A Proposed Design of Knowledge Based Performance Management System For Airport Company

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Abstract

The aviation industry has an important role in connecting different regions of the world. Along with the economic recovery after the COVID-19 pandemic, improving airport performance is important to pay attention to. This research aims to design a knowledge-based performance management system that is suitable for airport companies. This research aims to identify critical factors that affect the performance of airport companies, identify organizations with critical functions, and design an integrated performance management system (IPMS) based on predetermined variables. This study uses a combination of theoretical analysis methods and model validation using data from airport companies in Indonesia. Data collection was carried out through questionnaire surveys and interviews. The Analytical Hierarchy Process (AHP) is used to select the appropriate variables by determining their level of significance. This study identifies 9 critical factors that must be considered in designing a performance management system for airport companies. These factors include business perspectives, internal processes, and resource capabilities. Furthermore, this study designs an integrated performance management system (IPMS) by determining Key Performance Indicators (KPIs), Cascade KPIs, targets, weights, and organizational functions involved. This research results in a knowledge-based performance management system design that can be applied to airport companies. This system is expected to help airport companies in improving their performance and achieving organizational goals.

Keywords: Performance management system; Airport companies; Organizational performance; Knowledge-based management

INTRODUCTION

Air transportation has been the first choice among other modes of transportation, it is convenient and fast journey that can save a lot of travel time (Karim et al., 2023); (Septiani, 2021). To connect cities around the world, airports have an important role in orchestrating safe and secure departure and arrival of passengers while using air transportation. Many stakeholders involved in airport services, such as airlines, government, tenants, passengers, and shareholders / investors, this lead to airport business (Anjasmoro & CHARIRI, 2010). The airport business is expected to grow in parallel with the increasing number of passengers (Bharata et al., 2020); (Paminto, 2020).

Since being hit by the COVID-19 pandemic in 2019, the global economy has started to grow again slowly but has shown a huge potential in the airport business, especially since airport presence has a multiplier effect generated at local and regional economic performance . A study from German airports indicates the impact of additional passengers on airport employment. There is a rule of thumb that one million extra passengers per annum, generating around 500 on-site jobs (Klophaus et al., 2008) ; (HARIANTO, 2018). In addition, the airport become the most important transportation hub in Indonesia as an archipelago country that connects cities and regions (Bachtiar et al., 2023); (Prasetyo, 2019). However, during the pandemic travel ban, growing business is challenging due to the impact of Covid-19.

To prepare for the demands after the travel ban, the Ministry of State-Owned Enterprises (SOE) Indonesia, as the company shareholder, has put efforts to improve the attraction of air travel journeys by gathering airport, airline, and tourism companies owned by SOE forming a holding company for better synergy. This condition can activate a national airport network and its business at 36 airports across Indonesia, so the need to improve each airport performance has become a necessity. It is necessary to have strategic steps to create a wide range of improvements for airport management to meet an international standard to achieve its goal. As a first step is to know critical indicators relate to the airport performance.

Airports are complex sets of businesses, each airport may have different operational characteristics due to their unique ecosystem, financial, size, and governance. When comparing one airport to another, some of the typical factors that drive different results should be considered in making comparisons include passenger volume, traffic, mix of local and transfer passengers, mix of airlines service like low cost or full service, mix of the aircraft type used and public transportation access. For example, in terms of business smaller airports are likely concern about operating cost and break even, while larger airport have more focus on develop service, capacity and comfort. Therefore, it is necessary to develop performance indicators that are specific to each airport's operations to ensure accurate measurement and alignment with the overall corporate targets and performance (Rirring, 2022); (Farzana, 2023).

A well-designed performance management system according to the purpose, size, and their ecosystem in the airport can optimize corporate performance (Rukmana et al., 2023). The airport ecosystem involves critical players and stakeholders whose processes and performance can significantly impact the company at the corporate level . Therefore, a well-defined performance management system is necessary to ensure all parties involved are aligned and working towards the same goals (Moko et al., 2021).

