



Morphology of Tarutung City

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Abstract. Tarutung is a sub-district town that is the capital of North Tapanuli City, North Sumatra province, Indonesia. Tarutung City is a district that has the smallest area but has the highest population density. This study aims to find patterns of organizational structure Tarutung City space uses the morphological approach of Tarutung City. Method used is a qualitative method with a descriptive analysis approach. This study found that the pattern of a compact city with linear spreading follows the road, on the morphology of the city structure it is oriented towards the center of government, namely the regent's office, and the Regional People's Representative Council office, and on the visual morphology Tarutung City has a special landmark, namely the Cross of Love which is a building to commemorate the event of the spread of Christianity in the Batak lands which was pioneered by a German missionary, namely Dr. I.L. Nommensen.

Keywords: city, form, morphology, spatial, urban

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1 Introduction

Tarutung is a village located in Silindung Valley. Tarutung is surrounded by green hills and mountains, and is flanked by Siatas Barita Mount and Martimbang Mount. A river named Sigeon stretches like dividing the Tarutung city which flows its water, followed by Situmandi River to the open sea, the Indonesian Ocean. Regarding the origin of the name Tarutung, there are several versions that are used as references. In the Batak language dictionary, Tarutung means durian fruit. The people of Tarutung believe that the name Tarutung originates from a durian tree that grows in the middle of the village. Members of an ethnic group have a common history (ancestry), language, value system, customs, and traditions [2]. The prevailing customary and cultural systems show that Tarutung village already has the characteristics of the formation of a traditional city. Tarutung Village is the trade transaction activities center carried out with local residents or also with immigrants from the Batak land area such as Humbang, Samosir, Tobasa and Dairi. At the location of the tree, over time it was used as a place for trade promises. Trade activities with the outside world have also been going on for centuries.

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Tarutung is located in a strategic location and is profitable for trading activities because it is a cross-section of the Toba road that must be passed [3].

Cities are the most attractive places for the economic growth of a society, cities with their various problems make urban growth vary in each location due to various factors (Fitrianto et al., 2020) [4] [5].

The most influential factor according to Yu et al., 2020 is the growth of the city due to an interesting population movement because there is a new economic center in an area [6]. According to Chiaradia, 2019 it is the human desire to earn income and increase the income that makes them move to seek income in urban areas [1] [5].

According to Jabareen, 2006 urban areas are not only interesting to study, but urban sustainability needs to be researched continuously so that the pattern of urban growth becomes good and the city becomes livable. Pramesti, 2017 also said that not all cities can grow sustainably, it is because economic growth is no longer attractive or declining [7] [5].

According to Tallo et al., 2014 urban if judged by the structural morphology of government, the square area is the center of activity and the most important landmark of an urban area [8] [5]. In terms of its function, an area forms patterns of urban development and distribution.

According to Sitompul & Roychansyah, 2018 The orientation of an urban area can be influenced by the location of houses of worship or religious places that have a large scale, for example, the Belenduk church in Malang city which is the center point of the city [9] [5].

The morphology of the city is formed through a long process, any changes can provide lessons and benefits for handling the development of a city. By studying morphology of an urban area, an urban areas can be spared from past form weakness due to experience learning process of past failure and success [10].

City morphology can form the characteristics of a city as any city morphology can be different. Cities morphology are usually used for city and region. this identify that in analyzing the morphology of the city is also necessary to identify the factors that affect the shape of the city. Then the study of urban morphology requires various types form or aspect [10].

Tarutung is one of the sub-district city which is the regional capital of North Tapanuli Regency in North Sumatra Province. Astronomically, Tarutung City has located at 2.025468° North Latitude and 98.960200° East Longitude. The area of Tarutung City is 110.64 km².

This form of urban development of Tarutung is mandatory and has an urgency to be observed and reviewed as part of the control on the shape of the city and the impacts that will arise based on existing urban theories.

