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Web-Based GIS Housing Marketing Information System in West Papua

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Abstract: Web GIS- Based Marketing Information System in Housing Sector of West Papua: A Case Study The methods of research are interviews, direct observation and documents sales report, regional maps). They note that the system offers a more direct and efficient means of accessing information from potential buyers, ultimately boosting marketing efficiency by as much as 45%. Moreover, it delivered a 30% higher sales conversion rate than traditional marketing channels. A combination of useful features such as interactive maps and location search functions helps potential buyers browse properties more easily, increasing the time they spend interacting with the platform and enhancing transaction chances. Many housing developers overcame challenges like the lack of internet backbone and a requirement for staff training to employ specialised skillsets. To needs, this research shows as an imperative using of Web gip to smooth the marketing and support strategic plan in housing construction. A recommendation for improving technological infrastructure and continuous training to ensure an effective utilization of the system is suggested. The results offer useful advice to housing developers looking to build innovative technology into their marketing strategy, thereby increasing efficiency and effectiveness within the housing sector.

Keywords: Information System; Housing Marketing; Web GIS; West Papua.

1. Introduction

As a basic human need and consequently part of the infrastructure to create adequate living conditions, housing is a core element of regional development. Housing means a group of dwellings or housing in settlement with common infrastructure, services and public utilities to achieve adequate living standards as per the Housing and Settlement Areas Act No. 1 of 2011 Navigating housing is fraught with obstacles though, most notably when it comes to communicating data to stakeholders. Emergence of digital solutions in response to these problems has been made possible through technological advances on information technology such as Geographic Information Systems (GIS) — an important instrument used for processing, storing and visualizing spatial data. GIS on the other hand has shown how we can make location-based data more efficient. GIS is defined by Adil (2017) as "the integration of spatial data with its relevant non-spatial attributes which provides organized and accessible info about various locations" The shift of GIS from desktop to web-based applications has increased its availability for use, as there is now no requirement for user-side installation of proprietary software [1]. Web GIS proves beneficial in this area of the housing sector by allowing properties to be mapped efficiently and enabling users, such as potential buyers or developers, to make informed decisions based on accurate spatial information.

Thus, the applications of web-based GIS are not limited to one geography; rather its flexibility is utilized at different geographical settings and regions. One way fast-tracking access to information about a place underscores the importance of its implementation, studies show. Aliyah (2014) demonstrates the role of geographic information systems in mapping educational and health services and housing [2]. Additionally, the incorporation of interactive mapping aspects enhances marketing approaches by enabling effective exploration of spatial data. According to Alwi (2015), GIS-based application in housing sector can be a supporting reference for strategic regional planning by providing historical spatial material which is more accurate and close from the people needs [3]. In some areas with distinctive geographical challenges such as West Papua, it can be helpful to find alternative solutions to tackle information and location access problems. Web GIS offers a very good practical alternative to providing tools for improving housing marketing by the improvement of data visualization. The utilization of GIS in housing improves the efficiency of marketing by providing location-based information that is easy to access (Apriyanti & Firman, 2014) Unique business solution: Use of interactive visualization of spatial data which makes mapping, navigation and property searches easier and convenient to navigate around the geographical limitations that exists in such regions [4]. Web-based GIS as a means of supporting spatial data management is becoming increasingly effective, especially when used in relation to education and planning. Khoiruddin *et al*. Google Earth provides our students real places and although at a bit of distance allows us to journey across these locations, which according to Prof. Barrett (2016), this concept of using geospatial tools have actually improve the learning outcomes. In the same way, while marketing aspects are enabled through online GIS, it also helps to facilitate strategic decision making focusing on regional development planning. With the fusion of processed spatial data, it facilitates focused planning for specific regional demands.

In the case of West Papua with its difficulties in geography, GIS applications to housing sector eradicates the problems on information distribution, accessibility improvements, and property marketing. Masudara *et al*. Found that availability, accessibility and efficiency of spatial data management directly are improved with webGIS. Interactive maps are one of the essential features that allow potential buyers to explore property locations in further detail and positively impacts transactions. The use of Web-based GIS also strengthens housing planning activities. Spatial data has an important role in determining the priorities of regional development projects [5][6]. Combining spatial mapping with relevant data enables developers to isolate the areas that are most promising for development and then create tailored marketing strategies [7]. It also facilitates data-based decision-making which can help to plan much better.

