SCENARIO PLANNING FOR ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN RETAILER BUSINESS IN INDONESIA

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SCENARIO PLANNING FOR ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN RETAILER BUSINESS IN INDONESIA

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ABSTRACT

Artificial Intelligence (AI) was perceived as the future of industries. Despite the controversy it raised as the result of human set of skills replacement, the adoption of AI was put in place as the industry movement towards technology advancement. Retailer, in a business of providing space for customers to purchase goods from, was in no place to avoid the AI implementation. Dealing with customers, shoppers, products, and supply chain process opened up opportunity for business improvement using the AI. Starting with the increasing awareness of data importance, implementation of AI expectedly would elevate this conservative business by incorporating machine learning into the business process. However, the development of artificial intelligence in retailer did not see a firm road map yet. According to early observation, even the starting points of development, be it the infrastructure, capability or human resource, did not undergo the standardized measurement to reach a certain readiness state. The objective of this research was to asses and analyze the stages of AI implementation in retailer in Indonesia. Data was collected primarily using case study in one of the retailers. Reference was taken from previous studies and journals discussing the related subjects. The study used qualitative methodology, in which in depth interviews with the Subject Matter Experts of the respective retailers conducted in explorative way. Combined altogether, a road map of implementation for Indonesian retailers was built, so it served as guideline and frame work for the industry development.

Keywords: Artificial Intelligence, Retail Industry, Road Map, AI Implementation In Industry

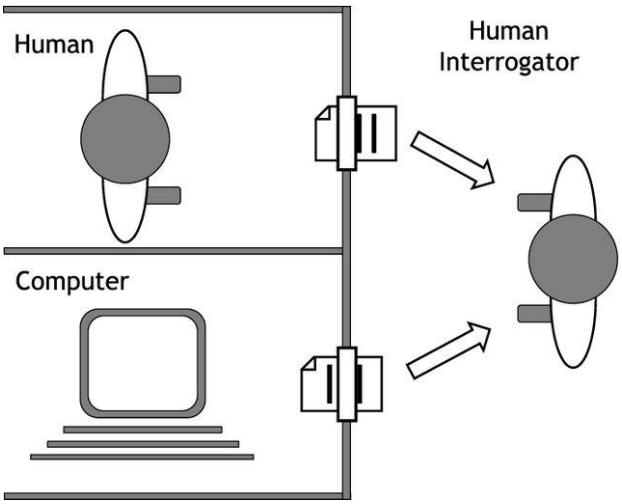
CHAPTER 1 : INTRODUCTION

1.1 Introduction To Artificial Intelligence

1.1.1. History and Definition of Artificial Intelligence

The story of artificial intelligence (AI) was spanned back as far as the 1950s when Alan Turing, a polymath from UK wrote his paper titled "Computing Machinery and Intelligence". The premise of Turing's paper was that reasoning and usage of available information to solve problem as performed by human could also be done by a machine. This became the basis of his paper, in which building and testing intelligent machine were discussed. It initiated the Turing test, a process to examine whether or not an intelligent system could imitate human (Russel & Norvig, 1995). Figure 1.1 shows the work flow of the test, which involveds a human as counterpart for the machine and another human as interrogator. The machine or computer passed the test if the interrogator could no longer determine which response came from computer and which from the human (Kuipers & Prasad, 2022).

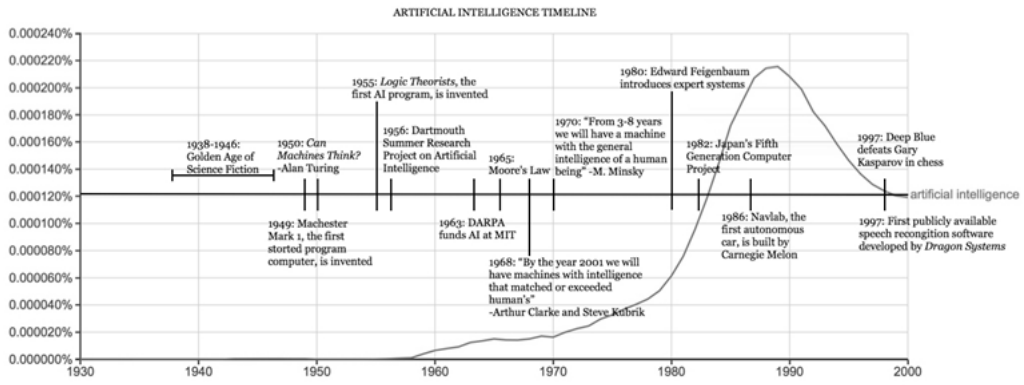
Figure 1.1 The Turing Test Work Flow



Note. (Kuipers & Prasad, 2022)

However, before Turing's paper, familiarization of AI concept had started almost a decade earlier with the booming of science fiction. Movies were showing robots with its ability to move and had vision in a human-like manner. Figure 1.2 described the timeline of AI development. The inability for computer to store data and command and expensive investment hindered AI to develop further at their early years. Exponential development of AI blew up in the 1980s with the successful deployment of commercial expert system initiated by Edward Feigenbaum, an American computer scientist. The system helped the company, Digital Equipment Corporation, to save approximately USD 40 Million a year by configuring orders for the new computer system. The financial success triggered implementation in other companies and industries. As Japan's Fifth Generation Computer project announced, interest in AI was then fueled. The building of computer system with ability to process and compute millions of data per second was on its way (Anyoha, 2017)

Figure 1.2 AI Development Timeline



Note. (Kuipers & Prasad, 2022)

Despite the growing interest, defining what AI resulted in variety of measurement and wording used in the context. Back in 1955, Professor John McCarthy of Stanford University defined AI as the science of and engineering of making intelligent machines. McCarthy was also considered as the first person who coined the term 'Artificial Intelligence' for this field of study, and hence was named The Father of AI (Anyoha, 2017). Current Oxford dictionary defined AI as the

theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. While Microsoft, the tech giant, described it as the capability of computer system to mimic human-like cognitive function such as learning and problem-solving (Microsoft Azure, n.d.). (Russel & Norvig, 1995) organized the definition of AI into what was called 4 agents based on the interest and objective of AI, that was to act and think, and to be human-like and rational. Being rational meant setting the standard of rightness by logic, while human-like had the goal to imitate human. The matrix of four agents are often described in Figure 1.3 :

Figure 1.3 Four Categories of AI Definition

	Human Behaviour	**Rational Behaviour**
Thinking (Mental Process)	**1. Thinking Humanly** Machines that think intelligently like humans	**3. Thinking Rationally** Machines that think rationally
Acting (Action)	**2. Acting Humanly** Machines that perform activities that human consider intelligent	**4. Acting Rationally** Machines that act rationally

Note. (Russel & Norvig, 1995)

Similarity among AI definition existed in the imparting human intelligence and ability to machine built. It was to teach a man-made infrastructure to imitate the creator of it. The teaching spanned from motoric ability to cognitive intelligence. In the past five years, it later on raised its own controversy. This research limited itself from discussing controversy around the position of AI to coexist with human intelligence.

So what AI did was they discovered, interpreted and interlinked information to act and think human-like. The process was done through series of math and logic, which involved huge amount of data as the basis of the learning. Hence, the big data

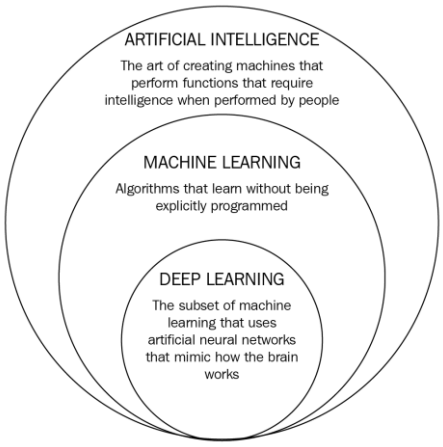
term. The use of them forced the machine to learn and, in the end, connected the information and came up with the reasoning of a certain stimulant.

1.1.2. Artificial Intelligence and Machine Learning

Another term popularly coined in the talk of AI technology was Machine Learning (ML). Discussion sometimes argued the difference between AI and ML. Machine Learning was a subset of Artificial Intelligence. It was a pathway to AI that used algorithms to automatically learn insights and recognize patterns from data, applying that learning to make increasingly better decisions. Inside ML, there was Deep Learning, a more advance learning that use large neural networks — networks that function like a human brain to logically analyze data — to learn complex patterns and make predictions independent of human input (Columbia Engineering, 2024).

Figure 1.4 illustrates the group subset of AI. In machine learning, set of data was being fed to the system so it could learn from. System learned to find underlying information from the set, interpreted them through network and established the reasoning. Analytical ability and pattern prediction were the result of machine learning. Hence, when one did machine learning process, it also meant that one did AI. But if one said he did AI, it did not necessarily mean they did machine learning.

Figure 1.4 Illustration of AI, ML and Deep Learning Subsets



Note. (Columbia Engineering, 2024)

Outside ML, there was other subset groups of AI that follow predefined rules or use other methods to solve problems or make decisions based on what they already know. These systems did not need to learn from the new data, because they had been preset with the solution. The example included rule-based system like chatbots (where the answer was hard-coded to the keywords) and expert system in medical that helped the doctor diagnose diseases without having to learn from new patient data (William, 2023).

1.1.3. Types Of Artificial Intelligence

As considerably new stream of knowledge and technology, the classification of AI was as much varied as the definition itself. It usually categorized into two branches, where one was based on its functionality and the other was on the capability. On the functionality branch, the grouping was on the system's ability to think like humans and was divided into (IBM Data and AI Team, 2023) :

1. Reactive Machine AI

Reactive machines are AI systems with no memory and designed to perform a very specific task. They work with presently available data and can not recollect previous outcomes. Reactive AI stems from statistical math and can analyze vast amounts of data to produce a seemingly intelligence output.

Examples of Reactive Machine AI

- *IBM Deep Blue*: IBM's chess-playing supercomputer AI beat chess grandmaster Garry Kasparov in the late 1990s by analyzing the pieces on the board and predicting the probable outcomes of each move
- The Netflix recommendation engine: Netflix's viewing recommendations are powered by models that process data sets collected from viewing history to provide customers with content they're most likely to enjoy
-

2. Limited Memory AI

In contrast to reactive machine AI, this form of AI can recall past events and outcomes and monitor specific objects or situations over time. Limited Memory AI

uses past- and present-moment data to decide on a course of action most likely to help achieve a desired outcome. However, it still can't retain that data in a library of past experiences to use over a long-term period. As it's trained on more data over time, limited Memory AI can improve in performance.

Examples of Limited Memory AI

- Generative AI: Generative AI tools such as ChatGPT, Bard and DeepAI rely on limited memory AI capabilities to predict the next word, phrase or visual element within the content it's generating
- Virtual assistants and chatbots: Siri, Alexa, Google Assistant, Cortana and IBM Watson Assistant combine natural language processing (NLP) and Limited Memory AI to understand questions and requests, take appropriate actions and compose responses
- Self-driving cars: Autonomous vehicles use Limited Memory AI to understand the world around them in real-time and make informed decisions on when to apply speed, brake, make a turn, etc.

3. Theory of Mind AI

Theory of Mind AI is a functional class of AI that falls underneath the General AI. Though an unrealized form of AI today, AI with Theory of Mind functionality would understand the thoughts and emotions of other entities. This understanding can affect how the AI interacts with those around them. In theory, this would allow the AI to simulate human-like relationships. Because Theory of Mind AI could infer human motives and reasoning, it would personalize its interactions with individuals based on their unique emotional needs and intentions. Theory of Mind AI would also be able to understand and contextualize artwork and essays, which today's generative AI tools are unable to do. Emotion AI is a theory of mind AI currently in development. AI researchers hope it would have the ability to analyze voices, images and other kinds of data to recognize, simulate, monitor and respond appropriately to humans on an emotional level. To date, Emotion AI is unable to understand and respond to human feelings.

4. Self-Aware AI

Self-Aware AI is a kind of functional AI class for applications that would possess super AI capabilities. Like theory of mind AI, Self-Aware AI is strictly theoretical. If ever achieved, it would have the ability to understand its own internal conditions and traits along with human emotions and thoughts. It would also have its own set of emotions, needs and beliefs.

The other branch of classification talked about the capability of AI. Stil from (IBM Data and AI Team, 2023), there are three levels of AI capabilities :

1. Artificial Narrow AI

Artificial Narrow Intelligence, also known as Weak AI, what we refer to as Narrow AI is the only type of AI that exists today. Any other form of AI is theoretical. It can be trained to perform a single or narrow task, often far faster and better than a human mind can. However, it can't perform outside of its defined task. Instead, it targets a single subset of cognitive abilities and advances in that spectrum. Siri, Amazon's Alexa and IBM Watson are examples of Narrow AI. Even OpenAI's ChatGPT is considered a form of Narrow AI because it's limited to the single task of text-based chat

2. General AI

Artificial General Intelligence (AGI), also known as strong AI, is today nothing more than a theoretical concept. AGI can use previous learnings and skills to accomplish new tasks in a different context without the need for human beings to train the underlying models. This ability allows AGI to learn and perform any intellectual task that a human being can.

3. Super AI

Super AI is commonly referred to as artificial superintelligence and, like AGI, is strictly theoretical. If realized, Super AI would think, reason, learn, make judgements and possess cognitive abilities that surpass those of human beings. The applications possessing Super AI capabilities will have evolved beyond the point of understanding human sentiments and experiences to feel emotions, have needs and possess beliefs and desires of their own.

1.1.4. Current Development and Implementation of AI In Industries

The rise of artificial intelligence was boosted up with the development of generative AI. The ability to produce novelty out of the learning process had triggered controversy on the implementation of AI. Debate amongst experts heated up on the subject of whether there should be boundaries for AI to interfere with human kind. The argument brought up the challenge to define the extent to which AI was a helpful technology development and which of it could endanger the existence of human ability. Copyright and intellectual property were being questioned, as AI actually made its learning from data or project done by human creator, but the output was claimed to be totally 'system creation'. As mentioned previously, this research limited itself from discussing controversy about AI implementation. However, to give a finer knowledge background of the topic, listed below are some of the top AI companies from (Team Stash, 2024) based on their market capitalization :

1. Microsoft : invested in OpenAI who produces ChatGPT. ChatGPT has the ability to produce script from limited text input
2. Alphabet : Alphabet is the parent company of Google and they have formed Google AI as a division on its own. They launched Bard in February 2023, directly competing with ChatGPT as chatbot script generator
3. NVIDIA : focusing in GPU (graphic processing unit) on which ChatGPT was trained. The rapid development of AI has made NVIDIA's revenue growth 125,85% in fiscal year ending January 2024 (Stock Analysis, 2024)
4. Meta : or previously known as facebook. Meta was able to form customer trend and preference by harvesting the big data analysis from social media
5. Tesla : starting as automotive industry developing the electric vehicle, Tesla expanded their ability to robotic and clean energy

Riding the wave, several industries had implemented AI to their business process. The implementation was driven by business requirement with objective was either optimization or customer engagement. From Data Science Central, some of the interesting implementation of AI in the industries are (Tarique, 2023) :

1. Healthcare

   Data mining for identifying patterns and carrying out highly accurate diagnoses and treatment of medical conditions; medical imaging, medication management, drug discovery, and robotic surgery, were some of the many AI inventions in healthcare systems.

2. Banking and finance

   AI professionals could be easily seen making Artificial Intelligence an integral part of the banking industry by far. Software robots processing loan applications, replacing human agents, robo-financial advisors, and AI-based chatbots, are incredible ways banking has become convenient and consumer-friendly in recent times

3. Transportation and logistics

   Self-driving vehicles have become a rage. From transforming supply chain management to deploying robots for sorting and packaging products in warehouses- AI has transformed the way we envision logistics today.

4. Travel

   AI-enabled chatbots have leveraged the highest benefits when it concerns increasing efficiencies, and yielding highly accurate responses to customer queries

5. Retail and e-Commerce

   Retail had experienced some of the most evident and startling intrusions of all time. Intelligent and targeted product recommendations, finding patterns in consumer behavior, chatbots on eCommerce websites, and many others have fueled the AI regime. More detailed AI application in retail industry will be elaborated on the next section

Retailer industry was in no position to avoid AI implementation to their day-to-day business. The advantage of AI to retail industry was mostly on the operational efficiency and sales optimization. To list some of the advantages were (Leleko & Chupryna, 2024) :

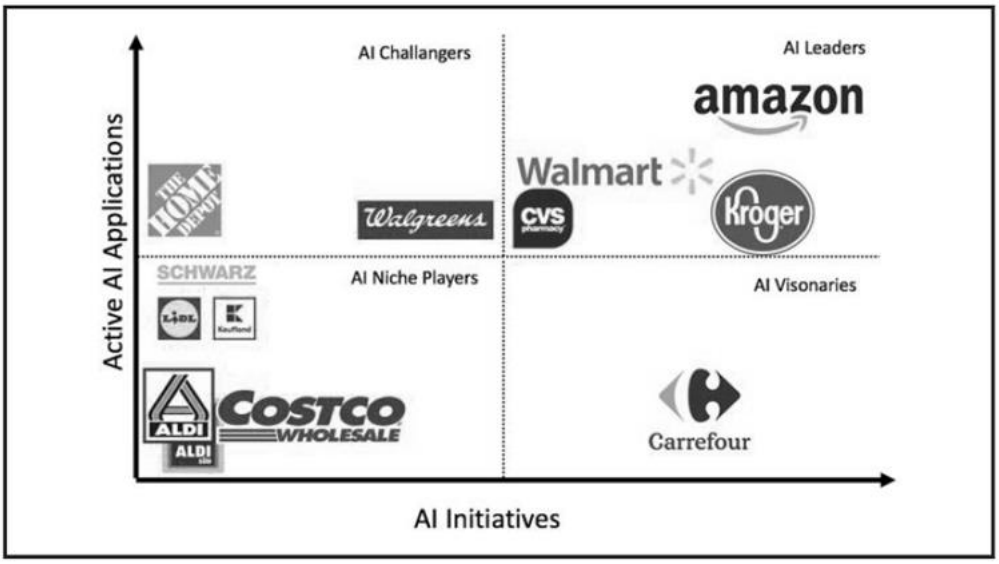
- enhanced customer experience by offering personalized product recommendations, tailored promotions, and round-the-clock support through

chatbots and virtual assistants, retailers can enhance customer satisfaction and loyalty

- advance security and data protection by implementing advanced AI-driven fraud detection and data encryption techniques to safeguard sensitive information, prevent financial losses, and maintain compliance with data privacy regulations
- improved operational efficiency by automating tasks and processes, reducing manual effort, and minimizing errors
- increased sales and revenue by optimizing pricing strategies, identifying cross-selling and upselling opportunities, dynamically adjusting prices based on market trends and customer demand forecasting
- better decision making by having informed decisions across multiple vital areas. Predictive analytics algorithms empowered retailers to monitor performance, anticipate trends, and react quickly to ever-changing market conditions.

