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A QSPM Strategy to Control Inventory Turnover in Aerospace Industry

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Abstract

Purpose: This study analyzes the current inventory management of PT. UTX and develops a data-driven control strategy by integrating internal and external strategic factors, addressing the aerospace industry's unique high-dependency and certification requirements that are rarely explored in prior research. A key novelty of this research lies in the integration of the SWOT framework and the Quantitative Strategic Planning Matrix (QSPM) to design aerospace inventory strategies—an approach that has not been explicitly applied in this context before.

Methodology: A sequential exploratory mixed methods approach was applied, starting with qualitative interviews and followed by quantitative strategic analyses to evaluate factors influencing inventory turnover

Research Findings: PT. UTX maintains a solid planning system through MPS and leverages 3PL and bonded logistics centers, yet faces issues in digital integration, cross-functional coordination, and single-source supplier dependency. The analysis positions the company in a "grow and build" strategy, with backward integration identified as the most effective approach to enhance efficiency and supply chain resilience

.**Limitations:** The study focuses on PT. UTX and relies on internal expert input, which may limit generalizability to other contexts.

Contribution: This research advances supply chain strategy literature by integrating mixed methods with strategic tools, empirically validating backward integration and multi-sourcing as resilience strategies in high-certification industries like aerospace.

Novelty: The study uniquely combines qualitative insights and quantitative models to design an inventory control framework, emphasizing backward integration and multi-sourcing to strengthen supply chain resilience.

Keywords: *Aerospace Industry, Inventory Turnover, Supply Chain Strategy, SWOT Matrix, QSPM*

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1.Introduction

The aviation industry has undergone rapid development over the last decade Nimatov and Imamova (2021) and now plays a strategic role as the backbone of the national economy (Gole, Dobrea, & Gombos, 2021). Beyond serving as a means of transportation, aviation drives the growth of various industrial sectors (Nimatov & Imamova, 2021). This growth demands a well-developed strategy Gliddon (2009) that includes airline management and aircraft procurement (Matinheikki, Kenny, Kauppi, van Raaij, & Brandon-Jones, 2024).The sector's vast opportunities attract numerous multinational companies to join its supply chain, including Honeywell, GE, Lockheed Martin, Safran, Moog, and PT UTX, which supply major global aircraft manufacturers such as Boeing and Airbus (Adnan, Rahayu, Hendrayati, & Yusuf, 2021). PT UTX is one of the world's largest aerospace Kamuri and Kurniawati (2020) and defense product supply companies, headquartered in West Palm Beach, Florida. The

company is engaged in the design, manufacture, and maintenance of systems and components for commercial Alam, Thakur, and Islam (2024), regional, business, and military aircraft and helicopters. In the aviation industry, the supply chain encompasses a series of processes and relationships between various parties, from the provision of fuel, aircraft, and spare parts to passenger services (Kahiluoto, Mäkinen, & Kaseva, 2020). The complexity of this supply chain necessitates efficient coordination and synergy among sectors to ensure the seamless operation of aviation as a whole (Ega Adhisty, Jandhana, Aries, & Hariantana Aygy, 2025).

Recent global supply chain disruptions, particularly in manufacturing and aerospace (Adnan et al., 2021), have simultaneously affected demand, supply, and logistics (Ustabulut, 2021). Such "triple shocks" force companies to move beyond the just-in-time approach toward more resilient strategies Zerine, Biswas, Doha, Meghla, and Polas (2025), including supplier diversification Lestary and Chaniago (2017), increased buffer stock, and adoption of innovative technologies .As a critical part of the aerospace supply chain, PT UTX faces similar challenges, requiring adaptive and efficient inventory management to ensure production continuity and competitiveness (Pollák & Markovič, 2021). This need for adaptive strategy is not exclusive to large-scale industries. As Yusuf, Hendrayati, Bastian, Nurhasan, and Adnan (2024), emphasize in their study on culinary MSMEs, the adoption of digital marketing has proven to be a key survival strategy during the COVID-19 pandemic. Their findings reinforce the idea that responsiveness, technological integration Ayurini and Wijayati (2025), and proactive planning are essential not only for small businesses but also for large industrial supply chains in navigating disruptions.

Effective inventory management is crucial in the face of uncertainty Hånell, Rovira Nordman, Tolstoy, and Özbek (2020), as it plays a key role in maintaining the availability of raw materials Whiting, Maynes, Podsakoff, and Podsakoff (2012), work-in-process (WIP), and finished goods Székely, Csata, Cioca, and Benedek (2020), all of which are owned by PT UTX. Excessive inventory Alam et al. (2024) can increase costs and the risk of obsolescence Addison et al. (2020), while inventory shortages can disrupt Chan-Olmsted and Kim (2023) production and lead to reduced customer satisfaction (Bhatt & Patel, 2020). Inventory Turnover is used as an indicator of inventory management efficiency Hinterhuber (2024), where values that are too high or too low both indicate potential problems (Musyaffi et al., 2024). Therefore, the right inventory strategy and compelling inventory valuation are crucial to supporting a smooth supply chain and improving the company's profitability (Gole et al., 2021).

Table 1: ***Inventory Turnover*** **PT.UTX 2017-2024**

Year	2017	2018	2019	2020	2021	2022	2023	2024
Turnover Ratio	4.45	4.82	5.09	3.71	5.22	7.02	5.71	5.8
Phenomenon Occurred	Building stock for factory moves.	Building stock after a factory move.	Pre-Covid	Covid	Post Covid	Business Recovery	There was a decline in customer demand.	There was a decline in customer demand.

