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Strategic Decision-Making: Implementing Artificial Intelligence for Customer Experience in XYZ Electricity

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ABSTRACT: This case study outlines the challenges in resolving customer complaints at XYZ electricity provider, where the industry achieves only 89.16% against a 100% service level agreement, leading to poor customer experience (CX). The objective of this paper is not only to identify the root causes of poor CX and validate artificial intelligence (AI)'s potential role as a solution, but also to pioneer the identification of critical success factors (CSFs) and strategic areas for AI implementation, leveraging computational ratings to enhance decision-making processes. This research employs comprehensive data collection methods, including primary data from interviews and workshops involving 300 participants and secondary data from observation and literature studies. It utilizes an integrative strategy framework (ISF) to strategically synthesize internal and external analyses. Additionally, it ranks critical areas for AI implementation using the analytic hierarchy process (AHP) based on pairwise judgment and Likert scale surveys from ten experts. The most significant findings reveal that direct impact on customers, at 28.54%, is the strongest CSF, while customer service, 14,63%, is the most impactful implementation of AI in the XYZ to fix poor CX. A pilot project on customer service can improve CX, revenue, and cost savings. The authors suggests that another researcher implement and evaluate AI in various businesses and specific client categories.

KEYWORDS: Analytic hierarchy process (AHP), Artificial intelligence, Critical success factor, Customer experience, Decision-making.

INTRODUCTION

Business development processes and services have been greatly enhanced by AI, particularly Generative AI (GEN AI). This has motivated corporations to constantly innovate and create new business models [1]. AI is defined as the simulation of human intelligence processes by machines, particularly computer systems, encompassing learning, reasoning, and self-correction. GEN AI represents a sophisticated subset of AI that excels in generating novel data patterns, enhancing decision-making capabilities, and optimizing operational efficiencies across various industries.

In 2022, the worldwide AI industry had a value of USD 454.12 billion. It is projected to reach approximately USD 2,575.16 billion in 2032, or a compound annual growth rate (CAGR) of 19% during 2023 to 2032. During 2022, North America accounted for around 36.84% of the market share. Furthermore, it is projected that the Asia-Pacific market would experience the greatest compound annual growth rate (CAGR) of 20.3% from 2023 to 2032 [2]. The swift adoption of digital technologies and the internet has greatly contributed to the expansion of the worldwide AI industry in recent years, with Asia Pacific accounting for 23.93% of the market share [2].

The majority of industries have generally depended on improvements in technology [3]. The adoption of AI in energy entities is clearly extending to numerous areas of the energy sector, including energy and digital transformation, integration, and the interplay between diverse sectors of energy and transportation [4]. Electricity, as a fundamental component of the larger energy framework [5], makes electricity firms also rely on the rapid advancement of AI technologies, specifically Gen AI, to enhance CX.

Electricity firms, considered as service-oriented companies, have encountered actual challenges, particularly in scaling up technology like AI to meet the high volume of customer complaints. Recent performance indicators scored only 89.16% out of the expected service level agreement of 100%, giving the customers poor CX.

Previous studies have explored the benefits of AI implementation in service-oriented companies, but none of these studies directly examined the CSFs or suggested potential areas for AI implementation in the context of enhancing CX in electricity companies. AI has been utilized to improve multiple industries, such as healthcare for musculoskeletal imaging [6], automotives [7], banking [8], finance [9], manufacturing [10], agrifood [11], aerospace [12], retail [13], and numerous others, excluding that of

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electricity. Another study merely focused on identifying and evaluating success factors and classified them into four main groups: organization, technology, process, and environment [14]. A separate study investigated various success factors for enhancing CX in a non-specific industry limited to qualitative approach, such as literature studies [15]. Human resource management has also examined the impact of ChatGPT, a generative AI application, on job creation, displacement, and the redistribution of human labor [16] but didn't explore the drivers to success implementation of AI.

This paper contributes to the existing literature by addressing the following research questions: (1) What solutions can improve XYZ's poor CX? (2) What are the critical factors for successful AI implementation in the electricity sector? (3) How can AI implementation be prioritized to enhance CX in the electricity sector? To answer these questions, the authors employ a mixed-method exploratory sequential design, starting with qualitative data collection and analysis, followed by quantitative data collection and analysis using the AHP approach. Methods include interviews, workshops, focus group discussions (FGDs), and surveys with ten experts.

This paper aims to validate the role of AI as a potential solution for poor CX and identify the CSFs by qualitative elaborations for AI successful implementation in electricity companies. The authors extend the research by identifying areas for AI implementation and incorporating computational ratings with CSFs to perform decision-making. By categorizing, examining, and ranking these areas, the results able to decide the most critical area for AI implementation. The novelty of this research lies in its identification of CSFs and eight critical areas for successful AI implementation to enhance poor CX in electricity companies. This research employs the Analytical Hierarchy Process (AHP) to prioritize these areas and guide decision-making. Furthermore, this research fills the gap from the previous studies by incorporating a quantitative approach using pairwise judgment questionnaires, ensuring more accurate and valid final implementation results. This qualitative and quantitative analysis enhances the reliability and applicability of the findings, making a significant contribution to the field.

Our contributions to this work are the following: first, we validate the role of AI as a viable solution for addressing CX challenges in electricity companies. Second, we identify and rank CSFs with eight critical areas for AI implementation. Third, we incorporate computational ratings for CSFs and employ a quantitative approach using pairwise judgment questionnaires to enhance accuracy and validity with AHP. We have developed a comprehensive framework that combines qualitative and quantitative methods to steer the successful application of AI in the electricity industry. The results of this research may help both practitioners and scholars not only to identify the critical success factors that impact the success of AI implementation in electricity companies and understand their importance, but also to be able to define the specific areas of AI implementation.

LITERATURE REVIEW

To obtain greater clarity on the solution to poor CX, the authors conduct several literature studies and related works.

Problem analysis for poor CX

The authors conduct problem analysis to identified and assessed the causes-effects and root cause by using two approaches: first, Kepner-Tregoe problem analysis, as illustrated in Figure 1. The authors conduct problem analysis to identified and assessed the causes-effects and root cause by using two approaches: first, Kepner-Tregoe problem analysis, as illustrated in Figure 1.

