

FINDING CONCEPTUAL FRAMEWORK AND CRITICAL KPI's FOR PERFORMANCE MANAGEMENT SYSTEM FOR FIELD INSTRUMENTATION TEAM OF PRIVATE OWNERSHIP CONSTRUCTION CONSULTANT: A CASE STUDY

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Abstract

Monitoring works is considered have significant impact on the office's internal processes, the proper PMS is needed. This study aims to manage the organizational performance of PT XYZ company using Knowledge Based Performance Management System (KBPMS) framework approach developed by Wibisono (2006). The proposed model was developed by combining a literature review and a case study approach applied to construction companies especially from previous studies in Indonesia. The data is analyzed to assess the suitability of the company's strategy with the current PMS used in the company, and to determine suitable performance indicators to be used in the proposed model. The analysis was carried out using a qualitative approach and multi-criteria decision-making with an analytical hierarchy process (AHP) approach from experts at the managerial level of the company. The research shows that there are at least 16 aspects and 20 performance measurement variables proposed for the monitoring division to support PT XYZ's performance. The development of this model is still in a stage that needs to be developed further. Evaluation and improvement of the PMS implementation will be planned in the future.

Keywords: Construction Consultant Company, Key-Performance Indicator, Knowledge-Based, Performance Management System, RACI.

Introduction

A construction endeavor involves three stakeholders: the owner, the contractor, and the consultant. There are at least five phases in a construction project, from the planning

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phase to the completion phase, during which each party has the potential for irregular sequences that cause construction work delays (Latif & Rahman, 2019). One of the factors effecting the company's performance in the construction industry is the absence of a performance measurement system (Formoso & Lantelme, 2000).

Performance measurement is inextricably intertwined with construction company administration. It provides the data required for process control and enables the setting of both ambitious and attainable goals. In addition, it must aid in the implementation of business strategies (Costa & Formosa, 2003). However, the successful implementation of performance measurement systems requires more than the selection of appropriate measures. Several private companies with growth prospects, including PT XYZ, lack dependability or lack a performance management system.

Performance management has emerged as a crucial tool for facilitating continuous business improvement (Robinson et al., 2005). (Fatima et al., 2017; Fatima et al., 2019) have conducted research on PMS in the Indonesian construction industry. Construction service businesses are distinguished from service businesses in other industries by a number of internal and external factors, such as the production process and management practices that are implemented. Despite the importance of performance management, it has not been extensively adopted by construction companies, and data on the performance of the construction industry are limited (Fatima et al., 2017).

According to Armstrong (2009), performance management serves at least three purposes, including aligning individual goals with the goals and core values of the organization, clarifying individual responsibilities and accountabilities, skills, and behaviors, and acting as a guide for every individual working for the organization to determine their own goals and develop their skills and competencies.

Proposed Framework

This paper proposes a PMS to aid companies in improving their performance, specifically PT XYZ, a developing construction consulting firm. It is necessary to implement a framework in corporate performance management in order to define how to address performance management system-related problems. The objective of using a project management system is to improve the performance process by enhancing individual and team performance (Amstrong, 2006).

If performance measurement is based on the wrong factor, then organizational behavior will not align with the company's strategy (Wibisono, 2012). The framework for this investigation was the Knowledge-Based Performance Management System. In 2006, Wibisono developed this framework. The framework proposed by Wibisono (2006) applies three crucial performance variables to processes: organizational output, internal processes, and resource capabilities.