This research discusses factors affecting the airport company's performance by identifying important indicators that enhance competitiveness. The main idea is to coordinate key players within the ecosystem to design corporate performance management systems (Solehudin et al., 2023). By identifying critical indicators and involving all stakeholders, the airport company can optimize its operations and achieve better results. The research question explores the cause-effect relationship regarding organizational performance outcomes, with objectives to find critical performance variables and indicators for airport business performance, identify organizations with critical functions, and design an integrated performance management system (IPMS) based on the determined variables. The study focuses on PT Angkasa Pura II, evaluating performance variables and indicators during the IPMS design phase to identify Key Performance Indicators (KPIs), Cascade KPIs, targets, weights, and organizational functions, while incorporating Malcolm Baldrige principles and a customer-centric approach. Limitations include the scope of implementing an IPMS, as well as constraints related to research purpose, time, and data availability.

METHODE RESEARCH

The research methodology used in this study is a combination of theoretical analysis and the validation of models using data from Indonesia's Airport Company (NAFIAH, 2022). Data collection was carried out by conducting a case study in a state-owned airport company. Data were mostly collected by a questionnaire survey, as well as face-to-face interviews. The Analytical Hierarchy Process (AHP), created by Thomas L. Saaty in 1970, is utilized to select appropriate variables by determining their level of

significance. The theoretical analysis revealed that there are nine crucial factors that must be taken into account when creating a performance management system (PMS) for an airport company as shown on figure 3.1 below:
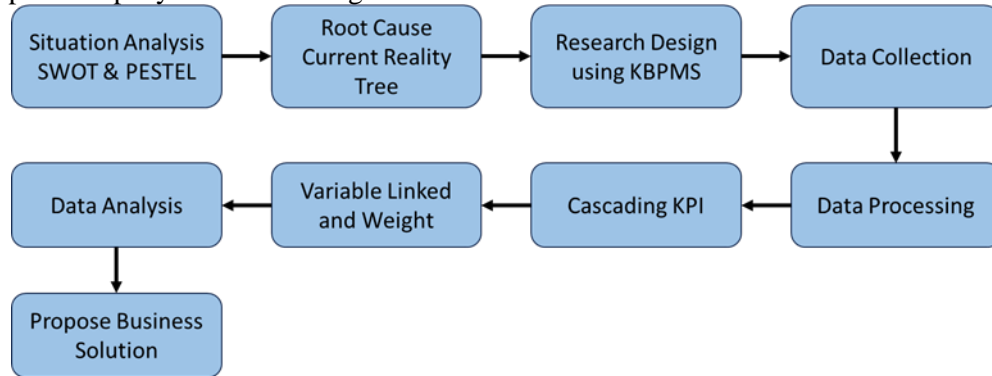

Figure 1 Research Method Framework

The research method depicted in Figure 3.1 is explained as follows: First, a thorough situation analysis is conducted to understand the organization's current state, including strengths, weaknesses, opportunities, and threats (SWOT), as well as internal and external environments. This establishes a baseline for measuring progress and highlighting areas needing immediate attention. Second, the root causes of issues are identified using the Current Reality Tree (CRT), a cause-and-effect diagram that traces problems back to their origins, allowing for more effective and sustainable solutions. Third, a research framework is designed using the Key Business Process Management System (KBPMS), mapping critical business processes and identifying key performance indicators (KPIs) to align data collection with organizational goals. Fourth, data collection involves gathering quantitative data like production statistics and financial metrics, as well as qualitative data like customer feedback and employee opinions, using methods such as surveys, interviews, and observations. Fifth, data processing entails cleaning, organizing, and integrating data to create a comprehensive dataset. Sixth, cascading KPIs break down high-level goals into specific, measurable indicators at various organizational levels to ensure alignment between overall strategy and daily activities. Seventh, variables are linked to specific KPIs and assigned appropriate weights based on their importance using the Analytical Hierarchy Process (AHP) to prioritize critical factors. Eighth, data analysis transforms raw data into meaningful information by uncovering patterns, trends, and insights. Finally, business solutions are proposed based on these insights, developing actionable recommendations to address identified issues and improve performance.

