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# Implementation of Technology-Enabled Field Service Management (FSM) for Enhancing Operational Effectiveness A Case Study of PT Biner Sinergi Optima

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***Abstract***

*The rapid advancement of digital transformation has driven organizations across various industries to integrate information and communication technologies into their operational processes to enhance efficiency, productivity, service quality, and organizational competitiveness. Within the security services industry, challenges related to human resource management, field supervision, operational monitoring, and compliance with customer service standards remain significant issues that require innovative and technology-driven solutions. This study aims to analyze the implementation of the Smart Field Service Management (Smart-FSM) model as a digital-based operational framework for security service management at PT Biner Sinergi Optima. This research employs a qualitative descriptive approach using documentation study methods, with data derived from the company's operational planning documents and digital transformation initiatives. The Smart-FSM model integrates several advanced technologies, including cloud computing, the Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), and drone-based patrol systems, to support real-time monitoring, data-driven decision-making, and operational optimization. The findings indicate that the implementation of Smart-FSM contributes significantly to improving supervisory effectiveness, accelerating response and decision-making processes, increasing transparency in service delivery, and strengthening compliance with operational standards. Furthermore, the system supports the achievement of a minimum Service Level Agreement (SLA) target of 90%, while simultaneously reducing operational inefficiencies and associated costs. The integration of these digital technologies also provides a sustainable competitive advantage through enhanced service quality, operational reliability, and customer satisfaction. Therefore, Smart-FSM can be considered a relevant and innovative operational model to support the digital transformation agenda of the security services industry in Indonesia and improve organizational performance in an increasingly technology-oriented business environment.*

*Keywords: Smart-FSM, Field Service Management, Digital Transformation, Security Services, Operational Management*

## 1. Introduction

The rapid advancement of digital technologies has fundamentally transformed the way organizations design, manage, and optimize their business operations. In an increasingly dynamic and competitive business environment, organizations are required to continuously adapt to technological developments to enhance operational efficiency, improve service quality, and sustain competitive advantage. According to Rothaermel (2024), organizations that successfully leverage digital technologies are more likely to achieve long-term competitiveness and organizational resilience than those relying on conventional operational systems.

The growing adoption of digital transformation has significantly impacted service-based industries, including the security services sector. Traditionally, security service operations have relied heavily on manual supervision, paper-based reporting systems, and labor-intensive monitoring processes. However, the increasing complexity of security threats, larger operational coverage areas, and rising customer expectations have created new challenges for security service providers. These challenges include ensuring real-time monitoring capabilities, maintaining service quality consistency, improving operational transparency, and managing field personnel effectively. Isworo et al. (2025) emphasized that without careful operational planning, new service-based companies face a significant risk of failure within the first three years, as evidenced by the 42% closure rate of new co-working spaces in Jakarta between 2020 and 2023

The Indonesian security services industry faces increasing demands for professionalism, accountability, and operational excellence. According to ABUJAPI (2024), security service providers are expected to adopt innovative technologies to improve service quality and operational effectiveness. In response, PT Biner Sinergi Optima developed Smart Field Service Management (Smart-FSM), a technology-based security service platform that integrates professional security personnel with cloud computing, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), mobile applications, and drone patrol systems. Through this integration, Smart-FSM aims to enhance operational efficiency, real-time monitoring, service transparency, and resource optimization, thereby strengthening the company's competitive advantage in the digital era.

The implementation of Smart-FSM is aligned with Porter's (1985) theory of competitive advantage, which suggests that organizations can achieve superior performance through either differentiation strategies or cost leadership strategies. By integrating advanced digital technologies into security operations, Smart-FSM enables PT Biner Sinergi Optima to simultaneously enhance service quality while improving operational efficiency. This dual advantage contributes to the creation of a sustainable competitive position in an increasingly technology-driven marketplace. Furthermore, Armstrong (2021) emphasizes that organizations utilizing data-driven performance management systems are better equipped to improve productivity, operational effectiveness, and decision-making quality. The Smart-FSM platform is designed to generate real-time operational data that supports evidence-based decision-making, proactive service management, and continuous performance improvement. Through integrated monitoring and reporting mechanisms, managers can gain greater visibility into field operations and respond more effectively to emerging operational issues.

Despite the growing adoption of digital technologies across various industries, empirical studies focusing on the implementation of technology-based operational models in the security services sector remain relatively limited, particularly within the Indonesian context. Existing literature has extensively discussed digital transformation, operational management, and service innovation; however, research examining the integration of AI, IoT, cloud computing, and drone technologies within security service operations remains scarce. Recent operational planning research in healthcare services, such as the study on Remedies Postpartum Care Center, emphasizes the critical role of structured service design, technology integration (e.g., smart home systems), and digital marketing strategies in ensuring service effectiveness, customer satisfaction, and sustainable operational performance (Martianto et al., 2025). This research seeks to address this gap by exploring the implementation of Smart-FSM as an innovative operational model that supports digital transformation in the security services industry.

