RESEARCH PAPER

DISCOVERING SPATIAL DEVELOPMENT CONTROL FOR INDONESIA: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT. As a developing country, Indonesia is experiencing rapid growth, necessitating the use of development-control instruments to achieve sustainable development. Furthermore, information about land reform implementation in Indonesia can only be found in academic journals written in Indonesian. As a result, determining the appropriate development-control model in Indonesia is critical. The appropriate concepts and development-control tools for Indonesia are discovered by reviewing papers that implement development control globally and the state of development-control implementation locally in Indonesia. However, by presenting the concept of controlling spatial development—beginning with defining development control, then capturing its typologies globally, and finally discussing the implementation condition in Indonesia—the model can also be adopted in countries with a similar planning system. The main gaps and challenges in implementing spatial development-control tools in Indonesia were identified in the final section of this article. In the meantime, a regulatory zoning system would be successful, but a discretionary system that includes economic development opportunities can be considered by strengthening human resources and institutions. The three elements in development control are spatial planning, land development, and regulation. Furthermore, the community's successful traditional spatial development control can be incorporated into the existing control regulations.

KEYWORDS: Spatial development control, literature review, sustainable development, control regulation

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INTRODUCTION

Sustainable development control is the goal of urban planning, which can be achieved through spatial use control (Gurran et al. 2015; Rowan-Robinson et al. 1995). In this context, spatial development controls have been conducted around the world. Their performance depends on various factors, including planning ability (Gurran et al. 2015), institutional capacity, land administration (Nel 2016a), and the need for community participation (Baics and Meisterlin 2016). It also promotes functional and integrated human settlements, maximizes resource efficiency, and elevates regional identity and a place's unique character (Yudono 2018). Spatial development control is a complex and multi-faceted subject, making it a challenging research field. Vast urban sprawl is a highly relevant topic in increasing urbanization levels worldwide. Spatial development control has arisen since the 1970s, owing to various environmental events that affect physical development and planning (Fuseini and Kemp 2015). Spatial planning helps to achieve a balance in urban development by promoting compact urban development and using undeveloped land versus reusing old urban sites. Sustainable urban development necessitates the prevention of uncontrolled urban sprawl in open spaces (Konyango et al. 2021). The number of journal articles on this subject has been progressively growing. Development control-related studies are becoming internationally widespread. There is an opportunity for a comprehensive, systematic, and up-to-date review of development-control research achievements and challenges.

Furthermore, Indonesia is facing a disruptive urban planning era (Margiansyah 2020; Yudono et al. 2020). The challenge of measuring sustainable development implemented would be an urgent matter in the planning process. Meanwhile, the development control was not fully implemented yet (Firman and Fahmi 2017; Suroso and Firman 2018). This article determines Indonesia's appropriate spatial development control model, considering its implementation challenges. The model developed can also be adopted by other developing countries with similar planning systems.

The purpose of this article is to determine the most appropriate spatial development control tools for Indonesia's condition. It is accomplished by analyzing the general characteristics of researchers of spatial development control implementation worldwide and then evaluating the performance of spatial development

control internationally and locally in Indonesia. From an international research sources, the study investigates spatial development control instruments, as well as their flaws and advantages. The implementation of spatial development control in Indonesia determines the successful technique, the weaknesses of the existing control instruments, and the country's conditions.

LITERATURE REVIEW

Development control is an effort in systematic planning to ensure that the development follows the plan that has been prepared. As a result, extensive urban planning consists of three general stages: planning, implementation, and control (Zhuang et al 2018). Moreover, development control is interpreted as a strategy for protecting an individual's property rights from outside disturbances (Amri and Giyarsih 2022). It should also protect others' rights, so they do not jeopardize public property. So, what is under the regulation of production control? The scope of production control can be very wide, starting with the building exterior, which must comply with the statute.

Spatial development control has existed since the late 19th century when the zoning concept was introduced (Peng et al. 2018). The first study was conducted by Wakeford in the United States in 1990, followed by Davies' study in 1989 on five European countries that began to consider the importance of controlling development (Booth 1993). Zoning regulations are instruments for regulating land use in the United States and several other countries (Aliyah et al. 2017). Zoning divides an area into several parts determined through regulations to separate industrial and commercial development from residential areas (Yu and Hui 2019). This concept then spread to other countries, such as the United States and Canada.

Land development control, such as zoning, is typically justified by planners in terms of social welfare to mitigate market failures, such as negative externalities or social costs, and provide public goods (Acheampong 2019). Spatial use control attempts to incorporate social and environmental considerations into the planning process. The three types of land development control used transaction cost theory to classify various forms and agents of governance in the land development process and the property market. When the state owns the land, the plan requirements are written into the land lease contract with the private agents. Development control takes the form of contractual covenants and deed restrictions when the planner is a private developer (Yu 2020). Private individuals can create, and the government can enforce contractual obligations that limit land development. This type of contract zoning or development control is used in the Netherlands, Israel, and Hong Kong. Coase's description of reality is more in line with Pigouvian social welfare theory in understanding development control as an economic and political planning tool (Lai and Lorne 2013).

According to Amri and Giyarsih (2022), development control can be divided into regulatory and discretionary systems. In the regulatory system, space use is based on legal certainty in the form of zoning regulations. The United States is one of the countries that apply this system, though it first existed in Germany (Amri and Giyarsih 2022). The authorized planning agency decides on a request for spatial development in the discretionary system. England is one of the countries that have adopted this system, which necessitates the ability of good plan human resources. It is since the implementation of this system is heavily reliant on the skills of professional technical planners (Nel 2016b).

Development-control tools typologies

Various forms of spatial use control have existed since the establishment of settlements. The basic objective is to enforce restrictions on space use and development considered important and the general public's desires. Several instruments for spatial development control are based on urban planning objectives (Zhuang et al. 2018), including zoning regulations, the imposition of sanctions, providing incentives and disincentives, and conducting environmental-impact analysis.

The United States introduced the first form of spatial use control based on the land development code (Owusu-Ansah and Atta-Boateng 2016). The code contains development and property use regulations, including zoning, subdivisions, and other related activities. Zoning is a land use management system that focuses on controlling the externalities of each use (Yu 2020). The land use regulation instruments were used to extract public benefits from large-scale developments in different ways, such as density negotiations in exchange for public benefits, incentive zoning programs, inclusionary zoning, transfer development regulation, and impact fees (Kim 2020). Zoning also regulates the floor area ratios and their impact on society and the generated traffic (Bird et al. 2019).

