*Turkish Journal of Computer and Mathematics Education Vol.12 No. 7 (2021), 1207- 1216*

*Research Article*

# Google SketchUp and Lumion Based Marine Tourism Destination Development Design

**[1]Husain Syam, [2]Muhammad Yahya, [3]Taufiq Natsir, [4]Ahmad Wahidiyat Haedar, [5]Asba Hamid,**

[1]Rector of Universitas Negeri Makassar, Makassar, Indonesia
[2]Dean of the Faculty of Engineering Universitas Negeri Makassar, Makassar, Indonesia
[3]Chairman of the Department of Civil Engineering and Planning Education Faculty of Engineering Universitas Negeri Makassar, Makassar, Indonesia
[4]Universitas Negeri Makassar, Makassar, Indonesia
[5]Universitas Indonesia Timur, Makassar, Indonesia

**Article History**: Received: 11 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 16 April 2021

**Abstract:** This study aims to describe the design of marine tourism development based on Google SketchUp and Lumion. The research location is on the island of Larea-rea as one of the marine tourism development destinations in the East Coast Region of South Sulawesi Province, Indonesia. This type of research is Research and Development (R&D) by applying the ADDIE (Analysis, Design, Development, Implementation and Evaluation) Approach. The data collection techniques used were field studies, observations and interviews. Data analysis was carried out following the stages of data collection, data condensation, data presentation, verification / concluding. The results showed that the design of tourism destination development carried out following the concept of ecotourism. This reality is shown in the empowerment of miniature mangrove forests to prevent coastal abrasion and the use of local cultural themes where the design of the roof side of the *Rumah Sembilan* is used according to the *Karampuang* traditional house. At the research locus, it can be seen that the natural marine potential possessed by the island of Larea-rea is still natural and well maintained in the form of unpolluted white sand beaches with clear seawater and natural coral reef conditions to support the development of ecotourism-based tourism.

**Keywords:** Tourism Destinations, Research and Development, Local genius, Google SketchUp, Lumion.

## Introduction

The development of Information and Communication Technology (ICT) plays an important role in developments in various sectors of life today. This reality is supported by the statements of experts (Baker & Ward, 2002; Heeks, 2018; Niswaty, Wulandari, & Saleh, 2019; Wahyuni, Akib, & Darwis, 2017) that the trend in world life today is very much influenced by the rapid development of information and communication technology and the advancement of knowledge with all its impacts, both positive and negative. This also drives the globalization flow that spreads everywhere, giving rise to a wide variety of implications in all aspects of human life and the nations of the world.

There are four levels of analysis in doing work using ICT, namely the level of core functionalities, application functionalities, affordances and broader changes (Heeks, 2018). Whatever the function, role and level of ICT are tools that can be used to process data, including processing, obtaining, compiling, storing, manipulating data in various ways to produce quality information, namely information that is relevant, accurate and timely (Wardiana, 2003). This is following the statements of experts (Budiman, 2017; Dewett & Jones, 2001; Heeks, 2018; Salazar, 2005; Wardiana, 2003; Yuan, Gretzel, & Fesenmaier, 2006) that the use of ICT at four levels of analysis is a means of infrastructure, systems and methods for obtaining, sending, receiving, processing, interpreting, storing, organizing and utilizing meaningful data. In other words, the use of ICT at various loci has been understood as software, hardware, use-ware or brain-ware.

There are several ICT software used in various sectors, including ICT software in the fields of education, health and medicine, government and public services, business, engineering, as well as in industry and manufacturing. The integration of information technology with organizational activities and planning has even been implemented by most government institutions (Budi, Akib, Jasruddin, & Dirawan, 2015; Radjab & Akib, 2020) but the question is to what extent the use of ICTs in government institutions in Indonesia. A cursory observation shows that the utilization of ICT in government institutions has so far been largely concerned with its functions and benefits as the main tool in administration, however, along with the demands of the industrial era 4.0, the application of ICT in the engineering sector is increasingly showing an important role in improving the quantity and quality of that field. One of the applications of ICT in engineering is making a map and designing an image that will affect the growth aspects of a region or region. This mapping process is part of the education or learning process for the community in an informal

context. Mapping in engineering is even increasingly needed as a source of data and information in learning the design development of an area.

According to Firdauzy & Zuharnen (2020), cartographic mapping is a science and technique for drawing the conventional spherical surface of the earth on a flat plane. Furthermore, research conducted by Said, Wahidiyat, Andayani, Harifuddin, & Salam (2017) proves that "cartography is a science used in depicting a map or globe". If so far the field of cartography is closer to the map visualization process in two-dimensional (2D) form, then in recent developments, it is easy to improve the quality of cartography, a map can be made in the form of visualization that resembles the real world, namely a map in three-dimensional (3D) form. A 3D map is a visualization of an area that resembles the real situation in the area, where the components contained in the 3D map have a volume of content consisting of three elements, namely length, width and height.

