UNPACKING THE BEEF SUPPLY CHAIN: A CASE STUDY OF OPERATIONAL CHALLENGES AND CONSUMER BEHAVIOUR IN NUSANTARA MEAT BERHAD, MALAYSIA

Mohd Hasbi Jaafar
Nusantara Meat Berhad
mohdhasbi@yahoo.com

Ahmad Sabri Yusuff
Asia e University
yassabri@gmail.com

Khairul Nizam Mahmud
Asia e University
nizam.mahmud@aeu.edu.my

Siti Hadijah Zulkifly
Asia e University
siti.hadijah@aeu.edu.my

Abstract

With an emphasis on Nusantara Meat Berhad's (NMB) business operations and difficulties, this case study investigates the crucial elements influencing the production and supply of beef in Malaysia. Based on qualitative analysis and in-depth interviews with key stakeholders, the study identifies operational and systemic inefficiencies in Malaysia's beef industry, such as land use restrictions, high feed costs, poor breeding practices, insufficient government intervention, a lacklustre marketing infrastructure, and an excessive dependence on imported meat. These problems have resulted in an unstable supply chain, low levels of self-sufficiency, and fluctuating beef prices. With its varied businesses and vertically integrated supply chain, NMB aims to close the supply gap for local beef. However, obstacles including workforce shortages, growing import prices, technical lag, and restricted access to grazing pasture make it difficult to scale. The study's strategic suggestions for increasing local output and competitiveness include implementing governmental reforms, fostering feedlot innovations, supporting integrated agricultural systems, and improving logistical infrastructure. For stakeholders, including agropreneurs and politicians, this research is essential to comprehending and negotiating the structural constraints in Malaysia's beef supply environment.

Keywords: Beef supply chain, Nusantara Meat Berhad, Malaysian agriculture, Food security, Livestock production, Integrated farming.

1.0 INTRODUCTION

Malaysia's beef sector is strategically significant for promoting both rural economic growth and national food security. With self-sufficiency levels continuously below 30% since 2005, the local beef industry is still undeveloped despite its potential (Khazanah Research Institute, 2018). Malaysia heavily relies on imports from Australia, New Zealand, and India as its beef consumption grew from 138,980 tonnes in 2005 to 201,556 tonnes in 2013 (a 45% increase) while domestic output lagged (Ismail et al., 2014). This discrepancy indicates structural inefficiencies in the sector, namely in the areas of government regulation, production, logistics, and market infrastructure. Smallholders have historically operated the Malaysian beef sector using conventional techniques, with little investment in feed and technology, poor breeding stock, and restricted access to grazing area (Farah Adila Abdullah et al., 2021). The swine and poultry sectors, on the other hand, have prospered and are now more than 100% self-sufficient. Lack of strategic cooperation throughout the supply chain, from breeding and feed delivery to slaughter, processing, and distribution, has been blamed for the stagnation of the beef sector (Nor & Rosali, 2014).

One aspirational local player trying to close this gap is Nusantara Meat Berhad (NMB). NMB is a prime example of a private sector endeavour in line with national food security strategies, such as the Malaysian Ministry of Agriculture and Food Industry's (MAFI) Food Security Policy Action Plan (2021–2025), thanks to its vertically integrated operations, which include importation, deboning, cold storage, and product distribution. As evidence of its size and operational reach, NMB sources cattle from all over the world, including Australia and Somaliland, and provides services to customers like Adabi, Brahim, Malindo Airlines, and AEON Big. NMB nevertheless confronts a number of challenges in spite of these efforts, including a fluctuating supply of raw materials, growing feed prices, a lack of breeding facilities, competition from imported beef, and a lack of government incentives or enforcement of policies. Operational challenges are further compounded by logistics, halal certification, and price sensitivity of consumers. Between 2008 and 2018, the price of domestic beef rose by 82%, deterring customers and favouring imported meat (MOA, 2015).

By answering the main research question, "What is the determining factor affecting the production and supply of beef in Malaysia?" this study explores these issues. Using NMB as a case study, it examines the sector's structural flaws, legislative gaps, and real-world commercial difficulties. It seeks to provide important insights into the development of Malaysia's sustainable beef supply chain through qualitative research and theme analysis. This case study also investigates the internal and external factors that determine the performance and sustainability of beef operations in Malaysia by focusing on NMB. Established in response to the government’s call for increased national self-reliance in beef production, NMB plays a pivotal role in cattle importation, slaughtering, meat processing, and distribution. However, the company, like many in the local meat industry, faces substantial operational constraints including fluctuating cattle supply, limited cold chain infrastructure, and complex regulatory frameworks. These constraints are further compounded by broader industry issues such as consumer price sensitivity, changing dietary patterns, and inconsistent quality standards across supply chain actors.

From a practical standpoint, the outcomes of this study are expected to provide strategic insights for beef producers, processors, and policymakers. For instance, understanding consumer preferences related to halal compliance, price, and freshness could allow NMB and other players to tailor their offerings more effectively. Moreover, identifying operational inefficiencies and external threats may help strengthen national policy frameworks such as the National Agrofood Policy (NAP 2.0), which aims to enhance food system resilience and reduce dependency on imported food products.

Overall, this case study aims to contribute to both academic discourse and industry practice by dissecting the key drivers and inhibitors of beef production and distribution in Malaysia. It seeks to highlight the interlinkages between production systems, marketing strategies, consumer behaviour, and regulatory ecosystems, using NMB as a representative case. Through a qualitative lens grounded in interviews with stakeholders across the beef supply chain, the study aspires to inform more sustainable and efficient operational practices for the future.

In the end, this study has theoretical and practical implications. It helps company executives improve their operational strategy and helps legislators create focused initiatives. Understanding the intricacies of the beef sector becomes both a commercial and a national issue as Malaysia works to increase domestic output and decrease its reliance on imports.

2.0 LITERATURE REVIEW

An important part of Malaysia's agricultural sector, the beef business supports rural income, jobs, and food security. The industry has systemic inefficiencies and limited self-sufficiency despite its socioeconomic significance. Malaysia's level of beef self-sufficiency decreased from 30% in 2010 to merely 22% as of 2018 (Khazanah Research Institute, 2018). Population increase, rising affluence, and a growing need for high-quality protein sources especially among Malaysians living in urban areas that have all contributed to the widening disparity between production and consumption (Farah Adila Abdullah et al., 2021).

Numerous studies have identified the key factors hindering the development of Malaysia’s beef sector. A prominent challenge is land scarcity, which inflates the cost of livestock farming and prevents expansion. According to Gerber et al. (2010), environmental constraints and land-use competition significantly affect ruminant livestock production. Malaysian cattle producers face similar obstacles, often having to compete with urban development for grazing land.Cost of feed is another critical constraint. As highlighted by Khazanah Research Institute (2019), Malaysian livestock producers heavily rely on imported feed, leading to price volatility. Musaba (2010) emphasized the need for improved feed management and technology adoption to enhance cattle productivity.

On the demand side, Malaysian consumers demonstrate a strong preference for halal, fresh beef despite the higher prices compared to imported frozen meat. Hamer et al. (2022) found that consumer preferences are influenced by factors such as freshness, origin, and religious compliance. However, the market remains highly price-sensitive. Mwashiuya et al. (2018) concluded that beef quality, particularly tenderness and taste, greatly influences buying decisions. Marketing and logistics remain underdeveloped in Malaysia’s beef sector. Asegede et al. (2015) argue that

weak marketing infrastructure limits producer access to markets and reduces profitability. This is particularly relevant for smallholders who lack the resources to engage in value-added processing. Theoretical frameworks also inform this study. The value chain model helps contextualise the multiple actors and processes involved in beef production—from feed supply to final consumption. In the Malaysian context, the fragmented structure of the value chain leads to inefficiencies, as highlighted in the thematic frameworks used in the thesis.

