

The Influence of Service Innovation, Time Management, and Technology Utilization on Operational Efficiency

Reviandi¹, Sumiati^{1*}, Erdayono¹, Wahidin¹, Ali Sadikin¹,
Yusuf Haidir¹

¹Sekolah Tinggi Ilmu Ekonomi KBP Padang

Jl. Khatib Sulaiman No.61, Lolong Belanti, Padang, West Sumatera 25136, Indonesia

*Corresponding Email: sumiati@akbpstie.ac.id

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Reviandi, R., Sumiati, S., Erdayono, E., Wahidin, W., Sadikin, A., & Haidir, Y. (2026). The influence of service innovation, time management, and technology support service company in Indonesia. A quantitative survey design was employed with 95 operational employees selected from a population of 1,917 employees using simple random sampling and a 10% margin of error. Data were analyzed using multiple linear regression. The results showed that service innovation positively affected operational efficiency ($b = 0.432$, $p < 0.001$), as did time management ($b = 0.269$, $p < 0.001$) and technology utilization ($b = 0.424$, $p < 0.001$). The simultaneous model was significant ($F = 139.061$, $p < 0.001$), and $R^2 = 0.821$, indicating that the three predictors jointly explained 82.1% of the variance in operational efficiency. Technology utilization had the largest standardized coefficient ($b = 0.740$). The findings suggest that transportation-support service organizations can strengthen operational efficiency by integrating process innovation, disciplined time allocation, and appropriate digital technologies into operational processes.

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ABSTRACT

Organizations face increasing pressure to improve operational efficiency while maintaining service quality and controlling costs. This study examines whether service innovation, time management, and technology utilization affect operational efficiency among operational employees of PT Reska Multi Usaha, a transportation-time management, and technology support service company in Indonesia. A quantitative survey design was employed with 95 operational employees selected from a population of 1,917 employees using simple random sampling and a 10% margin of error. Data were analyzed using multiple linear regression. The results showed that service innovation positively affected operational efficiency ($b = 0.432$, $p < 0.001$), as did time management ($b = 0.269$, $p < 0.001$) and technology utilization ($b = 0.424$, $p < 0.001$). The simultaneous model was significant ($F = 139.061$, $p < 0.001$), and $R^2 = 0.821$, indicating that the three predictors jointly explained 82.1% of the variance in operational efficiency. Technology utilization had the largest standardized coefficient ($b = 0.740$). The findings suggest that transportation-support service organizations can strengthen operational efficiency by integrating process innovation, disciplined time allocation, and appropriate digital technologies into operational processes.

Keywords: Operational Efficiency; Service Innovation; Service Operations; Technology Utilization; Time Management

JEL Classification: D23; L25; M12; O33

INTRODUCTION

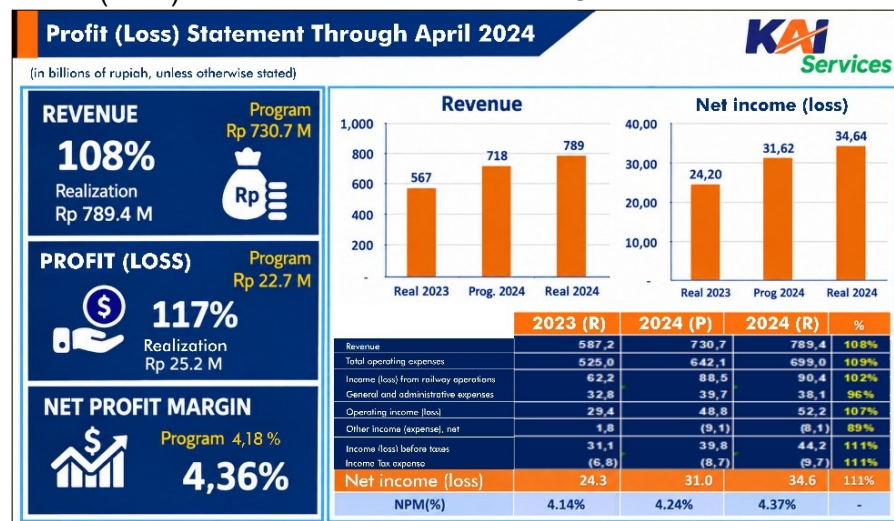
Amidst increasingly fierce competition in the service industry and demands for high operational efficiency, companies' failure to manage service innovation, time management, and the use of technology in operational processes is no longer merely an internal issue, but a direct threat to the sustainability of company performance and competitiveness. Organizations that fail to innovate, manage work time effectively, and optimize the use of digital technology in operational planning, implementation, and control are at risk of cost overruns, process inefficiencies, and decreased profitability. This condition is even more crucial for operationally intensive service companies, such as PT Reska Multi Usaha, which depend on service speed, process accuracy, and consistent quality.

In carrying out its business activities, PT Reska Multi Usaha faces complex challenges that include large-scale human resource management, cross-unit operational coordination, and the demands of utilizing information technology and digitalizing work processes to increase competitiveness. The high intensity of operational activities makes operational efficiency a key factor in maintaining the company's financial performance. Therefore, the company's ability to manage service innovation, work time management, and integrate technology into operational systems, performance monitoring, and decision-making are crucial for successfully achieving revenue targets and controlling operational costs.

To understand the extent to which operational efficiency has been realized in practice, a review of a company's financial performance is necessary as a reflection of the effectiveness of operational management. Profit and loss performance is a key indicator that illustrates the relationship between revenue achievement, cost control, and a company's ability to efficiently manage resources. Analyzing financial performance data not only reveals the final results but also reveals the operational dynamics occurring within the company.

Therefore, presenting PT Reska Multi Usaha's profit (loss) statement data is crucial for providing an empirical overview of the company's operational efficiency. This data serves as a basis for identifying potential inefficiencies in operational cost management and serves as a starting point for analyzing the relationship between service innovation, time management, and technology utilization and the company's operational efficiency.

Figure 1. Profit (Loss) Statement of PT Reska Multi Usaha



This operational efficiency phenomenon is clearly reflected in PT Reska Multi Usaha's financial statement. As shown in [Figure 1](#), it can be seen that although the company successfully exceeded its revenue target with realization of Rp 789.4 billion, or 108% of the target, operational costs also increased significantly. Total Operating Expenses increased to Rp 699.0 billion, or 109% of the target, while general and administrative expenses reached 96% of the target. This condition indicates that the increase in revenue has not been fully accompanied by optimal cost control.