This research aims to study the urban form of Tarutung City based on the history of Tarutung City and the development of the city which is oriented toward urban morphological approach

2 Literature Review

2.1 Administrative Delimitation vs City Morphology

Because the physical boundaries of the city are always changing all the time, it is very often seen that the physical boundaries of the city are far beyond the administrative limits of the city. Referring to the relationship between the existence of the city's physical boundaries and the city's administrative boundaries, it appears that there are 3 kinds of possible relationships according to [11], namely:

A. *Under Bounded City*

A city is said to be an under-bounded city if most of the physical boundaries of the city are far outside the administrative boundaries of the city, as shown in the figure 1.

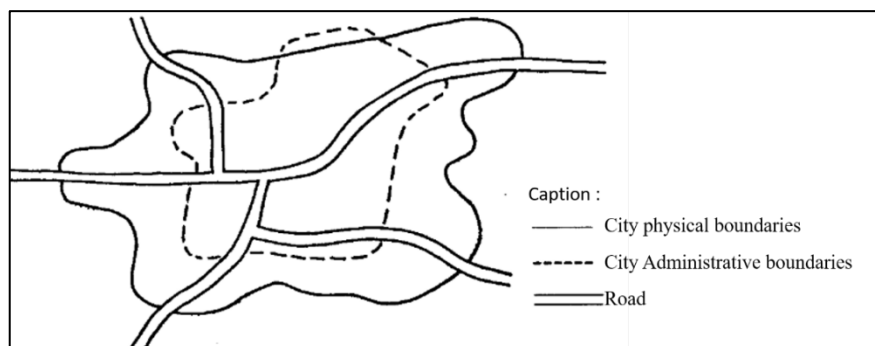


Figure 1 Under Bounded City

B. *Over-Bounded City*

A city is said to be an over bounded city if most of the physical boundaries of the city are within the administrative boundaries of the city, as shown in the figure 2.

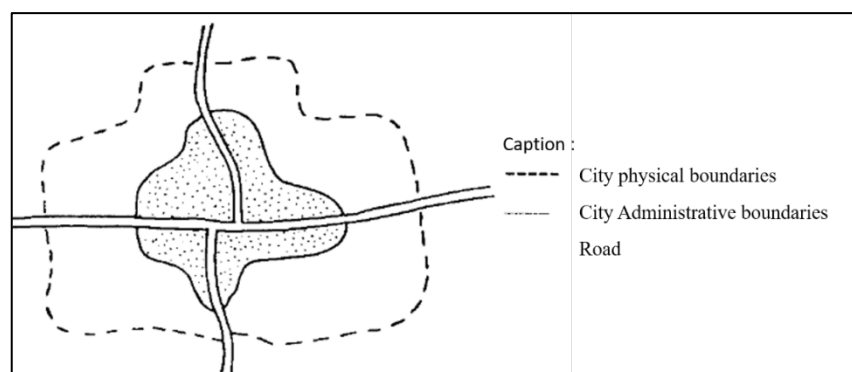


Figure 2 Over Bounded City

C. *True Bounded City*

A city is said to be a true bounded city if the physical boundaries of the city coincide with the administrative boundaries of the city.

2.2 Urban Morphology

Morphology is a form of physical appearance in an area, this physical appearance as shown from the spatial structure of the area which is formed due to the relationship between an area. Morphology can also be interpreted as the physical form of a city that as shown visually, structurally, and functionally so that it can be used as a forming element of a city that has characteristics .

The process of forming the morphology of a city starts from the process of forming life in the city which can bring problems such as physical space and land use due to urbanization. In general, important points in the observation of morphological analysis include land use, building form, building function, architectural style, building height, building distance, history of urban development, and road networks [12] [13] [14].

2.3 City Shape Morphology Theory

In theory, the shape of the city according to Hadi Sabari Yunus, 2000 can be interpreted as the shape, pattern, style, or arrangement of building masses in an area. The shape of the city can be used to identify the shape of an area that looks compact or non-compact which is influential in its development [11].

A. Compact Form

The compact shape is theoretically divided into seven forms, namely: the square city, the fan-shaped city, the rectangular city, the ribbon-shaped city, the rounded city, the octopus-shaped city, and the unpatterned city. This compact form is shown in the figure 3.