A. Research Design

The research will be based on Knowledge-Based Performance Management System (KBPMS). Introduced by Prof. Dermawan Wibisono also known as Integrated Performance Management System. Figure 3.2 describes this research design as a combination of qualitative and quantitative methods will be applied to analyze data.
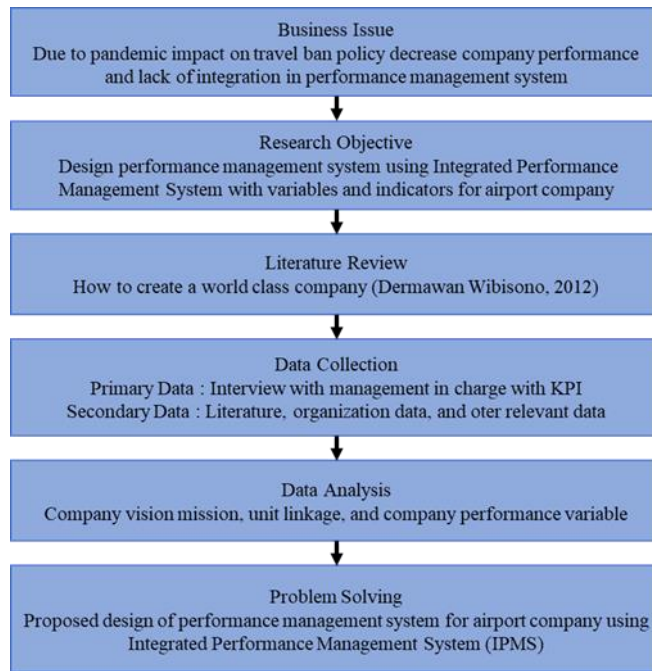
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Figure 2 Research Design

B. KBPMS Perspective

This research will focus on performance variables at the design stage and propose implementation of a Knowledge Based Performance Management System. Table 3.1 shows there are 3 perspectives of the Performance Management System, namely Business Results, Internal Process and Resource Capabilities. Each perspective has some parameters aspect.

Table 1 KBPMS Perspective

Perspective	Aspect
Business Result	Financial
	Non-Financial
Internal Process	Innovation
	Operation Process
	Marketing
	After Sales
Resource Capability	Human Resource
	Technology Resource
	Organization Resource

PT Angkasa Pura II Group which carry KPI from Ministry of SOE can be mapped into KBMS perspective, the variables should be aligned with corporate vision and mission also indicators priority from management concern. Besides, as far as we are aware, state-owned businesses have an obligation to advance social welfare in addition to turning a profit.

C. Analysis and Data Collection

The analysis begins with an understanding of the current company situation both internally and externally. To comprehend the company environment and mitigate business risks to improve performance, SWOT and PESTEL analyses are used to examine PT Angkasa Pura II's internal and external situations. SWOT stands for Strengths, Weaknesses, Opportunities, and Threats, capturing and creating a synthesized view of the current state; Strengths and Weaknesses are internal and controllable, while Opportunities and Threats are external factors impacting business priorities. Strengths include synergy management for 20 strategically located airports, strong airline partnerships, technological integration, government support, and a captive domestic market. Weaknesses involve infrastructure limitations, operational delays, high operating costs, lack of exposure to world-class operations, slow technological adoption, and complex regulations. Opportunities encompass increasing passenger demand, improving processes, popular destinations, new airline partnerships, and cargo services, whereas threats include complex airport standards, capacity issues, changes in consumer behavior, pandemics, and natural disasters. The PESTEL analysis covers political factors (government policies, political stability), economic factors (economic growth, exchange rates, and inflation), social factors (demographic trends, changing customer preferences), technological factors (advancements, infrastructure, and automation), environmental factors (regulations, climate change), and legal factors (aviation regulations, labor laws). External factors might disrupt operations, reducing revenue, so the research focuses on significant variables impacting performance using IPMS to propose a performance management system. Data was collected through structured and semi-unstructured interviews with subject matter experts, company documents, and narrative analysis to identify key performance indicators. The study includes KPIs from the Ministry of SOE and top management interviews involving financial, corporate planning, airport operation, commercial, IT, and innovation functions. The current reality map, based on the internal and external analysis and top management interviews, identifies five essential issues: financial outcome change, operational standard change, slow innovation, technological adaptation, and human resource adaptation.

RESULT AND DISCUSSION

A. KPI Assessment and Cascading

This study will use the Knowledge-Based Performance Management System (KBPMS) or the Integrated Performance Management System (IPMS) framework (Wibowo, 2023). Proposed design of integrated performance management system (IPMS) for airport company based on cascading KPI assessment explained in table 4.1 below. The corporate KPI is cascading to internal unit function mentioned in section 3.3 grouped by Financial Function, Corporate Planning and Strategic function, Airport Operation policy Function, Commercial and Service Policy, IT Function and Innovation & Human Resource Function.

