters, and reducing their impact.

1. Introduction

The highly developed cities of early Taiwan experienced slow decline beginning in the 1970's, with urban business districts shrinking and populations migrating to the suburbs. Beginning in the late 1990s, urban-renewal policies for older urban areas have aimed to check or reverse these processes, and have been widely discussed by scholars, policymakers and the general public. Urban renewal is an inherently complex and difficult process involving a wide range goals, including the improvement of living quality, the promotion of sustainable development, and preparation for and prevention of disasters. Through the Urban Renewal Policy Act, passed in 1998, Taiwan's government has sought to accelerate the promotion and implementation of urban renewal by harnessing the power and funds of the private sector: specifically, via measures such as volume awards and tax concessions, and incentivization of green architecture and the provision of open space.

However, private-sector participants and potential participants in urban-renewal projects often use decision-making models that measure the merit and success of such projects simply in terms of increases to real-estate prices. However, the economic value created by urban renewal is both broader and more complex than such models would suggest: including factors such as quality of life, aesthetics, disaster resilience, and what might be called the morale of local people and businesses, all of which



have a direct and/or indirect impact on the economic value of the city as a whole. Therefore, this study proposes a comprehensive framework for measuring the effectiveness of urban renewal in terms of its wider economic value.

As Chou has shown, the most controversial aspect of the economic assessment of urban renewal is the measurement of external costs and benefits: for example, the intangible value of historic districts and emotions in community networks, post-renewal increases in local commercial activities, or environmental pollution caused by increased numbers of vehicles. Some of these ripple effects of urban renewal are simply unquantifiable in economic terms, while others are quantifiable but diffused across a complex array of public and private stakeholders [1]. Based on findings that urban renewal positively affected the environmental quality of the surrounding area, Wu proposed that such quantification adopt all or more of the following three orientations: 1) health, e.g., ventilation, sunshine and air quality; 2) safety, e.g., traffic accidents and disaster preparedness; and 3) convenience, e.g., the presence and quality of public facilities, open space, and parking, as well as streetscape aesthetics and crowding [2]. Li noted that the price of housing will be affected by its age, layout and transfer area, as well as by its distance from transportation facilities and green space [3]; and Chen indicated that economic value was accurate as an evaluation index for historical re-use investment [4]. Accordingly, it is suggested that no matter what mode of development is pursued, post-restoration development of historically significant cultural assets should take account of the economic value of their reuse. As such, research on urban renewal should explore its financial impacts and risks, its effects on rights, the role of public/private partnerships, implementation methods, floor-area incentives, capacity transfers, options, and trust funds. Anyone who implements an urban-renewal business plan must confront multi-faceted social, cultural, economic, and ecological problems. Private-sector decision-making about whether to invest in such plans is closely tied to floor-area incentives and capacity transfers, as well as financial costs/benefit analyses and execution-time projections. However, in the view of the Taiwanese government and general public, the promotion of urban renewal is not merely about the generation of economic value, but also about redevelopment in a broader sense, including reduction of the impact of natural disasters on cities in the face of extreme climate events.

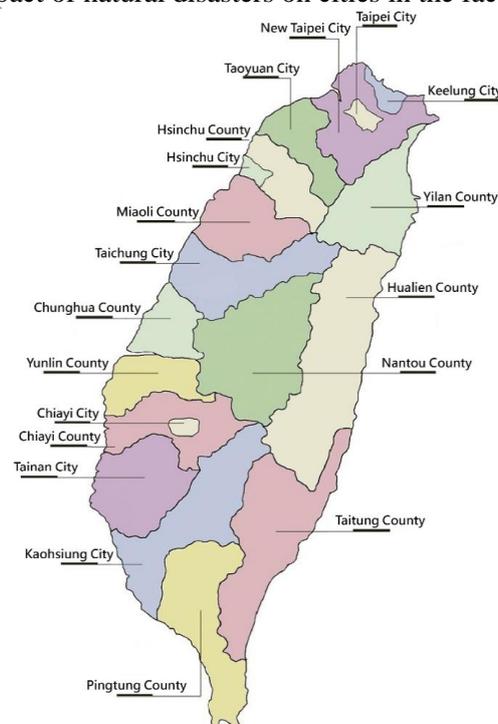


Figure 1. Taiwan. Produced by the authors, sources: [5]

Nevertheless, rates of return on investment continue to dominate private-sector decision-making about urban-renewal investment, which ignore the wider interrelationships between such investment and its less tangible consequences, good and bad alike. The same myopia affects academic research on urban renewal, which likewise tends to prioritize economic value as its chief conceptual orientation. Therefore, the key aim of the current study is to establish a completely novel framework for evaluating urban renewal projects' using the secondary-data method. The geographic scope of this research is depicted in Figure 1.