Gartner, a technological research and consulting firm in US, mapped several retailers along with their AI initiative and active application into grid as in Figure 1.5 and categorized them into Leaders, Visionaries, Challengers and Niche Players. The mapping was based on the completeness of vision of AI in the strategy and the initiative implemented. Amazon, Walmart, Krogers and CVS were placed as leaders for their comprehensive strategic of AI inclusion in the business, along with AI initiatives that was implemented. While Costco, the close competitor to Walmart, stood on the other side of the quadrant of considered limited both in the strategy and implementation. The quadrant showed that even two enterprises with similar business model could have different approach and readiness towards AI in the business.

Figure 1.5 Gartner Magic Quadrant of AI Adoption In Retailing



Note. (Weber & Schutte, 2019)

1.2 Introduction to Retail Industry

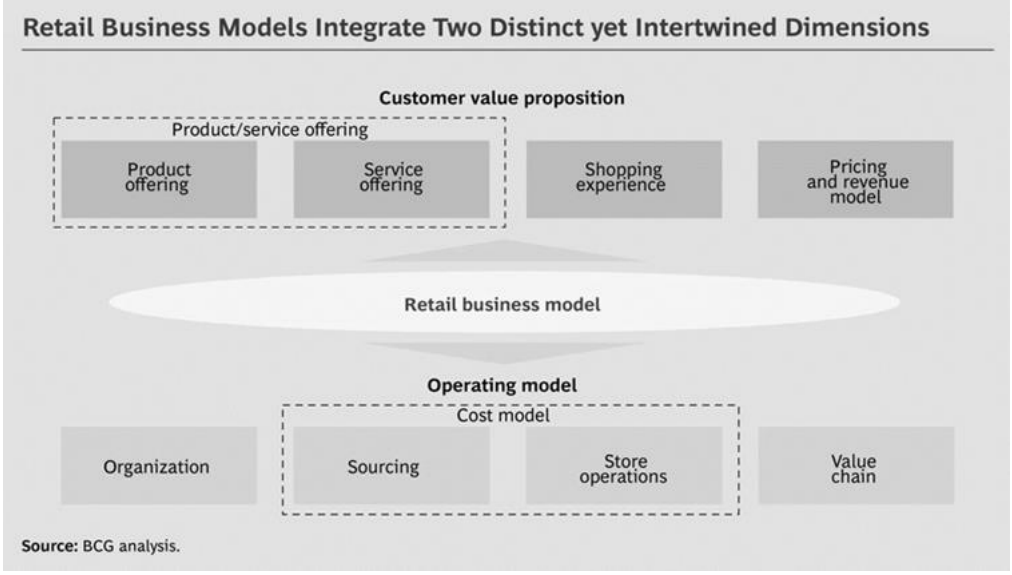
1.2.1 Definition of Retail

Retailing refers to the process of purchasing products from other organization with the intent of reselling them to the final customer, generally without transformation, and rendering services incidental to the sale of merchandise (Zentes, Morschett, & Schramm-Klein, 2017). The business had touch point(s) where transaction happened. The most common form of it was physical store (also commonly addressed as 'brick-and-mortar'), in which goods were displayed for the customer to endorse purchase decision. The era of internet and the birth of Amazon and E-Bay in 1995 in the US added variation of retail store from only brick-and-mortar to online market place platform.

Whether having physical or online store, retail business consisted of two intertwined dimensions, one being the customer value proposition and the other was operating model (Ramos, Souza, & Esquivas, 2010). More familiar term defined it as front and back business of a retail. In customer value proposition, retail dealt with product and service offering, shopping experience and pricing and revenue model. This dimension evolved around customer side of the business. The

back business, or the operating model, dealt with what it takes to run the business for the retailer. It involved sourcing and store operation, organization and value chain.

Figure 1.6 The Dimension of Retail Business



Note. (Ramos, Souza, & Esquivas, 2010)

The growth of retail business came from outlet expansion and basket size incremental. Expansion was the growth earned from addition or opening of new outlets. Logically, the more outlets there are, the bigger the business is generated. Basket size incremental was the organic growth expected for retail. This was the growth generated by customer purchased more products from the outlet. Expansion might be an easier source of growth, but it required high investment. On the contrary, working with basket incremental was a lower investment, but it needed a sharp analytical skill in understanding customer preference.

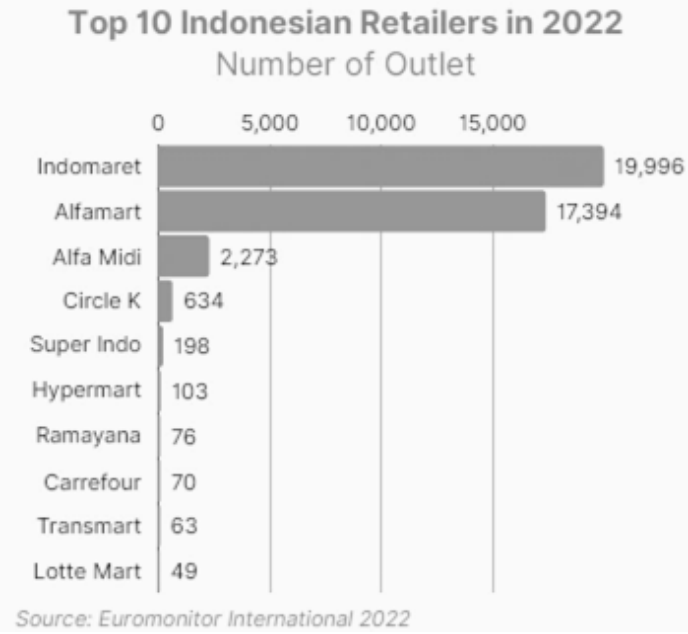
1.2.2 Retail Industry in Indonesia

The 275 million population of Indonesia consists of 70,72% of productive age (Badan Pusat Statistik , 2023). The vast number lured Indonesia retail market to be one of the most potential in Asia. It sized up to USD 46,34 billion in 2022. As

compound annual growth rate (CAGR) was presumed at 5%, it is projected to reach USD 71,89 billion in 2031 (Farid & Iduansjah, 2023). The growing of middle class consumer and the drive of household consumption to Gross Domestic Products were the engine for retail industry growth. Market experienced a downturn when Covid 19 hit in 2020, especially the tertiary and secondary goods trading segment. However, it recovered within only two years of period. Other than force majeure like pandemic, sensitivity of market movement was affected by inflation, which was often the result of fuel price increase.

Indonesia Retail Industry report of 2023 stated the most common type of retailers based on the product sold was the grocery retailer. This was the outlet that provides daily consumption needs, such as fresh and fast moving consumer goods. Grocery retail was still dominated by offline retailer with their brick-and-mortar stores, either traditional or modern store. Modern store referred to mini, super, or hyper market type of stores where self service type of shopping became the differentiator with traditional store. Figure 1.7 shows the number of outlets from modern trade retailers in 2022, with two biggest mini market leading brands (Indomaret and Alfamart) having the most of them.

Figure 1.7 Number of Outlet Indonesian Retailer in 2022



Note. (Farid & Iduansjah, 2023)

The coexistence of traditional markets, modern retail formats, and the surge of ecommerce platforms reflected the sector's resilience and responsiveness to the dynamic needs of Indonesian consumers. This diverse retail landscape was a reflect to the country's economic growth and the ongoing evolution of consumer preference (Farid & Iduansjah, 2023).

1.2.3 Introduction To Retailer X

In regards to the source's preference to remain anonymous, this research referred to the retailer account being studied as "Retailer X". Retailer X has been in the business for more than 25 years in modern trade retailer landscape in Indonesia. Their stores were spread across Java and Sumatra islands, with number of outlets reached up more than 200 stores in 2023 and ran by approximately 10,000 employees. Their assortment included packaged food, home care, personal care, hobbies, and fresh product. In addition to national major brands, Retailer X also offered their own private label and products from SMME (Small Medium Macro Enterprise) in their assortment.

From internal study conducted, it was known that Retailer X currently had the biggest market share among the super and hyper market players. To support the penetration, e-commerce channel was launched in 2021 with expectation that it would cover the white area of their service. Loyalty program and membership was also created to endorse closer engagement with customers in order to reward the loyal ones.

1.3 Problem Statement

As AI penetrated in various kinds of field, retail was in no position but to accept and embrace it as part of the future building block. Retail industry had already gone through major technology effect when internet arrived and flourished the e-commerce channel. Convenience of not having to go to the store and having the goods delivered to home was what made e-commerce emerged as the new

channel of shopping. Global supply chain trend then also endorsed it in a way that one could purchase goods from abroad without having to visit the country.

Directly serving end customer made retailer a gold mine of consumer data for defining preference and trend. This fit with AI characteristic of analyzing the pattern to later on predict behavior or create new trend. As retail offered range of needs from basic to luxury, the potential of AI interference in the business had strengthened. The dimension that retail industry had would be the starting point of the implementation.

The need for road map of AI implementation for retailer became necessary as it would define the building block for retailer's growth for the upcoming future. While every retailer was unique to the products they offer and the market they serve, a general reference on steps and focus when implementing technology like AI would serve as the guidance of adoption for the industry. Becoming part of digital transformation, the implementation of AI required organizational changes, not only technology improvement. The process must ensure that the current business model and process had minimal disruption that caused decline in sales while implementing digital transformation. This strengthened the need for road map of implementation.

1.4 Previous Research

A number of research had been conducted in the topic of AI implementation in retail industry. The below Table 1.1 listed the highlighted research and their key points :

Table 1.1 List Of Previous Studies

No	Author and Title Of Research	Variable Of Interest	Findings
1	Anica-Popa, Ionuț; Popa-Anica, Liana; Rădulescu, Cristina; Vrîncianu, Marinela (2021)	Practical benefits and associated risks generated by the implementation of artificial intelligence (AI) in retail based on Customer Experience, Cost and	Capitalizing on the pillar of CECoR, the focus of the framework had two important purposes, that is to refine customer profile and optimizing the personalization of offers

	The Integration of Artificial Intelligence in retail : Benefits, Challenges and a Dedicated Conceptual Framework	Revenue (CECoR) as the pillar	
2	Felix Dominik Weber and Reinhard Schütte (2019). State-of-the-art And Adoption Of Artificial Intelligence In Retailing	Potential impact on AI in retail business process	AI application have been used for value-added core tasks of retail companies, such as managing goods, ordering goods, serving customers, transporting goods, making goods available, and financial accounting activities. It opened potential for it transform retail processes, reduce traditional high costs for human resources and optimize low-margin business
3	Hsin-Pin Fu, Tien-Hsiang Chang, Sheng-Wei Lin, Ying-Hua Teng, Ying-Zi Huang (2023). Evaluation and Adoption of Artificial Intelligence in The Retail Industry	Critical factor and mechanism of AI adoption	Top management is most concerned with factors pertaining to business performance and minor concerned about the internal system's functional efficiency. Retailers pay more attention to technology and organisation context, which are matters under the retailers' control, than to external uncontrollable environmental factors
4	Hsi-Peng Lu a, Hsiang-Ling Cheng a, Jen-Chuen Tzou a, and Chiao-Shan Chen (2023). Technology Roadmap of AI Applications in the Retail Industry	AI-based service and technology application	Aside from suggesting 3 possible sequences for a crucial development order, it also proposes a development order for potential key technologies. Furthermore, the study provides recommendations regarding AI integration in New Retail, which can serve as a reference for retailers and service/technology providers

5	Jaheer Mukthar, K.P., Sivasubramanian, K., Ramirez Asis, E.H., Guerra-Munoz, M.E. (2022) Redesigning and Reinvention of Retail Industry Through Artificial Intelligence (AI)	AI for sales promotion and revenue generator	AI capabilities for edge and cloud, helps the retail industries with power in huge data handling, personalized and effective experience for the clients, gentle and appropriate product recommendation facilities, accurate and unique forecasts, increasing the inventory efficiencies and development of the overall retail business
6	Mohammed I. Alghamdi (2020). Assessing Factors Affecting Intention To Adopt AI And ML: The Case Of The Jordanian Retail Industry	Influencing factors of adopting AI and ML for retailer in Jordanian	Communication, government regulations, market structure, and technological infrastructure significantly influence the adoption of AI and ML in the Jordanian retail industry, while managerial support and vendor relationships were found to have negligible influence.
7	Oosthuizen, K., Botha, E., Robertson, J., and Montecchi, M. (2020). Artificial Intelligence in Retail: The AI-enabled Value Chain	The function of AI in various retail value chain activities	Key roles of AI in retail value chain are knowledge and insight management, inventory management, operation optimization and customer engagement
8	Wiebke Reim, Josef Åström and Oliver Eriksson (2020) Implementation of Artificial Intelligence (AI): A Roadmap for Business Model Innovation	AI as catalyst for business innovation	Four steps when implementing AI: (1) understand AI and organizational capabilities needed for digital transformation; (2) understand current BM, potential for BMI, and business ecosystem role; (3) develop and refine capabilities needed to implement AI; and (4) reach organizational acceptance and develop internal competencies

Noted. Source from Author

All research discussed about the importance of AI in the industry, along with its implementation in the day-to-day business process. However, there had not been one that discussed how to map the AI implementation or the general framework of how AI was supposed to be adopted step by step. Furthermore, there had not been a research on the topic with specific case in Indonesia. Therefore, this research complemented the previous research as it elaborated the plausible scenario of AI implementation with a specific case for Indonesia.

1.5 Research Question

From the problem statement, emerged key questions to be the focus of this research. The questions were addressed using Retailer X as the case study.

- What is the level of readiness of AI implementation in Retailer X as a case study of retail industry?
- What is the plausible scenario for AI implementation in Retailer X?
- How should the road map of AI implementation be for Retailer X?

1.6 Research Objective

As follow up to the research question, objective was built around elaborating the explanation for them :

- To assess the retailer industry readiness for AI implementation from several business aspect in Retailer X
- To analyze scenario for AI implementation within the defined measurement in Retailer X
- To create road map for artificial intelligence as part of digital transformation for retailer in Retailer X

1.7 Research Scope

This research used Retailer X as a case study. They were one of the big players in modern retail grocery, hence owned credibility in the business. In-depth interview was conducted with senior leaders who were the subject matter experts

related to digital transformation and artificial intelligence to collect primary information.

1.8 Research Benefit

This research was expected to contribute both to the practical industry and academic as below :

- Theoretical Benefit

This research would be the starting point of elaborating road map of AI in industries in Indonesia. A further study on more detailed guideline is also possible to conduct, complementing the general road map delivered as the result of this result

- Practical Benefit

For retail industry players, this research could be the guidance in building road map for business digital transformation that would have minimum downside effect and optimizing investment made to it. Specifically for Retailer X, the result of this research would complement their mission to serve the customer with best service, as implementation of AI could help them to provide better shopping experience for the customer, which will impact the business at the end.

1.9 Report Structure

This thesis was constructed in five chapters systematically in order to convey the result :

- Chapter 1 : Introduction

It introduced the concept of Artificial Intelligence and retail industry. This included the latest development existed

- Chapter 2 : Literature Review

The underpinning theory using as point of view when analyzing the case was elaborated in this chapter. Those theories were competitive strategy, digital transformation and scenario planning

- Chapter 3 : Research Methodology

The chapter explained methodology in conducting the research. Using qualitative approach, in-depth interview was used as the primary data source

- Chapter 4 : Analysis

This section described and interpreted the data collected. It was done in a manner of the theories explained in literature review. Analysis were descriptive and interpretation of the researcher based on the understanding of the situation

- Chapter 5 : Conclusion And Recommendation

The chapter concluded the research results into key points to be noticed and listed the emerging insights. Recommendation was given for the retailer so it would help the business in formulating strategy to implement AI

CHAPTER 2 : LITERATURE REVIEW

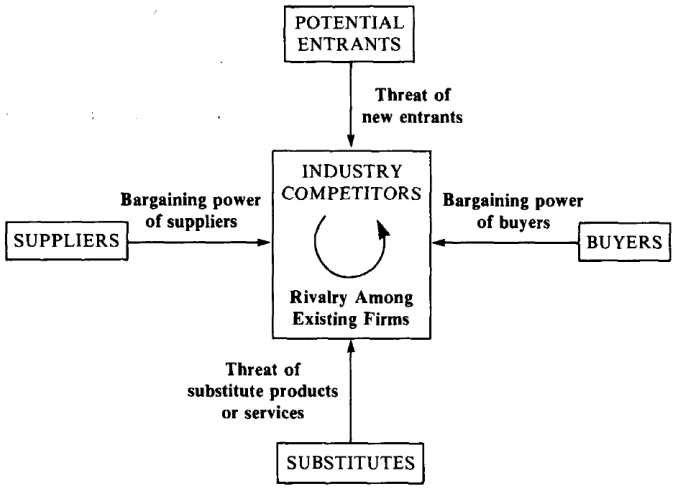
This chapter discussed the theories that underpinned this research and used in analyzing the data. There are three theories involved. Competitive strategy and digital transformation were the base of analyzing the focal concerns of this research, while scenario planning was the base of producing the result or deliverable.