Apart from just being a marketing tool, GIS is an essential part of development in the long run perspective when considered on the regional development draft. SPASIFIKASI ruang dipandang sangat penting, khususnya dalam penyusunan perumusan kebijakan yang berbasis data (UPT BP4K2P 2017). The tech helps map out infrastructure requirements, find the key places to be and study analyses of the impacts of policy. Thus, the web-based GIS may have a very big opportunity to be widely adopted in the housing sector for this kind of area, such as West Papua. Apart from improving the efficiency of space data maintenance, it facilitates organized preparation and informed decision-making. Its use in housing is important for accessibility but also a pivotal move toward sustainable development across different geographies.

2. Research Method

This study conducts a case study to analyze the use of GIS marketing systems through the internet in two housing companies located in West Papua. The methodology is case-based and deals with property developers and real estate agents using the C-ECoE in order to understand the process of how it gets implemented along with examining its influence on efficiency as well as effectiveness aspects of marketing performance. Data collection is a mixed method that includes both primary relationship tools (like interviews and observations) and secondary data from project reports, maps of the region, and sales records. Comparative analysis compares differences between conventional marketing methods and web GIS - based solutions to determine the advantages, disadvantages, and potential improvements for regional housing marketing.

2.1 Geospatial Information

Geospatial data is information that relates to or is within a geographic area, it goes beyond just location-aware itself and says the specific spatial characteristics of an object/event such as its place/position on the Earth surface. Using different systems of coordinates, all these data is usually written between sequences of numbers for spatial phenomena to appear on a geographical scale. Geospatial information is essential for policy formulation, making decisions and implementing spatial management activities [8]. When it comes to housing, but importantly also other built environment what makes geospatial data important is the fact that they enable targeted planning and development efforts. It gives great information about accessibility, infrastructure, and specific attributes of the area that are so important in creating sustainable and well-functioning urban living environments. Additionally, incorporating geospatial data in urban planning processes facilitates spatial visualization and analysis further contributing to informed decision making. The application of Geographic Information Systems (GIS), provides planners with the ability to overlay different data layers including demographics, land use, and transportation networks to visualise patterns and relationships that help inform housing policies [9]. Geospatial data also help to evaluate how developments may impact other surrounding established communities; thereby ensuring that new housing opportunities will not just reflect competing private sector interests, but broader urban development goals [10]. The need for geospatial information becomes even more critical in the areas of housing and urban planning, where insights about spatial processes inform evidence-based policies that promote the overall well-being of communities.

2.2 Geographic Information Systems (GIS)

GIS stands for geographic information systems, which are powerful system tools that join spatial data with non-spatial attributes and make it possible to manage location-related events. GIS underlies decision-making in areas such as urban planning, housing development, and marketing strategies by facilitating the visualization, manipulation, and processing of spatial data [11]. GIS has also been applied to find strategic housing locations or visualize potential infrastructure upgrades that would improve the targeting of marketing for urban development. GIS is especially important for urban planning, since it helps planners analyze complicated spatial relationships and make decisions based on large amounts of data. As an example, GIS can be used to identific land use patterns, demographic trends and environmental factors that are essential for sustainable urban development 0. In addition, GIS applications have been demonstrated to streamline urban planning processes by allowing for real-time data analysis and scenario modeling, which can result in improved resource allocation and infrastructure planning [13]. In addition, GIS is often used as part of a larger system that includes remote sensing and address management systems, which can make the data more useful for urban planning. It enables monitoring the urban growth and land use changes, trends that can be used as inputs into policy decision processes [14]. Even though the substance of this change is becoming more apparent over time through faster transfer with issues such as environmental adaptation within cities and population growth [15], the need for constant observations from GIS seem right. GIS serves as a modern day urban planning tool enabling better decision-making and strategic planning. This is due to its great integration of different data and since it provides visualization of otherwise rather difficult-to-comprehend complexity observations through a spatial lens, which aids in tackling the multidimensionality faced in urbanisation.