2. Literature Review

2.1 Definitions of Urban Renewal

Article Three of the Urban Renewal Law of Taiwan defines urban renewal as falling within the scope of urban planning, and as consisting of the implementation of reconstruction, rehabilitation or maintenance measures. "Old" urban renewal, according to Article Seven of the same law, is defined as taking place in areas where old buildings are dense, dilapidated, unsightly, and affect public safety, and therefore must be demolished, rebuilt, or specially maintained.

2.2 Definitions of Economic Value

In economic-value theory, "total economic value" includes "use value" and "non-use value" (Turner), with use value relating to the direct or indirect use of a certain thing, the benefits of which can be divided into current (direct), current (indirect), and future use value. Non-use value, meanwhile, is inherent in the existence of the thing – i.e., is neither called into existence nor changed by any other thing(s) – and can be divided into existential value and bequest value. The former means that even if people have little or no chance of using the resource, they are willing to pay a certain price to maintain its existence. The bequest value, on the other hand, refers to the total value people are willing to pay to protect the resource for the use of future generations, regardless of whether they are also using it themselves (Turner) [6].

3. Research Methods

Discussion of the economic value of urban renewal involves a wide range of orientations. The current study proposes an urban-renewal economic-value framework and factors based on an exploration of urban-renewal law and the related literature that adopts an economic-value perspective. Li [7], Feng [8], and Yeh [9] have all used the secondary-data method for indicator construction and argumentation; and this study also adopts it to collect, summarize and organize the essence of previous studies, before proceeding to a complete discussion and elaboration of the framework and factors mentioned above.

4. Results and Discussion

Urban-renewal implementers must cooperate with Taiwan's government and promote urban-renewal policy in accordance with the relevant laws and regulations if they are to win volume awards. The areas targeted for urban renewal are often old neighborhoods, developed in their wider urban settings' early history, and representing the essence of such settings. Therefore, land-use efficiency is improved after the land is re-planned to enhance the land use value via the urban-renewal process.

From prior discussions of the real essence economic value of urban renewal, it is clear that implementers also conform to urban-renewal law during the planning process, as evidenced by their plans' inclusion of public facilities and green buildings, which not only serve their agenda of gaining volume awards, but also enhance the value of real estate.

In addition to improving the quality of the urban environment and its functionality and safety, prevention of disasters is an important goal for urban renewal. In line with the principles of eco-city development and eco-city planning, planners plan various systems for urban public facilities, open space, mass transit, human-oriented transportation environments, green transportation and urban water resources, as well as formulating overall development strategies. Urban renewal's non-essence

economic value includes the use of new technologies and building technologies in housing, transportation and environmental planning, which can reduce energy use and carbon emissions. On the other hand, the addition of public facilities, open space and certain other types of change can lead to setbacks in public safety, and enhance the potential impacts of disasters.

The Urban Renewal Act is aimed in part at enhancing urban disaster-prevention and energy-conservation measures. Thus, planning and design processes conducted under the urban-renewal umbrella conform to the green building code and are more likely to secure volume awards. They also reduce energy consumption by buildings; legally reserve and demarcate open space and space for public facilities; enhance the environment for non-motorized transportation, e.g., walking and cycling; reduce carbon emissions; and improve urban evacuation and disaster-prevention functions. In the demarcation phase of urban-renewal areas, it is generally held to be possible to comprehensively assess the disaster-prevention systems of buildings and the overall environment in such areas. When updates are subsequently made, moreover, regional-level planning of disaster prevention systems can be improved.