Source: processed by the author, 2024

PT UTX's inventory turnover ratio data from 2017 to 2024 shows fluctuations that reflect the company's operational dynamics and external conditions. In 2017-2018, the ratio was relatively stable and tended to increase as the company built up stock to support the factory transfer process. The peak occurred in 2019, during the period before the COVID-19 Pandemic. However, in 2020, there was a significant decline to 3.71 due to operational and demand disruptions during the Pandemic. The ratio rose sharply again in 2021 and peaked in 2022 (7.02), marking the end of the post-pandemic business recovery phase. However, 2023 and 2024 showed a decline in the ratio due to weakening customer demand,

indicating a slowdown in inventory turns and necessitating adjustments to inventory management strategies to maintain efficiency.

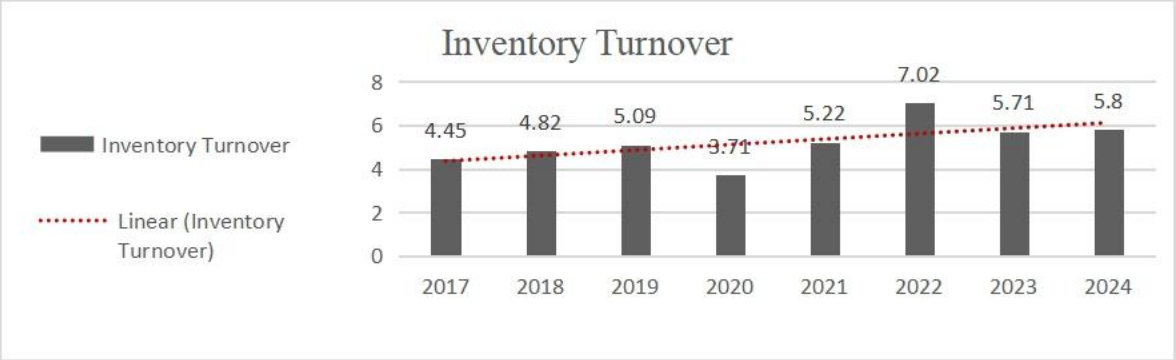


Figure 1: Figure of PT.UTX Inventory Turnover 2017-2024
Source: Company Data, 2025

The Figure "Inventory Turnover PT UTX 2017-2024" showed a fluctuating but increasing trend overall, as indicated by the rising linear trend line. The inventory turnover ratio declined sharply in 2020 (3.71) due to the impact of the COVID-19 Pandemic that disrupted operational activities and market demand. However, post-pandemic, there was a significant recovery in 2021 and a sharp spike in 2022 (7.02), reflecting improved efficiency in inventory management during the business recovery phase. Although the ratio declined slightly to 5.71 and 5.8 in 2023 and 2024, these values are still higher than those of the pre-pandemic period, indicating that PT UTX has maintained its inventory management efficiency despite facing the challenge of declining customer demand.

Table 2: **PT UTX Demand Decline Data 2023 - 2024**

Year/Parameter	2023		2024	
	Hours	Cost of Sales	Hours	Cost of Sales
Plan	503,633	36,427,298	491,132	40,133,759
Actual	421,405	28,458,447	445,305	34,827,691
Variance	(82,228)	(7,968,950)	(45,827)	(5,306,068)

Source: Company Data, 2024

PT UTX's 2023-2024 demand reduction data table reveals a significant negative difference (variance) between the plan and actual values in both production hours and cost of sales. In 2023, the exact hours decreased by 82,228 hours, and the cost of sales decreased by Rp7.97 billion compared to the plan. This decline continued in 2024, albeit with a minor difference of 45,827 man-hours and a cost of sales of Rp 5.31 billion. This data indicates a decrease in product demand from customers, which has a direct impact on production activities and sales value, posing a challenge to the company's operational efficiency and capacity planning. This research addresses these challenges by analyzing PT UTX's inventory management strategies to help the company achieve its targets. The novelty of this study lies in integrating expert-based input with strategic planning tools—specifically the SWOT framework and the Quantitative Strategic Planning Matrix (QSPM)—to identify and prioritize inventory control strategies in the aerospace industry. This dual-method approach differs from conventional supply chain models, which often rely solely on operational indicators or simulations, by providing a structured, data-driven decision-making framework. Therefore, the title of this research is "A QSPM Strategy to Control Inventory Turnover in Aerospace Industry.

2. Literature Review

2.1 Inventory Management

Inventory management is a critical element in decision-making related to warehouse operations, covering policies and procedures to ensure optimal item availability Wild (2017). In the supply chain context, it functions like a lubricant that keeps operations running smoothly (Prastacos, 1984; Reece &

Sesok-Pizzini, 2021). This process involves monitoring and controlling inventory, determining when and how much stock to replenish, balancing demand and supply, and minimizing new investments in inventory (Alam et al., 2024). Inventory may consist of raw materials, packaging, work-in-process (WIP), or finished products (Koumanakos, 2008).

