A Study on the Optimized Evaluation Criteria for a Disaster-Prevention Ur Area in Yongkang District, Tainan City

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Keywords: Urban Renewal Area, Evaluation Criteria, Economic evaluation criteria

1. Introduction

Since the 921 earthquake struck Taiwan in 1999, Disaster-Prevention Urba (DPUR) become one of the major considerations in disaster-prevention policy. T DPUR projects by the Ministry of the Interior in 2013 aims to introduce an inte for urban areas with higher disaster risks. However, the need for clear and it criteria for DPUR area selection is crucial. Controversial debates regardi designating the renewal area might result in high-risk area being undervalue low-risk area could be overvalued and stigmatized. Therefore, this research is proper evaluation criteria for DPUR areas in order to balance the possible nega on the renewal area.

This research will be based on the second phase of the DPUR Research Project District, Tainan City, which was brought up by the Ministry of the Interior. buildings risk map, blocks with higher ratio of high-risk buildings per block the potential DPUR areas. Secondly, cost-benefit analysis will be contacted fo different ratio of the high-risk buildings. If benefit exceeds cost then it ma further invest in reducing the risk of disasters. Renewal cost will consider buildings, construction cost and land expropriation cost, etc. Renewal benefit potential disaster loss. This research is expecting to establish a better ev facilitate the designation of DPUR area that could consider both the moral conc feasibility.

1.1 Delivering Concept of Disaster-Prevention Urban Renewal

Taiwan is located at the Circum-Pacific Seismic Zone, which has earthquakes a more than 200 times per year. The earthquake in Chiayi in 1906 caused 1,258 deaths, an buildings were completely destroyed; the earthquake in Hsinchu in 1935 caused 3 17,907 buildings were completely destroyed; the earthquake in Tainan in 1964 ca and 10,924 buildings were completely destroyed. On 21, September 1999, the earthquake on record in Taiwan in the 20th century struck Taiwan and took 2,415 buildings were completely destroyed, which also impacted the industry and econom of Taiwan. This fatal earthquake awakened the consciousness of urban disaster forced the government to face the necessity and exigency to review the urban st disaster impact.

In 2013, the Ministry of Interior of Taiwan proposed a new idea Disaster-p Renewal (DPUR), which is an attempt to review the existing urban renewal area consideration of criteria related to the impact of seismic disasters in order to

and increase the resilience these areas via building renovation or reconstructi
the Interior of Taiwan, 2013) Therefore, the primary concern of DPUR is to po
where there are high seismic disaster risks that urgently need to be evalu
However, the existing designation criteria for urban renewal areas in Taiwan ar
enough to clearly identify the DPUR areas.

1.2 Urban Renewal Designation Criteria in Taiwan

The urban renewal designation criteria in Taiwan are according to Articles 6 a
Renewal Act. According to Article 6, the areas with buildings that are deterior
to public safety are prioritized to be designated as urban renewal areas. Arti
that the areas with high possibility of being impacted by serious disasters sho
be designated as urban renewal areas. However, the completeness and specificati
mentioned above have recently been widely discussed.

First, the designation criteria for urban renewal areas in the Urban Renew
fundamental and indistinct to give specific and equal handling (Shih, 2008; Sun
The existing designation criteria also fail to deliver a comprehensive consid
prevention for the DPUR area (Cheng, 2011). Second, the designation criteria put
the deterioration of the physical environment but ignore the other local is
development potential. Therefore, although urban renewal improves the condition
environment, it doesn t help the local economic development or the disaster resi
so the public benefit of urban renewal cannot be wide spread (Sun, 2013; Lin,
existing urban renewal area designation lacks a consideration of an area-base
publicly-driven urban renewal areas in Taiwan are determined by an evaluation of
environment and the operability of the plan, and the privately-driven urban re
determined by the market value potential, which therefore tends to be more like
plan. The consequences of both of these approaches for urban renewal lead to dif
improving the disaster resilience and stimulating the economic development of
2008; Sun, 2013).

Therefore, lacking specific designation criteria and a consideration of an area
designated urban renewal areas will not only fail to improve disaster resili
undervalue or overvalue the risk of the areas under consideration. Once high-ris
undervalued, it is possible to misestimate the building tolerances for seismic
will be impossible to lower earthquake casualties when the next earthquake
contrary, once the low-risk areas are overvalued, it is possible to stigmatize
the local development. Hence, this research is an attempt to explore proper eva
DPUR areas in order to balance the possible negative consequences on renewal are

2. Literature Review

2.1 Urban Renewal vs. Disaster Prevention

In areas with a compact urban fabric, the high-density of old buildings and t
roads threaten the residents life and property safety. Urban renewal seems to
by which to change the urban fabric and improve living quality and safety by
buildings structure, relocating the living infrastructure and redevelopment tar
resilience.

