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Analysis of Digital Service Business Development at Pln Using Swot Analysis and Business Model Canvas (BMC) (Case Study of PT PLN (Persero) UIW Nusa Tenggara Timur)

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Abstract. *PLN's digital transformation has advanced significantly through the implementation of digital services as a one-stop platform aimed at improving customer satisfaction and increasing company revenue. These services offer various conveniences, including bill payments, electricity token purchases, product requests, and access to a marketplace. Understanding PLN's digital service business model is essential to support business development and service enhancement. This study analyzes PLN Mobile's business model across customer segments based on tariff classifications using SWOT analysis and the Business Model Canvas (BMC). Additionally, external business factors are examined through PESTEL and Porter's Five Forces frameworks to identify opportunities and threats. The research adopts a qualitative and descriptive approach, utilizing both primary and secondary data. Primary data are collected through in-depth interviews with internal and external PLN sources, while secondary data include the number of users, token purchases, complaint transactions, and PLN product requests obtained from PLN UIW NTT's internal reports. The findings reveal that PLN's digital services strengthen customer engagement and operational efficiency but also face challenges from technological, regulatory, and competitive dynamics. The analysis identifies 18 new strategic recommendations within a revised BMC framework, focusing on expanding customer segments, diversifying revenue streams, supporting green energy initiatives, and optimizing digital infrastructure and resources. These strategies are expected to enhance PLN's digital service performance, improve customer experience, and contribute to sustainable growth in the national electricity sector.*

Keywords: *Business Model Canvas; Digital Services; Electricity Sales Strategy; SWOT analysis.*

INTRODUCTION

PT PLN (Persero) is a state-owned company that conducts the business of providing electricity for the public interest in adequate quantity and quality as well as fostering profits and carrying out Government assignments in the electricity sector to support development by applying the principles of Limited Liability Companies (PLN, 2024).

The history of PT PLN (Persero) began on October 27, 1945 where President Soekarno established the Electricity and Gas Office, which was under the Ministry of Public Works and Power to manage the power plant owned at that time with a total capacity of 157.5 MW (PLN, 2024).

PLN is transforming through the formation of Holding-Subholding and innovative strategies including human resources, business processes and technology. The PLN transformation program is carried out with four pillars, namely Green, Lean, Innovative, Customer Focused in order to provide electricity for a better life (PLN, 2024). As for answering the challenges and opportunities ahead, PLN develops inclusive and sustainable transformation as "The Next Chapter of Transformation" which focuses on Growth, Digital, and Net Zero Emission.

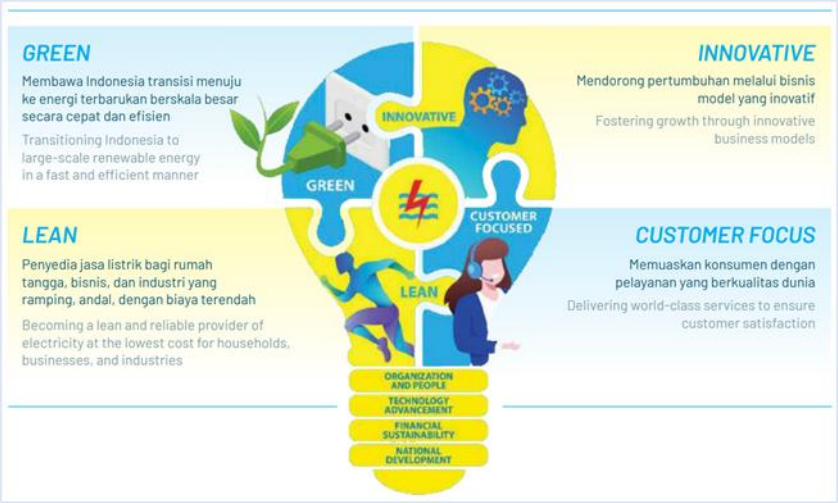

Figure 1. PLN's Transformation Pillar

Source: Company Profile (2024)

The digital transformation carried out by PT PLN (Persero) over the past three years since 2020 has become a major turning point for the Company in providing the best service for customers. One of the results of digital transformation is the PLN Mobile application which is expected to be a one-stop service for the needs of the community ranging from electrical services, electric vehicle services to internet services (Djufri & Lukman, 2020; Enji & Beni, 2023; Fiantika, 2022). Through PLN Mobile, people are more efficient in time and can enjoy the fastest service from PLN. (PLN, 2023).

PLN East Nusa Tenggara Regional Main Unit (UIW NTT) formed based on the Decree of the Board of Directors of PT PLN (Persero) No.087.K/010/DIR/2002 dated June 25, 2002, is one of the regional units of PT PLN (Persero). The business field of PLN NTT includes the electricity business consisting of generation, distribution of electricity, planning and construction of facilities to provide electricity to customers/communities. (PLN, 2017).

PLN UIW NTT is located on Jl. Piet A. Tallo No. 101, Kelapa Lima, Kupang City, East Nusa Tenggara. The business scope of PLN UIW NTT covers East Nusa Tenggara Province with the division of four (4) Customer Service Implementation Units (UP3) as follows:

1. PLN UP3 Kupang
2. PLN UP3 Western Flores
3. PLN UP3 Eastern Flores
4. PLN UP3 Sumba

PLN UIW NTT serves customers with a total of 1,285,297 customers as of December 2024 by serving the designated rates R (Household), S (Social), B (Business), I (Industry), P (Government), and L (Special Services) as seen in Table 1.1. Meanwhile, the customer category based on Postpaid & Prepaid shows that PLN UIW NTT customers have 1,278,644 prepaid customers or 99.4% and 6,653 postpaid customers as seen in Table 1.2. PLN UIW NTT has electricity sales of 1,454.14 GWh with electricity revenue of Rp. 1,790,734,896,932.-.