2.1 Competitive Strategy

Competitive strategy is about relating a company to its environment. Industry environment consisted of forces that defined how tense the competition among players. The goal of a business unit in an industry is to find a position in the industry where company can best defend itself against these competitive forces or can influence them to their favor (Porter, 1980). The state of competition in an industry defined on five basic competitive forces :

- Threats of the new entrants
- Bargaining power of buyers
- Bargaining power of suppliers
- Threats of substitute products or service
- Rivalry amongst existing firms
-

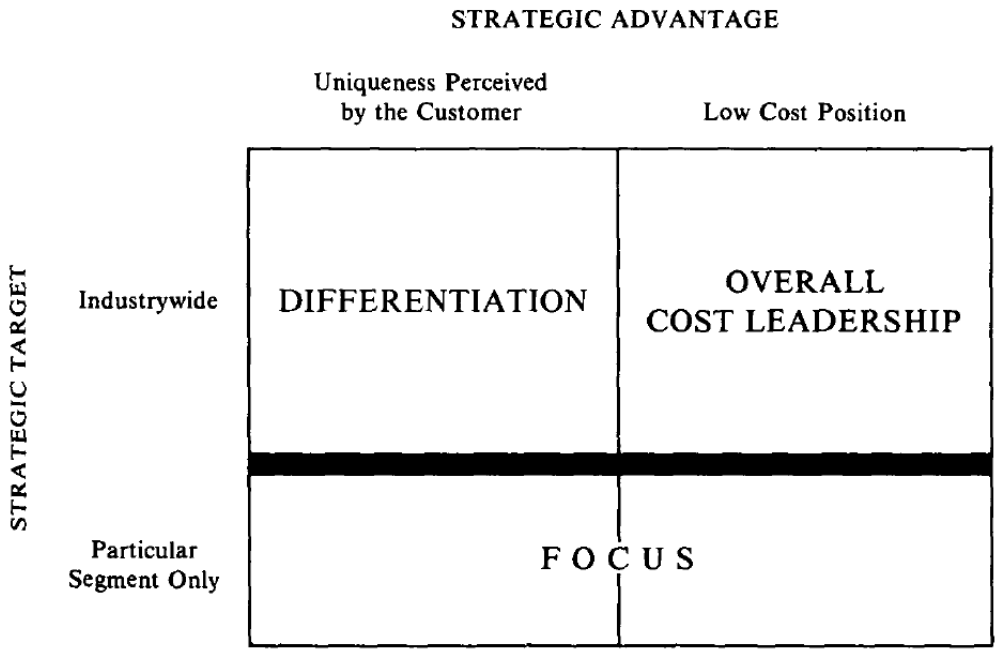
Figure 2.1 Five Competitive Forces



Note. (Porter, 1980)

The collective strength of these forces determined the ultimate profit potential in the industry. Analyzing the five forces guided the firm to define its strategy in existing in the business. They were defined by considering the strategic target and advantage. Strategic target analyzed whether the product targeted wide range of market or specific segment only. While the strategic advantage saw whether it focus on cost of the product and the uniqueness of it. Matrix then formed three options of generic strategic to be implemented ; cost leadership, differentiation or focus strategies.

Figure 2.2 Generic Strategy



Note. (Porter, 1980, p. 39)

Cost leadership strategy required aggressive construction of efficient-scale facilities, vigorous pursuit of cost reduction from experience, tight cost and overhead control, avoidance of marginal customer accounts and cost minimization in area like R&D, sales force, service, advertising and so on (Porter, 1980, p. 35)

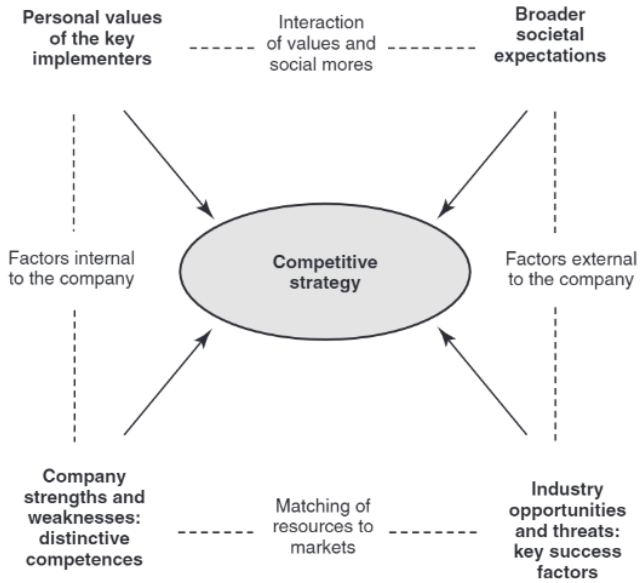
Differentiation strategy involved creating something that is perceived industrywide as being unique. The differentiation could happen along several dimensions. This strategy provided insulation against competitive rivalry because of brand loyalty by customers and resulting lower sensitivity to price. It also

increased margin, which avoided the need for low cost position (Porter, 1980, pp. 37-38)

The final generic strategy was focus on particular buyer group, product line segment or geographical market. Unlike the cost leadership and differentiation who aimed to achieve their objective industry-widely, focus strategy was built around serving particular target very well. The strategy rest on the premise that the firm was thus able to serve its narrow strategic target more effectively and efficiently than competitors who compete in broad market (Porter, 1980, p. 39)

(McGee & Sammut-Bonnici, 2014) explained in their journal that competitive strategy was the process of developing competitive advantage and earning above average returns for stakeholders. Competitive advantage was achieved through the strategic management of resources, capabilities, and core competences, as well as the firm's responsiveness to opportunities and threats in the external environment. There were elements that influence the competitive strategy which enabled the firm to survive the competition. Similar to Porter, Mc Gee and Sammut-Bonnici also elaborated forces that defined the strategy.

Figure 2.3 Forces According To McGee and Sammut-Bonnici



Note. (McGee & Sammut-Bonnici, 2014)

Society had expectations of its business organizations. Owners, managers, and other implementers of strategy had their own personal values and ambitions. The company had strengths and weaknesses, and the industry context offers opportunities and threats. The traditional, top-down view of strategy was encapsulated in the strategic planning view. This involved deciding on long-term objectives and strategic direction, eliminating or minimizing weaknesses, avoiding threats, building on and defending strengths, and taking advantage of opportunities (McGee & Sammut-Bonnici, 2014).

2.2 Digital Transformation

In the book *Rewired : A McKinsey Guide To Outcompeting In The Age Digital and AI*, digital transformation was defined as the rewiring of an organization, with the goal of creating value by continuously deploying technology at scale. The goal of digital transformation should be to build a competitive advantage by continuously deploying tech at scale to improve customer experience and lower costs. Digital transformations are different from regular business transformations, in both small and big ways. For one thing, business transformations usually end once a new behavior has been achieved. Digital transformations, on the other hand, are long-term efforts to rewire how an organization continuously improves and changes. *Rewired* laid out six capabilities critical for successful digital transformation (Lamarre, Smaje, & Zemmel, 2023) :

- The ability to craft a clear strategy focused on business value
- A strong talent bench with in-house engineers
- An operating model that can scale
- Distributed technology that allows teams to innovate independently
- Access to data that teams can use as needed
- Strong adoption and change management

The role of top leaders was critical in digital transformation, as they would lead the initiative and the process of transformation all the way. Figure 2.4 mapped what digital transformation word should reflect. The process should be led by CEO and senior leaders, capabilities should be the source, it had to continuously improve,

concerning both on customer and operational, with the competitive advantage being the final goal. So, the transformation was not just a shift, but it had to be a process that made a company beyond its competitors.

Figure 2.4 Meaningful Transformation

Note. (McKinsey & Company, 2023)

Another point of view was offered from the book *A Field Guide To Digital Transformation*. They defined digital transformation as a genuine attempt to change, upgrade and extend an organization's business models and technologies so as to enable it to gain value by (Erl & Stoffers, 2021) :

- Improving siginificantly what it has been doing
- Introducing new things it can do

Technology innovation was an enabler for digital transformation. However, it fundamentally involved four primary factors in the holistic approach :

1. Business
2. Technology
3. Data
4. People

The business factor of digital transformation was expected to take an organization to a new level of growth and effectiveness by transforming how the business relates to the outside world and how it operated internally. Technology and data wise were content with the distinguishing technology as digital transformation enablers.

Amongst all were cloud computing, blockchain, Internet of Things (IoT), Robotic Process Automation (RPA), big data analytics, and artificial intelligence. These technology innovations empowered business capabilities in two primary areas:

- Improved and new forms of automation
- Meaningful and responsive data intelligence

Digital transformation would change the way human workers contributed and related to the organization, hence the people factor involvement. Human workers affected by changes to business models as an effect of digital transformation may need to be retrained and perhaps even acquire new skills (Erl & Stoffers, 2021).

2.3 Scenario Planning

The book *Scenario Planning : The Link Between Future And Strategy* (Lindgren & Bandhold, 2009) defined scenario as vivid description of plausible future. They were different from forecasts, prognoses and visions, in the sense of a description of a relatively unsurprising project of the presents. A scenario was a well-worked answer to the question : "What can conceivably happen?" or "What would happen if…?" Scenario made risk-management possible, which contrasted it to forecast or vision which tend to conceal risks.

According to (Lindgren & Bandhold, 2009) scenario planning was a planning method used to deal with uncertainties in the future business environment. The differences between traditional planning and scenario planning approach could be summarized to where the first one mostly dealt with estimation and prediction of the future, the later dealt with creating it. The table in Figure 2.6 below listed the comparison.

One of the most famous and successful examples of scenario planning came from Shell, the global energy company. Taking from (The Shell Scenario Team, 2011), they had used scenario planning since the era of 1970 to list and analyze the plausible future and therefore, helped the leaders to make decision on the company's strategy. It had helped the company to navigate crisis occurred along the periods, like the financial crisis in 1998. Despite the scenario planning was mainly discussing energy development as the focus, it was created not only for Shell, but also for the use of greater platform

Figure 2.5 Comparison of Traditional Planning and Scenario Planning

Table 2.2 Characteristics of traditional planning compared with the scenario planning approach

	Traditional planning	*Scenario planning approach*
Perspective	Partial, 'Everything else being equal'	Overall, 'Nothing else being equal'
Variables	Quantitative, objective, known	Qualitative, not necessarily quantitative, subjective, known or hidden
Relationships	Statistical, stable structures	Dynamic, emerging structures
Explanation	The past explains the present	The future is the *raison d'être* of the present
Picture of future	Simple and certain	Multiple and uncertain
Method	Determinist and quantitative models (economic, mathematical)	Intention analysis, qualitative and stochastic models (cross-impact and systems analysis)
Attitude to the future	Passive or adaptive (the future will be)	Active and creative (the future is created)

Note. (Lindgren & Bandhold, 2009, p. 25)

One of the most famous and successful examples of scenario planning came from Shell, the global energy company. Taking from (The Shell Scenario Team, 2011), they had used scenario planning since the era of 1970 to list and analyze the plausible future and therefore, helped the leaders to make decision on the company's strategy. It had helped the company to navigate crisis occurred along the periods, like the financial crisis in 1998. Despite the scenario planning was mainly discussing energy development as the focus, it was created not only for Shell, but also for the use of greater platform.

Another example was from The world Wildlife fund (WWF). As described in (Exploring Alternative Futures: A Scenario Planning Approach, 2024), the organization had effectively used scenario planning to address complex challenges. In their project called "Living Planet Scenarios," the WWF developed four alternative futures to explore different pathways for biodiversity conservation. Through this exercise, they gained insights into the potential impacts of various factors, such as climate change, habitat loss, and policy decisions. The WWF used these scenarios to guide their conservation efforts, prioritize actions, and advocate for sustainable practices.

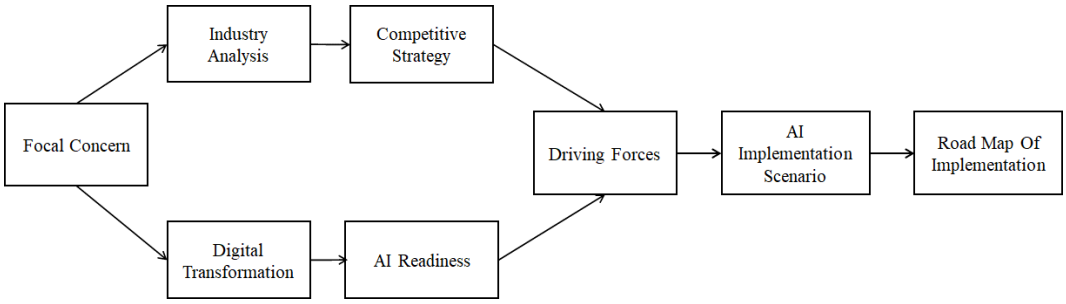
In constructing scenario planning for this study, TAIDA framework from (Lindgren & Bandhold, 2009) was used. TAIDA was an abbreviation for :

- *Tracking*; Tracking was about getting on the track of changes, discovering patterns, trends, threats and opportunities from immediate surrounding
- *Analyzing* ; it was discovering future consequences of changes in the present, and the interplay between trends and tendencies. Analyzing answered questions like 'What is happening to what seems to be happening" or 'Which ones of the sign is the lasting trend and which ones are just temporary?" The purpose of analyzing was to get an in-depth understanding of the changes and the interplay that can be observed, and from that try to find patterns and connections
- *Imaging* ; the identification of possibilities and generation of visions of what was desired. The process of imaging was more intuitively, creating not only intellectually understanding but also emotionally meaning when we put life into alternative future
- *Deciding* ; the weighing of information and choices and strategies identification. In the decision process, evaluation and tests of choices were made carefully
- *Acting* ; the setting up of short term goals, establishing of first step and following up of the action

2.4 Research Framework

The research started from the focal concern of uncertainties for AI implementation in retailer business. This was elaborated based on the competitive strategy and digital transformation drivers. From the findings of the two theories elaboration, a scenario planning was constructed revealing plausible futures of the implementation. Final delivery was the road map of AI implementation for retailer. A diagram of process is shown as in Figure 2.6 below :

Figure 2.6 Research Flow



Note. Author (2024)

This research did not carry hypothesis to be tested or verified. Instead, it explored the findings into result and conclusion.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 Research Design

This research used qualitative method with constructivist view and case study approach. According to John W. Creswell, qualitative research was an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involved emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. Qualitative method relied on text and image data (Creswell & Creswell, Research Design : Qualitative, Quantitative And Mixed Methods Approach, 2018)

Constructivism was a philosophical view that says all knowledge is constructed from human experience as opposed to discovered self-evident knowledge (Given, 2008). A constructivist worldview situated reality as a process of social construction. Humans made meaning of their experiences based on the social context. Social contexts were interpreted using one's own history and past experiences. The goal of the research was to rely as much as possible on the participants' views of the situation being studied. The questions became broad and general so that the participants could construct the meaning of a situation, typically forged in discussions or interactions with other persons (Creswell & Creswell, Research Design : Qualitative, Quantitative And Mixed Methods Approach, 2018)

(Yin, 2009) defined case studies as a design of inquiry found in many fields, especially evaluation, in which the researcher developed an in-depth analysis of a case, often a program, event, activity, process, or one or more individuals. Cases were bounded by time and activity, and researchers collected detailed information using a variety of data collection procedures over a sustained period of time. According to Willig (2001), the case study was not itself a research method, instead, it constituted and approached to the study of singular entities, which might involve the use of a wide range of diverse methods of data collection and analysis. This was an extensive investigation of just one person, group or event. The focus of case

study was upon a particular unit and that was the case. A case could be an organization, a city, a group of people, a community, a patient, a school etc. (Willig, 2001).

This research used a retailer company as a case study. The company required to remain anonymous for its name and employees being interviewed. Hence, it was referred as 'Retailer X' and no person name was mentioned when quoting.