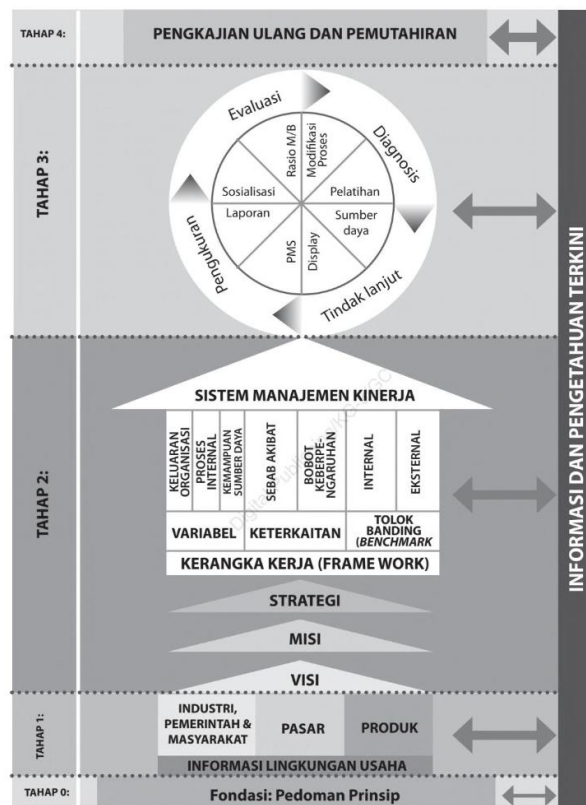


Figure 1. Conceptual Framework of IPMS (Wibisono, 2012)

Table 1
Stages in Designing IPMS (Wibisono, 2006)

Aspect	Focus	Stage
0	Principle Guidelines	Principles of Partnership, Empowerment, Integration, Independence, principles: Easy to Understand, Long Term Orientation, Time Base, Continuous Improvement, Quantitative
1	Basic Information	Industry, government and society, markets and competitors, products and services
2	Design	Vision, Mission, Strategy, Framework, Performance Variables, Linkages, Comparative Study
3	Application	Measurement, Evaluation, Diagnosis, Follow up, Reports, Outreach, Benefit-Cost Ratio, Process Modification, Training, Resources, Display, Current PMS
4	Refreshment	Review and update

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The PMS system must be dynamic and constantly updated to reflect the most recent developments in a variety of areas, including the business competition environment, government regulations, societal demands, technological advancements, and PMS standards.

Research Method

In this study, data collection consisted of company data, literature studies, and interviews in structured and semi-structured interviews limited to the study subject. Three experts in the company are gathered as a respondent. A set of initial performance indicators is then determined literature review based on a case study of a Indonesia state-owned construction firm (Fatima et al, 2017, 2019, 2022). Based on the initial KPIs measurement variables proposed by previous researchers, KPIs were determined that were suitable for the work model and business at PT XYZ.

1. Case Study and Limitation

PT XYZ is an Indonesian construction consultancy based in Bandung, West Java. The monitoring division is one of PT XYZ's operational divisions. Monitoring division in monitoring works is categorized as a job with a high level of people movement, as is the work of this division, which involves a variety of people from various parties. Some problems in the monitoring division are due to technical and non-technical issues, but the primary cause is the lack of a system that defines job responsibilities and measures company performance management. These factors have an impact on perceived inefficient work processes, delaying initiatives and possibly causing work delays. Monitoring works is one of the divisions that contributes to office revenue and engineer mobilization turnover, and it has a substantial impact on the office's internal processes, necessitating the implementation of a PMS. The research is conducted on PT XYZ's operational level management for the Monitoring Division; PT XYZ is a small to medium-sized construction consulting firm. Due to the fact that research in this field is still relatively "uncommon," very few empirical studies have been conducted on KPIs for (referring to various business level, company type, and specialization categories) variables.

2. Data Analysis

It is determined through a pairwise comparison which variables influence the PMS perspective that is linked to the company's vision and mission. The Analytic Hierarchy Process (AHP) can be used to assess the significance of the relationship between indicators. In this study, AHP was utilized to determine the weight of KPIs. Utilizing AHP online, KPI weights are calculated.

AHP is a simple decision-making tool for complex, unstructured, and even multi-attribute problems. The AHP methodology consists of three fundamental stages, beginning with the creation of a hierarchy and concluding with the calculation of results.

The strength of the AHP method lies in its ability to imitate human judgments regarding the significance of various factors in the achievement of goals or outcomes, as well

as its capacity to structure complex and multi-attribute problems. AHP evaluates the consistency of pairwise comparisons using each matrix's consistency ratio (CR). The CR value must be less than 0.1 in order to determine the viability of the results. If CR is greater than 0.1, there is a 10% possibility that each element has not been properly compared.

