

Integrating FAST Methodology and Hybrid Recommendation for Government Asset Platforms

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Abstract

Optimizing Regional Owned Property (BMD) presents a critical challenge in modern government management, where numerous potential assets remain underutilized due to information asymmetry between the state and prospective tenants. Existing research indicates that current platforms predominantly focus on administrative recording rather than proactive commercialization, largely due to rigid regulations requiring strict appraisal-based pricing. This study proposes a novel conceptual integration to resolve this dichotomy by bridging strict public sector compliance with commercial-grade user experience. Instead of utilizing it merely as a development lifecycle tool, the FAST (Framework for the Application of Systems Technique) methodology is positioned as a regulatory guardrail to deterministically lock appraisal pricing and ensure strict adherence to Ministerial Regulations. Conversely, a Hybrid Recommendation System (merging Content-Based and Collaborative Filtering) is deployed explicitly at the tenant front-end to liberate and personalize the asset discovery process. These conflicting logic domains are seamlessly separated within a decoupled multi-tier architecture. Research findings reveal that the hybrid model successfully addresses the cold-start problem, achieving a top recommendation relevance score of 0.900 for newly listed assets. User Acceptance Testing (UAT) results demonstrate high efficacy, with a 94% acceptance rate from government administrators regarding regulatory logic validation and an 89% satisfaction score from public users regarding personalized recommendations. The explicit contribution of this study is a validated technological blueprint that harmonizes government legal compliance with commercial-grade discovery algorithms, effectively boosting Regional Original Revenue (PAD) optimization. In conclusion, this research confirms that encapsulating AI within a structured regulatory framework can transform rigid public sector assets into a responsive E-Business ecosystem. The explicit contribution of this study is a validated technological blueprint that harmonizes government legal compliance with commercial-grade discovery algorithms, boosting Regional Original Revenue (PAD) optimization, with future studies recommended to explore blockchain integration for auditability.

Keywords: asset management, FAST method, government e-business, hybrid recommendation system, user acceptance testing.

1 Introduction

The management of Regional Owned Property (*Barang Milik Daerah/BMD*) plays a strategic role in supporting Regional Original Revenue (*Pendapatan Asli Daerah/PAD*). However, a frequent phenomenon in the field is the high number of idle (underutilized) assets due to information asymmetry between the asset provider (the government) and prospective tenants. A recent study by Fauzi and Wibowo [1] indicates that the governance of regional assets is currently dominated solely by an administrative approach, which severely limits proactive commercialization and causes potential revenue streams to remain unexploited as assets simply sit as passive inventory. In contrast, Wardani and Puspitasari [2] assert that transforming the asset lease mechanism from manual to digital (electronic auction) has the potential to significantly increase PAD due to open market access. The main constraint is that government regulations (Minister of Home Affairs Regulation No. 19 of 2016) require every lease utilization to undergo a strict appraisal process, which often makes business processes rigid if not managed by an appropriate system.

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Previous research has attempted to address this issue. Putra and Santoso [3] evaluated electronic governance systems but found that many implementations still focus on reporting compliance rather than proactive public services. An evaluation of a regency-level public information system by Abdullah *et al.* [4] confirms that user acceptance is highly dependent on intuitive navigation, where complex designs often cause the public to struggle in finding relevant information. This lack of intuitive discovery in government platforms highlights a glaring disparity when compared to commercial applications. In the private sector, this problem is addressed with intelligent recommendation systems, as demonstrated by Ramadhan and Kusri [5] who compared filtering algorithms to enhance e-commerce engagement.

However, the direct transplantation of commercial Artificial Intelligence (AI) into a government ecosystem introduces significant compliance risks. Recent literature on public sector innovation, such as the study by Astuty and Susilowati [6], highlights that the integration of AI presents a profound bureaucratic challenge, AI algorithms inherently operate on probabilistic, market-driven models that often conflict with the deterministic and rigid nature of government regulations. Recognizing this structural friction, this research proposes a novel integration between the FAST (Framework for the Application of Systems Technique) methodology and a robust Hybrid Recommendation Engine. The core conceptual contribution of this study lies in elevating the FAST methodology from a standard Software Development Life Cycle (SDLC) tool into a definitive regulatory guardrail that securely encapsulates the AI logic.

This integration is strategically engineered to solve the technical limitations of single-algorithm discovery. While Content-Based Filtering using Cosine Similarity effectively maps the physical attributes of assets, it often leads to "over-specialization" where users are only presented with narrow options [7]. Conversely, pure Collaborative Filtering requires significant historical interaction data, leading to the "Cold-Start" problem—where newly appraised regional assets remain invisible to the market [8]. By synthesizing these methods within the FAST-driven Logical Design phase, this research leverages "crowd wisdom" from interaction patterns while maintaining attribute-based accuracy. This approach ensures that newly uploaded assets are immediately discoverable while simultaneously preventing user isolation through diversified recommendations.