This study's framework for the economic value of urban renewal, as governed by the Urban Renewal Act, therefore incorporates the real essence and non-essence economic values of urban renewal, re-integration of land, and land-use planning; the gaps between urban areas, fire-protection structures or adjacent buildings, and the seismic strength of buildings; and the potential benefits of urban renewal to local development. The economic value of urban renewal is reviewed pursuant to the Urban Renewal Act, and in addition to major reconstruction takes account of improvements to the quality of the urban environment and urban disaster resilience; adherence to eco-city principles; and energy conservation. Urban-disaster prevention and climate-change adaptability concerns also mandate land-use reviews as part of urban-renewal projects. Increases in public space allow for the installation of permeable pavement layers that contribute to reducing rainwater runoff and storm impacts, while at the same time enhancing the amount of shelter space that is available in the event of earthquakes and fires. Lastly, indicators related to green buildings will be included in the framework, as they have been shown to reduce energy use and enhance resource reuse, thereby reducing urban carbon emissions and improving environmental quality. To sum up, then, this study explores urban renewal's economic-value structure in terms of three main aspects: land-use value, energy-conservation value, and urban disaster mitigation value. The specifics of its economic-value framework are shown in Figure 2 and Table 1.

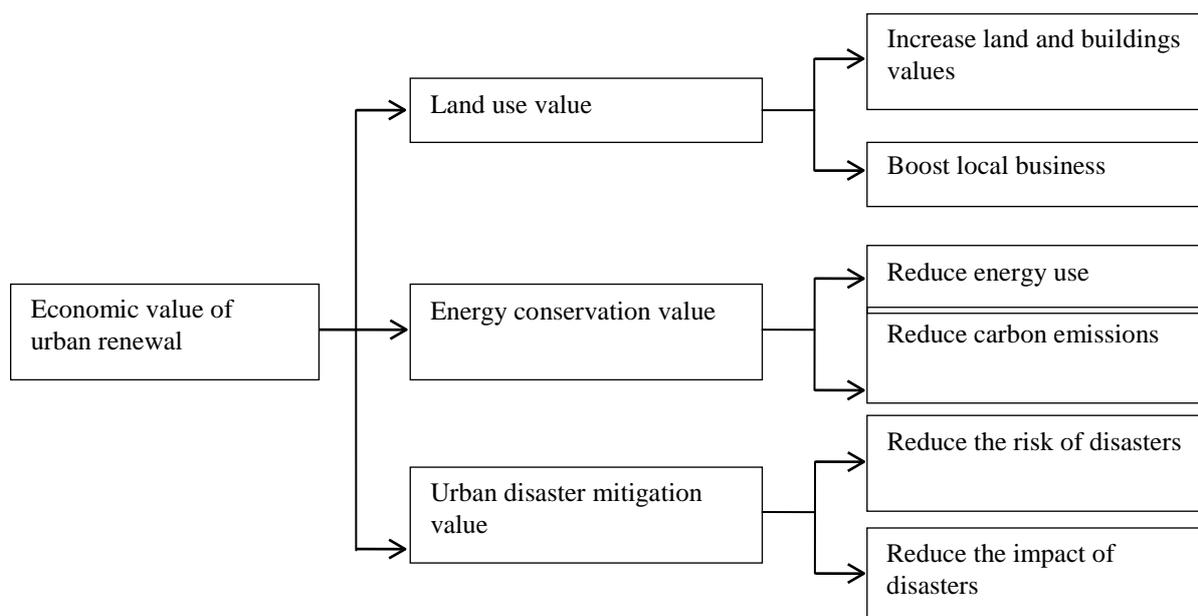


Figure 2. Economic-value framework for urban renewal

Table 1. Impact factors, economic value of urban renewal

Facet	Impact factors	Narrative explanation
Land use value	Increase land and buildings values	Green space improves the urban environment, protects environmental quality, establishes sound public facilities and open-space systems, mitigates the impact of disasters, boosts the markets in land and residential buildings, and increases commercial retail rents and occupancy rates.
	Boost local business	Comprehensive regional planning and good-quality residential can attract new residents and inward investment, improve local environmental quality, and increase the attractiveness of retail centers and tourist destinations.
Energy conservation value	Reduce energy use	Urban renewal can introduce green building design; reduce energy use and increase resource reuse, to obtain volume awards.
	Reduce carbon emissions	Construction for urban renewal uses new technologies, materials and commodities with low carbon footprints to reduce carbon emissions, improve urban air quality, and enhance urban carbon neutrality.
Urban disaster mitigation value	Reduce the risk of disasters	During the re-planning and consolidation of an area, fireproofing of its buildings and the adjacent buildings are enhanced, and the overall amount of open space is increased, thus reducing surface runoff, thus reducing both the incidence and the impact of fires and flooding.
	Reduce the impact of disasters	During the reconstruction of buildings, their seismic strength is increased, and open spaces and public facilities are planned with disaster-related evacuation, relocation and shelter in mind, thus enhancing the city's disaster resilience.

