

## **Analyzing Impact of Balinese Regional Policies Vertical Building Development Limitation**

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### **ABSTRACT**

Nowadays, ancient culture practices in which then derived into current practices mostly answer the problem in all side of things. Balinese culture is not that different from all of them. Most Balinese people have general understanding of *tri hita karana* (three ways to reach harmony) concept as the root of Balinese culture. The concept itself explains around how to reach harmony by making mutual relationship with nature, social lives, and the divine. From that, people in Bali derived the concept into various things including urban and rural planning. *tri angga* (three bodies) is one of the concepts that states regional planning must follow certain rules to reach harmony. This bodies consist of temple, people's working area, and nature which symbolizes the level of consecration of human bodies. From this concept, Bali regional development policies then adjusted to preserve cultural value of Bali. This policies states that any building built within the region must follow the regulation to get the certificate to further develop a project/building. In building development part there is one interesting regulation that states certain type of building cannot planned or developed past the height of a coconut tree, which then rewored into fifteen meters. But this case make development and/ or urban expansion move into more horizontal way. Horizontal development was a way to compensate the same amount of people that will use the facility compared to develop vertically, in turns use large area of landmass that can accelerate the speed of land decline and green open spaces which Balinese people sought to protect. This acceleration also accompanied with small island area, static land size, and sea level rise from climate change. This research aims to find whether existence of both limitation and the speed of land development can proceed sustainably

**Keywords:** building height limitation; green open space; horizontal development; regional development policies; tri angga, tri hita karana.

### **INTRODUCTION**

Green open space is one main forming elements of a city. This space has various essential functions to preserve city environment which then could utilized as water infiltration site as well as public space for the people who live in it. In addition, green open spaces presence can improve visual aspect and aesthetics of the city to give the community a sense of relief. In Indonesia, this aspect accompanied with regulation devised by Indonesian Ministry [1]. The document regulates the existence of green open spaces as an environmental element for preserving the urban environment. The existence of green open spaces provides a harmonious urban environment as a means of securing a safe, comfortable, fresh, beautiful, and clean urban environment. Therefore, each region required to provide green open space [2].

However, those regulations might potentially do not run in tandem with regional regulation found in Bali [3], which also regulates maximum building height limit in Bali Province. The regulation previously mentions maximum allowed building height not to exceed the height of coconut tree on nearby area [4]. The statement then rewored into maximum height limit of fifteen meters to provide consistencies. This regulation aims to maintain tradition and the sanctity of the land in Bali based on *tri angga* (three bodies). *Tri angga* is one derivation of *tri hita karana* principles which governs how building placed in a city also the shape of building mass relative to the city. It also indirectly helps maintain skyline quality in Bali. The existence of this regulation is also a symbol of the closeness people to other aspect surrounding them mentioned in the teachings of *tri hita karana* (three

way to reach harmony). However, the presence of this law influences the need of horizontal expansion to compensate space needed for people using certain facility especially commercial, office, and hospitality units compared to vertically developed buildings. Prominent level of land consumption can affect the increase in the number of land conversions in Bali which reaches up to seven hundred hectares per year [5]. This accelerated conversion rate is unsustainable for future development because of static land size or worse, reduction of land availability because of climate changes.

Tourism incentivized land conversion of private green spaces for people because of various factor, especially related to income. Farmer whose field converted often feel the lack of earnings and sudden influx of income is the way they see to solve that problem as [6] points out, GRDP increase would affect in reduce of agriculture land size potential. Currently, Balinese people have unique irrigation management of subak, which governs how to distribute water with *tri hita karana* as base principles. The principles consist of temples and the rituals, land ownership, and the organization between people to manage the land. This land conversion rate also can backfire to the culture itself. This culture might as well not exist in the future if there are no prevention measures taken to decelerate land conversion rate which can disrupt the balance of each element mentioned before.