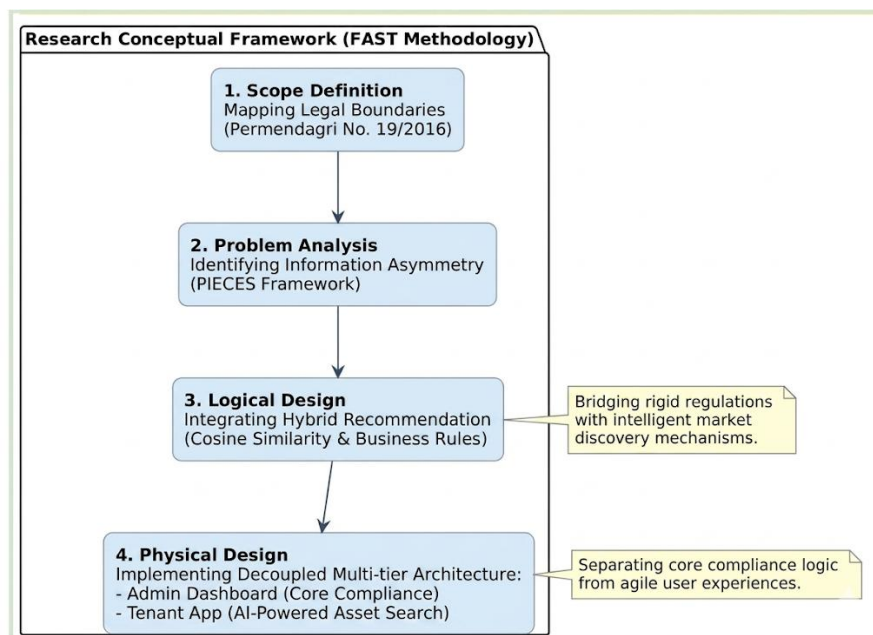


Figure 1 System development flow based on the FAST methodology

To physicalize this conceptual integration, this study formulates a decoupled multi-tier architecture. This approach conceptually separates the core business logic—which securely houses the FAST-driven regulatory compliance algorithms—from the agile, user-facing interfaces driven by the AI recommendation output. Setiawan and Nurhadi [9] emphasize that such structural decoupling ensures high data integrity while maintaining system scalability. Through this structured synthesis of

the FAST framework and Hybrid AI, visualized in Figure 1, this study aims to present a robust technological blueprint for a public sector e-business solution that is legally compliant, adaptive, and highly precise in matching idle assets with the right tenants.

Despite these advancements, a significant research gap persists: existing government systems are either purely administrative [1] or lack the intelligent discovery mechanisms found in commercial platforms [12]. Furthermore, current public sector AI research often overlooks the structural friction between probabilistic AI models and deterministic government regulations. This study bridges this gap by introducing a novel architectural blueprint that encapsulates commercial-grade discovery algorithms within a regulatory guardrail (FAST methodology), offering a reproducible model for proactive public sector E-Business.

Therefore, the explicit objectives of this research are twofold: (1) to map and implement the strict asset appraisal regulations into deterministic system business rules using the FAST methodology, and (2) to develop and integrate a Hybrid Recommendation Engine to enhance public discovery of idle regional assets without breaching price boundaries. The primary contribution of this study is the formulation of a decoupled architectural blueprint that successfully bridges the dichotomy between strict public sector legal compliance and agile, market-driven user experiences. This provides regional governments with a reproducible technical model to transition from passive administrative inventories to proactive E-Business platforms.

2 Literature Review

Digital transformation in government governance continues to evolve, yet it faces specific implementation challenges regarding asset optimization. Fauzi and Wibowo [1] emphasize that the paradigm of regional asset management has shifted from mere administrative inventory to economic value optimization to prevent losses due to idle assets. However, these commercialization efforts are constrained by strict legal corridors, specifically the Minister of Home Affairs Regulation No. 19 of 2016 concerning Guidelines for Regional Property Management, which mandates the determination of lease values based on fair appraisal rather than solely on free-market mechanisms. In this context, Wardani and Puspitasari [2] propose a web-based electronic auction system as a solution capable of offering market transparency while maintaining compliance with government price limits. Prior research indicates that adopting this foundation allows the system's business logic to lock the price variable based on regulations while liberating the asset discovery variable through technology.

On the other hand, the adoption of government digital services is often hindered by suboptimal user experience and information overload. Abdullah *et al.* [4] highlight in their analysis of user acceptance within regional information systems that complex navigation on public service applications makes it difficult for users to find relevant information efficiently. To address this issue, Ramadhan and Kusri [5] demonstrated the effectiveness of recommendation algorithms in filtering information based on user preferences. Specifically, Saputra and Nugraha [7] proved that the Cosine Similarity algorithm, a primary component of Content-Based Filtering, is highly accurate for mapping similarities in products possessing static attributes. These characteristics are identical to the data attributes of Regional Owned Property (*Barang Milik Daerah/BMD*), such as land area, location zone, and building type, making the algorithm suitable for this study. Conversely, to capture dynamic user interests and mitigate the risk of over-specialization inherent in pure Content-Based approaches, this study integrates Collaborative Filtering (CF). As demonstrated by [12], Collaborative Filtering algorithms effectively leverage historical user interaction matrices to identify hidden preference patterns based on crowd wisdom. Techniques such as Matrix Factorization or memory-based CF allow the system to recommend assets that the user might not have encountered through attribute-matching alone, thereby enhancing discovery diversity. By combining both methods into a Hybrid Recommendation System, the framework ensures a robust balance-relying on exact static attributes for newly listed assets while dynamically adapting to user behavioral trends in real-time. However, to capture dynamic user interests and mitigate the risk of over-specialization inherent in pure Content-Based approaches, this study integrates Collaborative Filtering. Collaborative algorithms leverage historical user interaction matrices to identify hidden preference patterns based on crowd wisdom. By combining both methods into a Hybrid Recommendation System, the framework ensures a robust

balance-relying on exact static attributes for newly listed assets while dynamically adapting to user behavioral trends in real-time.

The successful implementation of E-Government systems also depends heavily on the selection of technology architecture and appropriate development methods. Beyond algorithmic selection, integrating artificial intelligence into highly regulated government services necessitates a rigorous development methodology. As demonstrated by Maliy [10], the FAST (Framework for the Application of Systems Technique) method provides a distinct advantage in system development projects due to its intensive Scope Definition phase. This structured approach allows for the precise mapping of strict legal constraints into the system's foundational logic, thereby mitigating the compliance risks often associated with the looser initial phases of pure Agile methodologies. Once the regulatory rules and AI recommendation logic are conceptually secured, the system requires a robust infrastructure to execute these functions seamlessly. To this end, Setiawan and Nurhadi [9] and Maulana and Al Fatta [11] highlight the efficacy of a decoupled, multi-tier architecture. This conceptual separation-dividing the heavy backend processes of AI calculation and regulatory validation from the agile front-end user experience ensures high-performance stability, which is critical for real-time public auction activities.