Urban disaster prevention can be gradually created and improved by urban reconstruction, renovation and community planning for disaster resilience, the can be strengthened, and urban renewal areas can be built as the disaster preve surrounding areas. The urban renewal area together with the surrounding blocks, villages can be an urban living circle used to plan for disaster prevention and earthquake (Chou, 2010; Cheng, 2011).

Therefore, in order to reach the goals mentioned above and to maximize the pu urban renewal, we have to clearly evaluate the building conditions and disaster-prevention ability in the process of urban renewal area designation. worse building conditions and disaster-prevention ability should be prioritized DPUR areas in order to decrease the social and economic impacts of earthquakes However, determining the designation criteria that should be used to avoid overvaluing errors that may result in unnecessary impact to these areas require on optimizing evaluation criteria for DPUR areas.

2.2 From Renewal to Disaster Resilient: A Case Study of Japan

The concept of urban planning in Taiwan was originated during the Japanese occ had a great influence on the urban development of Taiwan. As a result, these tw similar urban fabric and also have acquired similar urban issues as time has high-density of deteriorated houses in urban centers, narrow and winding a subdivisions. Moreover, Taiwan and Japan are both located in the Circum-Pacifi and are bothered by frequent earthquakes. As the two countries have a similar issues and similar urban disasters, Japan will be used as a case study to compare its designation criteria with that of Taiwan.

The origin of urban renewal in Japan has a close relationship with disaster p Japan, the compact wooden houses frequently caught fire. The great Kanto eart World War II (1937-1945) and the Osaka-Kobe Earthquake (1995) not only serious city but also triggered disastrous city fires that increased the already huge d disasters accelerated the development of urban renewal in Japan and even brought urban disaster prevention. The earliest legislation of urban renewal in Japan c 1924 with the Agriculture Land Consolidation Act, which regulated the mechanism o readjustment. After WW II, the Special City Planning Act was enacted, and in Readjustment Act was revised. It was revised again in 1961 and became the U Remodelling Law.

In 1969, the Urban Renewal Act integrated the Urban District Remodelling L Disaster Countermeasures Basic Act which were attempts to try to combine the re of land with buildings. In the 1990 s, the government enacted the Urban Renaissan Measure Law, which was expected to improve living quality and the urban functi solve the vacancy problems caused by the economic crisis in Japan. In additi focused on the renewal priority of the Urban Renaissance Urgent Development encouragement of private investment initiatives. Lu, 2007;
Regeneration Cases in Japan, 2006

Compared to Japan, the earliest urban renewal plan in Taiwan can be traced back occupation period (1895-1945) when the city fabric was remodelled by the Japanes order to improve sanitation and consolidate the city landscape. In 1964, as the

moved to Taiwan from China, lots of immigrants living together in messy tempo
forced the government to promulgate a new chapter triggering "the reform of the
and development of the new city district" in the Urban Planning Act, which was
1973 to promulgate a new chapter of the urban renewal of the old city district
renewal legislation in Taiwan.

In 1976, as the Public Housing Act was enacted, the government began to colla
military to rebuild the military villages into public housing in order to impro
the city and the urban living quality. In this period, Taipei City experi
development than other cities in Taiwan, so it met the need of urban renewal
cities. In 1983, Taipei initially enacted the local act for urban renewal, but
government enact the Urban Renewal Act for the nation as a whole. The following
921 earthquake struck Taiwan and caused huge casualties. The Urban Renewal Act g
be reviewed and revised in the post-disaster recovery and rebuilding process and
completed after this disaster (Urban Regeneration R&D Foundation, 2011; Zeng, 20

When comparing the urban renewal development history of Japan with Taiwan s, i
that they had different motivations to get involved in urban renewal that led
The motivation of urban renewal in Japan was a result of the post-disaster and p
With economic and social development, urban renewal gradually transformed to la
that took the local economic and social development into consideration. Urban d
also became an important issue in urban renewal. Compared to Taiwan, which was m
on the consolidation of city appearances and the retrofitting of old buildings,
renewal in Japan was transferred from site development to urban redevelopment pl
attention was placed on the integration of urban functions. The Urban Developmen
is taken as another case study.