2.1 Production

Malaysia's domestic beef production is hindered by land scarcity, poor breeding practices, and low technological adoption. Most cattle farmers are smallholders managing fewer than ten head of cattle (Hashim, 2015). These operations often lack pasture land, relying instead on crop residues and agro-industrial by-products for feed, resulting in poor growth rates and inconsistent meat quality. Integrated livestock systems, such as cattle-oil palm intercropping, have shown promise but remain underutilized due to low farmer participation and limited incentives (Gabdo & Abdlatif, 2013). In order to increase large-scale output, feedlot systems were introduced under the National Feedlot Programme (NFP) during the Ninth Malaysia Plan. However, its progress was halted by high feed prices, inadequate planning, and governance problems (Ismail et al., 2014). Further limiting the industry's growth is Malaysia's 17,983 hectares of approved grazing area (Ministry of Agriculture and Agro-Based Industry, 2015).

Globally, China, Brazil, and the United States are the top three countries that produce the most beef. Vietnam, Myanmar, and Indonesia are the top three producers in Southeast Asia, respectively. From 1967 to 2017, Malaysia's cattle, buffalo, and beef production increased by 32% and 206%, respectively. These increases are still less than the rise experienced by other nations. Malaysia continues to be one of Southeast Asia's lesser beef producers. The nation's self-sufficiency in producing beef climbed from 18% in 2004 to 30% in 2010, then fell to 22% in 2018 (Khazanah Institute, 2019). Incorporating cattle into plantations and smallholdings since the Fourth Malaysia Plan, 1981–1985 (4MP), integration of animals into estates and smallholdings has been encouraged to maximise land usage.

The Integrated Agricultural Development Projects (IADPs) and the Coconut Replanting and Rehabilitation Project distributed cattle and buffalo under the 4MP. Through these operations, roughly 38,000 farmers received about 38,000 head of cattle and buffalo. Later, the Pahang State Farmers Organisation (PASFA) and the Johor State Farmers Organisation (PPNJ) joined forces with land development organisations to participate in these integration programmes. These organisations included the Federal Land Development Authority (FELDA), the Rubber Industry Smallholder Development Authority (RISDA), and the Federal Land Consolidation and Rehabilitation Authority (FELCRA). These organisations owned 15% of the cattle in the nation in 2000.

At least in the Southeast Asia region, land acreage plays a role in determining beef output. Nations with bigger landmasses, like Indonesia and Myanmar, produce more beef than smaller nations. Comparing production per land area (MT/sq km), some nations produce more with smaller land areas. Vietnam is a prime instance. Vietnam produced 2.7 times more beef than Thailand and 8.3 times more than Malaysia in 2017 despite having a similar territory to Malaysia and

Thailand. Except for Myanmar and the Philippines, the proportion of buffalo meat in total beef production generally decreased in most Southeast Asia nations. The buffalo meat production in Malaysia decreased from 61% in 1961 to 13% in 2001. In the 1980s, farm machinery was used in paddy fields to replace buffalos, used as draught animals and killed when they reached age 9. Economic transformation increased bovine meat output in most countries by increasing the cattle population relative to the diminishing buffalo number. This transformation was not the situation in Thailand, where the cattle population increased more slowly than the number of buffalo, sharply reducing the amount of beef that could be produced.

Malaysia must overcome many obstacles to advance the production of beef. Due to Malaysia's relatively small area designated for pasture and ruminant farming, which is only 17,983 hectares, one of the issues of Malaysian beef production is the production shortage (Ministry of Agriculture and Agro-Based Industry Malaysia, 2015a). Due to this, most livestock producers in Malaysia feel at ease with traditional farming, which entails raising cattle on a local scale with little to no grazing acreage (Hashim, 2015). The fact that large-scale farming in Malaysia is still in its infancy is another barrier to the country's beef output. Although numerous plans exist to increase meat production in Malaysia, including open-improved grazing land, vast smallholder systems, and intensive feed-lotting systems, the outcomes remain unknown. Other issues include the mismatch between supply and demand, entrepreneurial innovation, cheap production input, and limited land for farming. Peninsular Malaysian part-time livestock operations were encouraged to become commercial entities in the Fifth Malaysia Plan, 1986–1990 (5MP), which encourages using feedlots. Under the 5MP18, the usage of the feedlot system using regional agricultural byproducts, including palm kernel cake (PKC) and oil palm sludge, was encouraged. The proposal, however, was thwarted by the growing price of PKC between 1987 and 1989 and the availability of cheaper imported beef through barter or countertrade agreements with India.

In later agriculture programmes, the feedlot system was reaffirmed as the method for sectoral development. The government set aside RM80 million for the National Feedlot Programme under the Ninth Malaysia Plan, 2006–2010 (9MP), of which RM40 million was used to create the National Feedlot Centre in Gemas, while the remaining RM60 million was used to develop satellite feedlot farms across the nation. The growth of the feed industry and the absence of scale efficiencies make local feed production expensive, as recognised by the Sixth Malaysia Plan, 1991–1995 (6MP). The 6MP envisioned experimenting with home production of feed ingredients like soybean, tapioca, and maize. In parallel, the import tax on animal feed was gradually eliminated starting in 1991; as a result, the yearly growth rate of beef output over the 6MP era was significantly higher than the target namely 4.1% as opposed to the 1.3% target.

2.2 Marketing

Malaysia's beef supply chain is inefficient and not well integrated. Retailers, distributors, processors, and farmers all work independently with little cooperation (Nor & Rosali, 2014). The majority of fresh beef is sold at wet markets, with little penetration into contemporary retail formats, and the marketing infrastructure is inadequate. The beef industry is still fragmented, in contrast to the vertically integrated and technologically sophisticated poultry industry. By managing all

aspects of operations, from importation to processing and distribution, Nusantara Meat Berhad (NMB) aims to eliminate these inefficiencies through vertical integration. Even NMB, meanwhile, has to contend with issues including excessive bureaucracy, little government assistance, and volatile international pricing. Logistics are a major barrier, particularly when it comes to maintaining halal compliance across the cold chain (Faradina Ahmad et al., 2018). Operational effectiveness and customer trust are at risk due to halal certification delays, inadequate infrastructure, and possible cross-contamination.

One of the most pressing weaknesses hindering the growth of Malaysia's beef industry is the inadequacy of its marketing network, which negatively affects the efficiency and competitiveness of the sector. Despite global trends indicating robust growth in beef consumption rising from 31.5 million tonnes (MT) in 1963 to 65.7 MT in 2013 (FAO, 2019). Malaysia has struggled to capitalize on this demand surge due to inefficiencies along its beef value chain. The United States, Brazil, and China lead global beef consumption with 11.6 m MT, 7.86 m MT, and 7.09 m MT respectively, accounting for significant shares of the global market (OECD/FAO, 2021). In contrast, Malaysia remains heavily reliant on imports, particularly from India and Australia, to meet domestic consumption, largely because its local production system is unable to operate at scale or efficiently distribute its products. One of the most significant barriers to industry development is the lack of an integrated and robust marketing network. This weakness limits market access for local beef producers, particularly small and medium-sized enterprises (SMEs), which dominate the livestock sector. The fragmented marketing system leads to inefficiencies in pricing, inconsistent supply, and reduced access to end consumers. Many farmers and abattoirs operate in isolation, without the benefit of coordinated supply chain mechanisms that can improve economies of scale and bargaining power (Roslina Ali et al., 2018). These structural inefficiencies result in higher consumer prices and lower profits for producers, discouraging investment and innovation in the sector.