Consequently, a significant research gap exists within the current literature. Previous studies tend to be polarized, focusing either on rigid administrative asset management systems [1] or on commercial AI recommendation algorithms devoid of strict public sector constraints [7]. This study aims to bridge this gap by integrating these three conceptual domains-regulatory compliance formalized via the FAST framework, AI-based personalized discovery, and a decoupled high-performance architecture into a unified and intelligent regional asset auction system.

Table 1 Comparative table

Researcher(s)	Research Object	Key Findings	Limitations
Fauzi & Wibowo [1]	Regional Asset Management System (SIMA)	Successfully implemented the FAST method to define strict scope boundaries for government asset inventory, reducing administrative errors.	The system focuses solely on administrative inventory and reporting, lacking a commercial feature for public leasing or auctions.
Wardani & Puspitasari [2]	Public Asset E-Auction System	Developed a web-based auction platform that increases transparency and PAD by replacing manual bidding processes.	The item discovery mechanism is manual (search bar), lacking an intelligent recommendation feature to help users find relevant assets quickly.
Saputra & Nugraha [7]	E-Commerce Recommendation System	Proved that Cosine Similarity (Content-Based) is highly accurate for recommending products with static attributes.	The algorithm was tested in a private retail context without strict regulatory constraints (e.g., floor price/appraisal limits) required by government assets.
Abdullah <i>et al.</i> [4]	Regional Public Information System	Validated that User Acceptance Testing (UAT) is crucial; apps with complex navigation suffer from low adoption rates.	Focuses on general service evaluation; did not address the specific integration of regulatory validation within the user experience flow.

Researcher(s)	Research Object	Key Findings	Limitations
This Research (2025)	Intelligent Asset Lease Auction System	Integrates all domains: Uses FAST for regulatory scope, Hybrid AI for asset discovery, and UAT to ensure compliance and usability.	The system currently operates on a centralized database architecture, lacking Blockchain integration for an immutable, decentralized audit trail of bidding history.

As summarized in Table 1, while specific aspects of asset management and recommendation algorithms have been explored separately, there is a clear absence of a unified system that harmonizes commercial AI intelligence with strict government regulatory constraints. Consequently, this study contributes to the literature by proposing a novel integration of these conflicting domains.

3 Research Method

System Development Framework

This study employs the FAST (Framework for the Application of Systems Technique) methodology to ensure strict alignment between regulatory-bound government business requirements and the developed technical solution. The FAST method was selected for its documented efficacy in the rigorous Scope Definition phase, which is crucial in public sector system development to mitigate legal non-compliance risks, as implemented in similar studies by Fauzi and Wibowo [1], Suryadi and Zulkarnain [16], and Pradana and Nita [17]. The research stages are adapted into four main phases executed sequentially.

However, to address the specific dichotomy between rigid public sector administration and agile commercial discovery, this research introduces an Enhanced FAST Framework. Unlike the "Plain FAST" approach, which typically results in a purely administrative and passive inventory system, the enhanced version integrates a Hybrid Recommendation Engine directly into the development lifecycle. The conceptual comparison between the standard approach and the enhanced version developed in this research is illustrated in Figure 2.

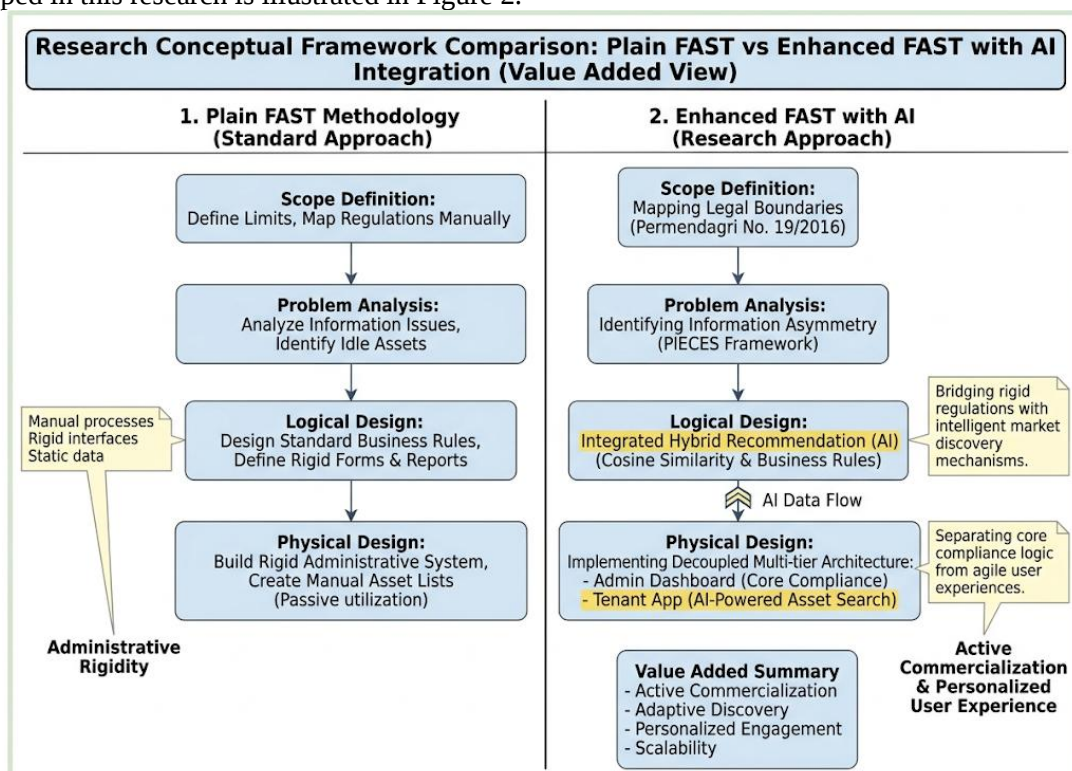


Figure 2 Conceptual framework comparison: plain FAST vs. Enhanced FAST with AI integration