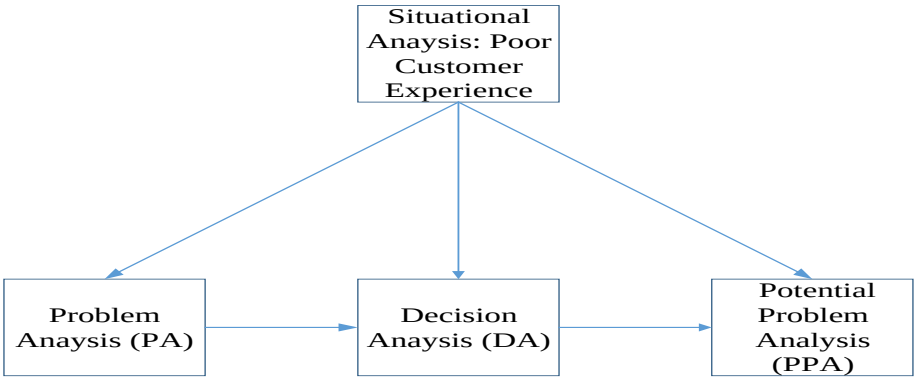

Figure 1. Kepner Tregoe Approach

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The authors then investigated previous studies that may outperform a solution for poor CX, as the categories were assembled based on the customer relationship management (CRM) context. Previous studies have discussed AI-CRM applications used by companies to enhance their collaboration with customers. By following CRM methods, AI can be examined as AI-CRM, leveraging the strengths of both technologies. The root causes will be categorized to identify whether the solution for poor CX is related to people, processes, or technology [17]. In this initial approach, the authors use Fishbone and Pareto to assess the business situation and identify the root causes and then categorize them to technology, people, and process as illustrated in Figure 2.

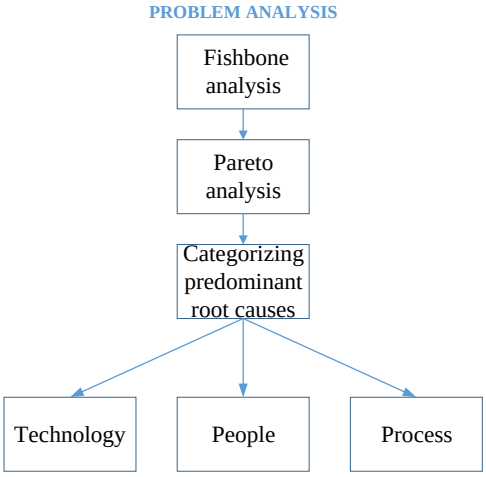

Figure 2. Problem Analysis Initial Approach

Secondly, we conduct an integrated SWOT and PESTEL analysis using the ISF approach to complement each other [18] as illustrated in Figure 3.

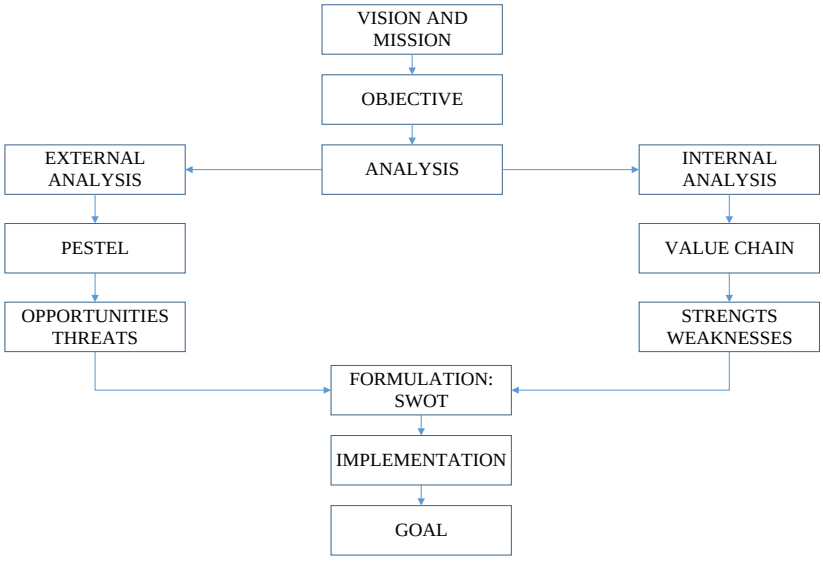

Figure 3. Problem Analysis Second Approach

CSFs for AI implementation in electricity

Many studies have examined CSFs in previous studies, but the electricity sector has not been specifically elaborated. The authors expand the research not only to validate the four CSFs identified from the previous studies that relevant to electricity [14], but also add one CSF as a new contribution. The authors conducted a series of qualitative primary data collection approach, such as workshops and focus group discussions, to validate and complete the five most relevant CSFs, as stated below:

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1) CSF 1: Direct impact to customer. This CSF is an addition to a previous study identified in workshops conducted by the authors. Chatbots and virtual assistants are considered to have a direct impact on customers since they improve CX and loyalty by providing efficient and customized interactions [15].

2) CSF 2: Cost of AI Implementation. AI expenses a lot [14] *and some organizations struggle to afford system updates, according to references* [19].

3) CSF 3: Technology maturity consists of infrastructure, technical expertise, system scalability, and flexibility [14].

4) CSF 4: Data readiness is defined as the quality and quantity of data [14].

5) CSF 5: Integration complexity [14]. *AI systems can collect, aggregate, store, and use accurate data by integrating with existing systems and databases*

AHP

In order to implement the AHP, researchers must gather data from domain experts. One significant benefit of AHP, in comparison to other approaches, is its ability to provide trustworthy findings without the need for huge sample numbers. Several researchers explore the difficulties of maintaining consistency in pairwise comparison matrices when dealing with larger datasets and participants [20] [21]. Scholars argue that assessments by just two experts are adequate and representative [22].

RESEARCH METHOD

This research will be measured, tested, and evaluated with a mixed-methods approach, integrating both a qualitative and quantitative approach.

Research Design

The authors conduct this research by applying the method shown in Figure 4. In accordance with the research method, the authors employed two approaches: firstly, the qualitative method involved secondary data examination. Four identified CSFs in this research demonstrate the qualitative secondary data collection. Furthermore, we gathered primary data from in-person interviews, focus group discussions, and workshops to identify and examine root causes, as well as add one more new contribution to the CSFs. Secondly, the quantitative method involved conducting a pairwise judgment questionnaire with ten experts. To maintain objectivity, the authors also conducted Likert to measure the importance of the eight critical areas for AI implementation rather than relying on the authors' judgement.

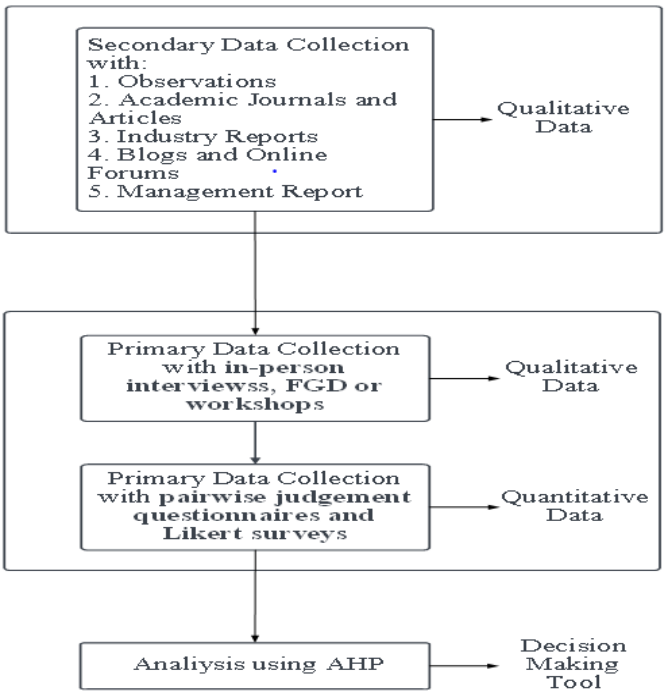

Figure 4. Research Design Method

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The authors analyzed questionnaires and surveys using the AHP mathematical method. It calculates and checks the priority weights, the consistency index, and the consistency ratio among all the factors derived from the AHP. The values of the priority weights help us find weights for individual factors when grouped in categories or when all taken together. It also helps the authors rank the factors and categories based on their importance. Both consistency index and consistency ratio guide us to check whether the judgments given by the experts are consistent or not.