Furthermore, although net income (loss) increased to Rp 34.5 billion (111% of target) with a Net Profit Margin (NPM) of 4.37%, this achievement still shows room for improvement in operational efficiency. The relatively moderate increase in net income compared to the surge in revenue indicates that the company's operational processes still face challenges in managing working hours, service effectiveness, and utilizing technology to reduce costs and increase productivity. In other words, the growth in financial performance does not fully reflect optimal operational efficiency.

Recent evidence indicates that operational efficiency is closely connected with firms' ability to coordinate resources, integrate digital technologies, and redesign processes. Digital transformation capability has been linked to operational performance through the integration of digital technologies with business processes and routines ([Yu et al., 2022](#)). Firm-level and meta-analytic evidence also shows that digital technology adoption can improve productivity and organizational performance, particularly when technologies are embedded in organizational processes ([Liu et al., 2024](#); [Oduro et al., 2023](#)). In service settings, service digitalization can further improve operational efficiency through process integration and improved coordination ([Harahap et al., 2024](#); [Ikhsan & Ginting, 2024](#)).

Service innovation is another potential source of operational improvement. Service innovation capability concerns an organization's ability to repeatedly develop or improve services and service processes, and the literature identifies resource- and capability-based perspectives as important theoretical lenses for explaining this capability ([Blommerde, 2023](#)). Empirical evidence from the hospitality industry shows that service innovation is positively associated with firm performance and is closely connected with technological innovation and co-creation capabilities ([Bhat & Sharma, 2022](#)). Similarly, evidence from Indonesian hotels associates service innovation with sustainable competitive advantage and organizational performance ([Sarya et al., 2022](#)), while [Sun and Cheng \(2024\)](#) demonstrate that service innovation can contribute to financial performance. Taken together, these findings suggest that service innovation can create organizational value by improving the way services and related processes are designed and delivered. This process-oriented effect is particularly relevant to operational efficiency because improvements in service processes can reduce process gaps, improve coordination, and support more effective service delivery. In this regard, service blueprinting can help identify service-process gaps and fail points that require redesign, providing a practical mechanism through which service innovation can contribute to more efficient service delivery ([Prabowo & Tarigan, 2024](#)).

Time management concerns the planning, prioritization, allocation, and control of working time. A meta-analysis found that time management is moderately related to job performance ([Aeon et al., 2021](#)), while a large survey of managers found that effective time management is associated with work efficiency and productivity ([Lušňáková et al., 2021](#)). The classic time-management literature also emphasizes planning behavior and perceived control of time as important mechanisms ([Claessens et al., 2007](#)). More recent workplace research suggests that digital time-management practices can shape how employees coordinate and structure work ([Pedersen et al., 2024](#)). These findings provide

a basis for expecting effective time management to contribute to operational efficiency in schedule-sensitive service environments.

Technology utilization refers to the effective use of digital systems, information technologies, and technology-enabled tools in operational activities. From a resource-based perspective, technology can contribute to performance when it is effectively deployed and combined with organizational resources rather than merely acquired (Karim et al., 2022). Porter and Heppelmann (2015) explain that smart, connected technologies can support monitoring, control, optimization, and more efficient service activities. Recent empirical research shows that digitalization can significantly improve operational efficiency, including through digital integration and process transformation (Dung et al., 2024; Liu et al., 2024; Zhang et al., 2024). Evidence from Indonesia also shows that accounting information systems and technology adoption can support operational productivity and business performance (Sumampouw & Lonto, 2026; Tikawati et al., 2026).

In the context of PT Reska Multi Usaha, the financial-performance pattern and the operational demands described above raise the question of whether service innovation, time management, and technology utilization are associated with employee-perceived operational efficiency. The research gap is therefore not simply the absence of studies on any single variable, but the limited integration of these three organizational capabilities in one empirical model for a transportation-support service context.

Accordingly, this study aims to examine the partial and simultaneous effects of service innovation, time management, and technology utilization on operational efficiency among operational employees of PT Reska Multi Usaha. The study is significant because it integrates three internal capabilities within a single empirical model and distinguishes contextual financial performance from the questionnaire-based operational-efficiency construct. Its novelty lies in applying the Resource-Based View to explain how service innovation, time management, and technology utilization can function as complementary internal resources and capabilities in a transportation-support service organization. The contribution is both theoretical and practical: theoretically, the study extends RBV to an employee-perceived operational-efficiency setting; practically, it identifies the relative contribution of the three predictors and provides evidence for managers seeking to improve service processes, work-time allocation, and technology-enabled coordination.

LITERATURE REVIEW

Resource-Based View (RBV)

The Resource-Based View (RBV) provides the theoretical foundation for explaining how firms can achieve superior performance by effectively managing and utilizing internal resources and capabilities. Barney (1991) argues that resources can become sources of sustained competitive advantage when they are valuable, rare, difficult to imitate, and difficult to substitute. The resource perspective includes more than physical assets; it also encompasses organizational processes, knowledge, information, and capabilities that enable firms to implement strategies and improve effectiveness and efficiency.

Recent research continues to apply RBV to digitalization and organizational capability. Karim et al. (2022), through a meta-analysis of ICT use and firm performance, show that technology can function as a strategic resource when it is effectively deployed. Inceoglu et al. (2024) further explain that digitalization changes how firms mobilize and govern resources, while Manresa et al. (2024) explicitly combine RBV with digitalization and operational-efficiency research. Research on dynamic capabilities also shows that organizations need to develop, integrate, and reconfigure resources to realize value from

digital transformation (Froehlich et al., 2025; Xiong, 2024). These studies reinforce the RBV argument that performance gains depend not only on possessing resources but also on the organization's ability to deploy and combine them effectively.

The RBV perspective is directly relevant to the present study. Service innovation can be treated as an organizational capability for redesigning service processes and routines; time management can be treated as an organizational and employee capability for allocating and coordinating working time; and technology utilization can be treated as a technology-enabled resource capability. When these resources are effectively combined, they can improve process execution, reduce wasted time and resources, and support operational efficiency. Service innovation capability research also identifies RBV as an established theoretical lens for explaining how organizations repeatedly develop and improve services (Blommerde, 2023).