Despite the growing body of literature on digital transformation, operations management, and service innovation, studies examining the implementation of integrated digital technologies within the security services industry remain limited. Existing research has primarily focused on sectors such as manufacturing, logistics, healthcare, and technical field services, while the application of advanced technologies in security service operations has received comparatively less attention. Furthermore, previous studies have largely investigated individual technologies, including cloud computing, Artificial Intelligence (AI), and Internet of Things (IoT), without exploring their integration within a comprehensive operational management framework. This gap is particularly important given the increasing demand for real-time monitoring, rapid incident response, operational transparency, and consistent service quality in modern security environments. In addition, research on digital transformation within the Indonesian security services industry remains scarce, highlighting the need for studies that provide both theoretical and practical insights into technology-enabled security operations.

To address these gaps, PT Biner Sinergi Optima developed Smart Field Service Management (Smart-FSM), an integrated operational platform that combines mobile applications, cloud computing, Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), and drone patrol technologies within a single operational ecosystem. Unlike conventional security management systems, Smart-FSM supports real-time monitoring, automated task scheduling, digital reporting, predictive decision-making, and enhanced operational control. Therefore, this study aims to analyze the implementation of Smart-FSM in enhancing the operational effectiveness of technology-based security services at PT Biner Sinergi Optima. Drawing upon the Resource-Based View (RBV) and Competitive Advantage Theory, the study examines how the integration of digital technologies contributes to operational efficiency, service quality improvement, and sustainable competitive advantage. The findings are expected to enrich the literature on digital transformation while providing practical guidance for organizations seeking to improve operational performance through technology-enabled service innovations.

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**Theoretical Study**

**Strategic Management**

Strategic management refers to the process of formulating, implementing, and evaluating cross-functional decisions that enable organizations to achieve their long-term objectives (David, 2021). In an increasingly dynamic and competitive business environment, strategic management serves as a fundamental mechanism through which organizations align their resources, capabilities, and operational activities with evolving market conditions and stakeholder expectations. The effectiveness of strategic management depends largely on an organization's ability to anticipate environmental changes and respond through appropriate strategic initiatives. According to Wheelen et al. (2018), an effective strategy should not only support organizational growth but also create sustainable competitive advantages through the optimal utilization of organizational resources and capabilities. Strategic management therefore provides a framework for organizations to identify opportunities, mitigate risks, and establish long-term value creation mechanisms. In the context of digital transformation, strategic management plays a critical role in guiding organizations toward the adoption of emerging technologies that enhance operational efficiency, service quality, and organizational performance. The successful implementation of technology-based operational systems requires strategic alignment between organizational objectives, technological investments, and business processes.

**Resource-Based View (BRV)**

The Resource-Based View (RBV), introduced by Barney (1991), is one of the most influential theoretical perspectives for explaining organizational performance and sustainable competitive advantage. RBV suggests that firms achieve superior performance when they possess resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN). According to this perspective, organizational success is not solely determined by external market conditions but also by the effective management and deployment of internal resources. These resources may include tangible assets, technological infrastructure, organizational knowledge, human capital, and managerial capabilities. Organizations that are able to leverage unique and difficult-to-replicate resources are more likely to sustain competitive advantages over time. Within the Smart Field Service Management (Smart-FSM) framework, digital technologies, operational data, cloud-based infrastructure, and workforce competencies can be viewed as strategic resources that contribute to organizational value creation. The integration of these resources enables organizations to improve operational responsiveness, enhance service quality, and strengthen customer relationships. Therefore, RBV provides an appropriate theoretical lens for understanding how digital capabilities can generate sustainable competitive advantages in technology-enabled security service operations.

**Competitive Advantage**

Competitive advantage refers to an organization's ability to create greater value than its competitors through superior products, services, processes, or capabilities. Porter (1985) argues that organizations can achieve competitive advantage through two primary strategic approaches: cost leadership and differentiation. Cost leadership focuses on achieving operational efficiency and minimizing costs while maintaining acceptable levels of quality. Differentiation, on the other hand, involves offering unique products or services that are perceived as valuable by customers. Organizations that successfully implement either strategy can improve their market position and enhance long-term profitability. Technological innovation has become a critical driver of competitive advantage in contemporary business environments. Information technology enables organizations to optimize operational processes, improve service delivery, and enhance customer experiences. Grant (2015) emphasizes that technological capabilities represent strategic assets that can contribute significantly to organizational competitiveness by facilitating innovation, operational excellence, and value creation. In security service operations, the integration of advanced digital technologies such as Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, and drone surveillance can create differentiated service offerings while simultaneously improving operational efficiency. Consequently, technology-driven operational models such as Smart-FSM have the potential to strengthen competitive positioning within the security services industry.

**Field Service Management**

Field Service Management (FSM) is a managerial approach designed to coordinate and optimize field-based operational activities through the integration of people, processes, and technology. FSM encompasses a wide range

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of operational functions, including workforce scheduling, task allocation, service monitoring, performance reporting, resource management, and customer support. The increasing adoption of digital technologies has transformed traditional FSM systems into intelligent platforms capable of supporting real-time operational visibility and data-driven decision-making. Modern FSM solutions leverage mobile technologies, cloud computing, automation, and analytics to improve workforce productivity and service effectiveness. According to Armstrong (2021), integrated performance management systems enable organizations to improve productivity by providing accurate performance measurements and facilitating continuous monitoring. In addition, digital FSM platforms contribute to enhanced operational transparency, faster response times, and improved service consistency. These characteristics are particularly important in service-intensive industries where operational effectiveness directly influences customer satisfaction and organizational performance.

