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Developing a Hay method-based job evaluation model for human resource management in construction company

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Abstract

The construction company's rapid growth is demonstrated by the allocation of 10.79% of the state budget expenditure towards infrastructure development. In this context, human resources must be managed without relying on expertise certification as part of competency tests; instead, emphasis must be placed on skills, experience, and leadership ability as primary criteria. Therefore, this research aimed to build and develop a job evaluation model in construction companies using the Hay method to achieve better performance. The method was employed to conduct job evaluations in the literature review of previous results, books, and journals. The results showed that there was an impact on job evaluation arrangements to increase performance based on cost efficiency, quality, time safety, and environmental considerations. The salary system model was dependent on the Hay method, using points as a metric to distinguish between various levels. Meanwhile, the output was used as a reference for academics, stakeholders, and students in developing job evaluations.

Keywords: Construction company, Construction project, Hay method, Job evaluation, Job impact, Job measure, Performance measure.

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1. Introduction

The construction company occupies a central role within a country, and the success of infrastructure development influences economic growth. In this context, Indonesia allocated 10% of the budget to infrastructure development [1, 2] to demonstrate the importance of the company. Additionally, human resources support is crucial in driving performance and

value [3, 4]. The different phases of a project [5-8] may reduce the possibility of high risks when managed properly. However, the need for development is becoming more complex with the adaptation of technologies such as Building Information Modeling (BIM) [9, 10]. In construction projects, the collaborative framework necessitates that human resources possess technical competencies and leadership skills, including effective communication, collaboration, conceptual understanding, and critical thinking. These attributes are essential for success within the construction sector [1, 11]. An important factor affecting the success of a project is the scarcity of skilled personnel [12]. Therefore, the local construction company must prioritize enhancing technological competence, managerial abilities, and human resources professionalism [12]. Human resources development is considered an important strategy [12, 13] connected to performance indicator aspects. In this context, job evaluation development is a strategic move in composing a systematic and fair organizational system [14-17]. Several methods are developed in composing evaluations from different organizations using the Hay Method [16-19]. Previous research has widely used the method as a tool for assessing the depth and responsibility of jobs [18, 20-22]. However, the specifics of conducting job evaluations in construction companies have not been carried out. Detailed mapping is required due to the challenges faced in achieving project performance [23-25]. This research is needed to guide the company in carrying out job evaluations systematically and comprehensively using the Hay Method.

2. Theoretical Literature Review

2.1. Hay Method in Industry Construction

The Chart-Profile job evaluation method, developed by Hay Group in the early 1950s is uniquely revolutionary. This method is different because evaluation criteria serve as the comparison factor. There are many common factors used to observe the differences between the types of jobs and the guideline for the Chart-Profile method is unique, offering the ability to evaluate the managerial-level job [20, 21]. A total of three factors are used for evaluation, namely know-how, problem-solving capabilities, and accountability [20].

The know-how factor aims to measure the ability, skill, and knowledge needed for every job [20, 21]. In construction company, a mapping is required for project life cycle and delivery system to determine the ability, skill, and knowledge [1, 2, 26-29]

2.2. Know-How

The first factor is the practical procedure or special methods required by job. In addition, basic routines and low level in project have lower scores compared to special methods and higher training [16, 17, 19, 21, 22]. These can be differentiated between Site Operation Manager (SOM) with Site Engineer Manager (SEM).

The second factor pertains to the extent to which a task necessitates the integration and coordination of diverse activities within a managerial framework. In this context, jobs having various functions are considered more complex than those with specific functions. Therefore, a higher level of complexity requires the presence of strong managerial expertise [20, 21]

The third and final factor of know-how is the expertise between people. This factor measures the interaction level of employees with others. Jobs including interpersonal interactions have higher values than those without criteria [18, 20, 21, 23] In this context, the comparison between SOM and SEM in organizational structure projects determines the different factor levels of the know-how.

2.3. Problem Solving in Construction Projects

This second factor aims to measure the ability of a job to use know-how to identify, define, and solve problems. Meanwhile, problem-solving requires knowledge and skills reflected in the know-how, and the factor is considered as a percentage of a score. A total of two factors must be considered to determine the score, and the first factor is connected with the type of environment in an organization. Jobs characterized by routine procedures for problem resolution will receive lower scores compared to those with less defined methods. Naturally, the guidelines for thinking for the employees increase the possibility of achieving a solution. The ability to solve problems will be higher in this position and more valuable [16, 17, 19, 21, 22].