Data Collection Methods

We invited a group of ten experts specializing in information systems, information technology, and support functions like accounting, legal, contact center, and human resources to participate in collecting data from Table I.

Table I. Demographic for Experts

Parameters	Result	%
Working Experience	25 years, 1 people	10%
	22 years, 1 people	10%
	21 years, 1 people	10%
	20 years, 2 people	20%
	19 years, 2 people	10%
	18 years, 3 people	30%
Gender	Female, 4 people	40%
	Male, 6 people	60%
Education	Bachelor	60%
	Master	40%
Experience with AI	Yes	100%

The authors conducted a Likert survey to measure the importance of the eight areas for AI implementation. The survey will be normalized and assessed the eight critical areas for AI implementation using the AHP, with the expert's weight shown in Table II.

Table II. Weight for Experts

Position	Experience (years)	Weight
Expert 1	25	5
Expert 2	22	4
Expert 3	21	3
Expert 4, 5	20	2
Expert 6, 7	19	2
Expert 8, 9, 10	18	2

Data Analysis Methods

This research is analized qualitatively by reviewing related literatures, and quantitatively by using Analytical hierarchy Process (AHP). Using https://bpmsg.com, the authors delivered a questionnaire to compare the AHP for criteria and sub-criteria in a paired fashion. All of the potential areas of implementation were weighed according to the parameter in the AHP model after the Likert scale surveys was normalized.

RESULT AND DISCUSSION

Result

1. Problem Analysis for Poor CX: Initial Approach

Fishbone problem analysis tool helps the authors in identifying ten root causes (RCs) as shown in Figure 5 and narrowing them down to seven most significant causes of poor CX (RC1-RC7) with Pareto analysis as shown in Figure 6 and Table III.

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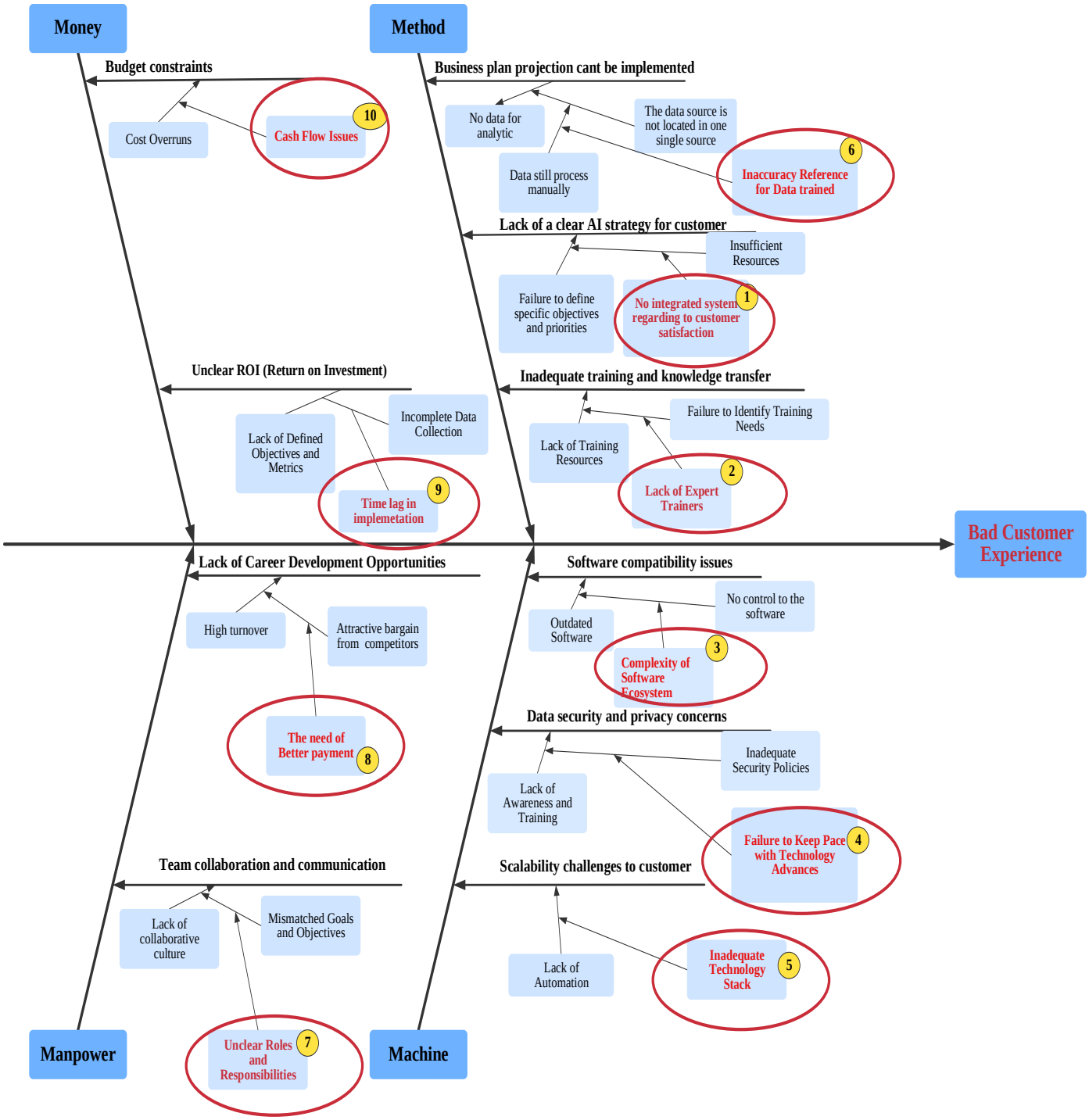

Figure 5. Ten Root Causes with Fishbone Analysis

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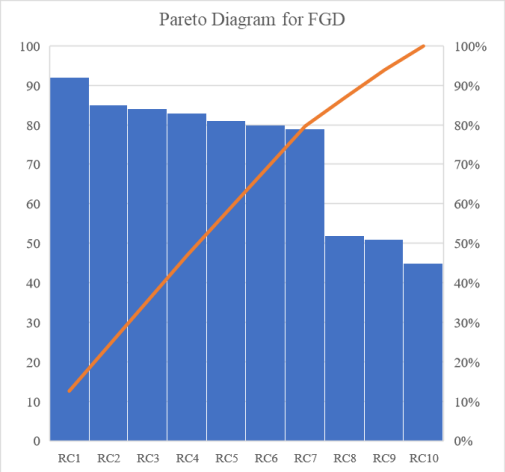