The PLN Mobile application is present as a digital innovation with the slogan "Everything Is Getting Easier", which makes it easier for customers to access all electricity and home services in one platform. The app can be downloaded through the Play Store and App Store, with a minimum requirement of Android Lollipop 5.1.x or iOS version 8.

PLN Mobile has four main service ecosystems:

1. Electricity – Customers can apply for a new installation, choose power (prepaid/postpaid), change power, and use temporary connection services according to additional electricity needs.
2. Internet – Provides internet services with increasing speed and quality to support home, office, and business activities.
3. Repair – Make it easier for customers to report electrical installation disruptions, monitor work status (tracking work orders), and make approvals and payments after the officer completes repairs.
4. SPKLU (Public Electric Vehicle Charging Station) – Charge. In feature it helps electric vehicle users find the nearest charging location from their position.

In addition, PLN Mobile provides a variety of digital payment methods, in collaboration with banks and payment platforms such as Mandiri, BNI, BRI, BCA, BTN, LinkAja, Gopay, OVO, and Doku, making services more practical and integrated for customers.

The PLN Mobile application has main menus such as Electricity, Internet, ListriQu, and Electricle Vehicle which provide services with their respective functions as shown in Table 1.

Table 1. Menu Function on the PLN Mobile Application

NO	MENU PLN MOBILE	SUB MENU	FUNCTION
1	Electrical	A new addition to LSP Plus	One-Stop New Installation Service which serves electricity new connection services in collaboration with DJK. Installers, and engineering inspection institutions (LIT), starting from Subscription-Owned Installations (IML), NIDI, SLO, and new Electricity connections.
		Change Power and Migration	Power change service for electric power addition
		Temporary Connection	Temporary installation services for certain activities that require greater electrical power
		Cost Simulation	Simulation of application costs, such as new pairing, power changes, and temporary pairs
2	Internet	Check Coverage	Services to ensure that ICONNET internet services are available
		Smart Home	Smart Home product sales service (electrifying agriculture)
3	ListriQu	ListriQu Services	Total service for home electrical problems by meeting installation needs with transparent prices and excellent service speeds
4	Electric Vehicle	Home Charging	Home charging activation service to start charging electric vehicles at home
		Home Charging Application	Home Charging application service so that you can start charging electric vehicles at home
		Test Drive	EV Test Drive: Certain events related to test drives on electric vehicles
		Marketplace EV	Electric vehicle product sales service

Source: PLN Mobile Application (2025), data that has been processed

In the era of globalization and rapid technological development, digital transformation is a phenomenon that changes the way companies do business, communicate with customers, and run operations. Various industrial sectors are now encouraged to adapt to technological

advances so that they can increase efficiency, innovation, and competitiveness of companies. The acceleration of digital technology adoption has accelerated after the COVID-19 pandemic.

According to McKinsey & Company (2021), the overall adoption of digital technology by companies has accelerated to three to seven years in a matter of months. In 2021, McKinsey Global Survey conducted a survey on how companies are rethinking the role of digital technology in their overall business strategy and how to run their business at an increasingly rapid pace in carrying out company operational activities.

However, it is not only the pace of business that has changed fundamentally due to the COVID-19 crisis. According to a McKinsey Global survey, many respondents are realizing that their company's business model is becoming obsolete. Only 11% believe their business model remains economically viable until 2023, while another 64% say their company needs to build a new digital business in achieving that goal. (Seiler & Hanselman, 2021).

The global pandemic has accelerated digital transformation in various sectors while creating new vulnerabilities to business disruptions. The McKinsey Global survey shows many companies face risks to their profit structure, value chain, and operations, despite continuing to invest in the digitization of services and customer experiences. Cross-industry companies such as John Deere, Goldman Sachs, Disney, and Bosch have successfully adapted by creating an IoT-based digital ecosystem and end-to-end services that increase customer value (Seiler & Hanselman, 2021).

Digital transformation is also happening in the electricity industry, such as UK Power Networks (UK), E.ON (Germany), PG&E (US), and AusNet (Australia), which are developing digital platforms to monitor energy consumption, report outages, make digital payments, and personalize services.

In Indonesia, PT PLN (Persero) implemented "The Next Chapter of Transformation" through PLN Mobile, a digital application that focuses on customer service. Since its launch in 2016 and fully transformed in 2020, PLN Mobile has been downloaded more than 76 million times until January 2025. In the PLN UIW East Nusa Tenggara (NTT) area, application users reached 1.07 million, with a surge in transactions from 64 times (2020) to 195,568 transactions (2024) worth IDR 73.7 billion.

PLN Mobile now presents integrated digital services including electricity payments and purchases, fault reports, new connections, SPKLU, and the PLN marketplace. This innovation strengthens customer service and satisfaction through fast, transparent, and technology-based access.

PLN's electricity sales to customers occur in Postpaid Postpaid Bill transactions and Prepaid Prepaid Electricity Tokens. Meanwhile, PLN has a Beyond kWh business which is a business activity other than the sale or supply of electricity (kWh). Transactions that occur on PLN Mobile to support Beyond kWh businesses, such as Stroomnet, SPBKLU, Iconcash Order Bundling, and Charge In.

