



Complete Village (Sub-District) Development Acceleration Strategy in Sukun District, Malang City

Ramadhani Naufal Na’afi^{1*}, Eko Suharto², Susilo Widiyantoro³

¹ Pacitan Regency Land Office
^{2,3} Sekolah Tinggi Pertanahan Nasional
* Correspondence: ramadhanithok87@gmail.com

ARTICLE INFO	ABSTRACT
Keywords: Complete Village, Implementation, Sukun District, Malang City Date logs: Received: June 12, 2025 Reviewed: July 29, 2025 Accepted: Sept 10, 2025 Published: Sept 24, 2025 How To Cite: Na’afi, R.N., Suharto, E, Widiyantoro S (2025). Complete Village (Sub-District) Development Acceleration Strategy in Sukun District, Malang City. <i>Marcapada: Jurnal Kebijakan Pertanahan</i>, 5(1), 43–62. https://doi.org/10.31292/mj.v5i1.160	The development of a complete city/regency is a strategic agenda of the Ministry of ATR/BPN to realize legal certainty over land. Malang City has achieved Complete City status, but the implementation of the Complete Village development in Sukun District still faces various obstacles. This issue is important to study because success at the village level is a benchmark for the quality of national land policy implementation. This study aims to analyze the implementation, problems, and strategies for accelerating the development of Complete Villages after the declaration of Complete City 2024. The study used a descriptive qualitative method with data collection techniques through structured interviews, field observations, and document reviews. Data were analyzed descriptively using the Miles and Huberman model with the application of three analytical tools: the 5M management approach (man, money, material, machine, method) to assess internal factors, Rumelt's Evaluation Theory to measure consistency, suitability, excellence, and feasibility of strategies, and SWOT Analysis to formulate adaptive strategies. The results indicate that the development of Complete Villages in Sukun District follows four main stages according to the 2022 PTSL Technical Guidelines and has fulfilled the 5M elements. However, Rumelt's evaluation identified technical and non-technical constraints, such as limited technological infrastructure, human resource capacity, and inter-agency coordination. The SWOT analysis recommended strategies such as strengthening institutional vision, improving cross-sectoral coordination, collaborating with third parties, and utilizing digital technology, particularly Artificial Intelligence (AI), to accelerate the sustainable implementation of the Complete Village.

A. Introduction

Land issues in Indonesia have long been a strategic concern for national development. Cases of overlapping certificates, legal uncertainty over land ownership, and agrarian conflicts leading to legal disputes remain common in various regions (Artika & Utami, 2020; Prihatin & Nurrokhman, 2019). This situation demonstrates that in addition to the quantity of land registration, the quality of land data also significantly determines legal certainty. In this context, the Complete Systematic Land Registration Program (PTSL) is a strategic government solution to accelerate land registration in Indonesia.

Since its launch in 2017, PTSL has been able to accelerate land registration, which was previously estimated to take up to a century (Ardani, 2019; Mujiburohman, 2018). Data shows that as of 2023, 110.8 million land parcels (88%) have been registered, while 15.2 million (12%) are targeted for

completion by 2025 (Jaya, 2024). Cities/districts that meet the Complete Village Value (NDL) criteria, based on the 2019 Complete Land Registration Technical Guidelines, will be given the title of Complete City/District (Rahmawati, 2022; Nugroho et al., 2018). However, there are still a number of areas that have been declared as Complete Cities/Regencies and still have work to do to complete cluster 4 land parcels. Some of these cities/regencies include: Madiun City which was declared a complete city on March 28, 2023 (Maula, 2023), Surakarta City which was declared on May 10, 2023 (Prasetyo, 2024), Badung Regency which was declared on January 12, 2024 (Darmawan, 2024), and a number of other cities/regencies.



Figure 1. Declaration of 46 Complete Regencies/Cities in 23 Provinces by Minister AHY
Source: <https://jatim.antaranews.com>

However, the development of complete villages/sub-districts faces technical obstacles such as limited Surat Ukur (SU), Gambar Ukur (GU), and Gambar Situasi (GS) archives and changes in regional administration (Artika & Utami, 2020), as well as non-technical obstacles such as limited human resources and facilities (Prihatin & Nurrokhman, 2019). Malang City, despite having Complete City status since October 2024, still has 9 out of 57 sub-districts that have not yet achieved Complete status, especially in Sukun District. The three sub-districts with the highest level of problems (Mulyorejo, Sukun, and Tanjungrejo) were recorded as having 8,612 data errors in the form of gaps and overlaps (Research Process, 2025).

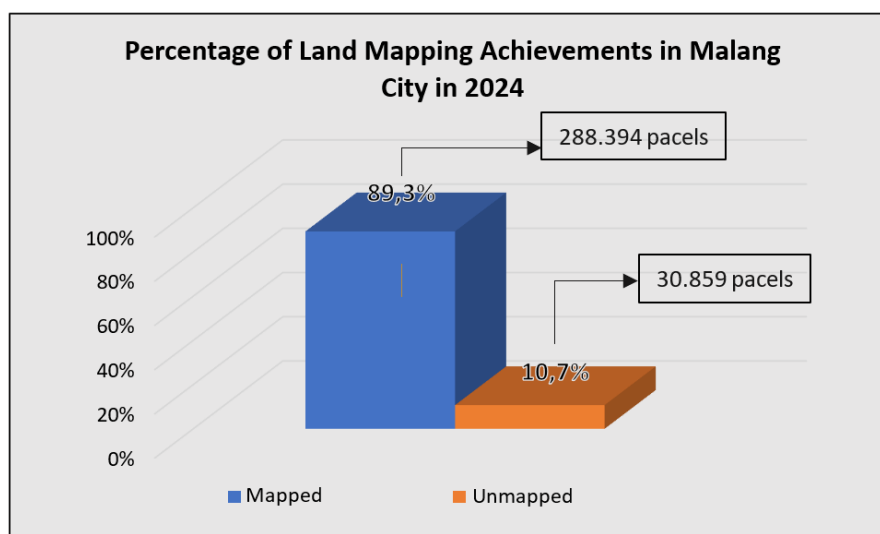


Figure 2. Percentage of Land Plot Mapping Achievement in Malang City in 2024
Source: Processed Researcher, 2025

