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Business Strategy Development for Drilling Cutting's Waste Industry using Ansoff Matrix

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Abstract

The drilling cutting's waste industry in Indonesia still facing major challenges in handling the Volatile Organic Compound (VOC) content, requiring companies to adopt more robust business strategy. This research develop a business growth strategy for PT. GPS using integrated framework combining Business Model Canvas, SWOT-TOWS, Analytic Network Process (ANP) and Ansoff Matrix. The existing business model was analyzed to identify structural gaps, followed by SWOT-TOWS formulatioan and ANP weighting using expert judgements. The ANP result indicate the differentiation based strategies strengthening service quality and reliability (ST2) and improving customer retention (ST1) are to priorities. These strategies align with Product Development of Ansoff Matrix, while technology adoption (SO2) support Market Penetration.The new business model integrated these priorities into value prepositions, key activities, and revenue streams. Economic feasibility analysis showed positive NPV, IRR, BCR across three scenarios, confirmung the financial viability of the strategic directions. The integrated approach provides actionable strategic recommendations to enhance competitiveness and longterm sustainability.

Introduction

The drilling waste industry facing growing regulatory, operational and enviromental pressures, particularly due to the presence of Volatile Organic Compound (VOC) in drilling waste. These conditions require company to adopt strategy that are not only market responsive, but also technically feasible and empiric. PT. GPS, currently operates a limited business model, focused on consultancy and chemical supply,which restricts competitiveness and ability to capture potential market (Porter, 1996).

The effective strategy implementation must be evaluated not only in terms of operational efficiency, but also contribute to organizational performance (Ho et al., 2014; Rachmad, 2025; Qalati et al., 2022; Fu et al., 2022; Al-Okaily et al., 2023). Hanoum and Islam (2021) emphasizes performance measurement should capture operational efficiency and reflect how process improvement translate into competitiveness. Hanoum (2021) shows that manufacturing enterprise performance, assesed through a network DEA approach, can integrate profitability and marketability dimensions. Building on insights, this research evaluates business strategy outcomes from strategic feasibility and implications for organizational performance in the hazardous waste management (Al Tawil et al., 2023; Kumar et al., 2023).

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The TOWS Matrix is commonly used to formulate strategies by combining internal (strengthness and weakness) and external (opportunities and threats) (Weihrich, H 1982; Skotnicka-Zasadzień et al., 2023; Žmegač et al., 2024; Đalić et al., 2021). However, it has limitations in quantitative assesment, and complex decision making process. Integration of TOWS Matrix with Analytical Network Process (ANP) enhance decision making competitiveness. ANP developed by Saaty (1996) as expanding from Analytical Hierarchy Process (AHP), consider interdependencies among elements, providing a comprehensive prioritization of strategic options.

To determine growth directions for PT. GPS, this research also using Ansoff Matrix, a framework for corporate growth strategies. By aligning ANP and prioritized strategies with Ansoff Matrix, PT. GPS is expected to develop growth initiatives that match its capabilities and external opportunities in drilling waste management.

Literature Review

Business Model Canvas

Business Model Canvas (BMC) is a visual framework for describing, analyzing and designing how an organization creates and deliver value (Osterwalder & Pigneur, 2012; Harianto & Soenardi, 2022; Pepin et al., 2024; Ningsih et al., 2023). BMC consist nine fundamental building blocks: customes segments, value preposition, channels, customer relationships, revenue streams, key resources, key activities, key partners and cost structure.

The BMC is widely used because provide a holistic view of business operations. Allowing researcher to map existing model, identify structural weaknesses, and detect opportunities for improvement in waste management services, BMC allows company to align between technical capabilities, regulatory requirements, and market demands. By integrating BMC with analysis tool such as SWOT-TOWS Matrix, BMC can support formulation of strategies empirically rather than generic or conceptual (Lertsakulbunlue et al., 2025; Blümel et al., 2023).

SWOT and TOWS Matrix

SWOT evaluate a company's strengths, weaknesses, opportunities, and threats (David, 2016; Mardiyana et al., 2022; Gödde et al., 2023). Strength reflect internal capabilities providing competitive advantage, while weaknesses denote internal limitations that reduce effectiveness. Opportunities emerge from favorable external such as technological progress or strategic partnerships, and threats arise from external factors such as new competitors, regulatory changes, or economic instability (Weirich H., 1982; Salamzadeh et al., 2022; Uwaoma et al., 2023). While SWOT provides a foundational evaluation, The TOWS Matrix enhances by systematically matched internal and external factors to generate four strategic alternatives: SO, WO, ST and WT (Weirich H., 1982). However, TOWS has limitations. It does not prioritize strategies, lack quantitative robustness, and it less effective for complex decision making (Yuksel et al, 2007; Mihajlović et al., 2024; Žmegač et al., 2024). Integrating TOWS with Analytic Network Process (ANP) would solve these issues by providing a structured prioritization, ensuring strategies are empiric, and aligned with organizational goals for effective strategic development.