4.1. Land Use Value

Urban development tends to spread outward slowly from a city's core. With the passage of time and changes to the environment, the building density, infrastructure, public facilities and open space of early urban planning have proved unable to cope with residents' needs. Urban environments are more at risk than ever before from extreme climate-related natural disasters, and the intensity their preparations for such events is generally insufficient, making urban-renewal projects potentially critical to residents' safety. On the other hand, re-planning of urban land use can also enhance the cityscape and residents' quality of life, not least by prioritizing open space. As such, urban renewal can indirectly promote the reinvigoration of local economic development.

4.1.1 Increasing land and buildings values

As noted in the previous section, the process of urban renewal tends improve the urban environment's aesthetics, environmental quality, and land-use efficiency. Harvey showed that in real estate-led reconstruction, the timing of a given project depends on three basic issues: the value of the available land resources as currently used; their value if re-assigned to the best possible alternative uses; and the

cost of such re-assignment [10]. Effective use of land and buildings, and thus urban-development efforts more generally, have been found especially effective if the methods adopted include restoring and upgrading existing structures and infrastructures (Malta Planning Authority) [11]. In addition, Jang observed that the greater positive social and economic impacts of urban renewal include changes in business practices, social values, architectural aesthetics, the presence of and demand for recreational facilities, shopping convenience, land-use patterns, land prices, and rents. Urban renewal provided a comfortable environment and higher security buildings, which promoted the value of land and property and improved land use efficiency in the land relocation and planning, as well as the reconstruction of buildings [12].

4.1.2 Boosting local business

As any city develops, changes in business practices and consumer tastes, and the passage of time itself, inevitably result in decay; and urban renewal is rightly seen as a means of reversing this process by re-inspiring local development. Andersen's research indicated that urban renewal's transformation of sites can serve as a catalyst for further investment and create a range of benefits for local communities [13]. The retail industry in particular provides numerous opportunities and hires from a wide array of socioeconomic groups, leading some to argue that retail-led regeneration provides significant economic opportunities through direct employment and additional investment while at the same time helping to rebuild strained emotional connections between districts and their inhabitants (Calxton and Siora) [14]. However, urban-renewal initiatives should also incorporate sufficient public resources to address the issue of urban stagnation head-on, while working to increase social and economic benefits and promote entrepreneurial activities (Calxton and Siora; Hamnet; Andersen) [13-15]. Nor should it be forgotten that the process of urban renewal, if successful, will tend to promote not only local employment and other local economic activity, but also the government's tax take.

4.2. Energy Conservation Value

Older urban-renewal projects often failed to create connections between well-established walking environments and mass transit systems. Increasingly, however, efficient and interconnected mass transit, green transportation, and pedestrian zones are important indicators of urban environments' resident-friendliness. Urban-renewal schemes must of course be compliant with regulations and congruent with other government policies, and this is perhaps especially prominent in the case residential and transportation-based carbon emissions. Newly built buildings use energy-efficient equipment to reduce their energy-consumption, and urban-renewal, planning and design decisions – notably, regarding the creation of external space – can also help reduce energy use. The Sustainable Neighborhood Retrofit Action Plan observed that gas and electricity consumption where be reduced through residents' and businesses' participation in old-community and urban-renewal environmental action activities [16].