Based on the sales report of PLN UIW NTT, sales until December 2024 reached 1,454.14 GWh from the sales target of 1,470.93 GWh or 98.86% of the 2024 target. There is still a sales gap of 1.67 GWh to reach 100% or 163.88 GWh to pursue the performance target beyond. Meanwhile, total electricity revenue will reach 1.79 trillion in 2024 and 73.73 billion will occur in PLN Mobile transactions. If you look at the revenue from each segment of PLN customer tariffs, as shown in table 1.8, it will be seen that each segment has significant

potential. The segments according to tariffs are divided into 6 (six) tariffs, namely social, household, business, industry, government, and special services.

In an effort to increase the company's sales, of course, the right strategy is needed by utilizing the business model implemented by the company. PLN can take advantage of digital transformation through PLN Mobile's digital service by maximizing the potential for electricity sales and Beyond kWh that can be obtained from each customer segment according to the implementation of PLN tariffs through understanding new business models (Irsa & Suhendra, 2021; Ismail, 2024; Kans, 2021; Müller, 2019).

Digital transformation strategies include four main dimensions: the use of technology, value creation, organizational structure changes, and financial aspects (Matt, Hess, & Benlian, 2015 in Reis et al., 2022). The rapid development of PLN Mobile users and transactions requires an understanding of the right business model so that it can be the basis for decision-making and service development as well as sales. A customer-oriented approach in business model design allows companies to discover new innovative opportunities (Osterwalder & Pigneur, 2010).

Although specific research on PLN Mobile's business model is still limited, various studies in other sectors such as livestock, clothing rental, and cultural tourism have used the Business Model Canvas (BMC) and Internet of Service (IoS) to develop new business models (Reis et al., 2022; Arrigo, 2022; Ammirato et al., 2022). In addition, previous research has shown that the combination of BMC and SWOT analysis is effective in designing business strategies through the identification of internal and external factors, as applied to the telecommunications, restaurant, and higher education industries (Rachman, 2024; Lestari, 2024; Barros, 2023).

Based on this, this study aims to identify opportunities for PLN Mobile's digital business development by analyzing the potential of each customer segment based on the applicable tariffs, through the SWOT approach and the Business Model Canvas (BMC), with a case study at PT PLN (Persero) UIW East Nusa Tenggara. The results of this research are expected to be the basis for PLN management and stakeholders in making strategic decisions to strengthen the digital service business, increase customer satisfaction, and optimize revenue from each customer tariff segment. In addition, the findings of this study can be used as a reference in designing customer loyalty programs and diversifying digital services that are more adaptive to market dynamics (Pramudhito, 2025; Sanusi, 2025). Academically, this research is expected to be a reference for the development of further studies in the field of digital business model innovation, especially in public services and utility companies. The theoretical contribution of this research lies in the integration of BMC, SWOT, and TOWS approaches in the context of digital transformation of the electricity sector, which is still limited in the Indonesian academic literature. Thus, this research enriches the study of digital business strategies in the critical infrastructure industry and can be the basis for further research exploring the application of digital business models in other SOEs.

MATERIALS AND METHOD

This research used a qualitative approach with descriptive purposes to provide an in-depth overview of PLN's digital service business development through a case study on PT PLN (Persero) UIW East Nusa Tenggara. This method allowed the researchers to understand the

phenomenon contextually through participatory observation, in-depth interviews, and analysis of internal company documents (Rachman et al., 2024; Kusumawardani et al., 2015). The researcher played an active role in the data collection process without altering the natural conditions (non-contrived setting) using a cross-sectional design, so data were collected at a specific point in time to capture a portrait of the actual condition.

The selection of resource persons was carried out by purposive sampling, consisting of internal resource persons (PLN management) and external resource persons (industry experts). Data collection was conducted through a combination of participatory observation, in-depth interviews, and documentation, aiming to obtain primary and secondary data relevant to the research focus.

Data analysis followed the Miles, Huberman, and Saldana (2014) model, which includes three main stages: (1) data condensation, involving the selection and simplification of data from interviews and documents; (2) data presentation (data display) in the form of matrices and narrative; and (3) drawing and verifying conclusions to identify patterns and deep meanings.

In addition, this study used several strategic analysis tools such as the Business Model Canvas (BMC), PESTEL analysis, Porter's Five Forces, SWOT analysis, and TOWS matrix to formulate new strategies and develop integrated business model designs.

To ensure data validity, qualitative validity tests were applied through source triangulation, technique triangulation, and member checking (Sugiyono, 2018). Triangulation was conducted by comparing interview results from various sources and employing multiple data collection techniques, while member checking involved requesting confirmation from sources to verify the accuracy of the researcher’s interpretations.

RESULTS AND DISCUSSION

This study uses data collection which is divided into, primary data collection and secondary data. Primary data collection was carried out by conducting in-depth interviews with resource persons and making observations on PLN's digital services. Meanwhile, secondary data collection is carried out by collecting company data and related supporting data.