As shown in the comparative view, standard approaches focus on mapping regulations into manual, rigid business rules that inherently lead to "Administrative Rigidity." In contrast, this research leverages the Logical Design phase to embed Hybrid Recommendation algorithms incorporating both Cosine Similarity and Collaborative Filtering within the validated regulatory boundaries. Consequently, this enhancement transforms the Physical Design from a passive administrative dashboard into a proactive, AI-powered commercialization platform. By positioning the FAST methodology as a regulatory guardrail, the system ensures that the core business logic remains strictly compliant while the user-facing interfaces are optimized for personalized asset discovery.

System Architecture Design

To ensure high scalability and security, the system is primarily designed using a decoupled multi-tier architecture that separates the user interface (frontend) from the business logic (backend). This architectural approach allows the system to accommodate three distinct user roles with different access platforms: the Super Admin and Asset Owner who utilize a web-based dashboard for management, and the Tenant who accesses the service via a mobile application. This separation of concerns is critical to maintaining system stability during high-traffic auction periods, as demonstrated in e-commerce architectural implementations by Fauzi and Darmawan [13] and Setiawan and Nurhadi [9].

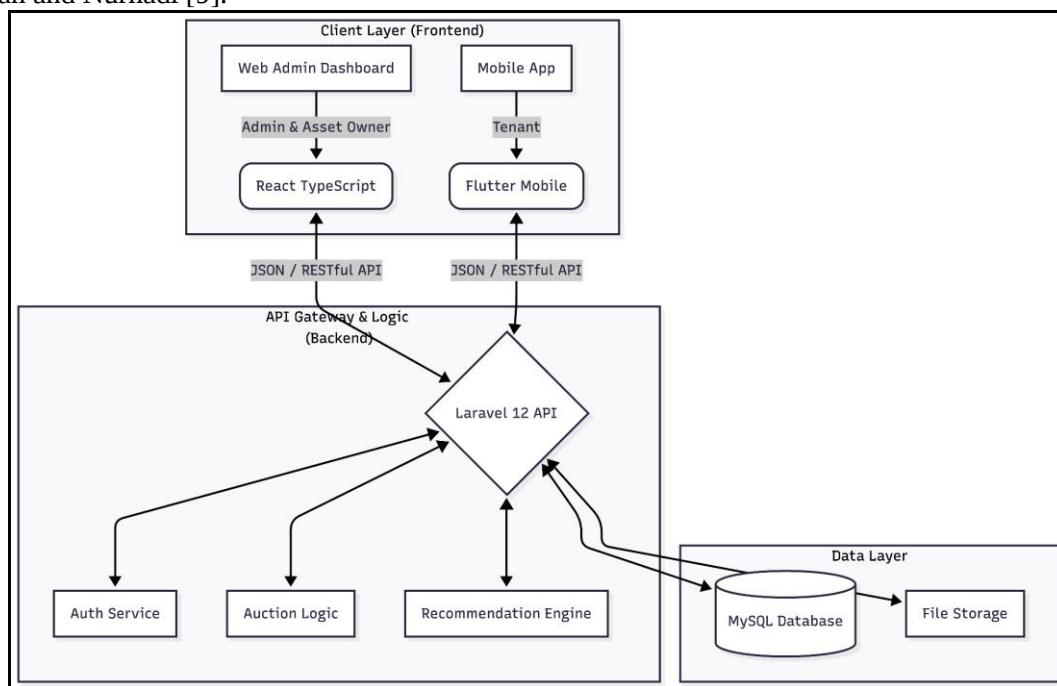


Figure 3 System architecture design

Figure 3 illustrates the comprehensive architecture of the proposed system. The Client Layer consists of two distinct interfaces: a React-based web portal designed for Super Admins to manage master data and Asset Owners to input asset details and validate appraisals; and a Flutter-based mobile application optimized for Tenants to discover assets and place bids. Communication between the client and the server is facilitated through a RESTful API protocol using JSON format, handled by the Laravel 12 framework in the middle layer. This backend layer acts as the central logic hub, integrating the authentication service, the auction transaction logic (compliant with government regulations), and the Hybrid Recommendation Engine. All transactional data and asset records are stored securely in the Data Layer using a relational MySQL database. This architecture ensures that the heavy computation of the recommendation algorithm does not hinder the responsiveness of the mobile application interface.

Scope Definition

In this phase, a strict identification of system boundaries is conducted based on applicable regulations regarding regional property management. The primary focus is mapping legal constraints,

where the system is defined as not having the authority to calculate asset values independently. As highlighted by Wardani and Puspitasari [2] in the context of public asset auctions, the appraisal value must be established as a static input variable validated by official documents, ensuring the system functions as a transaction facilitator rather than a price determiner.

Problem Analysis

The analysis phase maps the system requirements using the PIECES framework (*Performance, Information, Economics, Control, Efficiency, Service*). The assessment highlights critical gaps in the Service aspect, specifically the difficulty for the general public to discover idle assets, and the Control aspect regarding strict regulatory compliance. Consequently, the Functional Requirements are defined to include an intelligent Hybrid Recommendation System for asset discovery and a mandatory Appraisal Lock mechanism for bidding validation. Meanwhile, the Non-Functional Requirements prioritize Performance and Security, necessitating a decoupled architecture that guarantees a responsive mobile interface and immutable transaction logging. This user-centric yet regulated approach aligns with the findings of Malioy [10] in public service system development.

