(RESEARCH ARTICLE)

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Strategy of use Artificial Intelligence for optimization and stability cake business seasonal "Case study on small-medium scale model BR company"

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Abstract

Artificial Intelligent (AI) is the solution to problem. The objective of this research to identify SWOT factors to recommend the right type of AI to use. The method used descriptive qualitative, with SWOT analysis technique. The results showed that the strengths and opportunities of AI was digitization and wide market reach, analyzing a lot of data, cutting workflows, saving operational costs, optimizing stock and prices, helping employees work and improving services. Weaknesses and disadvantages are large costs and low human resource capabilities. The strategy that can be used is aggressive (IFAS 0.78 and EFAS 1.27). The recommended AI type is Google Auto Machine Learning (Google AML).

Keywords: Artificial Intelligence (AI); Optimization; Stability; SWOT

1. Introduction

The food and beverage industry, including RB company, faces complex challenges in managing production and maintaining business stability. Fluctuating demand, limited human resources, operational efficiency, are factors that determine the success of the business (1). Spikes in orders during certain periods, such as holidays or other big days, are difficult to predict. Every year, RB company faces unstable demand in the conventional way. Production demand spikes 150 times during the holidays. This is due to the element of culture and tradition (2) which obliges consumers to buy this cake. This surge affects the balance in production, namely production being hampered, waste of raw materials and a decrease in product quality and customer satisfaction (3). (4) He also added that a surge in sales of a product will lead to uncertainty in demand and difficulties in efficient management of raw materials (5).

In the digital era, many culinary businesses are turning to Artifical Intelligence (AI) technology to face production challenges and business stability. The use of Artificial Intelligence (AI) can be an innovative solution to improve operational efficiency in the food industry. AI can help in various aspects such as more accurate demand prediction, production automation, and optimization of digital marketing strategies to increase business competitiveness (6). One example is Mondelez International, which leverages AI to accelerate the development of new recipes and optimize production. Mondelez uses machine learning to create recipes based on certain characteristics such as aroma, flavor and appearance with consideration of cost, environmental impact and nutritional value. This approach has reduced the trial and error process, allowing new products to reach production four to five times faster (7); (8). Another example in research (9) uses machine learning algorithms to find various traditional and modern cooking recipes according to consumer desires in Banda Aceh. This is used by restaurant operators to streamline ingredients and optimize production time. If there is a spike in orders, businesses do not need a long time to find recipes and ingredients so that the products are produced on time with stable product quality.

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The use of AI in RB company is a challenge because RB company is a micro business that has not used technology in its production operations. Therefore, it is necessary to strategize how AI can help RB company in planning production, stock and distribution, and increasing customer satisfaction. The objective of this study is to identify the factors (strengths, weaknesses, opportunities and threats) of using AI and recommend the right AI for RB company to use as a micro business in optimizing production and maintaining business stability, especially in the face of seasonal order spikes. Through this research, it is hoped that effective strategies can be found in the application of AI technology to improve the competitiveness and efficiency of the seasonal cake business, as well as provide insight for other culinary industry players in adopting modern technology to support their business growth.

2. Methods

The research was conducted at one of small-medium scale company in Palembang, it names RB company with a qualitative method of case study type (10). This research is descriptive and generally explains and analyzes phenomena, events, dynamics, social, attitudes, beliefs, perceptions of a person or group (11). (12) added that the research was conducted in depth on programs, events, processes, activities, and was observing a case. Research begins with making observations, formulating problems, collecting data by identifying internal and external factors, analyzing IFAS and EFAS, preparing strategies and conclusions. The data used in this research are primary and secondary data. Primary data was triangulated through participatory observation, deep interviews with the owner and staff of RB company, and documentation

Secondary data was collected through literature study, observation and documentation (13). The data was then analyzed using the Spardley and Miles model which includes three stages: description, reduction and selection (14), selection results followed by SWOT. SWOT analysis is conducted by comparing external factors (opportunities and threats) with internal factors (strengths and weaknesses) to develop strategies. SWOT is done through 3 stages (15) :

2.1. Entry stage

Identify internal (strengths and weaknesses) and external (opportunities and threats) factors, then put them into the IFAS (Internal Factor Analysis Summary) and EFAS (External Factor Analysis Summary) matrices (16). The strengths referred to in this study are the potential or advantages possessed by AI as an optimization tool, while weaknesses are the unfavorable things that AI has. The opportunities referred to are all opportunities for AI to be used, and threats are things that bring losses if AI is used.

Next, the weighting of each factor is carried out. The weighting is done by asking questions using paired comparison. Weighting is done based on how important the factor is to the strategic factor, the weight is 0.00 (not important) - 1.00 (very important) (17). The next step is rating, and multiplying the weight and rating. Rating is done on a scale of 1 (poor) - 4 (excellent). The rating shows the influence on the factor (18).