Spatial planning is an important stage of controlling space use (Firman 2004a). Although the spatial plan was not legally binding, development management policies, including site selection notes, land use and construction permits, and fines for unauthorized land occupations, were implemented by city- and district-level planners based on accepted master plans (Deng 2018).

The land development permit system is intended to control land use development (Firman 2004b). Provided processes are transparent, and in line with the principles of administrative justice, the proposed land use management system will also be consistent with the principle of good administration.

MATERIALS AND METHODS

Search and data sources

Two levels of review were applied in this article. This study reviewed internationally published articles on spatial development-control practices obtained from Scopus and ScienceDirect. Further, national articles were also searched on Google Scholar to collect specific situations of planning implementation in Indonesia. To capture the current situation, we focus only on studies published in 7 years, from 2012 to 2020.

Data screening

The papers were then classified using data mining processes, and an overview of tools and implementation of development-control research was provided. Each article was evaluated using a structured data extraction format, considering the research standard. Author, year, title, journal, abstract, keywords, research intent, subjects, comprehensive themes, research methods, and data source were all extracted. The keywords and field of study were then examined in the following stage. We examine the performance of spatial development-control tools, the study method, the implementation challenges, and

the data source.

In the first search for international research sources, 385 articles were found. However, not all of these articles were about urban planning. As a result, a second screening was performed to find related articles. Thirty-nine articles were chosen from 189 urban planning-related articles published between 2012 and 2020 to describe the development-control implementation. Regarding national resources, the phrase «*pengendalian pemanfaatan ruang*» which translates to «development control» in Indonesian, was used to search Google Scholar for relevant articles. Three hundred-one articles about urban planning were gathered in the second step, which is managing the results of the first search. Only 48 articles were chosen for the third step to screen the relevant articles related to urban planning and published between 2012 and 2020. Finally, we chose 26 articles that could provide information on Indonesia's development-control implementation from 2012 to 2020. The international and Indonesia research sources selection processes were examined regarding development-control tools, their performance, the research method used, and the implementation challenges of development-control tools. Figure 1 depicts the article selection process.

The next step was to analyze the number of articles, country of research, and the relationship between research elements using NVIVO 12 and VosViewer as bibliometrics data analysis displays better to understand the general characteristics of spatial development-control studies. A comparative matrix of all selected articles was created to assess the overall performance and challenges of spatial development-control implementation. The current study examines spatial planning control tools, their limitations, and the benefits of foreign posts. The assessment in Indonesia describes the effective strategy, the shortcomings of the existing control tools, and the regional conditions. The sentiment analysis and comparative matrix are used to interpret the discussion and concept of development control. To avoid discrepancies, the authors of this review engaged in intense discussion.

RESULTS AND DISCUSSION

The need to control spatial growth has emerged since the 1970s as a result of numerous environmental events affecting physical development (Fuseini and Kemp 2015). The number of journal publications on this topic has increased significantly. From the 1970s to the end of 2020, 4189 articles were registered in ScienceDirect and Scopus (using the search phrases "development control" and "land use control"; however, only "cities," "urban studies," "land use planning," "development studies," and "regional urban planning" journal categories were considered) showed in Fig. 2. Since 2017, these articles have examined spatial development control in depth around the world. The vast majority of recent studies on the subject have come from China. There is also growing interested in development control in the Asia-Pacific region, including Hong Kong, Malaysia, Australia, and London. Despite the undeniable dominance of the American planning system in this area, development control-related studies are becoming more widespread internationally. A comprehensive, systematic, and up-to-date review of development-control research achievements and challenges exists. Furthermore, this article determines Indonesia's appropriate spatial development-control model to achieve sustainable development. Other developing countries with similar