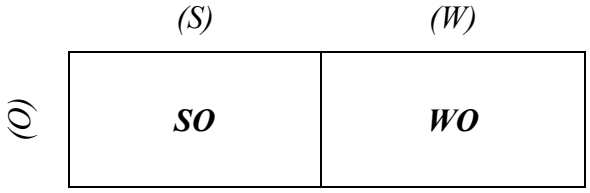

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Figure 1. TOWS Matrix

Analytic Network Process

The Analytic Network Process (ANP) developed by Saaty (1990), A multicriteria decision making method to count for interdependancies between elements. Unlike with AHP, which asumes hierarchical independence, ANP use a network structure that provide feedback across criteria and clusters. This makes ANP more suitable for complex strategic problems where factors influence one another (Hesam, 2024).

ANP begin with pairwise comparisons between elements using Saaty's scale (1-9) to measure the relative importance elements. These judgements are organized into a supermatrix consisting of unweighted, weighted, and limit supermatric to produce stable priority weights.

Table 1. Saaty Scale

Scale	Definition
1	Both criteria considered equally important
3	One criterion is slightly more important than the other
5	One criterion is moderately more important than the other
7	One criterion is clearly more important than the other
9	One criterion is absolutely more important than the other
2, 4, 6, 8	Intermediate values used when the relative importance between 2 criteria

The reliability of pairwise comparison is evaluated by consistency ratio (CR) with acceptable threshold 0,1. Consistency ratio (CR) is calculated as the ratio of concistency index (CI) to the random index (RI) , as shown in the formula below:

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}}$$

Tabel 2. Random Consistency Index

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

Ansoff Matrix

Ansoff matrix (Ansoff, 1957) is a strategic growth framework divided into 4 alternatives : market penetration, product development, market development and diversification. Market penetration focuses on increasing sales of exisiting product in current markets, product development introduces new product to existing market, market development targets new market with existing product, and diversification targets a new market and products with high risk but potential. (Kotler & Keller, 2016). The matrix widely used because provides clear structure for evaluating growth and understanding the strategic implications.

Ansoff Matrix integrated with TOWS- ANP results to ensure growth strategies based on prioritized strategic factors. ANP's priorities guide the placement of alternatives. SO strategies align to market penetration and product development, ST strategies align with market

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development, while WO and WT strategies positioned with diversifications, ensuring consistency with company's internal and external condition.