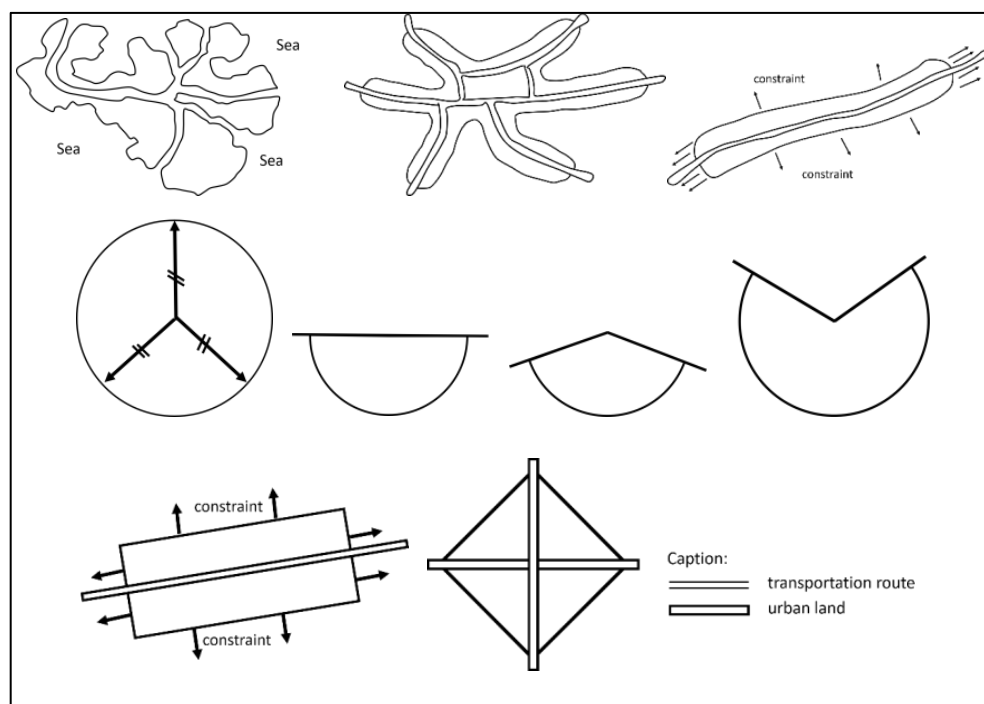


Figure 3 Urban Form [11]

B. Uncompact Form

In addition to compact forms, there is a theory that describes non-compact forms which are divided into four types, namely: chained city, Fragmented City, Split City, and Stellar City. This uncompact form is shown in the figure 4.

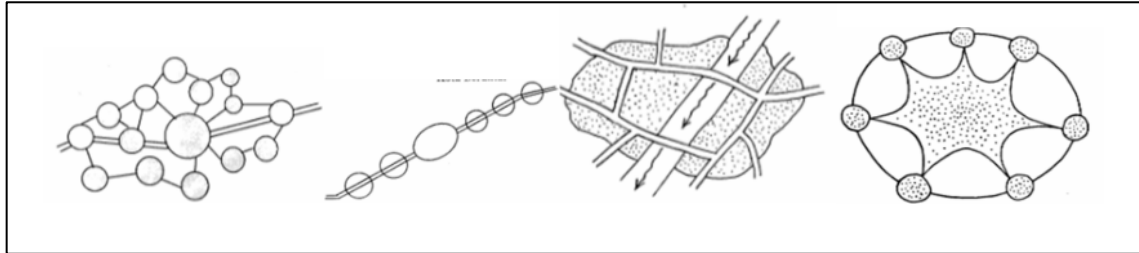


Figure 4 The Non-Compact City Shape [11]

2.4 City Structural Morphology Theory

According to Burgess, 1925 the structural morphology in question is that the city is distinguished based on its location on levels associated with the spatial distribution of residential and mobility [15]. The farther an area is from the center point, the shape and value of the area will be low and irregular as shown in figure 5. This is because the regulations, regulations, and geographical location determine the location of the city structure.