The following is the most concise summary of the results of observations and interviews on PLN Mobile services: the application appears with a simple UI consistent with corporate colors (blue-white) and clear navigation; the main features are grouped in Electricity, Internet, ListriQu, and Electric Vehicles as well as Favorite shortcuts (Token & Payment, Non-Taglis, Complaints, SwaCAM, New Install, Change Power, Temporary Connection, Cost Simulation, Marketplace, Credit & Bill) and Other menus (Balik Nama, Induction Stoves, PV Rooftop, Lifestyle, Streaming—coming soon, REC). Payment methods vary (e-money, VA, digital wallet, paylater, card, transfer) with varying admin fees. The market position is strong in the core services of electricity (monopoly), while the non-electrical area competes with commercial platforms (e.g. cashback). Integrated customer service (Live Chat–Contact Center 123, Help), with a loyalty program (Reward). In terms of technology, PLN Mobile utilizes GPS, OCR, and data analytics for Ambient Suppression Check, SwaCAM, remaining token estimation, and EV Trip Planner. Interviews (internal management & external experts) that have been member-checked and triangulated corroborate the findings: digital transformation improves transparency, speed, and customer experience, but still needs to strengthen system integration, user literacy, and optimization of non-electrical features**.**

PLN's Vision, Mission & Long-Term Strategy

PLN has a vision to become a Top 500 Global Company and the customer's first choice in energy solutions. To make it happen, PLN carries out a mission that is oriented towards customer satisfaction, improving the quality of life of the community, encouraging economic activities, and being environmentally friendly. Based on the results of an interview with Senior Manager of Commerce & Customer Management of PLN UIW East Nusa Tenggara, Bonifatius Indra Girindra Wardhana, it is known that PLN is committed to strengthening its business from upstream to downstream through generation, transmission, distribution, and customer service.

Digital transformation is a long-term strategy in supporting this vision and mission, especially through the implementation of PLN Mobile's digital services as the main innovation that brings efficiency, adaptability, and improved service quality. This strategy is also expected to be able to adapt to changes in customer behavior and government regulations. Based on interviews, the household customer segment is the largest user and the top priority in the development of PLN Mobile features in the future.

Table 2. PLN's Vision and Mission & Long-Term Strategy Development

Vision, Mission, and Business Strategy	
Vision Clarity	PLN's vision is to be the first choice for customers' electrical energy solutions.
Mission Clarity	PLN runs an electricity business with an orientation to customer satisfaction in order to improve the quality of people's lives, drive economic activities and run environmentally friendly businesses.
Vision & Mission in Strategic Focus	PLN focuses on customers and digital transformation (*digital moonshoot*) in improving efficient and innovative customer service to be able to adapt to changes in customer behavior so as to support long-term sustainability.
Innovation and Technology	PLN's digital services through PLN Mobile support the increasing needs of electricity and non-electricity services so that they can provide services easily, safely and quickly.
Sustainability	PLN seeks to understand customers' digital service needs by focusing on maintaining service performance and understanding the *customer journey* to provide the right service.
Competitive Advantage	PLN has a stable business process with a wide distribution of customers with services through digital services that are easily accessible, convenient to use, and fast.

Source: Processed data (2025)

According to the Senior Manager of Commerce & Customer Management of PLN UIW NTT, PLN'S TECHNOLOGICAL INNOVATION FOCUSES ON THE CUSTOMER JOURNEY BY DEVELOPING PLN Mobile based on customer input and surveys, while adjusting to applicable regulations. The app is constantly being improved from previous versions to make it more responsive and accessible. The main advantages of PLN's digital services lie in the integration of strong business processes, elegant and lightweight application display, and ease of navigation for users. However, PLN also faces challenges in the availability of resources in remote areas, requiring collaboration with partners to maintain service quality evenly throughout Indonesia.

***Business Model Canvas (BMC)* PLN Digital Services**

This research began with the collection of main data through in-depth interviews with PLN's internal resource persons (Commerce & Marketing management, Customer Service Implementation Unit, and Sales & Retail) and external sources, accompanied by observation and documentation of PLN Mobile digital services. Supporting data from the company's report was also used to strengthen the analysis.

After the data is collected, data reduction is carried out by selecting and summarizing the main information so that it is relevant to the focus of the research. The results of the reduction are then entered into nine blocks of the Business Model Canvas (BMC) to identify the components of the existing business model. The next stage involves analyzing the interlocking relationships to find the strengths and weaknesses of PLN's digital business model. The final result is in the form of an existing BMC which represents the actual condition of PLN's current digital business model.

1. PLN Digital Services Customer Segment

"PLN's digital service targets all tariffs and all PLN customers can access digital services to get easy electricity payments, token purchases, disruption and complaint reporting (Table 4.6 No.11) but for targets per specific tariff segment has not focused on that (Table 4.5 No.11)". According to the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 7 of 2024, PLN has several customer segments that are differentiated based on the customer's electricity designation, such as household, business, industrial, social, and government.

According to the observation results, the customer segment of PLN's digital services is intended for all customer segments without exception. However, in observation, it can be seen that most household customers enjoy PLN Mobile's digital services. The following are the results of the analysis of PLN's digital service customer segment.

Table 3. PLN Digital Services Customer Segment

Customer Segments	
All PLN customer segments (household, business, industry, social, and government)	PLN targets all PLN customers to be able to access digital electricity and non-electricity services within PLN Mobile with the main needs such as token purchases and account payments, complaint requests, and PLN product applications.

Source: Processed data (2025)

2. Value Proposition of PLN Digital Services

"The value that can be an advantage in PLN Mobile for customers is the ease of access to PLN services so that it brings services closer to customers, becomes a one-stop solution for electrical features, real-time services, and is more responsive to customer complaints and requests (Table 4.6 No.12)."

According to Wahyuddin et al. (2023), there are several advantages in the basic concept of digital capabilities, including increasing efficiency, increasing productivity, enabling adaptation to change, enabling better decision-making, and increasing competitiveness. Osterwalder and Pigneur (2010) emphasize how companies create value for customers can be quantitative (e.g. price and speed of service) or qualitative (e.g. design and customer experience). With the concept of capability in digital services, it can support the value

proposition that we want to provide to customers. The following are the results of the analysis of the value proposition of PLN's digital services.