Service Innovation

Service innovation refers to the development or improvement of service processes, delivery methods, customer interfaces, and supporting routines. Service innovation capability enables organizations to repeatedly introduce or improve services and is associated with organizational performance (Blommerde, 2023). Empirical evidence indicates that service innovation is positively associated with firm performance when supported by technological and co-creation capabilities (Bhat & Sharma, 2022), while service innovation in Indonesian hotels has been linked with sustainable competitive advantage and performance (Sarya et al., 2022). By redesigning procedures, simplifying workflows, and improving service execution, service innovation can reduce unnecessary activities and support more efficient use of organizational resources.

Time Management

Time management concerns the planning, prioritization, allocation, and monitoring of work time. Effective time management can reduce delays, improve task sequencing, and support more predictable work completion. The established time-management literature emphasizes planning, prioritization, and control of working time as mechanisms for improving effectiveness (Claessens et al., 2007). Recent studies report positive relationships between time management and employee performance or productivity, particularly when employees can prioritize tasks and structure their working time effectively (Odoh, 2024; Sri et al., 2024; Wazdy et al., 2024). Mere (2024) also highlights prioritization, structured scheduling, and appropriate digital tools as practical time-management strategies. Pedersen et al. (2024) further show that time-management practices can shape productivity and coordination in contemporary workplaces. In schedule-sensitive service operations, these mechanisms provide a theoretical basis for expecting time management to improve operational efficiency.

Technology Utilization

Technology utilization refers to the extent to which employees and organizations use digital systems, information technologies, and technology-enabled tools to support operational activities. Technology becomes strategically useful when it is integrated with organizational capabilities and routines (Karim et al., 2022). Yu et al. (2022) found that digital transformation capability positively affects operational performance, while Liu et al. (2024) provide firm-level evidence that digitalization significantly enhances operational efficiency. Manresa et al. (2024) similarly show that digital technologies and organizational practices are relevant to operational efficiency. Recent work also emphasizes the role of digital transformation capabilities in improving organizational processes and performance (Dung et al., 2024; Zhang et al., 2024). In the Indonesian context, Sumampouw and Lonto (2026) report that accounting information systems can improve operational productivity, while Tikawati et al. (2026) find a positive effect of

technology adoption on business performance. Digital banking adoption has likewise been linked to improved organizational performance (Ali, 2025).

Operational Efficiency

Operational efficiency refers to the extent to which organizational resources are converted into service outputs effectively, with appropriate attention to time, process execution, resource utilization, and cost. In this study, operational efficiency is treated as an employee-perceived process-level outcome rather than as a direct accounting measure. This distinction is consistent with recent research that examines operational efficiency as an organizational outcome associated with digitalization, process integration, and organizational practices (Harahap et al., 2024; Liu et al., 2024; Manresa et al., 2024).

Hypotheses Development

Service Innovation and Operational Efficiency

Service innovation can improve operational efficiency by redesigning service processes, removing unnecessary steps, improving service consistency, and enabling employees to deliver services with available resources more effectively. The positive association between service innovation and organizational performance documented in prior research supports this expectation (Bhat & Sharma, 2022; Blommerde, 2023; Sarya et al., 2022). From an RBV perspective, service innovation is an internal capability that can create value when the organization develops and deploys it effectively. Therefore, service innovation is expected to improve operational efficiency.

H1: Service innovation has a positive effect on operational efficiency.

Time Management and Operational Efficiency

Time management can support operational efficiency by helping employees prioritize activities, allocate work time, minimize delays, and complete tasks within required schedules. The positive association between time management and job performance and work efficiency reported in prior research provides empirical support for this mechanism (Aeon et al., 2021; Lušňáková et al., 2021). Within RBV, effective time management represents a capability for coordinating an important organizational resource—working time. Therefore, better time management is expected to improve operational efficiency.

H2: Time management has a positive effect on operational efficiency.

Technology Utilization and Operational Efficiency

Technology utilization can improve operational efficiency by increasing information availability, reducing manual processing, accelerating routine activities, and strengthening coordination. Recent evidence indicates that digital transformation capability improves operational performance and that digitalization significantly enhances operational efficiency (Liu et al., 2024; Yu et al., 2022). RBV further suggests that technology generates value when it is effectively integrated with organizational processes and capabilities (Karim et al., 2022). Evidence from smart-technology applications also indicates positive effects on operational performance when technology is embedded in operational systems (Putri & Fikri, 2025). Therefore, technology utilization is expected to have a positive effect on operational efficiency.

H3: Technology utilization has a positive effect on operational efficiency.

Joint Effects of the Three Predictors

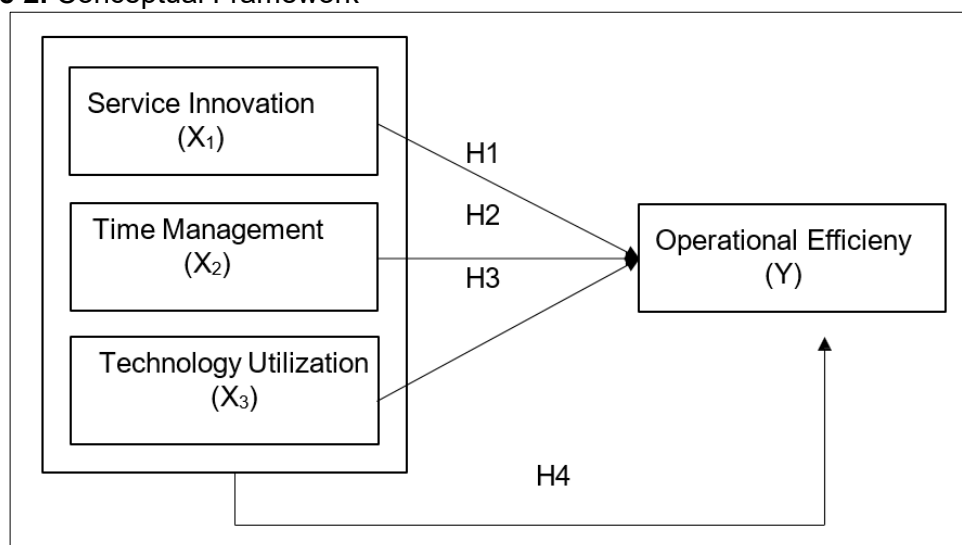
Operational efficiency is unlikely to depend on a single organizational resource or capability. Service innovation can redesign processes, time management can discipline execution, and technology utilization can support information flow and coordination. RBV emphasizes that competitive and performance outcomes can emerge from the effective combination and deployment of heterogeneous internal resources (Barney, 1991). Recent evidence on digital transformation similarly emphasizes the configuration of multiple organizational capabilities rather than technology alone (Froehlich et al., 2025). Accordingly, the simultaneous presence of the three predictors is expected to explain operational efficiency more strongly than any single predictor in isolation.