One of the sectors that can be the main driver in the development of 3D maps is the tourism sector. Law of the Republic of Indonesia Number 10 of 2009 in article 1 paragraph 10 states that "A strategic tourism area is an area that has the main function of tourism or has the potential for tourism development which has an important influence in one or more aspects, such as economic, social and economic growth, culture, empowerment of natural resources, environmental carrying capacity, defence and security".

The development of tourism destinations or objects of tourist attraction (OTA), including marine tourism, has an important role economically to increase the country's foreign exchange income and increase the creative economy of the people around the region. Ecologically, the use of the area for marine tourism can cause damage to the marine ecosystem if not managed properly. Therefore, the development of marine tourism in South Sulawesi Indonesia needs to be managed with the concept of ecotourism, which is a sustainable approach whose characteristics are landscape management and directed at community welfare, as well as conservation activities aimed at maintaining the continuity of resource use for the present and the future. will come.

In this study (Haedar, 2018), a 3D mapping of marine tourism objects - the coast of Lare-rea Island in South Sulawesi, was carried out using Google SketchUp and Lumion software because the locations studied had visualizations that were still abstract or two-dimensional (2D) but very potential and interesting to be designed as a focused development of coastal tourism or marine tourism destinations. The area designed is ± 1000 m2 so that in addition to making it easier to build a design, the advantages of using Google SketchUp and Lumion make it easier to build 3D designs that are useful to give a more attractive impression than if they are still abstract or 2D. Therefore, the purpose of this research article is to describe the design of an area following the ecotourism concept using Google SketchUp and Lumion software.

## Literature Review

Information and communication technology (ICT) is a tool used to process data, including processing, obtaining, compiling, storing and manipulating data in various ways to produce quality information, namely information that is relevant, accurate and timely (Wardiana, 2003; Yuan et al., 2006). Meanwhile, Dewett & Jones (2001) states that ICT is a means of infrastructure (hardware, software, use-ware), systems and methods for obtaining, sending, receiving, processing, interpreting, storing, organizing, and using meaningful data. Meanwhile, according to other experts (Budi et al., 2015; Budiman, 2017; Wardiana, 2003; Yuan et al., 2006) that ICT can be said to be the science needed to manage information so that information is accurate and can be searched easily. ICT is an important side of an information system consisting of hardware, database, software, computer networks, and other related equipment. In other words, ICT is a set of knowledge, procedures, programs, tools (tools) that form a particular system that can facilitate human work. As a system, in ICT there are various tools, both hardware, software and humans as use-ware to learn and apply it according to the level of urgency.

According to Budiman (2017), the position of ICT needs to be described, so that its existence becomes clear. The position of information technology (IT) is often equated with ICT or even considered broader than ICT, so it is often wrong in determining its position. ICT has various fields of study because ICT does not only discuss issues of information technology and computers but also discusses communication or telecommunications technology. The scope of ICT analysis summarized from the viewpoint of experts (Dewett & Jones, 2001; Javed, 2020; Salazar, 2005) is e-Learning; information management; information Technology; computer technology; management information system; Internet; telecommunication technology (cellphone, telephone, cable and wireless technology); computer network technology; Computer network security system; database system. Thus, it can be said that IT is part of the field of ICT science which in its implementation is interrelated with one another.

Creating a design of the software is based on several programming languages by programmers which are then compiled with compiler software so that it becomes code that can be recognized by hardware machines. Some examples of the software in question are Software, Operating Systems, Firmware (permanent software), Freeware (free software), Shareware (trial software), Malware (destructive software). In this study, two design support software

were used in the design sketch work for the visual design rendering process, namely using Google SketchUp and Lumion software.

Google SketchUp is the simplest but very powerful graphics program. This graphic program is very lightweight in making designs in three-dimensional format (Kurtulus & Uygan, 2010). The same thing was expressed by experts (Lee & Yan, 2016; Xu, Badawi, Fan, Ren, & Zhang, 2009) that Google SketchUp is a three-dimensional graphic software that has easy operation. Google SketchUp is a software made by Google that functions for graphic design that can produce 3D images. Also, this software is lighter than other software. Even with a simple appearance, Google SketchUp allows users or designers to draw more quickly and accurately.

Google SketchUp is a 3D modelling software program that is flexible, fast and practical. Google SketchUp is commonly used to design buildings and their details with a 3D appearance that is easy for the owner to read, with technical drawings displayed in two dimensions. This program is also equipped with tools for modelling animation. Meanwhile, Lumion is software that allows us to create 3D scenarios with real-time rendering quality. Lumion is targeted to produce many visualizations such as visualization of vegetation, various 3D models, as well as various lighting systems and materials, including visualization of marine tourism destinations with the concept of ecotourism.