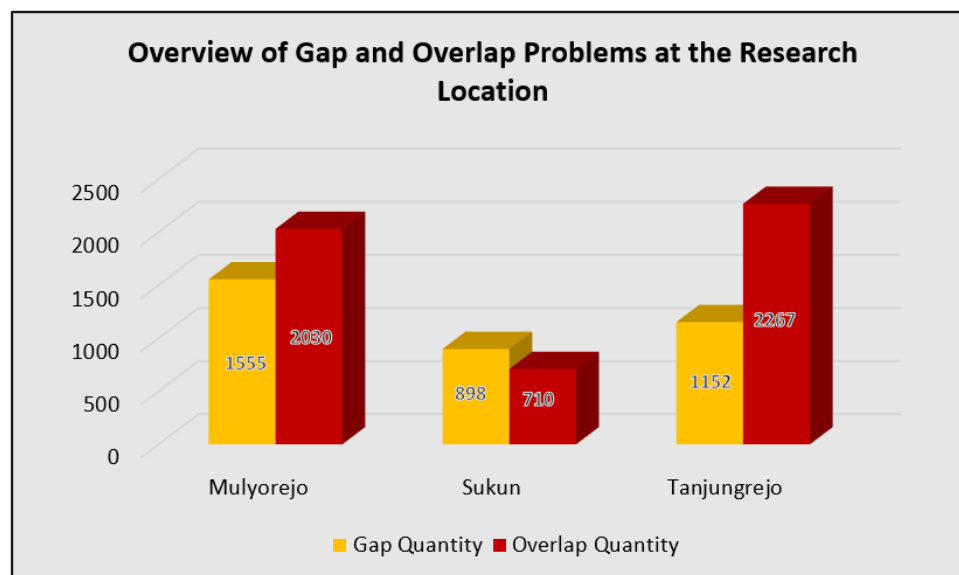


Figure 3. Gap and Overlap Problems at Research Sites
Source: Processed Researcher, 2025

The analysis of the development of the Complete Village in this study utilizes three main theoretical frameworks. First, the 5M management approach (man, money, material, machine, method) serves to identify internal factors in program management (Terry, 2012). Second, Rumelt (2011) assesses strategies based on consistency, suitability, excellence, and feasibility, allowing for an objective evaluation of policy implementation (Rumelt, 2011). Third, a SWOT analysis maps strengths, weaknesses, opportunities, and threats to formulate adaptive strategies for decision-making (Gürel & Tat, 2017).

The application of these three frameworks is important because it provides a comprehensive analysis. The 5M management focuses on internal conditions, Rumelt's theory emphasizes strategy quality, and SWOT analyzes the external environment, creating a more integrated approach that leads to clearer recommendations. These three theories are also relevant for evaluation in the discussion of research findings regarding the effectiveness of the Complete Village program.

Various studies have highlighted strategies for accelerating land data development. Kastika (2019) examined local government involvement and outsourcing in Denpasar; Turaichan (2022) emphasized the combination of studio mapping and field validation in Madiun; Junarto and Suhattanto (2022) emphasized the importance of external roles, including academics, in Gunungkidul; while Prasetyo (2024) discussed Surakarta City's thorough preparations for achieving the fifth Complete City status in Indonesia. Other studies have focused on complete village-based land registration (Rahmawati, 2022) or evaluating land data quality (Handono, 2020; Maula, 2023).

Although previous research has addressed aspects of strategy, data quality, and implementation of PTSL (Complete Village System), studies specifically integrating the implementation, challenges, and strategies for developing Complete Villages are still very limited. This study addresses this gap by examining the case of Sukun District, Malang City, as a unique example where Complete City status has been achieved despite several villages still experiencing problems. Therefore, the purpose of this

study is to analyze the implementation, challenges, and strategies for accelerating Complete Village development in Sukun District following the 2024 Complete City declaration.

B. Research methods

This research employed a qualitative method with a descriptive approach, aiming to present facts systematically, in detail, and accurately for easy understanding (Wirartha, 2006; Sugiyono, 2019; Azwar, 2017). This method was chosen to integrate the analysis of the implementation, problems, and development strategies of the Complete Village in Sukun District. The research data comprised primary and secondary data. Primary data were obtained through structured interviews with officials at the Malang City Land Office, village officials, and third parties involved in the development of the complete data; field observations in three selected villages (Mulyorejo, Sukun, and Tanjungrejo); and activity documentation. Secondary data included regulations, the 2022 PTSL Technical Guidelines, official reports from the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), and relevant previous research findings.

Data analysis was conducted using the Miles and Huberman descriptive qualitative analysis model, which includes three stages: data reduction, data presentation, and conclusion drawing. To strengthen the analysis, three theoretical frameworks were used. First, the 5M management elements (man, money, material, machine, method) are used to assess internal factors (Emerson, 1960 in Rohman, 2017). Second, Rumelt's Evaluation Theory (2011) to evaluate the consistency, suitability, superiority, and feasibility of a strategy. Third, a SWOT analysis (strengths, weaknesses, opportunities, and threats) to formulate adaptive strategies that can maximize potential while overcoming obstacles.

C. Aspects of Implementation of Complete Village Development in Sukun District

1. Implementation Conditions

The development of the Complete Village in Sukun District began in 2023. However, an interview with the Head of the Survey and Mapping Section at the Malang City Land Office revealed that implementation has faced various obstacles, primarily due to minimal oversight of the third party implementing the project. An evaluation of the third party's work revealed that the quality of land data in nine villages remains problematic. The data is poorly organized, contains numerous gaps and overlaps, and does not meet the requirements for Complete Village status. Nevertheless, all villages were included in the Minutes of Complete City Application, considering that collective submissions still allow Malang City to meet the requirements for Complete City status.