Compounding the problem is the issue of feed production, which remains a critical bottleneck despite recognition in Malaysia's National Agrofood Policy (NAP) 2011–2020. Local feed production is insufficient to meet demand, and the country imports roughly 75% of its maize and soybean needs, primarily for ruminant and non-ruminant livestock feed (MOA, 2020). This dependence on imported inputs exposes the sector to global price fluctuations, currency volatility, and supply chain disruptions, thereby increasing production costs. These elevated input costs, particularly for feed and labour, directly contribute to the uncompetitive pricing of locally produced beef compared to imports (Hashim, 2015; Roslina Ali et al., 2018). Additionally, labour costs in the livestock sector have been rising due to Malaysia's dependence on foreign workers and the declining interest of locals in agricultural work. The limited availability of skilled labour further exacerbates operational inefficiencies and raises costs. Likewise, marketing costs, including transportation, logistics, and cold-chain infrastructure, remain high due to the decentralized nature of beef production. Without proper investment in value chain development such as digital traceability systems, market intelligence, or contract farming producers face significant challenges in accessing high-value markets, such as hotels, restaurants, and export buyers.

In summary, while global and regional demand for beef continues to grow, Malaysia's beef industry is constrained by a weak marketing network and high input

costs, particularly in feed and labour. To improve competitiveness and sustainability, government policy must prioritize integrated supply chain strategies, local feed development, and marketing system modernization. Addressing these weaknesses is vital for achieving food security, reducing import dependency, and creating economic opportunities in the ruminant livestock sector.

2.3 Pricing

Beef prices typically significantly increase when demand exceeds supply. The cost of beef is a major worry for the nation's consumers. It seems crucial for the government to maintain low meat prices. However, it is unclear from the research if the price of beef significantly influences consumers' preferences for beef and its products. It is interesting to note that when beef production rises, the price is often believed to fall. Malaysia's mass populace and habitual meat eaters will probably appreciate this scenario. Despite significant efforts to enhance beef production in the nation, little attention has been paid to determining whether customers prefer locally-produced beef to imported beef and the factors that affect such preferences. Prices may not be the only element in play. The increase could backfire without this information since buyers might continue to avoid locally-produced beef (Hamer et al., 2022). Promoting the feedlot system, the Peninsular Malaysian part-time livestock enterprises were encouraged to become commercial entities through the Fifth Malaysia Plan, 1986–1990 (5MP). Under the 5MP, the usage of the feedlot system employing regional agricultural products, including palm kernel cake (PKC) and oil palm sludge, was encouraged. The idea, however, was thwarted by the growing price of PKC from 1987 to 1989 and the availability of cheaper imported beef thanks to barter or countertrade agreements with India.

In later agricultural strategies, the feedlot system was reaffirmed as the method for sectoral development. The government set aside RM80 million for the National Feedlot Programme under the Ninth Malaysia Plan, 2006–2010 (9MP), of which RM40 million was used to create the National Feedlot Centre in Gemas, while the remaining RM60 million was used to develop satellite feedlot farms across the nation. Common complaints about the skyrocketing cost of bovine meat are not without merit. From 2008 to 2018, the price of local beef increased by 82%. Specifically, one kilogramme of locally produced beef cost customers RM18.70 in 2008 but RM33.95 in 2018. Even worse, the cost of the less expensive option—imported bovine meat—more than doubled over that time. In contrast, processed chicken's price climbed by 20%, or less than RM2/kg. As illustrated in Figure 1, the price differential between chicken and beef has been growing over time, which accounts for the rising consumption of chicken compared to beef.

The price of beef does not fluctuate significantly by season within a year, and it has not grown significantly throughout the holiday seasons, perhaps due to government control over beef prices during these times. An in-depth investigation is required to comprehend the years-long, astronomical price hikes. Numerous potential causes are mentioned in the Malaysia Competition Commission (MyCC) report. MyCC asserts that the cost of local "beef" increases due to the rising import prices of live cattle and the country's switch in source in 2012 from Thailand to Australia.

There are significant questions regarding this logic in any case. First, while the price of local beef climbed by 46% during the same period, the unit import

value. (RM/kg) of live cattle in 2018 (RM13.90/kg) was only 27% higher than in 2013 (RM10.91/kg).

Second, the continuous domestic price increase in the following years cannot be explained by the switch in import sources from Thailand to Australia in 2012. Live cattle and buffalo imports from Australia comprised the same percentage of overall imports in 2018 (78%) as in 2013. The MyCC (Malaysia Competition Commission) report cites major companies in the import trade, which may have an oligopolistic influence over prices, as an explanation for the rising price of imported bovine meat in Malaysia. Although roughly 80 importers of bovine meat enter Malaysia, 40–50% of imports during the past few years have been made by two major importers. MyCC detects several probable anti-competitive behaviours among the major players, such as (i) the imposition of tying (bundling) requirements where distributors and retailers are compelled to purchase less advantageous cuts from importers in order to buy the parts they want and (ii) exclusive agreements/preferential treatment between key importers and overseas exporters attributed to long-standing relationships

2.4 Importation

To support domestic consumption, Malaysia imports bovine meat, primarily from Australia (fresh or chilled) and India (frozen). According to the latest data, local beef costs have increased by 82% since 2008. However, the cost of processed chicken only went up by 20%. This increment may explain both the rising consumption of chicken compared to beef and the widespread complaint that beef is becoming more and more expensive. The existence of oligopolistic businesses with dominant positions in the import trade may be to blame for the rising cost of imported bovine meat. MAJUTERNAK, as well as the importing of premium breeds for the growth and commercialisation of the beef and dairy industries, the National Livestock Development Authority (MAJUTERNAK) was founded in 1972. Seven beef/dairy farms with 12,000 acres of land, 100,000 head of cattle, and 640 workers were launched in Peninsular Malaysia and Sarawak three years after its establishment. Ten of the MAJUTERNAK-built abattoirs were completely functional by the end of 1980.

The Department of Veterinary Services (DVS) dispersed a sizable number of the high-quality breeding animals that Majuternak oversaw the importation of smallholders. Eight thousand seven hundred buffalo and cattle were given to smallholders as part of *pawah* initiatives during the Second Malaysia Plan (2MP), which ran from 1971 to 1975. The Third and Fourth Malaysia Plans, which covered 1976–1980 and 1981– 1985, continued this joint initiative. Approximately 400 hectares of land on seven former MAJUTERNAK farms were taken over by the Department of Veterinary Services (DVS) after MAJUTERNAK was disbanded in 1983, ten years later. In addition to providing animal distribution and extension services, including artificial insemination, DVS took on the responsibility of importing and breeding high-quality animals. Most imported bovine meat comes in frozen form. One hundred fifty thousand MT (or $498 million) of frozen beef was imported in 2018. India, with a 78% share in value terms, was by far the biggest exporter of frozen beef to Malaysia, followed by Australia (12%) and New Zealand (5%). Two thousand MT (USD20 million) of fresh or chilled bovine meat were imported in the same year, with Australia accounting for 91% (in value terms), New

Zealand for 4%, the United States for 3%, and Japan for 2%. However, the amount of fresh or chilled beef India ships to Malaysia is minuscule. The small number has been linked to Indian exporters' lower logistical capacities than exporters from industrialised nations like Australia. In addition, premium-grade bovine meat comes primarily from Australia and New Zealand when it is fresh or cold, whereas meat from India primarily serves the mass market. The massive amount of beef exports in the early 1990s which peaked in 1992 for fresh or chilled beef and in 1994 for frozen beef were mostly the result of shipments of Saudi Arabia-slaughtered halal beef. The rise of halal beef exports may be attributable to Malaysia's efforts to deepen economic ties with Saudi Arabia at the end of the 1980s, which included the formation of a Joint Committee made up of the Middle East Trade Industry, Agriculture Council and the National Trade and Commerce Council of Malaysia.