2.3 The Urban Development Plan in Tokyo, Japan

Except for the city downtown areas and commercial centers, Tokyo has a high-
wooden housing communities, most of which are deteriorated and have complex la
Most of these areas lack open spaces and always have narrow and winding alleys,
disaster-prevention issues. As a result, determining how to renew these high-d
communities to strengthen local disaster-prevention seems to be a big challenge
government of Tokyo.

In Tokyo s Urban Development Plan, the urban renaissance areas are classified ac
level, and the areas with higher hazard risks are given priority to be desig
renaissance areas. The Urban Renaissance Urgent Development Areas (URUDAs) are
that are more hazardous in the city that are targeted for urgent renewal. T
Renaissance Urgent Development Areas (SURUDAs) are the areas that are designat
URUDAs. These locations can widely spread the benefits of disaster prevention to
areas and prioritize the building of basic infrastructures.

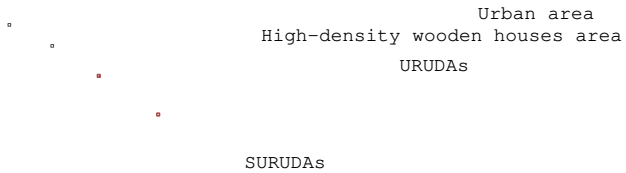

Figure 1 The classification of urgent urban renewal areas in Japan (Chen & Chang, 2005)

The URUDAs and SURUDAs both have time frame limitations related to reaching th the urban renaissance project as shown in the following table. The evaluation cr are made according to the Seismic-risk Area Hazard Investigation Report (the 5th version) by the Bureau of Urban Development in Tokyo. This investigation considers seismic-ris the number of wooden buildings and inflammable areas to create the evaluation cr Chang, 2005

Table 1 A comparison between renewal area and advanced renewal area in Ja Chang, 2005)

	URUDAs	SURUDAs
Time frame	2025	2015
Goal	70% inflammable buildings	70% inflammable buildings
Purpose	Besides renovation, reconstruction and land redevelopment is also encouraged to be promoted by the residents in order to improve disaster-prevention ability in communities.	Besides encouraging renovation, an infrastructure development plan is also promoted in order to improve disaster-prevention abilty.
Assessment standards	1. Evaluate the possible number of the buildings that will be destroyed by an earthquake. The index refers to the Seismic-risk Area Hazard Investigation Report (the 5th version) by the Bureau of Urban Development in Tokyo for which the data is more than 5 points. 2. Evaluate the fire hazard index and fire-spread hazard index. The index refers to the Seismic-risk Area Hazard Investigation Report (the 5th version) by the Bureau of Urban Development in Tokyo for which the data is more than 5 points. 3. The area which can reach the index below, $\frac{!"\#\ !"!!"\ !"\#\$\%\&\ !"\ !""\#\$\%\ !"\#\$\%\#\&'!}{!"\#!"!\$!"\#!} > 30$ buildings /per ha	SURUDAs are designated from URUDAs suggesting that Hazard area should be specifically mentioned for infrastructure rebuilding. The SURUDAs have to be redeveloped as soon as possible in order to spread the benefit of disaster prevention to the surrounding areas.

	4. The area which can reach the index below, + (1) 100% 100% osr = open space ratio (%)	

When comparing Taiwan s and Japan s urban renewal area designation criteri designation criteria has more principle criteria such as deteriorated , la structure and threat public safety, which provides a big framework but lacks follow. In contrast, Japan s designation criteria have more specific indexes such proportion of the household (Shih, 2008). The disaster-prevention criteria and t of Japan are both a good case for Taiwan to learn.

2.4 Area-based Urban Regeneration

The case study mentioned above obviously shows that the main purpose of urban re was urban inflammability, which is used as a tool to solve the problem of wooden houses in the city center of Tokyo. With the transformation of the con renewal to urban renaissance, Japan s government raised the level of the urban a higher level, regarding it as a special area of focus with an expectat multidisciplinary collaboration including urban planning, industry and disa Although Taiwan has a similar urban development history and urban fabric with Taiwan does not have high-density wooden houses in its city centers, nor do flammability issues. As a consequence, the urban renewal of Taiwan should be m the issue of comprehensive urban disaster prevention. Learning from the concept urban regeneration, renewal areas should have the ability to improve the condit environment while simultaneously reviewing the condition of the basic local infr degree of disaster preparedness. The purpose of DPUR is not only to strength structures through renovation or reconstruction, but also to improve disaster- entire area using urban renewal as a tool.

