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Systemic Integration of Artificial Intelligence in Indonesian Television Using Soft Systems Methodology

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Abstract

The television industry faces significant challenges due to digital disruption, particularly the increasingly widespread penetration of artificial intelligence (AI) technology. AI has the potential to optimize production, distribution, and audience preference analysis, but its implementation faces the complexities of unstructured social systems. This study aims to explore the systemic application of AI using a Soft Systems Methodology (SSM) approach to identify, analyze, and optimize its use in the television industry. The research method used was qualitative with a case study design at a national television station. The SSM process was carried out through seven stages, starting from exploring the problem situation, compiling rich pictures, analyzing CATWOE, and formulating and evaluating corrective actions. Data were collected through literature review, participant observation, and internal document analysis. The results show that SSM is effective in identifying strategic areas for AI optimization, particularly in audience segmentation, content automation, and broadcast management. The resulting framework is flexible, participatory, and responsive to the social dynamics of media organizations. The impact of this research is a contribution to the development of media information systems and technology, as well as expanding the scope of soft methodologies in responding to the challenges of digital transformation in an adaptive and sustainable manner.

Keywords: *Soft System Methodology, Artificial Intelligence for media, Digital Transformation, Television Industry*

1. INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has significantly transformed various industrial sectors, including the television industry. Beyond enhancing operational efficiency, AI enables transformation across content production, distribution, and personalized audience engagement. Empirical findings suggest that AI implementation improves content personalization and streamlines workflows; however, it also raises critical concerns regarding user privacy and the broader societal implications of automation [1]. In an increasingly competitive media landscape shaped by digital audiences, the strategic deployment of AI has become essential for television broadcasters to maintain relevance and competitive advantage [2].

AI-driven tools enhance audience experience through personalized recommendations and intelligent production workflows [3][4]. These developments are reshaping content consumption behaviors, fostering user satisfaction, and improving viewer retention [5].

Despite these advancements, the integration of AI in television broadcasting is fraught with challenges. Organizational complexity, divergent stakeholder interests, and uncertainty in technological adoption often hinder the full realization of AI's potential. Therefore, a purely technical approach is insufficient. A systemic and holistic strategy is necessary to ensure effective implementation and organizational alignment.

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Soft Systems Methodology (SSM) offers a systemic, interpretive, and participatory framework designed to address complex and unstructured problems in social systems [6][7]. In the context of the broadcasting industry, SSM provides a structured approach to understanding the multifaceted challenges of AI adoption, encompassing technological, strategic, and regulatory dimensions to build sustainable competitive advantage [8]. Its strength lies in facilitating stakeholder engagement and collective problem-solving within complex environments influenced by digital transformation.

Using SSM to examine AI integration in content creation, distribution, and consumption emphasizes the importance of a systems perspective in navigating the evolving media ecosystem [5]. This study contributes not only to the theoretical development of systemic methodologies but also offers practical insights for designing an inclusive and sustainable roadmap for digital transformation in the television sector amid the AI era [9].

Recent studies have highlighted AI-driven advances such as news production automation, content recommendation systems, and predictive audience analytics. However, many of these initiatives have predominantly focused on technical and siloed approaches, often neglecting cross-functional coordination and the socio-organizational impact of AI adoption [10]. This lack of systemic thinking frequently results in implementation failures due to internal resistance, miscommunication across departments, and misalignment between technology strategies and operational realities.

SSM addresses these gaps by integrating technical and social dimensions through dialogic, participatory, and reflective analysis. By involving stakeholders in problem exploration and collaborative solution design, SSM helps bridge interdepartmental gaps, align digital transformation visions, and formulate AI implementation strategies that are context-sensitive, adaptive, and sustainable [3][11][12].

AI interventions, when analyzed through the SSM lens, are situated within broader social systems rather than viewed solely as technical enhancements. This perspective ensures that AI solutions are more targeted, internally accepted, and viable in terms of organizational culture and regulatory compliance. SSM enables adaptive implementation that reflects the operational and social realities of television broadcasters, facilitating inclusive transformation that respects institutional structures, audience expectations, and privacy considerations.

This study aims to develop an SSM-based systemic framework to optimize AI integration in the production, distribution, and audience analytics of Indonesian television. The focus is on enhancing operational efficiency and content personalization. Additionally, this research addresses a critical gap in the literature by exploring the intersection of soft systems methodologies and advanced technologies like AI within the media industry, with a particular emphasis on broadcasting.