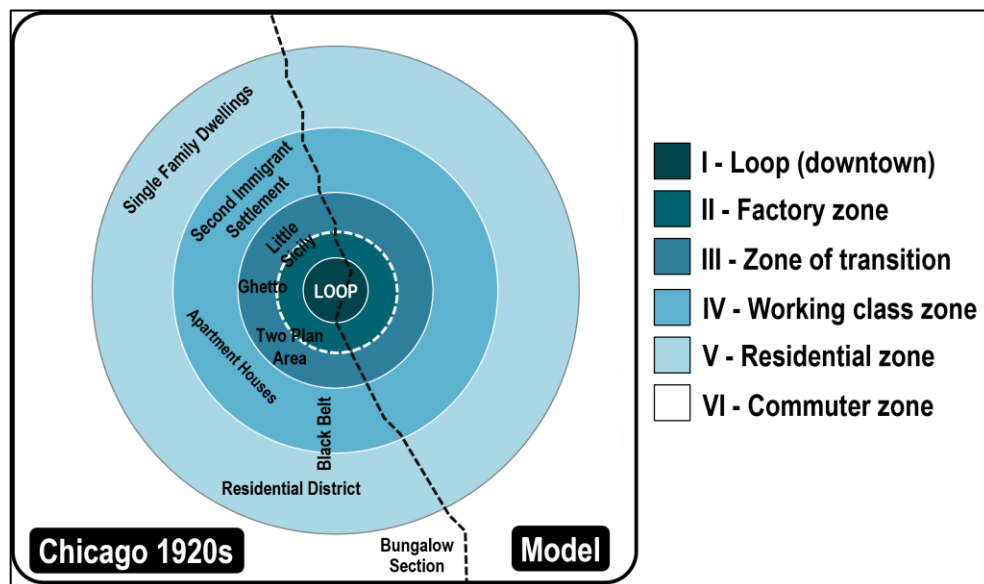


Figure 5 Structural Morphological Study of the city [15]

2.5 City Visual Morphology Theory

The visual theory of the city is intended to explain urban patterns or styles that are easy to judge from the visual description of the area. The visual theory of the city is divided into three, namely: (a) *Linkage*. Linkage is used to identify the shape pattern of a city based on the movement paths within the city (movement network). Linkage analysis focuses on the dynamics

of the city in terms of the movement of people within it, activities such as the economy, population mobilization activities, and land conversion movements; (b) *Figure Ground*. The composition of solid space and void space in urban areas can be recognized from the figurative environmental organization of the figure, the figurative fan ground, the poche system, and the figure/ground texture; (c) *Place*. According to Kevin Lynch, 1990 published on the theory of urban elements, the character or image of the city (Image of the City) can be formed based on the elements of paths, edges, districts, nodes, and landmarks [16].

3 Research Methods

The method used in this study is a qualitative method with a descriptive analysis approach. to analyze based on the characteristics of activities in space that affect the physical factors of the city as a place for carrying out activities and the resulting physical forms of the environment by non-physical factors from the formation of a city morphology. This analysis was carried out to get an output in the form of a proposal for a morphological pattern of the city when viewed physically. To find these outputs, some analysis is needed, including analysis of figure-ground, linkage, and place. Of the three analyzes, it can be used to identify the morphological pattern of Tarutung city, as seen from the morphological forming elements of the city itself. Secondary data collection was taken from historical literature studies, and past documentation maps, for primary data collection using Google map satellite imagery to determine the morphological pattern of the city.

4 Results and Discussion

Tarutung is a sub-district city that is the capital of North Tapanuli Regency, North Sumatra province, Indonesia. Tarutung City is a sub-district that has the smallest area but has the highest population density in North Tapanuli Regency. The area comparison between Tarutung and other sub-district in North Tapanuli Regency is shown in figure 6.



Figure 6 Location Map of Tarutung District, North Tapanuli

4.1 Morphological Analysis of Tarutung City Forms

The city of Tarutung can be analyzed for the morphology of the city by using the analysis of the shape of the city. In theory, the shape of the city according as in [11] can be interpreted as the rectangular city, this as shown from the longitudinal dimensions which are slightly wider than the widened dimensions. This may occur due to physical obstacles to the development of the city area on one side. The rectangular shape of Tarutung is shown in figure 7.

