Designing a Knowledge Management Strategy to Support Product Development and Innovation Agility at Paragon Corp

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ABSTRACT*: Paragon Corp is one of the largest Fast Moving Consumer Goods (FMCG) companies in the cosmetic sector in Indonesia. With the rapid development of global cosmetics, Paragon needs to adapt to these developments and maximize all opportunities to be able to grow bigger. New Product Development (NPD) plays a crucial role and makes a sizeable contribution to overall revenue.This research aims to develop knowledge management strategies to support product development and innovation agility in the NPD team (PID and R&D Directorate). Based on the survey, KM maturity for PID and R&D Directorate is currently at the Refinement level. The result shows that knowledge management practices have been performed in both directorates even though knowledge management has never been officially institutionalized or introduced and demonstrates that KM practices have also been regularly evaluated and improved. To achieve complete KM maturity, a gap still must be filled. The proposed improvement plan consists of establishing an organizational structure for KM enablers, making policies for safeguarding knowledge, creating employee core competency, integrating IT infrastructure, creating an integrated knowledge inventory, creating an innovation culture, and developing risk and impact analysis for knowledge contribution to support higher productivity.*

KEYWORDS-*Knowledge Management, KM Maturity, Asian Productivity Organization, New Product Development.*

I.   INTRODUCTION

The global cosmetics market was valued at US$ 341.1 billion in 2020. In all regions, demand for cosmetics has been negatively impacted by the pandemic, which has had an unprecedented and enormous global impact on the industry. According to Fortune Business Insight, the global market experienced a growth decline of -10.57% in 2020 when compared to the average annual growth between 2017 and 2019. The market is expected to hit US$ 560.50 billion by 2030 with a compound annual growth rate (CAGR) of 5.1% from 2021 to 2030. The uplift in CAGR is due to the market's demand and expansion, which will eventually reach pre-pandemic levels after the pandemic is finished.The cosmetics market is always evolving and changing. Players usually introduce new strategies more frequently to stay competitive in the market. Consumers in Indonesia are becoming more and more interested in local skincare and beauty companies since they can match their quality with several well-known overseas brands. According to information from the Ministry of Industry, the cosmetics industry expanded greatly in 2021, as seen by the 9.61 percent growth in the chemical, pharmaceutical, and traditional medicine sectors, which include the cosmetics industry.

Paragon is one of the largest Fast Moving Consumer Goods (FMCG) companies in the cosmetic sector in Indonesia. Paragon as a national company has now become a market leader that houses leading brands such as Wardah, MakeOver, Emina, Kahf, Labore, Putri, Biodef, Instaperfect, Crystallure, Tavi, Wonderly, OMG, and Beyondly. With the rapid development of global cosmetics, Paragon needs to adapt to these developments and maximize all opportunities to be able to grow bigger. To keep up with the competition in the world of cosmetics, the urgency to have a robust organizational model and knowledge management is needed. Product development is primarily handled by two departments: Product Development and Innovation (PID), and Research and Development (R&D) which play an important role to support the company's strategy. Agility in innovating is needed to keep pace with changing market conditions that are so fast. More and more brands are created by Paragon with a total of 12 brands which if converted into products amount to > 2000 product SKUs.

New Product Development (NPD) plays a crucial role and makes a sizeable contribution to overall revenue. In this cosmetics market, rapid product development is necessary. Consideration should be given to how the business handles knowledge to produce high-quality products and innovation. The important optional strategies of innovation and knowledge management can enhance an organization's capacity to meet customer needs and adapt to emerging technology. The application of knowledge management in a company is indeed connected to this situation. Numerous studies have been conducted on knowledge management, particularly regarding how it affects organizational performance. The management of knowledge serves as an enabler for high performance, allowing the organization to improve its financial performance and competitiveness.

II. LITERATURE REVIEW

II.1 Theoretical Foundation

II.1.1 Knowledge Management

Knowledge can be considered an unseen or intangible assets, the development of which requires complex cognitive processes involving perception, learning, communication, association, and reasoning (Gao et al., 2018). Knowledge management is a discipline that encourages an integrated approach to identifying, managing, and sharing all an enterprise's information assets. Databases, documents, regulations, and procedures, as well as previously tacit knowledge and experience held by certain employees, can all be considered information assets. Knowledge management concerns include developing, implementing, and maintaining the proper organizational and technical infrastructures to support knowledge sharing (Butler, 2000).The main goals of many knowledge management (KM) initiatives have been to capture, codify, and share the knowledge that exists within businesses. The objectives of an organization engaging in KM are broadly accepted, even though there is still disagreement about what makes a good definition of KM. The main goal of knowledge management is to leverage knowledge to the organization's advantage. The loss of talented workers due to turnover, pressures to avoid reinventing the wheel, demands organizational-wide innovations in both processes and products, risk management, and the speeding up of new knowledge creation are some of management's motivations that are obvious (Dalkir, 2005).

II.1.2 Knowledge Management Framework – APO Assessment

An intergovernmental group committed to increasing productivity in the Asia-Pacific region is called the Asian Productivity Organization (APO).APO KM Assessment Tool is a survey questionnaire created to assist organizations in quickly evaluating how prepared they are for KM. The evaluation is done at the start of the KM program. The organization must be aware of its advantages and room for growth before embarking on the KM journey. The company can then concentrate on its KM initiatives to close the gaps found during the assessment. Understanding the organization's vision, mission, business goal, and strategic directions is the first step in using the APO KM Framework. This helps in the organization's analysis of its key strengths and capabilities as well as the areas where it must develop. Asian Productivity Organization Framework (APO) and survey guidelines consider seven aspects: Leadership, Process, People, Technology, Knowledge Process, Learning & Innovation, and KM Outcomes. (Young, 2020).

II.1.3 New Product Development (NPD)

The development of new products is a creative process that requires a great deal of freedom to provide innovative engineers the room to create new products.The entire process, from concept to completion, could be viewed as sequential when lead times were lengthy and competition was relatively low(Barclay & Benson, 2016). Gurbuz (2018) state that the definition of a product phrase is dynamic and constantly changing throughout time. The term "product" is used to refer to what businesses produced, but today it is used to refer to a customer's need that is met or their satisfaction with an exchange.NPD has eight stages to completion. Businesses should decide whether to go on to the nextstage, continue to develop products, or look for more information at the conclusion of each step. The eight stages are (1) generation of new product ideas, (2) screening and evaluation of ideas, (3) concept development and testing, (4) marketing strategy, (5) business analysis, (6) product development, (7) test marketing and (8) commercialization.The probability that the development team will need to adjust during development increases with a new product's level of innovation (Trott, 2017).