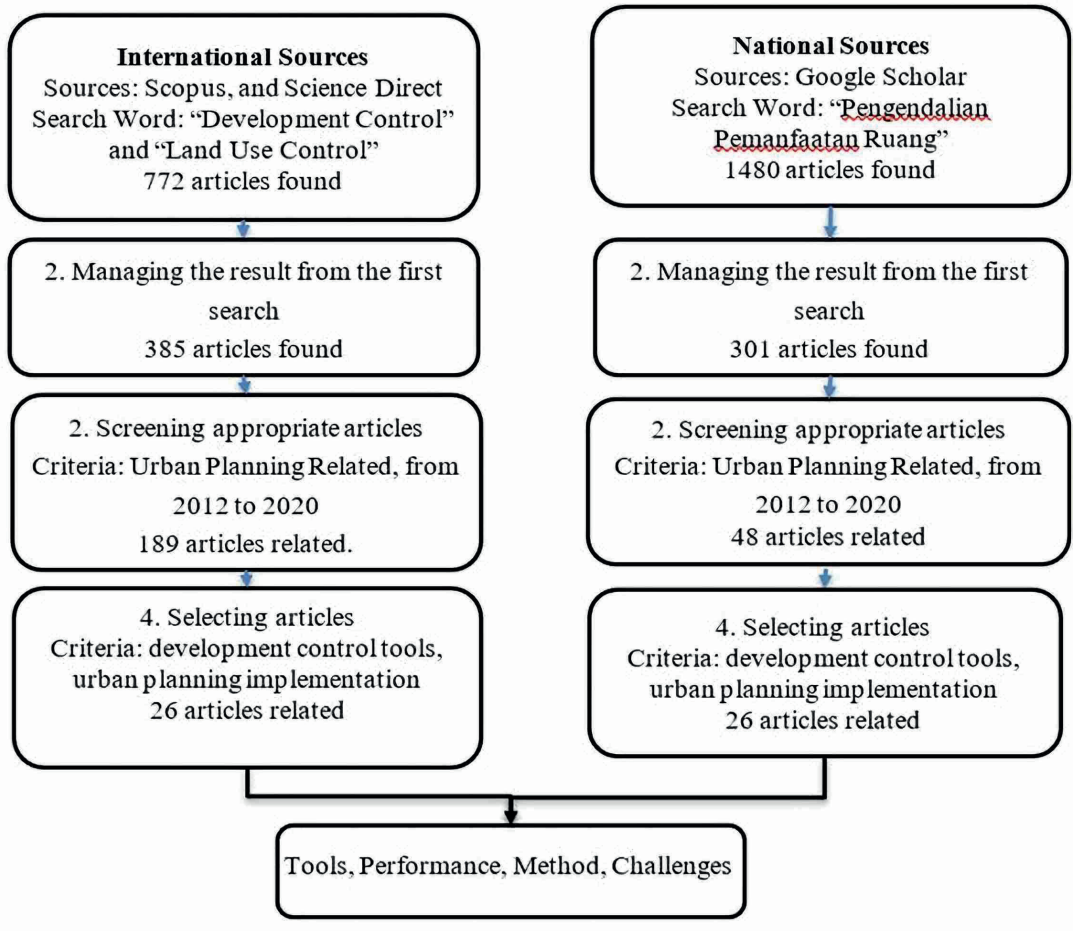

Fig. 1. Article selection process

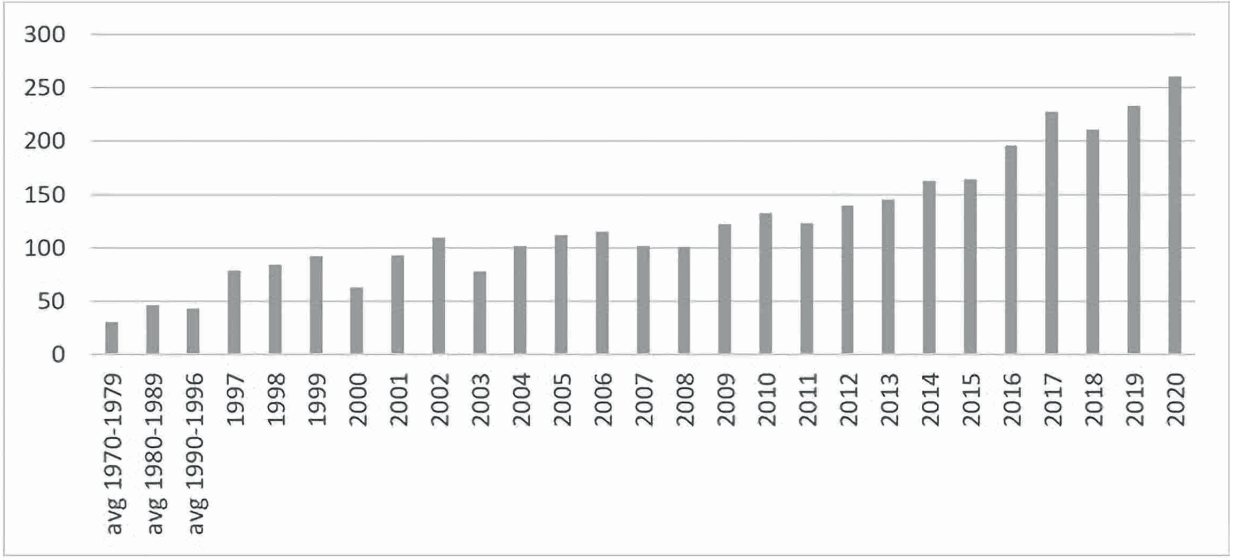

Fig. 2. Number of articles on development control registered in ScienceDirect and Scopus

planning systems can also use the model developed.

A significant amount of research has gone into analyzing the development of control tools. This study divides development control into two types based on a thorough literature review. Each type is addressed in its subsections below. Spatial development in the regulatory system is based on legal certainty in zoning regulations. Although this system originated in Germany, the United States is one of the countries that use it (Amri and Giyarsih 2022). The authorized planning agency decides on a request for spatial development in the discretionary system (Amri and Giyarsih 2022).

The following discussion focuses on spatial use control research. The tools used in various countries are mapped, including those in the Global North, which are developed countries with a well-established planning system, and those in the Global South, which are developing countries with dynamic planning systems in the process of development over the last five years of research. This information aided in describing the study's successes and shortcomings in implementing spatial use control. Figure 3 shows that most Global South countries use the regulatory system at the spatial use control stage, whereas the Global North countries use the discretionary system. However, several countries employ a hybrid system for spatial use control.

The concern of spatial development-control research can change over time depending on the focus of the study. The keywords in the research article can be used to determine the research focus. We can articulate important elements of spatial development control using bibliometric analysis in VosViewer. The results of the VosViewer bibliometrics analysis for international sources are shown in Fig. 4. The color change represents the evolution of the research's focus over time. In 2005, spatial control research concentrated on urban management,

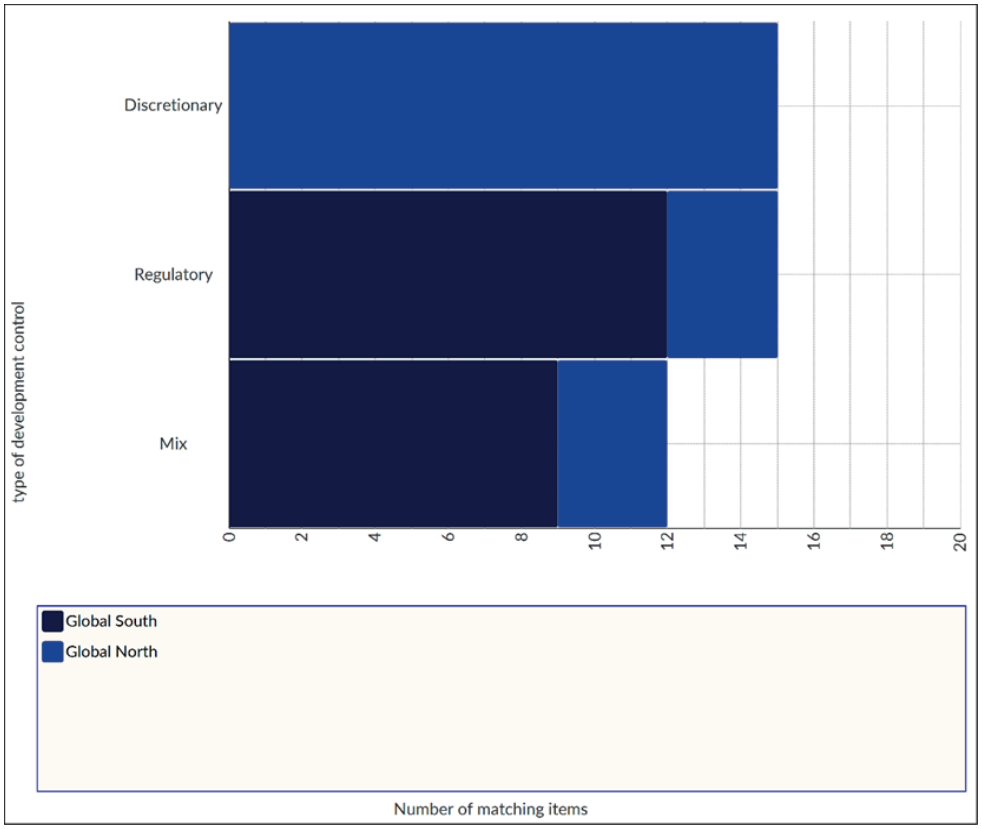

Fig. 3. Type of development control in Global South and Global North County

collaboration, social responsiveness, European countries, and city-level institutions. In 2010, the research emphasis shifted to evaluation, urban form, Ghana, Hong Kong, health impact assessment, informal settlements, and geographic information systems (GIS). Environmental planning, Australia, property rights, zoning, master planning, and regional planning were the elements that became the focus in 2015. The focus of research then shifted to ideology, economic restructuring, and finance over the next five years. At each stage, the main focus was on urban planning, housing, GIS, and urban management, which can be used as a foundation for spatial development control.