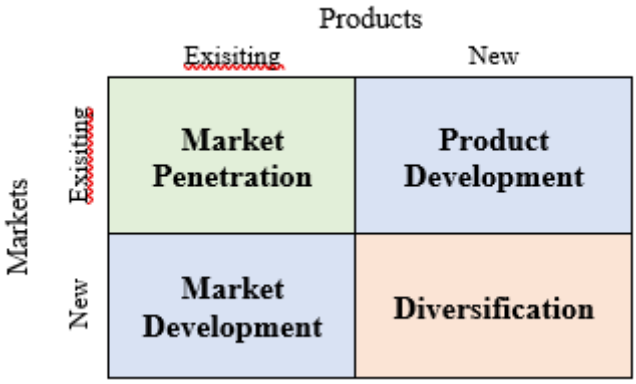

Figure 2. Ansoff Matrix

Methods

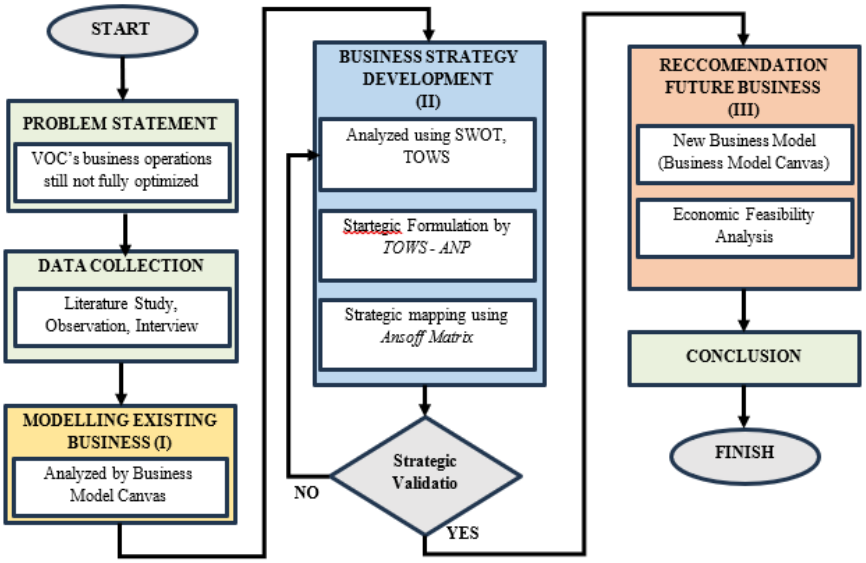

Figure 3. Research Flowchart

This research is to identify, analyze, and formulate business delevopment strategies for PT. GPS in drilling waste management. The reseach method divides into 3 steps: modelling existing business (I), Business Strategy development (II), and Reccomendation Future Business (III). Data collection was conducted through interview, observation, and additional data collected through literature study.

Modelling Exisiting Business (I)

The exisiting business mapped by using Business Model Canvas by translating the real operational and organizational conditions into 9 blocks of Business Model Canvas. This appoach allowed a structure visual of the company's current business model.

Business Strategy Development (II)

Business strategy development devide into 4 stages, firstly, the existing business mapped by using business model canvas classified by using SWOT into: strengths, weaknesses, opportunities, and threats. Validation of SWOT by using triangulation data, (literature review,

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field observation, and interview). The SWOT analyisis reviewed by experts in operation, waste management and business development to ensure data are comprehensive and relevance. Seccondly, The SWOT factors integrated into TOWS Matrix to formulate alternative strategies.

Third, TOWS strategies integrated into ANP. This process involved constructs an ANP network based on TOWS criteria, pairwise comparison to obtain priority weights and validating judgement using Consistency Ratio (CR). The ANP result served as the basis for prioritizing strategic alternatives.

Fourthly, the priority weight from TOWS-ANP analysis mapped into Ansoff Matrix (table 3).

Table 3. Integration TOWS-ANP with Ansoff Matrix

	Existing Products	**New Products**
Existing Markets	Market Penetration SO	Product Development SO
New Markets	Market Development ST	Diversifications WT

Recommendation Future Business (III)

A new business model developed using Business Model Canvas aligned with strategy's objectives derived from TOWS-ANP priorities. Each element of the revised model linked to empirical findings from earlier analysis directly reflects the company's: strengths, weaknesses, opportunities and threats. The new model validated through structured expert judgement in waste management and business development, followed by discussion with stakeholder to confirm operational feasibility, strategic relevance, and implementation readiness.

To support the strategy reccomendations, an economic feasibility analysis was conducted using Net Present Value, Internal Rate Return, Payback Period and Benefit Cost Ratio. These indicators were explicitly connected to the prioritized strategies generated through TOWS-ANP integration, ensuring the feasibility evaluations reflect the actual strategic direction rather than operating independently.

Result and Discussion

Interview

Interview was conducted with three expert respondent selected through purposive sampling. The selection focused on professional directly involved in drilling waste operations, enviromental compliance and business development management: 1) Senior Operation from Oil & gas with expertise in drilling waste; 2) Enviromental Compliance Specialist with expertise in waste management; 3) Business Development / Operation Manager from PT. GPS

Table 4. Interview results

Aspect	**Result**
Customer Segment	The target market focuses on oil & gas industry which produced drilling waste.
Value Propositions	PT. GPS focuses to provide Volatile Organic Compound reduction solutions, innovation and ecofriendly
Channels	Using combination channel : online (email, teleconference) and offline (meeting and field observation)

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Customer relationships	Customer relationships build by trust and experience.
Revenue Streams	Chemical sales, unit equipment sales, consultancy services and disposal waste commisions.
Key Resources	The business utilizes drilling cutting waste as a core business, supported by personnel skill and local partnerships.
Key Activities	Equipment design, chemical formulation, laboratory testing.
Key Partnerships	Oil & gas company, cement company, local vendors for equipment supplies, material, etc.
Cost Structure	Chemical purchases, equipment fabrication, human resources and logistic cost. Efficiency by reducing production cost and optimizing to use local material.
Strategy and Evaluation	The respondents agreed that the trend of drilling cutting waste will growth for next 3-5 years. The main challenge comes from price and services competition.

Modelling Existing Business (I)

The first step of developing a business model is identify the existing business model to gain prelimenary information about the company.