Effective inventory management stabilizes production and marketing, reducing uncertainty from supply fluctuations (Pulakos, Hanson, Arad, & Moye, 2015). However, excessive inventory can cause wasted storage expenses and opportunity costs, while shortages can disrupt production and add fees (Koumanakos, 2008). Maintaining optimal stock levels is essential, as excess inventory may cost up to 20–40% of its total value annually. Thus, inventory management plays a strategic role in operational efficiency Harahap and Yosepha (2025); Napitupulu and Widanarko (2024) and business sustainability.

2.2 Internal Factor Analysis Strategy Matrix (IFAS) and External Factor Analysis Strategy (EFAS)

The IFAS matrix is a strategic tool to summarize and evaluate a company's main strengths and weaknesses across functional areas (Agustina, 2024; Hignasari, Putri, & Wijaya, 2023). It also helps identify relationships between these areas (Kamaluddin, 2020). In contrast, the EFAS matrix summarizes and evaluates external factors such as economic, social, cultural, demographic, environmental, political, legal, technological, and competitive conditions (Akman, 2019). Agustina (2024) notes that the IFAS matrix is a strategy formulation tool used to summarize and evaluate the main strengths and weaknesses in the functional areas of a business (Hignasari et al., 2023). Additionally, it provides a basis for identifying and assessing the relationships between these areas (Kamaluddin, 2020). At the same time, the EFAS matrix develops strategies to summarize and evaluate economic, social, cultural, demographic, environmental, political, governmental, legal, technological, and competitive information (Akman, 2019)

2.3 Internal – External Matrix (IE)

The IE matrix can be divided into three main areas, each with different strategic implications (Ikatrinasari, Tyas, Cahyana, & Purwanto, 2020).

	KEKUATAN INTERNAL PERUSAHAAN/BISNIS			
	5,00	Tinggi 3,67	Rata-rata 2,33	Lemah 1,00
DAYA TARIK INDUSTRI/ PASAR	Tinggi 3,67 3	KUADRAN 1 *GROWTH* Concentration via Vertical Integration	KUADRAN 2 *GROWTH* Concentration via Horizontal Integration	KUADRAN 3 *RETRENCHMENT* Turn around
	Sedang 2,33 2	KUADRAN 4 *STABILITY* Proceed With Caution	KUADRAN 5 *GROWTH* Concentration via Horizontal Integration STABILITY No Change Profit Strategy	KUADRAN 6 *RETRENCHMENT* Captive company Divestment
	Rendah 1,00 1	KUADRAN 7 *GROWTH* Concentric Diversification	KUADRAN 8 *GROWTH* Diversification Conglomeration	KUADRAN 9 *RETRENCHMENT* Bankruptcy/ Liquidation

Figure 2: IE Matrix

According to Agustina (2024); Gliddon (2009); Nhamo, Dube, and Chikodzi (2020); Karacop and Ozdemir (2020) the purpose of the IE matrix is to obtain a more detailed corporate-level business strategy. The IE matrix can identify nine company strategy cells, but in principle, the nine cells can be grouped into three primary methods, namely:

1. First, the company's position in cells I, II, and IV can be described as growth and development. An intensive strategy (market penetration, market development, and product development) is an appropriate strategy.
2. Second, the company's position in cells III, V, and VII can be managed effectively with a guard and maintenance strategy, meaning that the approach is implemented without altering the established strategic direction. Market penetration and product development are two common strategies used in this type of division.
3. Third, the company's position in cells VI, VIII, and IX can be used as a harvesting or divestment strategy.

4.4 Analysis SWOT (Strengths, Weaknesses, Opportunities, Threats)

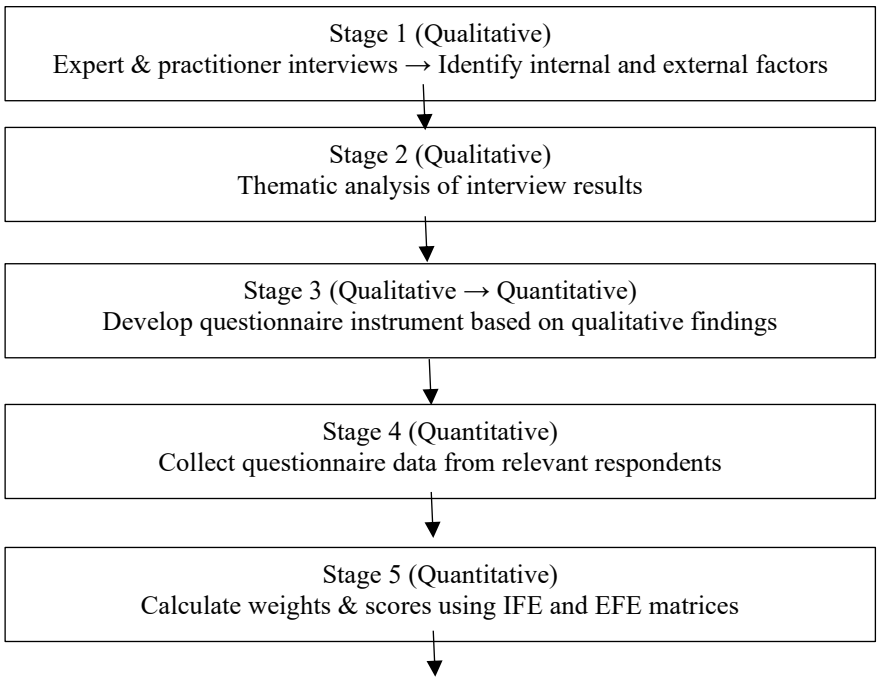
It is a valuable tool in strategic planning that helps organizations understand their position both inside and outside (Shahijan, Rezaei, & Preece, 2016). Two essential elements of this analysis are the IFAS (Internal Strategic Factors Analysis Summary) and the EFAS (External Strategic Factors Analysis Summary), which identify internal and external factors that can affect the organization's strategy and performance (Ustabulut, 2021). The IFAS matrix focuses on the internal aspects of the organization, including strengths and weaknesses. In recent research, IFAS analysis involves determining the value of the strengths and weaknesses facing the organization (Hignasari et al., 2023).