The development of the Complete Village in Sukun District is the final stage in the process of establishing Malang as a Complete City. Therefore, the Malang City Land Office must continue the development of unfinished urban villages after submitting the application in August 2024. This activity aims to complete the Complete City status declared on October 8, 2024. Implementation in three priority urban villages—Mulyorejo, Sukun, and Tanjungrejo—will be carried out from August to December 2024 by an internal team from the Land Office, third parties, interns from the National Land Agency (STPN), and the local urban village government.

2. Management Elements (Emerson's 5M Theory)

The implementation of the Complete Urban Village Development in Sukun District is supported by human resources (HR), budget, equipment, materials, and work methods that are integrated into a single element of activity management. The management elements involved in implementing this activity, when analyzed based on Emerson's Theory of Management Elements, which encompasses the 5Ms (Man, Machine, Money, Material, and Method), are as follows:

A0 Human Resources

The implementation of the Complete Village Development in Sukun District is supported by core Human Resources (HR) integrated into a single supporting element for the Complete Malang City Development project. The core implementers of this activity were appointed based on Decree of the Head of the Malang City Land Office Number: 49/SK-35.73.SP.01.02/2024 concerning the Composition of the Physical Task Force for Improving Data Quality Towards a Complete City for the 2024 Fiscal Year. The core implementers of the land data quality improvement activity at the Malang City Land Office consist of 14 people, including one team leader, four coordinators, and nine members.

In the context of the development of Complete Villages in 3 (three) village areas in Sukun District, several members of the core implementers are divided again to carry out tasks in each stage of improving data quality towards Complete Villages. When viewed at each stage, the man element in the implementation of complete village development in Sukun District is also strengthened by additional personnel from third parties (KJSB Hudan Pandu Arsa and Partners), local village community groups (Pokmas), and interns from the National Land College.

Table 1. Details of the Number and Duties of Complete Village Development Implementers in Sukun District

Village	Role	Number of Implementers	Duties and Responsibilities
Mulyorejo	Internal Land Office	2	<u>Internal Land Office:</u>
	Third Parties	5	Technical coordination, data validation, and monitoring
	Pokmas	5	
	STPN Intern	2	<u>Third Parties (KJSB):</u>
Sukun	Internal Land Office	2	Measurement and physical checking of land plots
	Third Parties	5	
	Pokmas	5	<u>Pokmas:</u>
	STPN Intern	2	Data verification and information collection at the village level
Tanjungrejo	Internal Land Office	2	
	Third Parties	5	<u>STPN Intern:</u>
	Pokmas	5	Studio mapping and finalization of results
	STPN Intern	2	

Source: Malang City Land Office Data, 2024

Based on Table 1, each sub-district involves approximately 14 implementers who carry out the data inventory, studio checks, field checks, and finalization stages. The ideal workload is estimated at

154 hours/month per person (7 hours/day). However, STPN interns experience a workload of up to 180–200 hours/month due to limited personnel and data complexity.

a) Budget

In terms of budget support, the Complete Sub-district Development in Sukun District is supported by a budget that remains integrated with the Complete City Development master budget. Based on the results of interviews with the Head of the Administration Subdivision and the Head of the Survey and Mapping Section of the Malang City Land Office, it is known that the budget for Complete City Development in Malang City is stated in the Budget Implementation List (DIPA) of the Malang City Land Office for 2024. In line with the 2024 DIPA, the budget for the implementation of the Complete City Development of Malang is sourced from Pure Rupiah and Non-Tax State Revenue (PNBP) amounting to Rp1,607,914,000 (one billion six hundred seven million nine hundred and fourteen thousand rupiah). The entire budget is listed in the activity point "PBT PTSL Complete Village/Subdistrict of Java Bali" and is divided into 3 (three) sub-activities, namely drone photography, community participation, and land measurement and mapping. You can see the budget details, which are an element of money for implementing the Complete City Development of Malang, in the Details of the Work Unit Working Paper for the 2024 Fiscal Year or, more concisely, in Table 2.

Table 2. Complete Malang City Development Budget

No	Types of Activities	Budget Ceiling
1	Drone Shooting	Rp197.328.000,-
2	Community Participation	Rp152.456.000,-
3	Land Plot Measurement and Mapping	Rp1.258.130.000,-
Total		Rp1.607.914.000,-

Source: Malang City Land Office Data, 2024

Based on Table 2, the Complete Village Development Program (Kelurahan Lengkap) in Sukun District absorbed the largest budget allocation for two main components: providing aerial photography via drone photography and land measurement and mapping. According to the Head of the Survey and Mapping Section of the Malang City Land Office, the entire budget has been optimally allocated by the Administration Section to the SP Section, which is the technical implementer of the activities.

The effectiveness of this allocation is reflected in the achievement of the Complete Village Development Program (Kelurahan Lengkap) development target in 57 villages throughout Malang City, including the three villages in Sukun District that were the focus of the study. Although the researchers did not obtain a breakdown of the budget allocation per village, interviews indicated that the available budget was deemed sufficient to support the overall program implementation.

The researchers analyzed the three main components of the budget structure as follows:

i. Aerial Photography

Malang City area: ±11,000 hectares

Third-party photography costs: IDR 15,000/ha

Ideal requirement: IDR 165,090,000

Available allocation: IDR 197,328,000

Budget surplus: IDR 32,238,000

With this allocation, photography activities can fully cover the entire Malang City area.

ii. Community participation.