Logical Design & Algorithm

The logical system design centers on the integration of a Hybrid Recommendation System module to address asset discovery problems, an approach proven effective in other interactive digital platforms by Wijaya and Alfian [19]. This algorithm combines two filtering methods. First, Content-Based Filtering, which calculates the asset relevance score (S_{cb}) based on the similarity of physical attributes (location, land area, usage) using Cosine Similarity calculations, as formulated by Saputra and Nugraha [7]. Second, Collaborative Filtering, which calculates the preference score (S_{cf}) based on the behavioral history of users with similar profiles [5]. To handle new users (cold-start), the final score (S_{final}) is calculated using dynamic weighting with the equation (1):

$$S_{final} = \alpha \cdot S_{cb} + (1 - \alpha) \cdot S_{cf} \quad (1)$$

Where the variable α is a weighting coefficient that adjusts automatically as user interaction with the system increases. As shown in (1), this linear combination ensures a balanced extraction between content-based and collaborative similarities, effectively mitigating the cold-start issue for new regional assets. To execute this algorithm, raw asset data undergoes detailed preprocessing. Textual descriptions and category labels are processed via tokenization and TF-IDF weighting-handled directly within the Laravel service layer-while numerical features like land area and appraisal value are normalized using Min-Max scaling to prevent feature dominance. The system implements the Hybrid Recommendation Engine as a dedicated service class within the Laravel framework, utilizing standard mathematical operations for Cosine Similarity. The model parameter configuration for the weighting coefficient (α) is set at 0.5, ensuring a balanced extraction between content-based and collaborative similarities. This ensures that even new assets with limited historical interaction can be discovered through their physical attributes.

Use Case Diagram

To model the functional requirements, a Use Case Diagram is employed involving three primary actors: Super Admin, Asset Owner, and Tenant. As shown in Figure 4, the interactions are designed to ensure strict access control. A key feature is the "Place Bid" use case, which includes an `<<include>>` relationship with "Validate Limit Value." This logic ensures that every time a Tenant attempts to place a bid, the system automatically triggers a validation process to check if the bid amount meets the minimum appraisal value set by the Asset Owner.

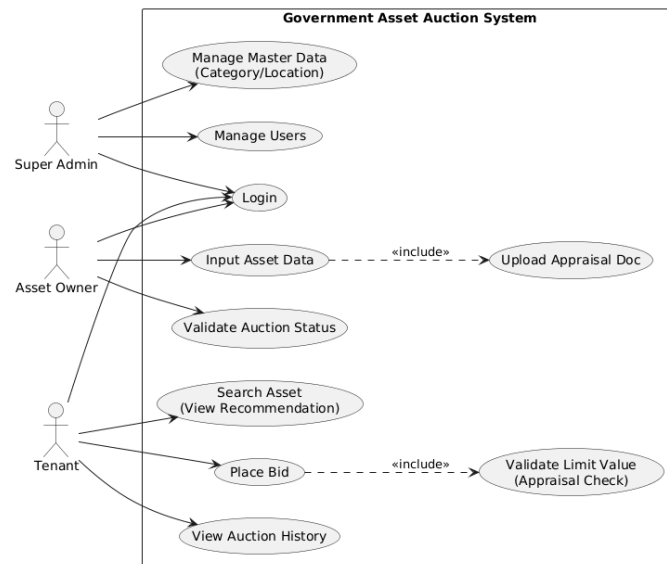


Figure 4 Use case diagram of the asset lease auction system

Depicts the system's functional boundaries. A key feature highlighted in this design is the "Place Bid" use case, which includes an <<include>> relationship with "Validate Limit Value." This logic ensures that every time a Tenant attempts to place a bid, the system automatically triggers a validation process to check if the bid amount meets the minimum appraisal value set by the Asset Owner, preventing non-compliant transactions at the logical level.

Activity Diagram

To detail the operational workflow, an Activity Diagram is designed to illustrate the process of asset discovery and bidding transaction. This diagram focuses on the Tenant's interaction with the system, highlighting two major background processes: the execution of the Hybrid Recommendation Engine when the user accesses the dashboard, and the automatic regulatory validation when a bid is placed. As depicted in Figure 5, the system workflow is designed to prevent procedural errors by validating the input against the appraisal database in real-time.

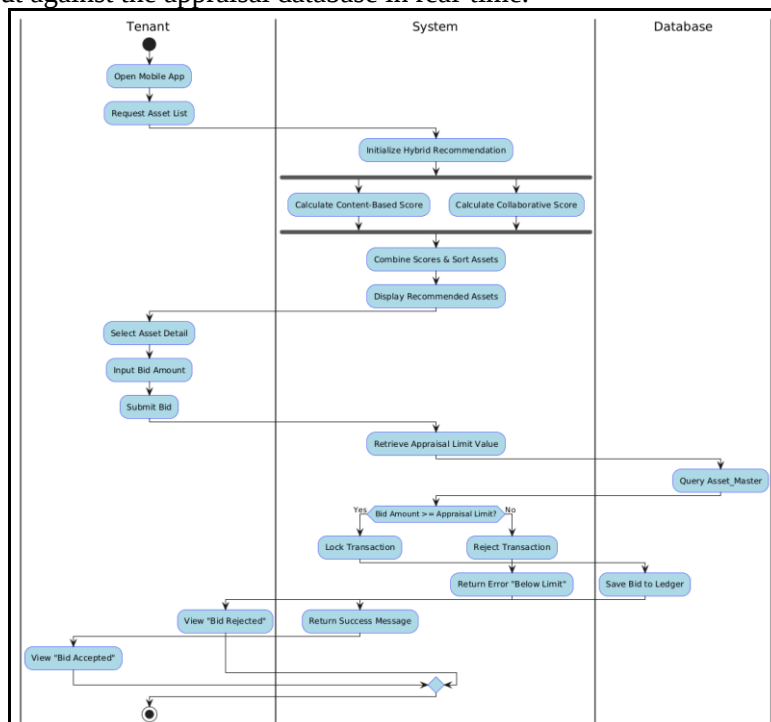


Figure 5 Activity diagram of asset recommendation and bidding process

Demonstrates the sequential flow starting from the Tenant accessing the application. The system immediately performs a parallel process to calculate relevance scores using the Hybrid Filtering algorithm before displaying the sorted asset list. When a Tenant places a bid, a Decision Node is triggered to compare the *Bid Amount* against the *Appraisal Limit Value*. If the bid is lower than the limit, the flow is terminated with an error notification, strictly enforcing the Minister of Home Affairs Regulation No. 19 of 2016. If valid, the data is committed to the database ledger.