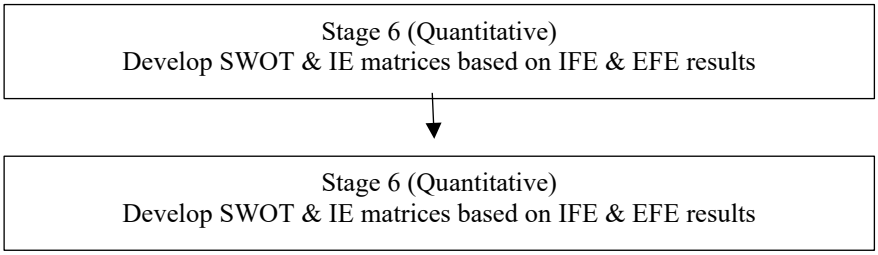
Meanwhile, EFAS analyzes the external opportunities and threats that the organization faces. The combination of IFAS and EFAS analysis forms a coherent strategy in SWOT analysis, leading to the prioritization of key areas and the development of a more focused approach. In other words, IFAS and EFAS analysis not only help organizations evaluate their current position but also provide insights for long-term planning by identifying strengths that can be leveraged and threats that must be overcome (Safanta, Shihab, Budi, Hastiadi, & Budi, 2019).

3. Method

This study employs a mixed-methods approach, specifically the Sequential Exploratory Design type Sugiyono (2022), which sequentially combines qualitative and quantitative methods. The following outlines the steps undertaken in this study:

Table 3 : Research stage





Source: processed by the author, 2025

The initial stage of the study used a qualitative method based on interpretive philosophy, which emphasizes the importance of a holistic understanding of social phenomena, including the company's internal and external environment, as well as reciprocal relationships. Qualitative data was obtained through observation and interviews to identify key factors, which were then entered into the IFE and EFE matrices. Qualitative research does not aim to establish by Elg, Gremyr, Halldorsson, and Wallo (2020) causal relationships but rather to develop a contextual understanding of phenomena. The results are initially subjective but can be tested for confirmability (Anandya & Oktavia, 2020).

Furthermore, quantitative methods are employed to support analysis and facilitate calculations during the strategy formulation process. This approach is based on the philosophy of positivism, which assumes that phenomena can be observed and measured, are causal, and are value-free. The instruments used must be tested for validity and reliability. Quantitative data is used to measure and support qualitative findings, thereby making the final results more comprehensive and robust. The combination of data from these two approaches is connecting, specifically by linking qualitative and quantitative results. Because it aims to provide a systematic picture of the company's condition and the most efficient strategy, this study is also categorized as descriptive research, with the main data coming from interviews (primary) and company documents (secondary). The variable operations used in this study, the research variables used include external variables and internal variables, while the indicators can be stated as follows:

a. External sub-variables include Work Environment and Geopolitical conditions.
b. Company sub-variables include Management, Finance, Operations, Research, and Development.

Table 4: **Operational variables**

Variable	**Sub Variable**	**Indicator**	**Technic**	**Data Source**
External	Work Environment	a. Government b. Customer c. Supplier	D&W D W	Seconder & Primer Seconder Primer
	Geopolitics	a. Economy b. Law-Politics c. Social-cultural	W W W	Primer Primer Primer
	Management	a. Planning b. Control	W W	Primer Primer

Internal	Finance	a.Investment decisions b.Financing decisions c. Cash Flow	W W W	Primer Primer Primer
	Operational	a.Production Capacity b. Production Plan c. Labor d. Quality	W W W W	Primer Primer Primer Primer
	Research and Development	a.Product Development b.Change in production plan	W W	Primer Primer

Source: processed by the author, 2025

4. Result and Discussion

4.1 External Analysis

Based on expert interviews, the external analysis of PT UTX's work environment identified the following key findings:

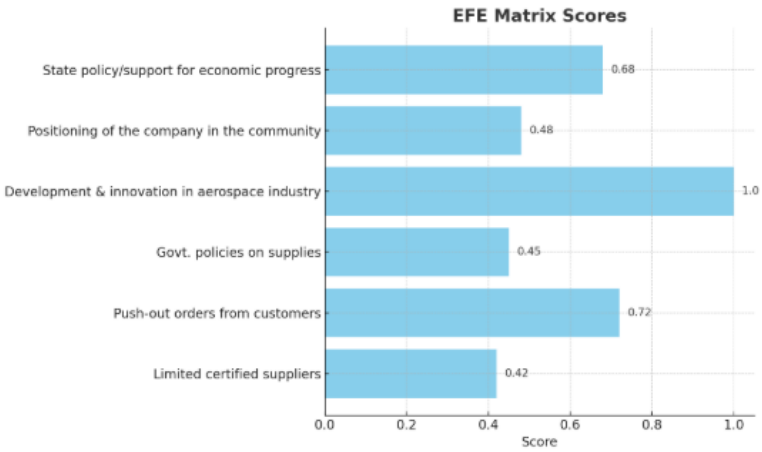


Figure 3 : External Factor Evaluation (IFE) Matrix Results

The EFE Matrix displays PT UTX's external opportunities and threats, measured by their weighted scores:

Opportunities

1. Development & innovation in the aerospace industry (1.00) – This is the most significant opportunity. Rapid technological advancements and market growth in aerospace present strong prospects for PT UTX's product and service expansion.
2. State policy/support for economic progress (0.68) – Government initiatives to stimulate the economy create a favorable business environment.
3. Positioning of the company in the community (0.48) – PT UTX enjoys a relatively strong local presence, which can be leveraged for brand trust and partnerships.

Threats

1. Push-out orders from customers (0.72) – Delays or postponements in customer orders can disrupt cash flow and production scheduling.
2. Government policies on supplies (0.45) – Regulatory constraints and policy changes may limit the availability or increase the cost of raw materials.
3. Limited certified suppliers (0.42) – Dependence on a small pool of certified suppliers increases supply chain risk and reduces bargaining power.

The chart indicates that PT UTX operates in an industry with high potential, especially in aerospace innovation, supported by favorable government policies. However, threats related to supply chain dependency and fluctuating customer demand must be strategically managed to maintain stability and growth.

4.2 Internal Analysis

The internal analysis shows that PT UTX has a strong managerial and financial foundation, supported by effective planning, operational excellence, and financial stability. Key points are as follows:

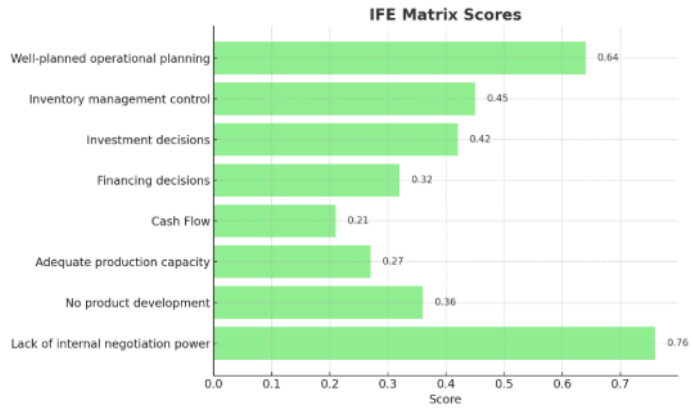


Figure 4: Internal Factor Evaluation (IFE) Matrix Results

The IFE Matrix visually presents PT UTX's internal strengths and weaknesses based on their weighted scores:

Strengths

1. Lack of internal negotiation power (0.76) – Although listed as a weakness, this high score indicates significant weight and impact on the company's internal environment, making it a priority area for improvement.
2. Well-planned operational planning (0.64) – Strong strategic and operational planning supports clear direction for all divisions.
3. Inventory management control (0.45) – Efficient systems, such as JIT and 3PL, help prevent excess raw material storage.
4. Investment decisions (0.42) – Internal funding ensures financial independence and stability.

Moderate Areas

1. No product development (0.36) – Limited R&D capability means reliance on process improvements rather than new product innovation.
2. Financing decisions (0.32) – Fully self-funded operations reduce risk but may limit large-scale expansion.
3. Adequate production capacity (0.27) – Sufficient but not optimized to handle sudden demand surges.

Weaknesses

1. Cash Flow (0.21) – While still positive, the relatively low score suggests room for improvement in liquidity management.

The chart shows that PT UTX has notable strengths in planning and operational control but faces challenges in innovation, negotiation flexibility, and cash flow optimization. The high score for "lack of internal negotiation power" suggests that addressing this issue could significantly improve competitiveness.

4.3 Managerial Implications – IE Matrix

The IE matrix places PT UTX in the "Grow and Build" quadrant. This implies that managers should focus on:

1. Expanding operational integration with suppliers (backward integration).
2. Investing in digital inventory systems to improve demand forecasting.
3. Strengthening multi-sourcing strategies to reduce dependency on a single supplier

Table 5: **Key Factor Determination**

Type	Scoring				Status
	Expert 1 (Material Manager)	**Expert 2 (Logistic Lead)**	**Expert 3 (Direct Material Lead)**	**Average**	
Opportunity 1	0,14	0,15	0,14	0,1433333333	Key Factor
Opportunity 2	0,15	0,15	0,18	0,16	Key Factor
Opportunity 3	0,16	0,16	0,18	0,1666666667	Key Factor
Threat 1	0,15	0,17	0,15	0,1566666667	Key Factor
Threat 2	0,13	0,15	0,15	0,1433333333	Key Factor
Threat 3	0,15	0,12	0,12	0,13	Key Factor
Threat 4	0,12	0,10	0,08	0,10	
Total	**1,00**	**1,00**	**1,00**		
Strength 1	0,08	0,09	0,09	0,0866666667	Key Factor
Strength 2	0,08	0,07	0,08	0,0766666667	Key Factor
Strength 3	0,06	0,05	0,07	0,06	Key Factor
Strength 4	0,07	0,08	0,05	0,0666666667	Key Factor
Strength 5	0,06	0,07	0,09	0,0733333333	Key Factor
Strength 6	0,07	0,06	0,05	0,06	Key Factor
Strength 7	0,01	0,02	0,04	0,0233333333	
Strength 8	0,03	0,02	0,01	0,02	
Weakness 1	0,07	0,09	0,08	0,08	Key Factor
Weakness 2	0,1	0,09	0,1	0,0966666667	Key Factor
Total	**1,00**	**1,00**	**1,00**	**1,00**	

