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Designing Creative Industry Center in Medan City with Tropical Architecture Approach

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Abstract. *Medan as the capital city of North Sumatra has rapid economic development, for instance in the creative industry sector. This development is in line with the large productive age rate which reached 69.99% and the increase in intellectual property applications to the Ministry of Law and Human Rights from North Sumatra. The rapid growth of the creative industry and the large number of productive ages require the right platform to encourage further development of the creative industry in the city of Medan. The right place for this is the creative industry center building facility. The facility can be used as a center for creative industry executants to develop their businesses in various ways, such as workshops, exhibitions, seminars, and so on. This facility was designed with a tropical architectural approach in an effort to respond well to the building's environment.*

Keywords *creative industry, creative industry center, tropical architecture*

1. INTRODUCTION

In recent years, the development of the creative industry in Indonesia has grown very rapidly. In fact creative industries have an important role in the National Economic Recovery (PEN). The development of this creative industry is not only centered in the capital city of Indonesia, but has also spread in various regions such as North Sumatra. One proof of the rapid development of the creative industry in North Sumatra can be seen in the number of applications for Intellectual Property (IP) to the Minister of Law and Human Rights. North Sumatra itself is the largest contributor of applications on the island of Sumatra and ranks 6th nationally. In 2019 North Sumatra recorded 1,337 works, then the number of records increased in 2020 to 2,141 works and in 2021 to 3,503 works.

Medan, which is the capital of North Sumatra Province, certainly has greater potential in the development of the creative industry in North Sumatra. The results of the 2020 Population Census show that the population of Medan City reached 2.44 million people. Based on the productive age group, in Medan City there are 1.7 million people or 69.99% of the population who are in the productive age group or 69.99% of the population who are in the productive age group. With a very large number with a percentage of almost 70%, Medan City has enormous potential to develop the creative industry more seriously.

Based on the 2020 Creative Economy Statistics by Kemenkraf RI, in North Sumatra itself there are 3 major creative industry subsectors that are most in demand by creative industry players, namely music with a percentage of 24.98%, culinary with a percentage of 19.71%, and

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performing arts with a percentage of 9.17%. Based on statistical data by Kemenenkraf, it can also be seen that in North Sumatra itself, Medan City contributes the most creative industry players, namely 54.93%. The Medan City Tourism Office recorded that the most creative industry in Medan City is the culinary subsector at 48% followed by the fashion subsector at 28%, and crafts at 4%.

The data that shows this great potential, provides a task for Medan City to be able to create a platform that is able to facilitate creative industry players in Medan City, especially for the 3 subsectors with the largest actors, namely the music, culinary, performing arts subsectors, and additional subsectors, namely fashion and crafts. Not only to facilitate creative industry players, but there must be a platform that is able to encourage the growth of interest from productive age people to participate in the development of creative industries in Medan City. This aims to advance the local economy and certainly reduce the unemployment rate in Medan City itself.

For the time being, Medan City does not have the intended platform. The marketing of creative industry products in Medan City is still through bazaar events that are often held in public spaces. These events are temporary facilities. According to KPMG, marketing by having a physical store that can be visited increases product sales. Also, based on a survey conducted by Think With Google in 2018, 61% of shoppers prefer shopping for goods that have physical stores.

Public facilities in the form of creative industry centers are the right place to facilitate actors and productive age communities. The facility can be used as a center for creative industry players to develop their business in various ways, such as workshops, exhibitions, seminars, and so on. develop their business in various ways, such as workshops, exhibitions, seminars, and so on. This creative industry center can also be used as a platform to stimulate the productive-age community of Medan City to take part in the development of their business.

The architectural theme applied in the building is the tropical architecture theme. The selection of this theme is based on the location of the building site which is in a tropical climate. By applying the tropical architecture theme theme, the designed building is able to provide a comfortable space for its users. Tropical architecture theme tropical architecture theme is able to respond to site conditions so that climate problems on the site can be resolved.

The purpose of the study is to be able to understand the concept of planning a creative industry center building by applying the principles of tropical architecture and planning a building that is able to accommodate all the activities of creative industry players.