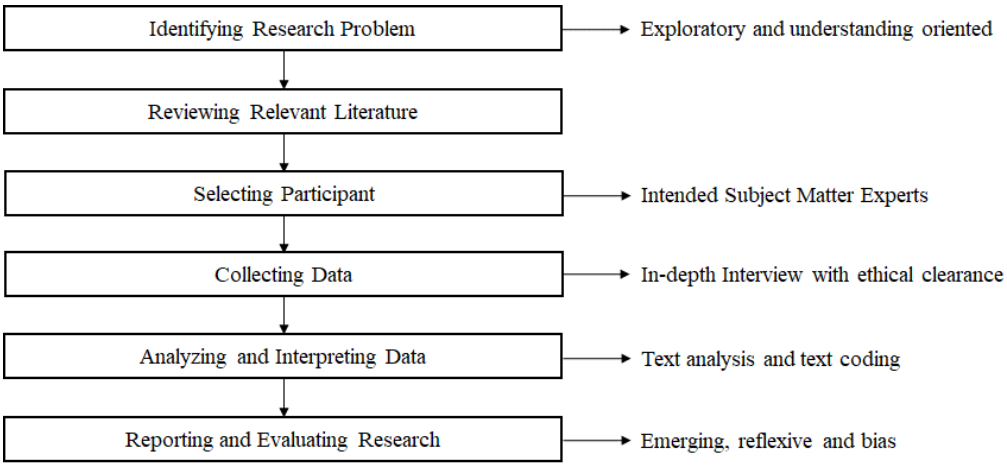
3.2 Research Procedure

The problem identification formulated the research objective and focal research question to be answered. Underpinning theories for the analysis to be based upon and built around then elaborated in the literature review, in order to enable the researcher to have comprehensive understanding and firm ground theory. Information and data to be collected required subject matter expert knowledge, not just random respondents.

In-depth interview was chosen to become the primary information gathering channel. In-depth interview was a qualitative research technique that was used to conduct detailed interviews with a small number of participants. In contrast to other forms of qualitative research, researchers using an in-depth interviewing approach invested a significant amount of time with each participant employing a conversational format. Interview questions were primarily open-ended and led to a discovery-oriented approach (Rutledge & Hogg, 2020). Questionnaire was developed to be open-ended as possible it could be, to enable elaboration of experience and point of view from the experts.

The steps of qualitative research interpreted for this study was as in below figure :

Figure 3.1 Steps of Qualitative Research



Note. Author (2024), adapted from (Creswell & Creswell, Research Design : Qualitative, Quantitative And Mixed Methods Approach, 2018)

3.3 Research Respondents

Literature review highlighted the relationship and involvement of digital transformation to business, technology, data and people. Based on this consideration, respondents selected were the subject matter expert (SME) for each respective element. Within Retailer X's organization, these SMEs were the senior leaders of business units of commercial, data, and technology. They were on General Managers and Vice Presidents level of management, with service years in the company ranging from 2 years to 27 years. The business units involved was described as below :

- Commercial team was dealing with suppliers for product assortment , availability in the stores, branding, customer engagement and marketing communication. Commercial point of view in this research represented the business element and what expectation met towards the business with the initiative of AI
- Digital team ; digital technology team was responsible for digital development, for example membership and e-commerce application. Their point of view reflected the technology side and the readiness in implementing AI to support the business

- Information Technology : IT team was responsible for data warehouse and management. They held the key to data management. The team's point of view explored on the current data governance and the expectation with the digital transformation and AI implementation

In addition, another subject matter expert outside the company was interviewed for his expertise on artificial intelligence in general. The expert was the Managing Director of IT Consultant company.

To ensure the ethical clearance, following (Creswell & Creswell, Research Design : Qualitative, Quantitative And Mixed Methods Approach, 2018) respondents will be treated with :

- *Informed Consent:* participants are fully informed about the research procedure and give their consent to participate in the research before data collection takes place.
- *No deception:* Deception of participants should be avoided altogether. The only justification for deception is when there was no other way to answer the research question and the potential benefit of the research far exceeds any risk to the participants.
- *Right to withdraw:* Participants feel free to withdraw from participation in the study without fear of being penalized. *It was due to this ethical clearance that the people part of the analysis could not be done in this study*.
- *Debriefing:* after data collection, participants were informed about the full aims of the research. Ideally, they should also have access to any publications arising from the study they took part in

3.4 Validity Strategy

(Given, 2008) Validity was one of the strengths of qualitative research and was based on determining whether the findings were accurate from the standpoint of the researcher, the participant, or the readers of an account. Terms abound in the qualitative literature that address validity, such as *trustworthiness, authenticity*, and

credibility (Creswell & Miller, Determining Validity in Qualitative Inquiry. Theory Into, 2000) and it was a much-discussed topic.

To reach the validity of the findings, multiple strategy was suggested to be used for validation. Following (Creswell, Qualitative Inquiry And Research Design : Choosing Among Five Approaches, 2013), this study used prolonged time, thick description and member checking as method of validation of the qualitative study. Prolonged time was used since researcher worked in the organization used as the case study. Observation and immersion were then accessible for the researcher to validate the data and findings. Thick description was given at the beginning of the report as an introduction part. The background of artificial intelligence and retail industry in Indonesia set the thinking frame to the readers of this report. The conclusion of the study was shared back to the respondents in order to get their validation, hence the member checking strategy is implied.

3.5 Source of Data

The study used primary and secondary data. Primary data was collected from in-depth interviews with subject matter experts, as explained in the previous part. The scheme of interview covered assessment of AI implementation readiness, challenges for AI implementation and support/enablers expected. Interview used open ended questions to enable the exploration and explanation of respondents. Secondary data was sourced from scientific journals, published articles in media, websites, and social media posts from verified accounts.

3.6 Data Analysis

Data from in-depth interview was analyzed through text analysis. Text was coded and clustered in order to examine pattern and generate findings. Descriptive analysis was used for the AI implementation readiness assessment, while the rest of the analysis was the interpretation of researcher to the data.

CHAPTER 4 : ANALYSIS

As the source required anonymity for the involvement in this research, the retailer's name was not revealed in this study and instead, was addressed as "Retailer X" only when necessary. Subject Matter Experts (SME) also remained anonymous.

4.1 Five Porter Forces Analysis of The Retailer

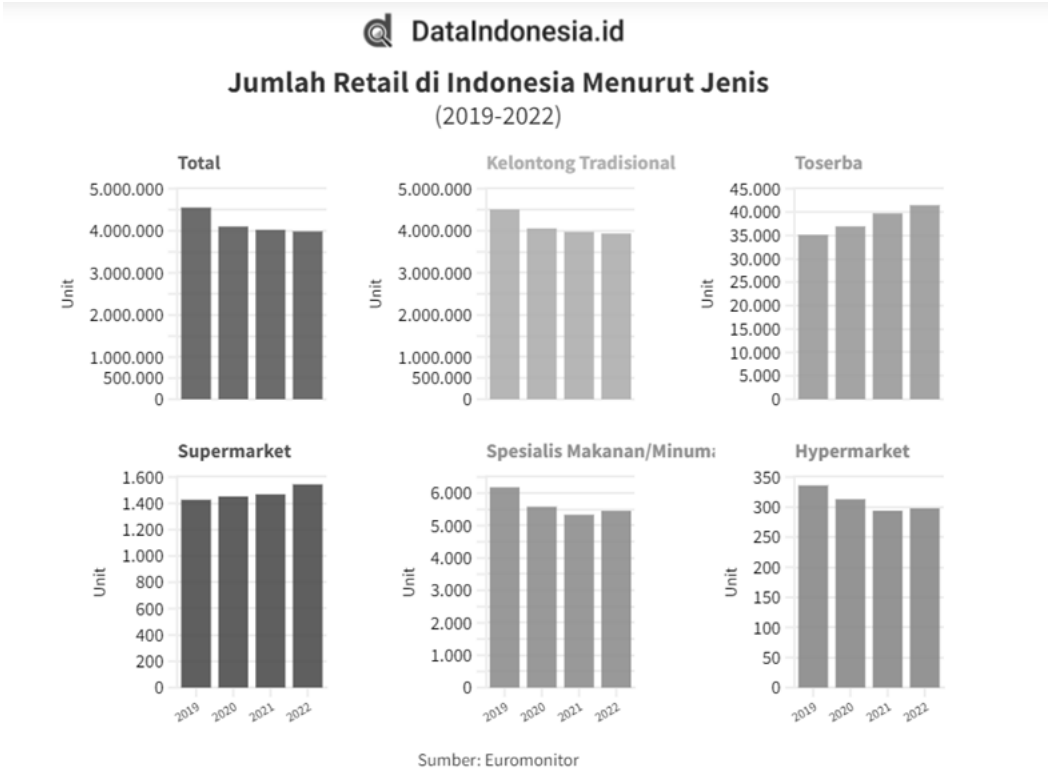
Porter's Five Forces Analysis was used to identify the business environment of a grocery retailer in general and Retailer X in specific.

- *Rivalry Intensity and Threat of The New Entrants*

Rivalry and new entrants had strong relation in retailer's five forces analysis. Therefore, this study put the two together in analysis. Retailer X was a grocery retailer selling fast moving consumer goods as their main business. This type of retailer was commonly found in Indonesia. Euromonitor recorded 3,98 million retail outlets existed in 2022 (Rizaty, 2023). The number was dominated by traditional grocery outlets (*toko kelontong tradisional*), reaching up to 3,94 millions of outlet. Breakdown of outlet population based on their type is described in Figure 4.1

According to (Levy, Weitz, & Grewal, 2023), the modern retail grocery was grouped into hyper market, super market and mini market/convenience store based on the selling area and the number of products offered, with hyper market being the largest and mini market being the smallest. Euromonitor data in Figure 4.1 reveals that super market type, whose market was the closest competition for Retailer X, increased in terms of numbers. In 2017, there were 1377 outlets of super market in Indonesia and the number grew to 1411 in 2020.

Figure 4.1 Number of Retail Outlets in Indonesia



Note. (Rizaty, 2023)

Retailer X itself currently had more than 200 outlets spreading in Java and Sumatera regions, making it one of the prominent players modern grocery retailers. Another format of modern retailer who aggressively expanded their presence was the mini market format. Indomaret and Alfamart were the two biggest names in it. Figure 4.2 exclaims Indomaret's expansion to additional 2460 outlets in three years, while Alfamart did it as well with 3615 outlets.

Figure 4.2 Indomaret and Alfamart Outlet Evolution

No.	Nama Data	Indomaret	Alfamart
1	2019	17.506	13.779
2	2020	18.271	14.973
3	2021	19.133	16.060
4	2022	19.966	17.394

Note. (Ahdiat, 2023)

As outlet expansion was one of the building blocks for retail business to grow, the opening of new stores was to continue to happen. Not only from the existing national store chains, but also from the local players, such as Yogya, Hari-Hari, Tiptop and new international chains such as Lulu Hypermarket. Franchise business model also helped the expansion of modern trade, especially for mini market. These factors set a strong threat coming from the new entrants for Retailer X.

Serving to wide range of customer segment, grocery retailers carried similar product assortment in their store. Table 4.1 shows the top products category growth in Indonesia. These categories with each respective top selling items, were found in all retailers, be it modern, traditional or online platform.

Table 4.1 Annual Growth of Top 10 Biggest Market Size of Fast Moving Consumer Goods

Product Category	Market Value Growth 2022 vs 2021
Instant Noodles	17%
Biscuit	17%
Cooking Oil	-23%
Powder Milk	2%
Coffee	9%
Liquid Milk	9%
Mineral Water	17%
Snack	24%
Baby Diapers	6%
Toilet Soap	15%

Note. Adapted from (NielsenIQ, 2023)

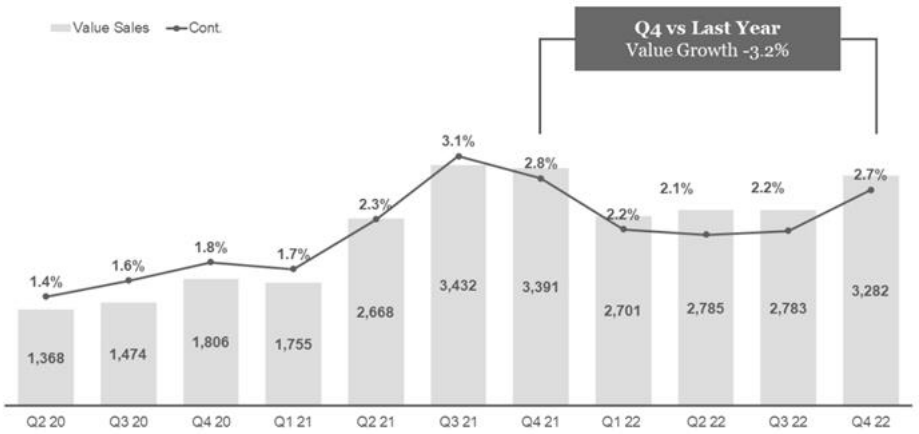
Considering the above trend, the rivalry intensity and also the threat of the new entrants was determined to be high for retailer industry. Retailer X played in a market where competitor was everywhere to be found and many of them even had the advantage of proximity (mini market and traditional stores). These competitors kept growing in number, leaving a fierce battle for market share.

- *Threat Of Substitute Products/Service*

The entrance of e-commerce to the industry instantly differentiated the form of retailer into brick-and-mortar and online. Summarizing from (Levy, Weitz, & Grewal, 2023), brick and mortar referred to retailer whose business activity took place in their physical store, whereas online represented those who did it through online platform. Despite having the same core business, online channel was perceived as a substitution of the brick and mortar. Covid-19 pandemic endorsed the online shopping behavior to expand from secondary and tertiary needs to basic need as well, in which grocery belonged to. The key substitution service of online channel was home delivery, instead of in-store purchase. Convenience and efficiency were the key offering in online trading.

In 2022, e-commerce accounted for an estimated 11.5% of total retail sales and was expected to reach 21.8% by 2027 (Farid & Iduansjah, 2023). Grocery e-commerce was still considerably low in sales compare to fashion and lifestyle ones, but the growing trend made brick-and-mortar retailer adopted and developed their own e-commerce platform. It was expected to nurture omni-channel shopping experience for customer and hence mitigating the decline of sales due to channel switch out. Figure 4.3 from NielsenIQ (2023) measures the e-commerce value size evolution quarter by quarter. The size doubled within two year period, despite the stable movement in recent periods.

Figure 4.3 Evolution of E-Commerce Market Value



Note. (NielsenIQ, 2023)

The substitute threat coming from e-commerce was at low to moderate level at the time being, merely due to the size of the market and low internet penetration in Indonesia. Upcoming years were to be monitored, as the trend, more digital savvy customers and established internet infrastructure were most likely change the power of this substitute.

- *The Bargaining Power of Suppliers*

Retailer's business process with their suppliers was explained in the book Strategic Retail Management (Zentes, Morschett, & Schramm-Klein, 2017) :

1. gathering information to select potential products and suppliers
2. evaluating potential suppliers and selecting suppliers
3. negotiating (purchase prices and terms)
4. concluding deals or contracts
5. ordering and re-ordering

Negotiation was the step where business objective was aligned between supplier and retailer. A large number of manufacturers or producers in a certain product range made suppliers own weaker bargaining position, due to wider option for retailer to choose their business partner. Table 4.2 shows an example of how wide the option was in chocolate wafer product. The list indicates market share amongst brands, with higher market share leads to respective supplier's stronger bargaining position, but still an open trade for others to fill in the space

Table 4.2 Market Share Wafer Salut Chocolate in 2021

Brand	**Total (%)**
Beng-Beng	35,7
Gery Saluut	27,5
Tango Walut	12,9
Tim Tam	11,3
Roma Superstar	8,8
Kit Kat	1,9
Top	1,8
Apollo	0,1
Kalpa	0,1

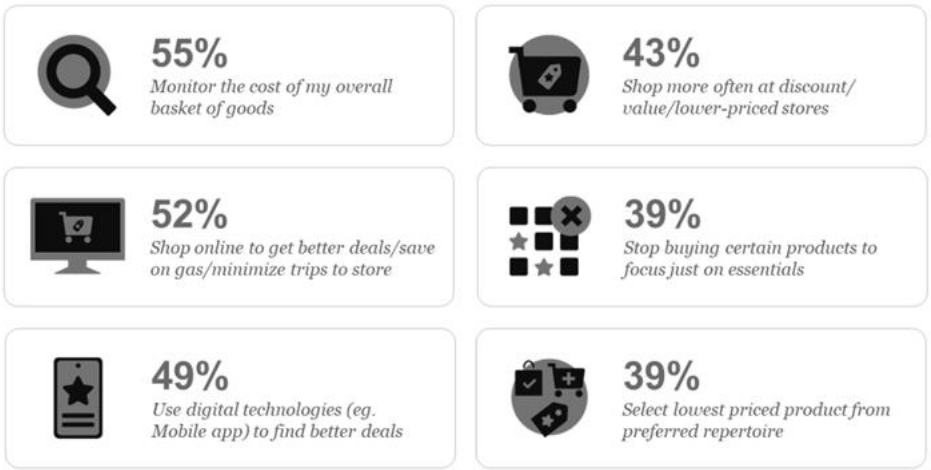
Note. Adapted from (Indonesia Data, 2022)

With market widely spread across the brands, the bargaining power of supplier of certain brand was being toned down. The suppliers knew the competition they had and hence, had to provide good negotiation deal for retailer to carry the products on their shelf. Nevertheless, the power of supplier was considered strong as they were the budget sponsor for promotion conducted in retailer. Supplier could use this to put more pressure to the retailer to provide more space for their products and to strengthen their in-store presence, in return of the sales generated. A moderate to high level of power then was fairly assessed to the power of supplier in retailer industry.