II.1.4 Agile Organization

An agile organization is a network of teams within a people-centered culture that operates in rapid learning and fast decision cycles that are enabled by technology, and that is guided by a powerful common purpose to co-create value for all stakeholders. Agile organizations are designed for both stability and dynamism. Using such an agile operational model, chances for value creation and protection can be quickly and efficiently taken advantage of by changing strategy, structure, processes, people, and technology. According to research, agile organizations have a 70% chance of going to fall into the best organizational health quartile, which is the best predictor of long-term performance. Additionally, these businesses gain stronger customer centricity, a faster time to market, faster revenue growth, lower costs, and a more productive workforce all at once (Aghina et al, 2018).

II.1.5 Learning Organization

Organization learning is "the process through which organizations change or modify their mental models, rules, processes or knowledge, maintaining or improving their performance". For businesses working in unpredictable circumstances, Organization learning is essential for them to react to unforeseen circumstances faster than their competitors. Organizations learn regardless of whether they apply systematic learning approaches. Hence, to develop the capacity for systematic learning, organizations rely on systematic procedures. Due to the lack of specific guidelines on how to implement the competences suggested in the literature, an ideal learning structure has not yet been established (Basten and Haamann, 2018).The creation of organizational

knowledge is seen as a spiral that is continuously repeated in four phases such as Socialization, Externalization, Combination and Internalization (Nonaka & Konno, 1998).

II.1.6 Knowledge Management Strategy and Planning

Knowledge strategy and planning should be part of the overall organizational strategy in order to recognize that organizational knowledge is a valuable asset. A strategy identifies how the organization can leverage its knowledge resources. The KM strategy provides the basic building blocks used to achieve this organizational learning and continuous improvement to not waste time repeating mistakes and to make everyone aware of new and better ways of thinking and doing (Dalkir, 2023). Bolisani and Bratianu (2017) explain that the KM strategy must be aligned with the overall organizational strategy.KM Planning involves a systematic approach to identify and analyze an organization's knowledge needs, assess current knowledge assets and capabilities, and develop strategies to manage and utilize its knowledge assets effectively(Tjakraatmadja, 2006).

II.2 Conceptual Framework

To help the researcher in choosing the best strategy for addressing the study objectives, this study was developed based on the research framework shown in figure 2.9 above. Starting with the APO Knowledge Management Framework, the framework assesses the NPD team at Paragon Corp's level of knowledge management readiness. Organizations start considering how they can improve their operations and performance. In this sense, knowledge has developed into an essential resource for businesses looking to strengthen their competitive advantage over competitors, which is crucial to their performance. Additionally, KM has been included into the implementation, strategy, and policy-making processes of numerous international businesses,
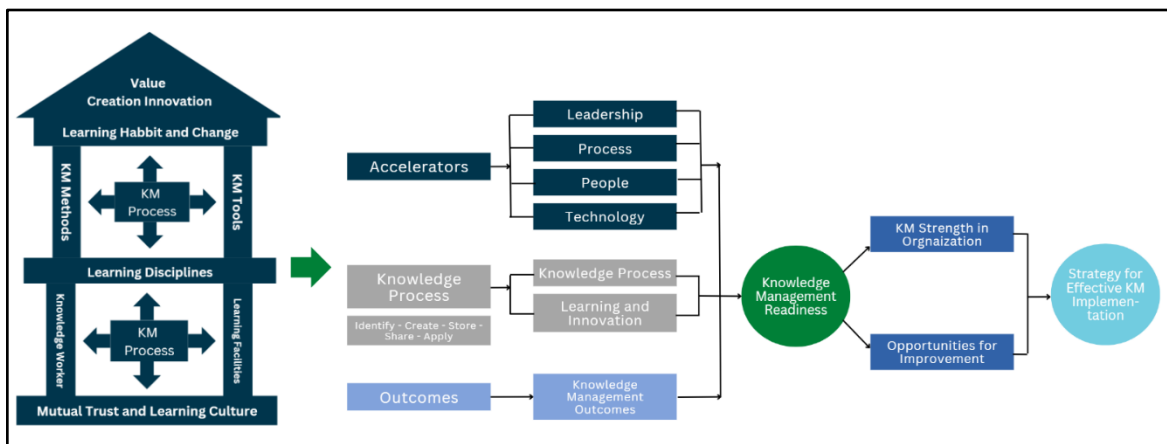
governments, and institutions.

Figure II.1 Conceptual Framework for Knowledge Management Research (Source: Author, 2023)

III.   RESEARCH METHODOLOGY

III.1 Research Design

This project is in descriptive qualitative research supported by information data interviews and discussion, referring to the literature review study and observing the organization's agile management process. The qualitative research approach explores phenomena by observing and using a semistructured interview method with the agile new product development team members. The qualitative research method is used to focus on conditions and problems in NPD team at Paragon Corp. The qualitative method allows the author to explore and better understand the complexity of problems in the internal company. This research utilizes a fundamental conceptual framework for knowledge management. An assessment should be undertaken initially to learn the current Knowledge Management maturity level and the current Knowledge Management activities in place to improve Knowledge Management maturity of an organization. The outcome of the knowledge management assessment will be used to establish a baseline, which will be utilized to identify opportunities for improvement and serve as a tool for planning to elevate the company's knowledge management maturity level to promote agility in productdevelopment and innovation.

III.2 Data Collection Method

III.2.1 Data Collection Method – Quantitative – Questionnaire

Quantitative research on the KM readiness level in the NPD Team at Paragon Corp is gathered using a questionnaire. The APO Knowledge Management Assessment Tool is adapted for this research to assess the organization's level of KM readiness. The key directorate for the NPD team is composed of Product development and Innovation, and Research and Development team. The managers and staff in this case serve as the research subjects, and the assessment is done by giving them a set of questionnaire questions. A company's performance on seven knowledge management audit areas is used to evaluate its readiness for KM. These seven

areas, which include KM accelerators, KM processes, and KM results, are based on the APO KM framework. Different aspects of the framework are measured by each of the categories. Six questions from each category must be rated by respondents on a scale of 1 to 5, with 1 denoting a very bad performance or doing nothing at all, and 5 denoting a very good performance for the category in question. There will be 42 questions in total, giving the highest possible KM assessment score 210 and the lowest possible score 42. The organizations' current KM maturity level will be determined using the sum of all question scores.