The original concept of the area-based approach is from the UK. It was used in policy in the 1970 s, but it was not until the 1990 s that this concept bec popular and was used as a policy by which to improve urban spaces. The ur experiences of Europe in the past 20 years taught that the combination of techni physical environmental with social and legal factors is essential. Although urb can clearly and successfully improve the physical environment, social and econom as unemployment, crime rates and poor education continue in some areas. Area regeneration will not only consider the retrofitting of buildings and the commu also solve the fundamental issues of these local areas, such as crime, unemployment basic infrastructure (Edwards, 2009).

In the process of area-based urban regeneration tries to break the geographic involve not only stakeholders but also other interest groups, as well as tho involvement of future stakeholders. Expecting to together discover local is development potential while improving the physical environment also includes the social and economic development, and even education, housing and transportation Plessis, 2013). Compared to the concept of area-based regeneration, which redevelopment and tends to be small in scale and pays more attention to the im physical environment and increases in market value while contributing very surrounding area, area-based regeneration considers more factors, such as biolog

social contributions. A comparison between these two concepts is shown in the
(Sag, 2010; Sun, 2013):

Table 2 Objectives, methods and evaluation criteria for site-specific and area
efforts (Meyer, 1998; Sun, 2013)

	Site-specific redevelopment	Area-based regeneration
Objectives		
Environmental objectives	Reduced human health risks and liabilities	Better regional environmental condition
Economic objectives	Tax base increase; job creation on-site	Reduced community drawbacks and specific economic improvements
Actual consultation on local community obectives	Minimal; as required by law with respect to community notice and consultation	Potentially extensive; (although development agencies may listen but not act on local concerns)
Evaluation criteria		
Time horizon	Short-term completion of onsite development	Long time allowed for expected spill over effects
Policy efficacy	Sales for clean up and reuse generated, impact on site values and tax revenues.	New capital flows into area; increase in area economic activity, incomes and property values
Public efficiency	Minimum public sector expenditure	Maximum leverage on public funds
Public effectiveness	Rate at which private landowners successfully market contaminated sites for reuse	Increase in area economic activity, household incomes; reduction in area drawbacks

The existing urban renewal in Taiwan is site-specific redevelopment, which emp
physical environmental improvements and increases in market values but ignores
and the development of the entire area under consideration. Lacking a considera
regeneration results in the urban renewal in Taiwan being generally limited t
improvements and a failure to use urban renewal as a tool by which to solve
stimulate economic development. The concept of area-based urban regeneration
more appropriate strategy to respond to local poverty and social-cohesion issue
regeneration will not only emphasize n the renewal of the physical environme
regeneration of the economy. Determining a method by which to attract the inter
and the private sector in investing into these areas has been widely discusse
2009).

Unlike general urban renewal areas, DPUR areas exhibit more investment uncerta
the high-disaster risk and the deterioration in these areas. Although the public
the private sector the successes of the project and provide subsidy assistance, inves
the market profit is still the dominant consideration of the private sector. Th
private sector investment is to show them that this project will be profita
research considers in addition to evaluation of disaster risk and area develop
necessary to add a cost/benefit evaluation of urban renewal. Adding the conside

renewal cost and benefits may increase investment interest and the confidence of
and also raise the proportion of stakeholders, which has the benefit of avoidi
urban renewal area development. The issues mentioned above all reveal the signi
of a cost and benefit analysis in urban renewal designation criteria.

3. Methodology

3.1 Conceptual framework

This research gives a suggestion of the DPUR area designation criteria for Tai
Besides the physical environment, which has already been considered in the exis
research increases the consideration of a market-driven factor that evaluates t
benefits in order to increase the proportion of the resident involvement a
investment interest. In addition, renewal efficiency in urban renewal areas can b
the visible benefits of DPUR can be seen, such as decreases in disaster losses.

This research is expected to build comprehensive designation criteria for a DPU
of physical environment factors refers to the urban renewal area designation cr
the Urban Renewal Act in Taiwan. In addition, this research refers to the conc
regeneration to take the economic index into consideration. Besides visible
increases in market value, other benefit brought about by the DPUR should also
such as improvements in property safety and decreases in disaster-risk and loss
research follows these two factors to review the existing urban renewal area in Taina
find the optimal evaluation criteria suggestions for the DPUR area. The concept
this research is as follows:

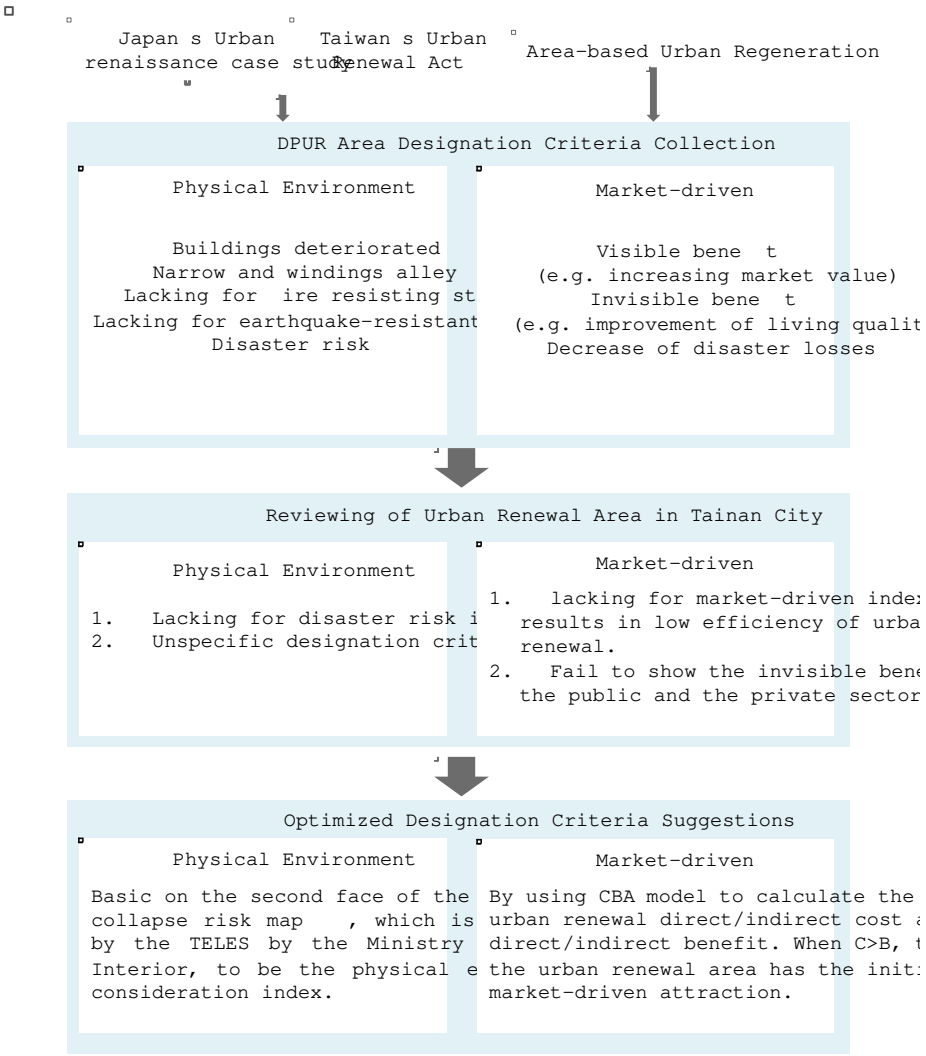

Figure 2 Conceptual framework

3.2 Study Area: Yongkang District, Tainan City

Yongkang District and Huweiliao in the East District in Tainan City were chos
areas. There are a total of six faults passing through Tainan City, but only
passes through the urban center and the compact development area in such as way
serious casualties when it triggers an earthquake. Consequently, the area that
passes through was selected as the study area for this research.
Yongkang District is located in the southwest part of Tainan City, which
developmental history that caused there to be a large number of deteriorated bu
the quick development of its transportation, industry and its rapid business
population and urban scale are quickly growing, so the Houchiali Fault may have
this district.

Tainan does not have the local legislation for urban renewal area designation
central legislation spelled out in the Urban Renewal Act. According to Articl
Urban Renewal Act, the areas with buildings that are deteriorated and hazardous

or the areas with high possibility of being impacted by a serious disaster shoul
designated as urban renewal areas. However, the designation criteria in the
principle guidance that not only lacks specific and objective guidance but also
of area-based urban regeneration that emphasizes physical improvements but
economic, social and disaster-prevention issues.

Moreover, the execution of the existing Taiwan urban renewal policies mostly
sectors investment and resident self-renewal, where the purposes of urban ren
misunderstood as market-driven development. This market-driven force becomes th
to whether an area appropriate for urban renewal can be renewed or not. In or
private sector-driven urban renewal projects, lots of incentives, such as tax re
ratio preference have been considered. However, these incentives encourage priv
urban renewal project investments that are mostly located in areas that have
potential. The areas that are deteriorated and hazardous don t tend to attract
resident-driven renewal projects. The renewal project are more focused on actual
on public benefits. Benefits that are not readily apparent, such as decreases i
renewal and increases of property safety and living quality, are ignored.