### Theoretical Framework

Before proceeding into research methodology, there are certain explanation needed in consideration. From these explanations then we can further derive it into research framework. This framework started from two conflicting interests that shifts via behavior in the society and sustainable development. These two elements are culture and tradition backed building height limit regulation, and the need of vertical development or land usage limit to reduce land area needed. The decision made by regional urban society then could produce multiple result such as, land conversion rate, social and ecological system shift, and community behaviors. This relation showed in this diagram as follows

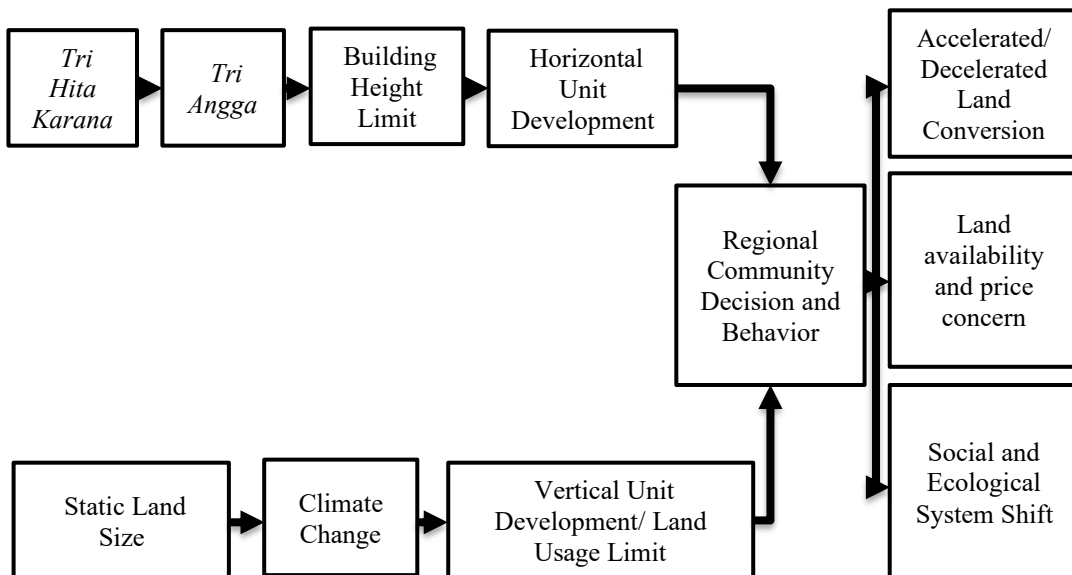


Figure 1. Theoretical Framework

### Tri Hita Karana

*Tri Hita Karana* is a cosmological concept unique to Hindu people in Bali. This concept signifies harmonious relation between each element in the cosmos. There are three causes to reach harmony or happiness centered from everyone with another individual (*pawongan*), nature (*palemahan*), and the divine or gods (*parahyangan*). This concept then derived into various aspect in Balinese people's activity [7]. One of those derivations is *tri angga* (three bodies) by combining it with *tri bhuwana* (three world) concept.

**Tri Angga**

*Tri Angga* is one of various derivation of *Tri Hita Karana* concept which signifies consecration of physical body symbolism related to spatial design aspect [8]. These bodies consist of head, torso and upper limbs, and lower limbs symbolizes as mountain (*svah loka*), plains (*bvah loka*), and sea (*bhur loka*) for universal scale. On macrocosms (*bhuwana agung*), it governs the placement of temples, people area of activity, and nature. This is similar in microcosmos (*bhuwana alit*) of individual house unit.

**Bhisama**

*Bhisama* is normative rules based on Balinese Hinduism used containing several command or guides as way to guide or organize people's behavior [9]. This definition is sourced from sanskrit language which means prohibition that could be sanctioned if ignored. There are various *bhisamas* exist nowadays in Bali and it is used to guide various thing people perform. One of those related to urban planning and development, the rules to protect sacred area of temples.

**Green Open Space**

States that green open space is one of the means provided by city government to the public interest and property. This space could function as city greenery, rainwater infiltration site, and recreational area to provide social and cultural interaction to urban society. This space according to Indonesia regulation about urban planning provide benefits especially for ecological preservation and providing society a space for public interactions [10].

**RESEARCH METHODS****Methods**

	Opportunity (O)	Threat (T)
Strengths (S)	<b>Strength-Opportunity (SO)</b> Strength focused strategies to maximize opportunities	<b>Strength-Threat (ST)</b> Strength focused strategies to minimize threats
Weaknesses (S)	<b>Weaknesses-Opportunity (WO)</b> Strategy to minimize weaknesses by maximizing opportunities	<b>Weaknesses-Threat (WT)</b> Strategy to minimize weaknesses and avoid threats

**Figure 2.** TOWS Matrix, (Weirich, 1982)

To find whether both horizontal oriented development and regional specific policies can coexist sustainably, qualitative approach-based literature review chosen with strength, weakness, opportunity, and threat (SWOT) analysis. SWOT analysis can provide insight to options resulted by merging element in the table and further could also provide action strategies via TOWS matrix (Fig. 2).