2. LITERATURE REVIEW

A. Creative Industry Center

Definition of Creative Industry Center

According to the British Council Creative Hubkit, a creative industry center is a place, both physical and virtual, that brings together creative industry players. The creative industry center acts as a place where various activities carried out by creative industry players are held. This center is a place that supports networking, business development and community involvement in the creative, cultural and technological sectors.

Classification of Creative Industry Centers

1. Based on its structure

a. For provit

Creative industry centers with this structure are centers that aim to make a profit. The building manager receives funds from users for mutual benefit as well as for building operations.

b. Non-profit

This creative industry center is a center that does not aim to take advantage of its users. The funds received are used only for building operations and activities of the creative industry center. activities of the creative industry center, where these funds can be received from building users as well as from other sources such as government and donations.

2. Based on the sector

a. Multi-discipline

Creative industry centers with multi-discipline types, in which there is a combination of various sectors of the creative industry. An example is the combination of the art and technology sectors.

b. Specific Sector

This type of creative industry center is a center whose building function is to support one creative industry sector only.

3. Based on the model

a. Studio

The studio model is a collection of various individuals and or small businesses such as UMKM in a coworking space.

b. Center

This model is a large-scale creative industry center that has facilities such as cafes, bars, cinemas, workshops or production spaces (maker space), shops (retail), and showrooms.

c. Network

This is a group of individuals or businesses that are spread out (not in one specific location) but these individuals or businesses form a network based on a particular sector.

d. Cluster

This model is a group of individuals or businesses that work together in a particular geographical area.

e. Online platform

This is a model of a creative industry center that uses online methods such as websites or social media to collaborate by reaching various audiences.

f. Alternative

A form of creative hub that focuses on experimenting with new communities, sectors, and financial models.

Creative Industry Center Functions

According to the British Council Creative Hubkit, creative industry centers have various functions such as:

a. Providing support in the form of services and facilities for ideas, projects, organizations, and businesses that are incorporated in it both in the long and short term. Organizations and creative businesses incorporated in the creative industry center can conduct events such as workshops, workshops, and other events. Organizations and businesses incorporated in the creative industry center can conduct events such as workshops, training, seminars, and so on.

b. Facilitate collaboration and community relations of creative industry players who are active in it. The creative industry center which is a creative industry community functions to connect the various businesses in it so that creative industry players can work together for the advancement of their business work together for the advancement of their business.

c. Reaching out to research and development centers, institutions, creative and non-creative industries. This research and development support helps creative industry players to develop their creative industries.

d. To communicate and attract a larger audience. The creative industry center serves to attract various groups of people so that the businesses in it will be better known and advanced.

e. To advance the skills and talents of the creative industry players who work in it. The creative industry center becomes a facility used to explore various contemporary practices and business innovations in the creative industry.

B. Tropical Architecture

Definition of Tropical Architecture

Tropical climates are characterized by predictable temperature patterns with modest seasonal variations and rainfall that is quite difficult to predict and varies greatly from year to year (Kellman and Tackaberry, 1997). Indonesia itself falls into a tropical climate region where the daily temperature range is much greater than the seasonal variation between the hottest and coldest months.

Climate conditions with high temperatures and rainfall are challenges that influence building design in Indonesia in terms of form, function, and design. Indonesia in terms of form, function, and materials.Humid tropical climatic conditions require special requirements in the design of buildings and the built environment, given that there are several specific factors that are only found specifically in this climate, so that architectural theories, composition, form, building function, building image and aesthetic values of the buildings formed will be very important. The architectural theories, composition, form, building function, building image and aesthetic values will be very different from those in other regions with different climatic conditions.

Characteristics of Tropical Architecture

According to Lippsmeier, there are 6 natural ways to overcome the tropical climate that can be applied to tropical architecture building design. By considering the proper placement of building masses in the direction of the sun and wind, as well as the shape of the plan and construction and by paying attention to the use of appropriate materials, the room temperature can be reduced by several degrees without having to rely on artificial ventilation. artificial air conditioning. The decrease in room temperature even at a small degree to the outside temperature or relatively slow air movement is able to provide a comfortable feeling for building users. In the humid tropical climate itself, the decrease in indoor temperature is prioritized by the use of cross ventilation. Here's a natural way to deal with the tropical climate:

1. Building orientation

Three main factors that determine the placement of buildings are:

a. Solar radiation and protective measures b. Wind direction and strength

c. Topography

2. Cross Ventilation

Indoor cooling can occur due to evaporation from the air flow process. This evaporation produces moist air that can lower the room temperature. Humidity must be maintained at a non-saturated point, because when the air humidity is too high even reaching 100%, cooling cannot

occur. So air conditioning in this case is very important. Without air conditioning, a room with humans in it will quickly reach its saturation point so that the body can no longer release moisture. Cooling with air can only be done when the air temperature is lower than the skin temperature (35°-36°).