The following table showing urban renewal area execution obviously illustrates
urban renewal projects have mostly been outside of the statutory urban renewal
representative counties in Taiwan. Especially in Taipei City, New Taipei City a
where the market value in the city is gradually rising, the number of urban ren
the statutory urban renewal area is much greater than the urban renewal projec
urban renewal area. This research s study area is in Tainan City, which has 18 u
but as of 2014, there are only 8 places where urban renewal is actually being
efficiency of the urban renewal is quite low.

Table 3 Urban renewal project statistics for five representative counties in
2014)(Ministry of The Interior, 2014)

County	The statutory urban renewal area	Urban renewal project in the statutory urban renewal area	Urban renewal project out of the statutory urban renewal area
Taipei City	235	11	820
Xinbei City	67	11	225
Taichung City	54	1	75
Tainan City	18	8	0
Kaohsiung City	12	5	4

This research is based on the second phase of the analysis of the building co
Yongkang District, which was delivered by the Ministry of the Interior in 201
divided into four levels as evaluated by the Taiwan Earthquake Loss Estimation
and the structure, story and the ages of the buildings were comprehensively eva
the building collapse risk map with the existing primary urban renewal area in
shows that the area includes the Feyang military village, the surrounding area
supply depot and the area surrounding the Yongkang Veteran General Hospital.

After overlaying the two maps, the results indicated that the buildings in these areas mostly are low-collapse-risk; the urban renewal area surrounding the sou depot is vacant, and the buildings in the other two urban renewal areas are extremely low-collapse-risk buildings. The following figure also shows that t high-collapse-risk are mostly not in the primary urban renewal area. Consequen primary urban renewal designation criteria in Tainan cannot efficiently respon disaster risk, and the physical environment deterioration for the designation areas in the future need to be carefully evaluated.

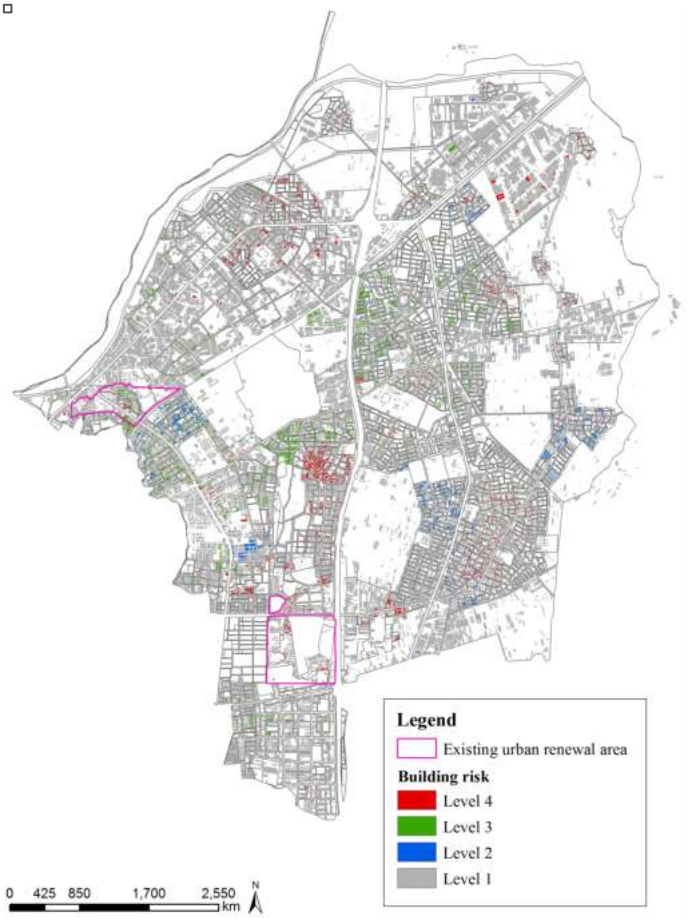

Figure 4 Overlay of existing primary urban renewal area and the building coll Yongkang District
(Ministry of The Interior, 2013)

Table 4 The proportions of building collapse risk in the existing primary urba Yongkang District, Tainan City

Primary Urban Renewal Area	The Feyang military vi	Surroundin area of sou military su depot	Surroundin area of Yongkang Veteran General Hospital.