**Data Analysis**

This analysis input sourced from existing literatures and site observation to sharpen analysis output. To have better understanding to some literature input gathered, content analysis utilized as way to organize and elicit meaning from the data collected to draw realistic conclusion from it [11].

**Location**

Location of which sample taken are from Bali Province of Indonesia, especially Sarbagita (Denpasar – Badung – Gianyar – Tabanan) Metropolitan Area as the location provide both example of accelerated urban development as a metropolitan area and existence of sign of land conversion. This

area consists of mostly southern section of Bali. These areas also have prominent traditional and cultural heritages which provide interesting topic on how

## RESULT AND DISCUSSION

From the local normative regulation adjusted with regional planning policy [3], we could find that there is certain radius in which area is prohibited or limited in development. These radiuses have a purpose to preserve sacred area of temples in Bali. Those radiuses were 5 kilometers (*apeneleng agung*) for *Sad Kahyangan* category temples, 2 kilometers (*apeneleng alit*) for *Dang Kahyangan* category temples, and lastly radius with how far stone could be thrown from temple area (*apenimpug*) or limited by stone or concrete fence (*apenyenger*) for *Kahyangan Tiga* category temples.

While those regulations provide a certainty of which area can be developed further, regional development policy of Bali provide main issue on this topic, limited building height of 15 meters. This regulation is based on *Tri Hita Karana* and *bhisama* or normative rules of based on Hindu religion as way to preserve sacred area of temples in Bali. Other related regulation is to develop building using Balinese styled ornamentation as an exterior design part of the building. Compared to most of regional development regulation in Indonesia, Bali sticks out because of those specific rules in development. The difference caused by the need to preserve local culture compared to other region that mostly did not strictly adhere to culture related to urban planning and design. The 15 meters height limitation purpose was a *bhisama* derivatives to keep temples sacred by preserving their 'meaning' as temples. In Bali, temples symbolize mountain which is one of highest place in Hinduism and the closest to gods. If building height exceed past the height of the mountain, then the temple no longer sacred since the highest place now in a place where human activity located. For individual building unit, this is mitigated by moving the temple of that specific building complex to highest storey of the building to preserve the value. But this is impossible to do to ancient temples since they already exist way back in the past, it does not have an ownership of a single building complex but a region, and lastly most of them have a massive scale in term of grounded area.

### Discussion

#### SWOT Elements Analysis

##### Strength

Bali regional building height limitation policy provide an obvious distinction to the region, cultural identity. Cultural identity is one element is lacking from most region in Indonesia in terms of architecture and regional planning because modern perspective in the subject. The lack of this element caused every region looks the 'same' to each other [12]. This policy is very strict, but it also grants local people and tourists alike a rare sight of how internationally invested buildings have local identity. This is achieved by combining two of notable policy of building height limit and the use of Balinese style as part of the building.

From urban visual standpoint, Bali regional building height limitation grants Balinese people and tourists unique urban landscape vistas by supplying them with vast unobstructed skylines while also maintaining traditional value. This provides tourism sector one point of interest beside other than cultural heritages.

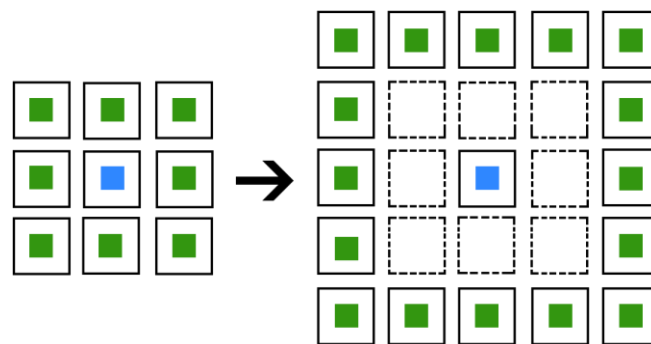
Open skylines are also providing a healthy environment for the society since unobstructed skyline means a better lighting and air distribution hence, lower overall energy usage and carbon footprint mainly in the nighttime. Lighting is the source of most energy consumed in the world. This is because sufficient lighting was essential to support people activity at nighttime. Looking from daily activities in several place in Bali especially in the Sarbagita Metropolitan area, various profession makes the city have an almost twenty-four-hour daily activity and tourism was one of them.