On the other hand, exports of fresh or chilled beef to Thailand and frozen beef to Singapore have accounted for most of the decade's high export levels. The ASEAN Trade in Goods Agreement (ATIGA), which involves the removal of import taxes among the six ASEAN member states, came into effect simultaneously. The beef industry's supply side has struggled to keep up with the growing demand for meat. This business largely depends on imported feeder cattle and meat to meet local demand. The number of cattle imported for breeding (ICTB) should be maintained. In contrast, the number of cattle imported for slaughter or feeder cattle should be increased by 20%, according to Buda & Zainalabidin (2021). This arrangement will increase the amount of beef self-sufficiency while stabilising the retail price of beef.

2.5 Exportation

Singapore and Thailand are still the top two foreign destinations for Malaysia's beef exports. Following Singapore (77%) and Cambodia (7%) as the top export destinations for frozen beef in 2018, respectively, was Pakistan (6%). Thailand accounted for 95% of fresh or chilled bovine meat exports in 2018. The massive amount of beef exports in the early 1990s—which peaked in 1992 for fresh or chilled beef and in 1994 for frozen beef were mostly the result of shipments of Saudi Arabia-slaughtered halal beef. This business arrangement may be attributable to Malaysia's efforts to deepen economic ties with Saudi Arabia at the end of the 1980s, which included forming a. Joint Committee of the Middle East Trade, Industry, and Agriculture Council and the National Trade and Commerce Council of Malaysia.

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policy to become an international halal food hub, including its present structure, major companies, achievement of food safety, quality and halal certification and major issues faced by the industry. It then discusses the potential of global meat products (Othman, Sungkar, Sabri, Hussin, 2009).

2.6 Government Control

The absence of scale efficiencies makes local feed production expensive, as recognised by the Sixth Malaysia Plan, 1991–1995 (6MP). The 6MP envisioned experimenting with home production of feed ingredients like soybean, tapioca, and maize. The yearly growth rate of beef output during the 6MP era was significantly higher than the aim, at 4.1% as opposed to the 1.3% target, because of the gradual elimination of the import levy on animal feed starting in 1991. The National Agrofood Policy (2011-2020) still recognised feed production as the ruminant industry's main bottleneck. Recently, Malaysia's entire feed for ruminants and non-ruminants comprised around three-quarters of imported maize and soybeans. The beef price is high, and there is too much difference between import and local. Therefore, government control is essential to maintain and balance import and local beef.

A non-tariff barrier must be removed by the government by enacting an unlimited quota policy for beef, mutton, and in Malaysia due to insufficient domestic production and supply as well as significant requirements from both local food businesses and final consumption, according to Buda & Zainalabidin (2021). Previous studies discovered that countries and commodities respond differently to removing non-tariff barriers. After approximately five years of implementation, it is critical to evaluate the impacts of removing import quotas on both local industries and consumers of those essential items (Ali, Ahmad, Safari, & Suhana, 2020).

Value-added beef exports decreased more than mutton exports; however, all commodities saw considerable effects after the liberalised import policy went into effect. Market prices for both animal products increased dramatically, but mutton's gain was roughly twice as large as beef's. Additionally, the trend analysis demonstrated that market prices for both beef and mutton increased once the limit was lifted. However, if non-tariff barriers are removed, things will improve under the trade theory (Ali, Ahmad, Safari, & Suhana, 2020).

2.7 Halal Logistics

The halal logistics sector is becoming more complex due to the lengthy supply chain process. This fact rang true, where logistics play a crucial role. Storage, distribution, handling, packing, and retailing must be done properly and per halal requirements to guarantee no breakdown in the logistical chain. Even though they were packaged separately, halal and non-halal meat were discovered in one freezer container, according to a recent newspaper article. This practice is a perfect illustration of how cross-contamination could happen. Although all parties try to prevent contamination, the complicated system necessitates close supply chain monitoring, or the chance of *subahah* or uncertainty may arise (Faradina Ahmad et al., 2018).

The first constraint is the scarcity of labour. Unfortunately, for most legal authorities, the person assigned to handle all halal-related matters also handles all

other religious matters. Due to this, both the employers and customers who applied for the halal registration needed to deal with halal application issues and had to reregister their certificates. Their main complaints were delays, poor customer satisfaction, and disappointing customer service.

The second problem is religious officers' lack of expertise in legal enforcement procedures and processes. Most employees lack legal education, training, and knowledge of proper litigation or inquiry procedures. Even though the law and standards exist, enforcing the law is difficult when the license holder is largely responsible.

The third factor is that there are so few authorities on duty. The same officers would oversee the process. This process includes administrative duties like registration, reregistration, customer complaint process, investigation of halal logistic companies or any other halal-application matters, report writings, meetings, daily administrative tasks, halal disciplinary meetings, and promotion of halal products, among other things. Due to these intricate tasks, they cannot devote enough attention to every case (Faradina Ahmad et al., 2018).

2.8 Processing

In the meat processing sector, processing meat is a specialised job. In addition to having manual processing experience with meat, experts typically know how to operate the processing equipment. Any industry needs technology and knowledge to succeed. "Meat 4.0" describes incorporating technologies from the fourth industrial revolution (Industry 4.0) in the meat industry. Robotics, the Internet of Things, Big Data, Augmented Reality, Cybersecurity, and Blockchain are some Business 4.0 components that have lately altered many manufacturing and industrial sectors, including the agri-food sector, particularly the meat business. During the COVID-19 pandemic, the demand for digitalised and automated solutions has significantly expanded throughout the food supply chain.

This paper presents the idea of Meat 4.0, emphasises its key enablers, and gives readers an updated overview of recent innovations and applications of Industry 4.0, as well as cutting-edge methods for digital transformation and process automation in the meat industry. The researcher hopes that the role of Meat 4.0 enablers in meat processing, preservation, and assessments of quality, safety, and authenticity will receive special attention.The literature examination reveals that Industry 4.0 has considerable potential to enhance how meat is processed, conserved, and analysed, decrease food loss and waste, provide safe, high-quality meat products, and stop meat fraud. The meat industry can be highly mechanised using smart technologies, such as robots and smart sensors based on spectroscopic and image technology, despite the current obstacles, according to a growing body of literature (Faradina et al., 2018).

2.9 Exchange Rate

Malaysian meat supplier relies heavily on importation. Therefore, the exchange rate becomes crucial, especially when the Malaysian ringgit is weak, as the cost of beef will be higher. The exchange rate issues are always one of the main criteria for the importer, especially in the beef industry. The supplier must spend more on foreign exchange because the Malaysian currency is weak. After all, importing is the only

method to provide beef entering the nation against Australian Dollars (Faradina Ahmad et al., 2018).

2.10 Consumer Preference

It is important to investigate Malaysians' preferences for beef purchases. Although there is still a large market for beef, production has been falling in Malaysia over the past five years (Hirschmann, 2020). This problem has led to an excessive reliance on imported beef, which is unfavourable for a nation aiming for universal food security (Hirschmann, 2020). Additionally, this has led to high pricing for domestic beef across the nation. Steady consumers of beef do not like steep prices.

Price is typically a key issue for Malaysians when making purchases, and it is likely to play a significant role in preferences for buying beef. Local beef costs more than imported beef. Malaysians still favour domestic beef over imported beef because it is always halal and fresher. The research, however, does not place much emphasis on regional beef (Zainalabidin et al., n.d.; Hamer et al., 2022). Due to underproduction, most studies on the beef sector during the past ten years have concentrated on the production site.