A bibliometric review of research papers on space use control from 2012 to 2020 was performed on VosViewer with bibliometric feedback to understand recent research on development control better. Figure 5 depicts the results of the bibliometric analysis. The most recent research on development control divides it into three categories: urban planning, land use, and the legal framework. Research in spatial planning clusters is interested in spatial planning frameworks, design guidelines, zoning with implications for land use laws, zoning negotiations, food systems, immigration, and city expansion. The second cluster of land use research is concerned with land use, the use of historical GIS, urban development, control, China, and development. Meanwhile, the third cluster includes the legal framework for regulating urban growth and the Abercrombie plan.

The matrix in Appendix Table A. 1 maps development-control instruments in various countries based on the most recent research. The conditions that allow the tools to be used are described by success and weakness factors. Understanding human resources and the quality of plans in the drafting process remains a challenge in the regulatory system (Ioannou 2016; Kuusana and Eledi 2015; Shibeshi et al. 2015). The planning phase continues to accommodate progress while providing no direction for urban development (Gurran et al. 2015). Furthermore, land administration issues in the Global South affect the implementation of space use control (Agheyisi 2019; Nel 2016b). The countries of the Global North that use the discretionary system rely on the planning board's decisions. The discretionary system faces several implementation challenges for planning, including requiring committee members to thoroughly understand planning and its social, economic, and environmental implications (Hsu et al. 2016). The economic benefits of this planning transaction are also difficult to quantify, particularly those representing the economic benefits of the entire community and other

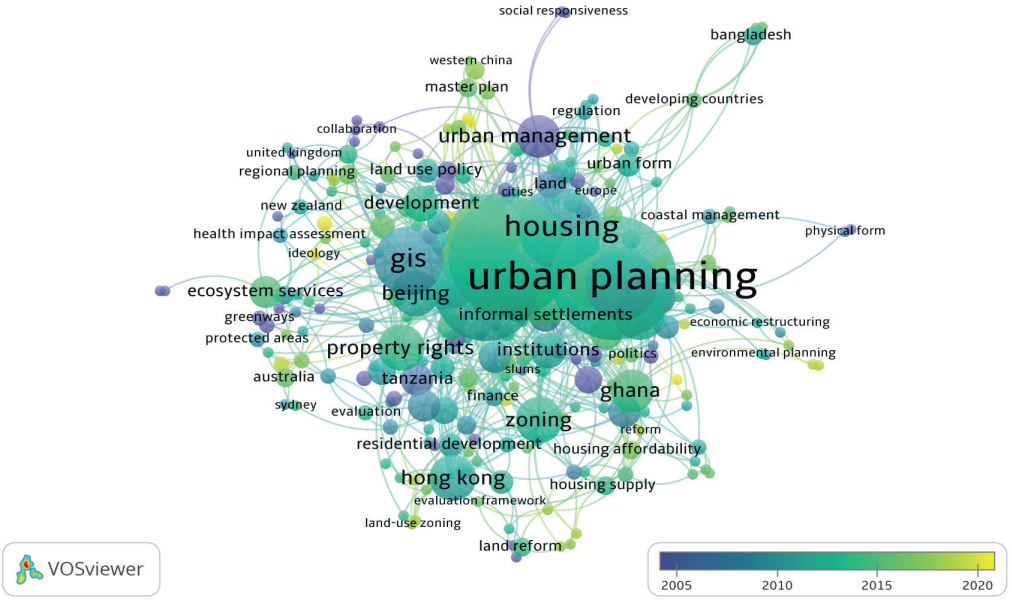

Fig. 4. The relationship between research elements with VosViewer from 2005 to 2020

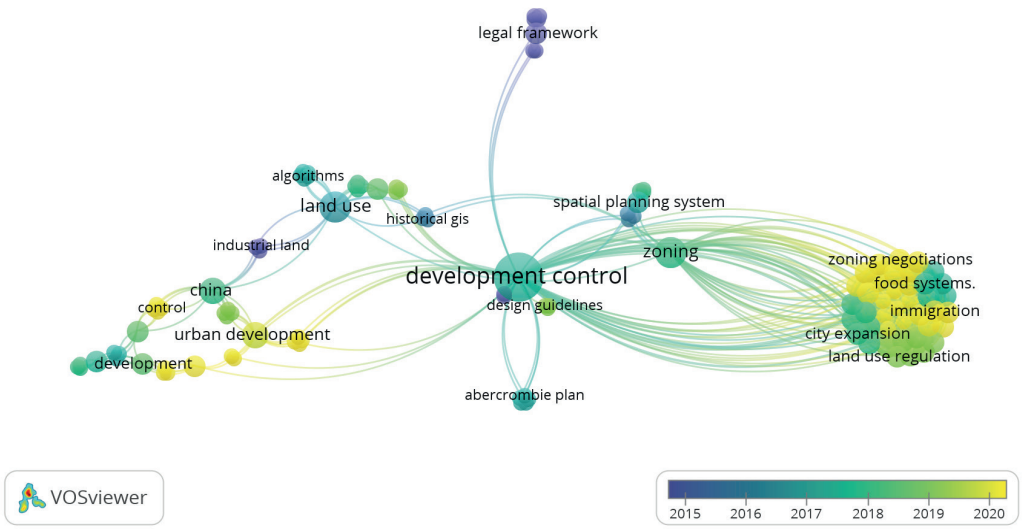

Fig. 5. The relationship between research elements with VosViewer for 2015–2020

social and environmental benefits (Hong et al. 2017). There is an opportunity to use land value capture as a concern to take advantage of land value as an instrument for spatial development control because its implementation is thought to promote city compactness (Kim 2020) effectively. A qualitative approach was used in this study to support the method of describing the planning conditions in the country or city.

