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THE 3rd INTERNATIONAL CONFERENCE ON BUSINESS AND BANKING INNOVATIONS
"Unlocking New Marketing Strategies on ASEAN After Covid-19 Pandemic"

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"Unlocking New Marketing Strategies on ASEAN After Covid-19 Pandemic"

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FOREWORD

Alhamdulillah, praise be to Allah Subhanahu Wa Ta'ala for granting us the opportunity to organize and publish the proceedings of the 3rd International Conference on Business and Banking Innovations (ICOBBI) with the topic "*Unlocking New Marketing Strategies on ASEAN After Covid-19 Pandemic*". This proceeding contains several researches articles from many fields in Business & Marketing, Banking & Sharia Banking, Accounting & Financial Management, Human Resources Management, Operations Management, Investasi, Insurance & Capital Market, Strategic Management, Technology Management, and Information System.

The 3rd International Conference on Business and Banking Innovations was held on 6th – 7th March 2021 by virtual (online) meeting and organized by the Master Management Study Program of STIE PERBANAS Surabaya in Collaboration with three Higher Education Institutions in Indonesia and two Universities from Asia countries. Keynote speakers in this conference were: Prof. Jessa Frida T Festijo (Lyceum of the Philippines University), Prof. Krisda Tanchaisak, Ph.D (Ramkhamhaeng University Thailand) and Burhanudin, Ph.D (Head of Undergraduate Program In Management of STIE Perbanas Surabaya, Indonesia).

I would like to give high appreciation to the Rector of STIE Perbanas Surabaya for his support at this event. Acknowledgments and thank you to all the steering and organizing committees of the ICOBBI for the extra ordinary effort during the conference until this proceeding published. Thank you very much to all presenter and delegates from various Universities. Beside it, I would like to express our gratitude to the three universities, namely Universitas 17 Agustus Surabaya, STIE 66 Kendari, Institut Institut Bisnis dan Keuangan Nitro Makassar which has been the co-host of this event.

Hopefully, the proceeding will become a reference for academics and practitioners, especially the business and banking industry to get benefit from the various results of the research field of Business and Banking associated with Information Technology. Proceedings also can be accessed online on the website <https://pascasarjana.perbanas.ac.id>.

Chair of the Master Management Study Program
STIE Perbanas Surabaya

Prof. Dr. Tatik Suryani, M.M.





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Human Resource Allocation Management System for A Multi-Office Architecture Firm

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ABSTRACT

Background and Purpose. For a multi-office architecture firm, an HR allocation management system is a necessity. The main challenge is to make the allocation equal between offices in terms of quality and quantity. This study uses ATTAYA Architects as the case study. ATTAYA Architects is a small size architecture firm based in Bandung and Jakarta. At the company, there is no HR allocation management system implemented. Therefore, the purpose of this research is to fill that gap by creating an HR allocation management system based on employees' skills for each office. **Methods and Analysis.** The study proposes a HR allocation strategy that considers literature review (including project management, HR management, HR allocation, and linear programming) and company policies (including employees' level, position, and skills). The strategy is analyzed and generated using binary linear programming. **Findings.** By implementing the strategy, the company has to keep the employees' skills deficit ratio between two offices to the minimum.

Keywords: HR allocation, linear programming, multi-office architecture firm

1. INTRODUCTION

The concept of architectural management (AM) first introduced in the 1960s [1]. Since then, the popularity level of AM has been increased rapidly as a discussion topic among professionals [2]. The perception about AM, which was initially considered insignificant, began to change as the amount of interest in the fact and the understanding increased. AM is considered to be closely related to an architectural firm's ability to balance profitability and design quality. Hence, an Architectural Management Taxonomy Framework (AMTF) had been created [3] to help architects understand and apply AM in their practices and show what aspects need to be considered in managing an architectural office. AM is divided into two separate management systems, namely office management and project management [2]. Although it can stand alone as a discipline in other fields, project management can also be incorporated as part of AM. This research will only focus on human resource management as part of project management.

