Knowledge-Based Performance Management System: A Case Study of an Indonesian SME Bakery

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ABSTRACT*: **Introduction:** This is a case study on the development of a performance management system based on the Knowledge-Based Performance Management System (KBPMS). The subject company is a medium-sized enterprise (SME) producing freshly baked bakery products on a daily basis. This study aims to provide a baseline example in developing appropriate performance management system for SMEs, particularly those within the similar industry, size, and phase of business lifecycle as the subject company. **Methodology:** The development process for the PMS involves five stages: (1)Foundation and principles (partnership, empowerment, integration, and independence); (2)Background information (business area information); (3)Design process (vision, mission, strategy, performance variable, correlation, and benchmarking); (4)Implementation (measurement, evaluation, diagnosis, follow up action); and (5)Refreshment (review and continuous improvement). This study is limited to design process. **Result:** A set of performance indicator was established and grouped into three main perspectives of KBPMS: business result, internal process, and resource capability. In addition, an implementation plan was formulated to guide future actions. **Conclusion:** The development of a PMS in SME can facilitate objective, data-driven and timely decision-making. However, the framework outlined in this study is not a universal solution and must be tailored to the specific context and needs of each company.*

KEYWORDS - *Bakery, Food manufacturing, KBPMS Performance Management System, SME*

I. INTRODUCTION

Performance Management System (PMS) represents a vital aspect of business, integrating various strategic and operational elements to enhance overall organizational efficiency and effectiveness. At its core, PMS involves the application of methodologies, data analysis, processing, and reporting to monitor and manage performance, aligning various dimensions of the business with its organizational goals and strategies. To date, different framework and tools such as Malcolm Baldridge National Quality Awards established by the U.S. Congress in 1987 [1], The Balanced Scorecard [2], Performance Prism [3], Knowledge Based Performance Management System [4], and others have been introduced.

Indonesia has a growing presence to its neighbouring countries and the world. As the seventh-largest economy by purchasing power and a leader in ASEAN, Indonesia is rich with economic potential related to its large population and growing middle class [5]. Indonesia's economy is dominated by MSME (Micro, Small and Medium Enterprise). As the backbone of the economy, SMEs accounted for 64.2 million units as of March 2021 and contributed to more than 61% of Indonesia's GDP valuing 8,573.89 trillion Rupiah, while absorbing 97% of the country labour force [6].

In the midst of tight economic competition from local and international competitors, businesses – including SMEs, needs to remain competitive and agile. However, challenges remain high and implementation remains low for SME in implementing agile practice such as PMS [7]. This study aims to provide a baseline example of a performance management system for SMEs, specifically for food manufacturing firms in the growth phase of the business lifecycle.

II. LITERATURE REVIEW

2.1 Performance Management System in SME

Small and medium enterprise in indonesia is defined by net asset and annual sales as follows: (1) 50 to 500 million rupiah of net asset and 300 million to 2,5 billion rupiah of annual sales for small enterprise; and (2) 500 million to 50 billion rupiah net asset and 2,5 billion to 50 billion rupiah of annual sales for medium enterprise [8].

The literature recently show an increasing interest on the implementation of performance management system in SMEs. Generally, PMS allows business to monitor their performance real-time –facilitating quick,

data-driven decision making process. However, despite this significant advantage, the implementation of a PMS in SME remains challenging, due to several reasons [7,9,10]:

- SMEs are generally characterized by flat organization with centralized decision-making process. This means, decisions are often made by the owner or small number of senior leaderships in the business. The implementation of PMS requires involvement and collaboration from all business level, from top management down to the shopfloor personnel. Thus, organization restructuring and distribution of authority may be needed to facilitate agility in responding to daily challenges and opportunities. However, organization restructuring and distribution of authority may be a challenge for SME in terms of resources, trust and confidentiality of the business.
- Decisions are often made by intuition and experience rather than data-driven analysis. Moreover, problems and opportunity are often identified using lagging financial metrics, leading to missed window time for effective actions.
- SMEs often focuses on short-term goal for survival rather than long-term strategic planning. This is often related to financial and human resource limitation, as well as incorrect perception and understanding of the PMS. PMS are often viewed as unnecessary bureaucracy, resulting in resistance towards the idea of PMS implementation.