Meta-analysis of research on development control in different countries is depicted in Fig. 6 as elements that can be used to draw a big picture of development control (Table 1). The components of creative control research can be classified into five interconnected groups. The area of development control is primarily of public interest, but it also affects private interests. This relates to the scope of the second category. The scope of land and space, particularly land use agreements on private landowners, do not conflict with the public interest. The arrangement is limited to building features visible to the public, such as the building facade. Land use, including improvements to its use; the physical environment, such as circulation, drainage, and green space; and spacing, which includes the basic building coefficient and the building floor coefficient, are all regulated by development control. The social identity of the neighborhood is defined before the building style. Building experts are concerned with the building's material, form, appearance, aesthetic control, and social character. The various instruments used in scope land use, according to the most recent development control articles, include Land Use Ordinance (Ahmad and Anjum 2012), Land Use Control (Abass et al. 2020), Land Subdivision Regulation (Agheyisi 2019), Statutory Planning (Alexander et al. 2012), Land Use Plans (Bidandi and Williams 2020), Development Regulations, Land Allocation (Cirolia and Berrisford 2017), Development Plan Transfer (F (Gurran et al. 2015; Hsu et al. 2016; Kim and Jang 2017). Urban Design includes upzoning (Kim 2020), building permits (Yin and Abdullah 2020), development management systems, and environmental impact assessments of land use policy. Building codes and design guidelines are used to regulate building construction. The final component explains why development control research is important. Researchers are concerned about the impact of construction on pollution, unnecessary noise, fire, health, highway, social character, and the right to peaceful enjoyment of one's own surroundings, so it must be controlled.

Identification of policy issues caused by development-control practices in Indonesia

An overview of the country is required to determine the best development-control model for Indonesia. Indonesia is a country made up of 17,000 islands. It is made up of hundreds of different cultures and ethnicities. This accumulation was built during the Dutch colonial period and is still used today. The most populous and densely populated island is Java, which accounts for only 7% of Indonesia's total land area but is home to 60% of the country's population and Indonesia's dominant ethnic group, the Javanese. The lingua franca maritime traders use is Indonesian, based on the Malay language (Sataloff et al. 2005).

Since the large kingdoms in Indonesia, urban spatial planning has long emerged. De Statuten Van, a modern urban spatial planning document issued by the Dutch government in 1642, was carried out for the city of Batavia. This regulation addresses the construction and maintenance of waterways, housing, and urban expansion, as well as the city government's authority and responsibility. The Dutch government then issued *Decentralisatie Wet*, which governed the formation of municipal and regional governments in 1903. Then came the *Koninklijke Besluit* 1904, strengthened by the *Locale Raden Ordonantie* 1905, which gave the city government the authority to decide on urban development issues. In addition, the Dutch East Indies government drafted a bill on urban area planning in Java in 1939. This bill was renamed *Stadsvorming Ordonantie-Ordinance City Formation* in 1948. Then, an implementing regulation, *Stadsvormingverdoning SVV*, a city formation regulation, was issued to speed up rebuilding war-damaged areas.

The City Development Bill, which regulates provisions in development stages, development financing, development regulations, and urban renovation, was drafted in 1970 in response to the need for urban planning (Sataloff et al. 2005). Then came Law No. 24 of 1992 on spatial planning, which established the stages of spatial planning: planning, utilization, and control. This law exists to regulate spatial planning in Indonesia, considering the following factors: (1) Indonesia as an archipelago with a diverse ecosystem, (2) coordinated and integrated natural

Table 1. The meta-analysis on research on development control in different countries

Domain	Public Interest		Private
Scope	Land – Spatial		Buildings
What to control	Land Use–Physical Environment	Layout, Spacing	Material, form, appearance, aesthetic control, social character
Development control tools	Land use ordinance, land use control, land subdivision regulation, statutory planning, land use plan, development regulation, land allocation development plan transfer development right zoning and land use regulations land use control	Density and scale, density bonuses building permit permission zoning, densities, green spaces, and layouts up zoning planning permits, development-control mechanism, and environmental impact assessment land use regulation urban design	Design guidelines, building code building rules
Impact	polluting industry, excessive noise, fire, health, highway, social character, the right to the quiet enjoyment of one's own surroundings		

resource management, (3) development patterns in a single dynamic environmental system, and (4) the fact that spatial planning can accommodate development developments.

Following the establishment of a regional autonomy government system because of the Reformation Order, Law 26 of 2007 on Spatial Planning was enacted with the goals of (1) wise natural resource management, (2) creating conditions and legal certainty, (3) strengthening national resilience, (4) expanding the existence of space and people's understanding of spatial planning, and (5) disaster mitigation based spatial planning.

At this point, spatial use control is being used in Indonesia. Since Law No. 27 of 2007 on spatial planning, Indonesia has been familiar with spatial use control instruments. The law replaces Law No. 24 of 1992, emphasizing the country's condition, including disaster-prone areas and environmental damage. As a result, urgent spatial development control is established. Furthermore, to exert control over its spatial development, Indonesia employs a mix of regulatory and discretionary systems.

The implementation of spatial development control, according to Indonesia Government Regulation Number 15 of 2015 on the Implementation of Spatial Planning, is an attempt to establish orderly spatial planning in compliance with the stipulated spatial planning, either by Presidential Regulations, Provincial or Regency, or City Regulations. The goal of spatial development control is to ensure that land use plans are consistent with spatial planning plans. Spatial use control is implemented through zoning regulations, spatial use permits, incentives and disincentives, and penalties.

There is a land right in inland use that gives the owner the right to use the land. However, a development right in spatial planning regulates that a plot of land can be used for land use according to the spatial plan. Due to policy differences, land use management as a subsystem of spatial planning has yet to be implemented in Indonesia. The disclosure of information about land ownership and spatial planning impedes land and spatial planning synchronization.

A literature review was conducted on the 26 articles from Google Scholar regarding the implementation of space use control from 2015 to the end of 2020 to determine the performance of spatial use control in Indonesia (Table A. 2 in the Appendix). According to a VosViewer bibliographic analysis (Fig. 6), the most frequently used phrases in articles about development control in Indonesia are spatial planning law, flood and disaster, spatial use management, spatial use changes, and massive development.

The articles discuss specific cases of spatial development control and provide specific conditions for space use control performance. According to Table 2 in the Appendix, not all spatial use control instruments are used. Permits and sanctions are the most used spatial use controls, whereas zoning is not widely used. The consistency of law enforcement is a common barrier encountered when implementing spatial use control in Indonesia. The lack of integrated licensing and spatial planning leads to numerous irregularities, which are not met with legal repression. Furthermore, planners cannot develop plans that serve as the foundation for spatial development control (Murti 2018). The developed plans were more responsive to development but were too late to recognize market developments. The importance of community involvement in developing development control instruments should be emphasized in developing spatial use control instruments (Chandra et al. 2019; Destratianto and Pramono 2020).