Figure 6. Highest Impact Root Causes with Pareto Analysis

Table III. Seven Highest Potential Root Causes Impact CX with Pareto Analysis

RC*	Lists of Root Causes	Score	Weight	Accumulative Weight
RC1	No integrated system regarding to customer satisfaction	92	0,13	0,13
RC2	Lack of expert trainers	85	0,12	0,24
RC3	Complexity of software ecosystem	84	0,11	0,36
RC4	Failure to keep pace with technology advances	83	0,11	0,47
RC5	Inadequate technology stack	81	0,11	0,58
RC6	Inaccuracy reference for data trained	80	0,11	0,69
RC7	Unclear roles and responsibilities	79	0,11	0,80
RC8	The need of better payment	52	0,07	0,87
RC9	Time lag in implementation	51	0,07	0,94
RC10	Cash flow issues	45	0,06	1,00

*RC=Root Cause

Next, the authors categorized the seven most significant root causes into three components: technology, people, and process. Table IV shows these three groups and the factors that affect each one. The authors find that five out of seven root causes of poor CX need solutions that are related to technology (71%), one out of seven root causes need solutions that are related to people (14%), and one out of seven root causes need solutions that are related to business processes (14%).

Table IV. Mapping Seven Root Causes into Technology, People, and Process

Components	RC1	RC2	RC3	RC4	RC5	RC6	RC7
Technology	X	-	X	X	X	X	-
People	-	X	-	-	-	-	-
Business process	-	-	-	-	-	-	X

2. Problem Analysis for Poor CX: Second Approach

We conducted internal analysis using the Porter value chain as shown in Figure 7, a valuation method that sees a business as a series of activities that transform inputs into valuable outputs for customers, and we conducted external analysis using PESTEL.

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The authors synthesize a conjoint external and internal analyses to strategic decision-making in a form of SWOT analysis as shown in Table V. Through this process, the authors discovered the primary root causes of weaknesses also associated with technology.

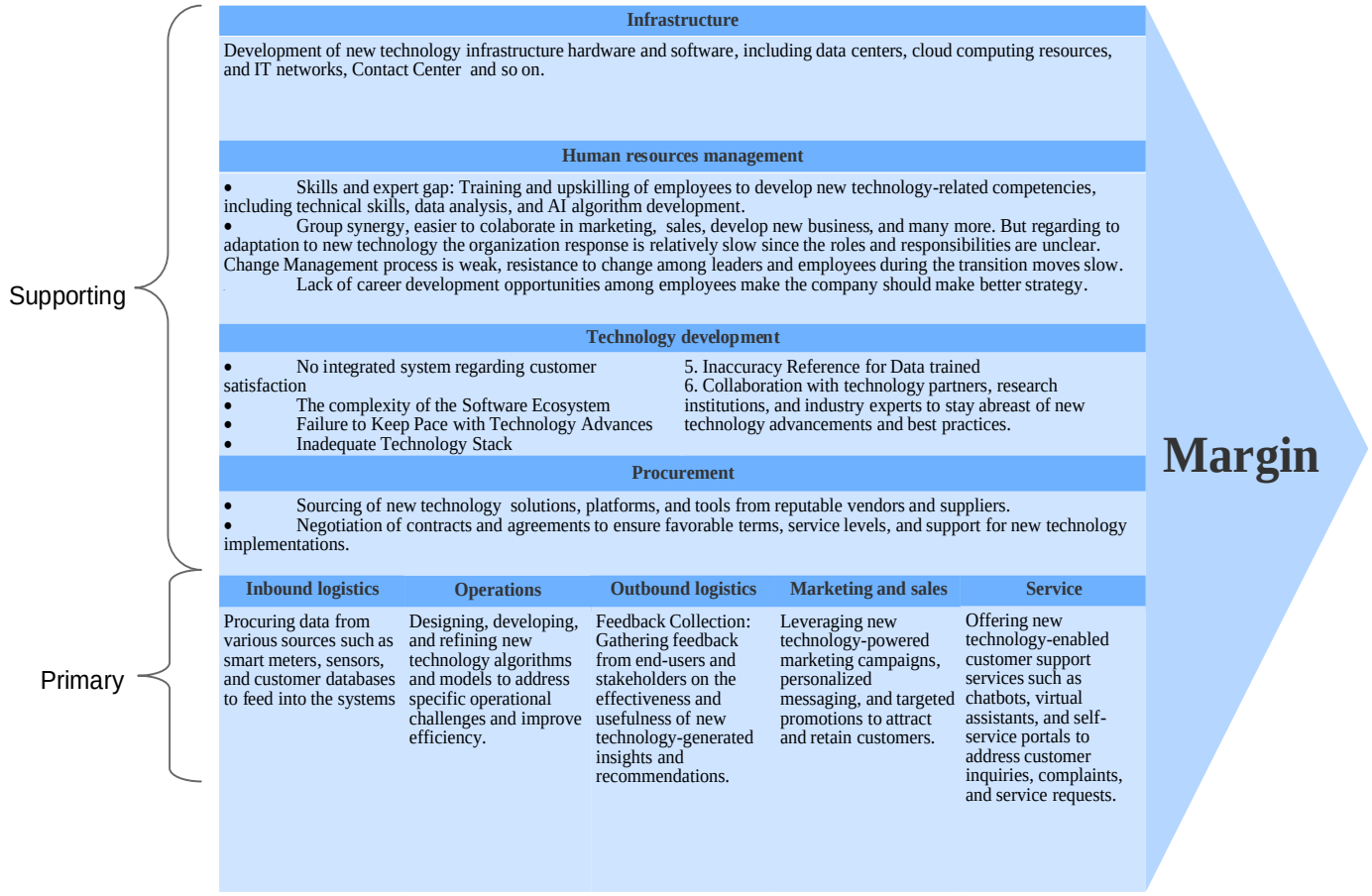

Figure 7. Value Chain for Poor CX

Table V. ISF Approach in the form of SWOT analysis

Strengths	**Weaknesses**
1. Electricity companies maintain and manage millions of customers. 2. Electricity companies operates infrastructure all around the country. This gives the company a good cost structure for a lower cost service as a strategy for cost leadership. 3. The company operates and manages all information, technology, infrastructure, and ecosystems. 5. The company may have group synergy, making it easier to collaborate in marketing, sales, developing new business, and many other areas. 6. Procuring data from various sources, such as smart meters, sensors, and customer databases, to feed into the company's systems.	1. There is no integrated system regarding customer satisfaction. 2. The software ecosystem is complex. 3. The company fails to keep up with technological advancements. 4. The technology stack is inadequate. 5. The reference for data training is inaccurate. 6. There is a skill and expertise gap. 7. The change management process is weak, leading to slow resistance to change among leaders and employees during the transition period. 8. Lack of career development opportunities among employees means the company should have a better strategy.