Table III.1 Knowledge Management Maturity Level (Source: Young, 2020)

KM Maturity Level	Score		Description
Maturity	189 - 210		KM is mainstreamed in the institution
Refinement	147 - 188		KM implementation is continuously evaluated and improved
Expansion	126 - 146		Institution-wide KM implementation
Initiation	84 - 125		Beginning to recognized the need to manage knowledge
Reaction	42 - 83		Not aware of what KM is and its importance in enhancing productivity and competitiveness

Table III. 2 Question for APO KM Maturity Level Assessment (Source: Young, 2020)

Category	Questions	Code
Cat 1.0: KM Leadership (LDR)	The organization has a shared Knowledge Vision and Strategy strongly linked to its vision, mission, and goals.	LDR 1
	Organizational arrangements have been undertaken to formalize KM initiatives (i.e., central coordinating unit for knowledge/information management, Chief Knowledge/Information Officer, ICT team, quality improvement teams/ Communities of Practice, knowledge networks)	LDR 2
	Financial resources are allocated for KM initiatives.	LDR 3
	The organization has a policy for safeguarding knowledge (i.e., copyrights, patents, KM, and knowledge security policy)	LDR 4
	Managers role-model the values of knowledge sharing and collaborative working. They spend more time disseminating information to their staff and facilitating the horizontal flow of information between their staff and with staff of other departments/divisions/units.	LDR 5
	Management promotes, recognizes, and rewards performance improvement, organizational and employee learning, sharing of knowledge, and knowledge creation and innovation	LDR 6
Cat 2.0: Processes (PRO)	The organization determines its core competencies (strategically important capabilities that provide a competitive advantage) and aligns them with its mission and strategic goals.	PRO 1
	The organization designs its work systems and key processes to create value to customers and achieve performance excellence	PRO 2
	New technology, knowledge shared in the organization, flexibility, efficiency, and effectiveness are factored into the design of processes	PRO 3
	The organization has an organized system for managing crisis situations or unforeseen events that ensures uninterrupted operations, prevention, and recovery.	PRO 4
	The organization implements and manages its key work processes to ensure that customer requirements are met, and business results are sustained.	PRO 5
	The organization continually evaluates and improves its work processes to achieve better performance, reduce variations, improve products and services, and keep updated on the latest in business trends, developments, and directions	PRO 6
Cat 3.0: People (PPL)	The organization's education, training, and career development programs build employee knowledge, skills, and capabilities, support achievement of overall objectives, and contribute to high performance	PPL 1
	The organization has a systematic induction process for new staff that includes familiarizing them with KM and its benefits, the KM system, and tools	PPL 2
	The organization has formal mentoring, coaching, and tutoring processes	PPL 3
	The organization has a database of staff competencies.	PPL 4

	Knowledge sharing and collaboration are actively encouraged and rewarded/corrected.	PPL 5
	Employees are organized into small teams/ groups (i.e., quality circles, work improvement teams, cross-functional teams, Communities of Practice) to respond to workplace problems or concerns	PPL 6
Cat 4.0: Technology (TEC)	Management has established an IT infrastructure (i.e., Internet, intranet, and website) and has developed capabilities to facilitate effective	TEC 1
	The IT infrastructure is aligned with the organization's KM strategy	TEC 2
	Everyone has access to a computer.	TEC 3
	Everyone has access to the Internet/intranet and has an email address.	TEC 4
	Information delivered on the website/intranet is updated on a regular basis.	TEC 5
	An intranet (or similar network) is used as a major source of organization-wide communication to support knowledge transfer or information sharing	TEC 6
Cat 5.0: Knowledge Process (KMP)	The organization has systematic processes for identifying, creating, storing, sharing, and applying knowledge.	KMP 1
	The organization maintains a knowledge inventory that identifies and locates knowledge assets or resources throughout the organization.	KMP 2
	Knowledge accrued from completed tasks or projects is documented and shared.	KMP 3
	Critical knowledge from employees leaving the organization is retained	KMP 4
	The organization shares best practices and lessons learned across the organization so that there is no constant reinventing of the wheel and work duplication.	KMP 5
	Benchmarking activities are conducted inside and outside the organization, the results of which are used to improve organizational performance and create new knowledge.	KMP 6
Cat 6.0: Learning and Innovation (LNI)	The organization articulates and continually reinforces the values of learning and innovation.	LNI 1
	The organization regards risk-taking or committing mistakes as learning opportunities so long as they do not occur repeatedly	LNI 2
	Cross-functional teams are organized to tackle problems/concerns that cut across the different units in the organization	LNI 3
	People feel empowered and feel that their ideas and contributions are generally valued by the organization	LNI 4
	Management is willing to try new tools and methods	LNI 5
	Individuals are given incentives to work together and share information.	LNI 6
Cat 7.0: Outcomes (KMO)	The organization has a history of (and maintains measures for) successfully implementing KM and other change initiatives	KMO 1
	Measures are in place for assessing the impact of knowledge contributions and initiatives.	KMO 2
	The organization has achieved higher productivity through reduced cycle time, bigger cost savings, enhanced effectiveness, more efficient use of resources (including knowledge), improved decision-making, and increased speed of innovation.	KMO 3
	The organization has increased its profitability as a result of productivity, quality, and customer satisfaction improvements	KMO 4
	The organization has improved the quality of its products and/or services because of applying knowledge to improve business processes or customer relationships.	KMO 5
	The organization has sustained growth as a result of higher productivity, increased profitability, and better-quality product and services	KMO 6

III.2.2 Data Collection Method – Qualitative – Semi Structured Interview

To collect qualitative information about the NPD team's level of KM preparedness, interviews are used. This supplemental data is collected after the primary data has been analyzed and a conclusion reached. APO's KM maturity assessment was used to determine the existing situation, the strengths, and any opportunities for growth. The interview questions were connected to the current KM practices in the NPD team (Paragon Corp). A semi-structured interview method will be used as a guidance and to promote two-way conversation between the researcher and the interviewee. The interview takes place over an online meeting with the Microsoft Teams application and in-person meeting and lasts for around an hour and it would be recorded as a digital asset. The Group/Department Head from each directorate will function as the interviewee.

IV. RESULT AND DISCUSSION

IV.1 Analysis

IV.1.1 Validity Test Result

We should compare the calculated Pearson coefficient value to these threshold values in order to assess the question's validity. The correlation is regarded as statistically significant at the given significance level if the Pearson coefficient value is equal to or higher than the critical value. This study used 100 samples and two levels of significance, with a 5% level of significance equal to 0.195 and a 1% level of significance equal to 0.256. As noted in the above table, all the questions are valid whether applying either a level of significance of 5% or 1%. The typical significance level is either 5% or 1%. To put it another way, a 1% significance level is more conservative than a 5% one because it requires more evidence to reject out the null hypothesis. We can be more confident that the observed correlation is not the result of chance if the Pearson correlation coefficient is significant at the 1% level rather than simply at the 5% level.

IV.1.2 Reliability Test Result

The widely accepted and reliable method of using Cronbach's alpha to assess a scale's or questionnaire's internal consistency. It can help ensure that the results are correct and reliable by offering insightful information about the validity and reliability of the research-related variables. Microsoft Excel can be used to calculate the Cronbach's Alpha value, which can then be used to determine the reliability of the question. The results are shown in the table below for each APO category:

Table IV. 1 Questionnaire Reliability Test Result (Source: Author Analysis, 2023)

Category	Cronbach Alpha Value	N of Item	Result
Leadership	0,81	6	**Very Good/Strong Reliability**
Process	0,83	6	**Very Good/Strong Reliability**
People	0,81	6	**Very Good/Strong Reliability**
Technology	0,81	6	**Very Good/Strong Reliability**
Knowledge Process	0,88	6	**Very Good/Strong Reliability**
Learning and Innovation	0,83	6	**Very Good/Strong Reliability**
Output	0,88	6	**Very Good/Strong Reliability**

According to the table above, each category's Cronbach alpha score is over 0.8, indicating that the research's reliability is Very Good. The Cronbach alpha value is typically regarded as a reliable indicator of high internal consistency when it is greater than 0.8. This indicates that the test or survey's items have a strong correlation with one another and consistently measure the same construct or dimension.