According to the bibliometric analysis of international and Indonesia research sources on development control, three important elements for implementing development control are spatial planning, land development, and regulation. The code for development control is shown in Fig. 7 based on the NVIVO12 code analysis.

The elements of development-control implementation are shown in Fig. 8. The three elements, namely, spatial planning, land development, and regulation, should function synergically to make the optimal implementation.

These three components are linked. Spatial planning regulations (such as community planning and construction regulations, land use regulations, regional planning

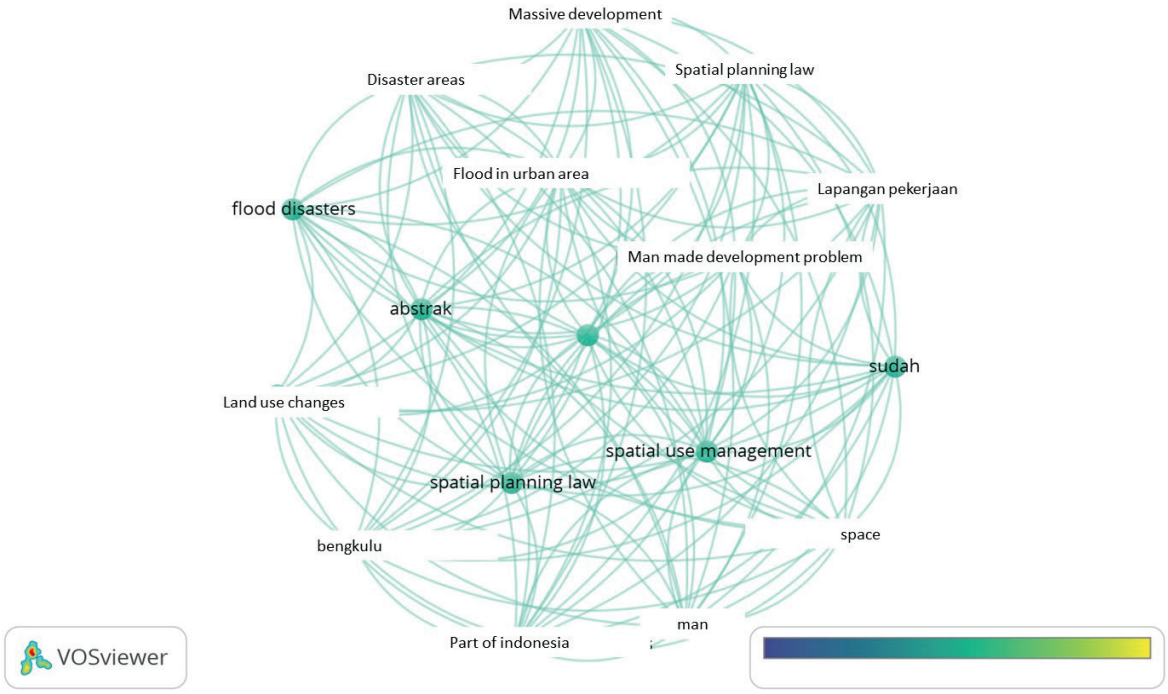

Fig. 6. The relationship between research elements of national development-control research with VosViewer

Fig. 7. Code analysis of development-control research in NVIVO12

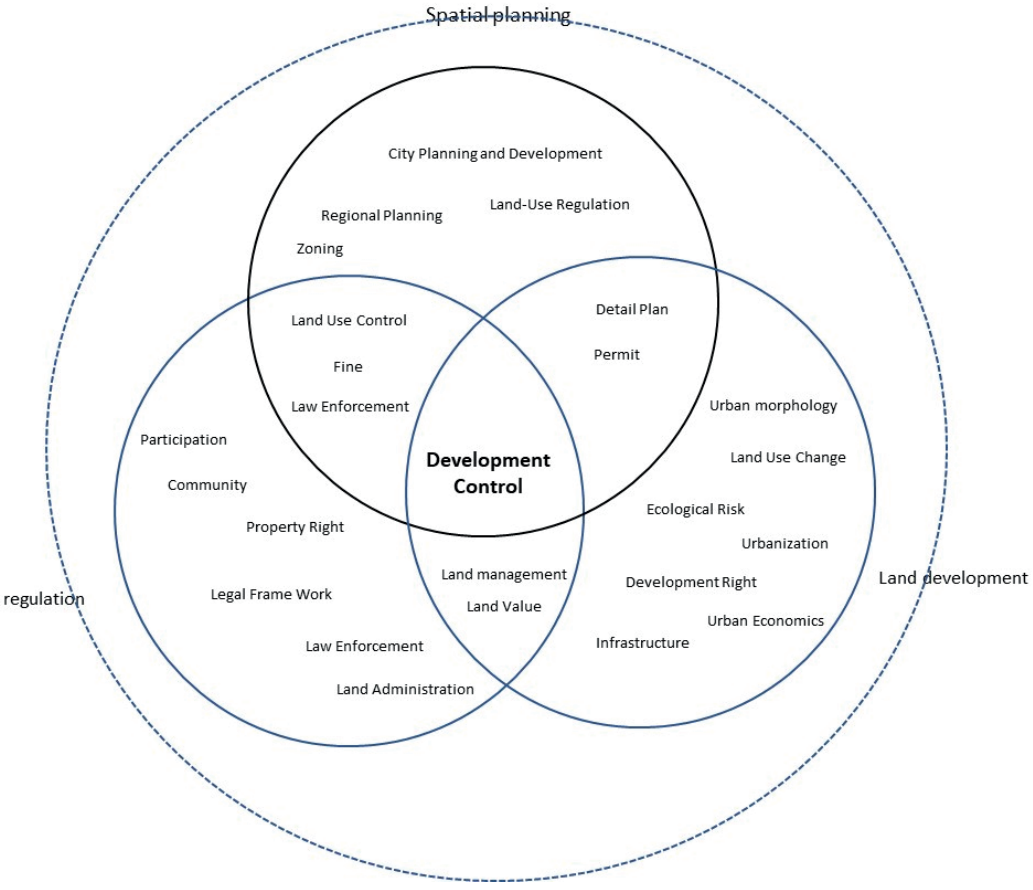

Fig. 8. Three elements of development control

regulations, and zoning regulations) serve as the foundation for managing space utilization in spatial planning elements. Furthermore, the plan must understand the state of soil morphology, land-use changes, ecological risks, and how the community perceives development. Infrastructure and the urban economy could benefit from spatial control. Furthermore, regulations must be enacted to govern the use of this room. Land administration regulations are based on the implementation of land control. The intersection of elements in the performance of commands may be strategic. The comprehensive plan requirement serves as the foundation for licensing. Land conservation and consideration of land values must be the foundation for developing legislation. The fundamental items that must be provided are clarification of land use management rules and regulations and penalties. This feature presents a challenge in its implementation in Indonesia. According to a review of previous research, the need for regional planners who can compile plans and control regional directives has become difficult, to the point where it appears that they only obey market shifts. The community's understanding of spatial planning remains very limited. The limitation of this research is that it is simply a review of numerous studies conducted, so practitioners must gain clarity from managing space use, interacting directly with the group, and direct consulting with experts.