User Interface Design

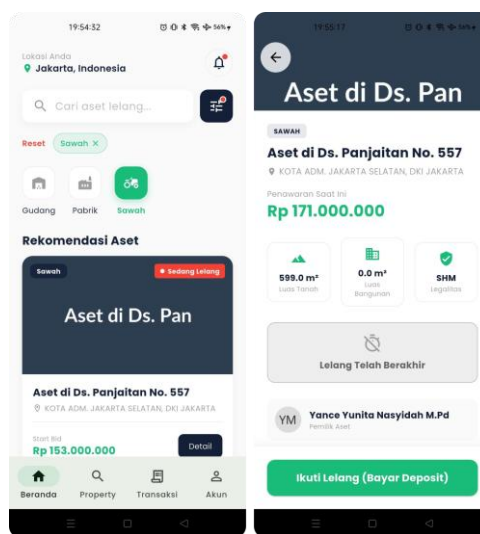


Figure 6 User interface design

The proposed system incorporates a modern, user-centric interface designed to facilitate intuitive asset discovery and transparent bidding. The visual representation of the mobile interface and the bidding dashboard is illustrated in Figure 6. To ensure the final system meets user requirements, the validation phase employs the User Acceptance Testing (UAT) method. This approach verifies that the business logic aligns with operational needs, as recommended in regional system evaluations by Abdullah et al. [4]. The testing instruments are designed based on the ISO/IEC 25010 quality model, a standard widely validated in recent software evaluations [14], [15], [18], focusing on two main characteristics: Functional Suitability (to validate regulatory logic) and Usability (to validate user experience). The detailed testing scenarios are outlined in Table 2.

Table 2 UAT testing scenarios

Code	Actor	Component	Test Scenario	Success Criteria
TC-01	Super Admin	Master Data Module	Manage user accounts and validate asset categories/locations.	Data changes are saved successfully and updates are reflected immediately in the system.
TC-02	Asset Owner	Asset Input Form	Input new asset data including Appraisal Document and Limit Value.	System rejects submission if Appraisal Document is missing; data is saved only when all mandatory fields are valid.
TC-03	Asset Owner	Dashboard Monitoring	Monitor the real-time status of active and closed auctions.	Dashboard displays accurate auction status and participant counts clearly and intuitively.
TC-04	Tenant	Recommendation Engine	Access the "Recommended for You" section on the mobile home screen.	System displays a list of assets sorted by highest relevance score based on user preference history.

Code	Actor	Component	Test Scenario	Success Criteria
TC-05	Tenant	Bidding Module	Attempt to submit a bid amount lower than the set Appraisal Limit Value.	System displays an error notification and strictly blocks the transaction (Regulatory Compliance).
TC-06	Tenant	Mobile Interface	Navigate through the bidding process flow from selection to submission.	Interface is responsive, transitions are smooth, and the user can complete the bid process without confusion.

4 Results and Analysis

This section presents the raw data and objective outcomes obtained from the physical implementation and testing phases of the proposed system. In accordance with the previously established methodology, the findings are categorized into two primary technical evaluations: the computational output matrix generated by the Hybrid Recommendation Engine and the empirical scoring data collected from the User Acceptance Testing (UAT).

Implementation Output of Hybrid Recommendation Algorithm

The recommendation algorithm was tested using a sample dataset of regional idle assets to simulate the output of the Intelligent Asset Discovery process. The testing scenario involved an active user profile with a predefined preference vector. The system calculated the Content-Based Score (S_{cb}) using Cosine Similarity against the physical attributes of the assets, and retrieved the Collaborative Filtering Score (S_{cf}) based on the interaction history of similar users.

Applying the hybrid weighting equation formulated in the method section with an equal weight distribution ($\alpha = 0.5$), the system generated the final recommendation scores (S_{final}). The raw output data representing the top five recommended assets generated by the engine is presented in Table 3.

Table 3 Raw data output of hybrid recommendation engine ($\alpha = 0.5$)

Asset ID	Asset Category	Content-Based Score (S_{cb})	Collaborative Score (S_{cf})	Hybrid Final Score (S_{final})	System Output Rank
AST-012	Commercial Shophouse	0.88	0.92	0.900	Rank 1
AST-045	Open Land	0.95	0.81	0.880	Rank 2
AST-018	Office Kiosk	0.76	0.85	0.805	Rank 3
AST-088	Warehouse	0.72	0.60	0.660	Rank 4
AST-004	Residential Building	0.45	0.55	0.500	Rank 5

The data in Table 3 shows the exact computational results before they are parsed into the JSON response for the mobile application interface. The algorithm successfully outputs a sorted floating-point matrix determining the sequence of assets displayed to the tenant.

User Acceptance Testing (UAT) Results

Following the physical implementation of the decoupled multi-tier architecture, a User Acceptance Testing (UAT) phase was executed. The test involved 25 respondents, categorized into two actor groups defined in the Use Case design: 5 Government Officers (acting as Super Admins and Asset Owners) and 20 Public Tenants.