Human Resource Management is notoriously complex. Human resources allow firms to succeed by giving them the skills needed to adapt products and services to market needs and meet competitive challenges [4]. The workforce characteristics and management determine a firm's performance, moderated by the firm's strategies. The idea has not been studied in professional firms, especially architectural firms. Researchers empirically identify the aspects of the architectural firm's workforce characteristics and management, influencing

its performance [5]. The firm's resource-based view emphasizes the link between its internal resources, strategy, and [6]. This is a critical context that researchers agreed should be considered when studying a firm's resources using the resource-based view [7-8].

HR allocation is one of the functions of human resource management. HR allocation is challenged by dynamic environments where changes are frequent [9]. The resource-based view suggests that human resources should be integrated into strategy formulation [5]. The use of the resource-based view in examining the potential of the workforce of architectural firms thus proved useful. Human Resource Planning is a process of moving an organization to its desired position, with the right kind of people in the right job at the right time [10]. The planning is designed to maximize value-creating activity to help employers effectively meet human resource requirements. To do this, one needs to consider an organization's goals and objectives, along with its various resource constraints. The query is one of how to implement the plan to satisfy the needs. One critical implementation is staffing the organization through selection and allocation when forecast needs have been established.

Linear programming (LP) is a mathematical optimization technique that has proved effective in solving resource allocation problems. LP is widely used in the literature and is more of a technical subject. This study emphasizes the measurement of intangible criteria and their incorporation into the allocation process using

LP to rate and derive the best combination of people assigned to each office. The HR allocation problem is solved using a standard software program like Microsoft Excel with a Solver routine.

Case Study: ATTAYA Architects is a multi-office architecture firm based in Indonesia. As an emerging small firm, the company faces many challenges and issues, especially those related to AM. The existence of two physical offices that far apart make coordination not optimal. The directors feel that this happens because of the unbalanced HR allocation between the two offices. The company wants to create a management system that helps management freely allocate human resources without sacrificing both teams' quality. The system is expected to address the HR allocation problems that will emerge in the future.

2. LITERATURE REVIEW

The research divides and limits the literature review into four topics, from the most general to the most specific, including project management, human resource management, HR allocation in project management, and LP.

Figure 1 illustrates how each area of knowledge is intertwined with one another. Starting from the most general, architectural management, which is divided into two, project management and office management [2]. Project management is allocating and financing resources, time and resource planning, and personnel management and training. Office management is a framework for the design and composition of individual projects. The research only focuses on project management.

Project management has many areas of derived knowledge. It consists of human resource, scope, time, cost, quality, risk, and procurement [11]. The theory addressed in this research focuses on human resource management, especially HR allocation, in supporting the work process at ATTAYA. Then, LP is discussed to solve the resource allocation problem.

LP is one of the simplest ways to perform optimization. It helps the company solve some very complex optimization problems by making a few simplifying assumptions. A linear program has three major components: decision variables, objective function, and constraints. Integer programming is an LP with the added requirement that all or some of the variables are integer non-negative, but it is not necessary if the model parameters are also integer. Staffing decisions and manpower allocations are easily studied using this mathematical modelling techniques when the purpose is to assign or schedule staff or workloads [12].

3. DATA & FORMULATION

Human resources data and analysis used in this research only focuses on architectural employees in ATTAYA who involved in the projects. The architectural employee is often referred as architect or architectural designer.

ATTAYA currently have a total of 10 architect employees (Table 1). They have a company policy to calculate the skills point of each employee. The calculation examines the multiplier coefficient of employee's level and position, project count, years of experience, and X-Factor (Table 2).