In the growth phase of business lifecycle, business often have a tendency to direct their attention towards operational and technological aspect, while neglecting organizational and managerial aspects [11]. Thus, as the business continue to grow and become more complex, the implementation of a PMS becomes critical in supporting strategic alignment, fostering sustainable growth, and ensuring long term success.

2.2 Knowledge Based Performance Management System (KBPMS)

First introduced in 2014, Knowledge Based performance Management System (KBPMS) is an established PMS developed by Dermawan Wibisono. KBPMS utilizes knowledge based approach for a better decision-making process with relevant data-driven information and insights [9]. KBPMS is developed in response to the needs of a more detailed and structured context, appropriate to the business environment of Indonesian companies.

KBPMS consists of three main perspectives with nine sub perspective as presented in Fig.1. KBPMS framework provides clear framework design, model, and indicators. In addition, the framework considers both vertical and horizontal linkage between perspectives by weighting indicators using different appropriate method, such as analytical correlation, Analytical Hierarchy Process (AHP) and Analytic Network Process (ANP). Lastly, KBPMS provides clear guideline for benchmarking, detailing different types of benchmarking – Internal, competitive, functional, process, generic, performance, and strategic benchmarking, with clear examples.

The development of PMS using KBPMS framework consists of five steps or stages, starting with foundation and principle guidance, followed by background information, design process, implementation, and refreshment. The foundation and principle guidance in the development of PMS based on the KBPMS approach includes four principles of partnership, empowerment, integration, and independence. The author also summarized the characteristics of a good PMS, which includes keeping everything as simple as *possible (Keep It Stupid Simple / KISS)*, long term orientation, time-based, focusing on continuous improvement, and using quantitative approach for objective decision making.
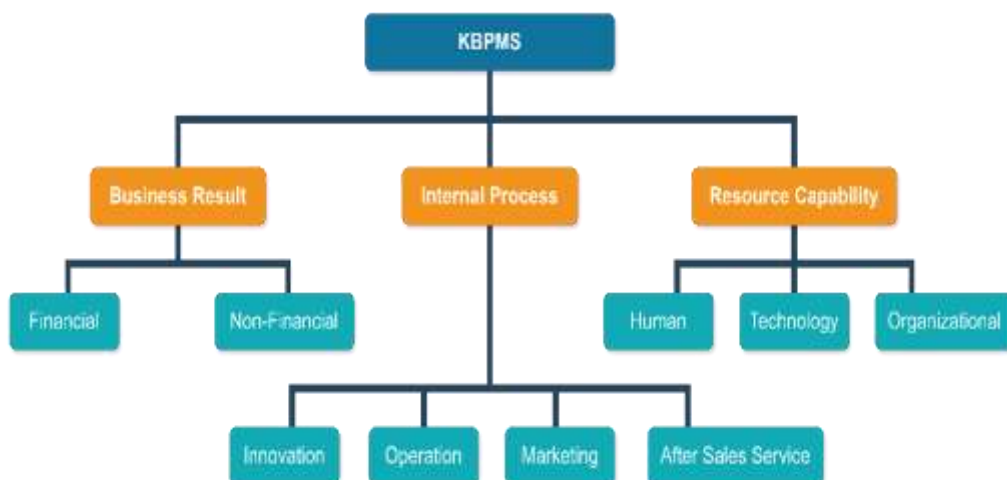