Unit cost: IDR 70,000/person/day

Total allocation: IDR 152,456,000

Maximum capacity: 2,178 participation days

Assumed duration of involvement: 10 working days

Estimated number of participants: ± 217 people

This number is considered sufficient to support the verification and data collection process at the village level.

iii. Land Measurement and Mapping

Estimated unfinished plots: 30,859 plots

Budget allocation: IDR 1,258,130,000

Average cost per plot: IDR 40,757

Standard field operational costs: IDR 35,000–IDR 45,000 per plot

This allocation is sufficient to complete all remaining plots, including those in the three subdistricts where the study was conducted.

a) Equipment (Machine)

Equipment is a crucial supporting element in the implementation of the Complete Malang City Development Program, including the Complete Village Development program in Sukun District. The equipment used to improve data quality includes hardware and software, as well as field measurement tools. Overall, this equipment consists of personal computers (PCs), laptops, scanners, printers, AutoCAD software (versions 2012 and 2021), ArcMAP software, Global Navigation Satellite System (GNSS), Total Station (TS), and other measuring tools. Table 3 shows a list of equipment used by the Survey and Mapping Section of the Malang City Land Office:

Table 3. List of Equipment Supporting Complete City Activities, Survey and Mapping Section, Malang City Land Office

No	Equipment Name	Total
1	Printer	3 unit
2	Scanner	4 unit
3	Personal Computer (PC)	24 unit
4	Laptop	29 unit
5	GNSS	5 unit
6	Total Station (TS)	3 unit
7	Measuring Tape	10 pieces
8	Pole Stick	7 pieces
9	Statif	7 pieces
10	Survey Drawing Form	Available

11	Stuffing List 201A	Available
12	Software AutoCAD 2012 & 2021	Available
13	Software ArcMAP	Available
14	Office Stationery (ATK)	Available
15	Internet Access	Available

Source: Malang City Land Office Data, 2024

Implementation of activities in Sukun District, which are part of the Complete City master program, is supported by equipment owned by the Survey and Mapping Section. Based on interviews, this equipment is deemed quantitatively adequate and in satisfactory condition and is regularly updated.

In addition to internal equipment, the Land Office also receives support from a third party, namely KJSB Hudan Pandu Arsa and Partners, which provides measurement equipment for field activities, as presented in Table 4. The equipment from KJSB is focused on supporting the field inspection phase, particularly land measurement in the three sub-districts where the study took place.

Table 4. List of Supporting Equipment for Measurement Activities from KJSB Hudan Pandu Arsa and Partners

No	Equipment Name	Total
1	Laptop	5 unit
2	Measuring Tape	2 buah
3	GNSS	4 unit
4	Total Station	2 unit
5	Statif	4 pieces
6	Pole Stick	4 pieces

Source: Malang City Land Office Data, 2024

The researcher conducts an efficiency analysis of the availability of equipment based on ideal needs in the field. The results of the analysis are presented in Table 5.

Table 5. Complete Village Development Efficiency Analysis Table in Sukun District

Yes	Equipment Name	Quantity Available	Ideal Needs	Surplus/Defisit	Information
1	GNSS Geodetic RTK	9 units (5 Land office + 4 KJSB)	6	+3 (over)	Inefficient (can be used in turn)
2	Total Station	5 units (3 Land office + 2 KJSB)	3	+2 (overrated)	Inefficient (rarely used together)
3	Laptop	34 units (29 Land office + 5 KJSB)	30	+4 (over)	Efficient (high rotation, support digital work)
4	Personal Computer (PC)	24 units	20	+4 (over)	Efficient (studio data processing)
5	Scanner	4 unit	3	+1 (overrate)	Efficient (moderate use)
6	Printer	3 unit	3	0 (sufficient)	Efficient
7	Tape Measure/Meter	12 pieces (10 Land office + 2 KJSB)	9	+3 (over)	Efficient (inexpensive and flexible tools)
8	Pole Stick	11 pieces (7 Land office + 4 KJSB)	9	+2 (overrated)	Efficient

9	Stand	11 pieces (7 Land office + 4 KJSB)	9	+2 (overrated)	Efficient
10	Software AutoCAD 2012 & 2021	-	As needed	-	Efficient (essential for data processing)
11	Software ArcMAP	-	As needed	-	Efficient (used intensively in the studio)
12	Internet Access	-	As needed	-	Efficient if stable; become an obstacle when the connection is slow

Source: Processed Researcher, 2025

Based on the equipment availability listed in Tables 3, 4, and 5, it can be concluded that equipment support for the Complete Village Development Project in Sukun District is quite efficient. The adequate availability of equipment from the Survey and Mapping Section, combined with support from KJSB Hudan Pandu Arsa and Partners, allows for optimal workload distribution between data processing in the studio and field measurements.

The proportional use of equipment such as GNSS and total stations relative to the number of personnel expedites the spatial verification process. Meanwhile, AutoCAD and ArcMAP software play a crucial role in ensuring data processing accuracy. Well-maintained equipment and regular updates minimize the risk of downtime, preventing disruption to the planned work schedule. Furthermore, the integration of internal and external resources supports the overall efficiency of budget utilization. This combination ensures that the workflow—from measurement to data finalization—is effective, coordinated, and meets established timelines.

b) Materials

The implementation of the Complete Village Development Project in Sukun District, Malang City, is supported by management elements in the form of working materials that include spatial and textual data. The materials used in the series of activities to improve the quality of land data include: 1) Registration Maps on the Computerized Land Office (KKP) Website; 2) Single Maps or Offline Registration Maps; 3) Analog Registration Maps; 4) Aerial Photo Maps; 5) Regional Administrative Boundary Maps; 6) List of Unmapped Land Titles (KW456); and 7) Physical Documents of Land Titles, Measurement Letters, and Measurement Drawings.