CONCLUSIONS

By examining the interest of each international and Indonesia research sources discussing spatial development control, it is possible to conclude that there are three foundations in development control. The three foundations are the spatial plan, land development, and institution. As a guide in managing the development permit, a detailed plan is required. A spatial plan should consider urban development holistically, taking into account urban economics and ecological risks associated with land-use change. The institution also serves as a foundation for the implementation of development control. Participation of the community, developers, and development of planning officers as the front line of control. Land management could be strategic tools in spatial development control, specifically how to manage property rights and value as the intersection of urban development and institutions.

Spatial use control in Indonesia highlights the importance of better understanding among planners, the government, and the general public. Aside from its economic benefits, existing instruments such as licensing can be a transactional effort to control spatial use. The need for detailed planning as a foundation for controlling is also a major factor in implementing spatial use control. Effective sanctioning efforts should be backed up by legal capacity.

There is an opportunity for land value capture implementation in zoning based on the gaps in the advantages and disadvantages of spatial development control. With a good system, the land value capture implemented in Indonesia includes the success of tax instruments as revenues, though it can be used to regulate zoning. Legalized informal control instruments should provide the opportunity to capitalize on the value of traditional use control.

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APPENDIX

Table A.1. Mapping table for research development-control systems and tools

Author		Journal	Development Control System and Tools	Country	Method	Comment
1.	Ahmad and Anjum (2012)	Cities	Regulatory – Land Use Ordinance	Pakistan – Global South	Descriptive	Overlapping power and institutions
2.	Abass et al. (2020)	International Journal of Disaster Risk Reduction	Regulatory – Land Use Control	Ghana – Global South	The maximum likelihood classification algorithm	Weak institutions and legislative frameworks affect the regulations made
3.	Agheyisi (2019)	Land Use Policy	Regulatory – Land Subdivision Regulation	Benin, Nigeria – Global South	Descriptive	Need for good land administration. Compilation of a good spatial plan
4.	Alexander et al. (2012)	Progress in Planning	Statutory planning	Israel	Descriptive	Nomocratic tools to promote common values; when "planning for itself," it should use teleocratic tools acting as an organization to realize its goals
5.	Allouf et al. (2020)	Environment and Planning B: Urban Analytics and City Science	Design Guidelines	Australia	Qualitative and quantitative comparative analysis	The victorian system as discretionary development control New South Wales uses a mix of regulatory and discretionary control systems
6.	Baics and Meisterlin (2016)	Annals of the American Association of Geographers	Zoning – building code	New York	GIS method	Land use in a political economy
7.	Baker et al. (2006)	Journal of Planning Education and Research	Density and Scale	US, Australia, and New Zealand	Historical descriptive	Technical staff to undertake comprehensive and legally robust development control
8.	Biggar and Siemiatycki, (2020)	Journal of Planning Education and Research	Density bonuses	Toronto	Descriptive	Consequence for political conflicts over local priorities, democratic accountability, and the built environment
9.	Bidandi and Williams 2020)	Cities	Land use plan	Kampala	Qualitative	Urban land insights and political, revisited urban land policy
10.	Boamah et al. (2012)	Habitat International	Building Permit	Ghana	Quantitative	Enforcement of land use regulation, land value tax
11.	Cirolia and Berrisford (2017)	Habitat International	Development regulation, land allocation	Nairobi, Addis Ababa, and Herare	Qualitative	Negotiated planning . ability architects of the planning discipline or by planners themselves. The planning outcomes in African cities do not reflect clear patterns of data-driven decision making or stakeholder consensus
12.	Collins (2017)	London Journal	Permission Development Plan	London	Historical	Governments, and their advisors, appear to have ignored development plan history
13.	Farhat (2019)	Planning Practice and Research	Design guidelines	Seattle	Qualitative approach	Overlapping design challenges; the importance of a new, mutually agreed upon design

14.	Falco and Chiodelli (2018)	Land Use Policy	Transfer development right	Italy	Comparative	Weak role of public authorities in linking the supply and demand of transferable development rights
15.	Firman (2004b)	Land Use Policy	Land development permits	Indonesia	Descriptive	Giving permission that does not suitable with the room design planning
16.	Ferreira (2020)	Land Use Policy	Transfer development right	Coimbra, Portugal		Reconsidering the merit of market-oriented planning innovations: Critical insights on Transferable Development Rights from Coimbra, Portugal
17.	Gurran et al. (2015)	Journal of Environmental Planning and Management	Regulatory - Zoning and land use regulations	Australia (Sydney)	Spearman correlation	Responsive planning rather than repressive between development pressures and regulatory development control
18.	Hong et al. (2017)	Land Use Policy	Land Use Control	Shenzhen, China	GIS based	Eco-environmental condition of ecological corridors in Shenzhen
19.	Hu and Zhou (2018)	International review for spatial planning and sustainable development A: Planning Strategies and Design Concepts	Development zones	China	Descriptive analytis	Local government-led land development; the-integration of multiple spatial plans
20.	Hsu et al. (2016)	Proceedings of the Institution of Civil Engineers: Urban Design and Planning	Zoning	Taipei	The multinomial logit model	Community involvement
21.	Hubbard (2015)	Geographical Journal	Discretionary-development control, zoning, and change of use regulation	Sydney	Qualitative–descriptive	Sensitive to local contingency and informed by notions of spatial justice
22.	Ioannou (2016)	Urban Planning	Zoning, densities, green spaces, and layouts	Cyprus	Descriptive	Insufficiently capable of providing rational urban development. Planning legislation and a complete planning system exist and have already been in place since 1990, but they do not seem to be efficient
23.	Kim (2020)	Land Use Policy	Zoning-Upzoning	US	Case study	Cities had clear standards or evaluation frameworks for determining: how much value was created, what can be asked for in return, and who should benefit from the value captured
24.	Kuusaana and Eledi (2015)	Land Use Policy	Land Allocation – Regulatory	Ghana – Global South	Explorative and descriptive narrative	Participatory land uses planning, the landowner is not involved
25.	Lawanson and Agunbiade (2018)	Area Development and Policy	Planning permits, development-control mechanism and environmental-impact assessment	Nigeria	Ex ante and ex post project impact assessments	Economic impact of local people on tradable zone