Table 4. Value Proposition of PLN Digital Services

		Value Proposition
1	Ease of access to services	PLN's digital services have convenience when customers want to access services because PLN pays attention to the user interface from color design, application performance, and application submission with clear information.
2	Completeness of service features	As a digital service that carries a one-stop solution in electricity services where customers can access various services, such as transactions, complaints, and meter recording.
3	Real-time service	PLN has the responsibility of fulfilling SLAs in handling customer requests so that digital services can increase the real time from the application to completion.
4	More responsive to customers	PLN strives to increase customer trust by providing transparent and responsive services with tiered monitoring.

Source: Processed data (2025)

3. PLN Digital Service Channels

The channel in PLN's digital services explains how digital services provide communication and reach customer segments to convey the value of their proposition. The resource person agreed that, "PLN has communication with customers through social media, such as Instagram @pln_id, @plnmobile, Facebook, Tiktok, and X. Especially in PLN Mobile, promotional information appears when opening in the form of a pop-up when customers access PLN Mobile or on digital platforms (Table 4.6 No.13)."

"The promos implemented by PLN have reached certain segment goals or according to the thematic promos issued. In accordance with the terms and conditions during the promotion, such as household or social. However, PLN has also implemented promotions for all fares within one existing promotion period (Table 4.6 No.14)." The following are the results of the analysis of PLN's digital service channels.

Table 5. PLN Digital Service Channels

		Channels
1	Social Media	Instagram @pln_id & @plnmobile, Facebook, Tiktok, and X.
2	Customer interaction	Customer service via live chat in collaboration with Contact Center 123 & email: pln123@pln.co.id

Source: Processed data (2025)

4. Customer Relationships for PLN Digital Services

"In maintaining customer loyalty in PLN Mobile's digital services, PLN implements ease of transactions, diversity of services in one digital service, ease of promos only from PLN Mobile services, improving application performance and customer user experience , accelerating information and recovering blackouts (Table 4.6 No.15)."

In the digital era, customer engagement is one of the main keys in service innovation, especially through the use of social media Echeverri and Skalen (2021) emphasize that social media plays an important role in driving customer engagement by enabling interactive communication. This research shows that companies that actively utilize social media are able to build closer relationships with customers, improve user experience, and support service

innovations that are relevant to current customer needs. The following are the results of the analysis of PLN's digital service customer relationship.

Table 6. Customer Relationships for PLN Digital Services

		Customer Relationships
1	Improving user experience as a one-stop solution for electricity	PLN provides customers with a user experience with a one-stop solution in the convenience of getting electricity services in one application, such as notifications of remaining prepaid token usage, outage notifications, and real-time information on the status of customer applications.
2	Improve user experience through ease of transaction	PLN collaborates with Banking and digital wallets to make it easier for customers to transact on PLN's digital services.
3	Building long-term loyalty	Customers enjoy PLN Mobile's digital services and earn Gelegar Points for every transaction in the application, and can redeem points for direct prizes, raffle coupons, and electricity vouchers. In addition, PLN provides PLN product promos and awards.
4	Using multi-channel	PLN Mobile uses several multi-channels such as Call Center 123, email.

Source: Processed data (2025)

5. Revenue Stream of PLN Digital Services

"Revenue is divided by electricity sales and non-electricity sales. Electricity sales, from token purchase transactions, electricity account payments, payment of connection fees for PB/PD/Pesta products. Meanwhile, non-sales of electricity, include REC revenue, PV Rooftop, market place, and the use of SPKLU (Table 4.6 No.16)." The following are the results of the analysis of PLN's digital service revenue stream.

Table 7. Revenue Stream of PLN Digital Services

		Revenue Streams
1	Electrical service sales	Sales from electrical services, such as electricity bill payments (including the purchase of electricity tokens) and non-bill payments (new connections/power changes/temporary lighting costs), electricity sales from Public Electric Vehicle Charging Stations.
2	Sales of non-electrical services	Other sales, such as REC purchases, marketplace sales.

Source: processed data (2025)

6. Key Resources of PLN Digital Services

"In terms of the development of the PLN Mobile application, it involves subholdings, namely PLN Icon Plus. PLN partners, such as Banking to support payment channels. Support for digital services such as connection officers, engineering service officers in overcoming technical glitches. There are also digital meter recording partners (Table 4.6 No.17)." The following are the results of the analysis of PLN's key digital service resources.

Table 8. Key Resources of PLN Digital Services

		Key Resources
1	Digital service infrastructure	PLN received support through cooperation with the sub-holding , namely PLN Icon Plus, in ensuring that PLN Mobile's digital service infrastructure runs safely and stably.
2	Cyber Security and Personal Data Protection	The cyber security system in protecting PLN's digital services and customers' personal data is protected.

3	Technology Developer & Maintenance Team	PLN has competitiveness in ensuring that features in digital services are still relevant and still a customer need. Meanwhile, the PLN Mobile service maintenance team is carried out by PLN Icon Plus.
4	Human Resources	PLN employees and outsourced personnel who have contributed in the back office in ensuring that digital services take place in receiving applications to ensure that the service has been completed.
5	Partnerships and stakeholders	PLN collaborates with external partners, such as Banking, Engineering Installation Services, and the Ministry of Energy and Mineral Resources. Meanwhile, PLN's internal partners are Connection Officers, Technical Service Officers, and Management Billing Officers.

