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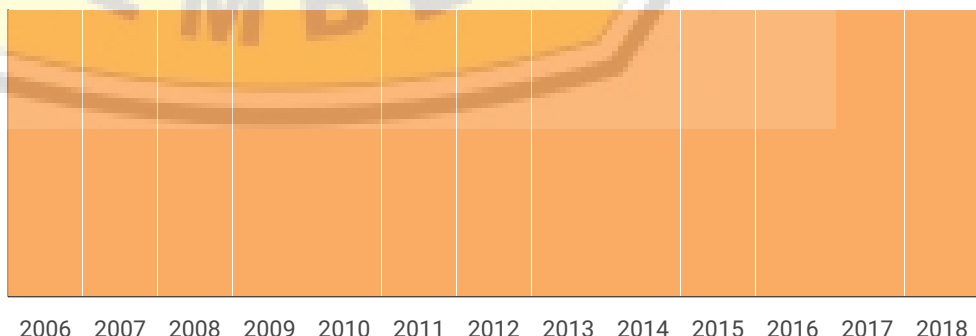
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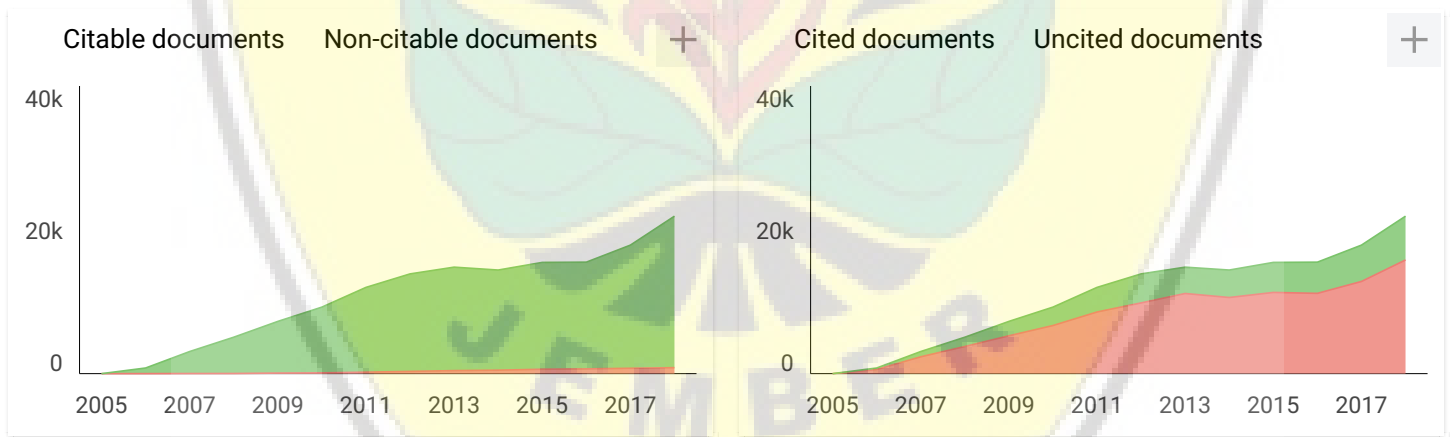