2. METHOD

2.1. Research Approach

This study employs a qualitative approach using the Soft Systems Methodology (SSM) framework developed by Peter Checkland [13][14]. SSM was selected due to its capability to address the complexity of unstructured social systems [15], particularly in the context of Artificial Intelligence (AI) adoption within the television industry [16]. The core focus of this approach lies in understanding stakeholders' diverse perspectives and formulating systemic solutions to optimize AI implementation. This research is an exploratory case study aimed at investigating real-world conditions in Indonesia's broadcasting industry, with a particular emphasis on AI integration in production, post-production, content distribution, and audience
behavior analysis [17]. The flowchart of the seven stages of SSM is illustrated in Figure 1 [18].

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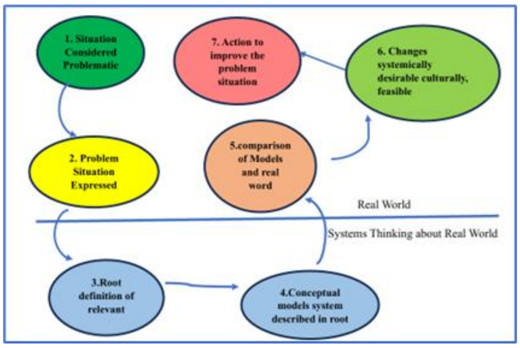

Figure 1. Seven Stages in Software Systems Methodology

Figure 1. illustrates the seven stages that form the methodological foundation of this study. These stages are structured into two main components: Systems Thinking about the Real World as the conceptual (ideal) model, and the Real World as the actual system (reality). Each stage produces distinct outputs that are sequential, interconnected, and mutually reinforcing.

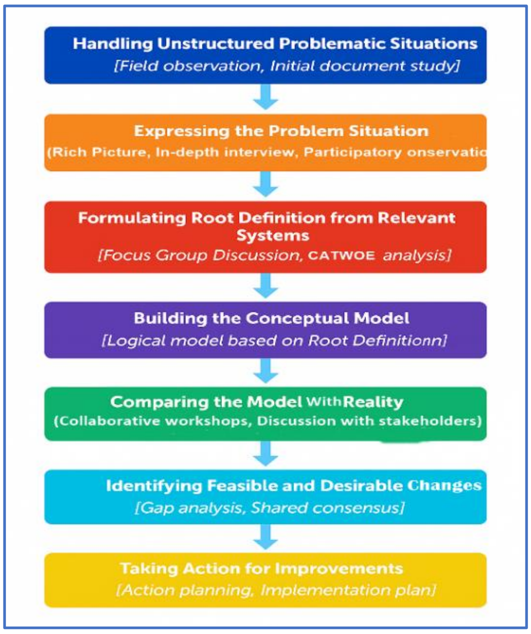

Figure 2. Flowchart of SSM Stages and Field Activities

Stage 1: Situation Considered Problematic (Unstructured Problem Situation)
This stage involves initial data collection through structured interviews and internal document analysis to understand the challenges and barriers to AI adoption in television organizations. Activities include preliminary observation, document review, and informal discussions to explore the social, cultural, and technical contexts.

Stage 2: Problem Situation Expresse
The situation is articulated through a Rich Picture illustrating organizational dynamics, stakeholders, conflicts, and AI-related processes. Activities include Rich Picture development in-depth interviews, and participatory observation to capture structures, processes, and inter actor conflicts.

Stage 3: Root Definition of Relevant System
Root definitions are developed using the CATWOE framework (Customers, Actors, Transformation, Weltanschauung, Owners, Environment) to formulate relevant human activity systems. Activities involve focus group discussions (FGDs) and stakeholder-based CATWOE analysis;

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Stage 4: Conceptual Models Based on Root Definitions
This stage constructs conceptual models of ideal system activities aimed at optimizing AI, such as data-driven decision-making, production automation, and machine learning integration. Activities include mapping logical sequences of key processes based on root definitions.
Stage 5: Comparison of Models and Real World
Conceptual models are compared with actual conditions to identify gaps, inefficiencies, and areas for potential intervention. Activities involve structured discussions or workshops with stakeholders to align the models with real-world practices.
Stage 6: Changes: Systemically Desirable, Culturally Feasible
This stage identifies feasible and desirable changes through FGDs involving IT teams, producers, management, and other stakeholders. Activities include gap analysis, consensus-building, and prioritization of interventions.
Stage 7: Action to Improve the Problem Situation
Pilot actions are implemented within a selected production unit to validate the system for broader organizational application. Activities include developing action plans, allocating resources, and designing collaborative implementation strategies.