- *The Bargaining Power of Buyers*

The wide option for store repertoire and similar product assortment left a little room for grocery retail outlet to gain loyalty from customer. Most Indonesian customers were price sensitive and looking for good value for their money (USA International Trade Administration, 2024). A survey from NielsenIQ revealed that this price sensitivity imparted by having behavior or tendency to adjust their spending when price increase occurred. In Figure 4.4, there are 43% of customers claimed that they would shop at lower-priced stores. In addition, 39% claimed that they would only buy on essentials, which means at any time price is unfavorable for customers, they would shop for core grocery only which could be found at any stores.

Figure 4.4 Saving Strategy of Indonesian Customers



Note. (NielsenIQ, 2023)

Increasing usage of gadget and digital technology made information on pricing is easy to get. 49% of customer claimed that they will find better deals by using the digital technology. These facts put customer in a strong position in retail industry. They had strong bargaining power due to wide choice of stores, similar level distribution of products, and accessible price information.

4.2 PESTLE Analysis of Retailer Industry

PESTLE stood for Political, Economy, Social, Technology, Legal and Environment. Both Porter's Five Forces and PESTEL analyzed the external factors that influence a company or industry. The difference lied in the ability of the respective company/industry to influence those factors. In Porter's, the industry had the ability to influence them, while in PESTEL, those factors were beyond the industry's control. Therefore, PESTEL usually elaborated the macro economy factors.

- *Politic*

Political stability played a great deal to trading activity, including retail industry. It ensured investment and conducive business environment. Politic also influenced the law and regulation in legal factor. For retail industry, political factor could influence the taxation, trading regulation, labor law and export and import regulation that directly impacted the operation of the business.

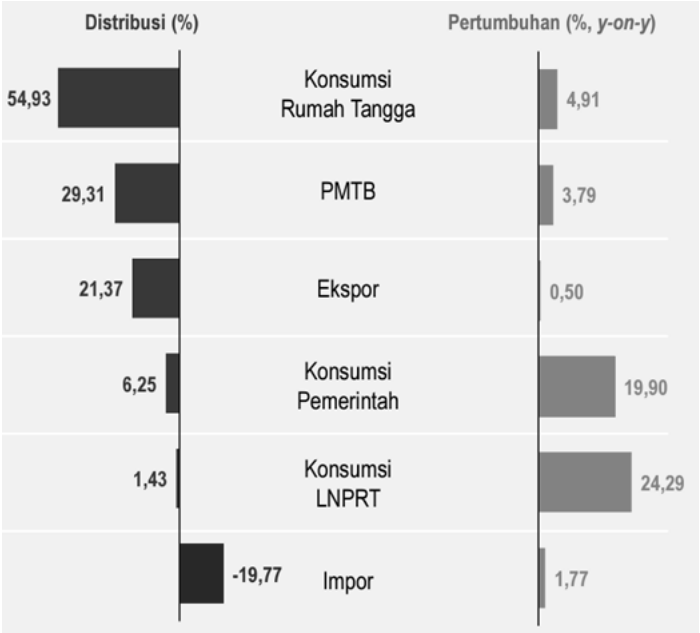
Having presidential election in every five years, political environment in Indonesia was proved to be disrupted before, during and after the election time. This made regulation and policy have high tendency to change when the new government embarked. Export and import regulation related to the supply chain of goods also depended on government regulation. Policy regarding import quota, exchange rate and global sourcing had direct impact to retail industry.

- *Economy*

Economy factor directly connected to retail industry was the growth of the economy itself and inflation rate. Gross Domestic Product (GDP) represented the ability for the economy to grow which would drive the purchase power. Indonesia

experienced economy contraction during 2020 when Covid-19 hit, but recovery had been fast and smooth. (BPS-Statistics Indonesia, 2024) recorded the latest GDP growth at 5,11% for Quarter 1 2024. Figure 4.5 showed that almost 55% of this GDP was contributed from household consumption (*konsumsi rumah tangga*). Household consumption then became the most significant influencer of the retail sales. Hence, if the economy went down, it would be most likely driven by household consumption decline, which in the end would impact the retail industry.

Figure 4.5 Indonesia Quarter 1 2024 GDP Distribution and Growth Based On Spending



Note. (BPS-Statistics Indonesia, 2024)

Inflation was another macro economy factor affecting retail industry. It reflected in the movement of consumer pricing. Low and stable inflation rate was pre-requisite for sustainable economy growth that would affect welfare of the people. Figure 4.6 shows inflation rate for Indonesia over the past one year. With the latest May 2024 number at 2.84%, Indonesia managed to keep the rate low when compare to global rate (5,9%) and Asia Pacific's (5,0%). For retail industry, this meant that price increase of goods was within manageable range as to impact to sales will be smooth.

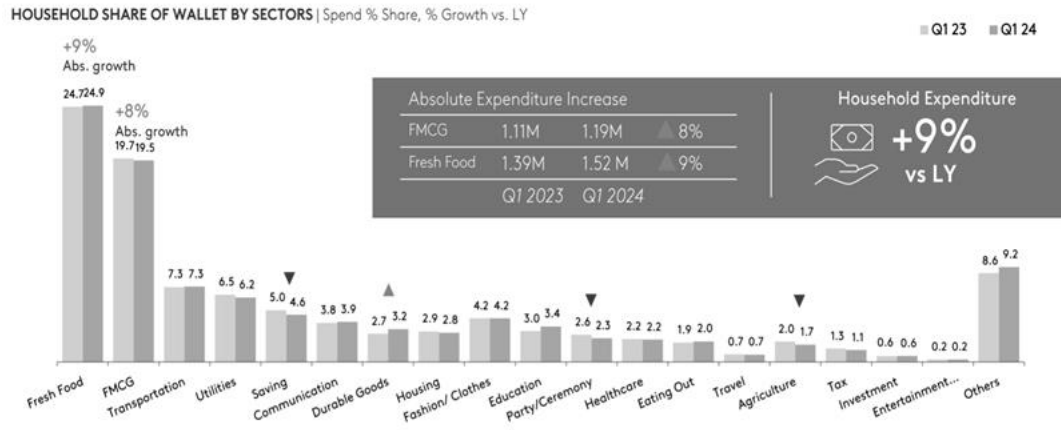
Figure 4.6 Indonesia Inflation Rate Year-On-Year

Note. (BPS-Statistic Indonesia, 2024)

- *Social*

Socio cultural condition of Indonesian market impacted the retail industry in trying to serve customer preference. The large population intrigued both as a market potential and complexity of behavior. Focusing on grocery retailer, basic daily needs remained similar throughout the regions, as resembled in nine basic commodities (*Sembilan Bahan Pokok*, abbreviated into *Sembako*). It reflects in the spending share showed in Figure 4.7, where fresh food and fast moving consumer goods occupied almost 45% combined of consumer's wallet.

Figure 4.7 Household Share of Wallet



Note. (Kantar Indonesia, 2024)

However, recent lifestyle trend also affected spending. Summarizing from (IDN Research Institute, 2024), social media increasing usage, leisure economy preference and health conscious rising concern were amongst the trend that affected customer in managing their budget. Despite prospectively still occupied the biggest

share of wallet, growing interest towards these trends could make consumer alter or modify their budget allocation by searching for more affordable option.

- *Technology*

The enabler for the rise of online channel and e-commerce was internet penetration. Survey conducted by APJII (Indonesia Internet Service Provider Association or *Asosiasi Penyelenggara Jasa Internet Indonesia*) in 2024 announced that Indonesia's internet penetration increased from 64,8% in 2018 to 79,5% in 2024 with percentage based to total population (APJII, 2024). This led to approximately 221 million of internet users. The rapid incremental paved the road for digital technology to penetrate the market. Digital transformation became a term attached to various industries.

The government initiative to accelerate Industry 4.0 implementation was an endorser for technology development in Indonesia. According to Kemkominfo (Indonesia Ministry of Communication and Information or *Kementrian Komunikasi dan Informasi Indonesia*), digital technology penetration should be based to four fundamental things, those were data volume incremental, computing capability, connectivity and business intelligent skills (Apa Itu Industri 4.0 dan Bagaimana Indonesia Menyongsongnya, 2019). Digital infrastructure itself has undergone major improvement over the past years. However, the need of high speed internet connection was still an issue to be handled should digital technology is to be upheld further.

In relation to AI implementation, technology was the strongest factor influenced the readiness of an industry. It was not only about the advancement of the it, but also about the adaptability level it provided. Scalability of a certain technology in accommodating AI determined how wide the acceptance of the industry to AI concept. Therefore, the complexity of AI methodology and calculation needed to be balanced with convenience and simplicity of the problem solutions it addressed.

- *Legal*

Most of the time related to politic factor, legal macro condition affected business operation through the regulation, law and government policy. Amongst these legal sides, regulation on supply chain (for example : import quota), pricing policy (such as highest retail price for commodity goods), and labor law delivered direct impact to retailer business topline and profit.

Specifically for modern retailer, store location and operating hour had to comply to the condition stated in the regulation of Indonesia Ministry of Trade. According to Indonesia Ministry of Trade Regulation No 23/2021, modern trade store had to be built in a sufficient distance from traditional market and micro-small-medium enterprises, so it did not disrupt the existing trading landscape. Although differing across regions, modern trade store, especially super market could not open their business for 24 hours non-stop by regulation. The rule applied to protect traditional trade business.

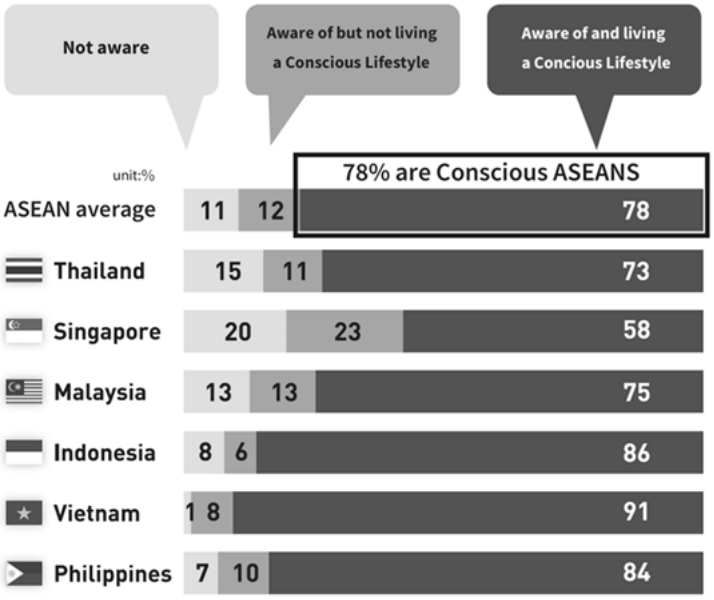
Retail industry in general and modern trade in specific are also bound by the regulation of the recent digital technology implementation. Regarding the AI implementation, data security and privacy were highly enforced and regulated. Exposure to personal identification information must also be regulated. Unfortunately, several cases of public data leakage in Indonesia indicated weak data security and infrastructure. Development of technology factor needed to be aligned with this legal factor regarding data.

- *Environment*

Since the project of Sustainable Development Goal was initiated in 2016, industries set environment sustainability in their business mission, including in Indonesia. Owning reputation as the second largest contributor to world's plastic waste according to research by (Meijer, Van Emmerik, Van der Ent, Schmidt, & Lebreton, 2021) set the bar rather low for Indonesia's environmental consciousness. Nevertheless, the growing concern of environment driven by the younger population has created opportunity for business to elevate this for their sustainability agenda. The life style moved towards conscious living was amongst the people. According to study conducted by Hakuhodo Institute of Life and Living

ASEAN, Indonesians were in the top 3 of ASEAN countries with highest proportion of people aware and living a conscious life style, as described in Figure 4.8

Figure 4.8 Awareness of Conscious Living in ASEAN



Note. (Hakuhodo Institute of Life and Living ASEAN , 2020)

Trend towards sustainable business process had endorsed environmental friendly initiative, for example eco-friendly packaging and disposable plastic bag reduction. As the consumer preference increasing, retailers could ride the wave by providing more space for products that support the environment. Disposable plastic bag for shopping has been banned in Jakarta since 2021. It was the initiative from the local government that had to be implemented by all modern trade. Despite the short time of implementation, modern retailer managed to comply to the regulation.

Another environmental factor closely related to retailer is the carbon print and energy consumption. Logistic process and the use of electronic equipment in stores surely generate carbon emission that could produce green house effect. Storage optimization and effective delivery schedule are the first step towards energy efficiency. It opened the opportunity to implement AI, as one of the benefit it offered was optimization of business process. By applying cross matrix calculation of cost, distance, stock and order, the warehousing of retailer was expected to be on the optimum level, hence reduced the carbon print.

4.3 Artificial Intelligence Readiness Assessment

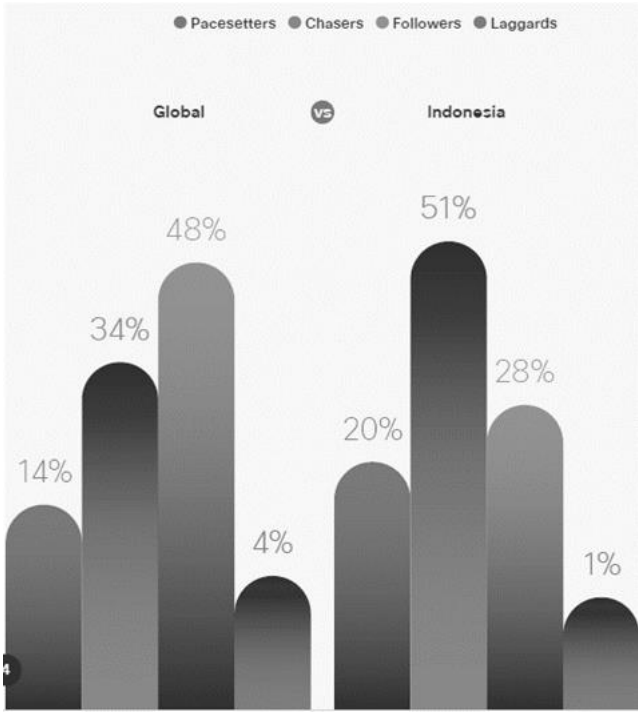
- *Cisco Readiness Assessment Index : A Brief Context Set*

In 2023, Cisco, a technology solution provider company, conducted survey addressing the readiness of AI implementation involving various industries globally. They interviewed more than 8000 senior business leaders from organizations with 500 or more employees. The leaders assessed the state of AI implementation in their company. Overall result was categorized into four groups based on their current state (Cisco, 2023) :

1. Pacesetters : the organization/company was at the forefront of readiness of AI implementation and integration globally
2. Chasers : the organization was well progressing and above average for AI readiness
3. Followers : the organization had momentum toward readiness for AI adoption but below average in preparation
4. Laggards : the organization that was least prepared for AI adoption and integration

The result distribution of the four categories is described in Figure 4.9 with Indonesia index being presented along with the global as a benchmark. The percentage represented how many respondents belong to respective group. 51% of respondents in Indonesia assessed their organization to be in Chasers state of AI implementation readiness. It suggested that most of the companies were well progressing in implementation and owned above average infrastructure for it.

Figure 4.9 Cisco AI Readiness Assessment : Global and Indonesia Result



Note. (Cisco, 2023)

Elaborating further from the total company classification, there were six pillars of readiness being assessed. The six pillars, along with their weighted based on the research conclusion, are strategy (15%), infrastructure (25%), data (20%), governance (15%), talent (15%) and culture (10%). The weighted described that more than half of readiness was determined by infrastructure, data and strategy. Covering these three pillars already gave strong indicator of the readiness level.

The assessment to Retailer X was based in Cisco framework. Aligning with digital transformation framework elaborated in literature review, it assessed the pillars of strategy as the business side, infrastructure as the technology side and data side. As discussed in Chapter 3, each side had Subject Matter Expert/s (SME) interviewed as the basis of assessment.

- *Infrastructure/Technology Assessment*

In accordance to the subject matter expert's elaboration, the infrastructure or technology in Retailer X was assessed to be in the lowest level in the readiness, which was the Laggards level. It indicated that the infrastructure was in very limited

preparation for AI adoption, even close to zero. Albeit, this assessment was assumably applied not only for Retailer X, but also for other brick-and-mortar grocery retailers in Indonesia. Misunderstanding of AI capability was a common practice in AI technology adoption for retailer. One of the examples elaborated was the mixed up definition of the causal relationship and predictive analysis, whom was the aim of AI implementation to the business process.

If you predict sales of Christmas ornaments will increase in December because Christmas is near, that is causal relationship, not predictive analysis. Predictive analysis is, for example, when people now are into plants as hobby, and then you learn from the historical data, you predict that this trend will repeat in another 5 years. Having said that, I would say that what is currently addressed as the need for predictive analysis, is actually just causal analysis. Hence, lead to the misunderstanding of technology requirement for it

AI readiness on technology side was driven by two big factors, technical ability and business direction. On global point of view, technical ability was no longer considered an obstacle for AI implementation in any industry. Hardware was not an issue, previous capacity challenge was answered by cloud computation ability and programming language has developed to a point where feedback was received in mili-seconds. Therefore, the use of technology into AI was a matter of investment and capability of handling. Since AI adoption was about learning the behavior by feeding large amount of data over an amount length of time, the willingness to invest and capability played the main role for the technology to set the learning environment. Technical side then opted out as the main barrier of AI readiness.

It left the business driver as the possible hindrance of technology adoption. In Retailer X's case, the tendency was to this factor. Misunderstanding of AI technology, as mentioned by the SME, was caused by incomplete mindset and business direction regarding both digital transformation and AI implementation. As also stated in the previous section, digital transformation has been in the agenda of Retailer X, but deeper focus as to adoption on certain process was needed for the technology to understand what they had to provide.