The first definition of ecotourism was introduced by the organization The Ecotourism Society (1990) as follows: Ecotourism is a form of travel to natural areas carried out to conserve the environment and preserve the lives and welfare of residents. Initially, ecotourism was carried out by nature-loving tourists who wanted the tourist destination to remain intact and sustainable, in addition to maintaining the culture and welfare of the people (Bottrill & Pearce, 1995; Fandeli, 2000). Ecotourism is a form of tourism that is managed with a conservation approach. The definition of ecotourism in Indonesia can be seen in the Regulation of the Minister of Home Affairs Number 33 of 2009 concerning Guidelines for the Development of Ecotourism in Regions, namely "Ecotourism is a natural tourism activity in a responsible area by paying attention to elements of education, understanding, and support for natural resource conservation efforts, as well as an increase in local people's income" (Fandeli, 2000).

Ecotourism is a form of tourism that must combine the following: 1) travel to an area (such as natural forests, caves, underwater life, the life of indigenous peoples, urban life, and so on); 2) learning activities to improve the tourist experience; 3) promote the conservation of flora, fauna and culture; 4) develop awareness and capacity of local communities. Meanwhile, according to Asmin (2018) that ecotourists can be differentiated according to the OTA goals they choose, the type of experience they want, the level of attention to conservation of natural resources, the level of community participation they expect. Thus, it can be stated that basically, the notion of ecotourism is a form of travel that is responsible for the preservation of nature which can have a positive impact on economic development and maintain cultural integrity for the communities around the ecotourism area. The results of previous research that became a reference in research on the development of ecotourism concept designs have been carried out by Said et al. (2017) entitled Development of Travel Attractions through the Design of Google SketchUp Based Coastal Tourist Map.

## Research Method

The type of research used is Research and Development (R&D) as a research method that can be used to produce a product and test the effectiveness of a product produced (Baharuddin, 2018; Haedar, 2018). The subjects of this study were the *Pulau Sembilan* cluster in Sinjai Regency, South Sulawesi Province, Indonesia. While the object in this study is Larea-rea Island. The terms associated with the title in this study can be interpreted as follows: "Marine Tourism Development Design is an architectural design that is designed based on local cultural values to increase the tourist attraction of the *Pulau Sembilan*".

The data that has been collected consists of two types, namely primary data and secondary data. Primary data is the main data obtained from direct monitoring and measurement results in the field. The data is in the form of observations from several parts of the building in the area. The digital results based on satellite imagery through Google Maps show the area of the island of Larea-rea. Meanwhile, secondary data or supporting data include Sinjai Regency Regional Development Master Plan, Central Statistics Agency (CSA) Data, Meteorological and Geophysical Agency (MGA) Data on Wave Height, Larea-rea Island Development Site Plan, Sinjai Regency wind direction data, Digital photos and satellite imagery photos of the island of Larea-rea and maps of administrative areas, maps of accessibility and topographic maps.

The stages of the development procedure in this study used the ADDIE (Analysis, Design, Development, Implementation and Evaluation) approach (Lin, Kalbaska, & Cantoni, 2016). This development research method is a practical approach capable of producing effective and efficient products. In this study, data collection techniques using expert validation instruments were carried out by experts to validate the results of the designs that had been made. The data collection techniques are based on the results of field studies, observations and interviews.

The data analysis process is carried out continuously, starting with reviewing all available data from various sources, namely from interviews, observations that have been written in field notes, documents and so on to conclude. In conducting data analysis, the researcher refers to several stages described (Miles, Huberman, & Saldaña, 2018) which include the stages of data collection, data condensation, data presentation and verification or concluding.

## Results

Marine Tourism Development Design in Larea-Rea Island, Sinjai Regency, South Sulawesi Province, Indonesia based on Google SketchUp and Lumion is a design with an ecotourism concept in which the designed area can become a tourism destination or marine tourism attraction that has a leading role surrounding communities and tourists in terms of preserving the Larea-rea island area. In operation, the resulting design uses Google-made software which functions as a graphic designer to produce 3D design images. This program is designed using Google SketchUp software and by using Lumion Software which aims to render animation on designs (Lee & Yan, 2016; Setiawan, 2011; Xu et al., 2009). As it is known, the mapping at the research location, especially in the Larea-rea Island area which only has 2D mapping, is considered less attractive for tourists so that it has not been able to produce information about the area.

Based on this reality, the design produced in this research uses the Google SketchUp Pro 2015 software with Lumion software as an addition in implementing the results. Google SketchUp was chosen because it is considered as one of the software that supports flexible, fast and practical 3D modelling. Google SketchUp is widely used for working on 3D-based projects, although laymen who are new to using it also find it easier when compared to other Architect or 3D programs (Lee & Yan, 2016; Ramadhanty & Handayani, 2020; Smirnov, 2016; Xu et al., 2009). This program is also equipped with tools for modelling animation (Setiawan, 2011). The design of a 3D map design begins with installing the Google SketchUp Pro 2015 software and Lumion software before designing. Before designing a visual modelling design, several toolbars are used in making designs in Google SketchUp, as shown in table 1.