3. Sun Protection

There are two types of sun protection elements, vertical elements and horizontal elements, but it is possible to combine these two elements in various forms. The design of sunshades must fulfill a certain function and the play of shapes can affect their effectiveness. Prominent horizontal elements are effective for high sun, which means protecting the north and south sides of the building. Vertical elements are effective for low sun, meaning they protect the east and west sides.

4. Air Humidification, Water

The air humidification method is a method of reducing air temperature by increasing air humidity through water evaporation. This method is done by adding water elements both inside and outside the building. So that the heat that occurs will cause evaporation and increase air humidity. An example outdoors is the application of a body of water around the building which is a source of water vapor to increase humidity so that the air feels cooler. However, this method is appropriate for use in dry tropical climates because when applied to humid tropical climates it is detrimental because it increases air humidity which leads to a feeling of heat.

5. Heat Storage and Retention

Natural ventilation systems in tropical climates focus on retaining heat during the day, but it is actually necessary to consider how the temperature conditions at night that require warmth. Here the heat storage ability of a material is an important consideration. Dense and heavy materials have the ability to absorb and store heat well. Light, porous, and loose materials absorb little heat and tend to release heat in a short time. However, dense materials inhibit heat transfer which is detrimental when there is high heat in the room.

6. Vegetation

The use of vegetation has different needs and effectiveness in different regions. In dry tropical climates dense vegetation can buffer unwanted hot winds and dust, and the evaporation of leaves adds moisture to the air so that temperatures will drop. Conversely, in humid tropical climates where high wind movement is required, shrubs and trees can inhibit air movement.

Comperative Study

Table 1. Comperative Study of Similar Project and Similar Theme

Comperative Study	
Similar Project	Similar Theme
1. Bandung Creative Hub	**1. Gading Festival Sedayu City**
 **Picture 1.** Bandung Creative Hub Source: https://www.archdaily.com/	 **Picture 3.** Gading Festival Sedayu City Source: Jurnal Linears, Vol. 3(2), Hlm. 75-77
Bogor Creative Hub is a creative industry center located on Jl. Ir. H. Juanda, Pabaton, Central Bogor District, Bogor City with an area of 1600 m2. This building was established in an effort to encourage the development of creative industry players in Bogor City. This creative industry center plays a role in uniting various activities of creative industry players. The building works as an open space for information exchange, informal training, and a space to find inspiration.	Roofs on buildings with tropical architecture concepts are generally sloping with a slope above 30º. This is because the shape of the roof like this is able to make high rainfall in tropical climates can flow smoothly directly to the ground and not stagnate at the top of the building. Gading Festival uses a sloping roof with a slope of 30º. A building without walls can also block glare and heat from entering the building. The use of sun shading under the roof prevents the sun's radiation from entering, reducing the sun's heat.
2. Artcot Creative Center	**2. Rent Office Wisma Dharmala Sakti**
 **Picture 2.** Artcor Creative Center Sumber: https://www.archdaily.com	 **Picture 4.** Artcor Creative Center Sumber: https://www.archdaily.com
Artcor Creative Center is located in the historic center of Chisinau in the courtyard of the Art Academy (AMTAP). This creative industry center was established as a means to develop the creative industry environment in Moldova. The spatial solution of the building is determined by the configuration of the plot position, the presence of architectural monuments built in the late 19th century, and the surrounding buildings. The building is a combination of a 400 m2 new building and a part of the old building of the academy of 450 m2. Part of the roof area (1200 m²) is occupied by an old warehouse and a 300 m² residential building, the demolition of which provided additional space for public areas.	Wisma Dharmala Sakti Jakarta uses openings with window elements on the side of the building and void elements in the center of the building. Openings on the side of the building are in the form of glass windows with aluminum frames that can be opened and closed, before flowing through the window strong winds are filtered first by balconies and concrete canopy canopies on each floor then passed on through the outer side window openings, into the building, then out through the inner side window openings (void side) or vice versa, so that the air flows crosswise at each corner of the room.