Source: processed by the author, 2025

The results of the three experts' weight assessment of external and internal factors show that all elements categorized as "Key Factors" have a significant influence on determining the direction of PT UTX's corporate strategy. From the external side, the most critical opportunity arises from the growing and innovative development of the aerospace industry (opportunity 3, with an average weight of 0.166), followed by the company's active participation in social activities (opportunity 2, 0.16). Meanwhile, the biggest threat is the Government's import policy, which can affect the speed and cost of raw materials (threat 1, 0.157). Other threats, such as pressure from large customers (threat 2) and limited certified suppliers (threat 3), are also considered necessary. However, the legal-political threat (threat 4) is deemed to have a relatively lower impact (0.10); therefore, it is not included in the key factor category.

Internally, the company's key strengths lie in its well-thought-out strategic and operational planning (strength 1, 0.087) and JIT-based inventory control system (strength 2, 0.077). The company's independent and efficient financial decisions also received significant weight, reflecting UTX's internal stability. However, two weaknesses were identified by the experts and included in the key factors, namely limitations in product development due to not being a design site (weakness 1, 0.08) and the inability to negotiate changes in production demand from internal customers (weakness 2, 0.097). This suggests that, despite having a robust internal structure, the company faces a pressing need to enhance flexibility and bargaining power within its internal supply chain to respond more effectively to changes in demand.

4.4 Swot Analysis

Based on the interview results obtained:

Table 6: **SWOT Mapping Results**

Strength	**Weakness**
1. Well-planned operational planning 2. Inventory management control 3. Investment decisions based on calculation and planning 4. Cash Flow 5. Operational (Sufficient Production Capacity) 6. Adequate production capacity	1. No product development 2. Lack of internal negotiation power against changes in production plans from customers, resulting in unavoidable changes.
Opportunity	**Threat**
1. State policy/support for economic progress 2. Positioning of the company in the community 3. Development & innovation in the aerospace industry	1. Government policies related to supplies (trade, import/export restrictions) 2. Order push-out phenomenon from customers 3. Limited aerospace industry suppliers (must be certified) 4. 4. Government policies related to law and politics

Source processed by the author, 2025

The SWOT analysis shown in Table 6 illustrates the overall strategic condition of PT UTX, both internally (strengths and weaknesses) and externally (opportunities and threats). In terms of strengths, the company demonstrates strong capabilities in operational planning, inventory management, investment decision-making, and cash flow management. Additionally, adequate production capacity is a crucial asset in efficiently meeting customer demand. It reflects solid internal governance and operating systems capable of supporting business stability. On the other hand, the company's weakness lies in its minimal role in independent product development and weak bargaining power against changes in internal customer demand, leading to high dependence on external decisions (sister companies).

Externally, PT UTX has several strategic opportunities, including state policy support for key industries (such as the economy and aerospace), an enhanced reputation through social engagement, and continued innovation and growth in the aviation industry. However, the company also faces significant threats, including strict government regulations on import/export, sudden changes in production demand from customers (push-out orders), limited certified suppliers, and legal and political uncertainty. This combination of factors highlights the need for an adaptive strategy that can capitalize on strengths and opportunities while minimizing the impact of weaknesses and threats. PT UTX needs to strengthen its supply chain flexibility and internal capability development to remain competitive in this highly dynamic industry.

4.5 External Environment Analysis (EFE Matrix) and Internal Environment (IFE Matrix)

After scoring, the following results are obtained:

Table 7: **The EFE and IFE Scoring**

External Factor	**Scoring**	**Rating**	**Skor**
Opportunities			
1. State policy/support for economic progress	0,17	4	0,68
2. Positioning of the company in the community	0,16	3	0,48
3. Development & innovation in the aerospace industry	0,20	5	1,00
Threat			
1. Government policies related to supplies (trade, import/export restrictions)	0,15	3	0,45
2. The phenomenon of push-out orders from customers	0,18	4	0,72
3. Limited aerospace industry suppliers (must be certified)	0,14	3	0,42
Total	**1,00**		**2,85**
Internal Factor	**Scoring**	**Rating**	**Skor**
Strength			
1. Well-planned operational planning	0,16	4	0,64
2. Inventory management control	0,15	3	0,45
3. Investment decisions based on calculation and planning	0,14	3	0,42
4. Financing decisions based on calculation and planning	0,08	4	0,32
5. Cash Flow	0,07	3	0,21
6. Operational (Adequate production capacity)	0,09	3	0,27
Weakness			
1. No product development	0,12	3	0,36
2. Lack of internal negotiation power against changes in production plans from customers, resulting in unavoidable changes.	0,19	4	0,76
Total	**1,00**		**3,43**

Source: processed by the author, 2025

The results of the EFE (External Factor Evaluation) Matrix analysis indicate that PT UTX achieved a total score of 2.85, indicating that the company is relatively responsive to external factors that affect it. This score indicates that PT UTX is in an above-average position in terms of utilizing opportunities and responding to external threats. The most significant opportunity comes from developments and innovations in the aerospace industry (highest score: 1.00), which suggests that PT. UTX is on track to capitalize on the sector's growth momentum. However, the order push-out phenomenon poses real challenges, as do government policies restricting imports and exports, which could destabilize the company's supply chain and production planning.