Table 1. **Toolbar used** (Haedar, 2018)

| ***Camera Tools*** | | |
|---|---|---|
| **Figure** | ***Toolbar*** | **Function** |
|  | Orbit | Change user views |
|  | Pan | Shift user views |
|  | Zoom | Zoom in and out of the design object view |
|  | Zoom extents | Shows all displayed objects |
|  | Previous | Returns the previous view |
| ***Drawing Tools*** | | |
|  | Line | Make a straight line |
|  | Rectangle | Make a rectangular object |
|  | Circle | Create a circular object |
|  | Arc | Make a semicircle |
| ***Edit Tools*** | | |
|  | Move | Move objects |

| | | |
|---|---|---|
|  | Push/ Pull | Creates the volume/thickness of the object |
|  | Rotate | Rotate objects |
|  | Follow me | Creates an object from a plane that follows a line |
|  | Scale | Change the size of the object |
|  | Offset | Make a line parallel to the selected plane |
| ***Principal Tools*** | | |
|  | Select | Rotate objects |
|  | Make component | Creates an object from a plane that follows a line |
|  | Paint bucket | Change the size of the object |
|  | Eraser | Make a line parallel to the selected plane |
| ***Construction Tools*** | | |
|  | Tape measure | Measure objects |
|  | 3D text | Create 3-dimensional text |

The design of the *Rumah Sembilan* tourist attraction based on the traditional house of Sinjai Regency is the *Karampuang* House. According to some informants, the naming of *"Karangpuang"* is an expression that simplifies the mention of the name of the host or owner as a person who is respected, revered and exemplified by being called *"karaeng"* and / or *"puang"* (Interview, 2018). So, because both are said to be continuous and at the same time, it becomes an abbreviation of *karampuang*. Without denying the naming, it is also known that *karampuang* is the naming for a traditional house following the number of islands that are famous as the place where it was built. The nine islands which are close together are what is called the "island of the nine". Some of the philosophical rationales for the design of the *Rumah Sembilan* are as follows:

First, the construction of a foundation and a house frame that carries the philosophy of *"Sulapa Appa"* (four corners) which is understood by the people of South Sulawesi as a basic element of human creation originating from land, water, fire and air (Interview results, 2018). In other words, the architectural concept of the house of nine originates from an ontological-epistemological view of life, namely how to understand the universe "universally". The philosophy of community life called *Sulapa Appa* is to show the efforts of every human being to "perfect themselves". This philosophy also explains that all aspects of human life are only perfect if they are in the form of a "quadrilateral", as is the plan of the Nine houses in Larea-rea (picture 1).

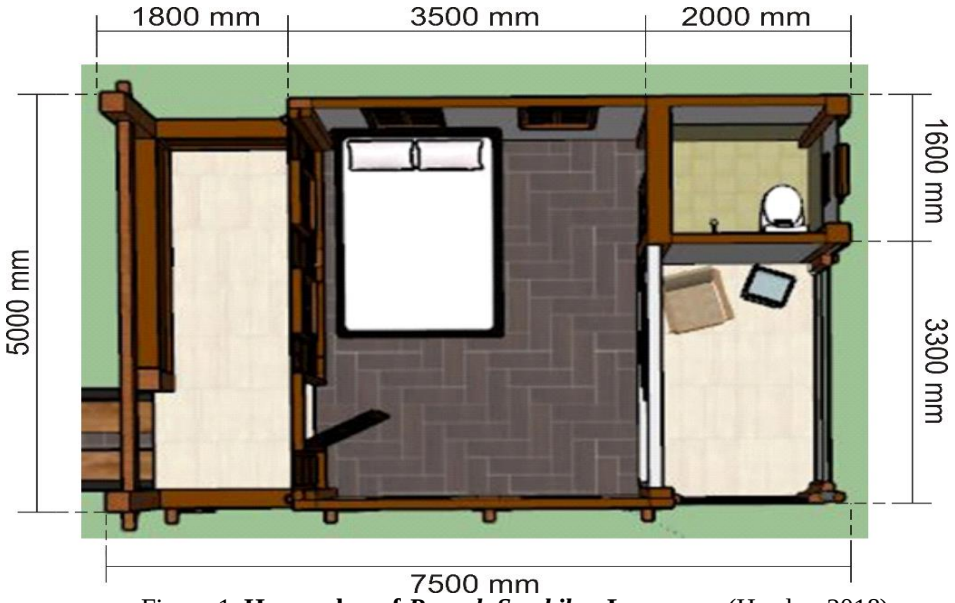


Figure 1. **House plan of *Rumah Sembilan* Larea-rea** (Haedar, 2018)

Second, the exterior construction with the *Karampuang* traditional house pattern is marked by the presence of a plank wall. Third, the making of the interior is intended to provide facilities in the form of a fan, double bed, bathroom and back porch. Fourth, in the process of making the roof of the house, the researcher carries the concept of the roof of the *Karampuang* traditional house which is characterized by a building in the form of a triangular prism and wearing a ridge cover called *timpa laja*.