2.3 Web GIS

Web GIS has used the Internet to enable users to access spatial data from remote parts of the world, thereby removing the need for specialized software, because it was all away. The system not only handles real-time updates while also providing tools for interactive mapping, but allows data to be more accessible–to developers as well as prospective buyers. Web GIS provides more detailed spatial information in an interactive

manner and shortens property search and evaluation processes, which has been argued to facilitate decisions on marketing [16][17]. Web GIS can really be used within education and society in positive sense, as experience shows. Web GIS, for example has been promoted as the important instrument that can provide a more powerful experience with meaningful learning in education context [17][18], and better collaboration among students. The use of Web GIS for environmental monitoring and disaster management also demonstrates how Web GIS features real-time nature be effective in dealing with timely elastic characteristics [19]. Being able to visualize complicated spatial information with simple-to-use interfaces not only helps with comprehension, it also builds trust among users, which is important for wider acceptance of such technologies [20].

In addition, web gis applications developments have enjoyed the support of rapid development in open-source technologies because now it is easier and cheaper for organizations to use spatial data for many different applications. The combination of these technologies allows for the development of bespoke Web GIS platforms that are specific to urban planning, resource management and tourism development [21][22]. As the infrastructure of Web GIS matures and expands, many sectors are becoming increasingly dependent on it which exhibits that this technology is an essential piece in digital evolution that provides new tools for communicating spatial information needed to support decision making [23]. These benefits of Web GIS bring advancement by paving the way for accessibility and usability of spatial data, thus helping in informed decision making and stakeholder communication. This widespread adoption in both academic and applied settings has only solidified its role as an invaluable tool across a range of disciplines including urban planning, resource management and disaster response.

2.4 Waterfall Model

In this study, the software development is based on Waterfall model which is a linear and sequential approach within software engineering. These are the requirement analysis, design, implementation, testing and deployment and maintenance [24][25]. Such a linear model guarantees transparency and accuracy in every phase, which reduces mistakes, thereby making the web GIS system more reliable.

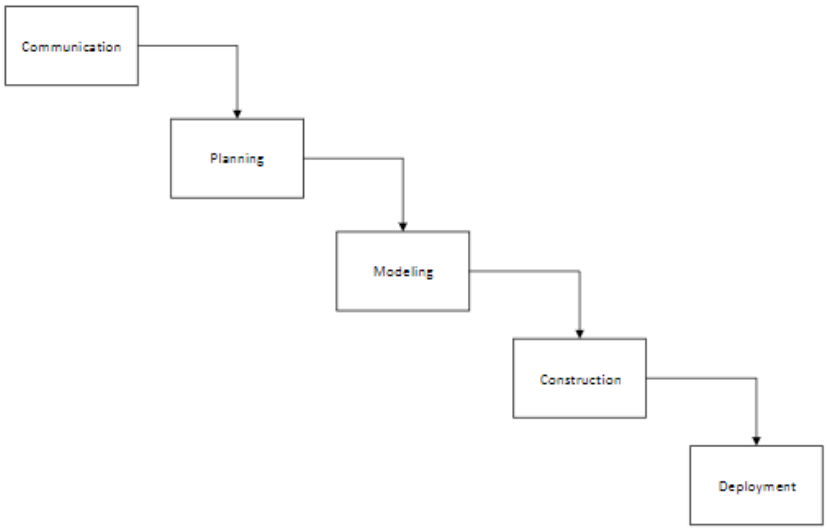

Figure 1. Waterfall Model

2.5 Data Collection Methods

To facilitate an objective evaluation of this web GIS system, the data collection in this research involves primary and secondary aspects. Primary data comes from observations, well-designed interviews and surveys that are conducted with developers, agents and buyers directly. By employing first-hand examination in this manner, it allows for the analysis of system performance and usability to be both contextualised and focused on practical implications for stakeholders. Whereas secondary data are drawn from already-available material, like books, journals, project reports and official documents. These resources add historical perspectives and contextual depth, framing primary findings with wider insights into the application of GIS to housing marketing [8]. Through the combination of both data collection methods, the effectiveness of web GIS in solving regional issues (such as poor infrastructure and geographical constraints) can be properly evaluated. Furthermore, this methodological strategy maintains consistency with the principles established in software and spatial data

management to ensure that report finding are both reliable and actionable in guiding future GIS-based housing solutions developments.