2.2. Data Collection, Analysis, and Validation Techniques

This study primarily utilizes secondary data obtained from existing literature [19]. In addition to secondary sources, data were collected through expert discussions with professionals in the fields of television broadcasting and artificial intelligence (AI), as well as from reputable media outlets and key media stakeholders. Field observations were also conducted within media industries, alongside the examination of accessible internal documents from publicly listed television and digital content companies. Company websites were reviewed to analyze their digitalization roadmaps and AI transformation strategies.

The data were analyzed using a descriptive-qualitative approach, incorporating both source and methodological triangulation. In-depth analysis employed system diagrams, mathematical optimization models for AI implementation, problem situation mapping, and the development of systemic solutions based on the Soft Systems Methodology (SSM). Data validity was ensured through triangulation, member checks with key informants, and semi-structured discussions of analytical results with experts in information systems and AI. A flowchart of the research process is illustrated in the following figure:

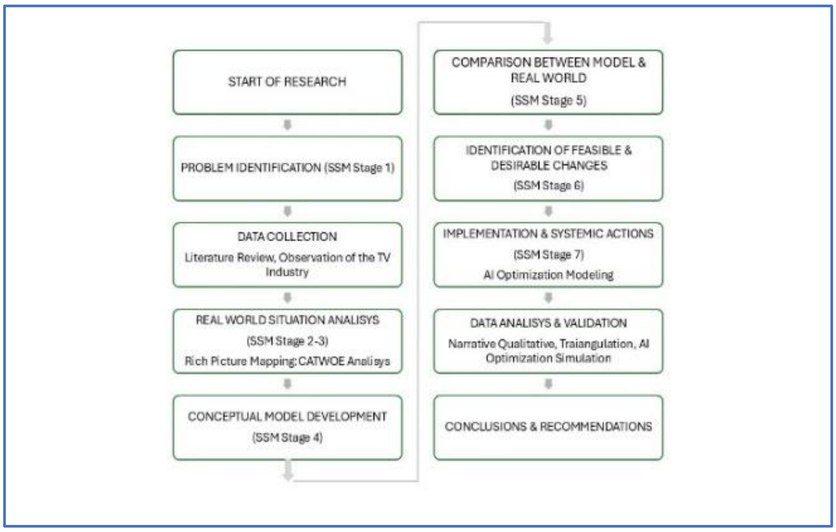

Figure 3. Research Flow Diagram

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Figure 3 presents the research flow diagram, which follows the sequential stages of the Soft Systems Methodology (SSM). Each stage produces measurable outputs that serve as inputs for subsequent stages, ultimately forming an integrated and cohesive research process.

3. RESULT

3.1. Rich Picture of AI Implementation in the Television Industry

The Rich Picture within the Soft Systems Methodology (SSM) framework illustrates the complexity of AI implementation in the television media industry. It highlights several key issues: suboptimal integration of AI technology in content production and distribution, low AI literacy among production and editorial staff, lack of a clear digital transformation strategy and AI adoption roadmap, and cultural resistance to AI-driven content creation.

The depiction includes various stakeholders: TV station management (as decision-makers), IT or technology teams (as AI developers and integrators), production teams (as users of AI in creative processes), audiences (as recipients of AI-generated content), AI technology vendors (as system providers), and digital transformation consultants (as roadmap planners) [17][20].

The main processes involved include content production (manual vs. AI-automated), AI-based content recommendation, audience behavior data processing, multi-platform content distribution, and AI-related human resource training. The dynamic systemic environment encompasses broadcasting regulations, global trends in AI adoption in media, competition among TV stations, and emerging technologies (e.g., generative AI, natural language processing, big data).

Figure 4. Rich Picture of AI Implementation in the Television Industry
Source: Generated by AI

Figure 4 illustrates a Rich Picture of the digital transformation ecosystem in the broadcasting industry, particularly focusing on the integration of Artificial Intelligence (AI) within a television (TV) station. The adoption of AI in the media industry extends beyond technological implementation, involving human adaptation, business decision-making, organizational culture shifts, and major challenges related not only to technical aspects but also to cross-functional communication and public education.