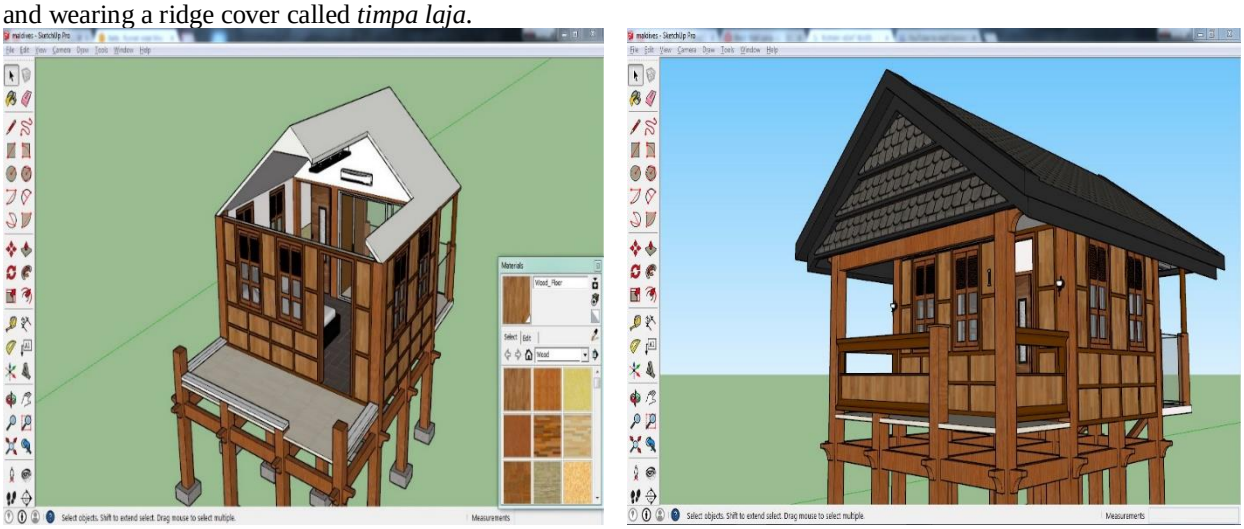

Figure 2. **(a) The construction of the house exterior and (b) The result of joining the roof and *Rumah Sembilan*** (Haedar, 2018)

Based on the research results, it can be explained that the stages of activities in this study are as follows. First, identify potential problems. At this stage, problems were found in the condition of the island of Larea-rea both in the form of visual designs and problems in the arrangement that did not use the concept of ecotourism and natural factors that allowed coastal abrasion to occur.

Second, data collection, researchers conducted field observations to collect data needed in the design of the Larea-rea Island design, such as data on the area of Larea-rea Island, Larea-rea Island Site Plan, Regional Tourism Development Master Plan, wave height data from the Meteorology and Geophysics Agency (MGA), data on Karampuang traditional houses, mapping of Larea-rea Island, transportation rates for visits to Larea-rea Island.

Third, product design, an initial product design is carried out to make a design according to the potential problems that exist on Larea-rea Island. The initial design of the product carried the theme of a garden that beautifies Larea-Rea Island. With the addition of a monument inscribed with *"Sembilan"* (nine) depicting Larea-Rea Island in the Pulau Sembilan District.

Fourth, design revision I, where a major revision was made due to the difference between the area of the existing island and the area of the island being designed, and there was a Site Plan that had been designed but was still in the form of a basic sketch.

Fifth, testing product I, the researchers built the Larea-rea Island pier. The pier is used as a berth for boats coming to Larea-Rea Island. Apart from the pier, the researchers also created a Diving Club. The Diving Club provides facilities in the form of diving equipment for tourists who want to dive to see the underwater beauty of Larea-Rea Island.

Sixth, design validation, is carried out based on the online form provided to the Sinjai Regency Tourism Office, South Sulawesi Province, Indonesia. The link for filling out the form: https://goo.gl/forms/AUzrFFpCr0bjIlBC3.

Seventh, design revision II. Based on the results of the validation given there were small changes to the design as suggested by the informant: Promotion staff of the Sinjai Regency Tourism Office stated that "Nine plus nine islands. The rest is great". The State Property Management Staff stated that "The design is very detailed, it even looks like a real photo. My advice, adds more people in each design". The Financial Administration Staff stated, "The design is beautiful". The Head of the Market and Tourism Development Section stated "The design is already great". The head of the General and Civil Service sub-division stated, "Seeing that this design is generally good enough to be realized in efforts to develop tourism destinations in Sinjai Regency, my suggestion is that this design requires a self-service design because inevitably visitors will need food one day, especially the island of nine which far from the city (Haedar, 2018).