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Opportunity	Threat
1. Growing demand for green technologies: increasing public awareness and concern about climate change present an opportunity for the company to leverage AI to promote renewable energy sources and reduce carbon emissions, aligning with societal expectations and environmental sustainability goals. 2. Technological advancements: Continuous advancements in AI technology offer opportunities for the company to enhance CXs through personalized services, predictive maintenance, and data-driven insights, resulting in improved operational efficiency and customer satisfaction. 3. Economic stability 4. International collaboration and partnerships: By collaborating with global AI technology providers and fostering international partnerships, the company can achieve economic stability.	1. Data privacy and security concerns: compliance with data privacy laws and protection against cybersecurity threats are critical challenges for the company, considering the sensitive nature of customer data and the risk of unauthorized access or data breaches, which can undermine trust and reputation. 2. Technological risks: System failures, algorithm biases, and data errors caused by AI technology may interrupt operations, violate regulations, and harm the company's brand. 3. Competitive landscape: Increasing competition from other energy providers and technology companies entering the AI-driven CX market poses a threat to the company's market share. 4. Environmental challenges: Natural catastrophes and harsh weather may impair energy infrastructure and service delivery, requiring the organization to have strong contingency planning and resilience.

3. Strategic Prioritizing AI Implementation Areas to Enhance CX in the Electricity Sector

Defining Criteria, Sub-Criteria, eight critical areas for AI

From the literature reviews, the authors analyzed the five CSFs impacting AI implementation as the AHP criteria for this research because it influences the goal of this research. To complete the other critical parameters for AI implementation, the authors conduct a series of workshops and interviews to finalize, confirm, and validate the criteria, sub-criteria, and eight critical areas for AI implementation and synthesize them with the AHP. This research's sub-criteria are in Table VI.

Table VI. Sub-Criteria

No	Sub-Criteria	Why this is important?
1	Response Time	The speed at which customer queries and issues are resolved
2	Personalization	Degree to which services are tailored to individual customer needs
3	Initial Investment	The upfront costs required for AI deployment
4	Training Cost	Expenses related to training staff to use new AI tools
5	Infrastructure reliability	Consistency and dependability of the AI systems
6	Expertise	AI technologies, especially advanced ones like generative AI, involve complex algorithms and sophisticated software.
7	Scalability and flexibility	Ease of modifying AI systems to adapt to new requirements in term of infrastructure and integrated software
8	Data quality	Accuracy, completeness, and reliability of data.
9	Data quantity	AI models, especially deep learning ones, require vast amounts of data to learn patterns, relationships, and insights effectively
10	Integration Compatibility	Ability of AI systems to integrate with existing technology
11	Implementation Time	Duration required to fully integrate AI systems.

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The authors synthesized the eight critical areas for AI implementation from the in-person interviews and FGDs, identifying these areas as the most potential or strongest candidates for implementing AI to enhance the CX. Table VII illustrates the eight critical areas for AI implementation that the electricity company should consider before implementing AI.

Table VII. Eight Critical Areas for AI Implementation

No	Areas	Why this is important?
1	Network infrastructure planning and simulation	AI improved tool for network planners can accurately calculate the expenses associated with modernization, provide alternative choices, and simulate the effects of implementing new technologies.
2	Customer insights (X-sell and upsell)	AI s used to create valuable information about customers, uncover chances for cross-selling and upselling, and automate the creation of tailored marketing material using generative AI.
3	Enhanced PMO tool for project tracking and reporting	AI allows the Project Management Office (PMO) to monitor all important projects, identifying any delays and hazards, modelling potential adjustments, and creating reports.
4	Business Insights (BI) and enhanced analytics	AI is used to provide business insights and improve data analytics, namely via features like anomaly detection. This allows users to easily extract important information by querying the data.
5	Field force maintenance assistance	Field reporting is improved with the use of AI technology, namely Gen AI, which automatically captures, expands, and synthesizes information.
6	Talent mobility and career path	AI utilizes quantitative and qualitative data to carefully choose individuals for available roles, suggest future possibilities, and develop individualized career trajectories.
7	Customer service support	AI analyzes customer complaints, promptly detects problems, integrates with operations and maintenance data, and provides recommendations for further actions and estimated time for resolving the issues.
8	Contract support and excellence	AI analyzes legal texts such as contracts and laws, identifying and emphasizing certain areas that need attention.

Next, we will assess the complexities of AI implementation areas using the AHP framework, as shown in Figure 8.

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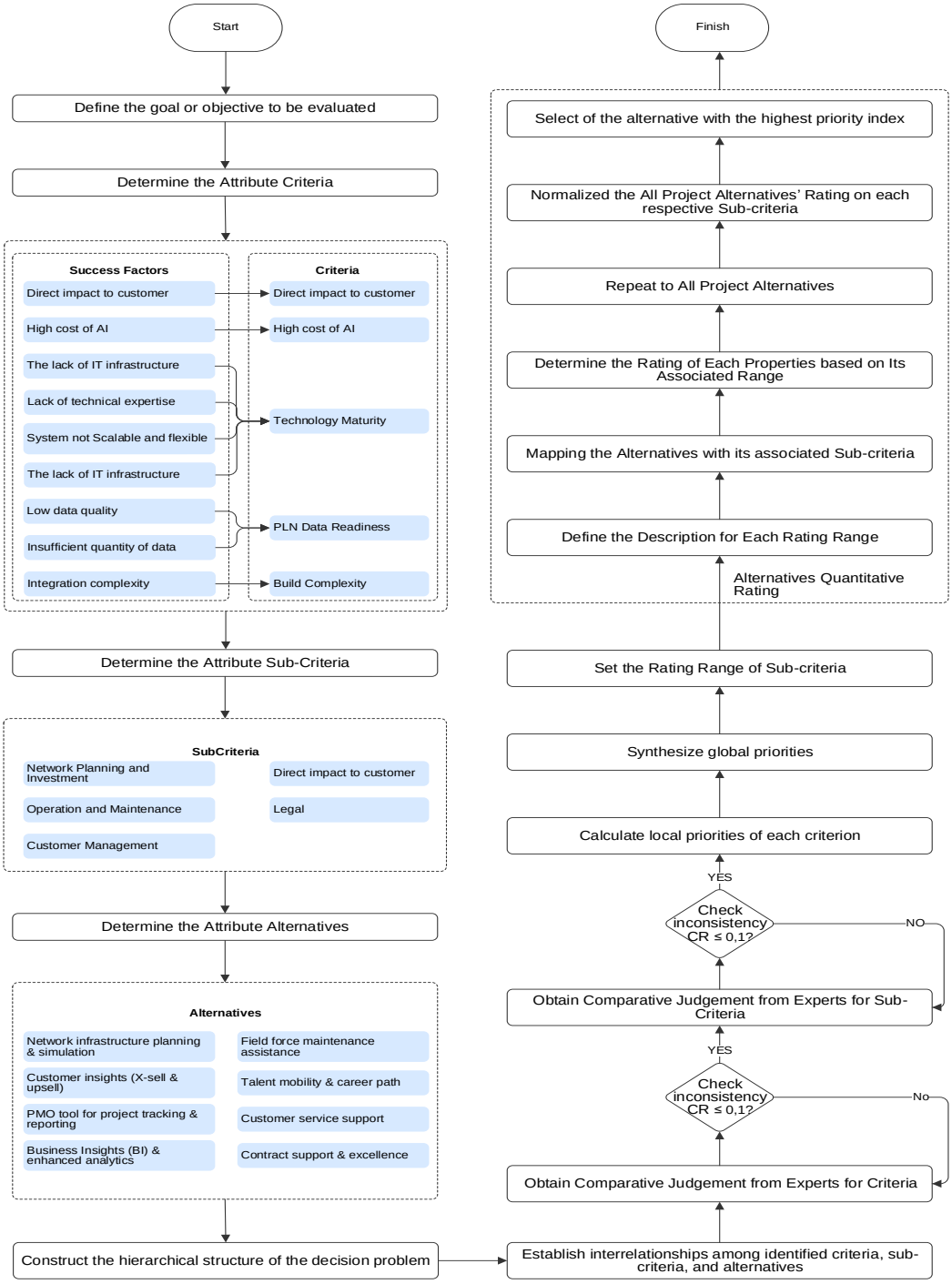