Figure 1. KBPMS Framework

III.   RESEARCH METHODS

Research methods outline the design process of a performance management system for CV MJS – a *commanditaire venootschap*, or limited partnership business entity established in 1998. CV MJS has yet to implement a comprehensive performance management system. Performance is currently measured through revenue and production efficiency. Thus, the development of this PMS framework serves as an important milestone for the company to enhance operational efficiency, align strategic goals, and drive performance improvement. Design process is as presented in Fig.2.
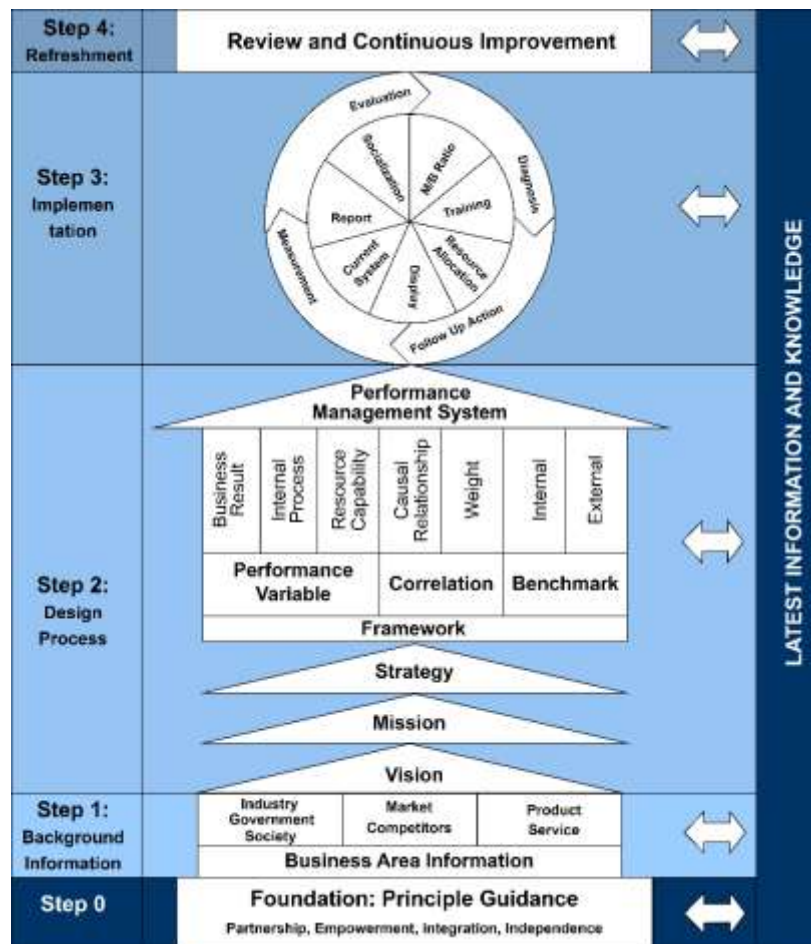

Figure 2. KBPMS Design Process *(Source: Wibisono, 2016)*

CV MJS is a local medium sized enterprise (SME) located in Bandung, West Java, Indonesia. The company operates in the field of food manufacturing, producing freshly baked bakery products on a daily basis. Banana Pastries or Pisang Bolen is one of the main products of CV MJS. To date, the company has developed and obtained various products from suppliers. Different types of cakes, pastries, bread, cookies and traditional chips can now be found in their self-owned stores.

As of January 2024, CV MJS has 14 stores across Bandung and Jakarta, with 245 employees supporting the management, production, and store operations.

3.1 Internal and External Analysis (Stage 1: Basic Information)

Internal, external, and industry analysis was done to aid the company in strategy development. SWOT (strength, weakness, opportunity, and threat), PESTLE (political, economic, social, technological, legal, and environmental), and Porter's Five Forces were done. Table 1 summarizes the result of internal, external, and industry analysis of CV MJS.