Table 6. Analysis of the Quality of Supporting Materials for Complete Village Development in Sukun District

Yes	Material Name	Format/Media	Material Properties	Quality of Materials	Resilience/Risk
1	Registration Map on the KKP Website	Digital (web-GIS, shapefile, etc.)	Non-physical/server-based	Excellent (standardized, regularly updated)	Safe from physical damage; Risk: System errors, data corruption
2	Single Map / Offline Registration Map	Digital venue (shp/dwg/pdf)	Not physical, stored locally	Good (depending on format and storage)	Risk of loss/corruption if not backed up

3	Analog Registration Map	A0 Paper	Physical, printed	Moderately depends on the quality of paper and ink	Prone to tearing, fading, temperature/humidity changes
4	Aerial Photo Map	Digital (orthophoto/TIFF), printable	Digital and/or physical (if printed)	Good – high resolution (10 cm), good accuracy, if printed depending on the medium	Risk of physical damage if printed; Digital data is more durable
5	Map of Regional Administration Boundaries	Digital and print (shp/dwg)	Digital	Good (refers to the BAK & RTRW map)	Need regular updates to stay accurate
6	List of Uncharted Land Book Qualities (KW456)	Printed documents (Excel)	Physical	Enough – often printed on plain paper, prone to fading/tearing	Easy to damage if not stored properly
7	Physical Documents: Land Books, Survey Letters, Survey Drawings	Printed documents	Physical, vital archives	Varies: some are old/damaged and some are new/good	Highly susceptible to water, termites, and other physical damage

Source: Processed Researcher, 2025

Based on Table 6, the supporting materials for the activity have met the quality standards required to support all work stages, both in terms of spatial accuracy and textual completeness. Digital maps, such as those available on the KKP website and the offline Single Map, have been regularly updated, ensuring coordinate accuracy and conformity to existing conditions. Analog maps serve as important historical references, while regional administrative boundary maps ensure measurements align with applicable legal boundaries.

Physical documents such as KW456 lists, land books, measurement letters, and measurement drawings have undergone an initial validation process to ensure data completeness and minimize input errors. High-resolution aerial photographs (10 cm) from drone mapping are also available for each sub-district, supporting rapid and precise data identification and correction.

b) Methodology

According to the statement of the Head of the Survey and Mapping Section of the Malang City Land Office, the improvement of land parcel data quality carried out at the Malang City Land Office, including the implementation of Complete Village Development in Sukun District, refers to the 2022 PTSL Technical Guidelines. In addition to referring to the 2022 PTSL Technical Guidelines, several adjustments have been made to account for the availability of equipment and human resources, as well as any obstacles and constraints encountered during implementation. The adjustments to the stages of land parcel quality improvement activities towards Complete Village and Complete City development at the Malang City Land Office are clearly visible in the four implementation stages, starting from data inventory and land parcel data identification, studio inspections, field activities, and

finalizing field results or reporting. The figure below (Figure 2) provides a more detailed view of the stages and flow of land parcel data improvement towards complete village development.

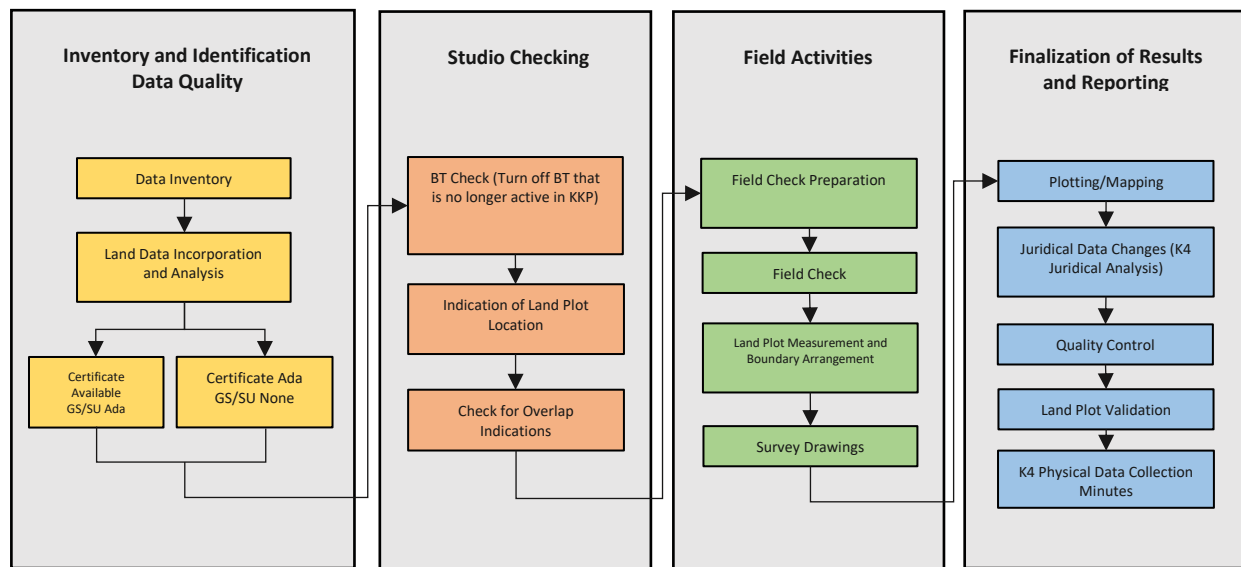


Figure 5. Land Data Quality Improvement Process
Source: PTSL Technical Instructions for 2022

Based on field observations and interviews with several informants, the implementation of Complete Village Development in Sukun District demonstrated significant performance achievements, with more than 85% of work stages completed within the target timeframe, despite technical obstacles in some villages due to improvements to the previous year's work data. This achievement percentage was primarily supported by the optimization of the integrated use of the 5M elements. Human Resources (Man), consisting of internal teams, third parties, STPN interns, and Community Groups (Pokmas), worked according to a clear division of tasks, thereby accelerating the data validation process. Proportional and efficient budget allocation (money) supported the smooth running of field activities and data processing. Modern, well-maintained equipment (machines), combined with external devices, increased the accuracy and speed of measurements. Quality materials and both digital and analog data ensured precise verification and corrections. Meanwhile, work methods (Methods), referring to the 2022 PTSL Technical Instructions, with adjustments to local conditions, minimized potential delays. Overall, the implementation of the 5Ms in this activity has proven effective in accelerating the achievement of the Complete Village Development target while sustainably improving the quality of land data.