Low energy usage aside, low-rise buildings also has relatively low concern from disaster caused by seismic activity. Low concern attributed from structural perspective of building. Low-rise building has much lower load compared to high-rise building. This is important point since, Bali as part of Indonesia have considerable threat from earthquakes caused by movement of earth tectonic plates. Indonesia is positioned on the junction of the three mega plates, the Pacific, Eurasia, and Indo-

Australia plate, which make this country highly prone to natural hazards impacts, specifically earthquakes, volcanic eruptions, and tsunami [13].

### Weakness

Despite of the benefits mentioned above, limiting building height limit ability of one land unit to accommodate people because of limited ability of certain floor area to support activity for number group of people. This forced accelerated land use throughout the region and decrease land availability while at the same time drive land price exponentially. This then cause a closed cycle of people move into more remote area to gain land tenure and then drove nearby area land price up and repeat. Those weakness then also form into another issue on accessibility. Because development went horizontally as effect of limited building height, important infrastructures become difficult to access to everyone as building move away from each other (Fig. 3).



**Figure 3.** Illustration depicting horizontal development land consumption direction

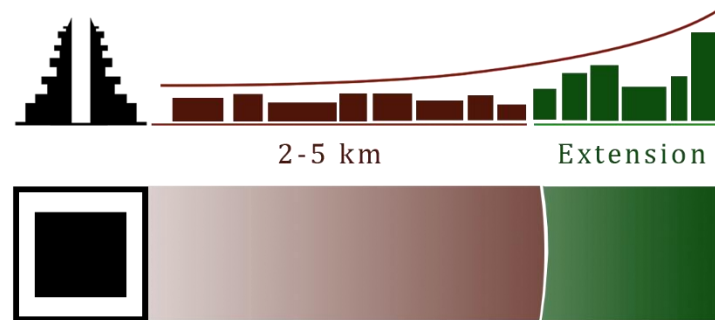
The picture also shows that assuming the development rate equal from important facility (blue), land consumption progress nearly squared each time development happens (green). This land consumption is also depleting the availability of green open spaces.

Carbon emission is one example of an externality from building height limit caused by such regulation. Forecasted distance among infrastructures combined with people's daily activities that run at the same time will produce worsen traffic congestion as time progresses thus produce increased carbon output from vehicles [14]. This is true especially when fossil fuels still a major energy source for transportation in Indonesia.

### Opportunity

Although there are several weaknesses to this policy, the strength it possesses can be utilized as an opportunity to develop land usage policy to limit land size acquisition for various building purposes to improve accessibility when building height limitation is still into effect. This policy also serve purpose as risk mitigation to unexpected, accelerated land conversion.

There is also opportunity to for limited vertical building development by combining building height setback rules combined with *bhisama* or normative rules from Hindu community in Bali set as protection for temple sacred areas. These rules specify the radius of sacred areas which were prohibited to develop within two-to-five-kilometer radius with the temple itself set as the center point [15]. Merging fact gathered from rules specified and reality found on the site, these rules have been distorted that such area could be developed albeit within strict rules and limited use with main purpose on supporting religious activity in the temples. This radius contextualized from those facts can be extended and used as building height setback buffer radius (Fig. 4)



**Figure 4.** Illustration of sacred zone extension as building height setback buffer radius

There's also exists regional opportunity with how *bhisama* itself come into fruition. *Bhisama* come from understanding of Hindu blended with local tradition and culture. This way, the rules should also perform differently adjusted on how nearby society interact with it. This should happen because every region even for a small local area such as villages have different understanding or value to shared culture compared to another village and the same apply to larger scale societies.

#### **Threat**

There are two notable threat worth considering in an effort pertaining building height limitation in Bali. Miscalculation on how to treat horizontal oriented urban growth increasing the risk of traffic congestion especially when building activity and/or special occasion or celebration in Bali come into consideration (e.g., *ngaben*, *pacaruan*, *ogoh-ogoh* parade). The ritual included as a concern because Balinese people have various celebrations throughout the year and most of the times have direct impact on people traversal between destinations.