26.	Lian (2018)	International Review for Spatial Planning and Sustainable Development	Land use regulation	Nixia, China	Technical analysis and evaluation	Planning of functional zones and key and core content of technology integration
27.	Nel (2016b)	Land Use Policy	Performance zoning, form-based codes, and local spatial plans	South Africa	Literature	Zoning has been criticized as being an exclusionary, unjust, and unsustainable land use management system
28.	Salal and Amirtham (2020)	Frontiers of Architectural Research	Regulatory-building rules	Chennai India	Steady-state method	Thermal building
29.	Shatkin (2016)	Cities	Land transfer	Jakarta, Chongqing, and Kolkata	Comparative	Land monetization can therefore provide powerful explanatory insights into emergent patterns of social and spatial inequality and political contestation
30.	Robb et al. (2019)	Urban Policy and Research	Discretionary – Land Use Control	Australia	Descriptive	Preserving public beach need for legislative reform or the emergence of incentive-based instruments to complement development control
31.	Sciara (2020)	Cities	Zoning	California	Qualitative analysis	Power retaliation in negotiating zoning
32.	Shibeshi et al. (2015)	World Development	No development control	Ethiopia	Literature reviews, interviews, descriptive statistics	No land use planning control – land administrative not correlated
33.	Saunders et al. (2015)	International Journal of Disaster Risk Science	Mix	New Zealand	Qualitative	Updating hazard information
34.	Tang and Ho (2015)	Land Use Policy	Land use planning regulation	Hong Kong	Johansen cointegration analysis and vector error correction model (VECM)	market competition and segmentation
35.	van der Sterren and Rahman (2015)	Sustainability of Water Quality and Ecology	Water-Sensitive Urban Design	Western Sydney	On-site design modeling	Penguatan local planning
36.	Xiao et al. (2017)	Transportation Planning and Technology	Land use control	China	GA	Decision-makers can make a trade-off between land use potentiality and construction cost
37.	Xu (2019)	Land Use Policy	Land use control	China	Descriptive	Institution building was driven by the party state's idea of "land as resources and asset."
38.	Yin and Abdullah (2020)	Planning Malaysia	Intensity, zoning high-density development	Malaysia	Qualitative and quantitative methods	Development control in the said urban center can identify the latest rank and upgrade or downgrade the growth center
39.	Yu and Hui (2019)	Habitat International	Zoning: Comprehensive Development Area, Greenbelt zone	Hong Kong	Discrete choice (probit) models	Planning schemes based on the Dutch method are more complex to implement. The technical evaluation of government officials is important, as is the arrangement of land ownership.

Table A. 2. Mapping table for research control tools

Article		Control Tools	Performance	Method	Obstacles
1.	Wahidin et al. (2019)	Land technical consideration	Spatial utilization not running optimally owing to vacuum of spatial plan	Qualitative–descriptive	Detailed spatial planning as a base for development permit
2.	Ariffudin (2020)	Detailed spatial plan	There are still many violations	Lack of socialization, knowledge of the officials	Knowledge of officer
3.	Budhianti (2020)	Location permission	HR capacity	Low law enforcement	Qualitative
4.	Budiyono (2020)	Companion zoning	For area preservation	design	Understanding zoning as a control for conservation
5.	Chandra et al. (2019)	Written warning administrative sanctions, temporary suspension of activities, closure of locations, demolition of buildings, and restoration of spatial functions	impact	Questionnaires and interviews	The need for community involvement
6.	Destratianto and Pramono (2020)	Advice planning	not run effectively and efficiently	Qualitative	The public and the private sector do not realize the importance of guiding advice planning
7.	Fazari (2020)	Sanction	Control is not optimal	Qualitative	Weak law enforcement
8.	Febrianda et al. (2020)	Development incentive and disincentive	not implemented yet	Qualitative	Detail spatial planning not stating incentive and disincentive for development
9.	Hastuti (2020)	Location permission	Authority	Literature	Understanding of the license as an instrument of control
10.	Hexagraha and Setyorini (2019)	Strong community involvement	Conflicting administrative and legal powers	Descriptive	Case study
11.	Idris and Amalia (2020)	Permit	Permit does not coherence with plan	Descriptive	Land use change caused by economic, social and physical factor
12.	Iskandar (2020)	Spatial plan	Not functioning optimally	Normative juridic	Increasing op apparatus integrity, the need of legal institution
13.	Jaya (2019)	. permit	Licensing instruments are implemented as a source of regional revenue rather than as part of a control mechanism	Qualitative interview	Regional regulation needs
14.	Murti (2018)	Penalty	Not running effectively	Qualitative interview	Legal factors, law enforcement factors, and community factors are ineffective or not running optimally
15.	Pratikto et al. (2019)	Permission, coordination	Implemented	Literature	Need coordination

16.	Prianto (2019)	Licensing is still a regional income	Not running effectively	Normative law	Understanding of licensing as control
17.	Qodriyatun (2020)	Control of flood causes	Controls are not implemented properly	Study of literature. There are no regulations	Not all violations have been prosecuted. Authority will be transferred to the center
18.	Rahmat (2020)	Fatwas on location direction plans	Fatwas were not thoroughly made and were not followed	Descriptive analysis	Need understanding
19.	Sam et al. (2020)	Incompatibility due to control, ownership, use, and utilization of land			Need reliable land administration
20.	Sari (2020)	IMB (building permit) and non-IMB	Administrative sanctions	Socialization to the community	Knowledge of officer
21.	Sejati et al. (2020)	Control is not optimal	The non-compliance factor	Application of criminal sanctions	Consistency of law enforcement
22.	Tenrisau (2019)	The imposition of criminal sanctions for violations of spatial planning	Not all indications of violations can be identified by the responsible work unit	Secondary literature	There is no detailed 1:5000 plans for proof
23.	Wahidin et al. (2019)	As a building permit	Not running effectively	Not running effectively	Control of traditional spatial development and
24.	Wulansari (2017)	Traditional Baliness building control	Effective implementation	Qualitative	Community influence
25.	Yustia (2019)	Licensing	This has not been fully done by the community	Questionnaire	Role of society