The TV station, positioned as the core of the ecosystem, receives inputs from various elements. AI and related technologies are utilized to manage content, distribution, and audience analytics, which in turn support service improvement.

The Technology Team is responsible for managing the internal technology infrastructure, including AI integration, with an emphasis on efficiency, data analytics, and financial performance, in collaboration with AI system providers.

The AI System Provider supplies AI solutions—either cloud-based or embedded systems that enable the TV station to perform content analysis, understand audience behavior, and support various operational functions.

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The Audience represents the end-users, i.e., the general public who consume and interact with TV content. AI has a direct impact on enhancing their viewing experience through personalized and data-driven services.

The Digital Transformation Consultant acts as a liaison between technology and business strategy, translating AI system outputs and technical insights into relevant, actionable business recommendations for both management and broader stakeholders.

a. Root Definition and Conceptual Modeling (CATWOE)

This analysis indicates that the adoption of AI in the television industry requires a systemic and participatory approach. Using CATWOE, the Soft Systems Methodology (SSM) facilitates the identification of stakeholders affected by AI implementation, key actors responsible for the implementation, the nature of changes resulting from AI integration, and the challenges that must be addressed to ensure effective and sustainable AI integration [21].

Table 1. CATWOE Analysis of the Soft Systems Methodology (SSM)

Components	Explanation
C (Customers)	Television viewers as end users of AI-based content and services.
A (Actors)	Tim pengembang teknologi AI (engineers, data scientists, IT),
T (Transformation Process)	From a manual content production and distribution system, to an automated system, based on AI analytics.
W (Worldview)	Optimizing AI technology can increase the competitiveness of the TV industry in the digital era, and change work culture and production processes.
O (Owner)	Television station owners, hold strategic authority and investment decisions in technology
E (Environmental Constraints)	Broadcasting regulations, data privacy, employee digital literacy levels, organizational cultural resistance to technological change, limitations of AI infrastructure and human resources

Table 1. The CATWOE analysis is one of the seven stages in the Soft Systems Methodology (SSM), which classifies problems in a structured and detailed manner. It supports more accurate decision-making by analyzing the elements of Customer, Actor, Transformation process, Weltanschauung, Owner, and Environmental constraints.

b. Comparison Between the Conceptual Model and the Actual System

The conceptual model represents how the system ought to function using a systemic approach and AI technology. In contrast, the actual system reflects the real-world implementation of AI, which faces cultural, structural, and technological challenges [22].

The comparison between the conceptual model and the actual system reveals significant gaps. Many decisions are made intuitively without the support of AI-based analytical systems, there is a lack of data interconnection between monitoring analytics and production teams, and the

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absence of a dedicated AI governance structure results in the lack of systematic control and performance evaluation of the AI system.

Table 2. Comparison Between the Conceptual Model and the Actual System

Systemic Framework	Aspect	Conceptual Model (Ideal)	Actual System (Reality)
System Focus	Objective	AI supports the entire production chain to distribution	AI is only used to a limited extent, for example for content recommendations.
	Integration of Parts	Close collaboration of technology, production and distribution	Fragmented, divisions run on their own
	Decision making	Data-driven through AI and real-time analytics	Still based on intuition or old habits
Competence and Organizational Culture	Literasi AI	All employees understand and adapt to AI	Low, especially in non-technical divisions
	Training	Routine, systematic, needs-based	Limited, not sustainable
	Attitudes towards AI	Supporting change and innovation	There is resistance to automation
Infrastructure & Technology	IT infrastructure	Available and compatible for AI integration	The infrastructure is not fully ready
	Technology Roadmap	Clear, structured and progressive	Not well defined
	Automation	The production process is largely automated and efficient.	Still manual at many points in the process
Audience Analytics & Distribution	Behavioral Analytics	Real-time with AI insight for personalized content	Terbatas pada data rating tradisional
	Content Distribution	AI-based multi-platform, content tailored to audience	Not automated, still one way

c. Optimization Model for Artificial Intelligence (AI) Technology in the Television Industry

In the context of the television and digital media industry, the adoption of Artificial Intelligence (AI) technology has already begun and is expected to continue growing in line with advances in network infrastructure and digital devices. However, empirical studies evaluating the effectiveness and optimization of AI implementation remain limited. Therefore, a comprehensive optimization model is needed to enhance both the efficiency and effectiveness of AI applications across key areas—namely production, post-production, content distribution, and data-driven audience analysis.