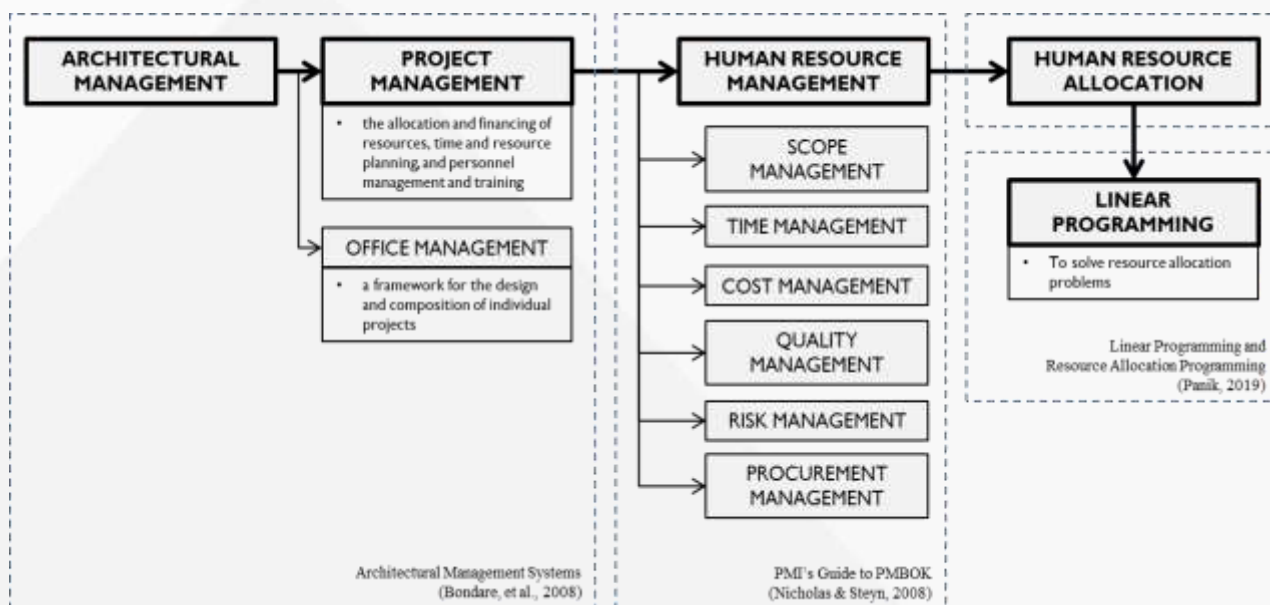


Figure 1. Key points of the literature review



The Sum points are calculated according to ATTAYA's company policy. The Sum Formula:

$$Sum = [\sum(p \times coeff)] \times coeffpos$$
 The following definitions apply:

p = parameter value of Skills including X, XP, and XF
 $coeff$ = multiplier coefficient of Skills parameter (1, 2, 3)
 $coeffpos$ = multiplier coefficient of employee's position (1, 2, 4, 6, 8, 10)
 Table 3 illustrates the skills sum, rank, and ratio of each architect employee. Based on the Skills data analysis, employee A1-BB was in the first rank with 545.10 points (or 26.32% of all employees' total Skills). It is predictable considering he has been practising architecture for more than eight years and had been

involved in a total of 29 AD projects, the most among others. A1-BB also had X-Factor value of 3, because one

of his design had been approved without revision by the client on the first meet. Employee A1-CC is in rank two with 448.44 points (21.65%). His crucial experience on construction site makes the company believe that he deserved an X-Factor value of 3.

ATTAYA have Skills value with an average of 207.12. Two other employees have a score above the average, which are A1-AA with 440.10 (21.24%) and A2-DD with 272.03 (13.13%). Ranks of 5-9 consecutively are B1-FF (5.50%), B1-EE (5.32%), B1-GG (3.91%), B2-II (1.45%), and B2-HH (1.26%). The last rank is employee B4-JJ, an intern, who was a fresh graduate and the least experienced, among others.