H4: Service innovation, time management, and technology utilization jointly have a significant effect on operational efficiency.

Conceptual Framework

The conceptual framework proposes that service innovation, time management, and technology utilization each have a positive direct relationship with operational efficiency. The model also proposes that the three predictors jointly explain operational efficiency. The directional paths are represented by H1–H4 in Figure 2. Consistent with RBV, the model treats the three predictors as complementary internal resources and capabilities whose effective combination may strengthen operational processes.

Figure 2. Conceptual Framework



RESEARCH METHOD

Research Design

This study employed a quantitative, explanatory, and cross-sectional research design. A quantitative approach was adopted because the study examined the relationships between measurable variables (service innovation, time management, technology utilization, and operational efficiency) using numerical data obtained through a structured questionnaire. The explanatory design was used to test the proposed relationships and determine the extent to which service innovation, time management, and technology utilization predict operational efficiency. Data were collected at a single point in time from operational employees of PT Reska Multi Usaha. The cross-sectional design was considered appropriate because the study aimed to capture respondents' perceptions and assessments of the four constructs during the period of data collection. The research design therefore provided a systematic basis for testing the hypotheses through statistical analysis, particularly multiple linear regression.

Population and Sample

The study population comprised 1,917 employees of PT Reska Multi Usaha. The sample consisted of 95 respondents selected from the population. Simple random sampling, as shown in Figure 3, was used so that each eligible employee on the available employee list had an equal probability of selection. The researchers first obtained the employee list, assigned an identification number to each eligible employee, and used a random-selection procedure to identify respondents before distributing the questionnaire. The sample size was calculated using the Slovin formula, $n = \frac{N}{1 + N(e)^2}$, with $N = 1,917$ and $e = 0.10$, resulting in approximately 95 respondents. The 10% margin of error was selected as a pragmatic precision level for an exploratory organizational survey with a known and relatively large population, while the limitation of this relatively wide error tolerance is acknowledged when interpreting generalizability. Participation was voluntary, and respondents were informed that their responses would be treated confidentially.

$$n = \frac{N}{1 + N(e)^2}$$

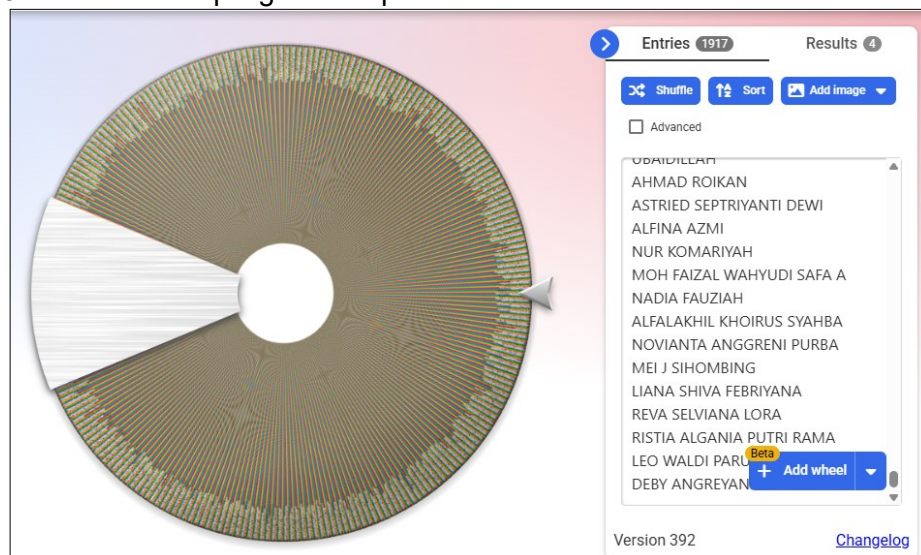
$$n = \frac{1.917}{1 + 1.917(0.10)^2}$$

$$n = \frac{1.917}{1 + 19,17}$$

$$n = \frac{1.917}{20,17} \approx 95$$

The final sample therefore comprised 95 operational employees. The questionnaire did not request respondents' names or other direct identifiers, and participation was voluntary. Respondents were informed about the purpose of the study and the confidentiality of their responses.

Figure 3. Random Sampling Technique



Data Collection and Variable Measurement

The primary instrument was a structured closed-ended questionnaire using a five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The instrument retained the operationalization documented in the thesis and comprised 18 items for service innovation (X1), 30 items for time management (X2), 27

items for technology utilization (X3), and 24 items for operational efficiency (Y). The indicator structure was theoretically grounded in recent service-innovation, time-management, digitalization, and operational-efficiency literature, including [Aeon et al. \(2021\)](#), [Blommerde \(2023\)](#), [Karim et al. \(2022\)](#), [Liu et al. \(2024\)](#), and [Manresa et al. \(2024\)](#).

Data Analysis

Data were analyzed using descriptive and inferential statistical procedures. Descriptive analysis was used to summarize the characteristics of the respondents and the distribution of responses for each research variable. Instrument quality was assessed through validity and reliability testing. Classical assumption tests included normality and multicollinearity, with heteroscedasticity also examined before estimating the regression model. Multiple linear regression was then employed to examine the effects of service innovation (X1), time management (X2), and technology utilization (X3) on operational efficiency (Y). The t-test was used to evaluate the individual effects of the independent variables, while the F-test assessed their joint effect on operational efficiency. The coefficient of determination (R^2) was used to evaluate the proportion of variation in operational efficiency explained by the independent variables. Statistical significance was evaluated using a 5% significance level.

RESULTS

Respondents' Demographic Profile

Table 1. Respondents' Demographic Profile

Characteristic	Category	Frequency (n)	Percentage (%)
Age	21-30 years	70	74
	31-40 years	25	26
	> 40 years	0	0
Gender	Male	37	39
	Female	58	61
Education	Senior High School (SMA)	76	80
	Associate's degree (D3)	0	0
	Bachelor's degree (S1)	19	20
	Master's degree (S2)	0	0
Length of service	< 10 years	95	100
	10 years or more	0	0

[Table 1](#) presents the demographic profile of 95 employees as the respondents of this study. It summarizes the respondents' demographic characteristics by age, gender, education, and length of service. In terms of age, the sample was dominated by 70 employees aged 21–30 (74%). Furthermore, there were more female respondents than male respondents: 58 females (61%) and 37 males (39%). Based on educational background, employees with a high school education accounted for the majority, totaling 76 people (80%), followed by 19 employees (20%) with a bachelor's degree. Meanwhile, there were no employees with an associate's or master's degree. The last is length of service. A total of 95 respondents had less than 10 years of service (100%).