1. Evaluation of the Implementation of Complete Village Development in Sukun District

The evaluation of the implementation of Complete Village Development in Sukun District was conducted using Rumelt's Evaluation Theory (2011), which covers four main aspects: consistency, suitability, feasibility, and benefit.

a) Consistency

According to Rumelt in Agusnawati et al. (2024), indicators of consistency in an activity include compliance with Standard Operating Procedures (SOPs), management systems, and adherence to technical guidelines. The evaluation results indicate:

- i. Compliance with Standard Operating Procedures (SOPs). The activity implementation generally adhered to the 2022 PTSL Technical Instructions, which clearly stipulate SOPs. The four main stages—data inventory, studio checks, field checks, and finalization of results—were carried out according to procedure;
- ii. Activity management and coordination between parties, including the Malang City Land Office, technical implementers, and village governments, have been quite successful. Despite technical adjustments due to updates to the KKP and GeoKKP systems, which required validating land parcels, management was able to maintain smooth implementation. However, there were concerns regarding limited human resources and the high volume of work.
- iii. Alignment with technical guidelines: The implementation of Complete Village Development in Sukun District remains aligned with the 2022 PTSL Technical Guidelines, which serve as the primary guideline. The stages stipulated in the Technical Guidelines have been followed, although some technical adjustments have been made to accommodate the requirements for land parcel validation within the KKP and GeoKKP systems.

Based on the analysis using Rumelt's Evaluation Theory (2011), the implementation of Complete Village Development in Sukun District demonstrates that, in terms of consistency, most stages are in accordance with the 2022 PTSL Technical Guidelines, starting from data inventory, studio checks, field checks, and finalization. The technical adjustments made included adapting the KKP's parcel validation system using artificial intelligence in the form of a UI Vision extension (macros), ensuring consistent implementation. Therefore, the consistency aspect was deemed quite satisfactory. The technical adjustments did not disrupt workflow, and implementation remained within official guidelines.

a) Consonance

According to Rumelt in Agusnawati et al. (2024), the suitability of activity implementation is determined by the compatibility between the work environment, type of work, and the competency of the implementers.

- i. Work Environment: Implementers stated that the work environment at the Malang City Land Office supports productivity. The availability of adequate equipment and competent coworkers with local knowledge are key supporting factors.
- ii. Consonance of Work with Human Resource Competencies: Implementer placement took into account educational background and technical expertise. The majority of implementers are graduates of Geodesy, Geography, and Urban and Regional Planning (PWK), who possess skills in measurement and mapping. They were directed to complete studio work using software such as AutoCAD and ArcGIS, in accordance with their respective expertise.
- iii. Based on the analysis using Rumelt's Evaluation Theory (2011), the suitability aspect was assessed as satisfactory. Human resource placement was aligned with technical competency,

and the work environment supported implementation. However, we still need to improve coordination between internal teams and field-based third parties to prevent duplication of work.

b) Feasibility

According to Rumelt in Agusnawati et al. (2024), the feasibility of an activity can be assessed by the extent to which its implementation does not burden available resources, including human resources, equipment, and budget. The feasibility evaluation results of the Complete Village Development Project in Sukun District indicate the following:

- i. Availability of Human Resources (HR): The availability of human resources is still relatively limited. Workload accumulation occurs primarily among studio mapping and field inspection staff, with work volumes exceeding the ideal standard of 154 hours/month. To address this shortfall, the Malang City Land Office is collaborating with third parties (outsourcing), particularly to support the field phase and finalize results.
- ii. Availability of materials and equipment: In general, the availability of equipment and materials is sufficient, although adjustments are still needed for optimal operation. GNSS and total stations are available in excess, but devices such as PCs, printers, and scanners are still limited and can potentially hinder data processing. While laptops and mapping software are considered efficient, the excessive number of handheld GPS devices leads to their underutilization. In terms of materials, digital maps (KKP and offline) are of excellent quality and updated regularly. Analog maps serve as historical references, and aerial photographs offer high accuracy (10 cm). However, printed materials such as KW456, land books, measurement letters, and measurement drawings remain vulnerable to damage if not properly managed.
- iii. Budget availability: Budget support has been well-structured, sourced from Pure Rupiah and Non-Tax State Revenue (PNBP), as well as additional funds from the Complete City/Regency program, which covers 104 Land Offices by 2024.

Based on the analysis using Rumelt's Evaluation Theory (2011), overall, the feasibility of this program's implementation is considered quite feasible. Budget support is adequate, and equipment and materials are available in relatively sufficient quantities. However, to ensure optimal and sustainable implementation, we must address the challenges of imbalances in equipment distribution and limited human resources.

a) Advantage

According to Rumelt's Evaluation Theory in Agusnawati et al. (2024), advantage in an activity refers to the superiority of resources, innovation, and strategies that positively impact program achievement. Interviews with implementers revealed several advantages in the implementation of the Complete Village Development Program in Sukun District, as follows:

- i. Resource Advantage. The Malang City Land Office has two main advantages: Digitalization of Documents—The majority of land documents have been digitized, facilitating archive searches and accelerating the validation process and integration of spatial and textual data. Quality Human Resources—Although limited in number, the human resources it has are highly competent and

have local knowledge, supporting effective communication with the community and streamlining the identification and field verification process.

- ii. Technological Innovation Advantage. Artificial Intelligence (AI) technology, particularly through the UI Vision Macros extension, is used in the land parcel validation process. This innovation accelerates previously time-consuming stages and demonstrates the adaptability of technology to support program acceleration, and
- iii. Acceleration Strategy Advantage. The strategies implemented included an internal approach by the Land Office and implementers, as well as external collaboration with local sub-district governments. This strategy strengthened coordination and effective implementation in the field.

Based on analysis using Rumelt's Evaluation Theory (2011), the benefits aspect indicates that the Malang City Land Office has significant advantages in document digitization, human resource competency, and technological innovation. Acceleration strategies involving cross-sector collaboration also strengthened program outcomes.