IV.1.3 Respondent Analysis

This survey was distributed to the NPD team which involved in key activities of NPD process, consist of PID and R&D Directorate. There are 53 personnel on the R&D team and 60 on the PID team, for a total of 113 subjects across both directorates. The questionnaire was completed online by respondents using a Google Form. Using the Solvin formula, 53 samples are needed to achieve a 90% confidence level with a 10% margin of error for a population of 113 employees. This survey was able to get responses from 100 employees, therefore the quantity matched the needed samples.

From the figure IV.1 In PID Directorate, the respondent age is almost equal between <25 years old and 25-40 years old, while the smallest group is employee aged 41-45 years old only 1 respondent of the PID's population. In R&D Directorate, there is no respondent with age 41-45 years old. Most of the respondents were employees aged 25-40 years old accounting30 respondents, followed by employees aged <25 years old 14 respondentsof the total R&D's population. In figure IV.2, working period demography in PID is almost equal for respondent who has working period <1 year, 1-3 year and 3-5 years. So, for this working period majority they place MT and executive level, followed by 6-10 years working period accounting 6 respondent and the smallest population filled by respondent who has >10 years working period which are dominated by Head of Department level. Working period distribution in R&D Directorate quite similar with PID for 1-3 years and 3-5 years working period. Working period distribution in R&D for <1 year very different with PID, in R&D only 6 respondentbecause MT level in R&D limited due to recruitment constraint. But for >10 years working period is higher than PID, accounting 3 respondentswhich place as Senior Scientist.
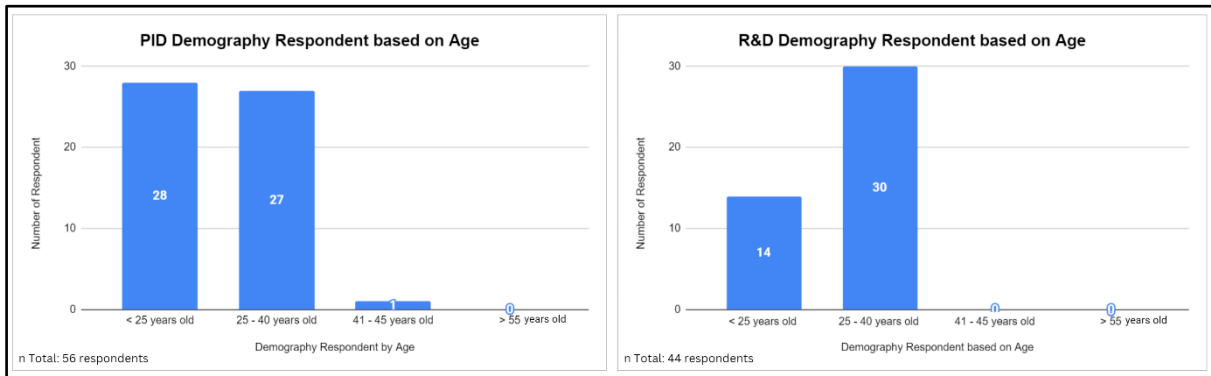
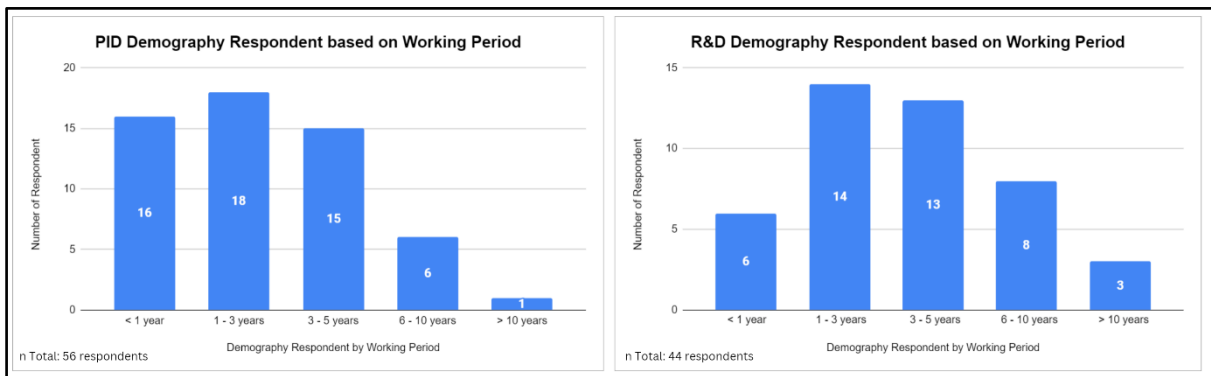Figure IV.1 Respondent Age Distribution for PID and R&D Directorate (Source: Author Analysis, 2023)

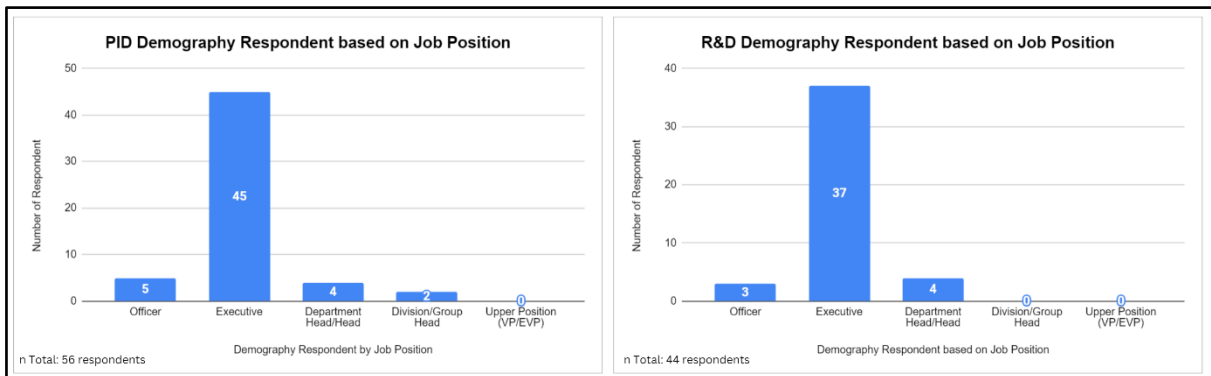Figure IV.2 Respondent Working Period for PID and R&D Directorate (Source: Author Analysis, 2023)

Figure IV.3 Respondent Age Distribution for PID and R&D Directorate (Source: Author Analysis, 2023)

Job position in Executive level is place highest distribution either in PID or R&D Directorate. Executive level in PID accounted by 45 respondentand 37 respondentsin R&D. Officer level in PID accounted by 5 respondents while in R&D 3 respondents. In the Department Head level has a same number between PID and R&D, that is 4 respondents from each directorate. In PID, there are 2 respondents from Group Head level that participate in this study which from R&D did not since the highest position only Department Head.