Meanwhile, few studies have examined customer preferences for local beef. It is vital to comprehend this gap and close it. To achieve this, the government must ensure that its efforts to boost beef output align with customers' wishes. Price is undoubtedly one of the most important elements affecting consumers' preference for buying beef because it influences various items' purchase intentions. Therefore, it is crucial to investigate how pricing impacts consumers' choice of beef in Malaysia. The study's results demonstrated the importance of consumer preferences and meat quality. Researchers Mwashiuya, Manyele, and Mwaluko (2018) did a study titled "Assessment of Beef Quality Determinants Based on Consumer Preferences." The researchers concluded that consumer preferences for buying depended greatly on the meat quality.

3.0 RESEARCH DESIGN AND METHODOLOGY

3.1 Research Approach

This study adopts a qualitative case study approach to investigate the determining factors affecting the production and supply of beef in Malaysia, the consumer buying behaviour, and the operational challenges encountered by beef producers particularly Nusantara Meat Berhad. The qualitative method is considered suitable for this study because it allows for in-depth exploration of contextual factors, stakeholder experiences, and real-world industry constraints, which cannot be fully captured through quantitative techniques alone (Creswell & Creswell, 2018). A case study design is particularly effective when a researcher aims to gain a holistic understanding of complex phenomena within a real-life context (Yin, 2018). In this case, the beef industry is examined through the lens of a single organization, providing the opportunity to analyse various internal and external factors impacting operational effectiveness. The exploratory nature of this research justifies the use of inductive reasoning. Rather than testing a hypothesis using predefined variables, the study begins with observations and stakeholder experiences to generate patterns, themes, and emerging insights. The goal is to build understanding from the ground

up, which is appropriate given the limited empirical literature on the operational management of beef production in Malaysia. This is especially true in the context of small- and medium-sized enterprises like Nusantara Meat Berhad, where operations are impacted not only by market dynamics but also by regulatory, logistical, and cultural factors (Merriam & Tisdell, 2016).

The study incorporates multiple sources of evidence, including semi-structured interviews with key personnel, analysis of company documents and industry reports, and direct observations. The interviews are conducted with senior management, operations staff, and stakeholders within the beef supply chain to gather insights on production processes, marketing strategies, supply limitations, and government regulations. Triangulation of these data sources enhances the validity and credibility of the research findings (Denzin, 2017). Sampling for this case study is purposive, selecting participants who possess specific knowledge of the beef production and supply processes. The decision to use purposive sampling aligns with the qualitative paradigm, which emphasizes information-rich cases that can yield valuable and detailed data (Patton, 2015). The sample includes individuals from management, procurement, logistics, marketing, and governmental liaison units.

Data analysis is conducted through thematic analysis, allowing the researcher to code, interpret, and identify recurring patterns within the collected data. Braun and Clarke's (2006) six-step approach to thematic analysis is employed, involving familiarisation with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and writing up the results. Thematic analysis supports inductive exploration and enables the researcher to construct a narrative that connects the operational challenges of the beef industry to broader structural and policy-related issues.

In summary, the qualitative, exploratory case study approach offers a comprehensive lens through which to examine the dynamic and often under-researched challenges faced by the Malaysian beef industry. It not only provides contextual richness but also enables practical insights for industry stakeholders and policymakers.

3.2 Selection of Cases

In qualitative research, particularly case study methodology, the selection of cases is crucial for ensuring the relevance, depth, and richness of the data collected (Yin, 2018). This study focuses on Nusantara Meat Berhad, a Malaysian company operating within the ruminant meat industry, specifically in the processing, production, and marketing of halal beef products. The decision to select this company was guided by the exploratory nature of the research, which aims to investigate the determining factors that influence beef supply chain operations, consumer behaviour, and operational challenges in Malaysia.

Nusantara Meat Berhad was selected using purposive sampling, a non-probability sampling technique that is widely used in qualitative research to identify and choose information-rich cases (Palinkas et al., 2015). The company represents a critical case due to its position as one of the key players in Malaysia's local beef supply chain, offering insights not only into the operational challenges but also into the interaction between supply chain actors, government regulations, and market

dynamics. The firm's strategic role in sourcing, processing, and distributing beef allows the study to explore comprehensive aspects of the beef production ecosystem in Malaysia. This case is also particularly relevant due to the broader issues surrounding food security, halal certification, consumer trust, and import dependency. With Malaysia still heavily reliant on imported beef covering over 75% of total beef consumption the operational challenges faced by local producers like Nusantara Meat Berhad reflect larger structural issues in the national agrofood framework (Ministry of Agriculture and Food Security, 2023). These include high feed costs, weak supply chain linkages, logistical bottlenecks, and fragmented marketing systems (Roslina Ali et al., 2018). Therefore, analysing this company offers not just organisational-level insights, but also industry-wide implications.

Additionally, the selection was influenced by accessibility and willingness to participate. Nusantara Meat Berhad granted formal permission for data collection, including site visits, interviews with managers and operational staff, and access to non-confidential internal reports. This cooperation ensured that the research was able to gather nuanced, first-hand insights into the processes and challenges within the beef value chain elements that secondary data alone could not provide (Creswell & Creswell, 2018). The case selection is also justified by the diversity of stakeholders associated with the company. These include upstream actors (farmers and importers), internal departments (processing, procurement, logistics), and downstream partners (retailers and institutional buyers). This range allows the study to obtain a holistic view of the determinants of operational effectiveness in beef production and distribution.

In summary, the selection of Nusantara Meat Berhad as the focal case is aligned with the study's objective to understand the real-world complexities of beef production in Malaysia. The company's central role in the halal beef market, its operational scale, and its interactions with both public and private sector actors make it an ideal candidate to answer the study's research questions.

3.3 Types of Data Collected

To gain a comprehensive understanding of the determining factors affecting the operational management of Nusantara Meat Berhad, a qualitative case study approach was adopted, enabling the collection of rich, contextual data from multiple sources. In line with recommendations by Creswell and Poth (2018), the study incorporated both primary and secondary data to enhance the reliability and depth of the findings. The primary data comprised qualitative information gathered through in-depth semi-structured interviews, site observations, and direct engagement with various stakeholders in the beef supply chain. A total of 15 interviews were conducted with company executives, operations managers, procurement officers, production workers, and logistics coordinators at Nusantara Meat Berhad. Additionally, upstream and downstream actors such as cattle suppliers, transporters, and retail buyers were also interviewed to gather perspectives on external factors influencing operational decisions. These interviews provided crucial insights into daily operational constraints, decision-making challenges, resource limitations, and the impact of regulatory frameworks on beef production.

Observational data was collected during field visits to the company's slaughterhouse, cold storage facilities, and packaging lines. This form of data

allowed the researcher to witness actual operational practices, hygiene protocols, logistics handling, and quality control mechanisms. Observational notes were recorded to document inefficiencies, equipment utilisation, and worker coordination. According to Yin (2018), direct observation is a valuable method in case studies, especially when triangulated with interview data for greater analytical validity.