Table 1. Summary of Internal, External and Industry Analysis for CV MJS

Internal Analysis: SWOT	
Strength	Quality, Fresh products without preservatives, State of the art production facility, Self-owned stores to market own products.
Weakness	Lack of automation (labour intensive and human reliant), Short product shelf-life, Skill and capability of human resource
Opportunity	Geographical market expansion, local delicacies products as gift for travellers.
Threat	Changing lifestyle and preferences, Health awareness against bakery product that are generally high in sugar and fat, Competition (low barrier to entry), supply disruptions and fluctuating cost of raw material.
External Analysis: PESTLE	
Political	Indonesian Government supports the development of local food Industry through innitiatives such as *Pengembangan Industri Pangan Lokal* (PIPL)
Economic	Inflation rate between June 2022 and April 2023 has failed to meet Bank Indonesia's target, consistent with the increasing raw material cost and volatility in ingredient prices observed. However, Indonesia's GDP growth showed a promising recovery post pandemic situation, giving a positive outlook for businesses.
Social	Indonesia's demographic landscape is characterized by growing younger population that are influenced by global trends, shaping customer preference towards healthier options, diversity, and trendy foods.
Technological	Investing in advanced baking and packaging technology can enhance efficiency, product quality, and scalability; The use of e-commerce platforms and digital marketing can expand the bakery's market reach.
Legal	Regulation Of the Indonesian Food and Drug Authority *(BPOM)*; Employment laws *(UU No.11 Tahun 2020)*; Tax policy *(UU PPh, UU PPN, PBB)*; Waste management *(UU No.18 Tahun 2008)*
Environmental	Efficient management of waste for sustainability practice; Indonesia's climate change can affect the availability and quality of ingredients, requiring adaptive strategies for sourcing and production, such as diversifying source of supply.
Industry Analysis: Porter's Five Forces	
Threat of New Entrants	**Moderate to High** Barrier to entry in the bakery segment of food industry is relatively low due to the possibility of starting small (scalability) which result in low initial investment. In addition, baking skills can be easily acquired by anyone.
Bargaining Power of Supplier	**Moderate** Bakeries have power over suppliers because there are large amount of suppliers in the bakery industry. However, changing supplier may at times require adjustment to the production process, demanding extra efforts and resources from the bakery.
Bargaining Power of Buyer	**Moderate to High** Bargaining power of buyer in the bakery industry is influenced by choice abundance, price sensitivity, relatively low switching cost, and easy access to the internet, allowing easier comparison between price and alternatives.
Threat of Substitute	**Moderate** Food continues to be developed and found, offering consumers diverse options and increasing threat of substitute. However, food consuption is also influenced by culture, memories, and self of identity that cannot be easily replaced.
Rivalry in the Industry	**Moderate to High** High rivalry in the industry is related to low entry barriers, as well as fierce competition on price, innovation, and quality.

3.2 Vision, Mission, and Strategy Development (Stage 2: Design Process)

Vision is defined as a statement that describes the long-term aspirations of a company that gives direction in setting goals, allocating and managing resources, as well as building corporate culture [9]. Based on KBPMS guide on a good vision, CV MJS vision was revised and finalized into:

> *"To be the most trusted producer of high-quality bakery product while bringing joy and success to all stakeholders by building strong, successful relationships that benefit everyone involved."*

Mission statement, on the other hand, aims to communicate the reasons for the company's establishment and the direction in which the company is heading [9]. Based on KBPMS guide on a good mission statement, CV MJS mission was revised and finalized as follows:

1. *To consistently ensuring quality of product and services.*
2. *To encourage continuous development of freshly made bakery products that are nutritious, hygienic, and safe for consumption without preservatives or other harmful additives.*
3. *To create human resources that is fearful of God, honest, proficient, loyal, and professional.*
4. *To foster continuous learning and development to encourage continuous development of the system and innovation towards mutual success.*

CV MJS strategy is developed based on the company's vision and mission to ensures alignment with its core values and long-term goals. The formation of CV MJS's strategy also takes into account internal and external factors that has previously been identified and analyzed in Step 1. After extensive analysis and discussion with the company, a strategy map is developed, in accordance to the KBPMS framework (Fig.3).
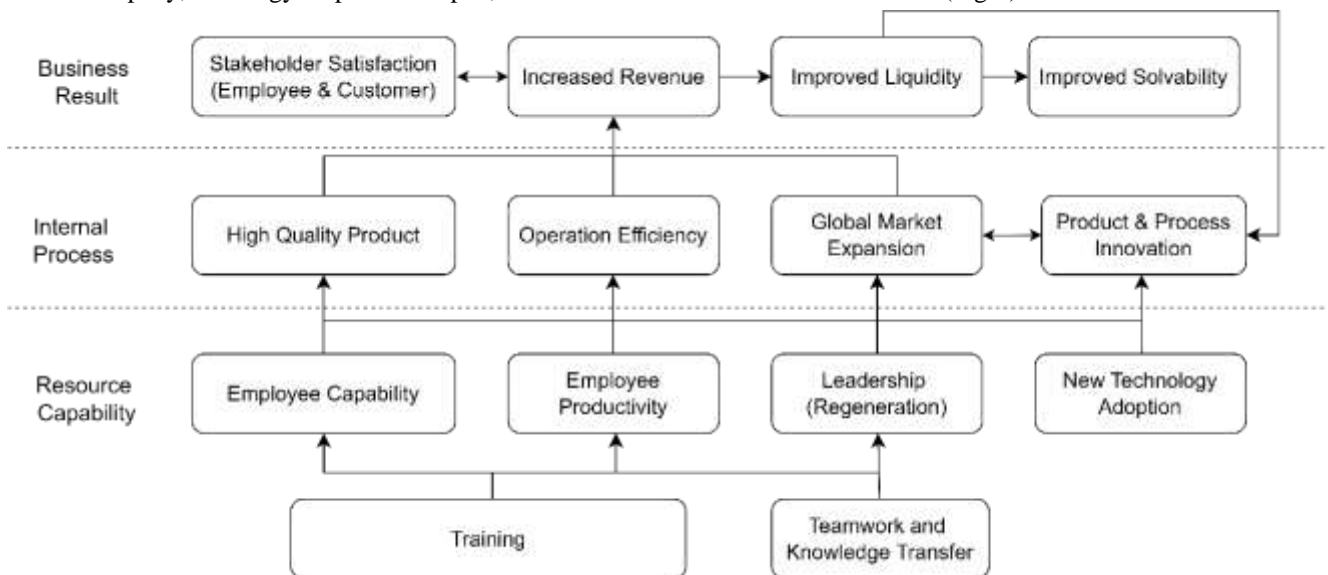