Table 3 Corporate KPI Assessment (source: modified by author)

Indicator	Cascading
EBITDA	Finance
Revenue	Commercial
Interest Bearing Debt To EBITDA	Finance
Interest Bearing Debt To Invested Capital	Finance
ROIC >= WACC	Finance

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Indicator	Cascading
Completion of audit financial statements	Planning
Completion of Airport Support Service Business Portfolio Arrangement	Commercial
Assets Management Plan	Commercial
Realization of State Capital Participation (PMN)	Planning
Unlocking assets value for CAPEX fulfilment and airport liability reduction	Commercial Finance
Development of priority airports	Planning
Formation of Tourism Fund	Commercial
Business Model Innovation	Commercial
Customer Satisfaction Index Score	Operation
Completion of Single Airport Management (SAM)/Policy Arrangement	Operation
Number of New Direct Flight for domestic & international destinations	Operation
Implementation of tourism program with tourism ecosystems	Planning Commercial
Number of business collaborations for developing and marketing joint products	Commercial
Number of users of the Injourney Group membership loyalty program	Commercial
Improvement of IT Security/Collaborative SOC (Security Operation Centre)	IT
Implementation of integrated IT services	IT
Implementation of Tourism Collaborative Platform	IT
Ratio of Top Young Talent in Nominated Talent	HR
Ratio of Women in Nominated Talent	HR
Ratio of Qualification Fulfilment in Risk Management Organ	HR
Implementation of Pension Fund Health Roadmap	HR
Implementation of One Human Capital System	HR
Transferability of Staff Skills/Training	HR
Availability of Training Courses	HR
Good Corporate Governance (GCG) Score	HR

B. Proposed Implementation Plan

Referring to the framework discussion in chapter 3 figure 3.2, variables and indicators are used to design IPMS system which consist of 3 perspectives, each perspective can be detailed into aspects from which the desired performance indicators are then selected in accordance with the vision and mission, company strategy and the needs of each stakeholder. From this comprehensive framework, detailed variables for each perspective are then designed. For simulation purposes, the value of data variables gathered and generated are only examples. The following step-by-step explanation outlines how the business solution for developing a performance management system is implemented on an Excel spreadsheet:

1. Prepare the KPI corporate data list
   To ascertain how the performance management system links one indicator to the others, it is essential to define the master data of the perspective, aspect, variable, indicator and target in this stage.

2. Setting columns for actual performance scores such as realization, achievement, each variable weight, and score
   An actual performance or realization field is required to calculate the achievement gap relative to the target.
3. Define variable linkage and weighted
   To develop a contextual performance management system, the collected variables are linked and weighted.
4. Establish formula for each variable
   The formula used to calculate and measure achievement for each variable and determine score
5. Setting actual value and getting started
   The proposed design of the Performance Management System is illustrated in the following table 4.2. Using realization data from the company, the variable scoring is calculated from the target-realization ratio, multiplied by weight, respectively.

Table 2 Design for PMS Implementation (source: modified by author)

Variables	Target	Realization	Achievement	Weight	Score
EBITDA	-2.40%	-1.50%	37.50%	0.0339	0.0127
Revenue	4.353	3.574	82.10%	0.0194	0.0160
Interest Bearing Debt To EBITDA	3.25	2.80	86.15%	0.0101	0.0087
Interest Bearing Debt To Invested Capital	48%	3.84%	8.00%	0.0161	0.0013
ROIC >= WACC	-0.60%	0.38%	163.33%	0.0062	0.0100
Completion of audit financial statements	Mar-24	Mar-24	100%	0.0210	0.0210
Completion of Airport Support Service Business Portfolio Arrangement	100%	35%	35.00%	0.0076	0.0027
Assets Management Plan	100%	30%	30.00%	0.0107	0.0032
Realization of State Capital Participation (PMN)	1	1	100.00%	0.0139	0.0139
Unlocking assets value for CAPEX fulfilment and airport liability reduction	4	1	25.00%	0.0039	0.0010
Development of priority airports	100%	35%	35.00%	0.0973	0.0341
Formation of Tourism Fund	2	1	50.00%	0.0147	0.0073
Business Model Innovation	2	1	50.00%	0.0308	0.0154
Customer Satisfaction Index Score	4.65	4.52	97.20%	0.0950	0.0923
Completion of Single Airport Management (SAM)/Policy Arrangement	100%	25%	25.00%	0.0148	0.0037
Number of New Direct Flight for domestic & international destinations	3	1	33.33%	0.0330	0.0110
Implementation of tourism program with tourism ecosystems	3	2	66.67%	0.0749	0.0499