Results and Discussion

A. Industry Overview

According to data from Badan Pusat Statistik in 2022, there are 24,236 construction entities in Indonesia, 2,450 of them are consultants. PT XYZ is known as a specialized consultant, which is still relatively small compared to other consultants. Based on data from the BPS data, the following table shown the categories of consultants in Java based on their classification.

Table 2
Consultant Classification Based on Province in Indonesia (BPS,2022)

Province	Classification				Total
	Large	Small	Medium	Specialized	
Jawa Barat	64	1769	183	241	2190
Jawa Tengah	19	1362	47	77	1482
Jawa Timur	36	2643	111	221	2919
DKI Jakarta	298	1117	343	583	2130
Total	417	6891	684	1122	8721



Figure 2. Consultan Company Classification in Indonesia (Source: BPS, 2022)

B. Consultant Success Factors

Nitithamyong and Tan (2007) suggest 12 factors that influence the effective performance of consultants in a construction project. The main factors consist of several explanatory points which are then summarized and numbered by writers as a decisive factor (DF) for study purposes which These 12 factors are interaction ability, efficient information management, proper planning for project implementation, establishment of standard procedures, factors in organizing team members, client support factor, commitment and flexibility factors, human resources factor and understanding of client needs., decision making factors, client characteristics and contribution factors, competency and experience factors and problem solving ability factor.



Figure 3. Consultant Success Factor (Adopted from Nitithamyong and Tan, 2007)

C. Company Vision, Mision and Strategies

PT XYZ has three main visions, namely to Develop art of engineering, to Become Capable Consultant, and to Achieve International Recognition, to achieve that vision, the Company must encourage its employees to move forward in developing innovative research in the industry sector, develop human and scientific resources for their employees so that they are always updated and competent, both technical skills and soft skills and Expanding networks and relationships, developing many research publications for employees, maintaining communication with both national and international relations. Participate in international events. The missions of PT XYZ are to apply civil engineering practice with professional and quality standards, to develop civil engineering knowledge

and methods suitable for developing countries, to develop local wisdom in geotechnical engineering to a global horizon to provide the best service for clients.

Table 3
Strategy Analysis Based on SWOT Matrix

	Strengths	Weaknesses
TOWS Analysis	<ol style="list-style-type: none"> 1. Highly competent, experienced and knowledgeable consultants teams 2. Solid reputation and credibility in the market for providing clients with high-quality and trustworthy consulting services. 3. Cultivated long-lasting relationships with a diverse client 4. Specialized consulting services that are distinct from those of competitors. 5. Good track record. 	<ol style="list-style-type: none"> 1. The use of technology is relatively stagnant 2. Affected by knowledge and reputation of key individuals 3. May encounter difficulties in scaling up its operations and managing increased client demands while maintaining the same quality and client satisfaction.
Opportunities	S-O Strategies	W-O Strategies
<ol style="list-style-type: none"> 1. Had the opportunity to become large consulting classification 2. The development of the construction industry 	<ol style="list-style-type: none"> 1. Value driven approach 2. Experienced Approach 3. Customer Engagement 4. Product/Services Leadership 5. Employee Engagement 	<ol style="list-style-type: none"> 1. Development of R&D Division 2. Human Resources Engagement
Threats	S-ST Strategies	W-T Strategies

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1. Competitor companies with better innovation offerings and lower priced offerings	1. Maintain good track record 2. Maintain relationship with existing customer 3. Increase relations 4. Customer engagement	1. Sensitive to technological developments, offering innovative new things, improving technology-based quality
2. Economic downturns or fluctuations can cause clients to spend less on consulting services, making it difficult to acquire new clients and retain existing ones..		
3. Changing client expectations and needs may affected the company		

D. Result

The result of the AHP are shown below, it resulted in three critical KPIs namely company mission & vision awareness, employee productivity levels, employee motivation & commitment in the perspective of resources capability, health operating cashflow, decrease in operating cost efficiency, appropriateness planning parameters in internal process perspective, and on-time project completion, performance quality, and customer satisfaction from a business result perspective.