IV.1.4 Knowledge Management Maturity Level of PID and R&D Directorate
According to the survey, R&D and PID have the same maturity level for KM but receive different scores. Get a total score of 157,96 for the PID Directorate. The average across the seven categories is 22,57. In comparison, the R&D Directorate had a higher overall score—163,14—with an average score of 23,31.Based on the results of the survey performed by the PID Directorate using the APO method, the category of learning and innovation received the highest score, 24.84, followed by the category of technology, 23,95. Moreover, the categories for leadership, process, and KM outcomes score higher than the average 22.63; 22,70; and 22,59. The categories for people and knowledge processes received the lowest scores of 22,04 and 19,23 respectively. People and Knowledge Process are the two categories with scores that are below average. In R&D Directorate, the category of learning and innovation received the highest score, 25,21, followed by the category of

technology, 24,65 and People 23,37. The categories for Leadership, Process and knowledge processes and KM Outcomes received the lowest scores of 22,67; 23,23; 21,21 and 22,91 respectively which that are below average 23,31. Even though the average R&D score is higher than the PID, the authors will prioritizing on improvement in categories that are below average. The study will go into detail about the results of each category and suggest improvements for how that all seven APO categories could be improved.
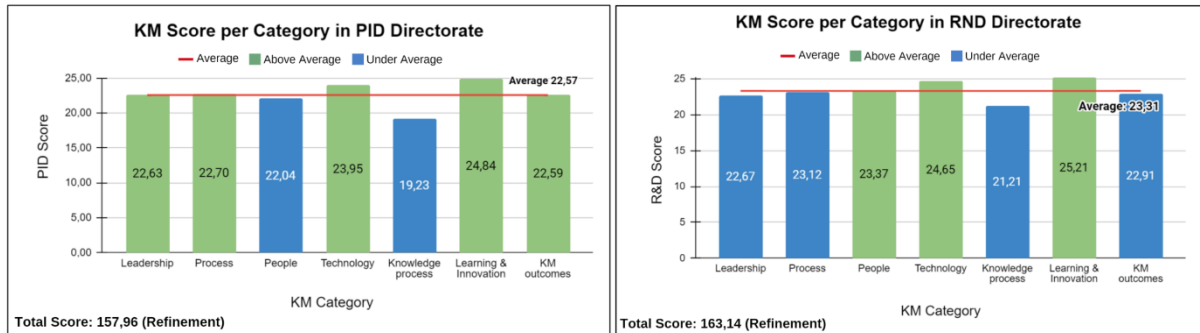
Figure IV.4 APO KM Maturity level by Category for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.5 Category 1: Leadership Score and Analysis

The total category leadership scores for the PID and R&D directorates were almost the same and the average score was 3,77 for PID and 3,75 for R&D. In PID, Leadership is one of the categories which is above average while the leadership category in R&D is below average. The PID and R&D Directorates had the highest scores for the LDR1 question, 4,34 and 4,30, respectively, indicating that these two directorates already have a Knowledge Management (KM) strategy connected to the business's vision, mission, and goals. The current Directorate strategic plan is generated from Paragon Strategic Planning (PSP), and all key initiatives and results have been carried out with the Vice President's, a BOD representative, approval. So that everything that is running is confirmed to be aligned with the company's goals.For the LDR 4 question related to the policy for safeguarding knowledge, the scores of the two departments were below the average with the lowest score among the other subcategories. This happened because the conditions in the two directorates were still weak in protecting knowledge, especially in storing digital documents. A lot of important data is stored on Google Drive, shared access still uses public software, and there are still personnel who use personal laptops and personal e-mail when accessing company documents.
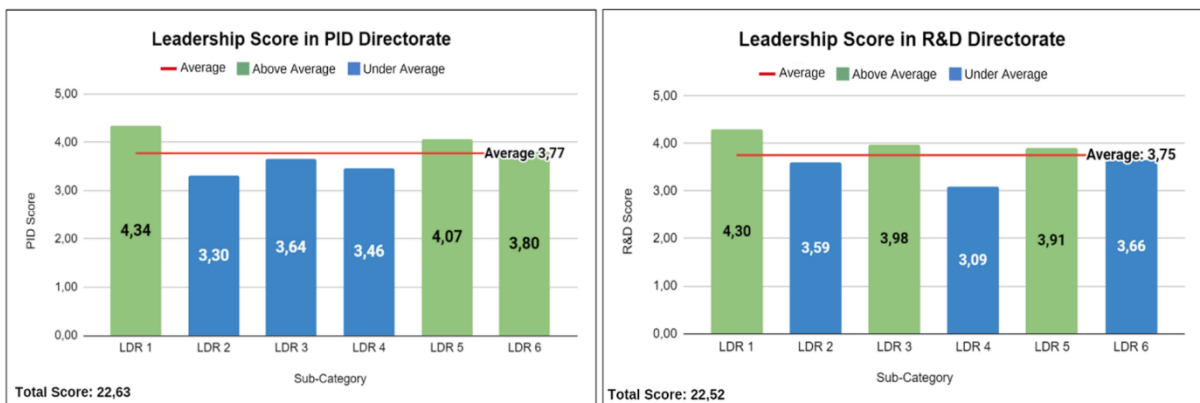

Figure IV.5 Leadership Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.6 Category 2: Process Score and Analysis

The total category Process scores for the PID and R&D directorates were almost the same (PID 22,70; R&D 22,98) and the average score was 3,78 for PID and 3,85 for R&D. The sub-categories that are above average and below average are in the same condition in both the PID and the R&D Directorate. The subcategories of processes that are above the average are PRO 2, PRO 5 and PRO 6, while the rest are below average.PRO 5 relates to the ability of the organization to implement and manage the key work processes to ensure customer satisfaction and business sustainability. This is almost similar to PRO 2, where both directorates have scores above the average. Having a more structured innovation funnel helps the personnel involved in the NPD process to be more critical at each stage so that the resulting product can meet consumer