Table 5. The Existing Business Model

<table>
<tr><th colspan="2">BMC: Existing</th><th colspan="2">Company Name: PT. GPS</th><th>March 2025</th></tr>
<tr><td rowspan="2">Key Partners
-Supplier
-Cement Company
-Oil Company
-Local Vendor
- Consultants
- Join Venture</td><td>Key Activities
-Fabrication unit
-Chemical Formulation
-Laboratory test
-Quality Control</td><td rowspan="2">Value Propositions
- VOC Treatment
- Government regulation
- Ecofriendly innovation
- Equipment supply</td><td>Customer Relationships
- Site visit
- After sales service
- Consultancy
- Long term supply contract</td><td rowspan="2">Customer Segment
Cement & Oil Company</td></tr>
<tr><td>Key Resources
-Drilling cutting waste
-Chemical
-Manpower</td><td>Channels
Direct Distribution
Online : email, telephone, teleconference
Offline : site visit</td></tr>
<tr><td colspan="3">Cost Structure
- R&D cost
- Chemical cost
- Operational cost
- Laboratory
- Manpower</td><td colspan="2">Revenue Streams
-Contract consultants
-Chemical Supplies
-Equipment sales</td></tr>
</table>

The review of existing BMC indicated several structural gaps that influence the company current strategy. Although PT. GPS has strong technical capabilities in fabrication, chemical

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formulation, and VOC treatment, the model shows limited adoption of digital monitoring and clean technology, which contributed to operational weaknesses. Customer dependence in oil & gas sector also increases vulnerability to market fluctuations. In addition, existing partnership remain transactional and not yet support technological innovation or service differentiation. Revenue stream are still dominated by chemical and equipment sales, indicating potential to diversify toward performance based contracts and digital service offerings. These gaps form the empiric basis for identifying weaknesses and threats in the SWOT analysis and highlight the strategies need for differentiation, technology enhancement, and market development, which are prioritized in the TOWS-ANP framework.

Business Strategy Development (II)

The development of business strategy at this stage begin with SWOT analysis from existing Business Model Canvas (Table 5). SWOT analysis identifies internal strengths and weaknesses, as well as external opportunities and threats. To strengthen analytical robust of the SWOT analysis and avoid subjectivity, all SWOT factor were derived through a triangulation process: Exiting BMC analysis (1) – Expert Interview (2) – Field Observations (3) and relevant literature (4). Each potential factor evaluated by using 1-5 scoring scale base on strategic impact and frequency of apperance across data sources.

Tabel 6. SWOT Analysis

Strengths	**Weakness**
S1. Customer trust & relationships S2. Waste treatment experts S3. Support infreastructure & equipment S4. Waste treatment reputations S5. service quality & government regulations	W1. Depend on primary customer W2. Limited branding & promotions W3. Undiversifications business W4. Limited sclae operations W5. Low digitalization of internal
Opportunities	**Threats**
O1. Corporate awareness for waste O2. Growing demand of waste treatment O3. Strict enviromental regulations O4. Expand to other sector industries O5. Technology enabling for efficiency & quality	T1. Intense price competition T2. Regulatory/ policy could increase cost T3. Economical fluctuations T4. Competitor with advance technology T5. Raw material & operational cost increased

TOWS Matrix constructed by combining internal and external factors to formulate startegic alternatives. Four categories strategic groups : SO, ST, WO and WT.

Tabel 7. TOWS Matrix

	Strength (S)	**Weaknesses (W)**

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Opportunity (O)	**S-O Strategies** 1. Expand the market into other industrial sector by leverage professional capabilities and company reputation. 2. Adopt enviromental friendly and cleaner technology to enhance service performance 3. Enhance service quality to meet regulatory and enviroment standard	**W-O Strategies** 1. Develop digital marketing to reach new potential markets. 2. Diversify service to reduce dependence on spesific segments. 3. Implement digital management system to increase efficiency.
Threats (T)	**S-T Strategies** 1. Retain the key customer through consistent service performance 2. Strengthen differentiation through service quality and reliability to compete low cost. 3. Optimize infrastructure to comply with regulations without reduce efficiency.	**W-T Strategies** 1. Reduce dependence on major customer to lower market vulnerability 2. Lowering production cost through efficiency & optimization program. 3. Increase revenue streams to against competitive pressure and regulatory changes.

TOWS strategies operationalized using insights from the existing BMC, expert interviews, and field observations to ensure practical and evidence based. SO strategies focus on market expansion, technology upgrade and compliance strengthening. ST and WO strategies enhance customer retention, differentiation, digital capability and service diversifications, while WT strategies address cost efficiency and customer dependency risk. These action align the strategic alternatives with PT. GPS operational and resources requirement.