Secondary data was also extensively utilised. This included internal documents such as standard operating procedures (SOPs), production logs, procurement reports, and employee training manuals provided by Nusantara Meat Berhad. In addition, external documents such as industry reports, government policy documents, halal certification standards, and the National Agrofood Policy (2011–2020 and 2021–2030) were reviewed. These sources were critical in understanding the structural and policy-level challenges affecting the beef industry in Malaysia, such as feed dependency, import reliance, and market inefficiencies (Roslina Ali et al., 2018; Ministry of Agriculture and Food Security, 2023). To explore consumer behavior, data was also collected through a series of informal interviews and document reviews involving retail customers, supermarkets, and institutional buyers such as hotel and restaurant supply chains. This information helped contextualise how downstream market expectations influence upstream operational strategies. Consumer preferences regarding halal certification, freshness, price sensitivity, and packaging were among the emerging themes. The triangulation of these data types interview transcripts, observation notes, internal company documents, and external industry reports allowed for a robust analysis of the production and supply chain ecosystem. Triangulation, as noted by Denzin (2017), not only strengthens the credibility of the research but also provides a nuanced understanding of the interdependent factors shaping operational outcomes.

In conclusion, the combination of qualitative interviews, observational data, and document analysis provided a multidimensional view of Nusantara Meat Berhad's operational challenges and strategies. This approach enabled the researcher to examine both the micro-level dynamics within the organisation and the macro-level influences of policy, market demand, and consumer behavior.

3.4 Identification of Patterns and Similarities

In case study research, the identification of patterns and similarities across data sources is a critical step in validating findings and drawing meaningful conclusions (Yin, 2018). For this study, thematic analysis was employed to interpret and organise qualitative data gathered from interviews, observations, and document reviews. By systematically coding the data and comparing responses across different stakeholder groups, recurring themes and operational patterns were identified. This process ensured the emergence of insights aligned with the research objectives: to explore factors affecting beef production and supply, understand consumer buying behavior, and identify operational challenges at Nusantara Meat Berhad.

The first observable pattern was the dependency on imported feed and livestock**,** consistently cited across all internal and external respondents. This reliance has exposed the company and the industry to cost fluctuations, currency risks, and supply disruptions. Interviewees from operations and procurement highlighted that the cost of feed, particularly corn and soybean meal, constitutes up

to 70% of production expenses. This finding aligns with Roslina Ali et al. (2018), who assert that feed cost is a major bottleneck in Malaysia's ruminant industry. The second dominant theme was regulatory complexity and inconsistent enforcement, particularly around halal certification and meat importation policies. Respondents noted overlaps between different agencies such as the Department of Veterinary Services (DVS), Jabatan Kemajuan Islam Malaysia (JAKIM), and the Ministry of Agriculture, which often delay approvals and compliance checks. This regulatory fragmentation was found to contribute to operational inefficiencies and increased overhead costs. These observations support previous literature that emphasises the impact of bureaucratic hurdles on agro-industrial competitiveness (Ismail et al., 2020).

A third pattern was the limited consumer awareness and price sensitivity in beef purchasing behavior. Data gathered from interviews with retailers and institutional buyers suggested that consumers in Malaysia still prioritize price over quality, origin, or sustainability. Despite the growing interest in locally produced halal beef, cheaper frozen imports from India and Australia dominate the market. This consumer trend influences the strategic decisions made by Nusantara Meat Berhad, forcing the company to compete in a price-sensitive environment with little room for differentiation. Another similarity observed was the lack of skilled labor and high dependency on foreign workers, which cut across all operational departments. Managers reported difficulty in retaining trained local staff due to the physically demanding nature of the work and the relatively low pay. This challenge hampers efforts to improve quality control, efficiency, and knowledge transfer in production processes. Furthermore, there was a consistent call for greater integration across the supply chain, especially between upstream cattle breeders and downstream processors. Multiple respondents mentioned the absence of long-term supply contracts and limited data-sharing as barriers to improving production planning and reducing wastage. This fragmentation reflects broader issues in Malaysia's agri-food sector, where vertical integration remains underdeveloped (Kaur et al., 2021).

In summary, through cross-case comparison and triangulation of the collected data, several patterns were identified that converge on the key operational challenges faced by Nusantara Meat Berhad. These patterns provide critical input for the formulation of strategic solutions and policy recommendations.

4.0 RESULT AND DISCUSSION

4.1 Production and Supply of Beef in Malaysia

Malaysia's beef industry continues to face significant challenges in meeting domestic demand, with local production fulfilling only about 22% of consumption as of 2022 (DVS Malaysia, 2022). A major limitation is land scarcity, especially in urbanized Peninsular Malaysia, restricting pasture-based farming and pushing farmers toward costlier feedlot systems (Roslina et al., 2018). Feed remains the most critical bottleneck, as over 90% of ruminant feed is imported, making local production vulnerable to global price fluctuations (National Agro-Food Policy, 2011–2020). Additionally, breeding inefficiencies due to poor genetic stock and limited use of modern reproductive technology hinder herd productivity (Shamsudin et al., 2020).

Although government policies and incentives exist, their fragmented execution has led to limited impact on industry development (Rahman et al., 2022). Furthermore, logistical challenges, especially in East Malaysia, and outdated slaughterhouse infrastructure contribute to supply chain inefficiencies and meat wastage. As a result, Malaysia continues to rely heavily on imported beef, raising concerns about food security and the sustainability of halal meat production. To improve local supply, comprehensive reforms in feed policy, breeding practices, infrastructure, and public-private coordination are urgently needed. Below are the factors that influencing the productions and supply of beef in Malaysia.

i. One of the most critical findings is Malaysia's continued dependence on imported beef, accounting for over 70% of local consumption. This dependency is largely due to insufficient local production capacities and limitations in feed resources, land use, and breeder stock availability (Hashim, 2015; Roslina Ali et al., 2018).

ii. The cost structure in beef production is another significant finding, with high feed prices, labor costs, and land rental expenses acting as persistent challenges (National Agro-Food Policy, 2011–2020).

iii. Government policies have offered support through subsidies and breeding incentives; however, implementation gaps and fragmented coordination have diminished their effectiveness (Department of Veterinary Services Malaysia, 2022).

4.2 Buying Behaviour Of Beef Consumers

The buying behaviour of beef consumers in Malaysia is influenced by a combination of cultural, religious, economic, and quality-related factors. Given that Malaysia is a Muslim-majority country, halal certification is a primary consideration in beef purchasing decisions. Consumers demonstrate a strong preference for beef that is halal-certified, hygienically handled, and sourced from trustworthy vendors (Shamsudin et al., 2020). In terms of quality, freshness, tenderness, color, and marbling are key attributes that affect consumer references, with many Malaysian consumers favouring fresh, chilled beef over frozen imports (Zakaria et al., 2021).

Price sensitivity also plays a vital role. Lower-income households tend to reduce beef consumption or shift to alternative proteins like chicken during periods of high beef prices (Roslina et al., 2018). Furthermore, urban consumers, especially in Klang Valley and major cities, are more exposed to modern retail outlets and are likely to purchase beef from supermarkets, while rural consumers often rely on traditional wet markets. Health consciousness is rising, with an increasing number of consumers seeking leaner cuts and organically raised livestock. However, despite these trends, there remains a low level of awareness regarding beef grading and traceability. This highlights the need for more consumer education and improved transparency in the beef supply chain. The factors listed below affect Malaysian beef customers' purchasing decisions.

i. Consumers in Malaysia prioritize freshness, halal status, and price when purchasing beef. Trust in the source and branding (particularly when involving “Halal integrity”) is a key determinant of consumer preference, as indicated by interviews and field surveys.

ii. There is also a shift in consumer expectations toward higher-quality cuts and hygiene standards, which creates pressure on local producers to meet global benchmarks (Hasbi Jaafar, 2023).

iii. Brand loyalty is low in this segment due to a lack of differentiated products; consumers are mostly price-sensitive, making it difficult for premium local beef to compete with lower-priced imported products.