Descriptive, Validity, and Reliability Results

Table 2. Descriptive Statistics of Study

Construct	N	Min.	Max.	Mean	Std. Deviation
Operational Efficiency (Y)	95	47.00	118.00	86.04	15.79
Service Innovation (X1)	95	18.00	90.00	63.20	16.42
Time Management (X2)	95	40.00	150.00	108.51	26.54
Technology Utilization (X3)	95	30.00	135.00	94.82	27.58

Table 2 presents the descriptive statistics for the 95 respondents. The Operational Efficiency variable (Y) ranges from 47 to 118, with a mean of 86.04 and a standard deviation of 15.79. The relatively high mean indicates that respondents generally perceive operational efficiency positively. The standard deviation suggests a moderate degree of variation in responses, indicating that respondents' perceptions are relatively consistent. The Service Innovation variable (X1) has a minimum value of 18 and a maximum value of 90, with a mean of 63.20 and a standard deviation of 16.42. These results indicate that service innovation is generally perceived positively by the respondents. Nevertheless, the standard deviation indicates a moderate level of variability, suggesting that perceptions of service innovation differ to some extent across respondents. The Time Management variable (X2) ranges from 40 to 150, with a mean of 108.51 and a standard deviation of 26.54. The mean indicates that time management is generally rated positively. However, the relatively large standard deviation reflects greater variability in respondents' perceptions, suggesting that the effectiveness of time management may vary across respondents.

A similar pattern is observed for the Technology Utilization variable (X3), which ranges from 30 to 135, with a mean of 94.82 and a standard deviation of 27.58. The mean indicates a generally positive perception of technology utilization, whereas the relatively high standard deviation suggests considerable variation in respondents' assessments. This variation may indicate differences in the extent to which technology is utilized or understood among the respondents. Overall, the descriptive statistics indicate that Operational Efficiency, Service Innovation, Time Management, and Technology Utilization are generally perceived positively. However, the relatively high variability observed, particularly in Time Management and Technology Utilization, indicates differences in respondents' perceptions that warrant further examination. These descriptive findings provide a general overview of the data and serve as a basis for subsequent inferential analyses examining the relationships among the variables.

Validity Results

Table 3. Validity Test Results of Service Innovation

Variable	Items	Corrected Item- Total Correlation/ R_{count}	R_{table}	Decision
Service Innovation (X1)	1	0.884	0.202	Valid
	2	0.894	0.202	Valid
	3	0.883	0.202	Valid
	4	0.894	0.202	Valid
	5	0.916	0.202	Valid
	6	0.891	0.202	Valid
	7	0.884	0.202	Valid
	8	0.870	0.202	Valid
	9	0.887	0.202	Valid
	10	0.897	0.202	Valid
	11	0.847	0.202	Valid
	12	0.899	0.202	Valid
	13	0.876	0.202	Valid
	14	0.881	0.202	Valid
	15	0.846	0.202	Valid
	16	0.881	0.202	Valid
	17	0.882	0.202	Valid

	18	0.871	0.202	Valid
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Table 3 presents the results of the validity test for the Service Innovation variable (X1) based on data from 95 respondents. At the 5% significance level ($\alpha = 0.05$), the R table value is 0.202. The Corrected Item-Total Correlation coefficients for all 18 items exceed the R table, with coefficients ranging from 0.846 to 0.916. These results indicate that each item demonstrates a strong correlation with the overall score of the Service Innovation construct. Therefore, all 18 items measuring Service Innovation (X1) meet the established validity criterion and can be retained for subsequent analysis. The validated items were subsequently subjected to reliability testing to assess the internal consistency of the measurement instrument.

Table 4. Validity Test Results of Time Management

Variable	Items	Corrected Item-Total Correlation/ R_{count}	R_{table}	Decision
Time Management (X2)	1	0.892	0.202	Valid
	2	0.881	0.202	Valid
	3	0.884	0.202	Valid
	4	0.866	0.202	Valid
	5	0.905	0.202	Valid
	6	0.864	0.202	Valid
	7	0.889	0.202	Valid
	8	0.850	0.202	Valid
	9	0.841	0.202	Valid
	10	0.886	0.202	Valid
	11	0.871	0.202	Valid
	12	0.861	0.202	Valid
	13	0.868	0.202	Valid
	14	0.867	0.202	Valid
	15	0.865	0.202	Valid
	16	0.862	0.202	Valid
	17	0.897	0.202	Valid
	18	0.831	0.202	Valid
	19	0.865	0.202	Valid
	20	0.887	0.202	Valid
	21	0.899	0.202	Valid
	22	0.892	0.202	Valid
	23	0.900	0.202	Valid
	24	0.879	0.202	Valid
	25	0.876	0.202	Valid
	26	0.896	0.202	Valid
	27	0.883	0.202	Valid
	28	0.897	0.202	Valid
	29	0.855	0.202	Valid
	30	0.861	0.202	Valid

Table 4 presents the validity test results for the Time Management variable (X2), based on responses from 95 respondents. At the 5% significance level ($\alpha = 0.05$), the R table value is 0.202. All 30 items demonstrate Corrected Item-Total Correlation coefficients exceeding R table, with coefficients ranging from 0.831 to 0.905. These findings indicate that each item has a strong correlation with the overall score of the Time Management construct. Accordingly, all 30 items measuring Time Management (X2) satisfy the

established validity criterion and can be retained for subsequent analysis. The validated items were then subjected to reliability testing to assess the internal consistency of the measurement instrument.