Figure 3. CV MJS Strategy Map

3.3 Indicator, Relationship, and Benchmarking (Stage 2: Design Process)

Performance indicator were identified from a literature study and discussion with the company, taking into account the company's vision, mission, strategy, and business environment. Relationships among indicators were done vertically using the analytical hierarchy process (AHP). Analytical Hierarchy Process (AHP) is a structured decision-making method introduced by Thomas L. Saaty in the 1970s. AHP facilitates complex decision-making processes by breaking problems into hierarchies of criteria and alternatives, and then systematically assessing their relative importance through pairwise comparison [12].

Benchmarking were also done to determine target of achievement for each performance indicator. Internal benchmarking was done for indicators in the financial business results perspective, by comparing the company's performance in the last three years. External benchmarking were done by identifying industry standard and competitor analysis. Lastly, discussion with the company were done to finalized performance target in accordance to available benchmarking and practical implication for implementation. Results are summarized in Table 2.

Table 2. CV MJS Performance Management System Summary

Perspective	Aspect	Variable	Objective	Indicator	Formula	Data Source	Target	Standard	Status
Business Result	Financial	Profitability	To measure profit-generating ability of a firm	Net Profit Margin	(Net Profit / Revenue) x 100	Income Statement	≥5%	HB	To improve
				Expense Ratio	(Total Expenses / Revenue) x 100	Income Statement	≤85%	LB	To improve
				Return on Asset (ROA)	(Net Income / Average Total Assets) x 100	Income Statement	≥10%	HB	To improve
				Return on Equity (ROE)	Net Income / Shareholder's Equity	Income Statement	≥15%	HB	To improve
		Liquidity	To measure company's ability to meet short-term obligations	Current Ratio	Current Asset / Current Liabilities	Balance Sheet	1.0	1.5 to 2.0	To improve
		Solvency	To measure company's ability to meet long-term obligations	Debt to Equity Ratio	Total Liabilities / Shareholders' Equity	Balance Sheet	1.5	1.0 to 1.5	To improve
	Non-Financial	Employee	To measure employee's satisfaction and loyalty	Employee satisfaction	Employee Satisfaction Index (ESI); Employee Net Promoter Score (eNPS)	Survey	ESI = 90% eNPS = 5%	HB	New
				Turnover Rate	(No of employee who left / [(No of employee at beginning + end)/2] x 100	HR Database	≤5%	LB	To improve
		Customer	To measure customer satisfaction	Customer Satisfaction	Net Promoter Score (NPS)	Survey	100%	HB	New
Internal Process	Innovation	Product Innovation	To measure intensity new product development	Product Development	Number of successful new product development	Internal Management Database	1	HB	New
			To measure intensity of product	Product Improvement	Number of successful product improvement	Internal Management Database	1	HB	New