3.1.1. Objective Function

The objective function of this study is formulated to maximize the total benefit value (Z) derived from the implementation of AI technology across four core processes in the broadcasting industry. The objective function is expressed as follows:

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$$Maximize\ Benefit\ Value\ (Z) = \alpha_1 P + \alpha_2 PP + \alpha_3 D + \alpha_4 A \quad (1)$$

where:

- P = AI contribution to production,
- PP = AI contribution to post-production,
- D = AI contribution to content distribution,
- A = AI contribution to audience analysis,
- α_1–α_4 = weighting coefficients representing the relative impact of each process.

The sum of all weight coefficients is constrained such that $\sum \alpha_i = 1$, where each α_i is bounded within the range $0 \leq \alpha_i \leq 1$.
This function provides a quantitative foundation for strategic decision-making related to AI technology integration, aiming to maximize the overall efficiency and effectiveness of the system. Simulation is employed to evaluate and determine the optimal configuration of business processes such as television content production to achieve the highest utility value (Z), which reflects maximum operational performance.

As an illustration, a case study conducted at a television station demonstrates the following:

- P (Production) : AI scriptwriters accelerate content creation;
- PP (Post-production): AI-based automated editing reduces post-production time;
- D (Distribution) : Content is simultaneously distributed via TV, YouTube, and TikTok;
- A (Analytics) : Real-time viewership data is captured from social media and digital platforms.

Through simulation, the optimal combination of AI technologies, human resources, and distribution strategies can be analyzed to enhance broadcast effectiveness, as indicated by the highest Z value.

3.1.2. Functional Contribution of Each Sector

To evaluate the functional contribution of each key sector, the following functional model is employed:

$$P = f1(x1, t1, c1) = \beta 1x1 - \gamma 1t1 - \delta 1c1 \quad (2)$$

$$PP = f2(x2, t2, c2) = \beta 2x2 - \gamma 2t2 - \delta 2c2 \quad (3)$$

$$D = f3(x3, t3, c3) = \beta 3x3 - \gamma 3t3 - \delta 3c3 \quad (4)$$

$$A = f4(x4, t4, c4) = \beta 4x4 - \gamma 4t4 - \delta 4c4 \quad (5)$$

Description:

x_I = Level of AI adoption in sector i (scale 0–1); t_I = Processing time (lower values indicate higher efficiency); c_I = Operational cost of sector i; β_I, γ_I, δ_I = Coefficients of effectiveness, time efficiency, and cost, respectively.

Constraints

$$c1 + c2 + c3 + c4 \leq Cmax \quad (6)$$

$$t1 + t2 + t3 + t4 \leq Tmax \quad (7)$$

$$0 \leq xi \leq 1 \ for \ i = 1,2,3,4 \quad (8)$$

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3.1.3. Simulation of AI Optimization in Production, Post-Production, Distribution, and Audience Analysis Processes

a) AI Optimization in Television Production Processes is Formulated as Follows:

$$P = f1\,(x1, t1, c1) = \beta 1x1 - \gamma 1t1 - \delta 1c1 \qquad (1)$$

Simulation-Based Calculation

- AI adoption rate (on a scale of 0 to 1) — $x_1 = 0.3$ (adoption rate AI 30 %)
- t_1 is the processing time — $t_1 = 48$ hours (production process duration)
- c_1 is the operational cost — $c_1 = 50.000.000$ (operational costs in rupiah)

To calculate the P value, the parameter values are needed:

β_1 (positive contribution from AI adoption), γ_1 (penalty per unit time), δ_1 (penalty per unit cost).

Assuming the parameter values are based on calibration results (estimates) from field data, we get: $\beta_1 = 100$; $\gamma_1 = 2$; $\delta_1 = 0.000001$

Calculation:

$$P = (100\times0,3) - (2\times48) - (0,000001\times50.000.000) = -116$$

This result indicates a negative utility, suggesting that at the current adoption level, time, and cost, the implementation of AI does not yet yield a net positive benefit.