Figure 8. AHP Conceptual Framework

Calculating AHP Criteria and Sub-Criteria as the Result of Pairwise Judgement

The authors constructs the AHP hierarchy formulation on prioritizing implementation of AI, maps all of the criteria, sub-criteria, and eight critical areas for AI implementation, and examines each of them one by one to with pairwise judgement to measure the importance of each factor within each category and the importance of each factor when taken all together. The hierarchy in Figure 9 will guide the authors in performing AHP calculation in prioritizing eight critical areas for AI implementation.

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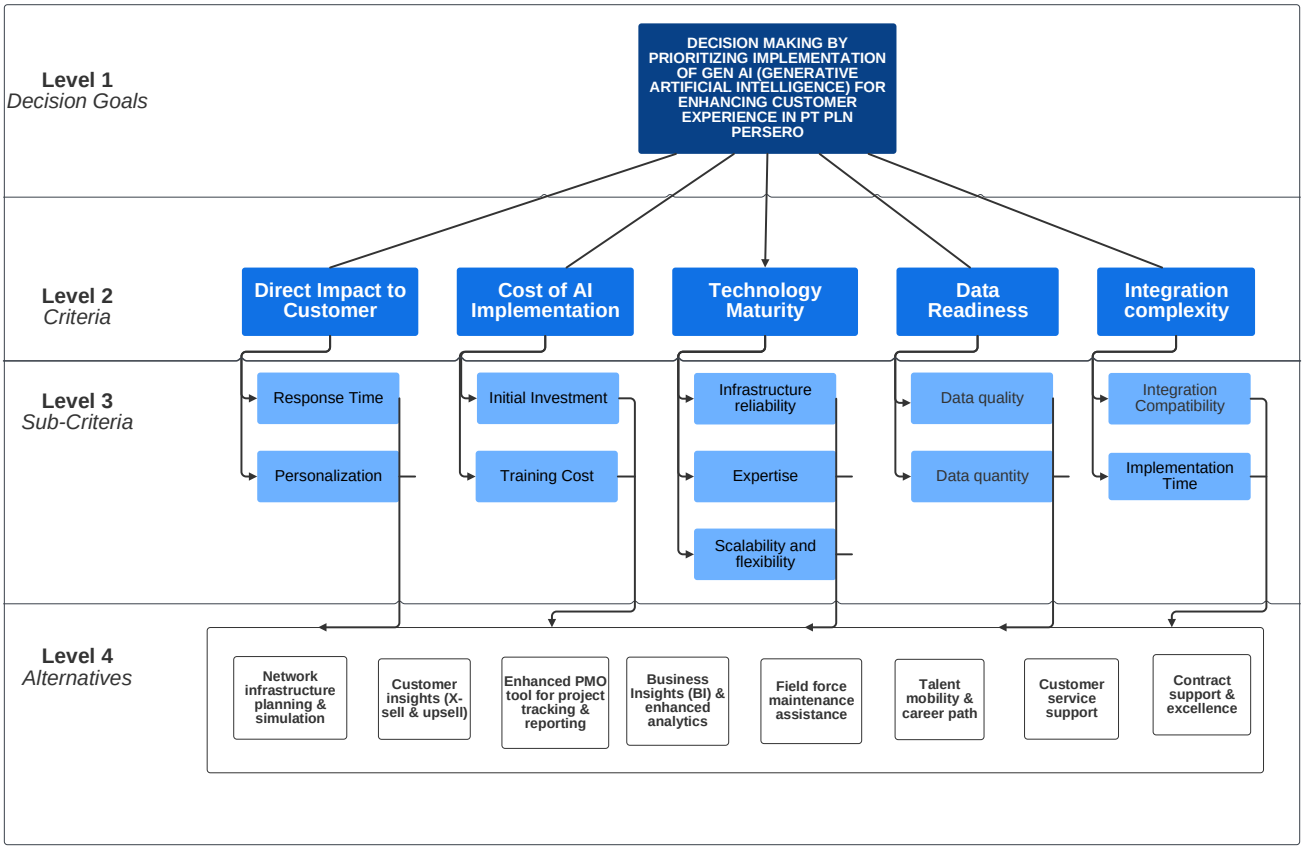

Figure 9. AHP Hierarchy Approach on Prioritizing Implementation of AI

The authors conducted a pairwise judgment matrix for criteria and sub-criteria with ten experts and discovered that all the Consistency Ratio (CR) values fell below 10%, confirming that the calculation inconsistency remains tolerable. Figure 10-15 displays the pairwise judgment matrix results.