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Variables	Target	Realization	Achievement	Weight	Score
Number of business collaborations for developing and marketing joint products	3	1	33.33%	0.0202	0.0067
Number of users of the Injourney Group membership loyalty program	100%	30%	30.00%	0.0477	0.0143
Improvement of IT Security/Collaborative SOC (Security Operation Centre)	2	1	50.00%	0.0294	0.0147
Implementation of integrated IT services	2	1	50.00%	0.0219	0.0110
Implementation of Tourism Collaborative Platform	100%	85%	85.00%	0.0915	0.0777
Ratio of Top Young Talent in Nominated Talent	36%	32%	88.89%	0.0400	0.0356
Ratio of Women in Nominated Talent	17%	14%	82.35%	0.0447	0.0368
Ratio of Qualification Fulfillment in Risk Management Organ	100%	80%	80.00%	0.0197	0.0158
Implementation of Pension Fund Health Roadmap	100%	75%	75.00%	0.0245	0.0183
Implementation of One Human Capital System	100%	27%	27.00%	0.0138	0.0037
Transferability of Staff Skills/Training	50%	30%	60.00%	0.1033	0.0620
Availability of Training Courses	100%	35%	35.00%	0.0119	0.0042
Good Corporate Governance (GCG) Score	95	94	98.95%	0.0276	0.0273

The overall performance of an organization can be effectively monitored using a radar diagram, which can also serve as a comprehensive KPI dashboard. This is illustrated in Figure 4.1. The radar diagram visually represents multiple performance metrics, allowing for a clear and concise overview of the organization is performance across multiple perspectives.
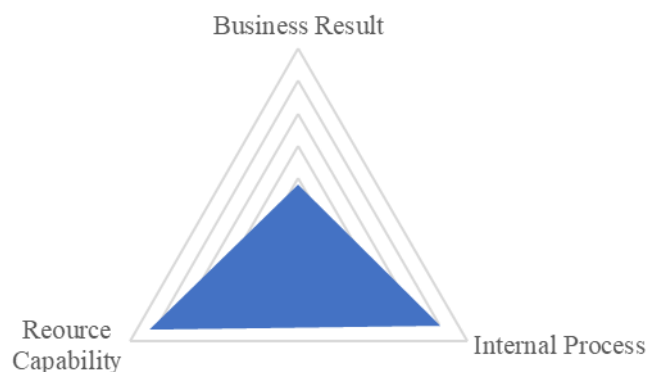

Figure 1 Dashboard KPI Perspective

The above information can be detailed in business result perspective, Figure 4.2 shows performance of IBD to Invested Capital and unlocking value for CAPEX fulfillment and airport liability reduction are low.
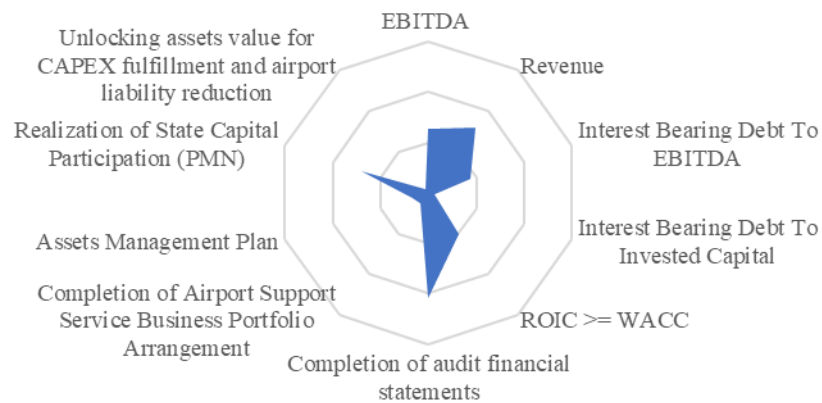

Figure 2 Business Result Perspective

In the internal process perspective, Figure 4.3 shows a strong performance for the Customer Satisfaction Index (CSI) variable indicator, which is a positive sign. Customer satisfaction is essential as it directly influences the entire performance of a business's success, resulting in enhanced customer loyalty, repeated business, and favorable word-of-mouth. Nevertheless, there are also other indicators within this perspective that need to be managed in order to achieve ideal performance levels. The data sample used is based on the realization from the first quarter (Q1), suggesting that there is enough opportunity to enhance these performance measures before the end of the year.