Source: Author's Processing, 2023

3. METHODS

The method of designing the Creative Industry Center building refers to the design process which includes the site analysis and function analysis stages. Existing data on the site is processed and used as an initial design reference, as well as function analysis used as a design reference. Data collection is done in the following ways:

a. Primary data

- Observation (field survey)

This method is used to obtain data about the object by making a direct visit to the object of research. By making a direct visit, the data obtained will be more accurate.

- Documentation

This method is data collection in the form of physical evidence both written and pictorial.

b. Secondary data

- Literature study

Collecting data in this way is by looking for literature that discusses and is related to the object of research. Data from literature studies can be taken from journals, books, news, and reliable internet sources.

- Comparative study

Comparative studies are carried out by looking for projects that have similar functions and themes so that it can be identified how the application of research objects in existing projects.

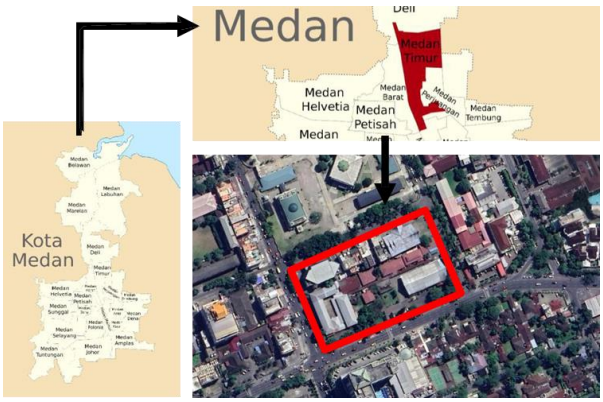
4. RESULTS

Project Location

The location of the design is located in Medan Polonia District, Medan City, North Sumatra Province.

Table 2. Site Description

Site Description	
Location	Jalan Perintis Kemerdekaan, Kelurahan Gaharu, Kecamatan Medan Timur
Area	± 15500 m^2
GSB	12.5 m
KDB	60%
KLB	6
KDH	20%
Zoning Use	Public Facility



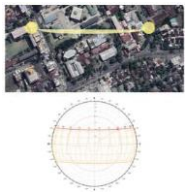
Picture 5. Site Location

Source: Author's Processing, 2023

Site Analysis

Table 3. Site Analysis

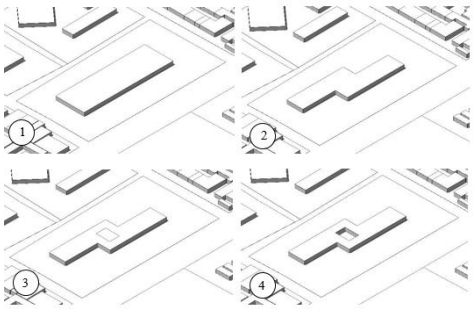
Element	Problem	Potential	Prospect
Land Use 	The functions of the surrounding buildings are diverse and there are functions that are not in line with the function of the building.	The building functions around the site are still dominated by similar functions that will be built.	Create boundaries against incompatible functions and integrate the building with surrounding buildings.
Building System 	The buildings around the site are low-rise buildings of 1-3 floors and there is one tall building on the west side of the site.	The predominance of low-rise buildings gives space for buildings to remain conspicuous.	The building also employs low levels but on a larger and more striking scale.
Vehicle Circulation 	The main vehicular circulation is a one-way road to the east of the site with very high intensity. The vehicular routes to the east and north are lower intensity roads.	The one-way Perintis Kemerdekaan road facilitates access in and out of the site.	Low-intensity roads (IAIN Road and Jalan Adinegoro) can be used as service access and building exit as well as an alternative site route.
Pedestrian 	The pedestrian paths on the north and east sides are not fully utilized. There are elements that interfere with pedestrianization.	On the south side (Jalan Perintis Kemerdekaan), the pedestrian path is well designed and comfortable to use.	The pedestrian paths on the north and east sides need to be processed so that there are no distracting elements so that they are comfortable to use.
Outside View 	The view to the east side is an office view.	The south side leads to the city center and can be seen tall buildings such as the Junction and Grand Mercure Hotel.	The view to the west needs to be blocked using vegetation or by diverting the view to that side.