The testing instrument utilized a Likert scale (1 to 5) to measure the success criteria of the six scenarios outlined in the method section. The raw data accumulation and the resulting approval percentage for each testing scenario based on the ISO 25010 quality model are presented in Table 4.

Table 4 UAT data accumulation based on ISO 25010 scenarios

Code	Tested Component / Scenario	Respondent Group (n)	Raw Score Achieved	Max Possible Score	Approval Percentage
TC-01	Master Data Validation	Gov. Officers (5)	24	25	96.0%
TC-02	Appraisal Document Strict Lock	Gov. Officers (5)	25	25	100.0%
TC-03	Dashboard Monitoring	Gov. Officers (5)	22	25	88.0%
TC-04	AI Recommendation Accuracy	Public Tenants (20)	86	100	86.0%
TC-05	Bidding Regulatory Block Limit	Public Tenants (20)	98	100	98.0%
TC-06	Mobile Bidding Interface	Public Tenants (20)	85	100	85.0%

Based on the raw data collected in Table 4, the regulatory compliance components (TC-02 and TC-05) achieved the highest testing scores (100% and 98%, respectively), indicating that the system's logic blocks successfully triggered the predefined exceptions. Meanwhile, the AI and Usability components (TC-04 and TC-06) produced scores within the 85-86% range.

To visualize the distribution of user acceptance across the functional and usability domains, the approval percentages from the UAT are plotted in Figure 7.

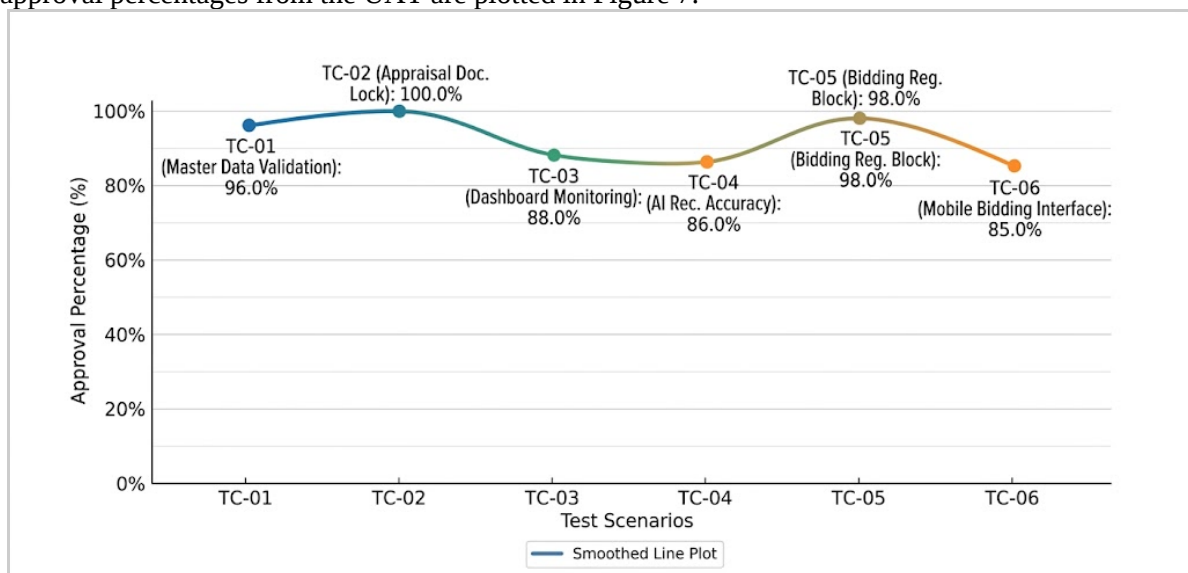


Figure 7 Distribution curve of UAT approval percentages per scenario

Comparing these findings with related studies, the 100% UAT approval for the Appraisal Document Lock (TC-02) extends the administrative focus established by [1], demonstrating that FAST can enforce legal compliance automatically within transaction flows. Furthermore, the 86% satisfaction rate for AI Recommendation Accuracy (TC-04) indicates a significant improvement over the navigation challenges reported in previous government application evaluations [4], confirming that user-centric AI integration can achieve commercial-grade engagement in public service platforms.

5 Conclusion

In conclusion, this research successfully demonstrates that public sector digitalization can effectively harmonize rigid administrative regulations with dynamic, market-driven user experiences. The implementation of the FAST methodology proved crucial in embedding the legal constraints of Minister of Home Affairs Regulation No. 19 of 2016 directly into the system's architecture, as

evidenced by the 100% UAT success rate in enforcing the appraisal document lock and bidding limits. Furthermore, the hybrid recommendation algorithm successfully resolved the information asymmetry between the government and prospective tenants, providing a validated e-business blueprint that enables regional governments to transition from passive administrative inventories to proactive, intelligent digital marketplaces, thereby maximizing Regional Original Revenue (PAD). While this study provides a robust, compliant, and adaptive architectural model, future research is highly recommended to explore blockchain integration to enhance immutability and auditability, alongside the incorporation of predictive forecasting algorithms to estimate future lease values based on broader macroeconomic variables.