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Figure 3 Internal Process Perspective

The next perspective, which is Resource Capability, Figure 4 shows strong performance for the variables "Ratio of Women in Nominated Talent" and "Implementation of Tourism Collaborative Platform," while other factors require management attention. Feedback systems and ongoing observation are essential. The organization will be kept informed about ongoing performance through regular performance evaluations, feedback loops, and data analysis, enabling prompt adjustments as needed.
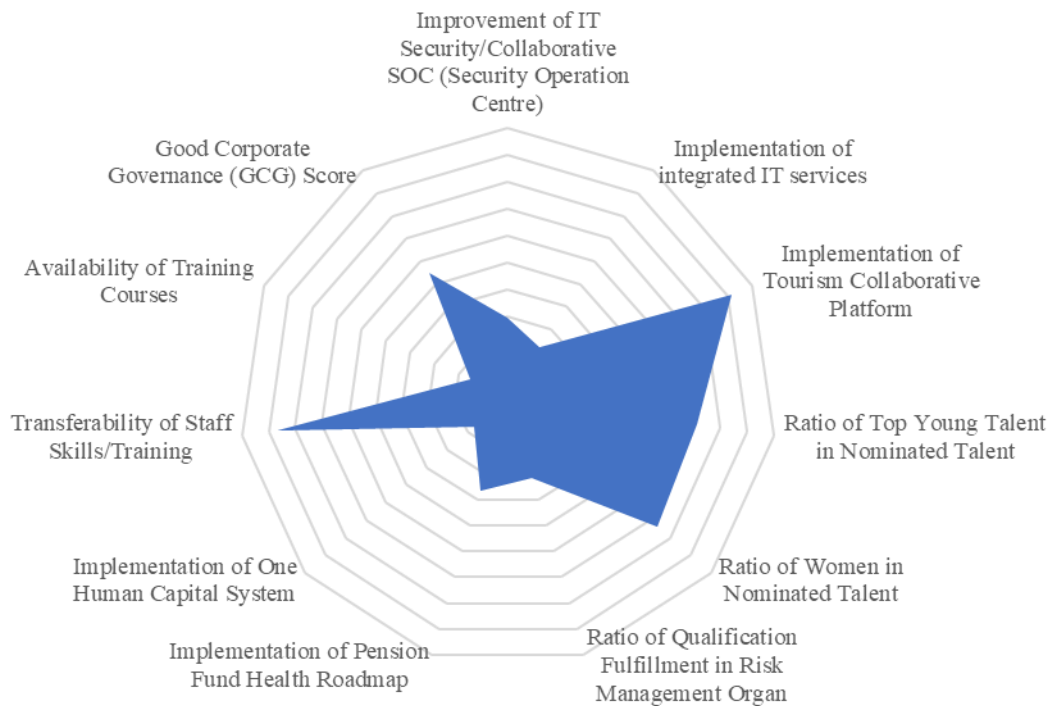
Figure 4.4 Resource Capability

Figure 4 Resource Capability

C. Implementation Schedule

A performance management system's implementation is challenging and complex but a worthwhile project that needs careful planning and carrying out. Organizations can ensure a disciplined and systematic approach to developing a strong PMS by adhering to the specified implementation timeline. Table 4.3 describe an implementation plan schedule in order to keep the system efficient and in line with corporate objectives, the periodic survey method is used for ongoing improvement of the system, guaranteeing its effectiveness and alignment with organizational objectives and improving overall success, employee engagement, and performance through these activities.

Table 3 Implementation Plan Schedule

No	Activities	2024															PIC
		Q1			Q2			Q3			Q4						
1	Management Review and Approval	▓	▓														F2
2	Assemble PMS Implementation Team	▓	▓	▓													F6
3	Develop PMS IT System		▓	▓	▓	▓	▓										F5
4	Socialisation for each organisation				▓	▓	▓	▓	▓								F3

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5	Implementation PMS																		F2
6	PMS Monitoring and Evaluation																		F1
7	Improvement for PMS system																		F2 & F4

1. **Management Review and Approval**

    In this initial phase, senior management is presented with the planned PMS plan for review and approval. It ensures that the system receives the necessary resources and support and is in accordance with the organization's strategic objectives. Getting management approval is crucial since it provides the authority and backing needed to carry out a strategy successfully. Several recurring difficulties come up throughout the design and implementation of performance management systems. First, there are some group members who are resistant. One typical thought among them is, "I have been doing everything well so far, so why implement a new system?" The second challenge is that most performance management systems in use are adapted from Western or Japanese methods, rather than being culturally built for the needs of the firm. Although many Indonesian companies have adopted Six Sigma, the Malcolm Baldrige Award, the Balanced Scorecard, and ISO, their performance has not significantly improved.