Matrix

		1 Direct Impact to	2 Cost of AI Implementat	3 Technology Maturity	4 Data Readiness	5 Integration complexity
Direct Impact to Customer	1	1	2 3/7	1 1/3	1 1/4	1 4/9
Cost of AI Implementation	2	2/5	1	1 1/3	1 1/4	1 1/4
Technology Maturity	3	3/4	3/4	1	1	1 1/7
Data Readiness	4	4/5	4/5	1	1	1 1/3
Integration complexity	5	2/3	4/5	7/8	3/4	1

Eigen value = 5,09, Consistency Rasio=1,97%

Figure 10. Figure 10 Pairwise Comparison for criteria

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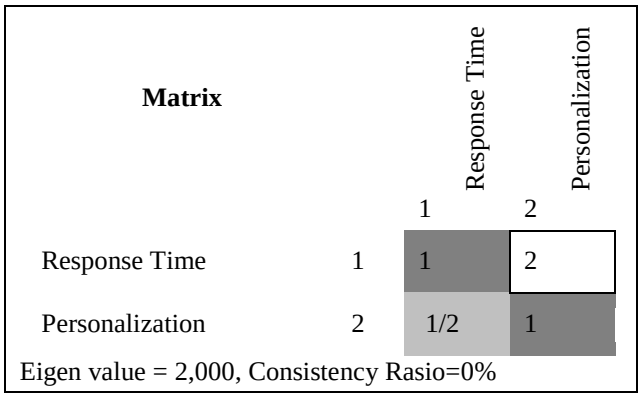

Figure 11 . Direct Impact to Customer

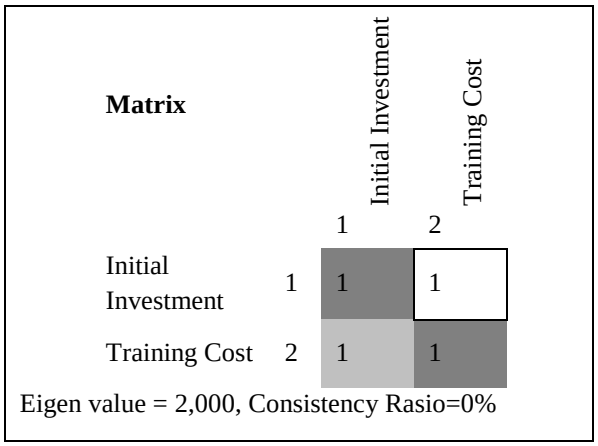

Figure 12. Cost of AI Implementation

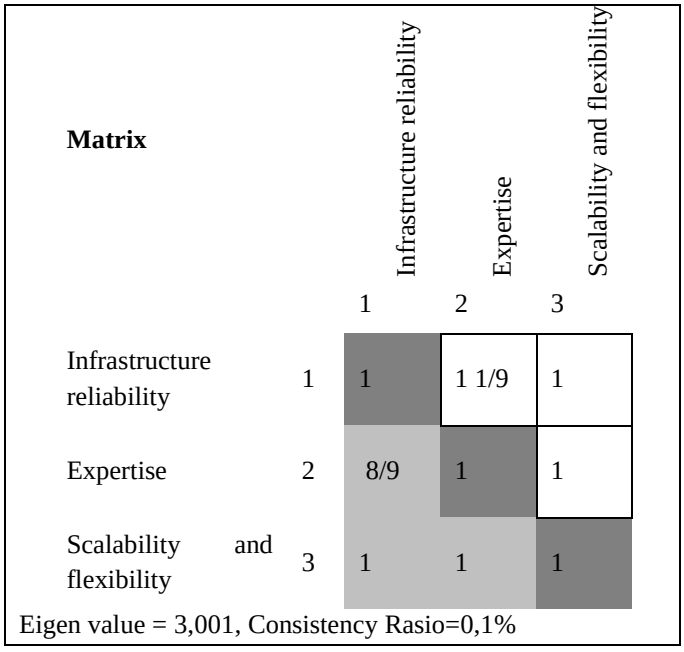

Figure 13. Technology Maturity

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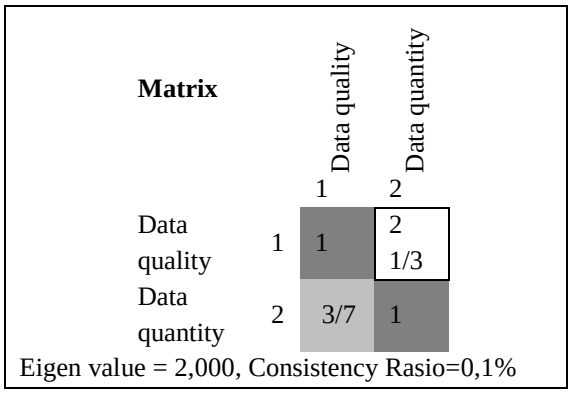

Figure 14. Data Readiness

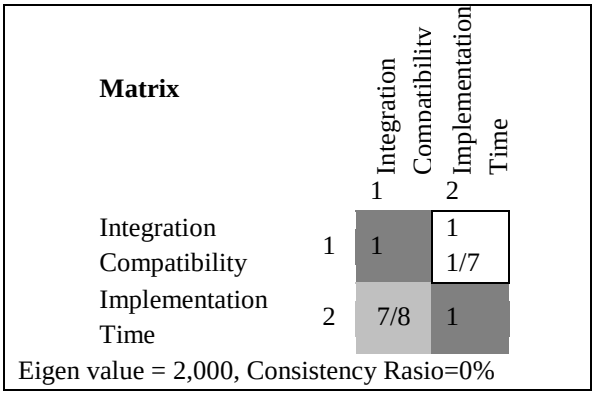

Figure 15. Integration Complexity

Based on the AHP calculation for each criterion in Table VIII, the authors determined that the criterion of direct impact to the customer (28,54%) holds the highest weight and importance among the other four criteria. Furthermore, the authors revealed that the response time sub-criteria have the strongest local and global weight value (18,96%) among other eleven sub-criteria. This implies that the eight crucial areas for implementing AI should be associated to the response time sub-criteria and their direct influence on the customer criterion.

Table VIII List of Global Weight for Criteria and Sub-Criteria

No	Criteria	Weight	Sub Criteria	Local Weight	Global Weight
1	Direct Impact to Customer	28,54%	1. Response Time	66,42%	18,96%
			2. Personalization	33,58%	9,58%
2	Cost of AI Implementation	19,02%	1. Initial Investment	50,00%	9,51%
			2. Training Cost	50,00%	9,51%
3	Technology Maturity	17,73%	1. Infrastructure reliability	34,57%	6,13%
			2. Expertise	32,11%	5,69%
			3. Scalability and flexibility	33,32%	5,91%
4	Data Readiness	18,82%	1. Data quality	70,22%	13,22%
			2. Data quantity	29,78%	5,61%
5	Integration complexity	15,89%	1. Integration Compatibility	53,29%	8,47%
			2. Implementation Time	46,71%	7,42%
	Total	100,00%			100,00%

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A Likert scale was utilized to identify the weight and importance of eight critical areas for AI implementation with the help of ten experts, as shown in Table IX.

Table IX. Weight of Areas for AI implementation Based on Likert Surveys

*SC**	Weighted							
	A1	*A2*	*A3*	*A4*	*A5*	*A6*	*A7*	*A8*
SC1	130	161	97	168	154	99	173	121
SC2	149	135	106	140	126	102	152	140
SC3	143	132	109	132	133	111	157	121
SC4	153	129	122	127	117	109	155	138
SC5	157	141	127	140	129	111	153	122
SC6	157	141	127	140	129	111	153	122
SC7	157	141	127	140	129	111	153	122
SC8	157	141	127	140	129	111	153	122
SC9	157	141	127	140	129	111	153	122
SC10	157	141	127	140	129	111	153	122
SC11	157	141	127	140	129	111	153	122

*A=Area, SC=Sub-Criteria

Based on the final calculation, the authors determine that customer service support has the most significance, considering 14,63% among other crucial areas for implementing artificial intelligence (AI). Table X displays the computation of eight crucial domains for the deployment of artificial intelligence (AI).