The condition of HR at ATTAYA varies greatly in terms of the quality of their skills. There is a skills gap

Table 1. Architects' Level and Position at ATTAYA

Level	Position	Code	Coeff	Number of employees
Senior Level	Principal Architect	A1	10	3
	Senior Architect	A2	8	1
Junior Level	Architect	B1	6	3
	Junior Architect	B2	4	2
	Probation	B3	2	0
	Intern	B4	1	1
Total				10

Table 2. The Parameters of Employee's Skills

No	Parameter	Definition	Description	Coeff
1	X	Project count	The number of projects employee has been involved in during their career	1
2	XP	Years of experience	The number of years since employee graduated or started their very first project during their career	2
3	XF	X-Factor	The employee's level of influence in a project	3

Table 3. Architect Employees' Skills

#	ID	coeffpos	Skills Parameters (p)			Sum	Rank	Ratio
			X (coeff=1)	XP (2)	XF (3)			
1	A1-AA	10	21.5	8.25	2	440.10	3	0.21248
2	A1-BB	10	29	8.25	3	545.10	1	0.26318
3	A1-CC	10	19	8.42	3	448.44	2	0.21651
4	A2-DD	8	19.5	4.25	2	272.03	4	0.13134
5	B1-EE	6	11	2.18	1	110.14	6	0.05318
6	B1-FF	6	8.5	3.75	1	113.98	5	0.05503
7	B1-GG	6	5.5	2.50	1	81.05	7	0.03913
8	B2-HH	4	4	1.25	0	26.02	9	0.01256
9	B2-II	4	3	2.25	0	30.02	8	0.01449
10	B4-JJ	1	2	1.17	0	4.33	10	0.00209
Total						2071.19		1.00000
Average						207.12		0.10000

among architect employees. There are three employees (A1-AA, A1-BB, A1-CC) that exceeds the two-thirds of the total of Skills value with 69.21 %.

The gap occurs due to factors such as employee's level and position, number of projects the employee has been involved during their career, their years of experience, and X-Factor. There needs to be a HR allocation management system so that the company can distribute employees evenly in both offices.

4. RESULTS & DISCUSSION

The company implements LP by using Microsoft Excel with Solver. All employees are considered to be placed anywhere based on their skills. There are two offices that needed to be allocated, Office A and Office B. The company policies or constraints to be taken into account while generating the allocation of the employee can be summarized as follows.

- 1) *Total employees*: there are ten architect employees (4 Senior and 6 Junior).
- 2) *One office policy*: each employee must be allocated to only one of the offices. He/she cannot work in two offices at the same time.
- 3) *Equality policy*: the number of employees in both offices must be the same, which is five employees per office.
- 4) *Minimum position policy*: each office should have a minimum of 1 Principal Architect (A1), 1 Architect (B1), and 1 Junior Architect/Intern (B2/B4).
- 5) *Deficit Ratio*: Deficit Ratio must be lower or equal to 5%. The company set threshold of 5% as their target to ensure that the skills gap between office is minimalized.

The HR allocation issue has been formulated as a binary LP model. The allocated value is either 0 (no) or 1 (yes) to only one of the offices.

Notation. The following notations are used to specify the mathematical model.

- x_{ijk} = the requirement of employee of position i with initial j in office k
- i = position (1=A1, 2=A2, 3=B1, 4=B2, 5=B3, 6=B4)
- j = employee initial (1=AA, 2=BB, 3=CC, 4=DD, 5=EE, 6=FF, 7=GG, 8=HH, 9=II, 10=JJ)
- k = office location (1=Office A, 2=Office B)
- dr = deficit ratio
- Z = total employees (10)

Decision Variables. The decision variable (x_{ijk}) represents the employee's allocation point of true ($x_{ijk}=1$) or false ($x_{ijk}=0$). The used decision variables can be described as follows:

$$x_{ijk} = \begin{cases} 1, & \text{if employee of position } i \text{ with} \\ & \text{initial } j \text{ is working in office } k \\ 0, & \text{Otherwise.} \end{cases} \quad (2)$$

Model Constraints. The company policies for HR allocation had been modelled into constraints.