Beside traffic congestion, if the policy not accompanied with land usage control mechanism, limiting building height might accelerate land conversion and end up in declining land availability for people because of static land size. There are also latent risk coming from global climate change from rising sea water level rise. Decreasing land availability also attributed to this rise of sea water level which further worsened the risk mentioned before. According to 13<sup>th</sup> Sustainable Development Goals: Take urgent action to combat climate change and its impacts, sea water level rise could reach up to 60 centimeters in height and can drown most of coastal areas especially in small island that have large portion of settlement located near coastal areas. Other water related disaster risk by uncontrolled development is tied with the existence of green spaces. The lack of green space combined with climate change could elevate the problem that the soil cannot hold water anymore because of rising temperature which promotes extreme drought and soil instability in the future [16]. The decline of important green spaces such as rice fields also raises the problem of food scarcity and in the end also lack of clean consumable water supply.

SWOT element analyzed from the regulation can be summarized in a table like follows. From the discussion above, there are 6 strengths, 5 weakness, 4 opportunities, and 4 threats per current timeframe.

**Table 1.** SWOT Element Analyzed

Strength		Weakness	
-	Traditional and cultural value preservation especially <i>Tri Hita Karana</i> principles	-	Low people to floor area ratio efficiency per building unit
-	Healthy environment from better lighting and air quality distribution	-	Accelerated land and green open space usage throughout certain area

Strength		Weakness	
-	Provides unique architectural and urban structure identity	-	Low traffic efficiency and congestion due to increasing distance between building or facilities
-	Provide a pleasing view with less obstructed skylines and vistas	-	Inaccessibility of certain facilities to people because increasing distance between people and important facilities
-	Low energy usage and carbon footprint because of better airflow and lightings	-	Exponentially accelerated land price in crowded area because increasing need of certain facilities
-	Low concern to seismic activity related disaster because of overall low load of building unit		
Opportunity		Threat	
-	Potential to use extended temple buffer zone as vertical oriented development zone for select purpose facilities	-	Risk of increasing carbon footprint from increasingly congested traffic activity
-	Potential to revise the regulation to consider an option for limited land usage in certain area as risk mitigation	-	Risk of faster land decline throughout region because accelerated land use
-	Potential to recontextualize <i>bhisama</i> because it is normative regulation and could be readjusted to current environment needs and use it to educate societies of the importance of sustainable development and their relevance with religions	-	Risk of decreasing land availability from the climate change and sea water level rise
-	Potential readjustment of building height limit and <i>bhisama</i> dependent of regional basis since this rule have religion and cultural value as base rules. Since Bali have different valuation on building or urban development strategies per region, then the rules could be modified accompanying the regions	-	Latent risk of hydrological cycle related disaster such as extreme drought, food scarcity, and lack of clean consumable water

### Possible Strategies

From several element analysis gathered, then we can synthesize a strength, weakness, opportunity, threat analysis table to form several possible strategies and predict the outcome of those strategies. These strategies made from combining elements of the table in the TOWS matrix and producing four core strategies as follows: strength-opportunity (SO), strength-threat (ST), weakness-opportunity (WO), and weakness-threat (WT) strategy.

**Table 2.** Strategies for Combining Elements in the TOWS Matrix

Strength		Weakness	
<b>Opportunity</b>	- Adjusting existent regional regulation specifically land usage context to mitigate risk caused by uncontrollable land consumption while also	-	Adjusting existent regulation to fit vertical building development for important facilities especially in far reach area since a vista to beach area was difficult to obtain and