Perspective	Aspect	Variable	Objective	Indicator	Formula	Data Source	Target	Standard	Status
			improvement						
Internal Process	**Innovation**	Process Innovation	To measure the intensity of process innovation	Process Innovation	Number of successful process innovation (or improvement)	Internal Management Database	1	HB	New
		Service Innovation	To measure the intensity of service improvement	Service Innovation	Number of successful service innovation (or improvement)	Internal Management Database	1	HB	New
	Operation	Operating Efficiency	To measure opportunity loss	Defective Product	(Number of defected product/Total production) x 100	Internal Management Database	0	LB	To improve
				Recalled Product (_Retur_)	(Number of recalled product/Total product delivered) x 100	Internal Management Database	≤1%	LB	To improve
	Marketing	Marketing Performance	To measure marketing effectiveness	Market Share	(Company's revenue/Total market revenue) x 100	Internal Management Database; Industry data	>0.005% _(Market Rev Data [13])_	HB	To improve
				Brand Equity	(Sum of all score / (number of respondents x max score)) x 100	Survey	75%	HB	New
	After Sales Service	Quality of ASS	To measure satisfaction and level of after sales service	ASS Satisfaction	% of satisfied individuals	Survey	100%	HB	New
Resource Capability	**Human Resource**	Employee productivity and competency	To measure employee's productivity	Employee Productivity	Profit / Total number of Employee	Internal Management Database	>150 million Rp	HB	To improve
			To ensure continuous improvement of employees	Human development program / training	Number of trainings	Internal Management Database	At least 1 per employee	HB	New
Perspective	**Aspect**	**Variable**	**Objective**	**Indicator**	**Formula**	**Data Source**	**Target**	**Standard**	**Status**

Resource Capability	Technology	New Technology Adoption	To measure the intensity of technology adoption	New Technology Adoption	Number of successful new technology adoption	Internal Management Database	1	HB	New
		Equipment productivity	To measure productivity and appropriate handling of equipment	Equipment productivity	Overall Equipment Effectiveness (OEE)	Survey	80%	HB	New
	Organization	Leadership	To measure level of transformative leadership among leaders	Adapted GTL scale	(Sum of all score / (number of respondents x max score)) x 100	Survey	100%	HB	New
		Teamwork & knowledge transfer	To measure teamwork within the organization	Teamwork & knowledge transfer	(sum of all score / (number of respondents x max score)) x 100	Survey	100%	HB	New