The second factor is related to the thinking challenges necessary. Different types of situations may be faced in jobs requiring different levels of problem-solving skills. Broad problem-solving may not be necessary when a job has a similar situation. Jobs requiring problem-solving skills will have a high score compared to those experiencing similar repeated situations [21, 22].

2.4. Accountability in Construction Project

The third factor, as measured by the guide chart-profile method, pertains to the extent of job's accountability for the actions. The three factors in this factor are the freedom to act, the impact of job on the result, and the number of resources related to job [20, 21].

- The freedom to act is the compliance of job with company policies and the amount of supervision required. Jobs with minimal supervision and wide freedom to conduct responsibilities will have higher score attributes [20, 21].
- Jobs can have indirect and direct impacts. The indirect impacts may be associated with the functions, which are subsequently used to accomplish objectives. Meanwhile, the direct impact on the result may be different where responsibilities are divided between others or influenced especially by job [20, 21].
- The final factor is accountability related to the number of resources. This is measured based on the number of revenues or expenses related to the field where the main emphasis of the work lies [20, 21].

2.5. Work Condition

A fourth factor, occasionally incorporated, aims to assess job aspects not captured by the factors, such as an unfavorable work environment or exposure to specific hazards [20, 21].

2.6. HAY Method Classification in Construction Industry

- Know-how factors [20-22] consist of knowledge, complexity, and human relations skills.

2.6.1. Knowledge

Knowledge level is divided into 8 (eight) levels differentiating the depth of understanding possessed by a person in construction company. Meanwhile, the qualifications of knowledge can be presented in Table 1.

Table 1.
Qualification of Knowledge.

Levels	Explanation
A	Accustomed to routine work [21, 22].
B	Using equipment, procedures, and machinery that are user-friendly and do not necessitate specific skills [20, 22].
C	Expertise in applying work methods and general procedures is essential for defining the skills required for specialized methods [20-22].
D	Special skills applications related to a complex education in implementing practical procedures and systems, requiring additional coverage from several functions, such as supervisor [20, 21].
E	Identifying and applying a theoretical framework acquired through formal education to implement in a training program requires the adept application of principles and concepts essential for effective knowledge dissemination [20, 21].
F	Roles at this level necessitate the application and use of extensive knowledge concerning environmental variations, while positions at the tier demand professional skills [20, 21].
GH	Roles at the level demand a high level of skill, which serves as a complement to authoritative sources. This includes strategic management, as well as the formulation of policies and operational functions. Mastery of theoretical frameworks, principles, and complex methods is essential [20-22].

Table 1 outlines job evaluation with knowledge qualifications ranging from basic tasks without equipment and the use of uncomplicated tools to the application of simple to complex work methods. The highest level of the knowledge hierarchy is the capacity to make decisions, and the classification is segmented into eight levels from A to H.

2.6.2. Complexity of work [18, 21, 22]

Job complexity is differentiated into levels II-V which describe the complexity of each. The level of work complexity is presented in Table 2 as follows:

Table 2.
Qualification of Complexity.

Levels	Explanation
II	The performance of a task is shown by the specific objectives and scope, without leadership components associated with other tasks. Furthermore, it pertains to positions where the execution of duties does not necessitate external information or alternative solutions. Procedures and respective processes are typically documented, leaving a minimal margin for deviation [18, 21, 22].
III	Individual roles manifest in the multifaceted tasks, comprising a blend of task-oriented activities and functional responsibilities, with an understanding of interconnectivity within the organizational framework. These roles include conducting scheduling, monitoring progress, performing job reviews, overseeing operations, and assuming leadership responsibilities within teams. The roles serve to integrate operational divisions within the project context [18].
IV	The role holds significant breadth within a department, wielding substantial influence across the organization. The amalgamation of diverse opinions and feedback from various departments is essential to optimize performance within job function [21, 22].
V	Management from every unit function in a big organization or the total management from a huge scope or segment in a bug organization [21, 22].

Table 2 shows the differences between individual job complexity to manage teams in very complex categories.

2.6.3. Human Relations Skills [18, 19, 21, 22]

Qualification of human relations skills is divided into 3 (three) levels which differentiate the level of complexity of

communication in the organization. The qualification of human relations skills is presented in Table 3 as follows:

Table 3.
Qualification of human relations skills.