Analytic Network Process (ANP)

Analytic Network Process applied to calculate weight of the strategic alternatives from TOWS matrix. ANP was chosen because it can accommodate interdependencies and feedback among criteria and sub criteria, which conventional hierarchy methods cannot handle. The network model in this research concist of several main clusters: internal factor (strengthness and weaknesses), external factor (opportunity & threats), and 12 strategic alternatives formulated from TOWS matrix. Each node within clusters interconnected based on relevant influences, followed by pairwise comparison using Saaty scale. The table below are the result for each cluster using software Super Decision v 3.2.0 :

Tabel 8. Strategy Development Priority

No.	Node	Name	Normalized by Cluster
1.	SO1	Expand the market into other industrial sector by leverage professional capabilities and company reputation.	**0.03184**
2.	SO2	Adopt enviromental friendly and cleaner technology to enhance service performance	**0.14580**
3.	SO3	Enhance service quality to meet regulatory and enviroment standard	**0.05563**

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4.	ST1	Retain the key customer through consistent service performance	**0.18380**
5.	ST2	Strengthen differentiation through service quality and reliability to compete low cost.	**0.32112**
6.	ST3	Optimize infrastructure to comply with regulations without reduce efficiency.	**0.07013**
7.	WO1	Develop digital marketing to reach new potential markets.	**0.04959**
8.	WO2	Diversify service to reduce dependence on spesific segments.	**0.02729**
9.	WO3	Implement digital management system to increase efficiency.	**0.01502**
10.	WT1	Reduce dependence on major customer to lower market vulnerability	**0.02380**
11.	WT2	Lowering production cost through efficiency & optimization program.	**0.06236**
12.	WT3	Increase revenue streams to against competitive pressure and regulatory changes	**0.01362**

ANP was applied to determine the relative priority of the 12 strategic alternatives generated from the TOWS Matrix. ANP was selected because it accomodates interdependancies and feedback among internal and external factors, which cannot be captured by linear hierarchical model. The network consists of 4 clusters : Strengths, Weaknesses, Opportunities, Threats linked to the 12 strategies TOWS Matrix. Interrelationships among nodes were established based on their influence on strategic decision making.Pairwise comparisons were conducted using Saaty scale and completed by three experts. Individual judgement s were aggregated using geometric mean and all matrices achieve concistency ($CR \leq 0.1$). ANP supermatrix also captured cross cluster interactions, such as technical strengths reinforcing opportunities and regulatory threats amplifying internal weaknesses.

The result indicated ST2 (Emphasize reputation and quality to compete low cost) is the highest strategy, followed by ST1, SO2, SO3, and SO1. This shows although opportunity driven strategies remain relevant, the company strategic direction is primarily shaped by competitive threats such as price pressure, regulatory changes, and technological advance. ST strategies demonstrates that PT. GPS must strengthen differentiation, reliability and customer retention before expanding aggressively to new markets.

To ensure strategic coherence, the highest priority strategies were mapped into Ansoff Matrix. ST2 and ST1 align with the Product Development. SO2 aligns with Market Penetration as technology adoption strengthens positioning within existing customers. SO1 and SO3 correspond to Market Development, given their focus on expand to new industries while maintain service quality.

Table 9. Ansoff Matrix Strategy Mapping

	Existing Products	**New Products**

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Existing Markets	*Market Penetration* *SO2 :* Adopt enviromental friendly technology	*Product Development* *ST1 :* Retain the key customer to compete in market. *ST2:* Strengthen differentiation through service quality and reliability to compete low cost.
New Markets	*Market Development* *SO1 :* Expand the market into other industrial sector *SO3 :* Maximize service quality to comply with government regulations.	*Diversifications* -

Mapping of ANP prioritized strategies into Ansoff Matrix to determine the most appropriate growth direction for PT. GPS based on empirical evidence and logic strategies. Unlike the initial interpretation, the revised analysis use the ANP result where ST2 and ST1 hold the highest weights to ensure reccomendations are fully aligned with the company's strategic priorities. The Product Development becomes the primary strategic focus, and highest ranked strategies, ST2 and ST1 indicated need to strengthen internal capabilities, enhance service quality, and improve value to existing markets.The Market Penetration supported by SO2 which leverages technology upgrades to increase competitiveness within existing customer segments. This aligns with industry trends favoring cleaner and more efficient waste treatment technologies.