*HB = the higher the better; LB = the lower the better

IV.   RESULT

Fig.4. illustrate the summary of CV MJS' performance indicators. The next step in the KBPMS framework is the implementation (Stage 3) and refreshment (Stage 4). The implementation stage is outlined by four pillars: measurement, evaluation, diagnosis, and follow up action, which circles around continuous improvement and making fundamental process changes when necessary [9]. In addition, there are seven key elements that represent vital components in achieving successful implementation according to KBPMS Framework. This includes: (1) Evaluating the current performance management system of the company; (2) Constructing reports in accordance with the PMS framework; (3) Socializing the new PMS to all relevant stakeholders; (4) Analysing financial cost-benefit ratios; (5) Executing training sessions to ensure successful incorporation of the new PMS; (6) Ensuring organization's capacity and resource allocation for successful implementation; and (7) Conveying information using relevant displays such as radar chart [9]. Fig.5 illustrate radar chart display of CV MJS business performance in 2022. Employee satisfaction and customer satisfaction were not yet measured in 2022. Thus, achievement in the display is not equivalent to 0% achievement but rather indicating unavailable data. Once the PMS is implemented, display should be presented for all indicators, grouped into the three main perspectives.
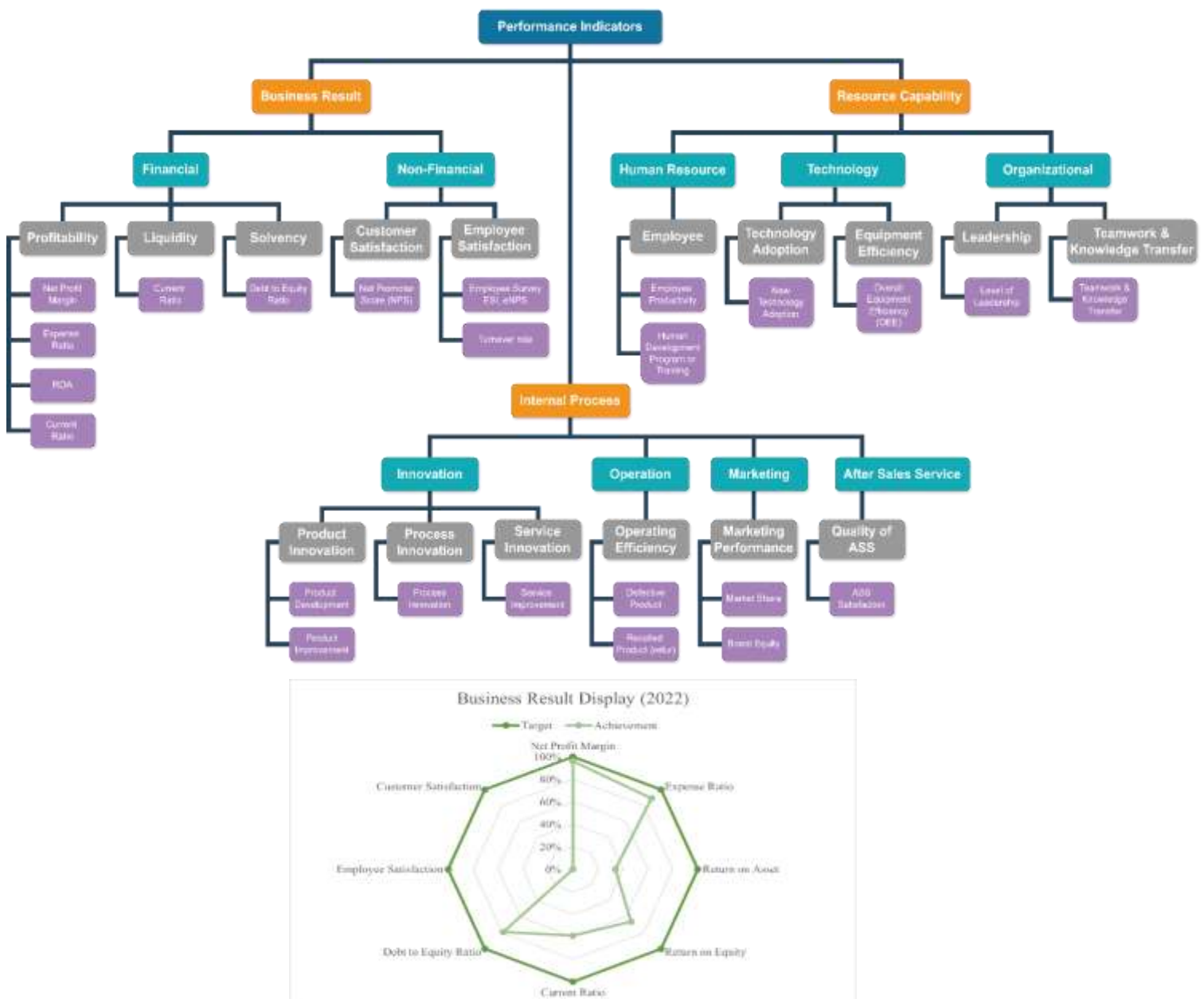
Figure 4. Summary of CV MJS Performance Indicators

Figure 5. Display Example

4.1 Implementation Plan

The implementation plan for the new PMS in CV MJS are detailed out in Table 3. Implementation starts with preparation, and followed by leadership and communication training program for top and middle management. In the preparation process, activities or sessions, along with tools will be scheduled, planned out, and prepared by the PMS PIC. Whereas professional training program aims to empower leaders in the company in taking up their role as leaders that will be respected and heard. This will facilitate the other steps of the implementation plan because with excellent leadership and communication, leaders in the company can become agents of change throughout the implementation process.

Table 3. Implementation Plan

No	Activities	PIC	Target Audience	Duration (Days)	Tools
1.	Preparation Process	PMS PIC (Assigned director)	-	10	-
2.	Leadership and communication Training	Professional Trainers	Top & middle management	5	Training program
3.	Presentation on findings of basic information (External and internal analysis)	PMS PIC (Assigned director)	Top & middle management	1	Presentation slide
4.	Vision, Mission, Strategy Awareness Program	PMS PIC (Assigned director)	Top & middle management	1	Presentation slide, Leaflets
5.	General Introduction and overview on performance management system	PMS PIC (Assigned director)	Top & middle management	1	Presentation slide
6.	Presentation on CV MJS performance management framework (indicators, measures, target, benchmark)	PMS PIC (Assigned director)	Top & middle management	1	Presentation slide, Leaflets
7.	Training on CV MJS PMS to head and PICs of each department (indicators, measures, record keeping, reporting format)	PMS PIC (Assigned director)	Head and PICs of each department	5	Presentation slide, Booklet
8.	Strategic Planning in response to the new PMS for each department	PMS PIC (Assigned director)	Head and PICs of each department	15	Presentation slide, Brainstorming board
9.	Vision, Mission, Strategy Awareness Program: Employee level	Head of each department	All Employees	5	Presentation slide, Leaflet, Posters
10.	General Introduction and overview on performance management system: Employee level	Head of each department	All Employees	5	Presentation slide, Posters
11.	Implementation Trial Phase	Head of each department	All Departments	20	-
12.	Evaluation, diagnosis and follow up action plan	PMS PIC (Assigned director)	Top & middle management	Continuous process	-