To improve the value of P, the following strategies can be implemented: increasing x_1 (AI adoption), reducing t_1 (production duration), and minimizing c_1 (operational costs). Accordingly, the simulation can be modified as follows :

- $x_1 = 0,8$ (adoption rate AI 80%)
- $t_1 = 24$ hours
- $c_1 = 30.000.000$

Assuming the parameter values remain constant based on the calibration results, the calculation will be as follows :

$$P = (100 \text{ x } 0,8) - (2 \text{ x } 24) - (0,000001\text{x } 30.000.000)$$

$$P=80-48-30=2P = 80 - 48 - 30 = 2$$

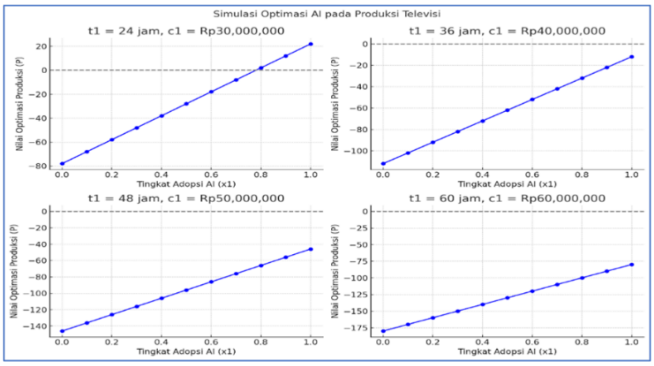

Figure 5. AI Optimization Simulation in Television Production Process

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The result of P = +2 indicates that the production process is reasonably optimized, as the contribution of AI successfully offsets both time and cost. Although the P-value remains relatively low, it demonstrates an improvement compared to the previous scenario, which yielded a negative value.

b) The AI optimization in television post-production is formulated as follows:

$$PP = f2(x2, t2, c2) = \beta 2x2 - \gamma 2t2 - \delta 2c2 \quad (2)$$

According to the simulation results

- $x_2 = 0.3$ (adoption rate AI 30 %)
- $t_2 = 48$ hours (post-production process duration)
- $c_2 = 50.000.000$ (operational costs in rupiah)

The calculation of P requires the specification of the following parameters: β_2, representing the effectiveness coefficient of AI; γ_2, the time penalty coefficient; and δ_2, the cost penalty coefficient. Based on calibration using field data, the following parameter values were assumed

- $\beta_2 = 100$
- $\gamma_2 = 2$
- $\delta_2 = 0.000001$

Substitute into the equation :

PP = (100 x 0.3) − (2 x 48) − (0.000001 x 50.000.000)

PP = 30 - 96 - 50 = -116

Interpretation of Results: The calculated PP value is −116, indicating that, under the selected parameters, the low level of AI adoption (0.3) is insufficient to offset the high production time and costs, resulting in a negative outcome. This suggests that the current implementation is not yet optimal.
Conclusion: The system remains suboptimal when AI adoption is low. To achieve a positive PP value, it is necessary to increase the level of AI adoption, reduce production time, and lower operational costs. Therefore, an alternative scenario simulation is proposed :

- $x_2 = 0.8$ (adoption rate AI 80 %)
- $t_2 = 24$ hours (post-production process duration)
- $c_2 = 30.000.000$ (operational costs in rupiah)

Assuming the parameter values remain constant based on the calibration results, the calculation will be as follows :

PP = (100 x 0.8)−(2 x 24)−(0.000001 x 30.000.000)

PP = 80 - 48 - 30 = 2

Interpretation of Results: The calculated PP value is +2, indicating that the system has begun to yield positive outcomes. With a high level of AI adoption (0.8), reduced processing time (24 hours), and moderate operational costs (IDR 30 million), the implementation of AI appears to be reasonably optimal and efficient.

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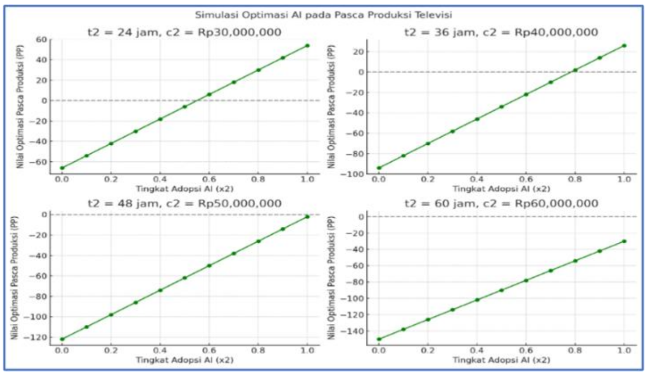