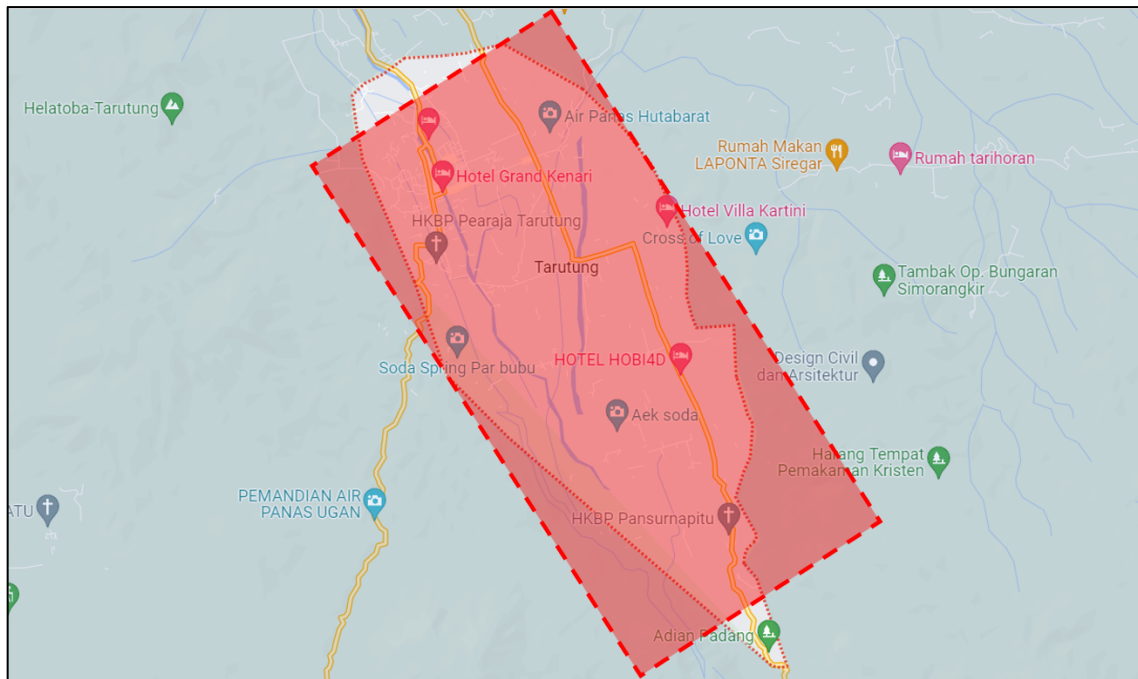


Figure 7 Tarutung City Shape

4.2 Tarutung City Spatial Structure

The spatial structure of the city of Tarutung is divided into 2 parts, namely the structure of the city space that is formed naturally (geographically) and the structure of the city space that is formed by man. The spatial structure of Tarutung city that is formed naturally is a river, the city of Tarutung is traversed by 2 rivers, namely the Sigeaon River (Aek Sigeaon) and the Situmandi River (Aek Situmandi). The unstoppable sound of water coming from Aek Sigeaon then empties into Aek Godang in Pahae naturally formed hundreds of years ago. However, the river has created history and a long civilization until finally the area where this river has turned into a smaller city that is more known as Tarutung City. The elders said the river existed long before Tarutung was as popular as it is now. narrated that in the past, people's houses were not yet crowded, while roads by the river were often used by passers-by to the center of the crowd.

Situmandi River or often called Hasak, is one of the rivers located on the outskirts of Tarutung City. This fast-flowing river directly flows into the Batangtoru River. The brown water flows swiftly, forming white foam every time it hits large and small rocks and is also sharp along the

river flow. At its deepest location of about 1 to 2 meters, the water forms ripples that chase each other. Sigeaon River and Situmandi River are shown in figure 8. Situmandi tourist attraction is a cave called Situmandi Cave that is believed to have sacred value / cultural wealth that is trusted by the local community and also the potential of natural beauty in the form of caves, interesting rivers to visit [17].



Figure 8 The Spatial Structure of Tarutung City Space That is Formed Naturally

The spatial structure of Tarutung city that is formed by man are the center of the city (a symbol of power, a symbol of prosperity, a symbol of God ,and green open spaces) and roads. The symbol of power in the city of Tarutung can be described from its government buildings which consist of the regent's office and the people's representative council office, as shown in figure 9.