Total buildings		3,028	0	1,950
High-collapse-risk	Buildings	73	0	96
	Proportion of the total buildings	2.41%	0.00%	4.92%
Medium-collapse-risk	Buildings	251	0	1
	Proportion of the total buildings	8.29%	0.00%	0.05%
Low-collapse-risk	Buildings	0	0	0
	Proportion of the total buildings	0.00%	0.00%	0.00%
Extremely low-collapse-risk	Buildings	2,704	0	1,853
	Proportion of the total buildings	89.30%	0.00%	95.03%

The initial designation for the existing primary urban renewal area in Yongkang comprehensively consider the deterioration and hazards in the area and ignored factor for the residents and private sector, which caused low efficiency in reg that is an obstacle to lowering disaster risk, improving quality of life and dis opinion of this researcher, the designation criteria for the physical enviro specific as Japan s urban renewal designation criteria and should involve consi risk. Besides the criteria related to the physical environment and disaster r criteria also should consider the benefits spreading to the surrounding areas, the ability the entire area to prevent disasters and the stimulation of economi can be based on the area-based approach. This research adds the economic evalu consideration, which examines the potential of market-driven approaches by renewal costs and benefits. It is believed that the intent of DPUR can be a designation criteria of the DPUR area take into account a consideration of b environment and the market, so that resident and the private sector alike wi helping DPUR area renewal efforts.

3.3 Quantity Framework for Creating Evaluation Criteria of DPUR Area

This research re-designates the primary urban renewal area by adding new desi from the perspective of the DPUR by evaluating the area s deteriorated buildings other physical environment factors in addition to adding the potential economic ben consideration of the DPUR area designation.

This research is based on the second phase of the analysis of the building co Yongkang District, which was delivered by the Ministry of the Interior in 2014 by the Taiwan Earthquake Loss Estimation System to simulate earthquake losses collapse risk can be divided into four levels after overlaying the PGA and bu which are high-collapse-risk (A), medium-collapse-risk (B), low-collapse-risk low-collapse-risk. In the criteria for physical environment, the research bas high-collapse-risk and medium-collapse-risk buildings in the map, but the medi buildings still have to overlay with the other disaster indexes, such as flood, of road blockages and soil liquefaction. If the medium-collapse-risk buildings the other high-risk disaster indexes (B4), then they may belong to the high-col (A).

The evaluation process is in accordance with the Urban Renewal Act to use a bloc
unit. Each hazardous block is evaluated by calculating the percentage of dan
(A+B4) in relationship to the total number of buildings on a block. Therefore
defines the block will result in designation as a DPUR area, which is the m
research.

The research uses the CBA model to evaluate the optimization of the percent
mentioned above. The cost is defined as the the direct/ indirect cost in the ur
and the benefit is defined as the the direct/indirect cost if not doing the u
After listing the cost and the benefit in the process, the total cost and benef
compared by additionally considering the earthquake probability, risk premium
interest rate. As a result, when the benefit exceeds the cost, it means that
hazard percentage has market-driven potential and also a physical environmenta
renewed. In short, this research is an attempt to use the CBA model to find most
percentage of a block to be designated as a DPUR area.