4.3 Operational Challenges at Nusantara Meat Berhad

Nusantara Meat Berhad (NMB), a key player in Malaysia's beef processing sector, faces multiple operational challenges that hinder its efficiency and competitiveness. One of the foremost issues is supply chain inconsistency, where the company struggles to maintain a stable and sufficient inflow of locally sourced cattle. This dependency on imports increases vulnerability to exchange rate fluctuations, international trade policies, and supply disruptions (Roslina et al., 2018). Compounding the issue is the high cost of animal feed, as Malaysia heavily relies on imported maize and soy-based feed, which accounts for a significant portion of operational expenditure. Furthermore, labour shortages and reliance on low-skilled foreign workers impact processing efficiency and product quality**.** Inadequate cold chain logistics remains a bottleneck, affecting the freshness and safety of meat products during storage and transportation. Compliance with stringent halal standards and food safety regulations also requires constant investment in certification, training, and monitoring systems.

Additionally, the marketing network remains underdeveloped, limiting market access, especially in rural and underserved urban areas. NMB also faces stiff competition from more established international meat suppliers, making price competitiveness a challenge. These operational limitations underscore the need for strategic investment in infrastructure, workforce development, and technological innovation to ensure long-term sustainability. The following elements have an impact on Nusantara Meat Berhad's operational challenges.

i. Internal interviews and operational audits reveal logistic inefficiencies, lack of cold chain infrastructure, and outdated abattoir technologies as major impediments to scaling operations.

ii. Middlemen (intermediaries) still play a dominant role in the beef supply chain. This creates layers of cost and opacity in pricing mechanisms, thereby affecting both margins for producers and prices for end consumers.

iii. Labor shortage is a key constraint, as the company struggles to attract and retain skilled workers for slaughtering, processing, and quality control due to the unattractiveness of the sector and competition from other industries (Hasbi Jaafar, 2023).

These findings collectively highlight systemic inefficiencies at both macro (industry-wide) and micro (firm-specific) levels. They underline the need for strategic improvements in policy coordination, supply chain integration, and consumer-oriented branding to ensure sustainable growth for companies like Nusantara Meat Berhad.

4.4 Overall Findings

The case study of Nusantara Meat Berhad (NMB) offers a comprehensive insight into the structural, operational, and behavioral dynamics shaping Malaysia's beef industry. The overall findings reveal that the Malaysian beef sector is constrained by supply shortages, inefficiencies in production, reliance on imports, inconsistent consumer behavior, and inadequate institutional support. NMB exemplifies the challenges and opportunities within this context, making it a representative case for understanding broader industry dynamics. One of the central findings is that local beef production remains insufficient, meeting only 22% of national demand. This mirrors the conclusions of previous studies by Roslina Ali et al. (2018) and Hashim (2015**)**, who emphasized that limited feed availability, high dependency on imported livestock, and the fragmented structure of the ruminant sector hinder domestic production capabilities. The National Agrofood Policy (2011–2020) similarly acknowledged these constraints, particularly in terms of feed and breeding infrastructure, which continue to impact productivity levels. The marketing network is another critical bottleneck identified. NMB, despite its market presence, faces difficulty in expanding its distribution due to inadequate cold chain logistics and lack of coordinated branding strategies. This is consistent with Rahman et al. (2014**)**, who argued that poor marketing systems and underdeveloped infrastructure are major limitations for the meat supply chain in Malaysia. Additionally, NMB's reliance on a price-sensitive market limits its flexibility in offering premium beef products, unlike competitors from Australia or Brazil.

In terms of consumer behavior, the study observed increasing awareness of quality, halal standards, and traceability, particularly among urban middle-income consumers. These findings support Shamsudin and Selamat (2011)**,** who noted that urban consumers are becoming more discerning and demand higher quality assurance. However, despite this growing consciousness, affordability remains a key concern, and many consumers still prefer imported frozen beef over more expensive local fresh meat, a behavior noted by Rasiah et al. (2016)**.** The operational challenges at NMB such as fluctuating feed costs, labor shortages, and regulatory burdens mirror the systemic weaknesses documented by Jalil and Ariff (2012) in their analysis of the ruminant industry. Moreover, NMB's experience shows that technological adoption is still limited, especially in areas such as automated processing and digital inventory systems, which are vital for ensuring supply chain resilience and cost-efficiency. Figure 5 show the thematic analysis of the study.



Figure 5: Thematic Analysis

Despite these challenges, the case study suggests that with targeted investments in feedlot development**,** technological innovation, and policy alignment, there is significant potential for local beef companies to increase competitiveness. Comparatively, Yusof et al. (2020) highlighted the benefits of integrated farming systems and public-private partnerships in improving productivity, a model that NMB could emulate.

In conclusion, the findings reinforce existing literature while providing updated insights specific to an industry player. They underscore the need for a multi-stakeholder approach that includes government intervention, private sector innovation, and consumer education to sustainably develop Malaysia's beef industry

5.0 CONCLUSION

This case study on *The Dynamics of the Beef Industry in Malaysia: A Case Study of Nusantara Meat Berhad* offers a critical lens into the structural and operational intricacies of one of the nation's key players in beef production and processing. The study sought to understand three core elements: the determining factors affecting beef production and supply, the behaviour of Malaysian beef consumers, and the operational challenges faced by Nusantara Meat Berhad (NMB). Findings from the study point toward a multifaceted set of issues, primarily revolving around supply chain inefficiencies, high dependency on imported raw materials, inconsistent market demand, and structural bottlenecks in feed and farm management. These issues are compounded by rising feed costs, labour shortages, and infrastructural constraints that collectively hinder the growth potential of local beef production.

Nusantara Meat Berhad represents a significant case in point, revealing how even an established meat processing firm grapples with systemic challenges. Despite possessing modern facilities and compliance with halal certifications, the company is heavily reliant on imported beef due to insufficient local supply. This reliance increases operational costs, exposes the company to international market volatility, and limits its control over raw material quality and delivery timelines. NMB also faces logistical issues in maintaining a cold supply chain and managing inventory due to fluctuating demand and inadequate domestic sourcing networks.

These findings highlight a need for improved vertical integration and government-supported strategies to boost local cattle breeding and reduce overdependence on imports.

The study also sheds light on Malaysian consumer behaviour, which is marked by increasing awareness of quality, safety, and halal standards. However, price sensitivity continues to dominate purchase decisions, especially among lower- and middle-income households. Consumers prefer lean cuts, consistent quality, and clearly labelled origin and certification. Nevertheless, there remains a knowledge gap concerning the nutritional benefits and traceability of beef, which presents an opportunity for firms like NMB to engage in consumer education and branding initiatives. Enhanced marketing strategies and transparency in sourcing could improve customer trust and loyalty. Comparative analysis with previous studies shows consistency in identifying Malaysia's key beef sector challenges namely feed scarcity, low self-sufficiency ratio (SSR), and inadequate support for smallholder farmers (Hashim, 2015; Roslina et al., 2018). These findings align with Jalil and Ariff (2012), who assert that a fragmented production system and weak public-private collaboration hinder national meat security goals. In this context, NMB's experience reflects both the progress and the persistent vulnerabilities in the industry. The case underscores the importance of adopting integrated supply chain strategies, including backward linkages to cattle farms and forward integration to retail outlets.

In conclusion, addressing the structural weaknesses in Malaysia's beef industry demands collaborative effort from stakeholder's government, industry players, and consumers alike. Policies must focus on supporting domestic cattle production, modernising farm practices, and ensuring fair market access for local processors. For companies like Nusantara Meat Berhad, diversifying supply chains, investing in local partnerships, and adapting to evolving consumer expectations will be crucial for long-term sustainability and growth. This study not only provides practical insights but also contributes to the broader discourse on food security, self-sufficiency, and agri-business resilience in Malaysia. Figure 6 shows the final research model that was developed for this case study.