Eighth, the final design result. At this stage, the design results are following the combination of the Site Plan design with the researcher's initiative design where the Site Plan design meets the ecotourism concept. The following shows an example of the final design result in the form of the Larea-rea Island Nine House.

**Real conditions** **Visual design**

Figure 3. **Welcome View of Larea-rea Island** (Haedar, 2018)

In Figure 3, the researcher made an inn called *Rumah Sembilan*. *Rumah sembilan* consists of 10 (ten) houses, which indicates that there are 10 islands. It is said to be *Sembilan* (nine) because the tenth island is "not considered" because the island has sunk due to tides (Interview on 26 May 2018), therefore this inn is named *Rumah Sembilan*. The researcher then innovated the lodging design by instilling the local culture of Sinjai Regency. This can be seen in the roof design architecture of *Rumah Sembilan* which is in the form of a prism by wearing a closed connection called *Timpa Laja* (Sinjai Traditional House) which is made of *"seppu"* wood.

The structure and construction of the *Rumah Sembilan* building adopt local culture such as *Palanggalliri* which functions as the foot of the house, *Alliri'* which is assumed to be a pillar or column, *Pattoddo'* which functions as a link/connector between the poles and as a support for *Alliri*'. Also, researchers embedded solar panels for electricity consumption needs at *Rumah Sembilan* for visitors who spend the night at the house. In each of the Nine Houses there are four panels (@ solar panels 120 Wp x 5 hours = 600 watts) which can produce ± 2,400 watts (http://www.panelsurya.com).

## Discussion

Architectural design is part of human culture, more specifically as part of the actualization of the local cultural values of the community in various aspects of life, including art, engineering, space / spatial planning, geography, history (Gunawan & Prijadi, 2011; Suharson, 2019). Some experts agree that there are several definitions of

architectural design based on how you view it. In terms of art, architecture is the art of building including forms and decorations (Alamsyah P, 2019; Salim, 2015), as is the shape of the *Rumah Sembilan* building which was inspired by the *Karampuang* traditional house. According to experts (Abel, 2000; Gunawan & Prijadi, 2011) that the articulation and actualization of the architectural development of an area are in line with the cultural development of various local cultures which are increasingly complex, complicated and fast due to the mixing, mutual influence and change.

It is often rather difficult to determine the boundaries of the actualization of the socio-cultural values of an area, but in this study, the architectural design of *Rumah Sembilan* becomes a philosophical, historical and original limitation, namely in Sinjai Regency, South Sulawesi Province, Indonesia. Based on this reality, it can be seen that the architectural design of traditional houses based on local cultural values have developed from time to time from time immemorial to the present, as we have seen and at the same time have been created as part of TAO (tourist attraction objects) and cultural treasures local people.

In today's multi-entrepreneurial socio-economic life (Sugandi, Yusuf, & Saukat, 2016; Syam, Akib, Patonangi, & Guntur, 2018; Syam, Lamangida, Madubun, Norwawati, & Akib, 2018; Tleuberdinova & Salauatova, 2018) by utilizing information and communication technology, the architectural design context has created increasingly modern forms of design that can be called contemporary architectural designs based on local cultural values. In other words, as with the subject and object of this study, it is illustrated that the architectural design of the nine houses features a unique form, different from custom, attractive and relatively complex so that it is understood as a form of architectural design based on local cultural values, namely the *Karampuang* traditional house, as a three-dimensional (3D) visualization as well as an icon for the development of marine tourism destinations based on Google Sketchup and Lumion. The result of the development of this artistic design is an articulation of the design for developing tourism destinations or TAO following the ecotourism concept based on local cultural values.

## Conclusion

The tourism destination development design that is being undertaken shows results following the ecotourism concept. This reality is shown in the empowerment of miniature mangrove forests to prevent coastal abrasion and the use of local cultural themes where on the roof side designs are used according to the Karampuang traditional house. At the research locus, it can be seen that the natural marine potential possessed by the island of Larea-rea is still natural and well maintained in the form of unpolluted white sand beaches with clear seawater and natural coral reef conditions to support the development of ecotourism-based tourism. Therefore, so that the design of the development of tourism destinations or TAO can have added value, the resulting ecotourism design concept needs to be realized in empowering miniature mangrove forests to prevent coastal abrasion and re-actualizing the use of local cultural themes in building nine houses. so that the design that fits the Karampuang traditional house has an attractive power for tourists.