2.2. Matching stage

Matching internal and external factors through the total score of internal and external factors into a cartesian diagram, with 3 main strategies of grow and build, hold and maintain and harvest-devest. The cartesian diagram was developed by the General Electric model (GE-Model). The horizontal axis of the IE matrix shows the total IFAS score, and the vertical axis shows the EFAS score (18)

Strategy development stage with SWOT matrix

Strategy determination is based on logic to maximize strengths and opportunities, and minimize weaknesses and threats. This is done by compiling SO, WO, ST and WT. After the strategy is determined, AI is designed into the optimization system according to the strategy obtained.

3. Results

Based on observations and interviews, internal and external factors were obtained (Table 1 and Table 2).

Table 1 Identification of internal factors (strengths and weaknesses)

Variable	*Stregth*	*Weakness*
Attitude (A)	Has a wide reach	Large implementation costs
Usefull (U)	Analyzes a lot of data	Only able to process data where the data was taken before (common sense)
	Increases productivity	Data is not private (data security risks)
	Improves customer service	AI intelligence depends on the input data
	Saves operational costs	
Easy of use (E)	Trims workflow processes	Unable to analyze (no instinct)
	Able to solve complex problems	

Table 2 Identification of external factors (opportunities and threats)

Variable	Opportunity	Threat
Attitude (A)	Increased use of digital	Not everyone understands AI
		Dependence on technology
Usefull (U)	Can optimize stock	Prone to prediction errors
	Personalize customer experience	
	Provide accurate predictions	
Ease of use (E)	Assist employee performance	
	Optimize dynamic pricing	
	Production efficiency	

The results of the analysis of internal factors (strengths and weaknesses) (Table 3) and external factors (opportunities and threats) (Table 4) show that internal factors have a value of 0.78 (S>W) and internal factors have a value of 1.27 (O>T).

Table 3 Analysis of internal factors (strengths and weaknesses) of AI use

| Internal Factor Analysis		Weight	Rating	Score
(Strength)	Broad reach	0.04	4	0.17
	Analyze a lot of data	0.09	2	0.17
	Increase productivity	0.09	3	0.26
	Improve customer service	0.09	3	0.26
	Save operational costs	0.09	3	0.26
	Cut workflow processes	0.09	4	0.35
	Able to solve complex level problems	0.13	2	0.26
(Weakness)	Large implementation costs	0.13	4	0.52
	The data was taken before (common sense)	0.09	2	0.17
	Data is not private (data security risk)	0.09	1	0.09

	AI intelligence depends on the input data	0.09	2	0.17
Total		1,00		

Table 4 Analysis of external factors (opportunities and threats) of AI use

Internal Factor Analysis		Weight	Rating	Score
(Opportunity)	Increased digital usage	0.14	4	0.55
	Can optimize stock	0.09	3	0.27
	Personalize customer experience	0.14	4	0.55
	Provide accurate predictions	0.05	1	0.05
	Assist employee performance	0.09	2	0.18
	Optimize the application of dynamic pricing	0.09	1	0.09
	Production efficiency	0.14	1	0.14
(Threat)	Not everyone understands AI	0.14	3	0.41
	Dependence on technology	0.05	1	0.05
	Prone to prediction errors	0.09	1	0.09
Total		1.00		

Based on IFAS (0.78) and EFAS (1.27), the strategy of using AI is located in square I of the cartesian diagram (Figure 1).
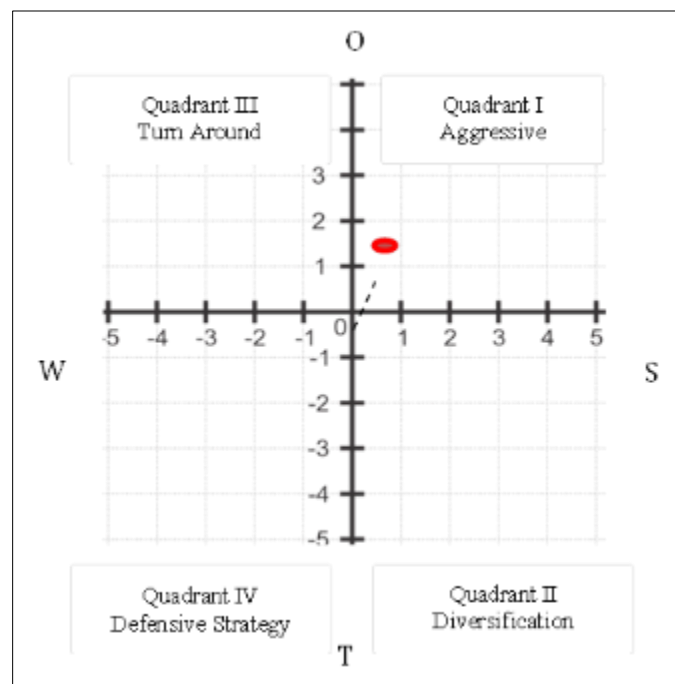
Figure 1 Cartesius SWOT diagram

Based on Figure 1, IFAS/ Internal Factor Analysis Summary (Strength) such as has a wide reach, analyzes a lot of data, increases productivity, improve customer service, save operational costs, cut down the workflow process, able to solve complex problems. EFAS/ External Factor Analysis Summary (Opportunity) such as increased digital usage, can optimize stock, personalize customer experience, provides accurate predictions, assist employee performance, optimize

the application of dynamic pricing, production efficiency. So the strategy was conducting trials on the use of AI in RB companie's business, selecting a type of AI that can provide usefulness and convenience in the selection of ingredients to sales. Usability in this case can be used for all business activities, and convenience includes operational ease and inexpensive prices.