Figure 6. AI Optimization Simulation in Television Post-Production

c) Optimization in the Television Distribution Process Based on the Following Formula :

$$D = f3(x3, t3, c3) = \beta 3x3 - \gamma 3t3 - \delta 3c3 \quad (3)$$

According to the simulation results

- $x_3 = 0.3$ (adoption rate AI 30 %)
- $t_3 = 48$ hours (post-production process duration)
- $c_3 = 50.000.000$ (operational costs in rupiah)

Based on calibration using field data, the following parameter values were assumed :

- $\beta_3 = 100$
- $\gamma_3 = 2$
- $\delta_3 = 0.000001$ (Since the costs are measured in Indonesian Rupiah, a scaling adjustment is applied to avoid excessively large numerical values)

Substitute into the equation :

$$D = (100 \times 0.3) - (2 \times 48) - (0.000001 \times 50.000.000) = 30 - 96 - 50 = -116$$

A negative D value of -116 suggests that the current AI implementation scenario is suboptimal. Contributing factors likely include a low adoption level of AI (0.3 on a 0–1 scale), prolonged processing duration (48 hours), and substantial operational expenditure (Rp 50 million). For comparative purposes and to identify potential improvements, a second simulation scenario—yielding a more optimal result is recommended :

- $x_3 = 0.9$ (adoption rate AI 90 %)
- $t_3 = 24$ hours (post-production process duration)
- $c_3 = 30.000.000$ (operational costs in rupiah)

$$D = (100 \times 0.9) - (2 \times 24) - (0.000001 \times 30.000.000) = 90 - 48 - 30 = 12$$

Result: D = +12, indicating that AI implementation yields a positive and more optimal outcome. This value is strongly influenced by a high level of AI adoption (x), reduced processing time (t), and operational cost efficiency (c). The following visualization illustrates the contribution of each variable to the D-value (Optimization Performance).

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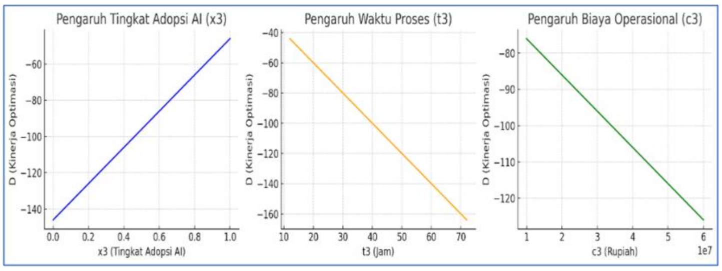

Figure 7. AI Optimization Simulation in Television Distribution

- Left graph (x_3 – AI Adoption Rate): A higher AI adoption rate significantly increases the value of D, indicating that AI adoption has a strong positive impact on post-production efficiency;
- Middle graph (t_3 – Processing Time): As processing time increases, the value of D decreases sharply, suggesting that longer post-production durations reduce efficiency;
- Right graph (c_3 – Operational Cost): Higher operational costs lead to a decrease in D, implying that efficiency improves when operational costs are minimized.

d) Optimization of AI in the Audience Analysis Process Based on the Following Formula:

$$A = f4\,(x4, t4, c4) = \beta 4x4 - \gamma 4t4 - \delta 4c4 \quad (4)$$

In the simulation calculation,

Step 1 involves assuming the weights.

As a baseline simulation (which can later be adjusted based on context or empirical data), the following example values are used

- $B_4 = 100$
- $\gamma_4 = 1$
- $\delta_4 = 0.000001$ (Since the costs are measured in Indonesian Rupiah, a scaling adjustment is applied to avoid excessively large numerical values)

Step 2: Enter the data.

- $x_4 = 0.3$ (adoption rate AI 30 %)
- $t_4 =$ 48 hours (post-production process duration)
- $c_4 =$ 50.000.000 (operational costs in rupiah)

$$A = (100 \times 0.3) - (1 \times 48) - (0.000001 \times 50.000.000)$$

$$A = 30 - 48 - 50 = -68$$

The interpretation of A = –68 (a negative value) indicates that AI implementation with an adoption rate of 0.3, a processing time of 48 hours, and a cost of 50 million rupiah is not yet optimal. This is because the penalties from time and cost outweigh the benefits of AI contribution. A comparative simulation suggests that increasing the adoption rate to 0.8, while reducing time and cost, could improve the outcome.