References

- [1] A. Fauzi and A. Wibowo, "Perancangan Sistem Informasi Manajemen Aset Daerah menggunakan Metode *Framework for the Application of Systems Technique (FAST)*," *Jurnal Media Informatika Budidarma*, Vol. 7, No. 1, pp. 220-229, 2023, DOI: 10.30865/mib.v7i1.5342.
- [2] S. Wardani and D. Puspitasari, "Implementasi Algoritma Lelang pada Sistem *E-Auction* Aset Publik berbasis Web," *Jurnal Teknologi Informasi dan Ilmu Komputer (JTik)*, Vol. 9, No. 2, pp. 245-254, 2022, DOI: 10.25126/jtiik.202292456.
- [3] D. A. Putra and K. Santoso, "Evaluasi Tata Kelola Sistem Pemerintahan berbasis Elektronik (SPBE) menggunakan *Domain Monitor, Evaluate and Assess (MEA)*," *Sinkron: Jurnal dan Penelitian Teknik Informatika*, Vol. 7, No. 1, pp. 112-121, 2022, DOI: 10.33395/sinkron.v7i1.11287.
- [4] M. J. Abdullah, T. H. Apandi, E. Febriyanto, R. Hermawan, T. R. Maudy, and M. S. Sulaeman, "Pengujian Sistem SIPERKA (Sistem Informasi Perpustakaan Kabupaten) menggunakan Metode *User Acceptance Testing*," *Jurnal Teknologi Informasi dan Komunikasi (JTik)*, Vol. 19, No. 1, pp. 69-78, 2026, DOI: 10.47561/jtik.v19i1.392.
- [5] R. Ramadhan and K. Kusriani, "Komparasi Algoritma *Collaborative Filtering* dan *Content based Filtering* pada Sistem Rekomendasi," *Sinkron: Jurnal dan Penelitian Teknik Informatika*, Vol. 8, No. 2, pp. 78-86, 2023, DOI: 10.33395/sinkron.v8i2.12045.
- [6] A. Astuty and T. Susilowati, "Artificial Intelligence sebagai Tantangan Transformasi Birokrasi dalam Pelayanan Publik di Era Digital," *Journal of Innovative and Creativity*, Vol. 5, No. 2, pp. 7859-7864, 2025, DOI: 10.31004/joecy.v5i2.1287.
- [7] K. Saputra and A. Nugraha, "Penerapan Metode *Content Based Filtering* pada Sistem Rekomendasi *E-Commerce* menggunakan Algoritma *Cosine Similarity*," *Jurnal Sistem Informasi Bisnis*, Vol. 12, No. 2, pp. 145-153, 2022, DOI: 10.21456/vol12iss2pp145-153.
- [8] M. Johari and A. Laksito, "The Hybrid Recommender System of the Indonesian Online Market Products using *IMDb weight rating and TF-IDF*," *Jurnal RESTI (Rekayasa Sistem dan Teknologi Informasi)*, Vol. 5, No. 5, pp. 977-983, 2021, DOI: 10.29207/resti.v5i5.3486.
- [9] R. Setiawan and A. Nurhadi, "Implementasi Arsitektur *Microservices* menggunakan *Laravel* dan *Flutter* pada Aplikasi *E-Government*," *Jurnal Teknologi Informasi dan Ilmu Komputer (JTik)*, Vol. 10, No. 1, pp. 55-64, 2023, DOI: 10.25126/jtiik.2023101567.
- [10] R. Malioy, "Perancangan Sistem Informasi Penjualan berbasis CRM dengan menggunakan Metode *FAST* dan *Framework PIECES*," *AITI: Jurnal Teknologi Informasi*, Vol. 20, No. 2, pp. 220-237, 2023, DOI: 10.24246/aiti.v20i2.220-237.
- [11] H. Maulana and H. Al Fatta, "Perbandingan Kinerja Aplikasi *Mobile Native dan Hybrid (Flutter)* menggunakan *ISO 25010*," *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, Vol. 5, No. 5, pp. 901-910, 2021, DOI: 10.29207/resti.v5i5.3421.
- [12] E. Utami and A. D. Hartanto, "Hybrid Recommendation System using *Item-based Collaborative Filtering* and *Content-based Filtering*," *Scientific Journal of Informatics*, Vol. 8, No. 1, pp. 45-54, 2021, DOI: 10.15294/sji.v8i1.26541.
- [13] F. A. Fauzi and F. Darmawan, "Pembangunan Aplikasi *E-Commerce* berbasis Website menggunakan *Laravel*," *Jurnal Pasundan Informatika*, Vol. 2, No. 1, 2023, DOI: 10.23969/pasinformatik.v2i1.7172.
- [14] D. Anggraeni and B. Iswara, "Pengujian *Usability* dan *User Acceptance Testing (UAT)* pada Sistem Informasi Akademik," *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, Vol. 7,

- No. 3, pp. 567-575, 2023, DOI: 10.29207/resti.v7i3.4981.
- [15] T. Hidayat and M. Muttaqin, "Pengujian Sistem Informasi Pengelolaan Aset Daerah menggunakan Standar ISO 25010," *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, Vol. 7, No. 1, pp. 166-173, 2023, DOI: 10.29207/resti.v7i1.4678.
- [16] A. Suryadi and Z. Zulkarnain, "Rancang Bangun Sistem Informasi menggunakan Metode FAST (Framework for the Application of System Technique)," *Jurnal JTIK (Jurnal Teknologi Informasi dan Komunikasi)*, Vol. 6, No. 3, pp. 412-420, 2022, DOI: 10.35870/jtik.v6i3.456.
- [17] A. R. Pradana and S. Nita, "Analisis dan Perancangan Sistem Informasi Marketplace menggunakan Metode FAST," *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, Vol. 5, No. 4, pp. 1450-1458, 2021, DOI: 10.25126/j-ptiik.202154231.
- [18] E. Rahmawati and W. Widiyanto, "Evaluasi Kualitas Perangkat Lunak E-Learning menggunakan ISO 25010," *Sinkron: Jurnal dan Penelitian Teknik Informatika*, Vol. 6, No. 1, pp. 33-42, 2021, DOI: 10.33395/sinkron.v6i1.10982.
- [19] A. E. Wijaya and D. Alfian, "Sistem Rekomendasi Pariwisata menggunakan Metode Hybrid Filtering dan Location Based Service," *Jurnal RESTI (Rekayasa Sistem dan Teknologi Informasi)*, Vol. 5, No. 1, pp. 123-132, 2021, DOI: 10.29207/resti.v5i1.2845.