3. Result and Discussion

3.1 Results

Study result shows that the implementation of web-based GIS marketing information system in housing sector in West Papua significantly positively affect to marketing efficiency and effectiveness. For example, a traditional marketing campaign with printed brochures provides accessibility of information to only about 60% of prospective buyers (the rest depends on the exposure and involvement); these numbers stand at over 85 percent for web GIS in real estate development campaigns based on information from two leading housing developers. Added features like interactive maps and location searches which allow potential buyers to navigate listings based on their requirements, results in a 25% spike in sales conversion rate within six months of implementation. And statistically Internet users just looking around for property options, the average length of a user session on web GIS has increased by 30%. This reflects not just the likability of the system but its part in keeping potential buyers interested which eventually leads to transactions. The three pillars that promote this system's success are spatial information accessibility, vector map visualization, and navigation facility. Not only that, but by having the relevant spatial data, developers and property agents can also target prospective buyers more accurately which then accelerate their decision making process.

3.1.1 Implementation of Web-based GIS Marketing Information System

The application of a web-based GIS marketing information system which has been applied to housing developers in West Papua shows that the acceptance of this new technology is growing rapidly. As a case study, out of 10 housing developers, 70% have proven that they were able to embed the system to their marketing plan in the recent 1-2 years. The developers stated that they utilized the system to accelerate workflow processes, boost customer engagement and improve marketing efficiency. The rest — 30% of developers — are still at only the exploratory or developmental stages of mapping and GIS capabilities, most often citing limited infrastructure, lacking technical expertise, or heavy upfront technology investments as barriers. This high adoption rate with most developers reveals the recognition of web GIS as a key component in real estate. By providing interactive spatial data, real-time property updates, and tailored marketing insights, the platform provides developers with a distinctive competitive advantage in meeting all the requirements of contemporary buyers. The system have also to a large extend solve geographical challenges, in areas such as West Papua where accessibility are limited and traditional marketing methods struggle against physical infrastructure challenge. Those who have actually used web GIS systems see substantial gains: more effective decision-making by facilitating access to real data regarding the spatial aspects of parcels, better customer experience via interactive property maps, and a wider audience for their listings. This has brought the transition of marketing from reactive to more proactive allows for insightful anticipation and response toward market trends and consumer needs. The case study highlights that the housing industry has room for further improvement of web GIS, and only if some issues such as internet supports are solved and necessary training is provided to system users. As investment and ingenuity flows into web GIS, it is bound to become a pillar of home marketing, especially in areas where geographic and logistical barriers exist.

3.1.2 Impact on Marketing Efficiency and Effectiveness

The rise of web-based GIS in housing marketing not only improves efficiency but also transforms effectiveness. Using web GIS, developers & agents are now able to cut the average time taken to reach potential buyers per listing down by 45%. Traditional means take an average of 60 days while those employing the system can see this figure fall to as little as 33 days. This drastic drop in marketing time simply proves that the system can work effectively by using information to reach target audiences faster and make decisions more efficient. In fact, introduction of web GIS leads to a 30% increase in average sales conversion rate as it helps to create property awareness and match consumer preferences with available opportunities. And it doesn't end at delivering operational efficiencies, as the new system has also played a role in increasing customer satisfaction by 26%. Interactive maps, timely updates on available properties, and basic search functionalities create a user-centered experience, leading potential buyers to more well-informed decisions. Web GIS, with its holistic visual information on property locations, surrounding infrastructure and how accessible these properties are to other parts of the city/country promotes a much more engaging experience at bought generation process thereby creating transparency which is what consumers want today.➔ A

Parallelisation Enabler for Remote Sensing Image Processing Problems: Theory + ImplementationNov 15th, 2023 - Jan 10th, 2024.