4. Discussion

4.1. Identification of Internal and External Factors

The identification of internal and external factors on AI usage is based on the TAM model. The model developed by Fred Davis and Richard Warshaw in their research (19) that, in the use of technology there are several variables that are taken into consideration for an industry to use it. The first variable is a person's attitude towards technology (Attitude, A), perceived usefulness (Perceived Usefulness, U) and perceived ease-of-use (Perceived ease-of-use, E). Based on the TAM model (user attitude variables (A), usability (U) and convenience (E)), the use of artificial intelligence (AI) in RB companie's business has strengths and weaknesses (Table 1), and opportunities and threats (Table 2) including:

- **Attitude (A),** RB company is very concerned about the current technology. This is shown through one of its implementations in the use of social media. Social media is the mainstay for RB company to promote and order. RB company promotes through Instagram and Tiktok, where her followers reach 62.5 thousand (Instagram) and 4,364 thousand (Tiktok) with a total of 7,080 posts and 71.8 thousand likes.

The use of digital Instagram and Tiktok in promotion and ordering is seen as reaching not only local but also international markets at a low cost. However, for the use of other applications RB company has not used because the application is not yet known so it is considered expensive and doubtful in the ability to operate (20) said that a person's interest in using technology is influenced by perception. Perceptions of technology are built from two main constructs, namely perceived usefulness and perceived ease of use.

- **Perceived Usefulness (U),** Although the trust or perception of technology has not yet been established, RB company is confident that AI can help her in analyzing a lot of data, optimizing stock, increasing productivity, applying dynamic pricing, cutting workflow, saving operational costs, predicting production and improving service. (21) and (22) said that trust and confidence have different concepts. Trust is formed from evidence, experience, or reputation. Meanwhile, belief is formed from understanding without evidence. So in this case, RB company has a perception of belief, not trust. This perception is exacerbated by the weaknesses and threats that AI has, namely limited data and HR errors in reading technology.
- *Perceived Ease of Use* **(E),** The same perception occurs on technological convenience. Perceived convenience means that by utilizing a technology, everything can be done (23). RB company was only convinced and not yet believe that the use of AI in business operations could provide convenience in solving problems and streamlining production.

4.2. Internal-External Factor Analysis and strategy development

Based on the results of the factor analysis, IFAS (0.78) and EFAS (1.27), the strategy of using AI is located in square I of the Cartesian diagram (Figure 1). (13) said that the use of AI for optimization and stabilization of RB company business has the advantage of utilizing strengths and development opportunities. The strengths and opportunities of using AI in RB companie's business optimization are in the confidence that RB company has in the use of AI, so it is necessary to develop a strategy.

Some of the strategies formulated are conducting trials on the use of AI in RB companie's business and choosing the type of AI that can provide usability and convenience, both ease of operation and price (Figure 1). In general, AI can be classified into 3 types based on its function, namely Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI) and Artificial Super intelligence (ASI) (24). (25) and (24) states of the three types of AI, the simplest and easiest AI (27) is Artificial Narrow Intelligence (ANI). ANI is designed and trained for specialized tasks (28). (26) said some examples of ANI are Machine learning, Ethical AI and bias mitigation tools, Natural language Processing (NLP) Tools, Computer vision tools, Virtual assistant and Chatbot platforms, Recommender systems, Robotics and automation tools, Image recognition and object detection libraries, Speech recognition and synthesis, Data analysis and Visualization tools. Of these ten examples, the one that has the function to predict is Machine learning while others such as NLP to understand human language, Computer vision to recognize images/objects, RS to recommend products, Robotics for process automation, Speech recognition to generate voice, Data analysis to display graphs, and Chatbot to respond.

Machine learning (ML) is capable of predicting data sets to improve efficiency, make decisions and provide innovative solutions. However, building ML models requires specialized skills in various domains, including data processing, feature engineering, algorithms and performance evaluation. This process requires comprehensive time (29). (30); (31); (32) recommends a feature to apply machine learning that is cheap and easy is Google AutoML

5. Conclusion

Based on the results and discussion, it can be concluded that the strength factors and opportunities for AI to be used by RB company are digitalization and a wide market reach, can analyze a lot of data and be able to solve problems, can increase productivity, cut workflows, save operational costs, optimize stock and prices, help employee work and improve customer service. Weaknesses and shortcomings include large implementation costs, human resources that may not be able to operate it, and errors in reading predictions. Therefore, the recommended type of AI is AI with low-cost and easy-to-use criteria. AI that has cheap and easy-to-use criteria is Google Auto Machine Learning (Google AML).

Compliance with ethical standards

Disclosure of conflict of interest

The authors Melati Pratama, Gatot Priyanto, Daniel Saputra, Anny Yanuriati declare that have no conflict of interest to RB company.

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