	Strength	Weakness
	<p>pertaining all the benefit of low carbon housing and unique architectural identity. This adjustment is determined per regional basis on how nearby society valued religion-based urban development strategy</p> <ul style="list-style-type: none"> <li>- Incorporating cultural and traditional value and heritages into control variable of land usage in regional development regulation</li> </ul>	<p>vertical building provide thermal comfort because of small heat receiving surfaces overall compared horizontally developed buildings</p> <ul style="list-style-type: none"> <li>- Adjusting regulation to elevate the use of public transportation compared to private vehicles to encourage people to appreciate cultural and traditional heritages while at the same time improving traffic efficiency</li> <li>- Adjusting development pathway into a centralized facility complex for every city activity center to ease the accessibility to certain facilities while also reducing traffic load</li> </ul>
Threat	<ul style="list-style-type: none"> <li>- Develop regulation accompanying traffic regulation specifically for crowded areas. This including one way traffic or even odd numbering policy. This is to avert carbon emission</li> <li>- Incorporating Nature-based Solutions or NbS [17] to individual building unit or facilities to mitigate risk caused by green space inexistence and preserve ecological cycle within certain region by synthesizing green environment within building complex</li> <li>- Strict predetermined land use regulation as way to preserve green open spaces to mitigate ecological risks dependent on regional basis.</li> </ul>	<ul style="list-style-type: none"> <li>- Green space preservation regulation within specific region to decrease the effect of carbon emission</li> <li>- Adjusting regulation to specify the existence of green space and Nature-based Solutions feature within individual land that will be developed.</li> <li>- Densification of city complex to reduce traffic congestion by centralized facilities development and or limited vertical oriented building complex adjusted by regional valuation of <i>bhisama</i></li> </ul>

### Strength-Opportunity (SO) Strategy

With several strengths listed above, we can use it to reinforce existing policy to pertain existence of Bali building height limit because it provides notable benefits to people especially from cultural standpoint. Meanwhile current teachings of *tri hita karana* and *tri angga* have potential to recontextualized and empower mentioned policy to avert uncontrollable land conversions. This



aspect is *pawongan* which specify harmonious relationship among people. If this were recontextualized, it could also relate to harmonious relationship among people with their belongings. This meaning can be further translated into how much land could be used for each people. For *tri angga* this aspect governs the 'body' which is area of people activity within urban context. If we were to improve the specifics, then point that mentions "*each body parts should be proportional in size, if specified criterion not achieved, then body itself could tumble and have difficulty to move*". In other way, if specific land usage exceeds past other important part of land, then it could possess danger in the future. In this definition, policy can govern which land could be developed further or prohibited to be developed [18]. This recontextualization is a method to reincorporate cultural and traditional values into tradition and culture-based urban development strategy. The blend of this value and risk mitigation strategies can soften how society receive a change to an urban development strategy and how they interact with it. This change also determined per regional basis as every region in Bali have slight difference in culture and tradition and how they value them. Current Bali regional development regulation which has taken some point from society normative rules. And this normative rule also based on culture and tradition mentioned above, so logically regulation adjustment should be performed regionally and by how susceptible the region to various risk especially ecological risks.

#### **Strength-Threat (ST) Strategy**

Although the existence of the regulation provided useful for preservation of cultural and identity aspect for Bali as a region, pertaining this regulation without looking at the externalities may possesses serious risk. With this concern, we can propose strategy on how mitigating several risks that can affect the existence of building height limit negatively. These strategies consist of some assistance to strategies mentioned in strength-opportunity strategy. First one is trying to mitigate traffic by readjustment of traffic regulation especially for highly crowded areas with simplifying the traffic in these area into a one-way traffic. This could also be empowered by even-odd plate number limitation system if necessary. Simplification of traffic will then decrease carbon emission while also let people save their resources. The next one is currently a modern strategy favored by urban planners by incorporating nature-based solution into future development. Nature-based solution (NbS) is broad knowledge on how to preserve existence of nature while planning forward. These solutions have several branches of implementation such as using green infrastructure and/or natural infrastructure to preserve green space existence, the other way could be achieved to preserve hydrological cycle with water-sensitive urban design approach. Either way, nature-based solution implementation is also applied with consideration of what risk that could happen in specific region. Lastly, direct effort to preserve green space by specifying an assertive rule determining possible or prohibited area to be developed by measuring the risk that might happen in specific region. This could be performed by adjustment to regional planning regulation at district level. Although the last strategy is probably fastest way to achieve controlled land use, another factor beyond government side like presence of land speculation practices may render this strategy very difficult to achieve. Nonetheless, it still could be performed as an option.

#### **Weakness-Opportunity (WO) Strategy**

This strategy covers how to avert weakness of building height limitation in Bali by purposing several opportunity options we can take. As we discussed earlier, *bhisama* rooted from Hindu belief understanding and region tradition and cultures. Hence, *bhisama* should be interpreted and adjusted per regional basis to conform to what region needed the most. This also should be mixed with ecological awareness to mitigate disaster risk tied with land use in specific region. This could be achieved with a transit-oriented development (TOD) pathways using centralized-subdivided city complex. This term is divided by subdivided part which means city blocks need to have size that comfortable to reach in working hours while centralized part means the location of facility that used in working hours. With this strategy performed, then it can be improved further by another element such as limited vertical oriented building to maximize land use by putting various facilities function within a single building complex. Vertically developed building should adhere the *bhisama* mentioned previously with a recontextualization to allow this kind of development with extended temple sacred area used as buffer. This set up is made to make facilities easily accessible for most

people in one city block. This will reduce dependency into private vehicles in favor of public transportation to commute in working hours. These strategies will be used to mitigate weakness especially low people to floor efficiency, land availability, and traffic related concern.