Source: processed data (2025)

7. Key Activities of PLN Digital Services

"The main activities that can be carried out are related to electricity services, such as access to PLN product applications or promos, reporting complaints/disturbances, electricity token purchase transactions or electricity account payments."

The following are the results of the analysis of PLN's key digital service activities.

Table 9. Key Activities of PLN Digital Services

	Key Activities	
1	Platform Development and Maintenance	PLN continues to make efforts in developing and maintaining digital service infrastructure so that it continues to be updated by focusing on customers.
2	Customer request handling	Handling service requests that customers can do through PLN's digital services, such as PLN product requests, complaints/disturbance reporting, token purchase transactions or bill payments.
3	Digital Marketing and Promotion	Promotional campaigns through digital platforms through pop-ups when opening applications and marketing for the introduction of digital services through social media.
4	Customer Data Collection & Analysis	Collect and analyze data on the use of customer electricity services so that they can provide usage evaluation through digital platforms.
5	Compliance with personal data protection & Data Security regulations	Ensuring the implementation of personal data protection regulations by paying attention to the confidentiality of customer data and ensuring the security of customer data on PLN's digital services.

Source: processed data (2025)

8. Key Partnerships for PLN Digital Services

"PLN collaborates with PLN Icon Plus as an application supporter, banks in supporting transactions, and installers (LIT) supporting LSP Plus services. In addition, PLN collaborates with business partners in managing connection officers, engineering services, and billing management."

The following are the results of the analysis of PLN's key digital service partnerships.

Table 10. Key Partnerships for PLN Digital Services

	Key Partnerships	
1	Technology & Innovation Developers and Providers	Collaborating with developers and providers, namely the PLN Icon Plus subholding in ensuring that digital services have a stable infrastructure for the sustainability of services.

2	Digital Payment Partners	Banking partners and similar partners in providing various payment options in PLN Mobile's digital services.
3	Engineering Installation Service Partners (LIT)	PLN needs cooperation with engineering installation services in supporting the fulfillment of LSP Plus services in new connection requirements.
4	Service Officer Partners	PLN is supported by internal partners in completing applications and services to customers, such as connection officers, engineering service officers, and billing management officers.
5	The Regulator	Support from regulators such as the Ministry of Energy and Mineral Resources & KOMINFO in supervising regulations and policies related to service standards and electricity sales, as well as regulating digital service regulations, including personal data protection and cybersecurity.

Source: processed data (2025)

9. Cost Structure of PLN Digital Services

"The operational costs incurred are divided into application development and management costs, marketing promotion costs, HR operational costs for back offices for application managers and connection officers, as well as material and work equipment investment costs (Table 4.6 No.20)."

The following are the results of the analysis of the cost structure of PLN's digital services.

Table 11. Cost Structure of PLN Digital Services

	Cost Structure	
1	Platform Development & Management Fees	The cost includes the development of digital technology and platform management for PLN's digital services.
2	Marketing Promotion Costs	Marketing promotion costs are in the form of introducing digital services to PLN customers.
3	HR operational costs	The costs incurred for HR operations in the back office in managing customer service requests to ensure that services have been carried out by PLN officer partners.
4	Operational costs of service officer partners	Operational costs of service officers incurred to ensure customer requests are completed in accordance with customer submissions, such as connection officer partners, engineering service officers, and billing management officers.
5	Cost of investment in materials & work equipment	The cost of procurement of materials and work equipment provided by PLN in ensuring that product applications through PLN's digital services can be carried out properly and safely.

Source: processed data (2025)

The analysis of the Business Model Canvas of PLN's digital services is currently carried out with the aim of gaining an understanding and evaluation of the current business model to identify weaknesses and opportunities for improvement. Not only that, understanding the current business model will ensure resources and changes that can be made in order to provide potential revenue in the future.

In the Customer Segments block, PLN's digital services have a target to touch all customer segments according to tariff categories with specific designations. The tariff for PLN customers includes households, industry, social, business and government. Each customer segment can feel the value proposition that PLN wants to provide through PLN Mobile digital services in order to answer customer needs. The value proposition offered is convenience, completeness of service features, real-time service, and responsiveness to customer needs. The

value given shows how PLN's services adjust to continuous electricity needs.

In building relationships with customers, PLN Mobile implements a Customer Relationship strategy that focuses on improving the user experience through the completeness of digital features, ease of transactions, and customer loyalty programs. PLN also adopts a multi-channel communication approach such as Contact Center 123, official email (pln123@pln.co.id), live chat, and social media (Instagram, Facebook, TikTok, X) to strengthen interaction with customers. In terms of revenue, PLN's Revenue Stream comes from the sale of electricity services (tokens, account payments, new connections, power changes, and SPKLU) as well as non-electricity services (purchase of RECs and transactions in the marketplace). In its operations, PLN needs to manage the Cost Structure which includes the cost of developing digital platforms, promotions, human resources, service partners, as well as technology and infrastructure investments.

The main activities (Key Activities) focus on platform development, customer service, digital promotion, data analysis, and compliance with personal data protection. This activity is supported by Key Resources in the form of digital infrastructure, cybersecurity, development teams, competent human resources, and the support of strategic partners such as banking, LIT, and the Ministry of Energy and Mineral Resources. PLN's Key Partnerships include technology developers, digital payment providers, field officer partners, and regulators (ESDM & KOMINFO), which play an important role in smooth operations and regulatory compliance. Overall, PLN Mobile's business model shows the integration between customer segments, value propositions, revenue streams, and cost structures, although digital service adjustments are still needed to better suit the needs of each customer tariff segment.