Table X. The Final of Areas for AI Implementation Weights and The Rank

Areas for AI Implementation	Total	Percentage	Rank
1. Network infrastructure planning & simulation	0,1391	13,91%	2
2. Customer insights (X-sell & upsell)	0,1322	13,22%	4
3. Enhanced PMO tool for project tracking & reporting	0,1090	10,90%	7
4. Business Insights (BI) & enhanced analytics	0,1332	13,32%	3
5. Field force maintenance assistance	0,1234	12,34%	5
6. Talent mobility & career path	0,1003	10,03%	8
7. Customer service support	**0,1463**	**14,63%**	**1**
8. Contract support & excellence	0,1164	11,64%	6

DISCUSSION

In our research, by using problem analysis tools from both Fishbone and Pareto, we identified seven fundamentals out of ten causes of poor CX in electricity companies. The seven identified root causes are no integrated system regarding to customer satisfaction, lack of expert trainers, complexity of software ecosystem, failure to keep pace with technology advances, inadequate technology stack, inaccuracy reference for data trained, and unclear roles and responsibilities. After that, we examined those root causes based on CRM from the previous studies, categorized them into people, process, and technology, and found that five out of seven root causes need technology-related solutions (71%), one out of seven root causes need people-related solutions (14%), and one out of seven root causes need business process-related solutions (14%). In the second approach examination, the authors utilized value chain and PESTEL analyses to identify and synthesize major findings into a SWOT analysis using ISF. Through this process, the authors identified the main underlying causes of the weaknesses associated with technological advances. From these two approaches, the authors might argue that the solution for poor CX in electricity companies is directly linked to technology-driven

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solutions. This argument also validates the previous studies that utilizing data analytical techniques such as AI and adopting a customer-centric business strategy allows the organization to get a comprehensive understanding of each client. This enables the company to proactively and consistently provide a wider range of goods and services, leading to enhanced customer retention and loyalty over extended durations. In addition to the adoption of technological advancements, such as AI, the challenges of delivering the highest value to customers through better communication, faster delivery, and personalized products and services also require changes to business processes and personnel.

This study also identified five CSFs that contributed to the success of AI implementation for electricity companies. Previous research has lacked understanding of how to improve CX within electricity companies. The first CSF was added by the authors from a series of workshops with stakeholders and added direct impact to customers as the initial CSF for AI implementation in electricity companies. The other four CSF validated from previous studies related to the electricity company are cost of AI implementation, technology maturity, data readiness, and integration complexity. The authors argue that CSF can be used as criteria for AHP calculation because it influences the goal of this research. The eleven sub-criteria and eight critical areas for AI implementation identified from workshops and group discussions.

This research's final aim is to prioritize and decide the most critical areas for AI implementation by categorizing, examining, and ranking them based on CSFs with mathematical assessment using AHP. The final results show that the most important CSFs for the successful implementation of AI is direct impact on customers, compared to other CSFs such as the cost of implementing AI, the maturity of the technology, the readiness of the data, and the complexity of the integration. Direct impact on customer satisfaction has the most weight (28,54%) among other criteria, followed by cost of AI implementation (19,02%), data readiness (18,82%), technology maturity (17,72%), and integration complexity (15,88%). This suggests that the direct impact to customer is considered the most important compared to other factors since it has the power to directly affect consumer satisfaction, engagement, and loyalty, which in turn has a substantial effect on company results and business competitiveness. Align with the criteria, AHP calculation determined that customer service support has the most significance, considering 14,63% among other crucial areas for implementing artificial intelligence (AI). This implies that prioritizing the adoption of AI in customer service support could effectively solve poor CX, as it allows customer service to interact directly with customers.

While earlier research has investigated the advantages of using AI in service-oriented firms, none of these studies specifically analyzed the critical success factors (CSFs) or proposed prospective areas for AI application to improve customer experience (CX) in electricity providers. Prior research evaluated that the most important parameters affecting the installation of AI systems have been identified and extracted [14]. Nineteen elements were identified and grouped into four groups in the study: organization, technology, process, and environment. The criteria and categories are evaluated using the analytical hierarchy approach. Both category-level and factor-level findings are provided by the analysis. Out of the four groups considered, technology emerged as the clear winner. Furthermore, out of all nineteen criteria, the findings point to ethics as the most important. The report presents the elements in sequence and discusses the results' significance for practice and research. By comparing our results to the previous ones, we significantly enhanced and filled the study with two notable discoveries. The authors' first discovery is the identification of five critical success factors (CSFs) specific to power firms. Additionally, the authors have identified eight crucial areas for the adoption of AI. We enhance the study by using the Analytic Hierarchy Process (AHP) to rank the most impactful areas of AI applications, determined by their importance to power firms. This research has never been done before, highlighting its originality and contribution to the field. This novel approach provides a fresh perspective and valuable insights for the industry.

CONCLUSION

The study findings suggest that technology has a substantial impact on enhancing the customer experience in electrical firms. Among the three areas of technology, people, and business processes, technology-driven solutions are the most significant. Alongside the implementation of technology innovations, such as artificial intelligence (AI), businesses must also adjust their processes and people in order to effectively provide consumers with the most benefits, including improved communication, quicker delivery, and tailored goods and services. Technology-related variables contribute to 71.4% of the overall proportion, representing five out of seven main causes.

The study further employed value chain and PESTEL analyses to integrate our findings into a SWOT analysis using ISF, highlighting technological advances as the primary weakness. Our findings demonstrate that improving CX in electricity companies

is largely dependent on technology-driven solutions. This assertion is validated by prior research emphasizing the importance of AI and customer-centric strategies in enhancing CX. This comprehensive approach validates the initial research question and highlights the critical importance of AI technology in driving customer satisfaction and operational excellence in the electricity industry.

A significant contribution of this research is the identification of five critical success factors (CSFs) for successful AI implementation: direct impact on customers, cost, technology maturity, data readiness, and integration complexity. This contribution directly answers the second research question, demonstrating the vital elements that drive successful AI integration in the electricity sector. Using the Analytic Hierarchy Process (AHP), we ranked these CSFs, with direct impact on customers emerging as the most important (28.54%). Additionally, customer service support was identified as the most significant area for AI application (14,63%). The use of AHP addresses the third research question on how AI implementation can be prioritized to enhance CX in the electricity sector.

The benefits of this research include providing a strategic framework for AI adoption, which can enhance customer satisfaction and operational efficiency in the electricity sector. However, limitations include the need for further validation in different contexts and more comprehensive data sources. Future studies should aim to refine the identified CSFs and explore additional factors influencing AI implementation.

In conclusion, this study offers valuable insights and practical recommendations for electricity companies looking to leverage AI to improve CX. Continued research should focus on expanding the applicability of these findings and addressing the identified limitations to ensure broader industry impact.

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