Levels	Explanation
1	Jobs at this level require effective communication to gain or obtain information, answer questions, or gain clarifications. This may include specific technical or communication functions from every department [18, 19].
2	Jobs at this level necessitate behavioral influence, resilience, and regulation across diverse situations. The individuals in the roles must show the capability to mitigate conflicts in emotionally charged scenarios, with persuasive and assertive skills. Moreover, the roles mandate the implementation of programs offering a transparent framework for monitoring and evaluating other positions [18, 19, 21, 22].
3	This is the highest level in terms of interpersonal skill and a significant level of influence with other people in different levels of the organization is necessary. The focus is long-term, behavioral, conflict resolution, and high emotional control in an intense situation requiring human behavior [21, 22].

Table 3 explains the level of communication in the organization from a small level to a large level, differentiating the skills of each level in communicating.

From the three factors, a know-how table is designed to describe the relationship between knowledge, complexity, and human relations as follows:

Table 4.
Qualification of know-how.

Professional/Content Knowledge	Complexity and Diversity											
	II			III			IV			V		
	1	2	3	1	2	3	1	2	3	1	2	3
A	38	43	50	50	57	66	66	76	87	87	100	115
	43	50	57	57	66	76	76	87	100	100	115	132
	50	57	66	66	76	87	87	100	115	115	132	153
B	50	57	66	66	76	87	87	100	115	115	132	153
	57	66	76	76	87	100	100	115	132	132	153	175
	66	76	87	87	100	115	115	132	153	153	175	200
C	66	76	87	87	100	115	115	132	153	153	175	200
	76	87	100	100	115	132	132	153	175	175	200	230
	87	100	115	115	132	153	153	175	200	200	230	264
D	87	100	115	115	132	153	153	175	200	200	230	264
	100	115	132	132	153	175	175	200	230	230	264	304
	115	132	152	152	175	200	200	230	264	264	304	350
E	115	132	152	152	175	200	200	230	264	264	304	350
	132	152	175	175	200	230	230	264	304	304	350	400
	152	175	200	200	230	264	264	304	350	350	400	460
F	152	175	200	200	230	264	264	304	350	350	400	460
	175	200	230	230	264	304	304	350	400	400	460	530
	200	230	264	264	304	350	350	400	460	460	530	610
G	200	230	264	264	304	350	350	400	460	460	530	610
	230	264	304	304	350	400	400	460	530	530	610	702
	264	304	350	350	400	460	460	530	610	610	702	807
H	264	304	350	350	400	460	460	530	610	610	702	807
	304	350	400	400	460	530	530	610	702	702	807	928
	350	400	460	460	530	610	610	702	807	807	928	1067

Source: Sari, et al. [30].

Table 4 describes the total points, which are a combination of knowledge, complexity, and human relations. The use of the points can be achieved by combining three aspects. For example, knowledge level A, complexity level II, and human relations 1 can be obtained between 38, 43, and 50, respectively. The selection of points can be justified by analyzing the length of time spent on the job.

2.7. Problem-Solving

a. Problem-solving characteristics are differentiated by thinking environment and challenges explained below:

2.7.1. Classification of Thinking Environments [16, 18, 19, 22]

Thinking environment qualifications describe the level of depth from easy to complex, as shown in Table 5.

Table 5.
Qualification of Thinking Environments

Description of the class	Code of classification
Simplifying a complex procedure into an easily comprehensible concept enables versatile application across diverse contexts, thereby facilitating the association with appropriate accompaniments [16, 19].	AC
Thinking to define something as a specific target in a situation with characteristics that require policies, practical knowledge, and basic reference in conducting job [18, 19].	DE
Thinking with a final target in an unclear, unseen situation and unstructured aspects [16, 18, 22].	F
Thinking about the conceptual frameworks, principles, and directives provided by specific institutions regarding the outcomes of organizational efforts, such as targets and objectives, may show ambiguities, latent factors, or unstructured factors within the environment [18, 22].	G
Thinking with philosophy, organization, legal basics, and constitutional principles connecting humanity [16, 18].	H

Table 5 shows the cognitive engagement, ranging from ideation to profound philosophical contemplation, across eight tiers of complexity, as applicable to various job roles within construction sector.

2.7.2. Classification of Thinking Challenges [16-22]

Qualification of thinking challenges shows the depth of every different situation, as reported in Table 6.

Table 6.
Qualification of Thinking Challenges.

Description of the class	Code of Classification
In diverse circumstances, singular solutions may be necessitated within distinct domains. The appropriate action is dependent on accumulated experience, with certain instances demanding discerning judgment [16-19].	3
A demand arises for analytical, interpretative, evaluative, and constructive thinking toward short-term objectives due to the fluid nature of the context [20-22].	4
During emergencies arising from administrative situations or novel concept developments, an imaginative method becomes important, especially in myriad internal pressures [18, 21, 22].	5

Table 6 describes construction of thinking in different situations according to the work carried out. In projects, changing situations are common, and during emergencies, the ability to solve problems with constructive thinking is essential.