Within the security services sector, FSM provides a structured framework for managing field personnel, monitoring operational activities, recording incidents, and ensuring compliance with service level agreements. A study on the operational planning of X-ray security equipment maintenance services found that integrating predictive maintenance algorithms, AI-based analytics, blockchain for supply chain transparency, and GPS-integrated CRM systems significantly improves service reliability, minimizes operational downtime, and ensures compliance with international standards such as TSA and ECAC (Safari et al., 2025). Consequently, FSM serves as a critical operational foundation for the implementation of technology-enabled security service solutions such as Smart-FSM.

**Conceptual Framework**

Nilai The operational success of technology-based security services depends on an organization's ability to integrate human resources, technological infrastructure, and operational processes into a unified management system. The Smart Field Service Management (Smart-FSM) model developed by PT Biner Sinergi Optima is designed to achieve this objective by combining digital technologies and operational resources to enhance service performance and operational effectiveness. Drawing upon the Resource-Based View (Barney, 1991), technological infrastructure, digital capabilities, operational data, and skilled security personnel can be considered strategic resources that contribute to organizational value creation. When effectively integrated, these resources enable organizations to improve service quality, optimize resource utilization, and strengthen competitive positioning. Similarly, Competitive Advantage Theory (Porter, 1985) suggests that organizations can create superior performance through operational efficiency and service differentiation, both of which are supported by technology-enabled operational systems.

Within the Smart-FSM operational model, cloud computing serves as the foundation for centralized data management and real-time information accessibility. Artificial Intelligence (AI) supports intelligent workforce scheduling, predictive analysis, and operational decision-making. Internet of Things (IoT) devices facilitate real-time monitoring and information exchange between field personnel and operational control centers. In addition, drone patrol technology enhances surveillance coverage and strengthens security monitoring capabilities in large operational areas. These technological components are further supported by professional security personnel, standardized operational procedures, and integrated monitoring mechanisms. The interaction among these elements enables organizations to improve operational visibility, accelerate incident response, optimize workforce allocation, and maintain service consistency. Consequently, the Smart-FSM model is expected to enhance overall operational effectiveness through improved efficiency, responsiveness, transparency, and service reliability. Based on the operational design presented in the Smart-FSM business plan, this study proposes that the integration of cloud computing, Artificial Intelligence, Internet of Things, drone-assisted surveillance, and human resource capabilities contributes directly to the improvement of operational effectiveness in technology-based security service operations.

## 2. Research Method

This study employed a qualitative descriptive research design to examine the implementation of Smart Field Service Management (Smart-FSM) as a technology-based operational model for security service operations. A qualitative approach was considered appropriate because the objective of the study was to explore and analyze the operational framework, technological infrastructure, and management practices embedded within the Smart-FSM business model rather than to test statistical relationships among variables. The qualitative design enabled a comprehensive understanding of how integrated digital technologies contribute to operational effectiveness within the security services industry. The research adopted a document analysis approach as the primary method of data

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collection. Document analysis is widely used in qualitative research to systematically review and interpret written materials in order to gain meaningful insights into organizational practices, strategic initiatives, and operational processes. In this study, the primary source of data was the Operational Plan of PT Biner Sinergi Optima, which provides detailed information regarding the design, implementation, and management of the Smart-FSM platform. The document serves as a comprehensive source for understanding the operational mechanisms and strategic direction of the organization.

The analysis focused specifically on the operational planning components presented within the Smart-FSM business plan. These components include the operational framework, business establishment stages, service delivery processes, technology infrastructure, human resource requirements, operational capacity management, monitoring mechanisms, and projected operational expenditures. By examining these elements, the study aimed to identify the key factors that support the effectiveness of technology-enabled security service operations and to evaluate how digital technologies are integrated into operational activities. Furthermore, the study examined the role of various technological components incorporated within the Smart-FSM ecosystem. Particular attention was given to cloud computing, Artificial Intelligence (AI), Internet of Things (IoT), mobile applications, and drone patrol technologies, as these technologies represent the core operational enablers of the Smart-FSM model. The analysis explored how these technologies contribute to operational visibility, workforce coordination, incident response capabilities, data management, and service quality improvement. This approach allowed for a comprehensive assessment of the technological architecture supporting the proposed business model.

To enhance the analytical rigor of the study, the findings obtained from the operational plan were interpreted using relevant theoretical perspectives drawn from strategic management, Resource-Based View (RBV), competitive advantage theory, and digital transformation literature. These theoretical foundations provided a conceptual framework for understanding how organizational resources and technological capabilities can be leveraged to improve operational performance and create sustainable competitive advantages. The integration of theory and practical business planning enabled a deeper interpretation of the Smart-FSM operational model. The data analysis process followed a descriptive analytical procedure. Initially, relevant information contained within the operational plan was identified, categorized, and organized according to major operational themes. Subsequently, the collected information was systematically analyzed to determine the relationships between operational resources, technological capabilities, service delivery processes, and operational effectiveness. Through this process, recurring patterns and strategic implications were identified and interpreted within the context of technology-driven security service management.