**Bibliography**


1. Abel, C. (2000). Architecture and identity: Responses to cultural and technological change. Routledge.
2. Alamsyah P, S. (2019). Arsitektur Tradisional Rumah Betawi. Patanjala, 1(1), 12–26. https://doi.org/10.30959/patanjala.v1i1.225
3. Baharuddin, B. (2018). ADDIE Model Application Promoting Interactive Multimedia. In IOP Conference Series: Materials Science and Engineering (Vol. 306, p. 12020). IOP Publishing. Retrieved from https://iopscience.iop.org/article/10.1088/1757-899X/306/1/012020/meta
4. Baker, P. M. A., & Ward, A. C. (2002). Bridging temporal and spatial" gaps": The role of information and communication technologies in defining communities. Information, Communication & Society, 5(2), 207–224. https://doi.org/10.1080/13691180210130789
5. Bottrill, C. G., & Pearce, D. G. (1995). Ecotourism: Towards a key elements approach to operationalising the concept. Journal of Sustainable Tourism, 3(1), 45–54. https://doi.org/10.1080/09669589509510707
6. Budi, R., Akib, H., Jasruddin, & Dirawan, G. D. (2015). Public information management services in South Sulawesi. International Journal of Applied Business and Economic Research, 13(4).
7. Budiman, H. (2017). Peran teknologi informasi dan komunikasi dalam pendidikan. Al-Tadzkiyyah: Jurnal Pendidikan Islam, 8(1), 31–43. https://doi.org/10.24042/atjpi.v8i1.2095
8. Dewett, T., & Jones, G. R. (2001). The role of information technology in the organization: a review, model, and assessment. Journal of Management, 27(3), 313–346. https://doi.org/10.1016/S0149-2063(01)00094-0
9. Fandeli, C. (2000). Pengertian dan konsep dasar ekowisata. Yogyakarta, Fakultas Kehutanan UGM. Yogyakarta.
10. Firdauzy, A. A., & Zuharnen, Z. (2020). Aplikasi Kartografi Dalam Survei Dan Teknik Pemetaan Gua Horizontal Studi Kasus: Gua Nguwik Di Desa Donorejo Kecamatan Kaligesing Kabupaten Purworejo. Jurnal Bumi Indonesia, 9(1). Retrieved from http://lib.geo.ugm.ac.id/ojs/index.php/jbi/article/view/1169