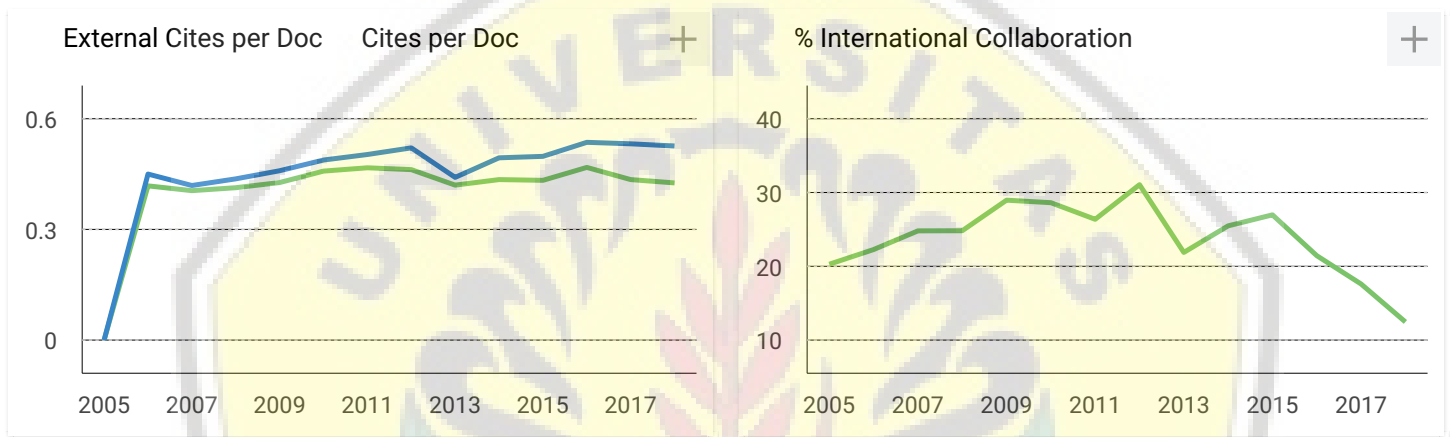
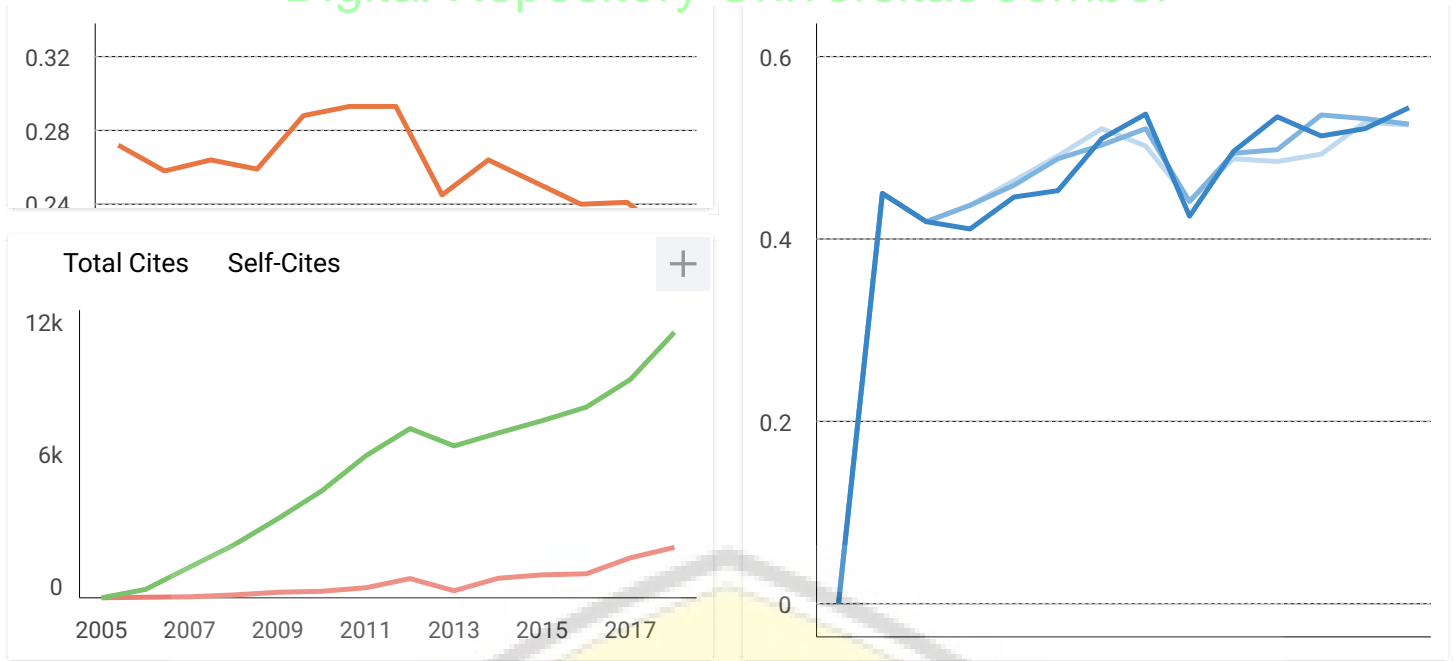
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Application of linear programming for expatriate assignment planning