satisfaction. In addition, the organization has just modified the work model to become a squad system so that the work system becomes more agile, and customer focused. PRO 6 relates to the ability of an organization to continuously evaluate and improve its work processes to achieve better performance. Both directorates have scores above average. This is because both have regular coordination meetings to update projects as well as evaluate them. The forum often generates improvement ideas for more effective business processes.
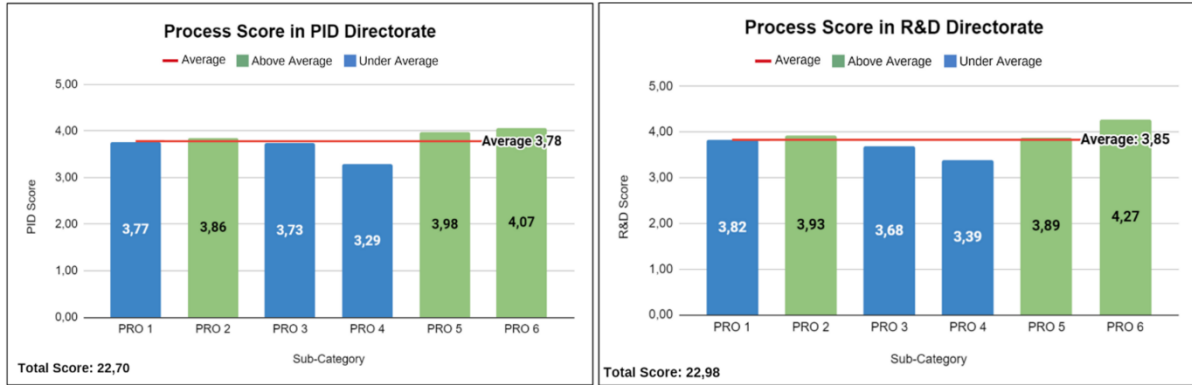

Figure IV.6 Process Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.7 Category 3: People Score and Analysis

The total score for the people category for PID differed significantly from R&D, where PID had a total score of 22,04, lower than R&D of 23,32, which included an average score of 3,67 for PID and 3,90 for R&D. The process category in PID is indeed below average compared to other categories, while the people category in R&D is above average. The sub-categories that are above the average and below the average between PID and R&D also differ inversely for the 3 sub-categories.For PPL 1 the conditions are both above average, this subcategory relates to Are education, training and career development programs helping to increase the knowledge, skills, capabilities of personnel and support optimal achievement and performance? At PID there is a training and career development program and is also assisted by the HR business partner team to make it, but the program has not been updated regularly and there are no procedures to ensure its effectiveness in daily work. For conditions in R&D, there is already an R&D Academy which has a complete curriculum for junior scientists, but not yet for senior scientists. In addition, R&D has been supported with the help of consultants who assist in developing the expertise of scientists. For PPL 4 related to the database of staff competencies. These two directorates have scores below the average with the same score of 3,18. In PID, the condition is that there are no written specific roles so that each personnel have not standardized their main responsibility. While in R&D documents have been prepared but implementation still does not fully refer to these competency documents and the assessment system is still not standardized.
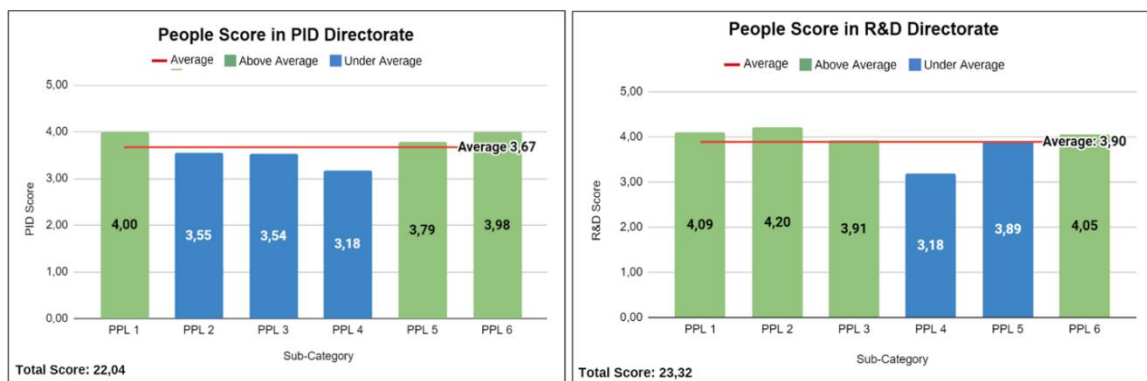

Figure IV.7 People Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.8 Category 4: Technology Score and Analysis

PID and R&D have different final scores in the technology category: 23,95 for PID and 24,57 for R&D. However, in these two directorates, this technology category performs better than average. The PID score has a value of 3,99, which is below average, while the R&D score has a value of 4,11. Regarding TEC 1 subcategory that has to do with whether the IT infrastructure is prepared to enable the success of KM. With a PID score of 3,20 and an R&D score of 3,73, these two directorates have values that are below average. In PID,

the problem is more on how to make IT-related facilities utilized by the team in a sustainable manner, because in practice the work of IT cannot be utilized optimally. For conditions in R&D, because the location is different from PID, problems are often found with poor internet network quality, besides that digital improvement initiatives will take a very long time to be processed by the IT team. The TEC 2 sub-category relates to The IT infrastructure which is aligned with the company's KM strategy. PID and R&D have below average scores, for reasons like conditions in TEC 1.For the TEC 3 sub-category related to access rights to the computer. This subcategory has the highest score in both directorates. PID with a score of 23.95 (average 3.99) and R&D 24.57 (average 4.11). All PID personnel are provided with laptops because their mobility is quite high while R&D uses PCs by default, so there are difficulties when they must work outside the factory, so most of them when working outside use personal laptops or shared inventory laptops. For the TEC 4 sub-category related to access rights to the internet/intranet and has an email address. It's also like TEC 3, with an above average score. Both PID and R&D all have email addresses starting from the admin level to the head of the directorate level which can be used to access various internet needs.
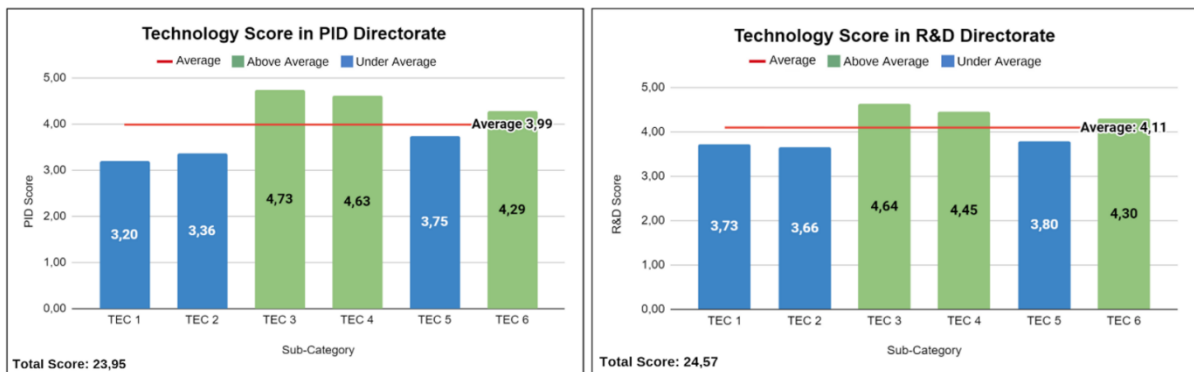