In addition, the study evaluated how the integration of digital technologies supports key operational objectives, including real-time monitoring, service transparency, workforce optimization, and Service Level Agreement (SLA) achievement. The analysis also considered the role of operational planning in supporting organizational scalability, service reliability, and long-term business sustainability. This evaluation was particularly important given the increasing demand for technology-enabled solutions within the security services industry. Finally, the findings of this study were synthesized to develop a comprehensive understanding of the Smart-FSM operational model and its potential contribution to the digital transformation of security service operations. The research provides both theoretical and practical insights into the implementation of integrated digital technologies in service-based organizations. By focusing on the operational planning framework of PT Biner Sinergi Optima, the study offers a contextualized perspective on how technology can be strategically utilized to improve operational effectiveness, enhance service quality, and strengthen organizational competitiveness in the security services sector.

## 3. Result and Discussion

### Service Blue Print

The Smart-FSM service blueprint illustrates an integrated service delivery process that connects customer requirements, operational activities, and supporting technologies within a unified management framework. The service begins when a customer submits a service request and communicates specific security requirements. Following this stage, PT Biner Sinergi Optima conducts a needs assessment and service verification process to ensure that the proposed security solution aligns with the customer's operational environment and expectations. This initial interaction establishes the foundation for a structured and transparent service delivery process while ensuring compliance with agreed Service Level Agreements (SLAs). The development of a service blueprint is essential for ensuring service consistency, operational transparency, and customer-oriented service delivery. A

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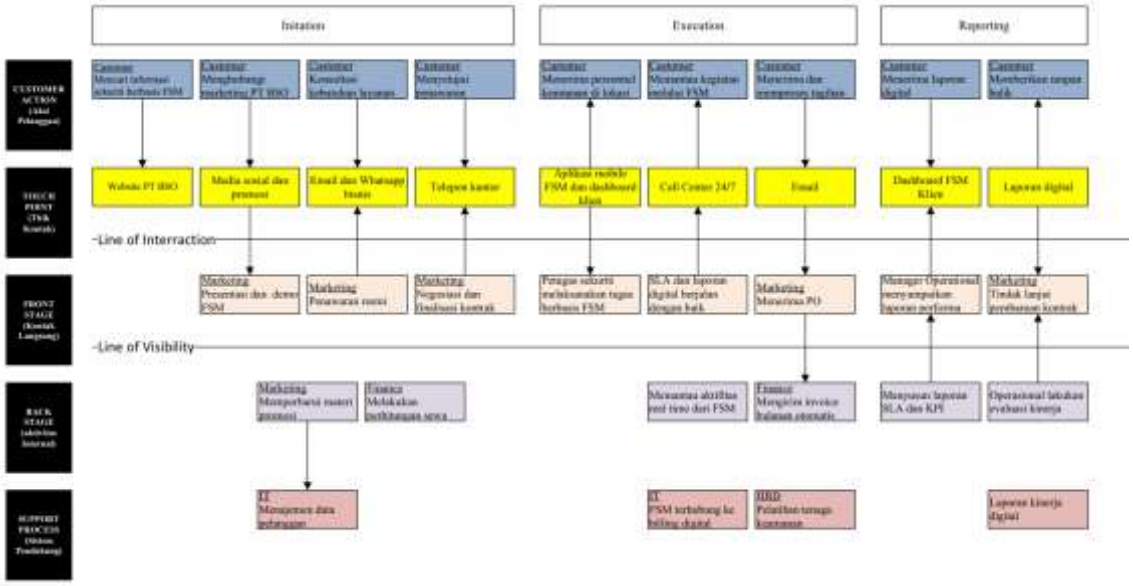
well-designed service blueprint enables organizations to align service processes, operational activities, and supporting technologies within an integrated operational framework.

Once the service requirements have been identified, PT Biner Sinergi Optima develops an operational plan and service agreement tailored to customer needs, followed by the selection of security personnel based on their qualifications, certifications, and operational competencies. Prior to deployment, personnel undergo orientation and training to ensure readiness for field assignments and familiarity with the Smart-FSM platform. During service execution, the Smart-FSM platform facilitates workforce scheduling, task allocation, monitoring, and reporting, enabling supervisors to oversee field activities in real time and coordinate operational responses more effectively. The platform also allows security personnel to submit reports electronically, record incidents, and communicate operational updates directly from the field, thereby improving information accuracy, reducing reporting delays, and enhancing overall operational transparency.

Furthermore, the Smart-FSM ecosystem is supported by advanced technologies, including cloud computing, Artificial Intelligence (AI), Internet of Things (IoT), GPS tracking systems, and drone patrol technology. These technologies provide continuous visibility into operational activities and support data-driven decision-making. The integration of digital tools enhances monitoring effectiveness, accelerates incident response, and improves resource utilization across security operations. As a result, the service blueprint demonstrates how PT Biner Sinergi Optima leverages technology-enabled operational processes to improve service quality, operational effectiveness, and customer satisfaction.




**Smart-FSM Mobile Application**

The Smart Field Service Management (Smart-FSM) mobile application serves as the primary digital platform supporting the operational activities of PT Biner Sinergi Optima. The application was developed to facilitate communication, coordination, monitoring, and reporting processes between field personnel, supervisors, and management. By utilizing a centralized digital platform, the organization can improve operational efficiency while ensuring that security services are delivered in accordance with established standards and customer requirements. The application provides a range of operational functionalities designed to support field service activities. These functionalities include personnel attendance management, task assignment, incident reporting, location tracking, patrol verification, and operational communication. Through the mobile platform, security personnel can access assigned tasks, submit operational reports, and communicate with supervisors in real time. This capability reduces administrative delays and enables faster information exchange between field operations and management.