$$1) \text{ Total employees: } Z = 10 \quad (3)$$

$$2) \text{ One office policy: } x_{ij1} \neq x_{ij2} \quad (4)$$

$$3) \text{ Equality policy: } \sum x_{ij1} = \sum x_{ij2} \quad (5)$$

$$4) \text{ Minimum position policy: } \sum x_{ijk} \geq 1, \quad (6)$$

where i is 1, 3, and 4/5/6

$$5) \text{ Deficit Ratio: } dr \leq 0.05000 \quad (7)$$

Objective Function

$$\text{Set to Value of } Z = \sum x_{ijk} \quad (8)$$

The highlighted cells from Table 4 are generated from Solver. The number of employees is distributed evenly with 5 in each office. Both offices have two Senior Level and three Junior Level employees. All constraints and optimally conditions are satisfied. Solver has found the optimal global solution using Simplex LP.

Table 4. The Strategy Configuration (LP)

#	ID	Configuration				Skills Ratio	
		Office A		Office B		Office A	Office B
1	A1-AA	x_{111}	1	x_{112}	0	0.21248	
2	A1-BB	x_{121}	0	x_{122}	1		0.26318
3	A1-CC	x_{131}	1	x_{132}	0	0.21651	
4	A2-DD	x_{241}	0	x_{242}	1		0.13134
5	B1-EE	x_{351}	0	x_{352}	1		0.05318
6	B1-FF	x_{361}	0	x_{362}	1		0.05503
7	B1-GG	x_{371}	1	x_{372}	0	0.03913	
8	B2-HH	x_{481}	1	x_{482}	0	0.01256	
9	B2-II	x_{491}	1	x_{492}	0	0.01449	
10	B4-JJ	x_{6101}	0	x_{6102}	1		0.00209
Subtotal			5		5	0.49518	0.50482
Total		10				1	
Deficit Ratio (dr)						± 0.00964	
						0.96%	

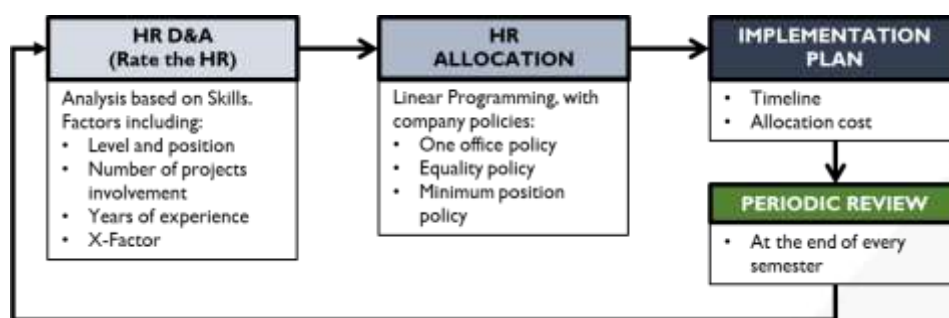


Figure 2. ATTAYA's HR Allocation Management System

5. CONCLUSION

The authors suggest an HR allocation management system that will be implemented at ATTAYA using LP (Figure 2). LP is a useful optimization technique for solving allocation problems by taking tangible measurements into consideration. A binary LP formulation was used to model alternative HR allocation strategies. The model tended to weight the skills attributes, which was the interaction between level and position, number of projects, years of experience, and the X-Factor. The constraints were total employees, the company policies, including one office policy, equality policy, minimum position policy, and deficit ratio. The strategy generates the lowest deficit ratio with 0.96% between two offices.

ATTAYA Architects will implement the proposed HR allocation strategy. Several important things that need to be considered including:

- The HR configurations will be scheduled for at least 6 months. By then, the company need to have a review to decide whether to keep or change the configuration.
- There will be a review at the end of every month to evaluate the development of the newly relocated employees. Moreover, in the second, third, and fourth month, there will be a weekly small workshop and training to increase employees' skills.

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