11. Gunawan, D. E. K., & Prijadi, R. (2011). Reaktualisasi Ragam Art Deco Dalam Arsitektur Kontemporer. Media Matrasain, 8(1). Retrieved from https://ejournal.unsrat.ac.id/index.php/jmm/article/view/315
12. Haedar, A. W. (2018). Perancangan Desain Pengembangan Pariwisata Bahari di Pulau Larea-Rea Kabupaten Sinjai Berbasis Google Sketchup dan Lumion (Designing of Marine Tourism Development in Larea-Rea Island, Sinjai Regency Based on Google Sketchup and Lumion). Universitas Negeri Makassar (UNM).
13. Heeks, R. (2018). Information and communication technology for development (ICT4D) (First). New York: Routledge.
14. Javed, A. (2020). The scope of information and communication technology enabled services in Promoting Pakistan Economy. Asian Journal of Economics, Finance and Management, 1–9. Retrieved from https://globalpresshub.com/index.php/AJEFM/article/view/860
15. Kurtulus, A., & Uygan, C. (2010). The effects of Google Sketchup based geometry activities and projects on spatial visualization ability of student mathematics teachers. Procedia-Social and Behavioral Sciences, 9, 384–389. https://doi.org/10.1016/j.sbspro.2010.12.169
16. Lee, S., & Yan, J. (2016). The impact of 3D CAD interfaces on user ideation: A comparative analysis using SketchUp and Silhouette Modeler. Design Studies, 44, 52–73. https://doi.org/10.1016/j.destud.2016.02.001
17. Lin, J., Kalbaska, N., & Cantoni, L. (2016). How to develop and evaluate an eTourism MOOC: An experience in progress. E-Review of Tourism Research (Ertr), 7, 1–5.
18. Miles, M. B., Huberman, A. M., & Saldaña, J. (2018). Qualitative data analysis: A methods sourcebook. Sage publications.
19. Niswaty, R., Wulandari, S., & Saleh, S. (2019). Strategi Humas Universitas Negeri Makassar Dalam Meningkatkan Citra Positif Masyarakat. Jurnal Ad'ministrare, 5(2), 99–104. https://doi.org/10.26858/ja.v5i2.7888
20. Radjab, A. F., & Akib, H. (2020). Partnership in Weather Observation using the Crowdsourcing Method. In IOP Conference Series: Earth and Environmental Science (Vol. 499, p. 12019). IOP Publishing. Retrieved from https://iopscience.iop.org/article/10.1088/1755-1315/499/1/012019/meta
21. Ramadhanty, D. M., & Handayani, T. (2020). The Effect of Computer-Based 3D Visualization. In IOP Conference Series: Materials Science and Engineering (Vol. 879, p. 12144). IOP Publishing. Retrieved from https://iopscience.iop.org/article/10.1088/1757-899X/879/1/012144/meta
22. Said, F., Wahidiyat, A., Andayani, D. D., Harifuddin, H., & Salam, R. (2017). Development of Travel Attractions Through the Design of Google SketchUp Based Coastal Tourist Map (Pengembangan Daya Tarik Wisata Melalui Perancangan Peta Wisata Pantai Berbasis Google SketchUp). Pekommas, 2(2). https://doi.org/10.30818/jpkm.2017.2020209
23. Salazar, A. (2005). Mapping the scope of information technology enabled transformation: a multi-theoretical framework and review. Manchester Metropolitan University. Retrieved from http://e-space.mmu.ac.uk/1800/
24. Salim, P. (2015). Memaknai Arsitektur dan Ragam Hias pada Rumah Khas Betawi di Jakarta sebagai Upaya Pelestarian Budaya Bangsa. Humaniora, 6(3), 395–402. https://doi.org/10.21512/humaniora.v6i3.3365
25. Setiawan, S. I. A. (2011). Google SketchUp Perangkat Alternatif dalam Pemodelan 3D. Ultimatics: Jurnal Teknik Informatika, 3(2), 6–10. https://doi.org/10.31937/ti.v3i2.298
26. Smirnov, A. (2016). The Information Technology Project. In MATEC Web of Conferences (Vol. 53, p. 1029). EDP Sciences. https://doi.org/10.1051/matecconf/20165301029
27. Sugandi, W. K., Yusuf, A., & Saukat, M. (2016). Rancang Bangun Dan Uji Kinerja Mesin Pencacah Rumput Gajah Untuk Pakan Ternak Dengan Menggunakan Pisau Tipe Reel (Construction Design and Test Performance of Elephant Grass for Cattle Feed using Reel Type Knife). Jurnal Ilmiah Rekayasa Pertanian Dan Biosistem, 4(1), 200–206. Retrieved from https://www.neliti.com/id/publications/97582/rancang-bangun-dan-uji-kinerja-mesin-pencacah-rumput-gajah-untuk-pakan-ternak-de
28. Suharson, A. (2019). Reaktualisasi Estetika dan Etika Wuwungan Rumah Tradisional Jawa dalam Era Revolusi Industri 4.0. In Sandyakala: Prosiding Seminar Nasional Seni, Kriya, dan Desain. (Vol. 1, pp. 319–327). Retrieved from https://eproceeding.isi-dps.ac.id/index.php/sandyakala/article/view/71
29. Syam, H., Akib, H., Patonangi, A. A., & Guntur, M. (2018). Principal Entrepreneurship Competence Based on Creativity and Innovation at the Context of Learning Organizations in Indonesia. Journal of Entrepreneurship Education, 21(3), 1–13. Retrieved from https://www.abacademies.org/abstract/principal-entrepreneurship-competence-based-on-creativity-and-innovation-in-the-context-of-learning-organizations-in-ind-7294.html
30. Syam, H., Lamangida, T., Madubun, J., Norwawati, U. P., & Akib, H. (2018). Public Entrepreneurship Perspective in Management of the Limboto Lake in Gorontalo Regency, Indonesia. Academy of Entrepreneurship Journal, 24(4). Retrieved from https://www.abacademies.org/articles/Public-

entrepreneurship-perspective-in-management-of-the-limboto-lake-1528-2686-24-4-188.pdf
31. Tleuberdinova, A. T., & Salauatova, D. M. (2018). Features of entrepreneurship activities in tourism. ҚАЗАҚСТАН РЕСПУБЛИКАСЫ, 53. Retrieved from http://rmebrk.kz/journals/3923/81103.pdf#page=53
32. Wahyuni, N., Akib, H., & Darwis, M. (2017). Keefektifan Pelayanan Kartu Tanda Penduduk Elektronik (KTP-EL). Jurnal Ilmiah Ilmu Administrasi Publik, 7(1), 1–10. https://doi.org/10.26858/jiap.v7i1.3434
33. Wardiana, W. (2003). Peranan Teknologi Informasi Pada Era Globalisai. Manajerial: Jurnal Manajemen Dan Sistem Informasi, 2(2). https://doi.org/10.17509/manajerial.v2i2.16474
34. Xu, H., Badawi, R., Fan, X., Ren, J., & Zhang, Z. (2009). Research for 3D visualization of digital city based on SketchUp and ArcGIS. In International Symposium on Spatial Analysis, Spatial-Temporal Data Modeling, and Data Mining (Vol. 7492, p. 74920Z). International Society for Optics and Photonics. https://doi.org/10.1117/12.838558
35. Yuan, Y.-L., Gretzel, U., & Fesenmaier, D. R. (2006). The role of information technology use in American convention and visitors bureaus. Tourism Management, 27(2), 326–341. https://doi.org/10.1016/j.tourman.2004.12.001