One of the key advantages of the Smart-FSM application is its ability to provide real-time operational visibility. Through integration with GPS tracking systems and cloud-based infrastructure, supervisors can monitor personnel movements, service completion status, and operational activities across multiple locations. The availability of real-

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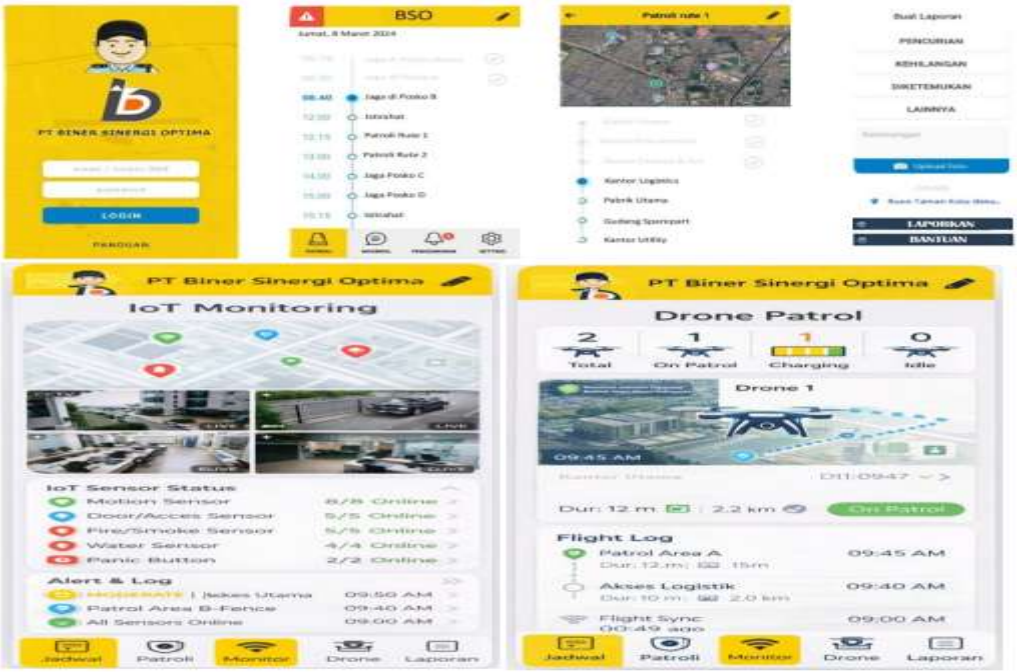
time data enhances decision-making processes and enables management to respond promptly to operational incidents or service disruptions. Consequently, the application contributes significantly to improving service reliability and operational transparency.

Furthermore, the Smart-FSM application functions as an important source of operational data that supports performance evaluation and continuous improvement initiatives. Information collected through the platform is utilized to assess workforce productivity, monitor Service Level Agreement (SLA) achievement, and identify opportunities for operational optimization. By integrating workforce management, monitoring, and reporting functions into a single digital platform, the Smart-FSM application strengthens operational control and supports the organization's broader digital transformation strategy. In the context of flexible workspace operations, Isworo et al. (2025) demonstrated that a phased operational strategy—comprising short-term standardization, medium-term technology integration, and long-term sustainable innovation—combined with modern service design and customer feedback mechanisms, enhances competitive positioning and operational efficiency in coworking spaces.




**Service Product and Design**

The Smart Field Service Management (Smart-FSM) service and product design was developed to address the increasing demand for technology-enabled security solutions. The design integrates professional security services with digital technologies to provide a comprehensive operational management system capable of improving service effectiveness, operational transparency, and customer satisfaction. By combining human resources with advanced technological capabilities, PT Biner Sinergi Optima seeks to deliver security services that are more responsive, efficient, and adaptable to evolving customer requirements. The Smart-FSM product design is centered on the integration of multiple technological components, including mobile applications, cloud computing infrastructure, Artificial Intelligence (AI), Internet of Things (IoT), and drone-assisted monitoring systems. These technologies function collectively to support workforce management, real-time monitoring, incident reporting, and operational decision-making. Through this integrated architecture, the organization is able to provide customers with enhanced visibility into security operations while improving the overall quality of service delivery.

From a service perspective, Smart-FSM is designed to provide end-to-end security management solutions covering personnel deployment, operational supervision, patrol management, incident handling, and performance reporting. The service design emphasizes real-time communication and continuous monitoring, allowing customers to access operational information and service performance data more efficiently. This customer-oriented approach supports greater transparency and strengthens trust between the service provider and its clients.

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Furthermore, the Smart-FSM service and product design reflects the organization's commitment to digital transformation and operational excellence. By leveraging technology as a strategic resource, PT Biner Sinergi Optima is able to differentiate its service offerings from conventional security providers. The integration of digital platforms and operational processes not only enhances service reliability but also supports sustainable competitive advantage through improved efficiency, innovation, and value creation for customers.