Infrastructure here is a support to business. As long as business wants it, has clear and strong direction for it, infrastructure shall follow. Making it available is not a bargain for us, but you need to provide the right fundamental

.

While in the process of alignment with business direction for wider scope of development, the technology team in Retailer X worked their development on what could be measured concretely. The team set up cloud data management and computation as the back bone infrastructure for the e-commerce platform and digital membership application. Setting the platform in cloud diminished possible source of problem from hardware. More importantly, it was aimed to process feedback of data and report query in very short time. There was informally a 'one minute' target, which meant that the processing time needed from query input to graphical presentation of the data would happen within maximum one minute time.

We are taking a small step. Before aiming the system to be intelligent, it needs to be fast. Fast enough that users would not complain that it takes such a long time for them to receive response to their query

The system development in the technology team then described in three general stages :

- First stage aimed at speed of query, which was the first measurable indicator of technology adoption in Retailer X
- Second stage was the clausal analysis feeding. This would still use the hard coding, but it would be enough to provide realistic descriptive analysis for short trend foresee.
- Third stage would be a trainable model, which was planned to be extension of hard coding with the enhancement of user feeding.

In regards to the two dimension of retailer business, the current development in technology indicated immediate effect of it to the back end of retail business dimension, or the operational side, instead of the customer value proposition side. As stated by the SME, putting the focus of AI implementation to the back end of business was perceived to be more manageable, as it was something that was fully within the company's authority. The AI should bring the impact to the efficiency

and effectiveness of standard operating procedure, hence would serve as fundamental to serve the customer. Despite customer personalization offer being more highlighted as AI implementation, operation capability was indeed the enabler behind it. Personalization led to large variation of preference, which required firm support of from the operational system.

The enabler for AI implementation to move forward was beyond technical capability. From the interview, what considered to be the first and foremost factor was direction from business. The direction would define the road map for technology and later on resource and investment required. Without the right understanding of what AI can do to the business and direction of development, technology team would possible still work on the development, but whether or not it was effective and impactful to the business would be left unmeasured. Closely related to infrastructure, management of data was brought up as the prerequisite of technology development. Not only highlighting about one single source of data, but it was also about one single knowledge of data that had to be agreed by all users. This knowledge then be formalized and documented for future reference. It would be a necessity to have mutual understanding on the data being used, so ideally there would only be one database to be claimed as enterprise data. Willingness to leave the legacy system that no longer served the current platform was also highlighted as the enabler for digital transformation as the umbrella of AI.

System or infrastructure is not the answer to every problem. Human is. System can accelerate process, but at the end of the day, it's business that has a say if it is effective or not

- *Data Assessment*

The early readiness of data collection and the limited understanding of the technology and framework of AI addressed Retailer X in the Followers level of readiness assessment. As data was the fuel of AI implementation, the conditioning of data treatment and management in an organization like Retailer X would affect the process of AI adoption. On the variety side of data, retailer held more benefit than its supplier counterparts. This related to the data consisted and sourced from

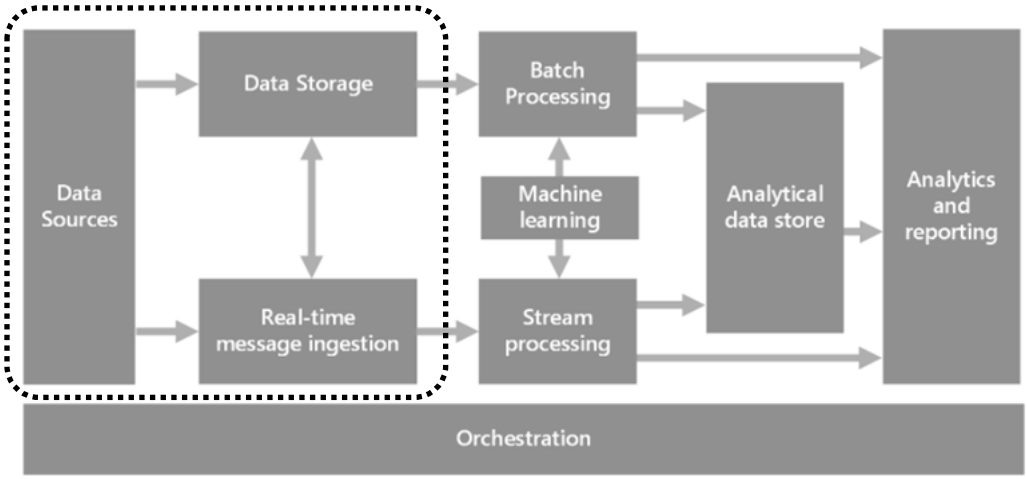
several points of contact : ordering, purchasing, stocking, delivering, replenishing, displaying and, of course, selling. Modern retailer could list up to 10,000 of products, depending on the size of their store. The matrix of those products and process they got through resulted in vast amount of data fit for AI modelling and that was only for commercial side of the business. That being said, the amount of data collected in a retailer business in general and Retailer X in specific, already produced great source for an AI model implementation. However, the management of the data was where the issue emerged.

Starting the business more than 20 years ago, Retailer X acknowledged that their data management was handled in several different type and stored in several places. However, over the past two years, there had been an increasing urgency to rejuvenate and upgrade the data management. One of the momentum was, again, the launching of e-commerce platform and digital membership application. It was even put as part of their mid-term business strategy to build a strong data team in the company to endorse fact-based decision making and create new revenue stream from data monetization. In order to make it happen, strong foundation of data must be built. Legacy data warehouse was considered no longer sufficient to fit with the current business requirement.

When we're talking about data, the first step towards data management was to design data storage system that enabled different sourced of data to be pooled altogether, resulting in one single source data. That goal is not possible with the legacy system that we had

If the architecture of data management is as described in the Figure 4. , Retailer X was at the early stage where they managed to have sufficient data source, and now just started to design or rejuvenate their storage, to be able to map the following process.

Figure 4.10 Data Flow



Note (Tejada, n.d.)

Responding to the urgency of reliable and updated platform, Retailer X planned to migrate to data lake system in the short future of time. Data lake acted as container for all data collected, be it structured (numbers, date, or short text, for example) or unstructured (picture or words, for example) data. Having data lake enabled Retailer X to capture and store beyond business figures. Implementation of data lake was expected to set the firm foundation of data usage in the future, one of it would be enabling AI to be part of the business process. When succeeded, it would be the base to advancement to data warehouse system.

Table 4.3 Difference Between Data Lake and Data Warehouse for Storage

	Data Lake	**Data Warehouse**
Type	Structured, semi-structured, unstructured	Structured
	Relational, non-relational	Relational
Schema	Schema on read	Schema on write
Format	Raw, unfiltered	Processed, vetted
Sources	Big data, IoT, social media, streaming data	Application, business, transactional data, batch reporting
Scalability	Easy to scale at a low cost	Difficult and expensive to scale
Users	Data scientists, data engineers	Data warehouse professionals, business analysts
Use cases	Machine learning, predictive analytics, real-time analytics	Core reporting, BI

Note. Adapted from (Microsoft Azure, n.d.)

Another issue emerged was the lack of understanding of AI in data team that limited them to make customization to their business process.

AI is something that we technically do not understand at this time. We bought software package which already includes AI in it, but how the AI operates, unfortunately, we do not understand. If we understand the technology behind it, we can design customization related to our business system. But right now, we can not do that

This issue put AI as the black box of innovation for Retailer X. The lack of understanding limited the implementation as they depended on what market currently provided. If business processed pointed out specific AI to be applied that was not available in the market, then implementation was adjourned.

In relation to that limitation, the highlighted concern was the urgency of equipping the right knowledge of AI both in terms of technical and capability as the main enablers for further development. The projection of data lake as one single source of data would need to be leveraged with computing ability or the data would just be dormant. Acquiring the knowledge would support the data team in designing the AI model framework to be applied in relevant business process.

Transformation of data management required resources beyond the current technical team. The plan of data lake triggered the necessity for data and system governance. Design and segregation of users and access had to be along the plan of transformation. When the data lake was ready, the prone to leakage and intervention also occurred. Thorough design of data governance was the prevention for that.

We will provide the system and the tools, but there has to be an expert who leads the process in terms of governance and utilization. This person understands about data, is able to design the governance and utilize what the data could do

The addressed function was commonly described as Chief Data Officer. (Zetlin & Olavsrud, 2024) defined Chief Data Officer as a senior executive responsible for the utilization and governance of data across the organization, with responsibilities covered data quality, data governance, master data management, information strategy, data science, and business analytics. This position was convinced to be

catalyst needed for data strategy development and had to complement the work of technical side from the IT/data team.

Current point of view from the SME directed to the back end of retail process to be the first focus of AI implementation, to be more specific in ordering system. In addition to being within the company's authority, the fact of the existence of reliable system in the market with proven used cases was considered to be an effective starting point and source of learning.

The drive for these enablers needed to be included in the company's general planning for digital transformation.

we already had digital transformation strategy and AI are in it, but it still on a high level. It will need to be detailed down on what business process to be incorporated with AI, so we will know what to provide and where to get it

- *Strategy And Business Assessment*

As Retailer X belonged to their global group, a road map for digital transformation and AI implementation had already been designed globally. However, the implementation of it to country level, in this case Indonesia, determined by local strategy focus. This was where the gap lied. Discussion with the SME resulted in categorizing current AI implementation in business and strategy in the '*Followers*' state of readiness which was another indicator of the preparation that was below average. Retailer X started data management related to commercial with the purpose of endorsing fact-based negotiation when dealing with their business partners, such as suppliers and vendors. For the time being this data was limited to sales offtake and supplier fund. The SME pointed out that commercial team was in the stage of assessing and completing the necessary data, before moving forward to cleaning process and data cube formation. All the information related to commercial was stored in business database.

The point of AI was automatic algorithm that runs on the existing behavior. That automatic part is what we haven't done. But we have taken the first step by organizing and managing the existing data

The missing automation process led to manual interference to analysis. An example of this manual interference was adjustment of sales pattern for seasonality (for example : sales during Idul Fitri and Chinese New Year). Had AI been implemented fully, such adjustment would have been an automatic output based on historical pattern and resulted in suggested sales and order forecast. Well-calculated sales and order would help business in delivering both bottom line and topline financial figure more effectively. In general, Retailer X already had general description of what they wanted with AI, but infrastructure and detail implementation to move towards the goal was not in place yet.

Usage of data as key behavior to endorse AI adoption was highlighted to be improved. According to the SMEs, several business cases occurred when decision could have been better if proper use of data and analysis existed. Access to the data was not easy to get. This was because, related to the assessment of data element, the current data warehouse was not integrated. For commercial use that required cross types of data analysis, the disintegration rose as a problem. Analysis might produce loop hole leading to incomplete insight. Data integration then addressed as the priority for AI implementation process.

Business also suggested that AI implementation was firstly for operational end instead of the customer value proposition. Negotiation, stock management and man power allocation was listed as area of operational that was potential to be supported by AI. As explained above, negotiation with suppliers and vendors had moved toward fact-based methods whose future development would involve cross business unit and function analysis. Stock management related to effective and efficient order, delivery, storage and replenishment would lead to result of optimum inventory to avoid lost sales opportunity and over stock supply. Man power allocation would produce work roster balancing store traffic with store staffs, for example. This idea, however, needed to consider labor regulation. Overall, the back end process of the business was considered to be more feasible to adopt AI.

The adoption of AI for customer value proposition evolved around personalized offer and communication. It became a challenge for Retailer X, as well as other brick-and-mortar grocery retailers, since physical outlets were not designed to serve particular segment of customers. Especially for Retailer X whose target

market was wide from all segments. Agility, as the one of the key offering of AI, was not at their best value as physical stores could not keep up with the change or adjustment of their elements (price, promotion, product assortment, for example) fast enough to align with AI. The use of AI for customer value proposition then would only be possible to be done through online platform.

"Challenge of AI adoption for customer side of the business only happened physical outlet. It should not be the case for our online sales platform. In online, it is possible to do personalization in offer, communication, product placement and even design

The momentum for Retailer X for AI adoption on customer side opened with the launch of their online sales platform and digital membership application. Data acquisition was done through those digital channels, accommodating source for big data analysis and machine learning. Combining this with initiative from data team to migrate to data lake would assumingly elevate the data analytic ability.

Similar to data and technology assessment, business also admitted the need for strategy direction for firmer AI implementation. Direction defined focus of investment to be made, whether it is infrastructure, human resource, or others. In relation to the business model, the SME admitted that selecting priority and focus in the company strategy, including AI implementation, needed to consider the financial impact to the business. Retailer X, as presumably other retailers as well, was a business ran on a modest margin. This made initiative or project that affected their topline sales would be put on a higher priority. However, this model also opened up opportunity to efficiency to lower the cost on supply chain process to generate higher profit and maintained affordable offering to their customer.

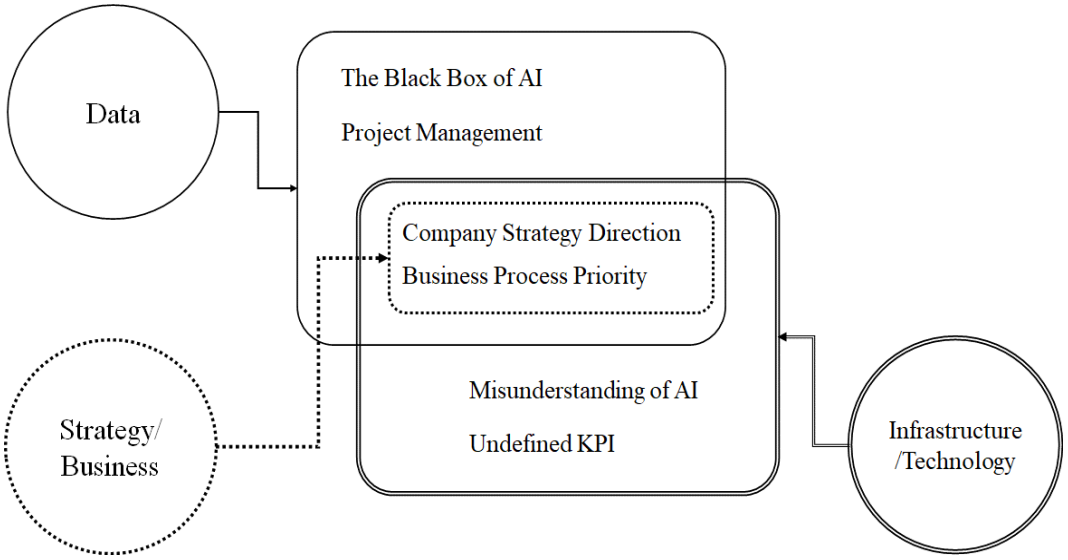
We have a lot agenda in our strategy, it is about prioritization. We had to choose which will make bigger impact to the company performance. That includes what AI should be implemented to the business process
We need business transformation, not only digital transformation, in order to embrace the adoption of AI to business process

- *Assessment Highlights*

The assessment highlighted notes of concern from each elements regarding the future of AI implementation for Retailer X. Data side addressed the issue of

clarity or transparency in AI processing, the urgency of consolidated data team management and direction as well as priority from the company in adoption process of AI. Almost similar with the data side, technology or infrastructure side claimed their readiness would be driven by the common understanding of AI capability in relation to business process requirement. There also had to be an agreed key performance indicator to measure the success rate of any AI adoption. The direction from company was considered the foremost factor to enable the implementation. The business side stressed on direction and selecting focus for business process as the drivers of willingness to invest in AI implementation. Hence, all notes met on two mutual concerns, which were company strategy direction and business process priority, as described in Figure 4.11

Figure 4.11 Assessment Notes Mapping



Note. Source from author

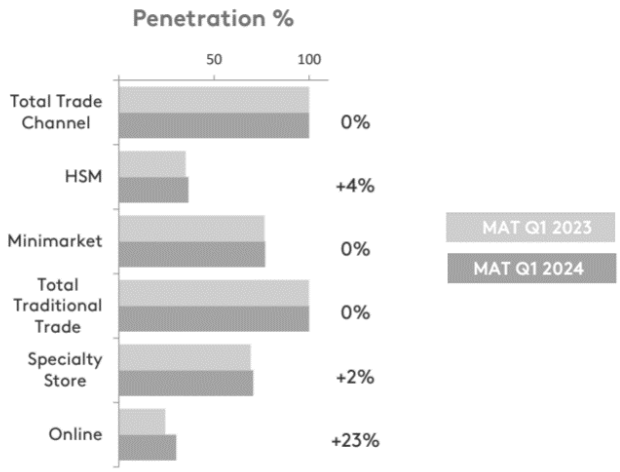
4.4 Scenario Planning Using TAIDA Frame Work

- *Tracking*

The focal concern for this study was AI implementation in retailer business in Indonesia. Porter's Five Forces, PESTLE and AI Readiness assignment had been done as described in the previous parts. As a summary of those analysis, there were notable trends to be explored.

Grocery retailer was an industry in which a large number competitors were in. These large number of players, in general, serve similar market. One or two retailers might position themselves differently in terms of target customer, but their revenue was still mostly generated from similar fast moving consumer goods products. This fact created wide channel repertoire for customer. One customer could have several kinds of outlets to visit and they will find similar. The wide repertoire was explained in Figure 4.12 from Kantar Indonesia. It shows percentage of households in Indonesia ever visited the respective retail channel, also named penetration. From the figure, most visited outlet is traditional trade, followed by mini market and then HSM (Hyper and Super Market) channel. This means that a household will be exposed to more than one channel of retail, hence the repertoire.