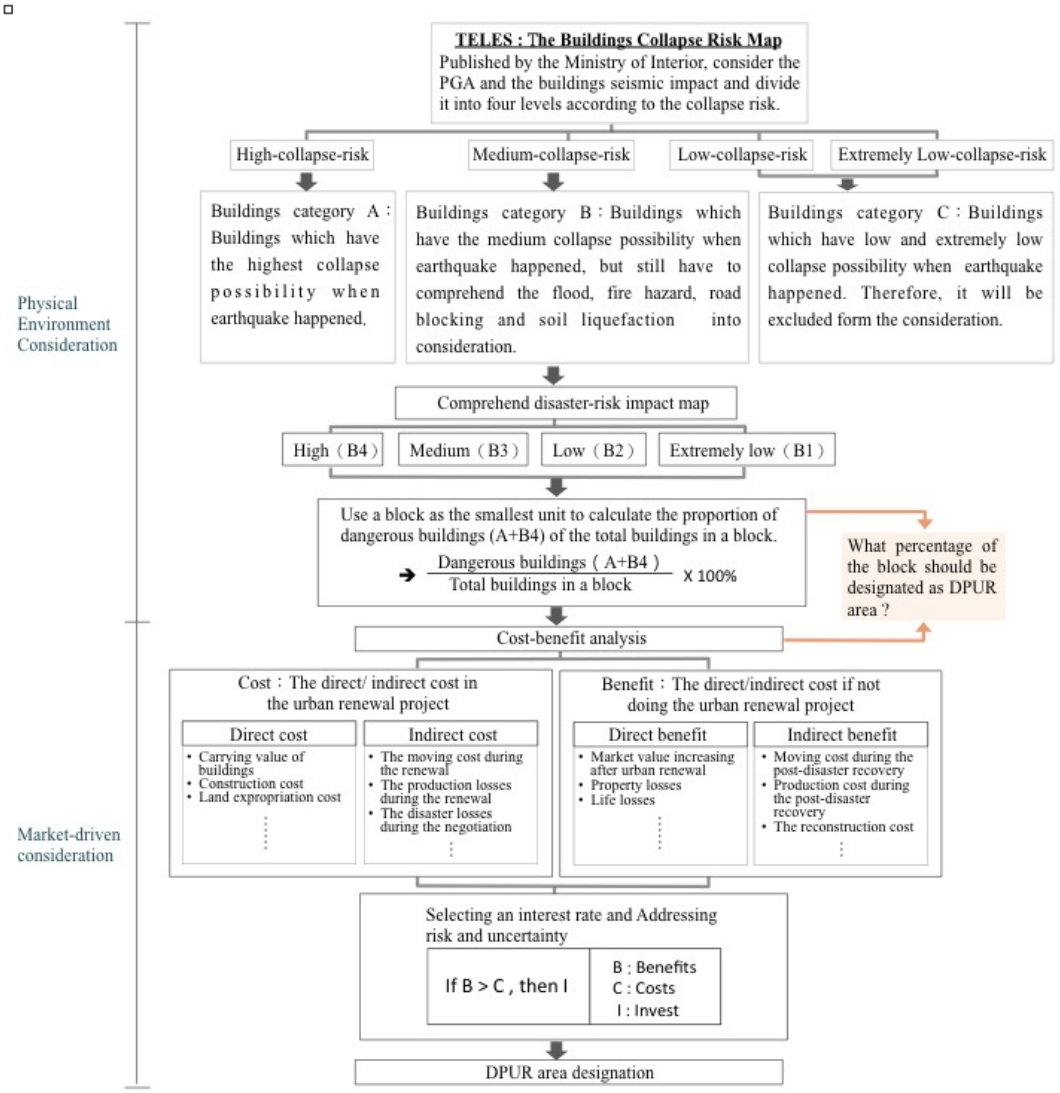

Figure 5 Future research process

4. Conclusions

Taiwan is located at the Circum-Pacific Seismic Zone, which is seriously impac
earthquakes. The huge casualties and losses in the 921 earthquake created
disaster-prevention in the Taiwanese government. As a result, the Ministry of
brought up the idea of Disaster-prevention Urban Renewal in 2013, which is in
the existing urban renewal areas by adding a consideration criteria for seismi
order to decrease vulnerability and increase the resilience of such areas via b
reconstruction. Nevertheless, the DPUR area designations still face lots of ch
existing urban renewal area designated criteria according to the Urban Renewal
and fail to consider market-driven factors related to renewal areas where the f
urban renewal is low. By reviewing the existing urban renewal area in the Yo
Tainan City study area, it was found that the prioritized urban renewal areas
seismic disaster risk but rather focused on market-driven factors for the purp
which may have resulted in failing to reach the goal of DPUR and may be the rea
efficiency of the renewal project.

Under the threats of unpredictable earthquakes, it is urgent that the DPUR are
that the disaster resilience of the area is improved. However, the existing de
Taiwan are more focused on improvements to the physical environment and lack a
consideration, which makes it hard to relocate the disaster prevention facili
attract the private sector to join in the project. Most of the private sectors,
stakeholders and enterprises that are interested in the renewal project, decid
project or not according to the investment risk and the market value. However,
benefits that are not immediately apparent such as quality of life, safety and
The complete benefits of disaster-prevention urban renewal may be underval
considering the visible benefits such as the appreciation market value of buildi

Therefore, this research is an attempt to explore proper evaluation criteria for
case study of urban renewal area designation in Japan and the area-based appro
takes the physical environment into account and also economic factors including both
invisible benefits. The main purpose of this research is to make an attempt
efficiency renewal problem, to arouse consciousness related to community disast
also to compare the benefits and cost of DPUR for the government and private se
the costs and the benefits in the CBA, which is also expected to give suggestio
renewal designations Taiwan.

5. Acknowledgment

This study was supported by a Grant-in-Aid for Scientific Research from the Ta
Science and Technology: The Potential Natural Disaster Risk of Distributions of
and Long-Term Care Facilities and Adaptive Land Use Control Strategies
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