The point of problem-solving is based on a percentage of know-how. The method to determine points in problem-solving is to map the qualifications of the thinking environment and challenges.

Table 7.
Qualification of Problem Solving

	3		4		5	
A	18%		25%	29%	33%	38%
B	21%		29%	33%	38%	43%
C	25%		33%	38%	43%	50%
D	29%		38%	43%	50%	57%
E	33%	38%	43%	50%	57%	66%
F	38%	43%	50%	57%	66%	76%
G	43%	50%	57%	66%	76%	87%
H	50%	57%	66%	76%	87%	87%

The use of Table 7 is to select a thinking environment at levels A-H with challenges from 3-5. For example, level A3 with 18% of the total knowledge points obtained in Table 4 can be used. Subsequently, a simple multiplication is conducted to calculate the points in the problem-solving qualification.

2.7.3. Accountability

Qualifications for accountability are divided into freedom of action, job impact, and magnitude, as explained below.

2.7.3.1. Freedom of Act

Freedom to act is the degree to differentiate measurable main work, as reported in Table 8.

Table 8.
Qualification of Freedom of Act [18, 19, 22]

Description of the class	Code of classification
Work adheres to structured policies and procedures, subject to review by the respective supervisor for every job type conducted [16, 18, 19].	A, B
Jobs are subject to policies and procedures that govern the applicability. Functional procedures are used to achieve job targets, particularly in operational activities directly connected to defining objectives [16, 18, 19].	C, D, E
Jobs in this position are naturally not limited in size since departments are subject to functional policies and organizational objectives [16, 17, 19].	F
Jobs in this position have sizes with unlimited freedom.	GH

Table 8 shows the qualifications for autonomy in action, from tasks governed by work, through roles with less defined procedures, to positions within departments unrestrained by functional limitations, tasked with formulating regulations and organizational objectives, and direct decision-making authority.

2.7.3.2. Classification of Job Impact

Job impact classification is divided into four levels based on the level of revenue production directly. This includes roles classified as indirect, contributory, shared, and primary, all contributing to the organization's revenue generation directly.

Table 9.
Qualification of Job Impact [16, 17]

Description of the class	Code of classification
Indirect [16, 17]	I
Contributory [16, 17]	C
Shared [16, 17]	S
Primary [16, 17]	P

From Table 9, the level of qualification job impact on revenue consists of 4 levels, namely indirect, contributory, shared, and primary.

2.7.3.3. Classification of Magnitude

Classification of magnitude is differentiated based on employee salary levels, as presented in Table 10.

Table 10.
Qualification of Magnitude [16, 17].

Degrees	Rupiah Range
Very Small	X< 5 million
Small	5-10 Million
Medium	10-20 Million
Medium Large	20-30 Million
Large	30-40 Million
Very Large	40-50 Million
Largest	>50 million

From Table 10, the magnitude levels start from very small to largest with an income of less than IDR 5 million, to > IDR 50 million per month.

The point of accountability is designed using three factors, namely freedom of act, job impact, and magnitude as described in Table 11.

Table 11.
Qualification of Accountability.

	Very Small 1				Small 1				Medium 3			
	I	C	S	P	I	C	S	P	I	C	S	P
A	9	12	17	23	12	17	23	32	17	23	32	43
	10	14	20	27	14	20	27	38	20	27	38	50
	12	17	23	32	17	23	32	43	23	32	43	57
B	14	20	27	38	20	27	38	50	27	38	50	66
	17	23	32	43	23	32	43	57	32	43	57	76
	20	27	38	50	27	38	50	66	38	50	66	87
C	23	32	43	57	32	43	57	76	43	57	76	100
	27	38	50	66	38	50	66	87	50	66	87	115
	32	43	57	76	43	57	76	100	57	76	100	132