Inside View 	Views into the site are slight from the north and east.	The southern side of the site that extends to Jalan Perintis Kemerdekaan will be viewed by more people.	The side of the building that leads to this street needs to be striking and eye-catching.
Noise Analysis 	Jalan Perintis Kemerdekaan provides the highest noise from passing vehicles.	IAIN Road on the north side has low noise intensity.	Public spaces and spaces that do not require acoustic comfort can be positioned on the south side of the building and vice versa.
Orientation 	The east side of the site still allows direct sunlight.	The longest side of the site is to the north and south, reducing the intensity of solar heat into the site.	Spaces that do not require thermal comfort can be positioned on the east side of the site.
Wind Analysis	The trees on the north side are too large in scale and may block the wind from entering the site.	Low-rise buildings around the site provide the potential for wind to enter the site (unobstructed)	Openings on the north side need to be provided in order to natural air into the building and implement a cross ventilation system.
Vegetation 	Vegetation around the site is inconsistently placed and at an irregular scale.	Vegetation around the site gives a more beautiful impression, but not the right consistency.	The vegetation on the north side needs to be replaced with low-physical vegetation so that it does not block the facade and the wind from outside.

Source: Author's Processing, 2023

Concept

Mass and Interface Concept



Picture 6. Mass Concept
Source: Author's Processing, 2023

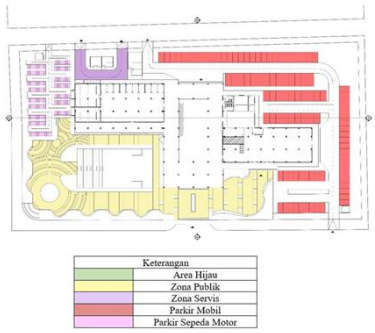
The initial mass of the building is taken from a basic rectangular shape with the longest orientation of the mass facing south and north. In addition to being oriented towards the north and south, the mass is also oriented to follow the shape of the site which has a slope of 19.7° to the east.

The mass form is scraped on two sides to give a more flattened shape and minimize the length of the building facing west and east. In addition, the massing creates a micro space on the west and east sides of the building that can be utilized as a functional outdoor space.

Scavenging leaves a massive space in the center of the building mass. This massive space makes it impossible to implement effective cross ventilation. Therefore, this massive mass was scooped out in the middle to create an inner court that can be utilized as a space for natural air flow in and out of the building. By doing this, cross ventilation can still be applied to the building. The final shape of the mass creates a flattened mass that can implement cross ventilation and achieve the principles of tropical architecture.

Landscape Concept

1. Zoning



Picture 7. Zoning
Source: Author's Processing, 2023

The building mass is placed closer to IAIN Road, leaving a space between the building and Jalan Perintis Kemerdekaan, which is the main access into the site. This remaining space is utilized as a public plaza. This plaza is a receiving space that is connected to the pedestrian on the south side of the site.

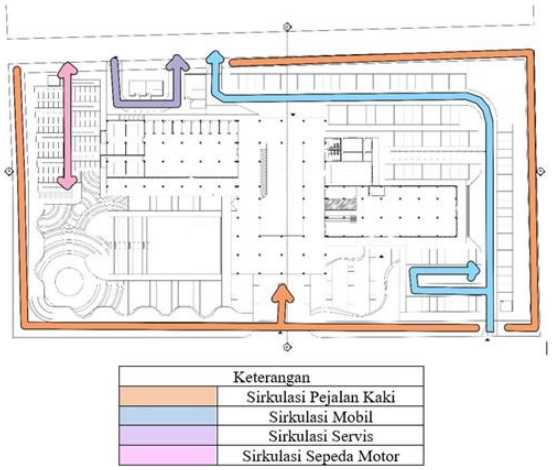
The direct connection between the pedestrian path and the plaza provides freedom of movement for pedestrians to enter the site. The plaza also functions as a space to conduct various activities of creative industry players such as bazaars, exhibitions, and other events that require a large outdoor space.