External Environmental Analysis

This research conducts an external environmental analysis that can have a significant influence on PLN's digital services business. The analysis will be carried out with the main data sources through interviews with PLN management resource persons and industry experts through the analysis of PESTEL and Porter's Five Forces. The results of the analysis will result in the identification of opportunities and threats that can occur in PLN's digital service business.

1. ***Politics***

Political factors in the PESTEL analysis show that policies, regulations, and political stability have a low influence on PLN's digital services. Based on the results of interviews with PLN management and industry experts, there are no significant political changes or government regulations that have a direct impact on the access and operation of PLN Mobile's digital services. Relevant political influence only comes from technical regulations, especially the policies of the Ministry of Communication and Information Technology (KOMINFO) related to the implementation of the Personal Data Protection Law (PDP Law). The impact of the regulation is adaptive, requiring PLN to make adjustments to the display and management of data without disrupting the overall stability of digital services.

2. ***Economical***

The economic factors in the PESTEL analysis showed a moderate influence on PLN's digital services, especially related to macro financial conditions that affected customer purchasing power, operational costs, and technology investment. Based on interviews with PLN management and industry experts, economic policies do not have a direct impact on the

digital services business, although they can affect the number of transactions and certain processes such as subsidy data verification. Economic challenges such as inflation can suppress people's purchasing power, while government policies in the form of electricity subsidy compensation can actually increase electricity consumption and have an impact on the frequency of use of PLN's digital services. Thus, economic factors have an indirect effect on the dynamics of transactions and the growth of the company's digital services.

3. *Social*

Social factors in the PESTEL analysis have a high influence on PLN's digital services, especially due to changes in people's behavior who are increasingly accustomed to using digital-based services. The results of the interviews show that customers now prefer fast and easy services through digital platforms rather than coming directly to the PLN office. In addition, social initiatives and the availability of internet infrastructure allow PLN to serve all customer segments more inclusively. With the increase in digital literacy and technology adoption in the community, social factors are the main drivers of the growth and optimization of PLN's digital services.

4. *Technologically.*

The technological factors in the PESTEL analysis have a high impact on PLN's digital services, because the advancement of innovations such as renewable energy, electric vehicle infrastructure, and the application of AI-based technology greatly affect service development. The results of the interview show that PLN has presented features such as the purchase of Renewable Energy Certificate (REC), the installation of rooftop solar PV, and access to Public Electric Vehicle Charging Stations (SPKLU) as a form of adaptation to green technology trends. However, challenges remain from rising customer expectations for application performance, service personalization, and AI utilization. Industry expert speakers emphasized the importance of adopting AI technology, including the application of chatbots, so that PLN is not left behind in digital innovation and can maintain the quality and competitiveness of its digital services.

5. *Environmental*

Environmental factors in the PESTEL analysis showed a low impact on PLN's digital services. Based on the results of the interviews, environmental policies do not directly affect the operation or development of digital services. However, PLN continues to show its commitment to green sustainability through the development of environmentally friendly energy supporting features such as electric vehicle menus, Renewable Energy Certificates (REC), rooftop solar PV, and Public Electric Vehicle Charging Stations (SPKLU). Industry experts also emphasized that the environmental impact in terms of digital data use is relatively small, while PLN Mobile's green initiatives have supported the clean energy transition and the use of electric vehicles.

6. *Legal*

The legal factors in the PESTEL analysis have an important influence on PLN's digital services, especially related to the implementation of the Personal Data Protection Law (PDP Law), cybersecurity standards, and environmental and green energy regulations. Based on the results of the interviews, the regulation encourages PLN to adjust the process and display of customer data on digital services to ensure security and compliance with data protection. Adjustments are made through a more transparent access and information management

approval mechanism, so that customer data remains safe and PLN's digital services run in accordance with applicable legal provisions.

Based on the results of PESTEL's analysis of PLN's digital services, it is further identified the opportunities and threats that affect the success of the sustainability of the digital service business.

Porter's Five Forces Analysis of PLN Digital Services

Porter's Five Forces analysis was conducted to understand the company's competitiveness and strategic position in PLN's digital services business. By knowing the strengths and weaknesses, such as the threat of new entrants, the strength of suppliers and customers, as well as the potential bargaining power of suppliers and buyers, as well as the competition of other companies.

1. The Threat of Newcomers

The threat factor of newcomers in Porter's Five Forces analysis has a moderate impact on PLN's digital services. Based on the results of the interview, PLN is still a monopoly company in the electricity sector with advantages in large infrastructure, strict regulations, and complex data security systems, so the barriers to entry for new competitors are quite high. However, potential threats can arise from private companies or platforms that offer similar services, such as token purchases, electricity account payments, public electric vehicle charging (SPKLU), and Renewable Energy Certificate (REC) sales. The industry resource person added that there is more competition in terms of digital payment services from banking or fintech, not in PLN's main business, so even though the threat is not significant, PLN still needs to innovate in order to remain superior in the quality and experience of its digital services.

2. Supplier Bargaining Power

The supplier bargaining power factor in Porter's Five Forces analysis shows a low impact on PLN's digital services. Based on the results of the interviews, PLN's main supplier of digital technology and infrastructure is its subsidiary, PLN Icon Plus, which handles cybersecurity and application development. However, the influence of suppliers on costs and strategic decisions is relatively small because PLN has a dominant position and high flexibility in choosing other technology service provider partners if needed. In addition, PLN's digital service tariff still follows the regulations set by the Ministry of Energy and Mineral Resources, so that suppliers do not have significant power in determining the price or direction of the company's digital service development.