	Very Small 1				Small 1				Medium 3			
	I	**C**	**S**	**P**	**I**	**C**	**S**	**P**	**I**	**C**	**S**	**P**
D	38	50	66	87	50	66	87	115	66	87	115	152
	43	57	76	100	57	76	100	132	76	100	132	175
	50	66	87	115	66	87	115	152	87	115	152	200
E	57	76	100	132	76	100	132	175	100	132	175	230
	66	87	115	152	87	115	152	200	115	152	200	264
	76	100	132	175	100	132	175	230	132	175	230	304
F	87	115	152	200	115	152	200	264	152	200	264	350
	100	132	175	230	132	175	230	304	175	230	304	400
	115	152	200	264	152	200	264	350	200	264	350	460
G	132	175	230	304	175	230	304	400	230	304	400	528
	152	200	264	350	200	264	350	460	264	350	460	608
	175	230	304	400	230	304	400	528	304	400	528	700
H	200	264	350	460	264	350	460	608	350	460	608	800
	230	304	400	528	304	400	528	700	400	528	700	920
	264	350	460	608	350	460	608	800	460	608	800	1056
	Large 4				Very Large 5				Largest 6			
	I	C	S	P	I	C	S	P	I	C	S	P
A	304	400	528	700	400	528	700	920	528	700	920	1216
	350	460	608	800	460	608	800	1056	608	800	1056	1400
	400	528	700	920	528	700	920	1216	700	920	1216	1600
B	460	608	800	1056	608	800	1056	1400	800	1056	1400	1840
	528	700	920	1216	700	920	1216	1600	920	1216	1600	2112
	608	800	1056	1400	800	1056	1400	1840	1056	1400	1840	2429
C	700	920	1216	1600	920	1216	1600	2112	1216	1600	2112	2793
	800	1056	1400	1840	1056	1400	1840	2429	1400	1840	2429	3212
	920	1216	1600	2112	1216	1600	2112	2793	1600	2112	2793	3694
D	115	152	200	264	152	200	264	350	200	264	350	460
	132	175	230	304	175	230	304	400	230	304	400	528
	152	200	264	350	200	264	350	460	264	350	460	608
E	175	230	304	400	230	304	400	528	304	400	528	700
	200	264	350	460	264	350	460	608	350	460	608	800
	230	304	400	528	304	400	528	700	400	528	700	920
F	264	350	460	608	350	460	608	800	460	608	800	1056
	304	400	528	700	400	528	700	920	528	700	920	1216
	350	460	608	800	460	608	800	1056	608	800	1056	1400
G	400	528	700	920	528	700	920	1216	700	920	1216	1600
	460	608	800	1056	608	800	1056	1400	800	1056	1400	1840
	528	700	920	1216	700	920	1216	1600	920	1216	1600	2112
H	608	800	1056	1400	800	1056	1400	1840	1056	1400	1840	2429
	700	920	1216	1600	920	1216	1600	2112	1216	1600	2112	2793
	800	1056	1400	1840	1056	1400	1840	2429	1400	1840	2429	3212

Table 11 is a combination of freedom to act, job impact, and magnitude classified in levels A, I, and small, respectively.

2.8. Organization Structure Project

Organizational structure is divided into functional and matrix aspects [31].

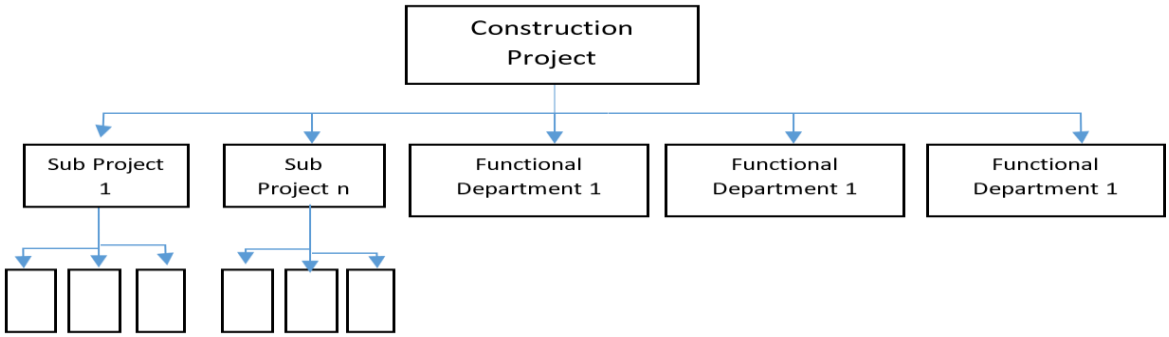

Figure 1.
Functional diagram of the organization structure in company.
Source: Mao, et al. [31].

Figure 1 reports that the matrix structure is divided based on the functions in the organization. Under construction projects, several project units and functional main departments interact directly. This structure will be effective and require fewer but less flexible people in project [31].