In the outdoor space, an apmhitheater is also made which is positioned on the south-west side of the site. This position can provide a more interesting performance atmosphere. The direction of the audience's view is directed to the city so that the performer has a stage

with an urban background. This interesting setting can add to a more memorable performance experience.

The outer space on the south side, which borders IAIN Road, is utilized as a service and parking area. The north-west side is used as a motorcycle parking area and the north-east side is used as a car parking area.

2. Circulation



Picture 7. Zoning
Source: Author's Processing, 2023

Access for cars is positioned on the south-east side of the site. This position facilitates access for cars coming from the west to the east of the site. Jalan Perintis Kemerdekaan, which is a high-density one-way street, has the potential to experience congestion. The exit position for car vehicles is made on the south-east side to avoid the density of vehicles at the intersection of Jalan Perintis Kemerdekaan - Jalan Sutomo which has a traffic light.

Motorcycle access is positioned on the north side of the site. The separation of motorcycle and car access aims to facilitate the circulation of both vehicles. IAIN Road, which is a two-way street, allows motorized vehicles to access the site from Jalan Adinegoro and Jalan Sutomo.

Pedestrian paths are provided around the site. The pedestrian on the north side of the site is made with a larger size and in certain parts has a direct connection with the site.

Discussion

Medan City is a city with rapid economic growth, especially in the creative industry. However, there are currently no adequate facilities in Medan City to house creative industry activities. The absence of a creative industry center building causes a lack of consumer interest in buying or using creative industry products or services.

5. CONCLUSION AND LIMITATION

Conclusion

Designing a creative industry center building is the right step in encouraging the rate of economic growth in Medan City, especially in the field of creative industries. This step can reduce unemployment and consumer interest in creative industry products and services. Building design with a tropical architecture approach can increase the productivity of creative industry players because it can create a comfortable space to work in the building. The application of tropical architecture principles in buildings can reduce building operational costs.

Limitation

It is necessary to build a public facility in the form of a creative industry center building in Medan City as a means of work and promotion for creative industry players in Medan City. This building should be designed by applying the principles of tropical architecture so that the operation of the building does not require too much energy so that it is more efficient. In addition, by applying tropical architecture, building users will be more comfortable in working in it.

REFERENCES

Ambrose, J. (1988). *Simplified design of building foundations*. John Wiley & Sons.

Appleton, I. (2008). *Building for the performing arts*. Elsevier.

Arisal, & Sari, Y. (2020). Analisis penerapan arsitektur tropis pada bangunan kantor sewa Wisma Dharmala Sakti Jakarta. *Jurnal Arsitektur*, 4(1), 54-56.

Chiara, J. D., & Callender, J. (1983). *Time-Saver standards for building types* (2nd ed.). Singapore National Printers Ltd.

Departemen Perhubungan. (1996). *Pedoman teknis perekayasaan tempat perhentian kendaraan penumpang umum*. Jakarta.

Jamila, A. F., & Satwikasari, A. F. (2020). Konsep arsitektur tropis modern pada bangunan kuliner Gading Festival Sedayu City. *Jurnal Arsitektur*, 3(2), 75-77.

Karyono, T. H. (2016). *Arsitektur tropis: Bentuk, teknologi, kenyamanan, dan penggunaan energi*. Penerbit Erlangga.

Kementerian Pariwisata dan Ekonomi Kreatif RI. (2020). *Statistik ekonomi kreatif 2020*. Jakarta Pusat.

Kementerian Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia. (2017). *Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat Nomor 14/PRT/M/2017 tentang Persyaratan Kemudahan Bangunan Gedung*.

Kementerian Pekerjaan Umum dan Perumahan Rakyat. (2018). *Perencanaan teknis fasilitas pejalan kaki*. Jakarta.

Lippsmeier, G. (1980). *Bangunan tropis*. Penerbit Erlangga.

Neufert, E. (1980). *Architect's data* (2nd ed.). Alden Press.