Figure 9 The Symbol of Power in The City of Tarutung

The symbol of prosperity in the city of Tarutung is the Tarutung market which is located in the center of Tarutung city, and is also the only market in Tarutung city, as shown in figure 10.



Figure 10 The Symbol of Prosperity in The City of Tarutung

The symbol of God in the city of Tarutung is the cross of love, which is a spiritual tourist spot made to commemorate the services of a Christian missionary from Germany, Ingwer Ludwig Nommensen who started his mission in Batak land and is where Ingwer Ludwig Nommensen looks at Rura Silindung below [18]. Cross of love is located in Siatas Barita sub-district, North Tapanuli, North Sumatra, about 2 kilometers from the city center of Tarutung. Cross of love location is shown in figure 11.



Figure 11 The Symbol of God in The City of Tarutung

4.3 Structural Morphological Analysis of Tarutung City

If referring to the relationship between the physical city boundaries and the city administrative boundaries, it as shown that the city of Tarutung can be classified as an over bounded city where

most of the urban physical boundaries are within the city's administrative boundaries, as shown in the figure 12.

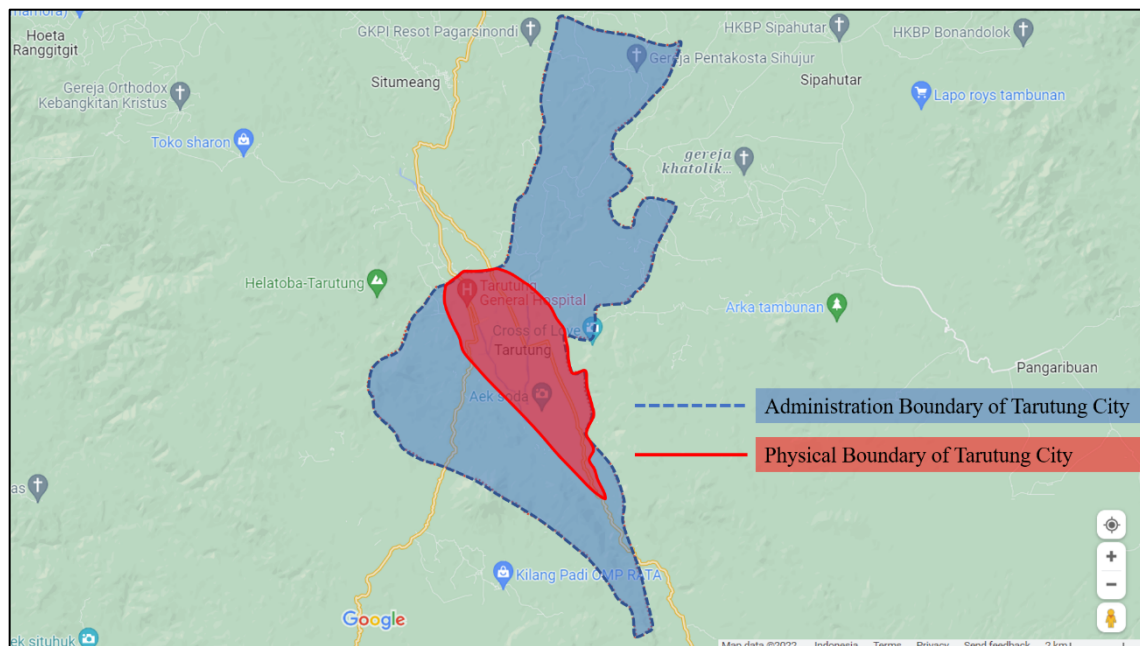


Figure 12 Morphological Structure of Tarutung City

5 Conclusions and recommendations

In the morphology of the shape of Tarutung City, it is a compact city and linearly oriented following the transportation routes of Tarutung City. In the morphology of the structure of Tarutung City, the central business center is centered on the government center. In terms of visual morphology, Tarutung City has a dominant landmark, namely the Cross of Love

The recommendations in this study must be followed up by the government and subsequent researchers, the morphology of Tarutung City in the spatial planning of the city area must be adaptive to the city function and the structure morphological form of Tarutung City also indicates that the CBD or business center is still centered on the center of government, also Tarutung City needs to preserve the cross of love which has a strong potential to attract new economic values.

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