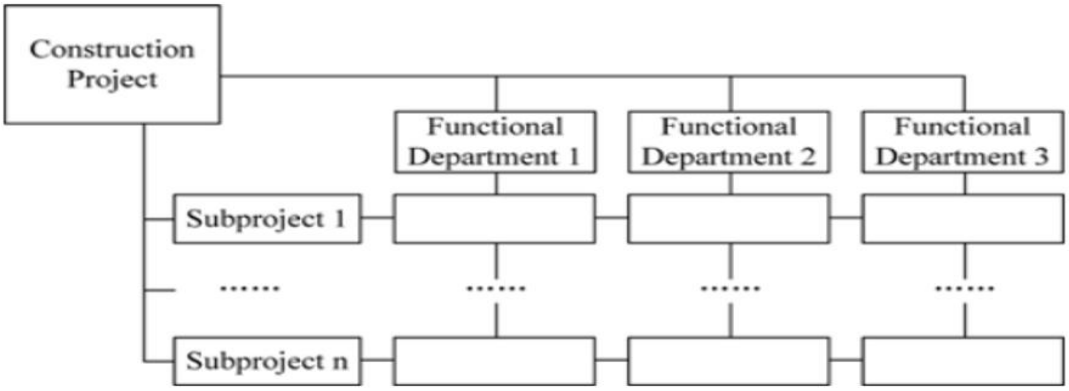

Figure 2.
Matrix diagram of the organization Structure of construction company.
Source: Mao, et al. [31].

Figure 2 describes an organizational structure in the form of a matrix where projects are managed, and the matrix structure is connected with the main office [31]. The organizational structure project recommended to analyze job evaluation in construction projects is as follows.

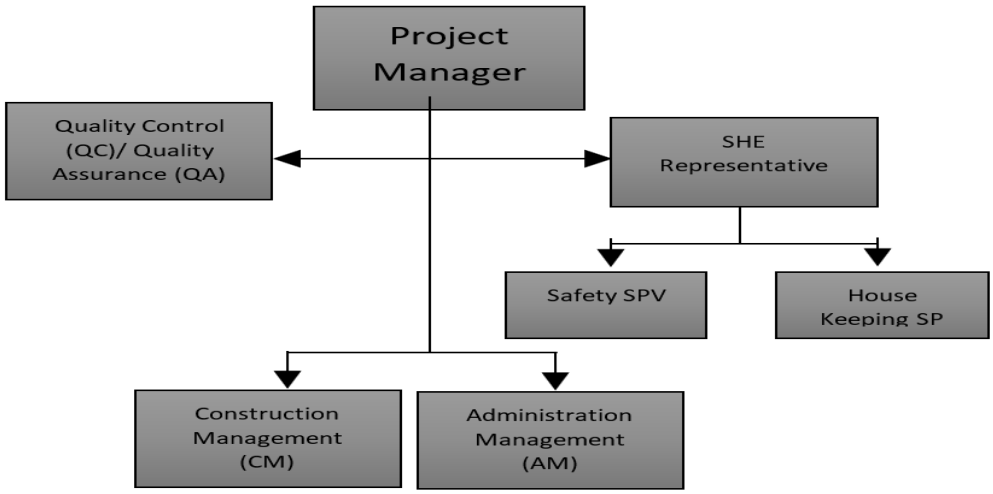

Figure 3.
Organizational Structure in Construction Projects.
Source: Susilowati [32].

Figure 3 is an organization structure project recommended for use in construction projects.