The Market Development includes SO1 and SO3. These strategies enable entry into new industry markets while maintaining high service standards, though their lower weight indicate the expansion should be selective and pursued only after strengthening capabilities. No strategies under diversifications, this indicating the company's resources and market conditions does not support high risk expansion into new products or industries

Table 10. Ansoff Matrix Strategy Rank

Ansoff Quadrant	Strategy	Weight	Implication
Product Development	ST1 : Retain the key customer to compete in market. ST2: Strengthen differentiation through service quality and reliability	ST1 : 0.18380 ST2 : 0.32112	Maintain customer loyalty an stabilize revenue Strengthen differentiation and reinforce competitive positioning
Market Penetration	SO2 : Adopt enviromental friendly technology	SO2 : 0.14580	Increase penetration through technology driven efficiency
Market Development	SO1 : Expand the market into other industrial sector	SO1 : 0.03184	Potential expansion requiring investmentand readiness

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	SO3 : Maximize service quality to comply with regulations	SO3 : 0.05563	Selective expansion while improving compliance driven value
Diversifications	-	-	No strategy prioritized

Table 11. Strategy Validation

Ansoff Matrix	TOWS–ANP Strategy	Weight	Internal Validation	Expert Judgement	Implication
Product Development	ST1: Retain the key customer to compete in market	0.18380	Consistent (CR ≤ 0.1)	Supported by experts	Strengthens revenue reliability
	ST2: Strengthen differentiation through service quality and reliability to compete with low-cost rivals	0.32112	Consistent (CR ≤ 0.1)	Agreed as a main strategy	Feasible as a top priority
Market Penetration	SO2: Adopt environmental-friendly technology	0.14580	Consistent (CR ≤ 0.1)	Supported by environmental practitioners	Feasible as a second priority
Market Development	SO1: Expand the market into other industrial sectors	0.03184	Consistent (CR ≤ 0.1)	Feasible but needs investment and partners	Feasible, but requires investment
	SO3: Maximize service quality to comply with government regulations	0.05563	Consistent (CR ≤ 0.1)	Implemented with increased manpower skill	Feasible as a supporting strategy
Diversification	–	–	Not relevant	Not yet priority	Not yet priority

Recommendation Future Business (III)

Business recommendation section has been improved to establish a clear connection with the result of SWOT, TOWS, ANP and Ansoff Matrix analysis. The proposed Business Model Canvas structured based on strategic priority factors, especially **ST2**, which emerged as the highest priority alternative based on ANP results. Each BMC block is aligned with PT. GPS internal strengths to address external threats, ensuring the revised model reflects real strategic needs rather the general adjustment.

Implementation implications were also outlined. This strategy requires strengthening technical workforce capacity, investing in VOC technologies, deploying digital monitoring systems, and establishing proper risk mitigation frameworks. These considerations provide a clear roadmap for executing the recommend business expansion in VOC treatment.

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Table 12. Mapping of BMC – SWOT – TOWS- ANP – Revised BMC

Existing BMC	SWOT Factor	TOWS	ANP Priority	Revised BMC
Customer Segment	W1 : Depend on primary customer	WO1 : Develop digital marketing	Medium	Expansion to cement company, smelter, manufacturing
Value Propositions	W2 : Limited branding & promotions	ST2 : Strengthen differentiation.	Highest (0.32112)	Compliance based VOC treatment with performance
Channels	W3 : Undiversi-fications business	WO1 : Develop digital marketing	Medium	Digital monitoring platform & client portal
Customer relationships	W4 : Limited sclae operations	WO2 : Diversify service to reduce dependence	Moderate	Performance based contract
Revenue Streams	S1 : Customer trust & relationships	SO2 : Adopt enviromental friendly and cleaner	High	VOC treatment fee / contract
Key Resources	W5 : Low digitalization of internal	WT2 : Lowering production cost through efficiency & optimization program.	Low	Digital equipment
Key Activities	S2 : Waste treatment experts	ST1 : Retain the key customer through consistent service performance	High (0.18380)	Digital monitoring
Key Partnerships	T1 : Intense price competition	WT1 : Reduce dependence on major customer	Low	Additional Partnerships
Cost Structure	T2 : Regulatory	WT2 : Lowering production cost optimization program	Low	Preventive maintenance program

The revise BMC is developed by aligning each block with the prioritized strategies. Key adjustment include: strengthening value prepositions through VOC treatment solutions; expanding customer segments beyond oil & gas; digital monitoring and laboratory enhancement into key activities; and diversifying revenue through service contracts, training, and maintenance programs. These modifications ensure new BMC reflects target responses rather than generic adjustment.