Overall, the program has met all four Rumelt evaluation criteria—consistency, suitability, feasibility, and benefits. However, while the consistency, suitability, and benefits aspects demonstrated satisfactory performance, the feasibility aspect still faces several important challenges. Uneven availability of equipment, as well as the need for improved coordination and supervision of field activities, are factors that need to be addressed to optimize future program performance.

D. Problems with Complete Village Development in Sukun District

The implementation of Complete Village Development in three subdistricts in Sukun District, Malang City, is not without its share of obstacles and problems. In general, the obstacles encountered can be classified into two main categories: technical and non-technical. The following is a complete description:

1. Technical Constraints

Technical constraints include issues related to technology, work tools, data systems, and operational methods. These technical constraints directly impact data accuracy, workflow fluency, and the integration of spatial and textual data. This phenomenon aligns with the Theory of Constraints (TOC) by Eliyahu M. Goldratt (1984), which states that every system has a "bottleneck" that limits overall performance. Some of the technical constraints encountered include:

a) Inconsistency between Textual and Spatial Data Before Complete Village Development

Before implementation, downloaded plot data showed irregularities. Implementers had to match the location, size, and shape of the land parcels with aerial photography maps and SU/GU/GS documents, while also adjusting textual data, such as NIBs, land title numbers, and measurement letters.

b) The Aging Process of Mapping Plots to KKP Registration Maps

Finalization of the mapping was hampered by updates to the KKP and GeoKKP systems, which required a plot validation process. This process was time-consuming, especially if supporting data was incomplete.

c) Shifts in Aerial Photography Maps per Village in Sukun District.

Analysis of the Technical Base Points (TDT) revealed a shift of 0.7–1.7 meters on the aerial photography maps due to inaccurate drone mapping. This resulted in the remapping of almost all land parcels and a delay of approximately one month.

d) Inconsistency between land parcels with Electronic Identification Numbers (NIBEL) and Aerial Photo Maps

Land parcels with NIBELs do not match the latest aerial photo maps, possibly due to differences in the base maps used during the initial plotting.

e) Insufficiently Informative and Unmappable GU/GS/SU (K4.2)

Many old documents cannot be used as references, and limited archives mean that some parcels fall into the Cluster 4.2 category and cannot be mapped.

f) Land parcels are mapped based on old villages.

Some data is still recorded based on the old administrative areas (Villages I–VI), making them irrelevant to current conditions after regional expansion.

g) Slow Internet Connection and Occasional Maintenance on KKP or GeoKKP Servers

Slow internet connections and periodic maintenance on KKP and GeoKKP servers hamper steps that rely on online access, such as data validation and integration.

2. Non-Technical Constraints

Non-technical constraints relate to social dynamics, communication, and decision-making between the parties involved. This is relevant to the Behavioral Theory of the Firm by Richard Cyert and James March (1963), which emphasizes that organizational behavior is influenced by resource and coordination constraints. The following are some of the identified non-technical constraints:

a) Limited Human Resources for Mapping at the Malang City Land Office.

The number of mapping personnel is disproportionate to the area size and data complexity, resulting in an imbalance in the workload.

b) Lack of Coordination with Local Village Governments

Unlike the PTSL program, which is based on active collaboration, this activity focuses more on studio work. Only during field inspections does the village office coordinate, and the involvement of community groups (pokmas) remains limited.

c) Limited Land Archives in Villages

Observations in Mulyorejo, Sukun, and Tanjungrejo villages indicate that most villages lack complete and organized land archives, particularly Letter C books.

E. Strategy for Accelerating Complete Village Development in Sukun District

In the context of implementing Complete Village Development in Sukun District, researchers used a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to identify internal and external factors influencing the program's progress and results. This approach allows for a comprehensive mapping of strengths that can be optimized, weaknesses that need to be evaluated,

opportunities that can be maximized, and threats that need to be anticipated. By using a SWOT analysis, program implementation strategies can be designed in a more targeted, adaptive, and sustainable manner, tailored to real-world conditions.

The SWOT analysis of the Complete Village Development implementation in Sukun District was conducted using a descriptive qualitative approach that integrated the results of in-depth interviews with stakeholders (section heads, field implementers, third parties/KJSB, and village government representatives) as well as direct field findings during observation and document review. Internal data such as human resource availability, equipment, budget, and implementation methods were analyzed to identify strengths and weaknesses, while external factors such as regulatory support, technological developments, cross-sector collaboration, coordination barriers, and geographic conditions were used to identify opportunities and threats. This process was carried out systematically: first, inventorying all internal and external factors based on the evidence obtained; second, classifying these factors into the four SWOT components; and third, linking them to relevant strategies to strengthen strengths, minimize weaknesses, capitalize on opportunities, and anticipate threats. This combined approach, based on interviews and field verification, ensured that the SWOT analysis results were based on factual data and not merely subjective perceptions.

Based on the identification of internal factors encompassing both strengths and weaknesses, as well as external factors encompassing opportunities and challenges, the researchers then formulated recommended strategies that could be applied to accelerate the Complete Village Development program in Sukun District. These recommended strategies were derived from a combination of the four factors in the SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). Recommendations are obtained in 4 (four) forms of combining internal and external factors, namely the Strengths and Opportunities (SO) strategy, the Weaknesses and Opportunities (WO) strategy, the Strengths and Threats (ST) strategy, and the Weakness and Threats (WT) strategy. The combination of these factors is based on the objective of formulating a strategy that takes into account the overall influence of internal and external factors. Details of the results of the SWOT analysis in the implementation of Complete Village Development in Sukun District can be seen in Table 6 below:

Table 6. Strategic Recommendations from SWOT Analysis Results

External Factors Internal Factors	Chance (Opportunities)	Challenge (Treaths)
	1. Fiscal policy support in the form of budget allocation; and 2. Partnerships with third parties (outsourcing); and 3. The development of digital technology such as the application of Artificial Intelligence (AI)	1. Malang City which is highlighted as a big city with great hopes in the land sector; 2. Limited time given for program completion; and 3. Society's resistance to change.
Strengths	SO Strategy	ST Strategy
1. The availability of digital warkah and digitization of good	1. Optimizing the use of digital warkah and aerial photo maps; 2. Expansion of partnerships with third parties (outsourcing) to support the	1. Strengthening public communication and public education; 2. Optimize aerial photograph assets for periodic monitoring and evaluation;

registration maps; and	digitization and data processing process;	3. Developing a digital surveillance and reporting system;
2. Availability of overall aerial photo maps in Malang City.	3. Development of digital-based integrated information systems;	4. The use of digital warkah as an identification tool for easily accessible legal certainty evidence; and
	4. Efficient and focused utilization of budget allocation to increase digital technology capacity; and	5. Realistic and flexible time management planning.
	5. Strengthening HR training programs and workshops.	
Weaknesses	WO Strategy	WT Strategy
1. The limitation of mapping human resources is inversely proportional to the volume of work in Malang City; and	1. Recruitment and training of new mapping human resources through partnerships;	1. Improvement of strict Standard Operating Procedures (SOPs) for human resource and data management;
	2. Development of data synchronization systems;	2. Development of rapid response teams to address data issues and community conflicts;
	3. Budget optimization for human resource capacity development programs;	
Weaknesses	WO Strategy	WT Strategy
2. Synchronization of old village data has not been completed	4. Implementation of an integrated digital collaboration platform involving third parties; and	3. Participatory approach through socialization and intensive dialogue with the community;
	5. The use of AI technology for data error detection and correction.	4. Prioritizing work based on risk and impact so that limited resources can be focused; and
		5. Increased cooperation with external supporting institutions.

Source: Processed Researcher, 2025

The proposed strategy, based on a combination of internal and external factors, reflects efforts to maximize the potential of the Malang City Land Office in facing existing challenges. The Strengths and Opportunities (SO) strategy recommendation states that leveraging internal strengths, such as the availability of digital document archives and aerial maps, can be key to seizing external opportunities, such as technological advances and collaboration with third parties. Optimizing digital technologies such as Artificial Intelligence (AI) for data validation and developing integrated digital-based information systems are crucial steps to increase efficiency and transparency, while also supporting human resource capacity development. Furthermore, expanding partnerships and efficient budget allocation can accelerate the digitalization process and support the sustainability of data management programs.

The combination of Weaknesses and Opportunities (WO) factors yields recommendations for the Malang City Land Office to focus more on leveraging external opportunities to address internal weaknesses, such as a shortage of mapping experts and poorly integrated data. Recruitment and training of human resources involving academics and outsourcing, as well as the development of a data synchronization system, can help effectively address these issues. Furthermore, the use of a digital collaboration platform involving third parties is a solution to ensure the alignment of old and new data within a single, integrated system.

The challenges facing the Complete Village Development in Sukun District form part of a SWOT analysis that can be applied to derive strategic recommendations for acceleration. Strengths and

Threats (ST) strategies can be implemented by leveraging the power of digital documents and data to address external threats such as community resistance to change and time pressures. Strengthening public communication, data transparency, and flexible time management planning are crucial aspects in addressing these challenges. Furthermore, recommendations for Weaknesses and Threats (WT) strategies include a greater focus on reducing internal weaknesses and mitigating external threats through improving Standard Operating Procedures (SOPs), establishing a rapid response team, and enhancing collaboration with external institutions to strengthen internal capacity.

Based on several strategic recommendations from the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis that have been implemented, it is hoped that appropriate strategies can be identified to optimize the implementation of Complete Village Development, particularly in Sukun District, Malang City. In line with this, the Malang City Land Office, along with implementing agencies and local village governments, has taken several strategic steps to maximize strengths, minimize weaknesses, optimize opportunities, and anticipate existing challenges. All parties have implemented the following strategies to maximize the implementation of the Complete Village Development Program in Sukun District.

1. Development of a comprehensive plan for transforming Malang into a Complete City through the Complete Village Development initiative.
2. Conducting a comparative study at land offices that have previously achieved complete city status.
3. Involvement of Third Parties.
4. Application of Artificial Intelligence (AI) Macros through UI Vision Extensions for the Land Plot Validation Process.
5. Formation of Community Groups (Pokmas).

F. Conclusion

The conclusion of this study indicates that the implementation of the Complete Village Development program in Sukun District has followed the stages of improving land data quality as stated in the 2022 PTSL Technical Guidelines, which include data inventory, studio checks, field checks, and finalization of results. Analysis of the 5M management elements (Man, Machine, Money, Material, and Method) shows that all stages have been fulfilled, although there are technical adjustments, especially in the field check and studio mapping stages. The evaluation results using Rumelt's Evaluation Theory (2011) indicate that the program implementation generally ran smoothly and well; however, there are still notes related to the limited adequacy of human resources and supporting equipment that require attention. During the implementation, various technical obstacles were found, such as inconsistencies in textual and spatial data, slow land parcel validation processes, shifts in aerial photo maps, inconsistencies in NIBEL land parcel mapping, less informative GU/GS/SU documents, unresolved mapping of old village parcels, and internet connection problems. Meanwhile, non-technical obstacles include limited mapping personnel, minimal coordination with sub-district

governments, and incomplete land records at the sub-district level. Based on the SWOT analysis, several strategies have been formulated and some have been implemented to address these issues, including the development of a Grand Design for Complete Sub-district Development, conducting field studies at land offices that have achieved the Complete City designation, involving third parties, utilizing Artificial Intelligence (AI) technology for plot validation, and establishing Community Groups (Pokmas) to expedite and optimize program implementation. Going forward, these strategies are expected to boost effectiveness and accelerate the achievement of the complete sub-district target in Sukun District.

Suggestions and recommendations

Further researchers need more in-depth follow-up research on the results and impacts of data quality improvement, complete sub-district development, and similar initiatives. Future researchers can integrate qualitative and quantitative methods (mixed methods) to obtain more comprehensive facts and information regarding complete data development activities.

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