# Building 3D Apartment Structures in Indonesia from As-Built Drawings Using GIS Software for Cadastre Functions

**Luluk Dita Shafitri, Moch Iqbal Fauzan and Aulia Latif (Indonesia)**

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**SUMMARY**

The convergence of 3D Building Information Modeling (BIM) and Geographic Information Systems (GIS) signifies a profound advancement in the fields of architecture, engineering, and construction. This research explores the integration of 3D BIM and GIS technologies, with a particular focus on utilizing as-built drawings that are converted into floor plans as the foundational dataset. The primary objective is to define and categorize spaces into private and commercial areas within 3D models, enhancing the utility of spatial data.The methodology involves a multi-step process, beginning with the transformation of conventional 2D AutoCAD floor plans into detailed 3D BIM models. These models are then geospatially referenced and augmented with GIS data, incorporating cadastral functions to ensure comprehensive spatial analysis. This integration is executed using ArcGIS Pro, which supports advanced spatial analysis, project coordination, and informed decision-making in urban planning and infrastructure development. Additionally, the results of this integration are disseminated via an Esri-based web platform.

This research elucidates the practical applications, benefits, and challenges associated with integrating BIM and GIS technologies. The integration process not only optimizes the management and development of urban spaces but also significantly contributes to the advancement of spatial data infrastructure, thereby supporting sustainable urban growth and development. Through detailed case studies and practical examples, the research illustrates the workflow from 2D AutoCAD floor plans to comprehensive 3D BIM-GIS models.The research employs 2D data from multi-floor apartment buildings in Indonesia. The conversion process involves extruding the 2D floor plans to define the height of the structures, creating accurate 3D representations. The research focuses on the type of 3D building data processed, emphasizing the importance of using multipatch data types, which are provided in shapefile format. Several processing steps are conducted in ArcGIS Pro to achieve indoor 3D building models using GIS-based software.The integration of BIM and GIS

technologies offers significant advancements in spatial data infrastructure, enabling more efficient project coordination and decision-making. By integrating these technologies, urban planners and developers can achieve a higher level of detail and accuracy in their projects, leading to better planning and management of urban environments. This integration supports sustainable development by providing comprehensive tools for analyzing and managing spatial data, facilitating more informed and effective urban planning decisions. Moreover, the use of an Esri-based web platform for disseminating the integration results promotes greater collaboration among stakeholders. This platform allows real-time sharing and updating of data, enhancing transparency and improving the efficiency of project workflows. The integration also supports the development of smart cities by providing the tools needed to manage complex urban environments effectively, cadastre and land administration purpose.

In conclusion, the integration of 3D BIM and GIS technologies represents a significant leap forward for the architecture, engineering, and construction industries. By transforming traditional 2D AutoCAD floor plans into detailed 3D BIM models and enriching them with GIS data, this research demonstrates the potential for improved spatial analysis, project coordination, and decision-making. The use of advanced tools such as ArcGIS Pro and the dissemination of results through an Esri-based web platform further enhance the accessibility and utility of these integrated models. Ultimately, this research highlights the potential of BIM and GIS integration to foster more efficient, sustainable, and collaborative urban development.