Table 5. Validity Test Results of Technology Utilization

Variable	Items	Corrected Item- Total Correlation/ R_{count}	R_{table}	Decision
Technology Utilization (X3)	1	0.882	0.202	Valid
	2	0.903	0.202	Valid
	3	0.907	0.202	Valid
	4	0.896	0.202	Valid
	5	0.899	0.202	Valid
	6	0.891	0.202	Valid
	7	0.907	0.202	Valid
	8	0.922	0.202	Valid
	9	0.913	0.202	Valid
	10	0.904	0.202	Valid
	11	0.924	0.202	Valid
	12	0.896	0.202	Valid
	13	0.892	0.202	Valid
	14	0.888	0.202	Valid
	15	0.897	0.202	Valid
	16	0.915	0.202	Valid
	17	0.924	0.202	Valid
	18	0.906	0.202	Valid
	19	0.894	0.202	Valid
	20	0.892	0.202	Valid
	21	0.923	0.202	Valid
	22	0.901	0.202	Valid
	23	0.909	0.202	Valid
	24	0.904	0.202	Valid
	25	0.881	0.202	Valid
	26	0.914	0.202	Valid
	27	0.865	0.202	Valid

Table 5 presents the validity test results for the Technology Utilization variable (X3), based on responses from 95 respondents. At the 5% significance level ($\alpha = 0.05$), the R table value is 0.202. All 27 items demonstrate Corrected Item-Total Correlation coefficients exceeding the R table, with coefficients ranging from 0.865 to 0.924. These findings indicate that each item has a strong correlation with the overall score of the Technology Utilization construct. Accordingly, all 27 items measuring Technology Utilization (X3) satisfy the established validity criterion and can be retained for subsequent analysis. The validated items were then subjected to reliability testing to assess the internal consistency of the measurement instrument.

Table 6. Validity Test Results of Operational Efficiency

Variable	Items	Corrected Item- Total Correlation/ R_{count}	R_{table}	Decision
Operational Efficiency (Y)	1	0.765	0.202	Valid
	2	0.719	0.202	Valid
	3	0.824	0.202	Valid

	4	0.751	0.202	Valid
	5	0.791	0.202	Valid
	6	0.746	0.202	Valid
	7	0.749	0.202	Valid
	8	0.828	0.202	Valid
	9	0.820	0.202	Valid
	10	0.813	0.202	Valid
	11	0.771	0.202	Valid
	12	0.756	0.202	Valid
	13	0.797	0.202	Valid
	14	0.809	0.202	Valid
	15	0.815	0.202	Valid
	16	0.818	0.202	Valid
	17	0.772	0.202	Valid
	18	0.790	0.202	Valid
	19	0.776	0.202	Valid
	20	0.820	0.202	Valid
	21	0.729	0.202	Valid
	22	0.811	0.202	Valid
	23	0.776	0.202	Valid
	24	0.763	0.202	Valid

Table 6 presents the validity test results for the Operational Efficiency variable (Y), based on responses from 95 respondents. At the 5% significance level ($\alpha = 0.05$), the R table value is 0.202. All 24 items demonstrate Corrected Item-Total Correlation coefficients exceeding the R table, with coefficients ranging from 0.719 to 0.828. These findings indicate that each item has a strong correlation with the overall score of the Operational Efficiency construct. Accordingly, all 24 items measuring Operational Efficiency (Y) satisfy the established validity criterion and can be retained for subsequent analysis. The validated items were subsequently subjected to reliability testing to assess the internal consistency of the measurement instrument.

Table 7. Reliability Results

Variable	Cronbach's Alpha	Critical Value	Decision
Operational Efficiency (Y)	0.976	0.70	Reliable
Service Innovation (X1)	0.985	0.70	Reliable
Time Management (X2)	0.990	0.70	Reliable
Technology Utilization (X3)	0.992	0.70	Reliable

Table 7 presents the results of the reliability test for all variables examined in this study. The Cronbach's Alpha coefficients for all variables exceed the commonly accepted threshold of 0.70, indicating satisfactory internal consistency of the measurement instruments. The Operational Efficiency variable (Y) obtained a Cronbach's Alpha coefficient of 0.976, followed by Service Innovation (X1) at 0.985, Time Management (X2) at 0.990, and Technology Utilization (X3) at 0.992. These coefficients indicate a high level of internal consistency among the items within each construct, suggesting that the instruments provide consistent measurements. Therefore, all measurement instruments meet the reliability criterion and are suitable for subsequent statistical analyses, including hypothesis testing of the effects of Service Innovation, Time Management, and Technology Utilization on Operational Efficiency at PT Reska Multi Usaha.

Classical Assumption Test

Classical assumption tests were conducted to ensure that the multiple linear regression model used in this study meets basic statistical requirements. Meeting the classical assumptions is crucial to accurately interpreting the regression analysis results and avoiding bias. In this study, the classical assumption tests performed included normality, multicollinearity, and heteroscedasticity tests.

Normality Test

The normality test aims to determine whether the residual values from a regression model are normally distributed. A normal residual distribution is one of the main requirements for optimal regression model use. The normality test in this study was conducted using a statistical test, where data are considered normally distributed if the significance value is greater than 0.05.

Table 8. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		95
Normal Parameters ^{a,b}	Mean	0.0000000
	Std. Deviation	6.68170508
Most Extreme Differences	Absolute	0.045
	Positive	0.045
	Negative	-0.040
Test Statistics		0.045
Asymp. Sig. (2-tailed)		0.200 ^{c,d}

Based on the test results in [Table 8](#), the significance value obtained was above 0.05. This indicates that the residuals in the regression model are normally distributed. Therefore, the assumption of normality in this study has been met.

Multicollinearity Test

A multicollinearity test is performed to determine whether there is a strong relationship between independent variables in a regression model. The presence of multicollinearity can disrupt the stability of the regression coefficients and complicate the interpretation of research results. Multicollinearity testing is performed by examining the Tolerance and Variance Inflation Factor (VIF) values.

Table 9. Multicollinearity Test Results

No	Variable	Tolerance	VIF	Decision
1	Service innovation (X1)	0.994	1.007	Free from multicollinearity
2	Time management (X2)	0.972	1.028	Free from multicollinearity
3	Utilization of technology (X3)	0.972	1.028	Free from multicollinearity