4.2.1 Reducing energy use

As previously noted, urban-renewal schemes involving the erection of new buildings are required to comply with the Green Building Code, which emphasizes the use of energy-efficient materials and design features that facilitate energy efficiency, energy-use reduction, and water-saving. Specifically, this can involve solar-energy systems, lighting technology, ventilation control, rainwater harvesting and roof greening, among other elements. Such approaches to building represent the most cost-effective approach to CO₂ reduction; and urban renewal also provides a useful opportunity to switch to sustainable fuel sources, as changes in energy infrastructure can be linked across multiple buildings, thus reducing costs (Sunikka) [17]. Moreover, urban-renewal efforts generally tend to increase the amount of pedestrian-friendly space and reduce the use of personal motor vehicles, thus lowering carbon emissions and having a broad positive impact on the welfare and health of the inhabitants.

4.2.2 Reducing carbon emissions

As noted above, residential buildings and transportation are the two main sources of urban greenhouse-gas emissions, which cause urban temperatures to rise, often to uncomfortable or even dangerous levels. Ideally, therefore, new buildings constructed as part of urban-renewal schemes should comply with green building codes, improve pedestrian-friendliness and the proportion of green transportation, and use clean and renewable energy to reduce urban carbon emissions and create a low-carbon urban environment. As Mehdipanah et al. has noted, most urban-renewal projects result in improved walking capacity, construction of new public spaces, and increases in the number of community projects that have important positive impacts on residents' overall well-being [18]. Urban renewal's role in CO₂ reduction, in particular, is also important in terms of policy outcomes and regulatory compliance (Sunikka) [17].

4.3. *Urban Disaster Mitigation Value*

4.3.1 *Reducing the risk of disasters*

Thomas suggested that being prepared for reconstruction represented an opportunity to replace any substandard buildings, resolve disaster-relevant land-use conflicts, and remove environmental nuisances [19]. Reconstruction can also help make the most of the land's potential, and help communities solve various problems (Sigworth and Wilkinson) [20] such as residential basement flooding (SNAP) [16]. Ideally, other infrastructure, and the environment should all be improved by urban-renewal initiatives, in a manner supported by all social partners (Adair et al.) [21]. The selection and prioritization of urban-renewal areas should be based on comprehensive consideration (i.e., at the regional as well as local scales) of how to reduce the incidence of preventable disasters, in what Shi has referred to as active disaster management [22].

4.3.2 *Reducing the impact of disasters*

During the re-planning and consolidation of an area, urban-renewal projects can upgrade its buildings' fire safety (and that of adjacent buildings in other districts), and add open space that reduces surface runoff and improves the drainage system, thus reducing the impact of non-preventable disasters involving fires, storm surges, and flooding caused by heavy rain. As well as reducing their immediate negative consequences, such adaptations to natural disasters reduce post-disaster recovery times and costs. Moreover, many old buildings in Taiwan remain in use beyond what might be called the end of their natural lifespan: a problem that can best be dealt with via government regulation aimed at ensuring that more buildings meet certain safety standards. The disaster-prevention and mitigation strategies used in the field of urban disaster management, combined with urban renewal's reconstruction methods, could usefully develop assessment indicators for the disaster-risk factors of buildings and their surrounding environments in the contexts of earthquakes, fires, and floods, singly or in combination. Indeed, active promotion of urban-renewal measures has become the main strategy for improving Taiwan's urban disaster Mitigation functions (Deng, 2011) [23]. As we have seen, urban renewal promotes compliance with regulations and governmental policies, including those aimed specifically at smoothing post-disaster recovery and reconstruction processes at both the micro (building) and macro (regional) scales.

5. Conclusion

Urban-renewal areas in Taiwan are considered priority planning areas, and are selected in part according to various disaster-preparedness factors. According to the principles of eco-city planning and urban-design guidelines, a key development criterion for urban renewal is whether it will benefit sustainable urban development, slow the heat-island effect, and enhance overall environmental quality via the provision or more open space, green space, and water features. Urban renewal is expected to achieve both disaster reduction (in the case of man-made disasters such as fires) and disaster mitigation (in the case of both man-made and natural disasters), regionally as well as locally. The present study has explored the economic value of urban renewal in Taiwan through an analysis of the

relevant laws and scholarly literature, and established a useful framework for the economic valuation of urban-renewal projects that goes beyond the usual, simplistic method of simply measuring post-project increases in property values. Rather, this new framework – in addition to property values – takes account of projects' tangible and intangible impacts on local business activity; reductions in energy use and carbon emissions; and disaster prevention and mitigation.

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