Figure IV.8Technology Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.9 Category 5: Knowledge Process Score and Analysis

The total process Knowledge category score for PID was 19,23 (average 3,21) which was lower than R&D's 21,07 (average 3,53). In total category, Knowledge process is below the average for these two directorates. For KMP 1, it relates to the ability of the department to have a systematic process for identifying, creating, storing, sharing and applying knowledge. Both have scores above the average even though the PID value is lower than R&D. The actual PID system hasn't been formed yet but everyone has their own way of managing knowledge, for NPD each squad has a shared folder that can be accessed by all teams, but it's not standardized yet.
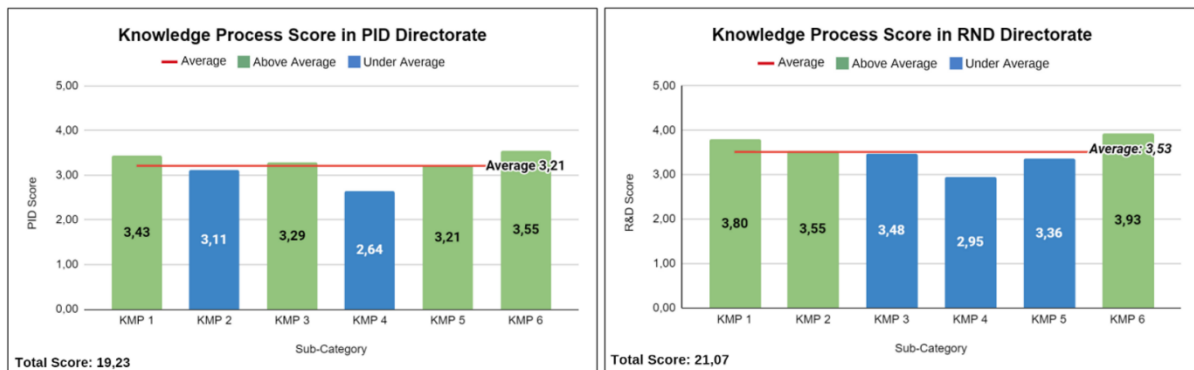

Figure IV.9Knowledge Process Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

For R&D the conditions are like PID, each personnel have their own folder so that it is difficult for others to trace, but they also have folders that can be accessed together where the contents are not updated and incomplete. For KMP 2 related to maintain knowledge inventory. PID has a score below the average of 3,11 and R&D above the average of 3,55. At PID there is no integrated inventory for all PID personnel. Currently there is still use of personal/per team inventory which is not accessible to everyone. As for R&D, the conditions were similar to KMP 1, that is, there was already a document storage server, but it was not updated enough and everyone was more comfortable with their respective inventory locations.In KMP 6, where this subcategory relates to benchmarking activities to improve organizational performance, the scores of the two directorates were higher than the average. For R&D, it has a much higher score of 3,93 (the highest among the other subcategories) and a PID of 3,55. These two directories consistently engage in benchmarking activities, such as

sharing information with experienced hires or consultants, having conversations with business partners, or even utilizing market intelligence data.

IV.1.10 Category 6: Learning and Innovation Score and Analysis

PID and R&D have different final scores in the learning and innovation category: 24,84 for PID and 25,16 for R&D. However, in these two directorates, this category performs better than average or even reach highest score. The PID score has a value of 4,14, while the R&D score has a value of 4,20. The two directorates had the highest marks in the LNI 2 subcategory, which is associated to risk taking or making mistakes that can be used as learning opportunities. or R&D it has a much higher score of 4.55 and a PID of 4.36. This has become a corporate culture, where management encourages young leaders to make measured decisions.The LNI 6 subcategory has the lowest score among the other subcategories in both PID and R&D with a score of 3,71 for PID and 3,64 for R&D. This subcategory relates to the incentives given to individuals when sharing information. At PID, they once gave some kind of gift, but it was not effective in motivating individuals. In R&D, the practice of giving incentives is not common, except when there is competition, so the incentives are given to the winners only.
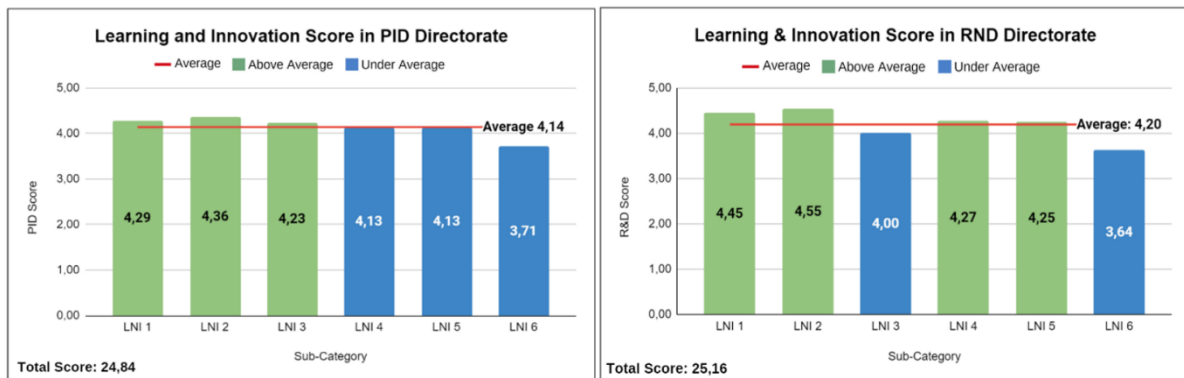

Figure IV.10Learning and Innovation Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.11 Category 7: KM Outcomes Score and Analysis