### Weakness-Threat (WT) Strategy

As defensive measure to minimize all the weakness and avoid the risks from happening, strict measure must be taken. In this case, we could combine strength-threat and weakness-opportunity strategy altogether since this strategy have a lot of overlaps with previous strategies. This strategy is performed by densification and centralization of city complex to lower need of private vehicle compared to public transportation adjusted with nearby societies to *bhisama*. This is strategy performed to avert the risk of increasing carbon footprint and declining land or green space that might be dangerous to existing ecological and hydrological systems. To improve this strategy further, we took back NbS and use it to minimize damage caused by altered land function by continuous development. This strategy performed at the same time as early planning for preserved green spaces to prevent uncontrollable land use. This also can be strengthened by the use assertive rules specifying region in effect. With those mentioned above, this strategy is a harsher take to two previous strategies. As of now, Bali still have chance to perform previous strategies as it still has abundant green space. But with how Bali is with tourism aspect, land decline might happen sooner because of high need for land ownership causing acceleration to land use.

### CONCLUSION

From the discussion and analysis above, we can conclude that interpretation of *bhisama* is the key how sustainable development with building height limit policy within Bali regional development regulation can coexist. If we assume every region treat *bhisama* the same without considering how each region interact with it and without awareness of natural system, then existence of building height limitation might come dangerous in future. This is because Bali was a popular tourism region which attract not only domestic tourists, but also foreign. Among those tourists, some might decide to have long or even permanent stay in Bali. Because of them staying for extended amount time, they might need place to dwell, increasing the need of land use for accommodation be those by themselves or local people offering service. If this trend continues, Bali will run out of area to be developed in the not so far future and forces even local people to live outside the province which may contradict majority of people in Bali. But land decline caused by land use is inevitable since mortality rate is often much slower than birth rate which cause an increasing trend in individual count within region. People will grow and sooner or later need another place to dwell which consume land to develop. The only strategy we could take to prevent the risks of increasing land use is to limit land use per building type or incentivize ecological system preservation with incorporating green strategies in development. Both of this can be incorporated to already established regulation. Strategy introduction and interaction to societies could be eased by incorporating land and nature preservation aspect to the *bhisama*. From *bhisama* this strategy could be then recontextualized with Hindu understanding input and then can be socialized easier to communities. There are several limitations with this writing as not every side of the development for the regulation covered entirely. One example was how SWOT element fits societies that lives in higher altitude compared to majority of the island's people. In this case, the weakness part of accessibility could be nullified since development is already limited because of land gradient prevent advanced development in a risk of landslide. Such, there are no risk of inaccessibility caused by advanced development in those regions. Comparatively, on lower altitude region nearby the beaches, some strength might turn out to be a negative aspect such as better lighting. As much as lighting provide good working condition, lighting caused by the sun also brought heat on the way via infrared emission. The heat not necessarily bad for densely vegetated area, but in coastal areas, vegetation is much sparse compared to hills and mountain and in turn have worse thermal comfort caused by the sun. This writing also has limitation on analysis as this writing use literature reviews as base and some aspect of SWOT possibly missing or went undocumented because of time and resource limitation. This writing also did not consider the existence of land speculators. Land speculators is one key to why certain place have a high land price. In fact, horizontal development might provide an emergence of new land speculators in remote, soon-to-be-developed areas because of profit based psychology. One ongoing

case right now in Bali is the development of toll road bridging Balinese capital of Badung and Denpasar to Jembrana. This connection set a psyche for people to obtain a tenure to several land in this area and then resell the land ownership back when people in need for land with a much higher price point. This example might drove land ownership price far before development of such area started. Land speculation also distort urban planning vision in the future for those regions causing effect such as poor land subdivision, poor accessibility, urban sprawls, also presence of incompatible land uses.

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