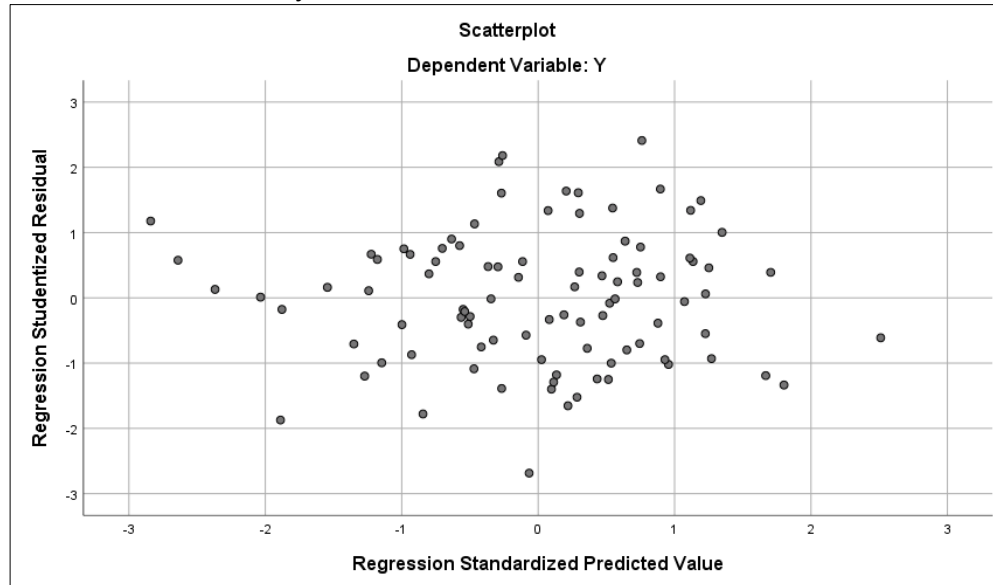
[Table 9](#) shows that all independent variables have a tolerance value greater than 0.10 and a VIF value less than 10. This shows that the independent variables are not highly correlated with each other, so it can be concluded that the regression model is free from multicollinearity.

Heteroscedasticity Test

The heteroscedasticity test was conducted to determine whether there were differences in residual variances in the regression model. A good regression model requires that the residual variances be constant or homoscedastic. If heteroscedasticity occurs, the estimation of the regression coefficients can be inefficient and potentially lead to errors in drawing conclusions. The heteroscedasticity test in this study was conducted using a scatter plot, namely by mapping the residual values (ZRESID) on the vertical axis and

the predicted values (ZPRED) on the horizontal axis. The purpose of this test was to determine whether there were differences in residual variances in the regression model used. The test results can be seen in Figure 4.

Figure 4. Heteroscedasticity Test Results



Based on the scatter plot results, the residual points are randomly distributed, both above and below the zero line on the Y-axis, and do not form a specific pattern, such as a tapered, widened, or wavy pattern. This pattern less distribution of points indicates that the residual variance is relatively constant across all predicted values. Thus, it can be concluded that there are no symptoms of heteroscedasticity in the regression model used. This indicates that the homoscedasticity assumption has been met, making the regression model suitable for further analysis, including hypothesis testing.

Multiple Linear Regression Analysis

Multiple linear regression analysis was used in this study to determine the effect of Service Innovation (X1), Time Management (X2), and Technology Utilization (X3) on Operational Efficiency (Y) at PT Reska Multi Usaha, both partially and simultaneously. This analysis was conducted after the research data met all classical assumptions, so that the regression model used was declared feasible and statistically valid.

The following table summarizes the results of the regression coefficient, t-test, significance value, F-test, and R-square (R2) values. The results can be seen in the following table:

Table 10. Summary of Multiple Linear Regression Analysis Test

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.618	5.140		-2.066	0.042
	Service innovation (X1)	0.432	0.043	0.449	9.983	0.000
	Time management (X2)	0.269	0.027	0.452	10.051	0.000
	Utilization of technology (X3)	0.424	0.025	0.740	16.627	0.000
a. Dependent Variable: Y						

Table 10 reports the estimated coefficients. Service innovation ($\beta = 0.432$, $p < 0.001$), time management ($\beta = 0.269$, $p < 0.001$), and technology utilization ($\beta = 0.424$, $p < 0.001$) are all positively associated with operational efficiency.

Table 11. F Test Results

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19239.184	3	6413.061	139.061	0.000 ^b
	Residual	4196.647	91	46.117		
	Total	23435.832	94			

Table 11 presents the regression model is statistically significant ($F = 139.061$, $p < 0.001$). This result indicates that service innovation, time management, and technology utilization jointly have a significant effect on operational efficiency at PT Reska Multi Usaha. Therefore, H4 is supported, confirming that the three independent variables collectively contribute to explaining variations in operational efficiency.

Table 12. Hypothesis Testing Results

Hypothesis and Relationship		Coefficient / F	p-value	Decision
H1	Service Innovation → Operational Efficiency	$\beta = 0.432$; $t = 9.983$	< 0.001	Supported
H2	Time Management → Operational Efficiency	$\beta = 0.269$; $t = 10.051$	< 0.001	Supported
H3	Technology Utilization → Operational Efficiency	$\beta = 0.424$; $t = 16.627$	< 0.001	Supported
H4	X1, X2, X3 → Operational Efficiency	$F = 139.061$	< 0.001	Supported

Table 12 summarizes the hypothesis tests. All three direct effects are positive and statistically significant, and the simultaneous F-test is also significant. Therefore, H1, H2, H3, and H4 are supported. Technology utilization has the largest standardized coefficient ($\beta = 0.740$), indicating the strongest relative association with operational efficiency among the three predictors in this sample.

Testing the Coefficient of Determination (R²)

The coefficient of determination was used to assess the proportion of variance in operational efficiency explained by the predictors. Higher R² values indicate greater explanatory power within the sample, but do not by themselves establish causality or out-of-sample accuracy.

Table 13. Coefficient of Determination

Model Summary				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.906a	0.821	0.815	6.79095

Table 13 shows $R^2 = 0.821$ and adjusted $R^2 = 0.815$. Thus, 82.1% of the observed variation in operational efficiency is explained by service innovation, time management, and technology utilization in the estimated sample model, while 17.9% remains associated with factors outside the model. The adjusted R² of 0.815 indicates that the model retains substantial explanatory power after accounting for the number of predictors. It should be interpreted as explanatory power rather than evidence that the model is free from overestimation. In addition, an R value of 0.906 indicates a very strong

relationship between the variables of service innovation, time management, and technology utilization and operational efficiency. Thus, it can be concluded that the regression model in this study has a high degree of accuracy and is suitable for explaining the relationship between the independent and dependent variables.

DISCUSSION

Service Innovation and Operational Efficiency (H1)

Service innovation has a positive and significant association with operational efficiency ($\beta = 0.432$, $p < 0.001$); therefore, H1 is supported. The result indicates that improvements in service procedures, service methods, and work-process design are associated with more efficient operational execution. This result is consistent with evidence that service innovation capability supports organizational performance and repeated service improvement (Blommerde, 2023), as well as empirical evidence linking service innovation with firm performance and technological or co-creation capabilities (Bhat & Sharma, 2022). It is also consistent with evidence from Indonesian hotels that service innovation is associated with sustainable competitive advantage and performance (Sarya et al., 2022), as well as research showing that service digitalization can improve operational efficiency by integrating service processes (Harahap et al., 2024). From the RBV perspective, service innovation represents an internal capability that creates value when the organization can develop and deploy it effectively. The practical implication is that managers should focus innovation efforts on measurable process improvements, such as reducing redundant steps, simplifying service procedures, and redesigning workflows around operational bottlenecks.