The total category KM Outcome scores for the PID and R&D directorates were almost the same and the average score was 3,76 for PID and 3,82 for R&D. Subcategory KMO 1 relates to the successful history of the department when implementing KM. PID has a score above the average of 3,77 and R&D below the average of 3,75. At PID, they have run KM and held successful change initiatives, but because they are not well documented, they cannot be replicated perfectly. For R&D there is an implementation of KM such as the R&D Academy which is quite successful but needs to be extended to the senior scientist level. The KMO 2 subcategory relates to assessing the impact of knowledge contributions and initiatives. These two directorates have scores below the average, where the PID score is 3,59 and the R&D score is 3,48. In R&D, improvement or KM initiatives usually run right away without a detailed impact review process, and improvement projects that run between one project and another are not integrated. Meanwhile, in PID, only large projects are subject to impact analysis, for small projects there is no prior assessment.The KMO 5 subcategory relates to the department has improved product quality and services because of applying knowledge. Both directorates have scores above the average. With the Post Launch Evaluation (PLE) agenda after 6 months the product has been on the market, this is an important moment to improve quality (continuous improvement).
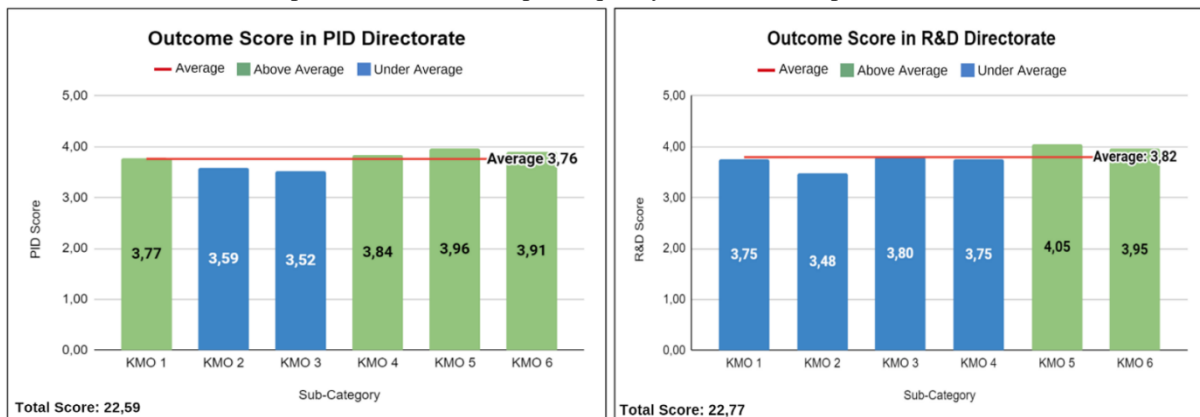

Figure IV.11Outcome Category Score for PID and R&D Directorate (Source: Author Analysis, 2023)

IV.1.12 Interview Analysis with Data Triangulation

On March 20 (PID) and March 28 (R&D), 2023, respectively, the Head Directorates of PID and R&D attended interviews. The interviews lasted around 120 minutes and were performed via video conference (Microsoft Teams) and in-person meetings. The researcher briefly explained the APO KM framework and each component of the questionnaire before presenting the survey results to the interviewee and taking questions related to each survey topic.In this study, we examine the relationships between qualitative and quantitative results, which are categorized as convergence, complement, and divergence. The triangulation analysis shows that the quantitative data and qualitative data have a relationship of convergence and complement. No divergence is found from the quantitative and qualitative data for any of KM categories in strength and weakness point.

IV.2 Business Solution

The strengths and weaknesses discovered from the collected data are the starting point to select the component that the organization must focus on to improve its standing on the KM maturity level. The focus of the improvement plan will be on the aspects that come under the "weakness" category. There is room for improvement in areas where the department has performed comparatively well. Identifying weakness to find the key for improvements is done by determining KM activities in the KM assessment tool with score lower than the average category score.In the following, the researchers made it in the form of a PPT framework (People, Process, Technology) so that it is easier to understand according to the KM objective design. Then all proposals can be schemed as follows for the PID and R&D Directorate:

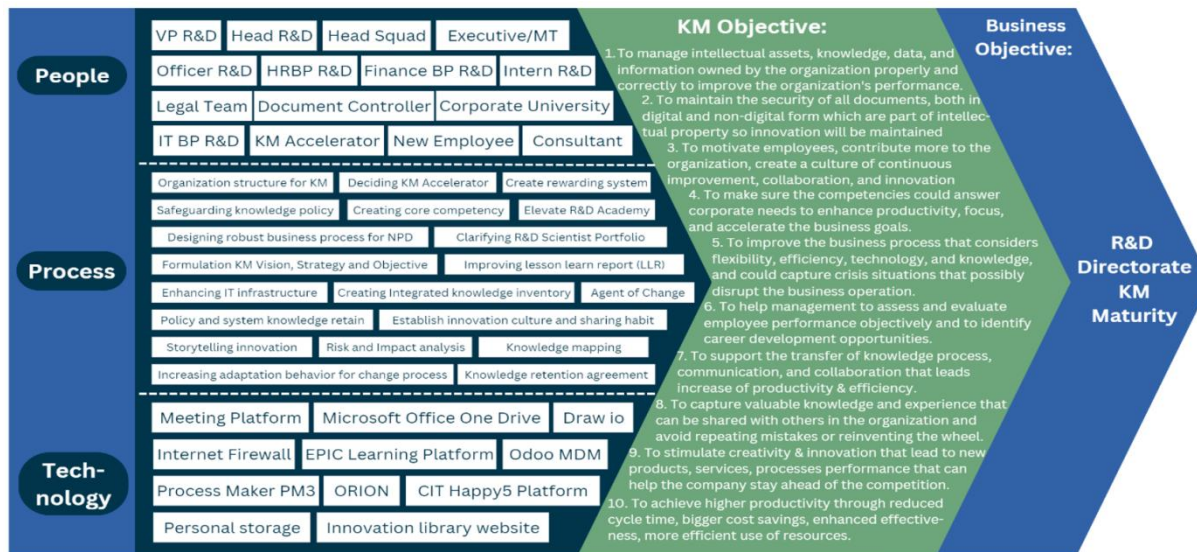Figure IV.12 Business Solution's PPT Framework of PID Directorate (Source: Author Analysis, 2023)

Figure IV.13 Business Solution's PPT Framework of R&DDirectorate (Source: Author Analysis, 2023)

From thefigure above, there 14 action plans for PID directorate and 13 action plans for R&D directorate are proposes as solution to increase KM maturity. There will be 27 action plans, but 8 action plans has a same objective and can be done together. so that in total implementation there are only 19 action plans that will be carried out to increase the maturity level of the two directorates.

V.   CONCLUSION

Based on the analysis of the APO KM maturity assessment result, the current level of KM readiness in the PID and R&D Directorate are determined through qualitative data obtained from employees in the directorate. The questionnaire is adapted from APO Knowledge Management Assessment Tool which measure seven KM audit categories that consist of KM Leadership, Process, People, Technology, Knowledge Process, Learning and Innovation and KM Outcomes.

- PID Directorate is at Refinement level with score 157,96 points out of 210 points for its KM practice.
- R&D Directorate is at Refinement level with score 163,14 points out of 210 points for its KM practices.

The result shows that knowledge management practices have been performed out in both directorates even though knowledge management has never been officially institutionalized or introduced. The results demonstrate that KM practices have also been regularly evaluated and improved. To achieve complete KM maturity, a gap still must be filled.

KMstrategy initiatives can be implied in the NPD team to improve the agility, quality, and performance of product development and innovation. Among the strategic initiatives that apply to these two directorates aremaking policies that can protect all forms of knowledge assets, especially those related to NPD, creating employee core competencies that align with companies' vision, mission, and strategic goals, designing robust and thorough business processes for NPD, creating database of staff competencies, enhancing IT infrastructure that suits the KM strategy, creating policy and system regarding knowledge retain for employee leaving the company, creating innovation culture and sharing knowledge habit and developing risk and impact analysis of knowledge contribution to support higher productivity.

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