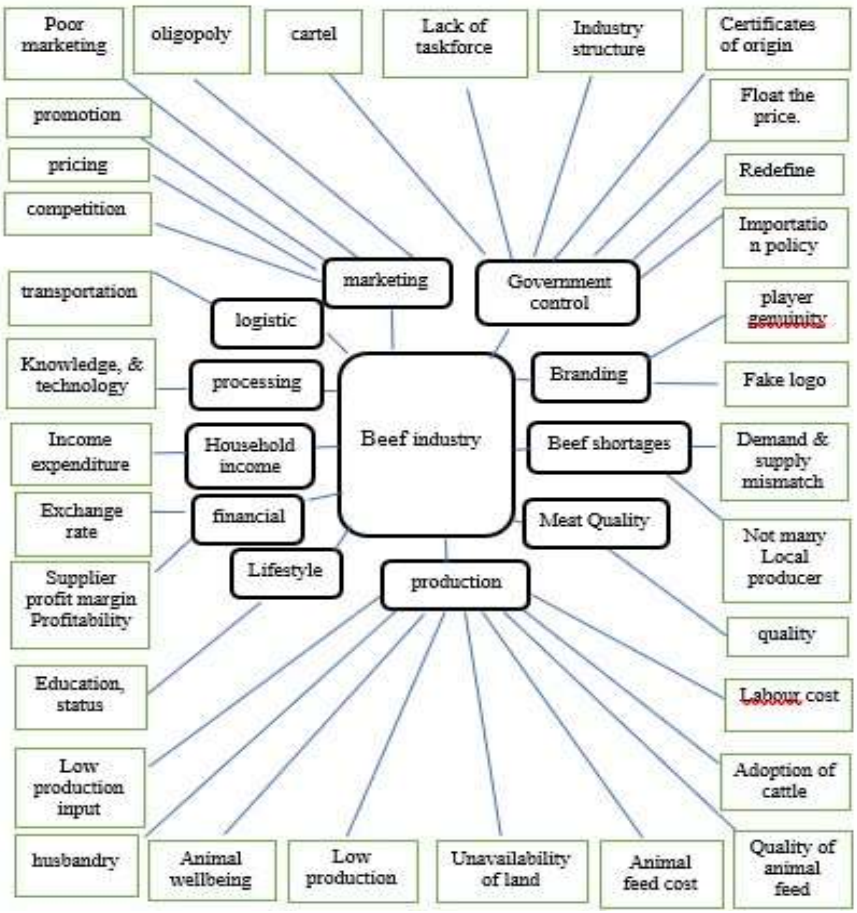


Figure 6: Hasbi Dynamic Model

5.1 Limitations And Suggestions For Future Research

While this study offers valuable insights into the operational, supply chain, and consumer behaviour dynamics of the beef industry in Malaysia specifically through the lens of Nusantara Meat Berhad (NMB) several limitations must be acknowledged. These limitations are both methodological and contextual, and addressing them in future studies could strengthen the validity, applicability, and depth of research in this important sector.

First, the research relied on a single case study methodology focused on one company, Nusantara Meat Berhad. While this allowed for an in-depth exploration of a real-world setting, it inherently limits the generalisability of the findings to the broader Malaysian beef industry. The experiences of NMB, while indicative, may not fully reflect the challenges, strategies, or performance metrics of other players, particularly smaller processors, importers, or vertically integrated firms. Therefore, future research should consider employing comparative case study designs involving multiple firms across the value chain to generate a more comprehensive and diversified understanding.

Second, data collection was restricted to a limited time frame and relied heavily on interviews, internal company reports, and secondary data sources. These sources, while rich in operational detail, may lack longitudinal depth. Changes in government policy, consumer preferences, or global market disruptions (such as

those caused by pandemics or international trade agreements) could drastically alter the industry landscape. Future research should incorporate longitudinal studies that track changes over time, allowing researchers to examine trends, measure policy impacts, and evaluate the sustainability of interventions.

Another key limitation lies in the underrepresentation of primary data from beef consumers themselves. Although the study touches upon consumer behaviour based on secondary market research, it does not fully explore buyer preferences, price sensitivities, or perceptions of locally produced beef through survey-based methods. This gap limits the ability to validate the assumptions made about market demand. Future research should integrate quantitative consumer surveys or focus group discussions to triangulate findings and provide robust insights into demand-side behaviour.

Additionally, while the thesis references policy frameworks like the National Agro-Food Policy and the Malaysian Halal Certification regime, it stops short of a full policy analysis. Given the central role of government intervention in shaping the beef industry particularly through subsidies, import licenses, and agricultural infrastructure future studies should conduct policy impact assessments. These could evaluate the effectiveness of existing government initiatives and identify new levers to promote local beef production and processing.

Finally, the rapid advancement of agro-tech and supply chain innovations is a crucial but underexplored area in this research. Technologies such as blockchain for traceability, AI in livestock health monitoring, and automated logistics can reshape industry performance and consumer confidence. Future research could examine the adoption rate, feasibility, and impact of such innovations within the Malaysian context.

In summary, expanding the scope, diversifying data sources, and deepening policy and technological perspectives will not only enrich future research but also contribute to more actionable solutions for Malaysia’s beef industry.

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BUSINESS HIGHLIGHT : PROBLEMS AND SOLUTIONS

The Malaysian beef industry faces a multifaceted set of challenges that constrain its growth and efficiency. Despite rising consumer demand for beef, domestic production remains limited, covering only 22% of national consumption needs, with the remainder heavily reliant on imports (Department of Veterinary Services, 2022). The case study of Nusantara Meat Berhad (NMB) highlights key operational bottlenecks, including fragmented supply chains, inconsistent quality standards, dependence on imported feed, high production costs, and insufficient cold chain infrastructure. Compounding these issues are marketing inefficiencies and regulatory hurdles that affect timely distribution and competitiveness.

Additionally, consumer behaviour reflects a lack of trust in locally produced beef, stemming from concerns over quality consistency, halal integrity, and price sensitivity. On the policy front, while frameworks like the National Agro-Food Policy (NAP 2.0) aim to increase self-sufficiency, actual implementation on the ground has been slow and disjointed.

To address these issues, several solutions have been proposed. Firstly, strengthening upstream production through integrated cattle farming and local feed development would reduce reliance on imports and stabilise supply. Secondly, digitalisation of supply chain operations including traceability systems and logistics coordination would improve operational transparency and product quality. Thirdly, more robust public-private partnerships (PPPs) could enhance infrastructure development, particularly in processing and storage.

From the demand side, building consumer trust through certification schemes, education campaigns, and branding of locally produced halal beef can improve market acceptance. Finally, policy reforms need to focus on simplifying regulatory procedures and providing targeted incentives for SMEs and producers like NMB to innovate and scale operations sustainably.

In summary, the beef industry in Malaysia requires a comprehensive, systemic approach combining technological adoption, market restructuring, and strategic policy alignment to address its current inefficiencies and enhance competitiveness in both domestic and regional markets.

Challenges and Solutions for the Beef Industry in Malaysia

Problems	Solutions
Limited domestic production covers only 22% of consumption	Integrate cattle farming, develop local feed production
Fragmented supply chains and inconsistent quality standards	Digitalize supply chains to improve traceability and coordination
High reliance on imports for feed and cold chain constraints	Public-private partnerships to boost infrastructure
Marketing inefficiencies and regulatory hurdles	Certification and branding of local halal beef

A systemic approach combining techn-ological adoption, market restructururing, and policy reforms is essential to revitalize to revitalize's beef industry.