**Operational Workflow of FSM**

The core operational process of Smart Field Service Management (Smart-FSM) is designed to ensure the effective delivery of security services through a structured and technology-enabled workflow. The process begins with the identification of customer requirements and service specifications. Following the initial assessment, operational planning is conducted to determine workforce requirements, deployment schedules, and service coverage areas. This planning stage is essential for ensuring that operational resources are aligned with customer expectations and organizational service standards. Once the operational plan has been finalized, qualified security personnel are selected and assigned to designated service locations. Prior to deployment, personnel receive operational briefings and are registered within the Smart-FSM platform to ensure seamless integration into the digital monitoring system. Through this process, the organization can establish clear communication channels, define operational responsibilities, and ensure compliance with established security procedures and service requirements.

During service execution, Smart-FSM facilitates real-time operational monitoring through integrated digital technologies, including mobile applications, GPS tracking, cloud-based systems, and IoT-enabled devices. Supervisors and operational managers can continuously monitor workforce activities, track service completion, and respond promptly to incidents or operational disruptions. The availability of real-time information enhances operational visibility and supports faster decision-making, thereby improving overall service effectiveness.

The operational process concludes with performance reporting, service evaluation, and continuous improvement activities. Operational data collected through the Smart-FSM platform are analyzed to assess workforce performance, service quality, and compliance with Service Level Agreements (SLAs). The results of these evaluations provide valuable insights for management in identifying operational improvements, optimizing resource allocation, and enhancing future service delivery. This continuous feedback mechanism ensures that Smart-FSM remains responsive to customer needs while supporting sustainable operational excellence.

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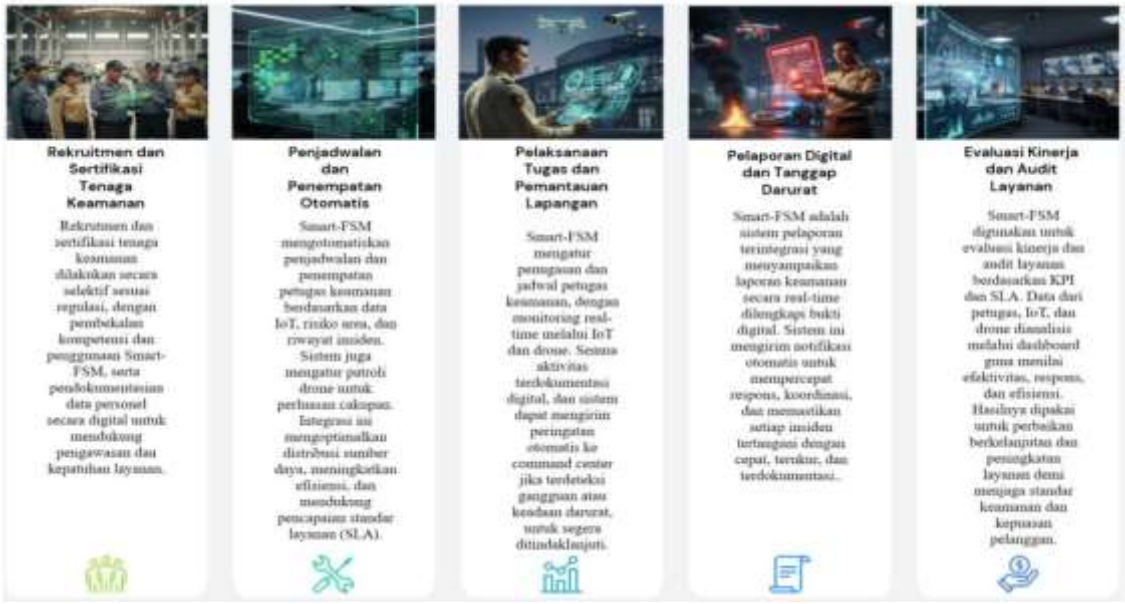


**Operational Technology Infrastructure**

The operational effectiveness of the Smart Field Service Management (Smart-FSM) model is strongly supported by an integrated technological infrastructure designed to enhance service quality, operational visibility, and decision-making capabilities. As security service operations become increasingly complex, organizations require advanced technological solutions capable of supporting real-time monitoring, workforce coordination, and operational control. To address these requirements, PT Biner Sinergi Optima integrates multiple digital technologies into a unified operational ecosystem that enables efficient and reliable service delivery. A key component of this technological infrastructure is cloud computing, which serves as the foundation for centralized data management and information accessibility. Through cloud-based systems, operational data can be stored, processed, and accessed in real time by authorized personnel across different locations. This capability improves operational coordination, facilitates information sharing, and ensures that critical operational data remain available for decision-making processes. Furthermore, cloud computing supports system scalability, allowing the organization to accommodate future business growth without significant increases in infrastructure investment.

Artificial Intelligence (AI) also plays an important role in supporting operational activities within the Smart-FSM platform. AI technologies are utilized to optimize workforce scheduling, analyze operational patterns, and support predictive decision-making. By processing large volumes of operational data, AI assists management in identifying potential risks, improving resource allocation, and enhancing service efficiency. The application of AI enables the organization to transition from reactive operational management toward a more proactive and data-driven approach to service delivery.