Time Management and Operational Efficiency (H2)

Time management also has a positive and significant association with operational efficiency ($\beta = 0.269$, $p < 0.001$), supporting H2. The result indicates that employees who are better able to prioritize tasks, allocate work time, and complete activities within required schedules tend to report higher operational efficiency. This finding is in line with Aeon et al. (2021), who found a moderate relationship between time management and job performance, and Lušňáková et al. (2021), who reported that time-management practices are associated with managerial work efficiency and productivity. Pedersen et al. (2024) further show that contemporary time-management practices shape how work is structured and coordinated. Under RBV, effective time management can be viewed as a capability for coordinating working time as an organizational resource. Managers should therefore strengthen scheduling, task prioritization, and workload coordination rather than treating time management solely as an individual skill.

Technology Utilization and Operational Efficiency (H3)

Technology utilization shows the strongest relative association with operational efficiency among the three predictors ($\beta = 0.424$, $p < 0.001$; $\beta = 0.740$), H3 is supported. The result indicates that technology-enabled work processes are strongly associated with faster information processing, greater coordination, and more efficient execution. This finding is consistent with firm-level evidence that digital technology adoption can improve productivity and that the effect can be particularly pronounced in service firms (Oduro et al., 2023). It also aligns with evidence that digital transformation improves operating efficiency when technology is embedded in organizational processes (Dung et al., 2024). Indonesian evidence on service digitalization and accounting information systems likewise points to improvements in operational efficiency and productivity (Harahap et al., 2024; Sumampouw & Lonto, 2026). The result should not be interpreted as meaning that technology automatically creates efficiency; rather, the magnitude of the coefficient suggests that technology utilization is an especially important operational capability in this setting. Management should therefore prioritize reliable systems,

employee training, and integration between operational information systems and day-to-day service routines.

Joint Effect of Service Innovation, Time Management, and Technology Utilization (H4)

The simultaneous model is statistically significant ($F = 139.061$, $p < 0.001$), supporting H4. Together, the three predictors explain 82.1% of the variation in operational efficiency ($R^2 = 0.821$). The result supports the argument that operational efficiency is better understood as an integrated organizational outcome than as the product of a single managerial practice. It is supported by RBV argument that organizational performance can emerge from the effective deployment and combination of heterogeneous internal resources and capabilities (Barney, 1991). Service innovation redesigns how activities are performed, time management coordinates when activities are performed, and technology utilization supports the information and coordination mechanisms that connect these activities. For transportation-support service organizations, the practical implication is that isolated interventions may be less effective than integrated operational programs that combine process redesign, work-time coordination, and technology-enabled execution.

CONCLUSION

This study concludes that service innovation, time management, and technology utilization are positively associated with operational efficiency at PT Reska Multi Usaha. The findings indicate that improvements in service processes and service delivery, more effective management of employees' work time, and the appropriate use of technology can each contribute to more efficient organizational operations. Furthermore, the three factors jointly contribute to operational efficiency, suggesting that improvements are more effective when service innovation, time management, and technology utilization are addressed as interconnected components of organizational operations rather than as isolated practices.

Theoretically, this study contributes to the RBV by demonstrating how organizational resources and capabilities related to service innovation, time management, and technology utilization can be leveraged to support operational efficiency. The findings extend the application of RBV beyond conventional discussions of competitive advantage by highlighting its relevance to day-to-day operational processes and service delivery. Practically, PT Reska Multi Usaha should integrate these three areas into its operational strategies by encouraging service-process improvement, strengthening work planning and time allocation, and ensuring that technology is effectively incorporated into operational activities.

LIMITATION

This study has several limitations. First, the cross-sectional design limits causal interpretation. Second, operational efficiency was measured through employee self-reports, which may introduce common-method and self-report bias. Third, the sample was limited to one transportation-support organization and used a 10% margin of error, which limits generalizability. Fourth, the study did not include objective operational measures alongside the questionnaire. Future research could examine other organizational and contextual factors that may influence operational efficiency and employ broader samples, longitudinal designs, or comparative settings to provide a more comprehensive understanding of these relationships.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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ABOUT THE AUTHOR(S)

1st Author

Reviandi is a graduate of the master's program in Management at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia. He earned his Bachelor's degree in Socio-Economics from the Faculty of Animal Husbandry at Universitas Andalas. His research interests include service operations, human resource management, and operational efficiency.

Email: reviandi23@gmail.com

ORCID ID: <https://orcid.org/0009-0002-3887-606X>

2nd Author

Dr. Sumiati, S.E., M.M., CPHRM, is a lecturer at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia, and serves as Head of the Master of Management Program. She holds a doctorate from Universitas Negeri Padang. Her research interests include human resource management, organizational performance, and sustainable management.

Email: sumiati@akbpstie.ac.id

ORCID ID: <https://orcid.org/0000-0002-8053-260X>

3rd Author

Erdayono is a graduate of the master's program in Management at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia. He earned his Bachelor's degree in History Education at Sekolah Tinggi Keguruan dan Ilmu Pendidikan Persatuan Guru Republik Indonesia Sumatera Barat.

Email: erdayonosmk@gmail.com

ORCID ID: <https://orcid.org/0009-0008-7902-6823>

4th Author

Wahidin is a graduate of the master's program in Management at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia.

Email: wahidinyeni896@gmail.com

ORCID ID: <https://orcid.org/0009-0009-5294-3506>

5th Author

Ali Sadikin is a graduate of the master's program in Management at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia. He earned his Bachelor's degree in *Analisis Kesehatan*.

Email: alisadikin3333@gmail.com

ORCID ID: <https://orcid.org/0009-0008-4330-3032>

6th Author

Yusuf Haidir is a graduate of the master's program in Management at Sekolah Tinggi Ilmu Ekonomi KBP, Padang, Indonesia. He earned his Bachelor's degree in English Language Education at STKIP Muhammadiyah Sungai Penuh.

Email: yusufhaidir@gmail.com

ORCID ID: <https://orcid.org/0009-0002-3666-0927>