3. Buyer bargaining power

The buyer's bargaining power factor in Porter's Five Forces analysis shows a low impact on PLN's digital services. Based on the results of the interview, customers have no influence on prices or service policies because electricity tariffs and digital service fees have been regulated by the relevant Ministries. PLN retains a strong bargaining position in determining the service structure, while customers can only demand improved quality and user experience. Thus, although customers play an important role as end users, they do not have significant bargaining power in influencing the price or direction of PLN's digital service development.

4. Threat of Replacement Products

The threat factor of substitute products in Porter's Five Forces analysis has a high impact on PLN's digital services. Based on the interview results, threats mainly arise in services that

are easy to duplicate such as token purchases, electricity account payments, and SPKLU services, which are also offered by other e-commerce or fintech platforms. However, for PLN's core services such as new connection requests and handling power outages, customers are not easy to switch because they depend on PLN's infrastructure and authority as the main national electricity provider. Although competition in the area of additional services is increasing, PLN still has a structural advantage through its network and wide infrastructure scale, so the threat of replacement products is more partial and does not replace the company's main services.

5. Industry Competition

The industry competition factor in Porter's Five Forces analysis shows a moderate impact on PLN's digital services. Based on the results of the interviews, the level of competition in the electricity sector is still low because PLN has a dominance of the national market and a strong infrastructure to serve customers throughout Indonesia. Competition only appears in certain sub-services such as Rooftop PV, SPKLU, and energy e-commerce, where several private companies have begun to develop similar platforms. However, the strength of the network, the scale of operations, and PLN's status as a state-owned company make it difficult for competitors to match the position and capabilities of PLN's digital services as a whole. Thus, despite the potential for increased competition in the supporting sector, PLN's dominance in the core electricity business remains a key strategic advantage.

External Environmental Analysis Integration

This study identifies opportunities and threats from the analysis of PESTEL and Porter's Five Forces, which are then included in the External Factor Evaluation (EFE) Matrix to assess the level of importance (weight) and magnitude of impact (rating) on PLN's digital services. The assessment is carried out based on input from internal and external sources who have been reconfirmed. The results of the analysis showed that there were nine opportunity factors and nine threat factors. The highest-scoring factor indicates the highest level of priority in the formulation of development strategies. Based on the results of EFE Matrix, the most significant opportunity is in the Key Activities aspect, namely the development and launch of one-stop solution services which are the main advantages of PLN's digital services. Meanwhile, the biggest threat comes from the Value Proposition aspect, namely the emergence of replacement products from the banking and e-commerce sectors that offer convenience in payment transactions, so it needs to be anticipated to maintain the competitiveness of PLN's digital services.

Internal Environmental Analysis

Analysis of the internal environment of PLN's digital services through the Internal Factor Evaluation (IFE) Matrix identifies strengths and weaknesses that affect the success of improving service quality and company revenue. Based on the results of observations, in-depth interviews, and documentation, 18 strength factors and 18 weakness factors were found spread across nine blocks of the Business Model Canvas. PLN's main strength lies in the ease of access to services, the use of data analytics for personalization, the diversity of customer segments, and the support of extensive digital infrastructure. PLN also excels in providing complete, responsive, and innovative services through digital platforms and strategic partnerships with technology and fintech companies. However, weaknesses still lie in cybersecurity risks, high

costs in service development, limited technology human resources, and dependence on government and third-party subsidies. Overall, PLN has a strong foundation in digital transformation, but it needs to strengthen data security, improve HR competence, and expand revenue diversification to maintain long-term business competitiveness and sustainability.

SWOT and TOWS Matrix analysis on BMC blocks

The SWOT analysis developed into the TOWS matrix produced 36 combined strategies from internal and external factors, consisting of 9 SO, 9 WO, 9 ST, and 9 WT strategies. After reassessment and simplification, 18 key strategies were obtained that were more focused and efficient to be implemented in the development of the new Business Model Canvas. This strategy is divided into three main categories based on the level of importance and the duration of its implementation. The short-term strategy focuses on increasing customer satisfaction and operational efficiency through the application of digital technology and artificial intelligence (AI), strengthening contact centers, optimizing loyalty programs, and developing one-stop solution platforms. The medium-term strategy is directed at developing innovative services according to customer needs and increasing the capacity of technological human resources, while the long-term strategy focuses on business sustainability through improving resource management, cost efficiency, process automation, and strengthening digital infrastructure. Overall, this priority strategy demonstrates PLN's commitment to strengthening digital innovation, improving customer experience, and building an adaptive and sustainable service system.

CONCLUSIONS

This study analyzed PLN's digital services business model using the Business Model Canvas (BMC), assessed internal and external factors through SWOT analysis, and formulated new development strategies with the TOWS method to create a more adaptive and sustainable model. Findings revealed strengths in easy access, comprehensive features, real-time services, strong resources, and strategic partnerships, which enhance revenue and support green energy initiatives. However, challenges such as regulatory changes, security risks, and competition from similar digital services remain. The study proposed 36 strategies, prioritizing 18 that focus on service personalization, AI integration, revenue diversification, and strengthening infrastructure and resource management. Practically, PLN is advised to improve user experience, embrace emerging technologies, expand collaborations, and innovate green energy products. Future research should broaden the analysis of PLN’s digital business model by incorporating a wider electricity industry perspective and macroeconomic and environmental factors using the PESTEL framework to deepen strategic insights for advancing digital services.

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