In addition, the Smart-FSM ecosystem incorporates Internet of Things (IoT) technologies and drone-assisted surveillance systems to strengthen monitoring capabilities and situational awareness. IoT devices facilitate real-time data collection from field operations, enabling continuous communication between security personnel and operational control centers. Meanwhile, drone patrol technology expands surveillance coverage, improves inspection efficiency, and enhances incident detection capabilities, particularly in large operational environments. The integration of these technologies creates a comprehensive operational support system that improves responsiveness, operational transparency, and overall service effectiveness while reinforcing the organization's digital transformation strategy. A case study on a technology-based warehousing startup, Secure Stash, revealed that the integration of Warehouse Management Systems (WMS), RFID tracking, Lean operational principles, and the NICE relationship model (Networking, Interaction, Common Interest, Experience) significantly improves process efficiency, inventory accuracy, service reliability, and customer trust in logistics operations (Denito et al., 2025).

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**Operational Cost and Financial Sustainability**

The successful implementation of Smart Field Service Management (Smart-FSM) requires a well-structured operational cost framework to ensure long-term business sustainability and service reliability. A well-structured operational cost framework, as demonstrated by Isworo et al. (2025) in their coworking space operational plan, should integrate capital expenditure, pre-operational costs, and operational expenditures to ensure long-term business sustainability and service reliability. The operational cost projection developed by PT Biner Sinergi Optima serves as a financial planning tool that supports resource allocation, technology deployment, workforce management, and continuous service improvement. A comprehensive cost projection is essential for maintaining operational efficiency while ensuring that service quality standards are consistently achieved. The projected operational costs primarily consist of personnel expenses, technology infrastructure investments, system maintenance, operational support activities, and administrative expenditures. Human resource costs represent a significant component of the overall operational budget due to the labor-intensive nature of security service operations. In addition, investments in digital technologies such as cloud computing, Artificial Intelligence (AI), Internet of Things (IoT), mobile applications, and drone patrol systems contribute to the establishment of a technology-enabled operational ecosystem that supports service effectiveness and operational control.

The implementation of technology within the Smart-FSM platform is expected to generate long-term operational benefits despite the initial investment requirements. Through automation, real-time monitoring, and digital reporting capabilities, the organization can improve resource utilization, reduce operational inefficiencies, and minimize administrative workloads. These improvements contribute to cost optimization while simultaneously enhancing service quality and operational transparency. Consequently, technology investments should be viewed as strategic expenditures that support organizational growth and competitive advantage.

Furthermore, the operational cost projection demonstrates the organization's commitment to financial sustainability and scalable business development. PT Biner Sinergi Optima has allocated a Capital Expenditure (Capex) budget of IDR 907,5 Million to support initial investments, including the procurement of operational vehicles and the establishment of supporting operational infrastructure required for Smart-FSM implementation. In addition, the company projects a gradual increase in Operational Expenditure (Opex) over the planning period as service capacity, technological capabilities, and operational coverage continue to expand. The projected operational cost is expected to reach IDR 465,6 Million by the fifth year of operation, reflecting the organization's commitment to maintaining service quality, technology enhancement, and workforce development. This financial projection indicates that PT Biner Sinergi Optima has developed a structured and sustainable cost management strategy that supports long-term growth, operational scalability, and the successful implementation of the Smart-FSM business model.

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| No | Deskripsi | Tahun | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 1 | Cloud (Demo) | | 18,000,000 | 19,800,000 | 21,780,000 | 23,958,000 | 26,353,800 |
| 2 | Email Official (Google Mail) per Karyawan | 4,560,000 | 34,200,000 | 34,200,000 | 18,000,000 | 18,000,000 | 18,000,000 |
| 3 | Web Hosting + Domain (.com atau .id) | 500,000 | 500,000 | 500,000 | 500,000 | 500,000 | 500,000 |
| 4 | Pemeliharaan Sistem | | 500,000 | 50,000,000 | 50,000,000 | 50,000,000 | 50,000,000 |
| 5 | Beban Perjalanan Dinas & Transport | 20,000,000 | 30,000,000 | 40,000,000 | 60,000,000 | 80,000,000 | 100,000,000 |
| 6 | Biaya Koordinasi | | 15,000,000 | 15,000,000 | 15,000,000 | 15,000,000 | 15,000,000 |
| 7 | Beban Sewa Office | 18,750,000 | 75,000,000 | 82,500,000 | 90,750,000 | 99,825,000 | 109,807,500 |
| 8 | Beban Internet | 6,000,000 | 12,000,000 | 13,000,000 | 14,000,000 | 15,000,000 | 16,000,000 |
| 9 | Beban Listrik + Air | 9,000,000 | 18,000,000 | 19,000,000 | 20,000,000 | 21,000,000 | 22,000,000 |
| 10 | ATK | 6,000,000 | 24,000,000 | 24,500,000 | 25,000,000 | 25,500,000 | 26,000,000 |
| 11 | Peralatan Kebersihan | 2,000,000 | 4,800,000 | 5,300,000 | 5,800,000 | 6,300,000 | 6,800,000 |
| 12 | IPL | 3,600,000 | 7,200,000 | 7,700,000 | 8,200,000 | 8,700,000 | 9,200,000 |
| 13 | Biaya Pemeliharaan Aset | | 23,920,000 | 31,150,000 | 32,903,000 | 36,378,300 | 39,966,130 |
| 14 | Operasional umum | 60,000,000 | 18,000,000 | 20,000,000 | 22,000,000 | 24,000,000 | 26,000,000 |
| **Total** | | **130,410,000** | **281,120,000** | **362,650,000** | **383,933,000** | **424,161,300** | **465,627,430** |