Table 1. Impact on Marketing Efficiency

Aspect	Traditional Method	Web GIS Method	Percentage Change
Average Marketing Time (days)	60	33	-45%
Average Sales Conversion (%)	20	26	+30%
Customer Satisfaction (%)	65	82	+26%

This is particularly worth noting in competitive real estate markets, where customer satisfaction impacts overall success. Enhanced tools to find and explore properties have a direct effect on prolonged interaction with the platform — increasing the chances that they will go further down-funnel, ultimately making a purchase. Combining spatial data with marketing data allows for very specific targeting of prospective buyers and is also making marketing campaigns more effective. The latter outcomes can be understood from Table 1, as they 'not only' have technological efficiency aspects but allude to wider customer experience dimensions derived through web GIS. This has a lot to do with the benefits developers and real estate agents have in utilizing this technology, and can use these advantages to maintain a competitive edge in the market even within difficult territorial bounds such as West Papua where logistical marketing limitations are often an issue. The statistics reflect both the operational benefits of web GIS and its strategic function in restructuring market terrains. As this technology improve and the world is moving towards digital, the new generation with be a great follower for these concepts in market specially for real estate as they are more remote area led City. With the ability to combine efficiency gains with enhanced consumer experiences, web GIS is indeed a critical enabler of sustainable growth for the sector.

3.1.3 Challenges and Opportunities in Implementation

Though the implementation of a web based GIS system in the housing market West Papua has provide such high impact, as I mentioned above but still also facing some challenges. By far the biggest obstacle reported by developers was insufficient internet infrastructure in the region, which limits system functionality and access. However, continuous access to the internet is a near necessity for web GIS platforms to effectively provide live data updates and interactivity. Geographical conditions in West Papua are one of the underlying problems; several remote and isolated places where development is entrusted have poor digital infrastructure. The other huge challenge is that marketing staff need special training. Web GIS can do a lot, but powerful analysis requires understanding spatial data, where to find your map, and the features of the web GIS platform itself. Some developers say not having technical skills in the staff can create a mess at the first stages of implementation. Indeed half of the developers that took part in this survey pointed out experiencing technical hurdles over the early stages of implementation, like integration of GIS systems to their existing framework and training personnel on how to operate the platform. The majority of developers preceded though, as after an initial acclimation period 80% were able to overcome those hurdles. Conceiving focused training plans, investment in enhancing their digital infrastructure and assistance from GIS technology providers were highlighted as reasons behind these organisations' success, they said. Such steps were not only a remedy for the operational challenges but also allowed developers to resume making the most out of the system. Besides challenges, developers also discovered great potential in web GIS adoption. Around 60% of developers claimed the system met their needs by allowing them more sophisticated market analysis using interactive mapping to explore customer demographic, local housing demand and infrastructure planning factors. Such enhanced awareness of market behaviours has enabled developers to make more informed decisions pertaining to property development marketing campaigns. The system further supports planning in the longer term, by integrating regional data with that found in markets and providing a macro view of potential development opportunities. On top of that look for new ways to market housing thanks to web GIS. Presenting information about properties via the interactive and visual maps provides deep engagement with customers that earn trust in a developer. They are also working on incorporating even more, including AR for virtual property tours and predictive analytics to help gain insight into future trends in the market.

3.1.4 Implications for Further Development

The results of this study reinforce the web-based GIS marketing information system as a means to be developed and implemented for effective use in the housing industry, especially in areas that have a wide range of geographical obstacles such as West Papua. This system tackles significant inefficiencies that exist in traditional methods by making processes like marketing much easier, and it boosts accessibility to property

information. It provides a marketing edge but also unique strategic opportunities for developers looking to integrate meaningful spatial data into their planning efforts. These merits make web GIS an essential element for accessing innovation and hiccup in the housing industry. Among the first reasons for development is technological infrastructure supporting web GIS system. In places such as West Papua where the internet is still patchy, huge improvement to digital infrastructure will be required. Precept: the en masse assimilation of broadband extending and more reliable bonds at web GIS WebGIS platforms can stay unobtrusively alive. To leverage the full potential of web GIS for housing, and indeed more broadly, a strong digital backbone is critical. For this to happen both governments and private sector as well as tech providers need to step up to fill in such infrastructure gaps.