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Table 13. The New Business Model

<table>
<tr><td colspan="2">BMC: Existing</td><td colspan="2">Company Name: PT. GPS</td><td>March 2025</td></tr>
<tr><td rowspan="2">Key Partners
-Oil Company
- Cement & Manufacturing Industries (SO1)
-Local Vendor
-Consultants
- Join Venture
- Technology Provider (ST2)
-(Enviromental Treatment) – SO2
- Longterm Service Partner (QC equipment & calibration) (ST1)</td><td>Key Activities
-Fabrication unit
-Chemical Formulation
-Laboratory test & Compliance (SO2)
-Quality Control &Reliability program (ST2, ST1)
- Digital Monitoring & reporting System (WO3)
-Customer Training</td><td rowspan="2">Value Propositions
- VOC Treatment
- Government regulation
- Ecofriendly innovation
- Equipment supply
-“Integrated Treatment Solutions” (ST2)
-Enviromental Compliant & technology solution (SO2, SO3)</td><td>Customer Relationships
- Site visit
- After sales service
- Consultancy
- Long term supply contract (ST1)
- Training & Maintenance
- Digital Reporting (WO3)</td><td rowspan="2">Customer Segment
Cement & Oil Company
Service Company (SO1)
Manufacturing (SO1)</td></tr>
<tr><td>Key Resources
-Drilling cutting waste
-Chemical
-Manpower
-VOC Treatment technology (SO2)
- Skilled personnel (ST1, ST2)</td><td>Channels
Direct Distribution
Online : email, telephone, teleconference
Offline : site visit
Service agreement, training & maintenance,
B2B digital system platform (WO3)</td></tr>
<tr><td colspan="3">Cost Structure
- R&D cost
- Chemical cost , operatioanl cost
- Digitalization & system maintenance (WO3)
- Digitalization service & manpower training skill (WO3)
- Preventive maintenance cost (ST1/ST2)</td><td colspan="2">Revenue Streams
-Contract consultants
-Chemical Supplies
-Equipment sales
- Training & Maintenance
- Performance base packages (ST2)
- Long Term agreement (ST1)</td></tr>
</table>

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 New Strategy

Model Validation Process

The validation process conducted using structured expert judgement approach. Experts from operation, commercial and enviroment divisions with experience more than 5 years in waste management industry evaluated feasibility of the proposed model using criteria such as technical readiness, organizational capability, regulatory compliance and market potential on scale 1 - 5. The expert inputs was focus on the six blocks were directly affected by the TOWS-ANP strategic priorities, as the remaining blocks showed no significant structural changes were validated through interview and existing operational data.

Table 14. Expert Evaluation

BMC Block	Evaluation Criteria	Expert 1	Expert 2	Expert 3	Average	Feedback
Value Propositions	Technical Feasibility	4	5	4	4.3	Emphasize compliance
Customer relationships	Market Potential	4	3	4	3.6	Need Long term contract
Revenue Streams	Financial Feasibility	4	5	6	4.3	Add revenue options
Key Resources	Technical Capabilities	3	4	3	3.3	Digital Monitoring
Key Activities	Organizational Readiness	3	3	4	3.3	Workforce readiness
Cost Structure	Operational Risk	3	3	4	3.3	Preventive Maintenance

 Top Priority Strategy

Economic Feasibility

The economic feasibility analysis evaluated the financial viability of implementing prioritized strategy alternatives derived from TOWS-ANP results. Since service differentiation **(ST2-ST1)** and technology adoption **(SO2)** require operational enhancement and capital investment, financial evaluation need to asses.The projection using the following data:

CAPEX : Rp. 995,980,000 (year - 0)

Volume Drilling cutting : 842 m^3/year

Service Rate : Rp. 2,000,000/m^3

Revenue Growth : 3% / year

MARR : 15% /year

OPEX year -1 : Rp. 951,245,000

Straight Line Depreciation : Rp. 99,598,000/year

Tax : 22% (UU no. 36/2008 about PPh)

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Feasibility parameter are Net Present Value (NPV), Internal Rate Return (IRR), Payback Period (PbP) and Benefit Cost Ratio (BCR). To reflect competitive dynamics identified in the SWOT-TOWS analysis, especially price pressure and threat of low cost competitors, service rate scenarios were evaluated as follow :

Best Case : Rate Rp. 2,500,000/m^3

Base Case : Rate Rp. 2,000,000/m^3

Worst Case : Rate Rp. 1,800,000/m^3

Table 15. Sensitivity Analysis

Skenario	Net Cash Flow*	NPV*	IRR	PbP	Benefit Cost Ratio
Best Case	8,767,193,907	1,680,722,122	64%	Year - 2	5,89
Base Case	5,002,685,219	650,241,730	35%	Year - 3	3,61
Worst Case	3,496,881,744	238,049,574	22%	Year - 3	2,71

*) in IDR (Indonesian Rupiah)

In the best case, strong differentiation and compliance (aligned with ST2-SO3) allow premium pricing, yield attractive result (NPV IDR 1,680,722,122, IRR 64%, BCR 5,89). This support the strategic emphasis on service quality and reputation.