Figure 4.12 Household Penetration To Grocery Retail Channel

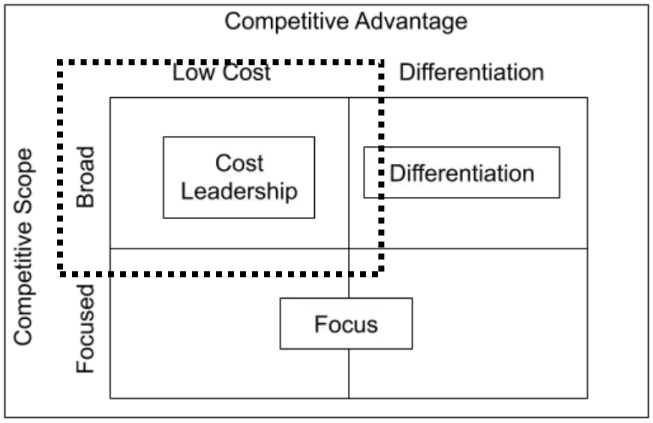


Note. (Kantar Indonesia, 2024)

The wide repertoire triggered price sensitivity of the customers. The access to compare prices amongst outlets led to a strong bargaining power from the customer. Grocery retailer was forced to maintain their price at competitive level in order to win the customer basket. In the end, it led to tight margin for the retailer.

In competitive strategy, this condition put grocery retailer into cost leadership position. As described in Figure 4.13, cost leadership strategy applied when an industry serves wide market and compete for affordability.

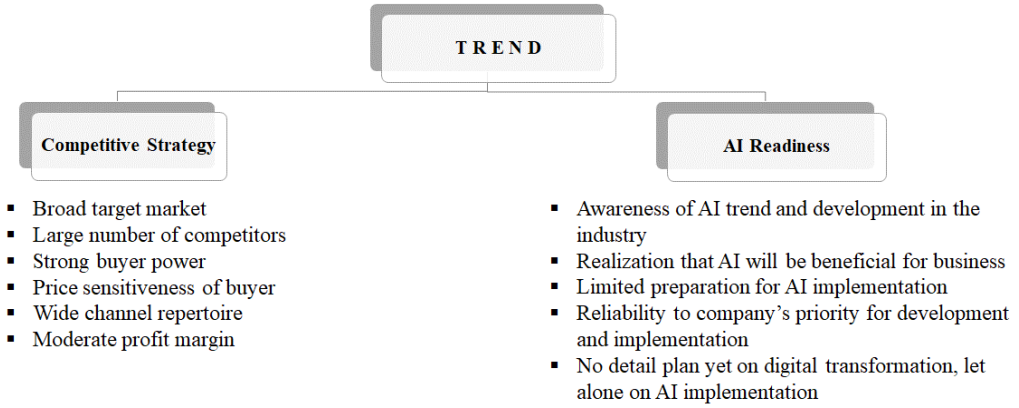
Figure 4.13 Porter's Three Generic Competitive Strategy



Note. Adapted from Porter 1980

The AI readiness assessment indicated awareness of AI trend development in industry. The benefit of AI to the business was also acknowledged and seen as the road to grow for the business. What considered was missing seemed to be detail plan and focus priority in AI specifically and digital transformation generally. Priority set was considered to be the driver for strategic planning of AI implementation. Overall, Retailer X was at the level where preparation for AI implementation was limited. Albeit, the momentum for them existed in the implementation of digitalization through their online shopping and loyalty platform. The urge to balance what was unable to do in brick-and-mortar store into the digital shopping experience was the driver for future endorsement for AI implementation.

Figure 4.14 Trend Tracking



Note. Source from author

- *Analyzing*

Combining all Porter's five forces, PESTLE and AI Readiness Assessment, the listed trend in Tracking step was categorized into two groups. There were factors supporting the implementation of AI and there were those hindering it. The realization of the benefit to the business process across subject matters was the strongest supporting factor affecting the willingness to implement AI. Grocery retailer being run on a moderate to low level margin of profit encapsulated the need to increase efficiency in business process. Support was also shown in the willingness to invest in AI infrastructure and resource needed, entailed with solid business case.

On the other hand, the hindrance factor was the missing priority in the general strategy of the company. Business had realized the importance of data in understanding their customers, but the utilization of them was still limited. Integration and transformation from legacy system to the new digital was needed as the enabler for further exploration of AI technology to be implemented. The current condition led to initiative being run independently by each business unit. To each their progress and milestone, indicator of whether or not the initiative served the adequate support for business was not measured yet.

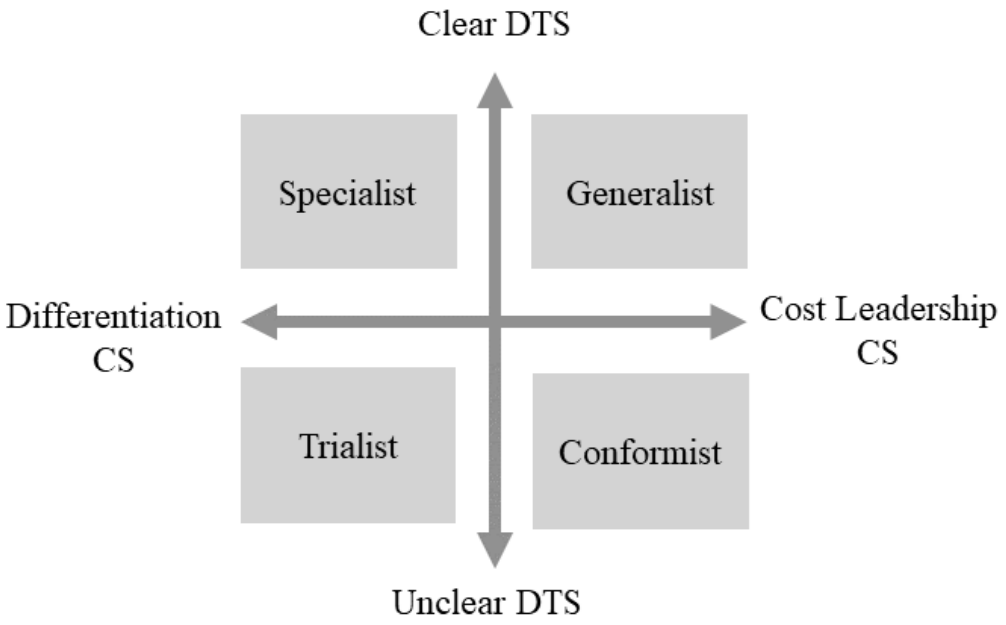
The trend tracking emerged two driving forces regarding the focal concern on AI implementation. They were the competitive strategy of the company and the digital transformation strategy. As the two driving forces were both strategies, it indicated that the company, or even the industry, was still at the beginning stage of implementation. Competitive strategy was put as the force because how business positioned them selves in the market was related to how they treated initiative towards the business process. Porter defined three generic competitive strategies, which were cost leadership, differentiation and focus, as explained in literature review in Chapter 2. With cost leadership, the company served large market and was after cost efficiency in order to maintain affordability in offering to customer. This strategy required business to be scalable as profit margin was lower. Topline revenue was be pushed to generate profit for the business. While in differentiation, they seek strong position within segmented target market who was not cost-

oriented type of customer. Brand loyalty was likely to be high, at the expense of smaller customer base.

The existence of digital transformation strategy was another key force for AI implementation. As observed and confirmed by the interview, it was the missing starting point for Retailer X to move further with the AI implementation. While awareness was good as a trigger, it took an aligned digital transformation strategy to put a focus on AI in the business.

Combining the competitive strategy (CS) and digital transformation strategy (DTS), a matrix of scenario was conducted as in Figure 4.15

Figure 4.15 Matrix Of Scenario



Note. Source from author

There were four plausible scenarios generated by the forces :

1. *Generalist* : this scenario was plausible when business took their competitive strategy to be cost leadership and the digital transformation strategy was clear on the requirements and road map
2. *Specialist* : the digital transformation strategy was also designed comprehensively and business targeted specific market only

3. *Trialist* : this was plausible when business targeted at specific market despite the lack of detailed in digital transformation strategy

4. *Conformist* : the business served wide market with no digital transformation strategy in place

- *Imaging*

The four scenarios would create each own plausible action and condition when occurred. Imaging was the third process in scenario planning when future consequences was projected as the result of scenario implementation

1. Generalist Scenario

The Generalist scenario took place when the company set their competitive strategy as the cost leadership. They served wide target market for the scalable business to maintain affordable offer. Margin would be low to moderate, hence the scalable business became necessary to generate profit. The wide target market enabled the company to provide assortment that would meet the needs of all segments of their customers. They needed to ensure that the customer filled up the basket in their store. In relation to AI implementation, this would open the opportunity to use AI to support both the operational and the customer value proposition sides of a retailer. This would only be possible when digital transformation strategy was already clear with AI included in the proposition. Top management would define the goal of the implementation and mutual Key Performance Indicator would be shared among business units involved to ensure the alignment. There would be a need for special team to lead the initiative, supported by the top management.

2. Specialist Scenario

Specialist scenario would have the similar level of clarity in digital transformation strategy as in the Generalist. The difference lied in the target market, as the Specialist would focus the business for specific target market. For AI implementation, this would lead to targeted marketing or personalized offer. The customer value proposition would be the focus. Targeted customer would receive

personalized communication and offer related to their historical behavior. Machine learning who studied shopping pattern of customers should be the first to develop, as it would define the model to predict upcoming purchase pattern.

3. Trialist Scenario

Trialist scenario had similar mission with Specialist in a sense that it would serve specific target market. However, the missing clarity in digital transformation strategy would make machine learning and other form of AI were not able to support this targeted offer with the right reading and prediction of behavior. The data was already there, but the integration was still behind and hence hindered the qualified seeding for machine learning process. The segmentation could still be run, however it would be minimum data driven. Eventually, segmentation might work from series of trial and error done, which lead to inefficiency in time and resource. Despite the inefficiency, this strategy could trigger the urgency of AI implementation in digital transformation strategy. Therefore, this could be the stepping stone taken.

4. Conformist Strategy

Conformist strategy shared the missing clarity in digital transformation strategy. AI implementation would not be the focus. For Retailer X and most of modern grocery retailers, this was status quo. They served wide market and AI implementation readiness was still at the low level. There was not a detail plan required for digital transformation. However, since the market was generic in needs and requirements, scalable business would still be able to achieve. In maintaining the affordable offer, retailer would keep the similar assortment at low price level with deep cut promotion being offered. This might drive low brand loyalty. Customer would easily choose the lowest price and switch stores if necessary. Data was collected but not yet analyzed for data-driven decision making. The missing detail plan of digital transformation strategy would lead to limited preparation in a sense of infrastructure, business and technology.

- *Deciding*

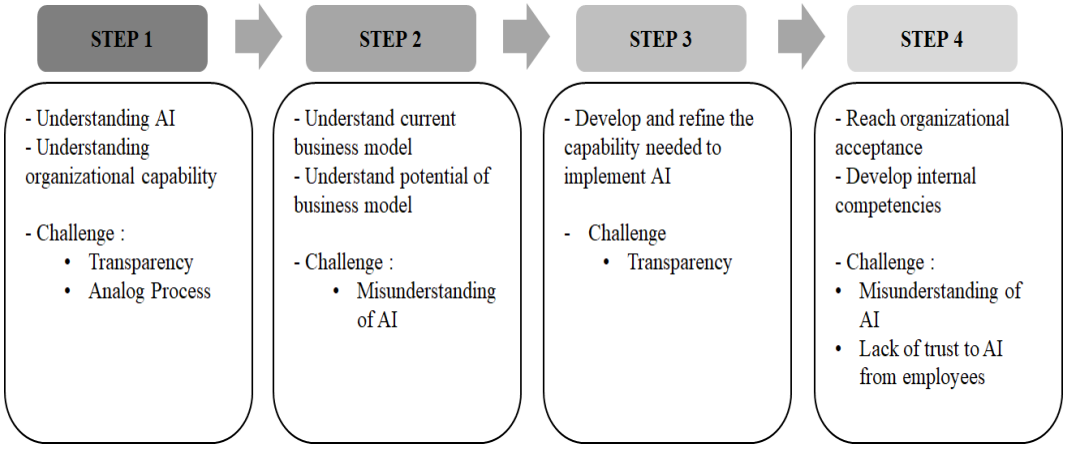
Generalist scenario was proposed to be chosen for AI implementation strategy in Retailer X. The current competitive strategy of cost leadership was maintained and the missing digital transformation strategy was to be improved for plausible future. Implication to having Generalist strategy had the effect on how the company operated their business. Direction from top management would be needed to formulate the road map of digital transformation.

Generalist scenario maintained the current wide target market. So while the business digitally transformed, the main business model would remain the same. The strategy maintained one driver while improved the other one. Having this scenario, it is expected that the change management would be more seamless.

- *Action*

The action part formulated road map plan for AI implementation for Generalist strategy. Considering the readiness condition of Retailer X which tend to be at the Followers state with limited preparation for AI implementation, the road map needed to cater preparation at the very early stage. (Reim, Astrom, & Eriksson, 2020) conveyed four stages of implementing AI to the business that started with understanding the fundamental of AI and the organization itself. The steps illustrated in Figure 4.16 When cross referenced to the assessment of Retailer X, the road map was suitable to serve for the guidance of AI implementation.

Figure 4.16 Road Map For Scenario



Note. Adapted from (Reim, Astrom, & Eriksson, 2020)

- *First Stage : Understand AI and Organizational Capabilities*

The first step of the road map initiated by having firm understanding of AI and the organizational capabilities. Conceptual framework of characteristic of AI and the listing of organizational capabilities was the expected deliverable that would define the following steps of the road map.

In order to gain common understanding of AI, possible challenges of transparency and analog process needed to be resolved. The issue with transparency usually related to the complexity of AI itself.. Multi-layer algorithm and inter-units modelling produced by AI would rise the issue of comprehensiveness. This was commonly addressed as the 'black-box' of AI, where everyone knew something was in it but yet only a few could understand it. It was also mentioned by the SME in readiness assessment. The understanding, including the conceptual flow of how AI worked, would minimize the transparency issue. Establishing the transparency was needed to gain trust from the enterprise in AI implementation.

As the key to AI and digital transformation was data acquisition, pre-condition for implementation would be converting analog process to digital. The challenge of analog process transition to digital was stated by SME in the in-depth interview, which also indicated the urgency of transparency. The current understanding of digitalization process was limited to switching from paper to electronic documentation. Transformation from legacy system to future digital ecosystem faced a challenge in which the trust to the new digital system was not fully commended. It was critical for users to agree on the new system in the whole digital transformation scope, so that parallel work with legacy system could be minimized.

Digital transformation is not a cheap word. It was not as simple as switching from paper to digital form. It was about acquiring the data in the right systematical way and we need to agree on that new system. Otherwise, users would not want to move on from the legacy system

Having said those, the initial step of the road map required top management direction to be pursued. Understanding of AI concept and organizational

capabilities had to be common platform of the top leaders of the company. Failure to do so would risk the cascading of strategy to operational stage. It was aligned with the function of leadership in digital transformation as described in (McKinsey & Company, 2023) that top management (CEO and the board of directors) needed to ensure alignment, commitment and accountability in digital transformation as it required large scale and coordinated investments. This would also open the opportunity to collaborate with experts on AI and digital transformation in assessing the readiness and setting the common ground.

Analog process related to digital transformation as the prerequisite of AI implementation, which required massive amount of data for system learning. The data fed to AI then had to be structured as digital contents. Data management needed to be traced back to the point of collection. Then followed the storing, cleansing, processing and transforming. AI would be able to create and learn from model when the feeding was qualified. Otherwise, a condition of *garbage in-garbage out* would likely to happen. For Retailer X, the conversion of analog to digital process had been applied to several business process. However, the dependency and preference towards legacy system would need to be resolved.

According to (Weber, Engert, Schaffer, Weking, & Krcmar, 2023), four organizational capabilities were needed to facilitate AI implementation, those were AI Project Planning, Co-Development of AI systems, Data Management, and AI Model Lifecycle Management. Each capability can be explained by its manifestations, as in Figure 4.17 in organizational practice. Overall, there was consensus among that AI is a broad field that encompasses many different techniques.