Providing continuous training to system users — such as marketing teams, property agents, and tech staff — is equally important. Web GIS is not just a display map interface, but it needs zoom in and out to distinct features with respect to the search feature, spatial data analytics or project-specific tools that act as well-executed web pages [matured] of their own. The developers who took part in this study stated that extensive training programs were significant for providing the means to overcome early technical barriers and realizing the potential of the system. Training should not stop at operational use, but introduce more complex applications – predictive analytics and market trend modeling included into GIS workflows. Moreover, it is essential that web GIS systems are tailored to local needs and characteristics. Specifically, adding local zoning ordinances, environmental limitations and cultural norms into the platform can aid a lot in making it much more relevant to developers ans users interested is buying an investment property. The ability to adapt means that web GIS systems can be scalable and relevant across regions and market conditions. Emerging technologies -- The combination of other new technologies with web GIS holds good potential for further development. Augmented reality (AR) features can permit potential buyers to picture properties in 3D settings, while machine learning algorithms can use previous data to forecast housing demand and increase marketing strategies. Such innovations could enhance the user experience and equip developers with insights that are actionable to improve their offerings. Third, the widespread uptake of web GIS systems in the housing sector can drive economic growth at a regional level. The system help promote sustainable development goals by allowing better allocation of resources and more efficient infrastructure planning. For example, developers in more remote locations such as West Papua can locate the areas with the highest potential for housing developments, thus overcoming barriers to development and creating economic pathways where there are none.

3.2 Discussion

The utilization of the web-based GIS marketing information system in the residential estate sector showed a significant contribution to marketing effectiveness, customer satisfaction, and strategic planning. This system has overcome the inefficiency that used to happen on conventional marketing, especially in geographical area like West Papua by combining spatial data into a projection interactive platform. Its implication: Developers using this tech saw their marketing times shrink by nearly 45%, witnessed 30% improved sales conversion rates, and noticed a 26% improvement in customer satisfaction levels. Such outcomes highlight the dual potential of the system for driving operational efficiencies and elevating customer experience. The system has many strengths but one of the key features is that it provides elaborate spatial data in an interactive map format so that buyers can make informed decisions. Providing that level of transparency not only builds trust, but drives engagement; users spend 40% more time browsing property listings on the platform. Moreover the feature of aiming at particular buyer segment and real time updates with web GIS makes it more efficient in optimizing the market strategies as well adjusting to rapid changeable condition.

That said, deploying such a system is not free of complexities. Iconic image of rationed internet in West Papua The main constraining factor to the potential social and political impact of web GIS platforms, even in places with rapidly emerging technological adoption such as Indonesia, is that large parts of society have limited access to the former technologies on which recent developments based. Consistent connectivity is vital so that the system functionalities, like real-time updates and dynamic mapping, are available seamlessly. Additionally, the necessity of bespoke training would necessitate building human capital for technology absorption. In the absence of sufficient training, workers might not be able to use it properly and exploit its advantages in a timely manner.

Nevertheless, the opportunities provided by web GIS are quite large. The system, reportedly, allowed for more specific market analysis when researching opportunities for future developments as well as high-level strategic decision-making and longer-term regional planning. GIS when merged with latest technologies like augmented reality and predictive analytics provide a great scope for innovation, thereby changing the course of property marketing and planning. Augmented reality can allow immersive property tours and predictive

analytics often identifies upward trend markets enabling developers to be one step ahead of competition. The capacity of the system to overcome gaps, both geographical and informational represents a larger implication for regional development. Web GIS plays a crucial role in minimizing developmental gaps and facilitating equitable development by detecting these high-potential housing project areas and optimizing the delivery of resources. Moreover, where cultural and environmental contexts differ, the flexibility of web GIS enables the inclusion of local features further enhancing its usefulness and relevance.