2. **Establish a PMS deployment Team**

    It is crucial to create a specialized team to supervise the deployment of the PMS. The composition of this team often consists of human resources professionals, information technology specialists, subject matter expert and representatives from other departments. Their responsibility is to strategize, synchronize, and carry out the implementation process. By assembling a team with a wide range of backgrounds and skills, we can ensure that many viewpoints and areas of expertise are taken into account during the process of designing and implementing the system.

3. **Establish PMS IT System**

    The establishment of the IT infrastructure for the PMS entails the selection and customization of software solutions that will facilitate the performance management operations. This may involve establishing databases, creating user interfaces, and integrating with other HR systems. The IT system must possess a user-friendly interface, be capable of scaling to accommodate increasing demands, and have the ability to generate the required reports and analytics.

4. **Socialization for Each Organization**

    The process of socializing the PMS involves effectively articulating its purpose, benefits, and procedures to all employees. This can be accomplished by implementing training sessions, workshops, and disseminating informational resources. The objective is to achieve universal comprehension of the system's functioning, its potential advantages for individuals, and the specific expectations placed upon them. Efficient socialization contributes to diminishing resistance and fostering acceptance.

5. **Implementation PMS**

    The implementation of PMS refers to the stage where the PMS is actively applied and carried out. The process encompasses the implementation of the software, the execution of preliminary performance assessments, and the application of the established procedures within the system. During this stage, the implementation team offers assistance and resolves any problems that may develop. Effective execution is essential to guarantee that the system operates as planned and fulfils the requirements of the organization.

6. PMS Monitoring and Evaluation

Continuous monitoring and assessment are essential to determine the efficiency of the applied PMS. This includes monitoring performance metrics, collecting user feedback, and evaluating the extent to which the system achieves its objectives. Regular surveillance facilitates the detection of areas that require enhancement and guarantees that the system is providing benefits to the organization.

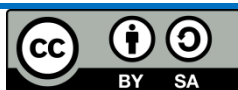## 7. Improvement for the PMS system

The PMS system undergoes continual modification based on the monitoring and evaluation phase findings, aiming to refine and enhance its functionality. This may involve the implementation of software updates, the alteration of procedures, or the resolution of any detected deficiencies.

CONCLUSION

This chapter concludes the research by answering the research question. According to the analysis in Chapter 4, the variables and indicators used to design a performance management system in an airport company are adaptable, and using the analytical hierarchy process (AHP) as a tool helps create an integrated performance management system framework. This framework allows management to identify underperforming indicators that require immediate attention, ensuring the system's flexibility to adapt to changes within the company. As the airport company grows and its operating landscape evolves, the system can be upgraded to incorporate new variables and indicators that reflect emerging priorities and goals. Maintaining long-term performance and competitiveness in the aviation sector necessitates this flexibility. The study demonstrates that an integrated framework and adaptable performance management system are crucial for efficiently overseeing and enhancing airport operations. The company's ability to recognize and swiftly correct underperforming indicators ensures optimal operations and the achievement of strategic objectives. This study emphasizes the importance of flexibility, ongoing monitoring, and a methodical approach in developing a robust performance management system. Figure 5.1 shows an overall corporate performance gauge, based on first-quarter data, indicating ample opportunity to enhance these performance measures before the year's end. The Knowledge-Based Performance Management System (KBPMS) requires regular reviews for continuous improvement. To ensure its relevance and functionality, it is essential to anticipate and adjust to changes in internal and external environments. For further development, the KBPMS can offer a comprehensive approach to performance management by integrating best practices and global standards, supporting overall organizational excellence through improved process quality, risk mitigation, and strategic coherence. The proposed Integrated Performance Management System (IPMS) design aims to provide a foundational basis and valuable resource for future researchers, offering a comprehensive framework that can be expanded to develop more advanced systems for assessment, visualization, and analysis, thereby enhancing practicality and usability in a constantly changing organizational environment.

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