Meanwhile, the IFE (Internal Factor Evaluation) Matrix analysis yielded a total score of 3.43, indicating that PT UTX's internal strengths are significantly more dominant than its weaknesses. It suggests that the company has strong internal fundamentals, particularly in areas such as operational planning, inventory control, and decision-making regarding investment and financing. However, there are two significant weaknesses, namely dependence on external product design and a weak bargaining position in negotiating changes to the production plan. These two weaknesses carry substantial weight and have the potential to hinder efficiency if not managed strategically. Therefore, the focus of improvement should be on enhancing internal product development capabilities and strengthening coordination and negotiation with external entities (such as sister companies).

4.6 Internal and External Environmental Analysis (IE Matrix)

Mapping the position of PT UTX is done to facilitate the determination of alternative development strategies that are suitable for addressing competition and future business growth. The results obtained

from the IFE and EFE matrices are used to compile the IE matrix, which determines the position of PT. UTX is determined.

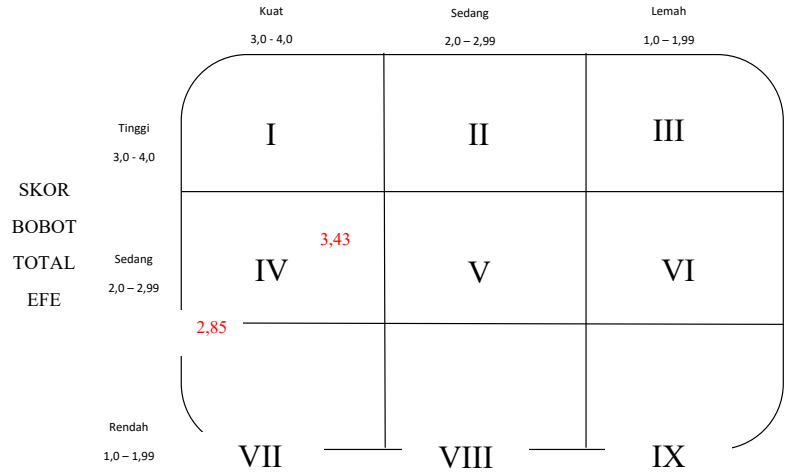


Figure 3: IE Matrix
Source: processed by the author, 2025

Based on the mapping results in the IE (Internal-External) Matrix, PT UTX's position is in quadrant IV, which is determined by an IFE score of 3.43 (strong category) and an EFE score of 2.85 (medium category). It suggests that the company possesses robust internal strengths to address various complex external challenges. This position represents a grow and build strategy, where the company is advised to focus on development and expansion through market penetration strategies, product development, or integration both upstream and downstream. A suitable strategy for this quadrant IV position is to leverage the internal strengths already in place to respond more aggressively to market opportunities and manage threats with proactive tactics. PT UTX needs to strengthen its bargaining power with internal customers, accelerate production process improvements, and consider collaboration or technology investments to increase efficiency. With favorable internal conditions and a relatively conducive external environment, the company has a strong foothold to accelerate medium to long-term growth.

4.7 QSPM Matrix Analysis (Quantitative Strategic Planning Matrix)

The QSPM matrix is the final stage of the strategy formulation analysis, where the most effective alternative strategies are evaluated. Based on the results of the calculation and analysis of the QSPM Matrix, the most suitable strategy at this time is the Backward Integration strategy.

Table 8: **QSPM Matrix**

Factors	**Scoring**	**Alternative Strategy**			
		Product/Process Development		**Backward Integration**	
		AS	**TAS**	**AS**	**TAS**
Opportunity					
1. Industry Development	0,20	**5**	**1,0**	**5**	**1.0**
2. State Policy on the Economy	0,17	**4**	**0.68**	**4**	**0.68**
3. Company Positioning	0,16	**3**	**0.48**	**3**	**0.48**
Threat					
1. Government Policy on Inventory	0,15	**3**	**0.45**	**3**	**0.45**
2. Push-out Order Phenomenon from Customers	0,18	**4**	**0.72**	**5**	**0.90**
3. Limited Aerospace Industry Suppliers	0,14	**3**	**0.42**	**5**	**0.70**

Total	**1,00**		**3.75**		**4.21**
Strength					
1. Well-Planned Operational Planning	0,16	**4**	**0.64**	**5**	**0.80**
2. Inventory management control	0,15	**4**	**0.60**	**5**	**0.90**
3. Investment decisions based on calculation and planning	0,14	**3**	**0.42**	**3**	**0.42**
4. Financing decisions based on calculation and planning	0,08	**3**	**0.24**	**3**	**0.42**
5. Cash Flow	0,07	**3**	**0.21**	**3**	**0.21**
6. Operational (Adequate production capacity)	0,09	**3**	**0.27**	**4**	**0.36**
Weakness					
1. No Product Development	0,12	**4**	**0.48**	**4**	**0.48**
2. Lack of internal negotiation power against changes in production plans from customers, resulting in unavoidable changes	0,19	**4**	**0.76**	**5**	**0.95**
Total	**1,00**		**3.62**		**4.54**