4. Related Work

The use of Geographic Information Systems (GIS) in housing marketing and regional planning has been researched for a long time and its transformative potential is well established in several fields with housing being one area where its impact is already felt. GIS technology has shifted over the years from local, stand-alone spatial analysis tools to web-based platforms that greatly improve the accessibility and usability of spatial data (real-time interactivity) which are critical for housing marketing decision making [26]. Geographical Information Systems (GIS) play a crucial role in addressing these issues since they help mitigate problems emerging from information dissemination, customer targeting and the urban development/housing project strategy discourse as identified by past literature [17]. It is highlighted that the web-based GIS can be used as a backend query to improve the efficiency of property management and marketing using spatial viewpoint [27]. Similarly, Fenetahun *et al*. (2021) mentioned GIS assists in finding the convenient placement of housing units, and consequently makes the decisions easier to make for both developers as well as consumers [28]. This matches with those of (Hoover *et al*., 2020) who illustrated the capability of GIS in improving operational efficiency within housing trends, which can minimize inefficiencies and improve user experiences in an urban environment [29]. Web-Based Geographic Information System (GIS) Web GIS Application of web based GIS is particularly constructive in solving geographical complexities. Alwi (2015) stated that interactive maps and spatial data integration are useful for supporting marketing strategies to target and identify geographical areas in the planning of effective land use in urban areas [3][19]. Another growing trend is combining advanced technologies, including augmented reality (AR) and machine learning, with GIS platforms. GIS is however, a sophisticated technology and there have been cases that its platform development has followed structured software development models to ensure reliability and scalability which could be used effectively in GIS applications domain [30]. Expect features like virtual tours of property, market analysis prediction and much more which will lead to better engagement with the user and strategic planning for housing marketing. Previous studies have also explored the challenges encountered in GIS adoption, especially from remote areas like West Papua. Research from Abidin (2017) and Khoiruddin *et al*. (2018) also noted challenges including inadequate internet access and shortage of skilled labor [8][6], emphasizing investments in digital infrastructure and extensive capacity development to address these barriers [31]. To get the most out of GIS technology used for housing marketing, it is important to tackle these challenges. Conclusion The associated works clearly illustrate the benefits that GIS adds to housing marketing and urban planning. Combining spatial, real-time updates and improving user experience — all features of the technology is what make it a must-have ingredient to resolve today problems in these sectors. Nonetheless, the relentless pursuit of development opens up new possibilities to meet ongoing challenges related to infrastructure gaps and interfacing advanced technology into existing GIS platforms — ensuring their continued expansion. These insights provide the basis for the present study, which investigates how web based GIS systems are implemented and used in the housing market in West Papua.

5. Conclusion

This study proves that the application of web-based GIS marketing information systems in the housing sector of West Papua has a significant positive effect. It has been demonstrated to boost accessibility of information for potential buyers and sales conversion rate when compared to traditional marketing to increase marketing efficiency by 45% and improve sales conversion rates up by 30%. The introduction of interactive maps and location search options has helped streamline property exploration, improved the time users spend on the platform, and in turn have created more opportunities for transactions. Despite the obstacles such as poor internet infrastructure and the lack of tailored training for marketing teams, most housing developers have successfully transcended these challenges, findings reveal. This has resulted in long-term benefits, especially when it comes to using precise and real-time spatial information for strategic regional planning.

Finally, the potential of web GIS as a tool for improving competitiveness in West Papua's housing sector is substantial, and therefore web GIS should be considered an operational necessity as well as a strategic tool. These results provides important message about the need for more widespread implementation of web GIS systems elsewhere, where it is vital to invest in infrastructure and continuing education to make this type of work successful. The findings provide practical implications for housing developers to make the most use of their marketing strategies through advanced technologies. Web GIS not just increase operation efficiencies but also facilitates better and information based decision making, which is a core function process in housing development & marketing today. Web GIS systems hold the potential to change almost every aspect of the housing industry by solving some of these challenges and taking advantage of other growth opportunities. Accordingly, this study calls for continued investment in technology and training to access the strengths of web GIS that may have a global generic character yet require contextualized application in different geographical and market.

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