| No | Name | Price |
|---|---|---|
| 1 | Mobil Operasional (All New Avanza 1.3 E CVT) | 255,000,000 |
| 2 | Sepeda Motor (Honda BeAt) | 20,000,000 |
| 3 | Setup Ruang Kantor | 60,000,000 |
| 4 | CCTV 4 Titik (Alat  Pemasangan) | 4,500,000 |
| 5 | Mesin Absensi | 2,000,000 |
| 6 | Meja dan Kursi Kerja Manager | 4,000,000 |
| 7 | Meja dan Kursi Kerja Staff | 3,500,000 |
| 8 | Meja dan Kursi Rapat (8 Org) | 8,000,000 |
| 9 | Meja dan Kursi Resepsionis | 4,000,000 |
| 10 | Sofa Ruang Tunggu (4 Org) | 4,000,000 |
| 11 | TV (40 Inch) | 4,000,000 |
| 12 | Printer + Scan + Fotocopy | 2,000,000 |
| 13 | Smartphone | 3,500,000 |
| 14 | Sistem FSM Basic | 250,000,000 |
| 15 | Enhancement FSM CCTV + IOT | 150,000,000 |
| 16 | Enhancement FSM Drone | 100,000,000 |
| 17 | Notebok Direktur | 12,000,000 |
| 18 | Notebook Manager | 10,000,000 |
| 19 | Notebook Staff Adminstrasi | 4,000,000 |
| 20 | Notebook Staff IT | 7,000,000 |
| 21 | DJI Mavic 3 Thermal (M3T) Patroli Drone & Surveillance | 75,000,000 |
| 22 | Melexis MLX90640 IoT Sensor Panas (Thermal/IR) | 5,376,000 |
| 23 | Tuya PIR IoT Sensor Gerak (Motion Detector) | 1,276,800 |
| 24 | HiLook PTZ-N4215-DE3 CCTV | 18,000,000 |
| | | |
| | **Total** | **907,500,000** |

## 4. Conclusion

This study examined the implementation of Field Service Management (FSM) as a technology-enabled operational model at PT Biner Sinergi Optima through the Smart-FSM platform. The findings indicate that the integration of digital technologies, including cloud computing, Artificial Intelligence (AI), Internet of Things (IoT), mobile

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applications, and drone-assisted surveillance, plays a significant role in enhancing the effectiveness of security service operations. The Smart-FSM platform enables real-time monitoring, improves workforce coordination, supports faster decision-making processes, and increases operational transparency, thereby contributing to improved service quality and operational performance. The analysis also demonstrates that the Smart-FSM operational framework successfully integrates human resources, operational processes, and technological infrastructure into a unified service delivery system. This integration strengthens monitoring capabilities, facilitates digital reporting, and supports the achievement of operational targets, including compliance with Service Level Agreements (SLAs). Furthermore, the implementation of advanced technologies provides PT Biner Sinergi Optima with opportunities to improve resource utilization, optimize operational workflows, and enhance customer satisfaction. From a strategic perspective, the findings support the Resource-Based View (RBV) and Competitive Advantage Theory by illustrating how technology-enabled capabilities can serve as valuable organizational resources that contribute to sustainable competitive advantage. In line with the findings of Isworo et al. (2025) on the integration of location strategy, service quality, technology, and financial management in coworking spaces, the Smart-FSM model similarly demonstrates that combining human resources, digital technologies, and operational processes creates a holistic approach to achieving sustainable competitive advantage. The Smart-FSM model not only improves operational effectiveness but also creates service differentiation through the adoption of innovative technologies that are not commonly utilized in conventional security service operations. Finally, the study concludes that the Smart-FSM platform represents an innovative and scalable operational model capable of supporting the digital transformation of the security services industry. Through the integration of technology and operational excellence, PT Biner Sinergi Optima is well-positioned to strengthen its competitiveness, improve service reliability, and achieve sustainable business growth in an increasingly digital business environment. Suggestions: Based on the findings of this study, PT Biner Sinergi Optima should continue enhancing the Smart-FSM platform by expanding the utilization of advanced digital technologies and strengthening system integration across operational functions. Continuous investment in Artificial Intelligence, predictive analytics, and real-time monitoring capabilities may further improve operational efficiency, incident response performance, and decision-making accuracy. In addition, regular technology upgrades will be necessary to ensure that the platform remains aligned with evolving industry requirements and technological advancements. The organization should also prioritize workforce development initiatives to maximize the benefits of technology-enabled operations. Continuous training programs focused on digital competencies, operational compliance, and technology adoption can improve employee readiness and support the effective implementation of Smart-FSM. Strengthening collaboration between operational personnel and technology teams may further enhance system utilization and operational performance. From a managerial perspective, the company should periodically evaluate operational performance indicators, including Service Level Agreement (SLA) achievement, workforce productivity, customer satisfaction, and technology utilization effectiveness. Such evaluations will enable management to identify improvement opportunities and ensure that operational objectives remain aligned with organizational growth strategies. For future research, scholars may conduct quantitative studies to measure the impact of Smart-FSM implementation on operational performance, customer satisfaction, and organizational competitiveness. Future studies may also explore the adoption of similar technology-enabled operational models in other service industries to provide broader insights into the role of digital transformation in enhancing operational effectiveness and sustainable business performance.

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