Source: processed by the author, 2025

Based on the calculation results from the QSPM Matrix (Quantitative Strategic Planning Matrix), the alternative strategy of Backward Integration obtained a total score of 4.54, which is higher than the Product/Process Development strategy, scoring 3.62. This indicates that, based on the evaluation of external and internal strategic factors, backward integration is a more advisable strategy for the company to implement. This strategy is considered more effective in taking advantage of opportunities, responding to threats, and maximizing the company's strengths while minimizing its weaknesses. The Backward Integration Strategy reflects the need for companies to strengthen control over the supply chain, especially on the upstream side, such as raw material procurement, production technology, or even internal capacity building, so as not to be too dependent on outsiders. It is essential, given the high weight and rating on issues such as the limited number of certified suppliers and the phenomenon of push-out orders from customers. By adopting this strategy, companies can not only improve operational efficiency and stability but also have a stronger bargaining position in the face of the highly competitive and highly regulated aerospace industry dynamics.

Based on the analysis of inventory management conditions at PT UTX, the company has a robust planning system that utilizes the Master Production Schedule (MPS) and the Sales, Inventory, and Operations Planning (SIOP) approach. However, there are still significant challenges, particularly in terms of dependence on a single supplier, inadequate system digitization, and limited cross-functional coordination. While a Third Party Logistics (3PL) strategy has been implemented for certain commodities, such as billets, it does not yet cover other high-value commodities, including forging and semi-finished parts, which have greater supply risks. Through SWOT analysis, it was found that PT UTX has strengths in planning systems and logistics facilities, as well as opportunities in digital transformation and multi-sourcing strategies. However, weaknesses in manual systems and external threats such as demand push-outs and supply disruptions remain significant risks. The urgency of digital transformation is in line with the findings of Musyaffi et al. (2024), who emphasize that technological readiness and perceived ease of use are crucial drivers in the adoption of cloud-based systems among MSMEs. Their research suggests that even small-scale organizations can significantly enhance their operational resilience through well-integrated digital solutions—a principle that also applies to large-scale enterprises like PT UTX facing dynamic supply chain complexities. The results of the IFE and EFE Matrix position the company in Quadrant I of the IE Matrix, indicating that PT. UTX is in a growth and building strategic position. From this position, the most relevant strategies are backward integration

and supplier diversification, which aim to strengthen control over the supply chain and enhance operational resilience.

Strategy selection based on the QSPM Matrix shows that the backward integration strategy obtained the highest attractiveness score, making it the top choice. This strategy allows UTX to reduce dependence on a single supplier by acquiring or forming strategic partnerships on the upstream side. In addition to improving supply stability, this step can also increase logistics efficiency, reduce costs, and improve inventory turnover ratios. This strategy aligns with the Supply Chain Integration theory, which emphasizes the importance of integrating entities to achieve efficiency and resilience within the supply chain. Therefore, it is very appropriate to apply in the context of the challenges faced by PT UTX today.

5. Conclusion

5.1. Conclusion

Inventory management at PT UTX is supported by a solid planning foundation, utilizing the Master Production Schedule (MPS) system and the Sales, Inventory & Operations Planning (SIOP) approach. However, the effectiveness of inventory control still faces various challenges, such as the lack of system digitization, limited cross-functional coordination, and dependence on a single certified supplier. These conditions have an impact on the instability of inventory turnover and the deviation between the planned and actual cost of sales. Through the SWOT, IFE, EFE, and IE analysis approaches it is evident that PT UTX is in a "grow and build" strategic position, indicating that the company possesses sufficient internal strengths and promising external development opportunities. The results of strategy evaluation using the QSPM matrix indicate that the backward integration strategy is the most suitable approach to implement. This strategy enables PT UTX to control the upstream side of the supply chain, reduce dependency risk, and enhance the efficiency and stability of raw material supply.

5.2. Limitation

While this study successfully formulates an integrated inventory control strategy for PT. UTX by combining qualitative and quantitative approaches, it is important to acknowledge several limitations. First, the analysis is based on a single case study within PT. UTX, which may limit the generalizability of the findings to other companies or industries. Second, the data collection relies primarily on internal expert interviews, which could introduce bias due to subjective interpretations. Lastly, while the strategic tools used—such as SWOT, IE, and QSPM—provide structured decision-making support, they are inherently based on judgmental input, which may affect the objectivity of the final strategy recommendations. Future research could benefit from broader comparative studies across multiple organizations and include external stakeholder perspectives for a more comprehensive analysis.

5.3. Theoretical and Practical Implications

This research contributes to the development of inventory strategy models in high-risk industries by integrating backward integration within a combined qualitative–quantitative decision-making framework. The study demonstrates how traditional strategic tools can be adapted to address volatile supply chain conditions in aerospace manufacturing. For PT UTX and similar companies, the proposed model can be extended to other inventory components beyond raw materials—such as work-in-progress and spare parts—while adopting digitalization, multi-sourcing, and collaborative supplier partnerships to strengthen resilience and adaptability in dynamic market environments.

5.4 Recomendation

By implementing a gradual backward integration strategy, supported by the company's existing internal capabilities, PT UTX can increase inventory management efficiency, improve the inventory turnover ratio, and strengthen competitiveness in the highly dynamic and highly regulated aerospace industry. This research also confirms the importance of digitalization, multi-sourcing, and strategic collaboration as part of a long-term supply chain management strengthening agenda

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