Table 4.4 Organizational Capabilities for AI Implementation and Manifestation in Practice

Organizational Capability	Manifestation in Practive
AI Project Planning :	
The ability to identify, evaluate and prioritize suitable AI use cases	Developing an understanding of AI
	Systematically identifying AI use cases
	Assessing and prioritizing AI use cases
Co-Development of AI Systems :	
The ability to communicate with and integrate stakeholders into AI implementation	Integrating diverse expertise
	Translating AI models to business function
	Considering the workforce in AI implementation
Data Management :	
The ability to collect, curate and provide data for AI implementation	Making AI-relevant data available
	Collecting data for AI implementation
	Curating data for AI implementation
AI Model Lifecycle Management :	
The ability to orchestrate the evolution of AI models, including development, deployment, and maintenance	Orchestrating itirative development procedure
	Deploying AI models to multiple context
	Operating AI systems in productive use

Note. Adopted from (Weber, Engert, Schaffer, Weking, & Krcmar, 2023)

As data storage initiative had already been initiated in Retailer X, the process could also be in this stage of the road map. Again, the challenge, as observed by author, was the transition from legacy data system. Data architecture must be priority to be built in getting the readiness for AI implementation. Relating this to organizational capability, there was three approaches which Retailer X could choose in building the data architecture as explained in (AI Infrastructure Alliance, 2022) :

1. To build their own ; where a company built their own AI infrastructure from scratch, like what Google, Tesla and other AI pioneers did at their early times. This approach was not recommended as it highly complex and prone to failure

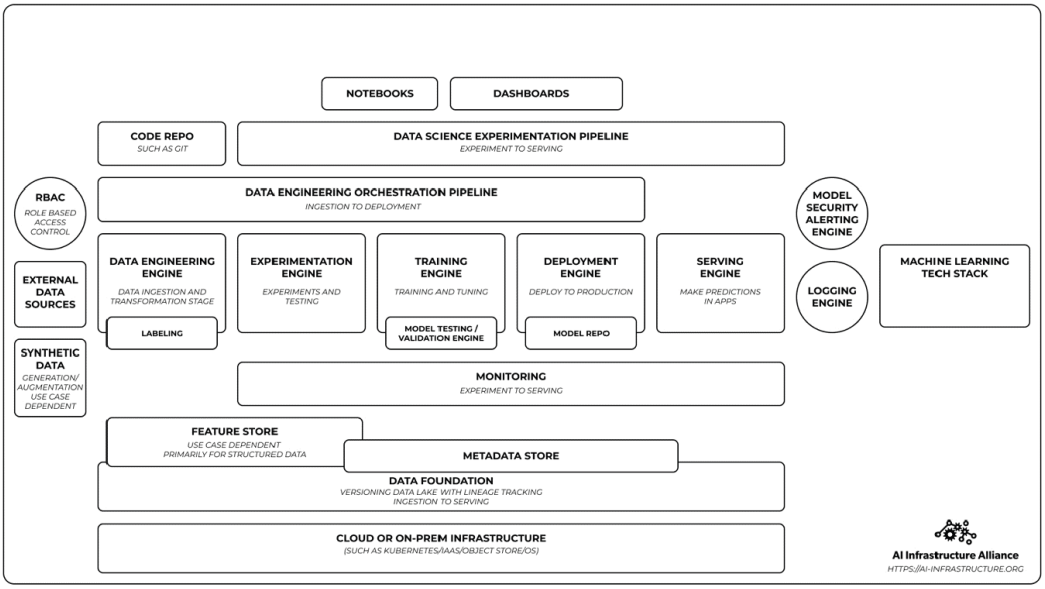
2. To buy an end-to-end ; where a company purchased a single, unified and end-to-end AI platforms to serve all the machine learning and analytics need. This approach required an extensive knowledge from the platform provider on every aspect of AI. This approach was also not recommended,

as with the current stage of AI development, it was doubted that there was a single platform who mastered an end-to-end process

3. Best of breed ; where a company took modular approach to create AI stacks. This approach enabled the company to seek and evaluate leaders in each capability category.

An example of blueprint and landscape of capability breakdown needed to be considered when designing the architecture of AI was described in Figure 4.

Figure 4.17 Blueprint Of Capability



Note. (AI Infrastructure Alliance, 2022)

Current infrastructure for Retailer X consisted both on-prem and cloud, with the first was dominantly used by legacy system and the later was for their digital infrastructure. AI implementation required large capacity of storage and computer, which was the benefit of cloud. Since the rest of the blue print had not yet been designed, it was suggested for Retailer X to go ‘Best Of Breed’ and purchased the platform for infrastructure and data foundation first.

- *Second Stage : Understanding Current Business Model, Potential Business Model and Business Ecosystem Role*

As explained in the literature review, business model of retailer consisted of two intertwined dimensions, which was the operation and customer value proposition. The business model described a cycle of supply chain process from acquiring the resources for good to offering the good to customers. Understanding of business model helped in prioritizing the focus of AI implementation and later to be included in digital transformation process. The previous step explained that business model of Retailer X used cost leadership as competitive strategy. It led to wide target market to serve and scalable business to generate revenue and profit. Common statements from in-depth interview of all subject matter experts highlighted that the operation process should be the first target of AI implementation than the customer value proposition. The reason was due to feasibility and authority in the operation than the later one. On the business side, the competitive strategy that fell within cost leadership also strengthened the cause for improving operational model first. As cost leadership leaned toward cost efficiency in order to gain business profit, the implementation of AI to the process was considered to be more controllable.

Challenge in the second step, as summarized by (Reim, Astrom, & Eriksson, 2020), was the likeliness of misunderstanding of AI. This challenge could emerge when the previous step of understanding the concept of AI was not properly constructed. On this second step, Retailer X also needed to understand its role in the business ecosystem as a direct value creation. Understanding the role should indirectly open opportunity to consult outside party or experts in the digital transformation process. Example taken would be professional consultant on digitization strategy or suppliers. The ideal would be building capabilities internally, but focusing on value creation as core skill and delegates expert tasks to professional party was a feasible and reasonable option to be put in the grand strategy.

- *Third Stage : Develop and Refine Capabilities to implement AI*

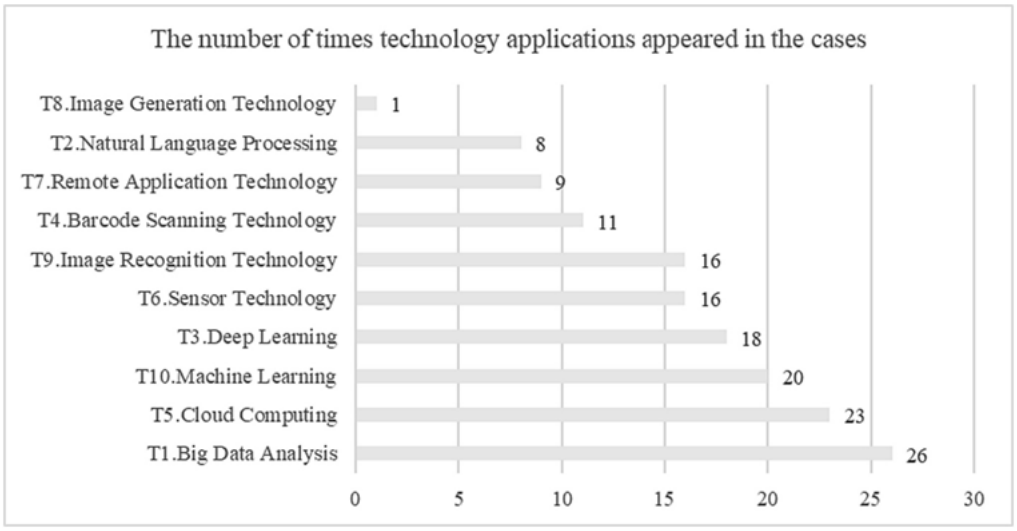
Third stage focused on the development of the relevant capabilities. The umbrella capabilities were like what was addressed in Cisco's AI readiness assessment : strategy, data and infrastructure, culture, and security. These capabilities along with their assembly, would be the standard when evaluating implementation process. Technology became the highlight in this stage, since digital transformation strategy were started to be applied. When road map reached this stage, technology should create its own road map for AI adoption. As data and infrastructure were moving towards the data lake, Retailer X was on the right starting point for technology. The hindrance came from the data collection and architecture. The critical step before migration to cloud was to have proper design of data architecture. The most proper method to do this was by designing it from zero, along with governance, flow and sequence of data processing from raw to structured. Challenge would rise from historical data, which needed to be maintained for business purpose but not all could be tracked back to the source to be included in the migration.

The usage of technology in AI implementation for retailers have been varied according to the maturity of the enterprise. (Hsi-Peng, Hsiang-Ling, Jen-Chuen, & Chiao-Shan, 2023) listed the service and technology, in order of most frequently used, listed in Figure 4. Big data analysis, cloud computing and machine learning was the most common technology to be adopted in retail industry in implementing AI.

For Retailer X, this finding should be the base when selecting focus for their AI implementation. Big data analysis had started to be implemented, despite the incomplete direction of digital transformation strategy. The momentum of digital loyalty member enabled Retailer X to collect data on their customer behavior to be used in predicting the trend. The establishment of data science role was part of setting up the big data analysis process. Aligning this with the previous stage in the road map, big data analysis could put the first focus in optimizing the operational model, for instance the ordering system and stock management. Options were to build their own or to buy a ready to use platform. In order to focus on the role as

value creation, it was more recommended to purchase a platform and benefit from the used case, instead of building it on their own.

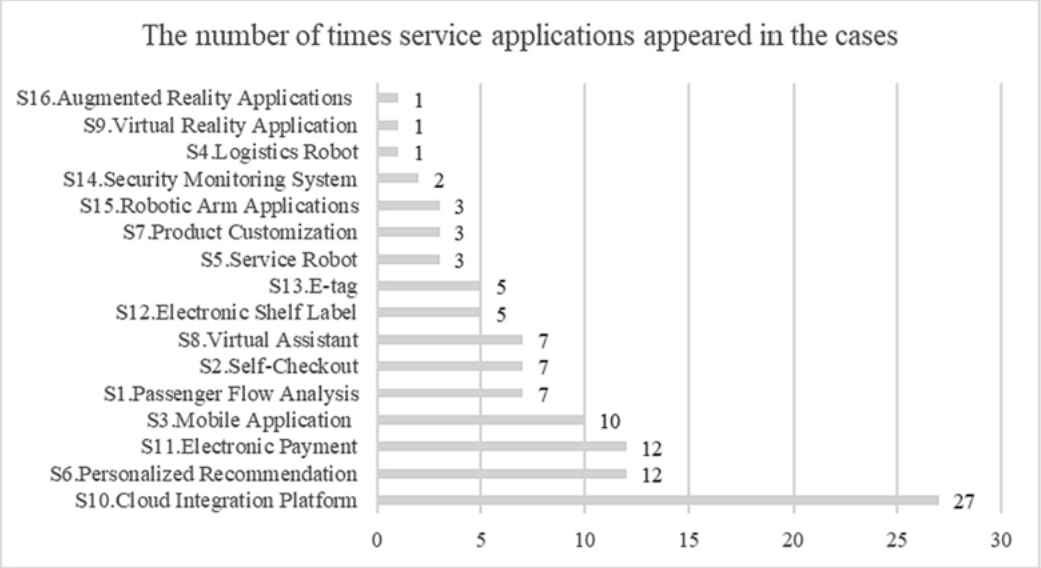
Figure 4.18 Most Used AI Technology in Retailer



Note. (Hsi-Peng, Hsiang-Ling, Jen-Chuen, & Chiao-Shan, 2023)

Still from (Hsi-Peng, Hsiang-Ling, Jen-Chuen, & Chiao-Shan, 2023), in addition to the technology, the service application mostly used in retailer turned out to be cloud integration platform. This was aligned with Retailer X's initiative of moving to data lake management. The table also implied that personalized recommendation was not the necessary service to be after by retailer in AI implementation. As it actually became the current development focus in Retailer X, it was recommended to switch focus to data integration first.

Figure 4.19 Service Application Most Used in Retailer



Note. (Hsi-Peng, Hsiang-Ling, Jen-Chuen, & Chiao-Shan, 2023)

- *Fourth Stage : Reach Organizational Acceptance and Develop Internal Competencies*

Acceptance of AI integration to business process would determine whether or not an organization managed to have seamless transformation of business process. The stages required to reach acceptance had to involve proven track record of implementation. Acceptance needed evidence of the project being conducted and delivered what it promised. Pilot project was recommended as the first step to convey the message. It should be conducted with an agreed key performance indicator amongst the stake holder involved. In bringing the project to live, the team had to deploy an MVP (Minimum Viable Product) range. (Gartner, n.d.) defined MVP as the release of a new product (or a major new feature) that is used to validate customer needs and demands prior to developing a more fully featured product. To reduce development time and effort, an MVP includes only the minimum capabilities required to be a viable customer solution. The purpose of MVP in pilot project, in addition to time efficiency, was to have validated learning base that would endorse feedback loop for the project. In the case of Retailer X, it was suggested that the pilot to be done in the operation model to align with the feasibility

purpose. With proof record from pilot project, the risk of resistance to AI would be mitigated and the broader training would be able to conduct.

The pilot result would lead to the need of having AI formation team on board. This team consisted of both business and technical experts, to overview the implementation and pilot project of AI. Suggestion for Retailer X was to involve IT team, data analyst team, and business team. Align with the concern from SME, it was possible that in order to develop internal competency, establishment of the position of Chief Data Officer and the team became a necessity to ensure sustainable improvement of data management. The team needed to report directly to the President Director to maintain their neutrality and, at the same time, was able to coordinate business units for the development of AI.

CHAPTER 5 : CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The initial objective of this study was :

- To assess the retailer industry readiness for AI implementation from several business aspect
- To analyze scenario for AI implementation within the defined measurement
- To create road map for artificial intelligence as part of digital transformation for retailer

Study concluded a limited preparation level, scenario aiming at strategy clarity and road map started with conceptual understanding as the result.

By using Retailer X as case study, findings from the analysis assessed that retailer industry was most probably be at Followers level from Cisco Readiness Assessment Index. This revealed the limited preparation in terms of infrastructure, data management and business direction to adopt AI to the business. Strategy direction, top management involvement and business priority were the major drivers needed for the industry to catch up and accelerate the preparation.

Scenario was designed under digital transformation and competitive strategy which emerged as driving force in scenario planning. Considering the business model and expectation towards clarity on digital transformation strategy, AI implementation scenario must be manageable enough to allow business to transform gradually, but at the same time keeping up with the agile development of data as the result of digitalization. Therefore, from the listed scenarios, the one where competitive strategy remained as it is to be cost leadership, would balance the rapid change coming from digital transformation. However, the remaining scenarios which offered alternative of segmented target market is possible to be developed as the next advancement when AI infrastructure has taken more proper place in the company business processes. It is also important to review and focus on business process to select priority of AI deployment. Since there will be investment involved, the effect to financial would normally be the consideration

factor to set the priority. Business unit then needs to build strong used case in order to analyze the impact of AI to the company performance.

Following the result of the analysis, road map designed for AI implementation in Retailer X amplified the weight on the conceptual framework and capability understanding. It required top down direction from the high level management to align the vision and mission of AI adoption to the business. The absence of direction is possible to rise uncertainty to transformation, which later on might trigger the lack of trust from employees. Once the conceptual framework was instilled, more specific road map for technology and data management could be designed by setting the benchmark to current market condition.

5.2 Theoretical Implication

AI development accelerates exponentially since the launch of generative AI. While this marked a strong momentum and rose excitement both in technology and service, it might limit the understanding to AI to generative type only. Previous studies conducted discussed about the advance technology to support AI development. However, there were only a few discussing the implementation to an industry with almost zero preparation. This study enriched the research of AI implementation with real case study, so that future research could use it as a reference. Coverage wise, research that cover Indonesia and grocery retailer are still limited, compare to those for hospitality or financial industries. Thus, this study contributes to future discussion about AI implementation in Indonesia.

5.3 Practical Implication

Grocery retailer is still a conventional business of trading relied on their brick-and-mortar stores. Hence, technology implementation might take a step back further when compare to other industries. In Indonesia, this step also needed to consider limitation such as internet penetration and the speed of computing. This study served as guideline for brick-and-mortar retailer in Indonesia to start their AI implementation from ground zero. Specifically for Retailer X, the result of this study might help them to :

- rise the awareness of being behind in AI adoption journey when compare to other industries
- point out and communicate the barrier of AI implementation
- put priority on optimizing the back end of the business to reach operational excellence according to the road map
- elaborate the possibility to have new stream of revenue by incorporating AI analysis that would give benefit for their business partner

5.4 Limitation of The Study and Recommendation for Future Study

Despite Retailer X being one of the most prominent players in modern grocery retailer and hence representing the condition of the industry, the result of this study has the tendency to be biased to them. The study rises initial condition of AI readiness in the industry, so further validation from similar enterprise would enrich the insight. In-depth interview conducted was limited to top managerial and board of director level, which might limit the opinion and observation for the practical side of the implementation plan. Due to time and policy limitation, this study limited itself to technical and commercial part of the business, while actually some key factors, such as regulation and talent resource, might also generate findings related to digital transformation ecosystem.

Recommendation for future study was given to gain vertical and horizontal insight. For vertical insight for Retailer X, it is recommended to validate the findings by conducting another study with quantitative approach to measure the employee acceptance, capability and expectation towards AI implementation in their job scope. The quantitative study shall be conducted across employee levels to seek any difference in scale of acceptance, expectation and knowledge from one level to another. Having the detail result would help Retailer X in pinpointing the focus of learning for specific level and/or department.

For wider scope of study, it is recommended to conduct case study with another grocery retailer to have comparison on the situation and validate the industry current existence towards AI development. It is also recommended to cover different type of brick-and-mortar retailer (non grocery) to have external reference. Fashion or home appliances retailer could be the case. They have similar

business model but have been riding the wave of digital transformation earlier than the grocery retailer. It could be a good used case for AI implementation.

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APPENDIX 1 – INTERVIEW GUIDELINE

1. Describing Cisco AI Readiness Assessment
    - Awareness of global readiness
    - Awareness of Indonesia readiness
    - The pillars of assessment

2. Assessment of the current AI readiness
    - The level of readiness
    - Elaboration on the assessed level
    - What has been done

3. AI Implementation Process
    - Challenge for implementation
    - Potential business process to be implemented
    - Current iniatiative to support the implementation

4. Key Enablers For Implementation
    - Existing supporting factors
    - Missing factors for implementation