1. Performance Indicators

**Table 4
KPIs Weight**

Perspective	Aspect	Variable	Indicator	KPIs Weight
Business Result	Financial	Profitability	Profit Margin	0.062
			Return on Equity	0.062

			Return on Investment	0.039
		Solvability	Earning After Tax	0.046
			On-time Project Completion	0.242
	Non-financial	Customer	Performance Quality	0.25
			Customer Satisfaction	0.157
		Environment	Safety Incident	0.14
			Health Operating Cashflow	0.709
Internal Process	Operation Process	Work Accomplishment	Decrease in Operating Cost Efficiency	0.041
			Appropriateness Planning Parameters	0.026
		Human Capital Readiness	Company Mission - Vision Awareness	0.173
	Human Resource	Manpower Productivity	Employee Welfare	0.099
			Employee Productivity Levels	0.2
Resource Capability		Human Capital Improvement	Employee Motivation & Commitment	0.192
	Technology	Infrastructure Availability	Maintenance Cost	0.023
		Culture	Culture	0.092
		Leadership	Leadership	0.066
	Organization		Harmony	0.039
		Employee Engagement	Teamwork & Knowledge Sharing	0.116

2. Variables Interrelation Model

In this paper, The AHP Result is used by the researcher for this section to identify causal connections based on the perceptions and experiences of the parties involved. Due to the lack of proof, cause and effect are still only theories.

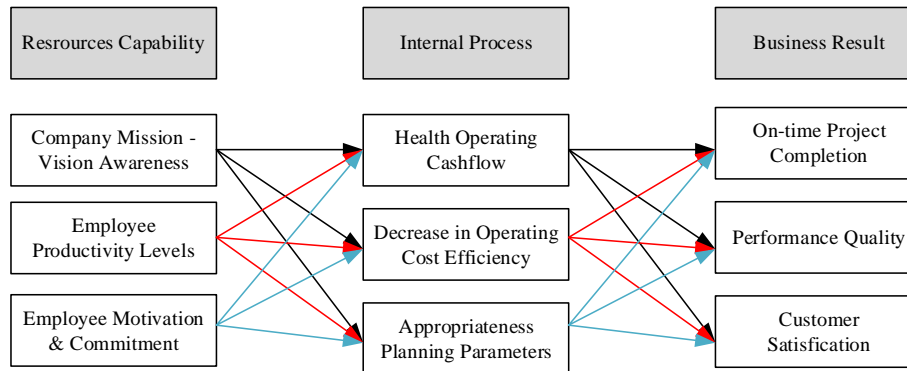


Figure 5. Linkage Scheme

Conclusion

Several aspects that can be highlighted from this paper include the following: (1) Consulting firms are a competences-based competitive sector. Consultancy services are professional services that require certain expertise in various scientific knowledge that prioritizes the role of thinking. (2) There are not many PMS in specialized construction consulting firms in Indonesia, this is due to the diverse nature of the industry, from the type of company (medium, small, large, specialized), company culture, project work (time, cost, quality), and other factors such as company decisions and policies. (3) Company performance, especially in this sector, cannot only be assessed from the financial aspect, but also needs to pay attention to other aspects such as quality, work time, stakeholder satisfaction (benefits). (4) The research was conducted at PT XYZ, especially in the field instrumentation monitoring division. With a high rate of movement of people, the involvement of various internal and external parties of the company, and work that demands quality and completion-speed, the issues encountered in the work process greatly affect the performance of the department and the company. A performance management using the KBPMS approach is expected to be a solution. (5) Several key performance indicators are cascading from previous studies in the same industry, adjusted to the research subject, namely the type of consulting firm. For the monitoring division, using the KBPMS approach in 3 perspectives it is proposed 12 aspects and 20 performance measurement variables that are considered influential, taking into account the quality aspects required by the consultant, the variables selected are measurable variables. (6) In this case, The AHP conducted by the expert's judgement resulted three critical KPIs that affected the company vision and mission. These critical (most) important factor are company mission & vision awareness, employee

productivity levels, employee motivation & commitment in the perspective of resources capability, health operating cashflow, decrease in operating cost efficiency, appropriateness planning parameters in internal process perspective, and on-time project completion, performance quality, and customer satisfaction from a business result perspective.

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