In addition, a PMS should be supported by an appropriate information system to enable comprehensive data collection, analysis, and storage, as well as to enhance communication across the organization. Garengo and colleagues found that an advanced Management Information System (MIS) is crucial for creating a conductive environment for effective implementation of PMS [11]. Thus, it is important for a less matured

company like CV MJS, to invest in establishing a good MIS to facilitate the use of the established PMS.

V.   CONCLUSION

The development of a performance management system (PMS) in a small medium enterprise (SME) serves as a beneficial tool for data driven and timely decision-making process. This study serves as a baseline for the SMEs as a guide in developing appropriate performance management system. Although, the final framework in this study is not a "one size fits all" framework to be readily used as it is. Relevancy and practicality must be tailored to the specific needs of the subject company.

Implementation plan should be executed to gather initial feedback for refinement of the finalized performance management system. In addition, some performance indicators in this study are measured using a self-developed survey. Thus, it is important to reassess the validity and reliability of each measurement after the execution of the implementation plan.

This study is also limited to corporate level strategy. It is important to cascade performance indicator across different business levels – corporate, business unit, management operational, and shop floor level, to ensure successful implementation and effectiveness of the PMS implementation by aligning individual goals and objective of all employees with the organization's vision, mission, and strategy.

REFERENCES

[1].   NIST (National Institute of Standards and Technology). (2021, October 6). Baldridge performance excellence program: How Baldridge works. U.S Department of Commerce. https://www.nist.gov/baldrige/how-baldrige-works

[2].   Kaplan, R. S., & Norton, D. P. (1996). Using the balanced scorecard as a strategic management system.

[3].   Neely, A., Adams, C., & Crowe, P. (2001). The performance prism in practice. Measuring business excellence, 5(2), 6-13.

[4].   Wibisono, D., & Khan, M. K. (2010). The Conceptual Framework of a Knowledge-Based Performance Management System. Gadjah Mada International Journal of Business, 12(3).

[5].   United States Department of State. (2022, April 19). U.S. relations with Indonesia. https://www.state.gov/u-s-relations-with-indonesia/

[6].   BI Institute. (2022, August 22). Challenge of culture-based SMEs digitalisation. https://www.bi.go.id/en/bi-institute/BI-Epsilon/Pages/Tantangan-Digitalisasi-UMKM-Berbasis-Budaya.aspx

[7].   Papulová, Z., Gažová, A., Šlenker, M., & Papula, J. (2021). Performance measurement system: Implementation process in smes. Sustainability, 13(9), 4794.

[8].   Asean Main Portal. (2024). Definitions of MSME in ASEAN member states. Retrieved on June 30, 2024 from https://asean.org/wp-content/uploads/2023/11/Definition-of-MSME-in-ASEAN-Member-States.pdf

[9].   Wibisono, D. (2016). How to create a world class company (2nd ed.). Penerbit ITB

[10].   Yazfinedi, Y. (2018). Usaha Mikro, Kecil, dan Menengah Di Indonesia: Permasalahan dan Solusinya. Quantum: Jurnal Ilmiah Kesejahteraan Sosial, 14(1), 33-41.

[11].   Garengo, P., Nudurupati, S., & Bititci, U. (2007). Understanding the relationship between PMS and MIS in SMEs: An organizational life cycle perspective. Computers in industry, 58(7), 677-686.

[12].   Saaty, T. L. (1980). The analytic hierarchy process (AHP). The Journal of the Operational Research Society, 41(11), 1073-1076.

[13].   Statista. (2024, June 22). Bread & cereal products – Indonesia. https://www.statista.com/outlook/cmo/food/bread-cereal-products/indonesia

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