- $x_4 = 0.8$ (adoption rate AI 80 %)
- $t_4 =$ 24 hours (post-production process duration)
- $c_4 =$ 30.000.000 (operational costs in rupiah)

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A = (100 x 0.8) – (1 x 24) – (0.000001 x 30.000.000)

A = 80 – 24 – 30 = 26 ,

A value of A = 26 indicates a positive outcome, meaning that this scenario is significantly more optimal.

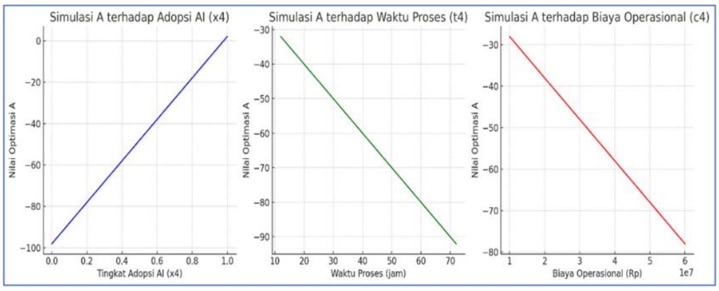

Figure 8. AI Optimization Simulation for Audience Analysis

The following graph illustrates the simulation results of A-values (AI Optimization in Audience Analysis) in relation to three key variables:

- AI Adoption Rate (x_4): Higher adoption rates significantly increase the A-value, indicating a positive contribution of AI;
- Processing Time (t_4): Longer processing times lead to a decline in the A-value, highlighting the critical role of time efficiency in optimization;
- Operational Cost (c_4): Increased costs reduce the A-value in a linear manner, emphasizing the importance of cost efficiency in AI implementation.

4. DISCUSSIONS

The application of Soft Systems Methodology (SSM) in this study demonstrates its relevance in addressing unstructured and multidimensional problems [6]. The television industry, which integrates creative, technical, and business elements, represents a complex environment that requires a systemic approach. SSM enables the mapping of stakeholders' subjective perspectives and facilitates consensus-building for necessary changes [23]. The results indicate that SSM successfully bridges the understanding gap between technical actors (e.g., AI developers) and non-technical stakeholders (e.g., producers and content managers), particularly through the use of CATWOE analysis and holistic conceptual modeling.

The implementation of the Artificial Intelligence (AI) Optimization Model in the television industry significantly enhances production efficiency. AI automates key processes such as editing, transcription, and content classification, leading to reduced production time and operational costs [24]. Moreover, AI's ability to analyze audience data in real-time (e.g., from social media and streaming platforms) provides deeper insights for generating more relevant and personalized content [25]. Content distribution also becomes more targeted, as AI algorithms optimize scheduling and channel selection based on audience preferences, thereby maximizing reach and viewer engagement.

AI supports data-driven decision-making, as AI-based dashboards and reports enable management to make strategic decisions based on analytics rather than assumptions. It also fosters cross-divisional collaboration through integrated digital platforms, promoting synergy among technology, production, and editorial departments [26]. From a systemic innovation perspective, the SSM approach ensures that AI optimization encompasses not only technological aspects but also organizational culture, human resource competencies, and structural dynamics. Thus, television companies that adopt AI optimally are more responsive to shifts in audience behavior and emerging digital content trends [27].

This study presents the SSM-AI framework as a contribution to the development of media information systems, enriching systemic methodologies for digital transformation in the media sector and supporting the advancement of adaptive, AI-driven systems. Literature on AI-based information systems highlights the need for systemic methodologies that foster sustainable value creation and adoption. The integration of SSM with Responsible AI exemplifies how such frameworks can guide holistic digital transformation through a systemic and evidence-based approach. Overall, this research extends the application of soft systems methodology within media information systems, promoting the development of human-centered AI technologies [28][29][30][31][32].

5. CONCLUSION

The Soft Systems Methodology (SSM) has proven effective in identifying and designing solutions for complex challenges in the implementation of AI within the television industry. Through stages such as rich picture, CATWOE analysis, and conceptual modeling, SSM facilitates stakeholder acceptance and engagement. Simulation results indicate that applying AI in production units directly enhances audience engagement, demonstrating that a structured integration of AI has a measurable impact on the efficiency and performance of the television media industry. The primary barriers are organizational—namely, low technological literacy, resistance to change, and weak interdepartmental integration—rather than technical limitations of AI itself. SSM serves not only as an analytical tool but also as a human-centered digital transformation framework, with strong potential for integration with quantitative methods to assess the long-term impact of AI on television business models.

CONFLICT OF INTEREST

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