3. Materials and Method

3.1. Research Methodology Used Is Delivered as Follows

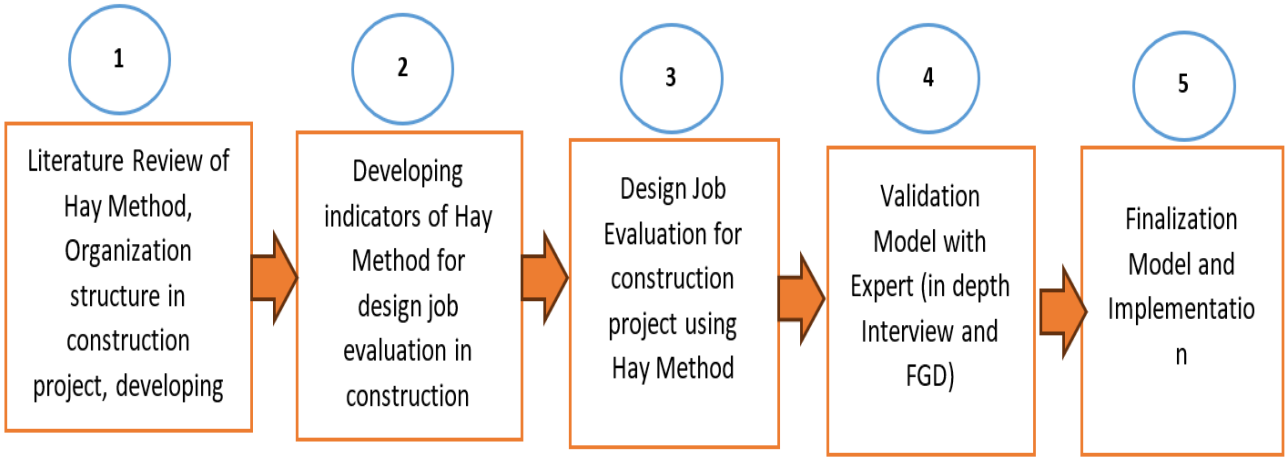

Figure 4.
Research Methodology

Figure 4 describes that the steps consist of five steps as follows:

Step 1: This step is initiated with a comprehensive literature review, including various organizational structure theories and factors used in analyzing the Hay method, including know-how, problem-solving, and accountability. Subsequently, it includes identifying gaps in previous research on the method, aiming to explore applications within the construction domain.

Step 2: This step establishes standardization for each factor used to measure the depth of indicators in knowledge, problem-solving, and accountability. The level of difference for each point is determined at the upper limit with a level of 15%. The subsequent step is to develop a table to measure the depth of each factor in conducting job evaluations in a specified organizational structure.

Step 3: Job evaluation is designed for each of the determined positions based on the organizational structure used in the construction company. The results are validated in the field. Interviews were conducted by asking for written consent when carrying out validation in the field and expert FGDs to draw consensus.

Step 4: The following step is validation in the field with an ongoing project before conducting a focus group discussion (FGD) to determine the magnitude and level of difference. The participants consist of seven experts with the following qualifications:

1. Two construction management experts with Ph.D. degrees and a minimum of five years of experience in construction management.
2. Three experts in designing payroll systems for middle-class companies with experience as managers.
3. Two project managers with a minimum budget of 10 billion Rupiah and at least three years of experience.

Step 5: The subsequent step is to finalize the model and results from the FGD within the construction company.

4. Results

Job description analysis from organization structure in projects is produced from the steps considered. This variable helps to evaluate every member of project. In this research, job description mapping consists of eight positions as presented in Table 12.

Table 12.
Job Description of HR Construction Project.

No	Position	Tasks
1.	Project Manager	Set a target and explain the method used. Determine the right people in accordance with authority. Show leadership *(leadership)* and motivate the staff. Evaluate progress implementation and take appropriate action. Integrate responsible answers with business from a group of people who come from various functions to reach target project.
2.	Quality Control/Quality Assurance	Scope of work includes quality management system planning, preparation procedure work, conducting related audits quality, and work quality inspection. Understand and learn the appropriate technical specifications used in project in company. Conduct quality testing on the items used in project. Evaluate feasibility tests in the field and laboratory Balance work methods, technical specifications, and time efficiency to enhance the smooth running of projects. Conduct quality control on materials and work inventories.
3	Safe Healthy Environment (SHE) representative	Audit and conduct planning, execution, and work supervision. Provide standard policies on every work procedure. Responsibility for the smooth implementation of project in HSE aspects. Responsibility for work safety and security in project location.
4	Construction Management	Project scope and work progress, job site logistics, safety conditions, and work quality inspection [33]. Construction managers are responsible for handling and controlling fieldwork to achieve the target set by company. Conduct target planning and work program control to understand contract documents, shop drawings, construction, and concepts. Avoid any unnecessary mistakes based on work experience. Prepare project planning, work reports, and job evaluation results to be reported to headquarters. Provide feedback to management on the risks influencing and building relationships with clients to develop and provide a future for company. Monitor project progress, work productivity, and compliance with safety codes. Executing, socializing, developing, and controlling the implementation of rules and regulations, systems, and project procedures. Provide guidance, motivation, and training to subordinates as well as emphasize work discipline.
5	Administrative Management	Schedule routine meetings and document meeting results. Break down projects into small tasks. Create and update workflow. Delegate tasks to project coordinator and other team members. Perform risk analysis. Monitor project progress and handle potential problems. Prepare and provide progress documentation for internal teams and stakeholders. Track expenses and forecast future expenses. Coordinate quality control to ensure work results are up to standard. Measure and report work performance.
6	Safety SPV	Conduct identification and mapping for potential hazards in the work environment. Create and maintain K3 documents. Provide suggestions related to the safety program. Conduct evaluation on the possibility or chance of work incidents. Become the liaison between government regulations and company policies.