In the base case, result remain financially (NPV IDR 650,241,730, IRR 35% and BCR 3,61) indicating the reccomended strategies (ST1-SO2) still generate return, above MARR even under average market conditions

In the worst case, despite price pressure (ST1), the project remain viable (NPV IDR 238,049,574, IRR 22%, BCR 2,71), demostrating the adopting clean technology and operational efficiency (SO2, WT2) supports resilience under competitive markets. Overall, the financial result confirmed the prioritized TOWS-ANP strategies are feasible, with sufficient returns to justify investment in capability strengthening, technological upgrades, ans selective market expansion.

This work supports the recent literature in strategic-management research by stating that companies with a high level of regulation and environmental sensitivity focus on differentiation, reliability, and regulation compliance instead of aggressive market expansion (Kumar et al., 2023; Blumel et al., 2023). The preference of service quality and customer-retention policies is an indicator of a more general shift to resilience-oriented strategies, where the centralization of internal capacities are discussed as a precondition to expansion efforts in the face of two-fold pressure of regulatory control and price competition (Al Tawil et al., 2023; Salamzadeh et al., 2022).

The prevalence of the threat-based (ST) approaches confirms the criticism against the opportunity-focused strategic theories that overlook structural constraints and operational risks (Porter, 1996; Pepin et al., 2024). In highly industrialized systems, strategic restraint and ability convergence are often compared to more sustainable performance results than diversification or quick market development (Blumel et al., 2023; Kumar et al., 2023). In this respect therefore, differentiation is not only an option of competition but a necessary adaptation mechanism to regulatory and technological pressure.

Methodologically, the combination of TOWS and the Analytic Network Process (ANP) addresses one of the main limitations of traditional SWOT-based solutions, i.e. the lack of

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priorities and the refusal to consider the links between strategic factors (Dalic et al., 2021; Mihajlovic et al., 2024). In line with the most recent multi-criteria decision-making research, the ANP framework introduces feedback loop responses among internal strengths, regulatory threats, and technological opportunities, and thus, producing more realistic and decision-related strategic results (Hesami, 2024; Zmegac et al., 2024).

The fact that environmentally-friendly technology adoption has been positioned as a supporting and not a primary growth driver is consistent with the recent body of sustainability research, which proves that in hazardous waste industries, technology may be regarded as an enabler of compliance and operational efficiency but is not a source of disruptive innovation (Fu et al., 2022; Al-Okaily et al., 2023). This highlights the fact that sustainability solutions in this setting are largely defensive and risk-averse, especially when it comes to cost and competition challenges (Kumar et al., 2023). Lastly, the transformation of the prioritized strategies into an updated Business Model Canvas and evaluation of their financial feasibility contribute to recent findings that consistent alignment between strategy, business-model design, and measures of performance increases organizational resilience (Hanoum, 2021; Hanoum and Islam, 2021). On the whole, this analysis is relevant to the present-day strategic discourse because it demonstrates that, in the case of regulated industrial industries, good strategic development is based on the ability to build capabilities in a sequence, prioritize analytically, and make growth decisions in a disciplined manner instead of an expansionist paradigm (Mihajlovic et al., 2024; Zmegac et al., 2024)

Conclusion

This study integrated SWOT, TOWS, ANP and Ansoff Matrix to develop a strategic growth for PT. GPS. The ANP result show the differentiation-oriented strategies strengthening service quality and reputation (ST2, ST1) as the highest priority, followed by technology adoption (SO2) and selective market expansion (SO1, SO3). These priorities indicated the capability enhancement must precede agrresive market growth. Ansoff Matrix confirmed Product Development and Market Penetration as the most appropriate paths, which translated into a new Business Model Canvas. The new model strenghtens Value Prepositions, expand Customer Segments, and introduces technology-based improvements and diversified Revenue Streams. Economic feasibility show positive NPV, IRR, and acceptable Payback Period across all scenarios. Overall, integrated framework provides a coherent and financial strategic direction to enhance PT. GPS competitiveness and long-term sustainability.

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