No	Position	Tasks
7	SOM	Control the direction of project, ensuring the specifications and criteria from the client are met. Communicate with other construction professionals and community members by coordinating and monitoring the workers. Provide instructions and orders to the team in carrying out technical work. Prepare materials to be used in making project quality planning. Prepare materials used to make project budgets.
8	SEM	Technical planning and construction materials. Provide every shop drawing. Create the necessary calculations. Determine technical data specifications materials and construction work volume. Lead the fieldwork by using and optimizing every available resource to fulfill the quality, time, and cost criteria.

The table describes the tasks and responsibilities of each member of the organization.

The subsequent step is to prepare a job evaluation for the construction project where mapping is conducted using know-how, problem-solving, and accountability factors.

Table 13.
Job evaluation for construction project.

No	Position	Point Review			Total Score
		Knowhow	Problem-Solving	Accountability	
1	Project Manager	264	50% =132	400	796
2	Quality Control/Quality Assurance	230	38%=87	132	449
3	Safe Healthy Environment (SHE) representative	230	38%=87	132	449
4	Construction Management	230	57%=131	304	665
5	Administrative Management	230	38%= 87	132	449
6	Safety SPV	175	50%=87,5	115	377,5
7	SOM	230	57%=131	200	561
8	SEM	230	50%=115	132	477

From Table 13, each position has different points in performing jobs based on know-how, problem-solving, and accountability. The results show that the project manager has the highest score based on the job evaluation carried out from the three factors, namely knowledge, problem-solving, and accountability. A minimum difference of 15%, 2x15%, or 3x15% must be considered to check each level.

Table 14.
Level of difference [16]

Position	Quality Control/Quality Assurance	Safe Healthy Environment (SHE) representative	Construction Management	Administrative Management	Safety SPV	SOM	SEM
Project Manager	3x15%	3x15%	15%	3x15%		15%	2x15%
Quality Control/Quality Assurance					15%		

The level of difference is obtained according to the pattern permitted in job evaluation. Meanwhile, Supriadi, et al. [18] carried out the same mapping on retail company using hay method and set the level of difference in the range of 19-43%. Nadiyah [16] did not calculate the level of difference for each job but used the results to evaluate the current salary position.

5. Discussion

5.1. Level of Difference

The level of difference shows the disparity in points between the highest and lowest levels, derived from the results of FGD. This difference should be at least 15% and not exceed 60% to ensure meaningful differentiation across levels of evaluation, as reported in Table 15.

Table 15.
Level of difference for each position.

	QC/QA	SHE Rep.	CM	Admin Mgt	Safety SPV	SOM	SEM
Project Manager	45%	45%	15%	45%			
SHE representative					15%		
Construction Management						15%	30%
SOM							15%

The implementation of the Hay method for job evaluation shows the process of establishing a point-based payroll system in a construction company. For example, the payroll system can be implemented since the difference between the Project Manager and QC/QA is 45%.

5.2. Simulation of Pay

The simulation of pay for each position as an organization structure of the project is shown in Table 16.

Table 16.
Simulation of pay for construction project.

No	Position	Level of difference	Pay Simulation (IDR)
1	Project Manager		40.000.000
2	Quality Control/Quality Assurance	45%	22.000.000
3	Safe Healthy Environment (SHE) representative	45%	22.000.000
4	Construction Management	15%	34.000.000
5	Administrative Management	45%	22.000.000
6	Safety SPV	15% from HSE	18.700.000
7	SOM	15% from CM	28.900.000
8	SEM	15% from SOM	24.500.000

Points of job evaluation can be used to prepare the pay range for construction companies and this provides a fair system for every position. Therefore, a fair system drives work achievements in construction companies [34-36].

6. Conclusions

In conclusion, the implementation of the Hay method for job evaluation was reported to enhance the systematic nature of the process, facilitating effective control over the tasks and responsibilities associated with each position within the construction company. Meanwhile, the points must be analyzed and checked through the level of difference between 15-60% [18]. The size of the points in job evaluation was used to form an open and fair payroll system since the factors were controlled by every member of the company. Additionally, the characteristics could drive good work performance to increase values and benefits in the long run [16]. The results obtained were expected to organize human resources more professionally in improving project performance [37].

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