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Abstract. An expatriate is a person who lives temporarily or resides outside her/his native country or a foreigner who lives in a country. It is usually because of a state or professional duty. The activity of sending employees to branch companies in other countries is called expatriation. Expatriation activities are high cost activities, so the need of sending employees to branch companies in other countries must be carefully calculated. Assignment problems occur in various decision-making situations which include assignment of work for machinery, agents for special tasks, sales personnel in the sales area and others. The distinguishing characteristic of an assignment problem is that one agent is assigned to one task. The research was conducted at PT. Asian Hybrid Seed Technologies Indonesia, where the company will open three new marketing areas and require expatriates to be assigned as project leaders. In this article, a set of assignments to optimize the objectives function, namely minimizing cost and time, was solved by using linear programming model.

1. Introduction

International business enacts an important role in the global economy because it dominates most of the commercial activities of countries in the world. Cross-border interaction has entered the daily activities of companies throughout the world. The current global economy causes Multinational Corporations (MNCs) to be in an increasingly competitive, dynamic and interdependent business environment. This condition causes MNCs to be good at managing, coordinating and integrating all company operations in other countries with their holding companies.

Multinational Corporations (MNCs) are large companies that stand in one country that produce or sell goods or services in various countries. The two main characteristics of MNCs are their large size and global activities are centrally controlled by the holding company. The activities of MNCs are: Importing and exporting goods and services, making significant investments in foreign countries, buying and selling licenses in foreign markets, engaging in contracting and allowing local producers in foreign countries to produce their products, and opening manufacturing facilities or assembly operations abroad.

MNCs make benefit from opening branches in other countries in various ways. First, MNCs can take advantage of economies of scale by reducing Research & Development spending and advertising costs on global sales, gathering global purchasing power for suppliers, and utilizing managerial technology and knowledge globally with minimal additional costs. Furthermore, MNCs can use their



global presence to take advantage of the inexpensive labor services available in certain developing countries, and gain access to Research & Development divisions in developed countries.

In addition to getting labor from the destination country, MNCs must conduct global assignments to employees to meet the workforce needs of several companies and to be affiliated in other countries as company representatives. According to McNulty, this assignment activity is often called expatriation. Expatriation is an expensive activity. Companies spend a lot of money each year to send their employees to international assignments, however, based on recent reports there has been no evaluation of how these expatriates can provide added value to the organization because of the many expatriates who have not been able to adjust well to destination countries (McNulty, 2015b). Employees who get global assignments are called expatriates. According to McNulty, expatriates are people who live temporarily or live outside the country where he was born and raised or in other words foreign citizens who live in a country, usually because of a state or professional duty.

PT Asian Hybrid Seeds Technologies Indonesia or PT Jagung Hibrida Sulawesi is a business unit of the holding company Indophil Asia Equities and started in Manado Indonesia in 2002. Mr. Alan B.Uv is a founder of PT Asian Hybrid Seeds technologies Indonesia. In 2003, this business moved its operation to Jember, East Java, which is one of the centers of Agribusiness in Indonesia. This company has grown rapidly and became one of the major players among the other hybrid corn seed producers in Indonesia.

PT. AHSTI plans to expand the marketing area to meet the demand for seeds production. At present five new markets will be opened in Kalimantan, Sulawesi and three regions in Java. The company faces the problem of assigning project leaders to each market area. At present there are two expatriates who are free from other jobs and are willing to assign as project leader, while three other expatriates will be brought in from outside company.

Alternatives and Estimated costs for project completion assignments can be seen in Table 1 below.

Table 1. Estimated project completion assignment costs (in hundreds of millions rupiah)

Project Leader	Market				
	1	2	3	4	5
1 Expatriate A	412	430	582	416	496
2 Expatriate B	442	478	626	466	552
3 Expatriate C	434	626	602	440	464
4. Expatriate D	400	466	620	428	512
5 Expatriate E	470	552	598	402	466

The following figure below presents the estimated cost and expatriate assignment area.

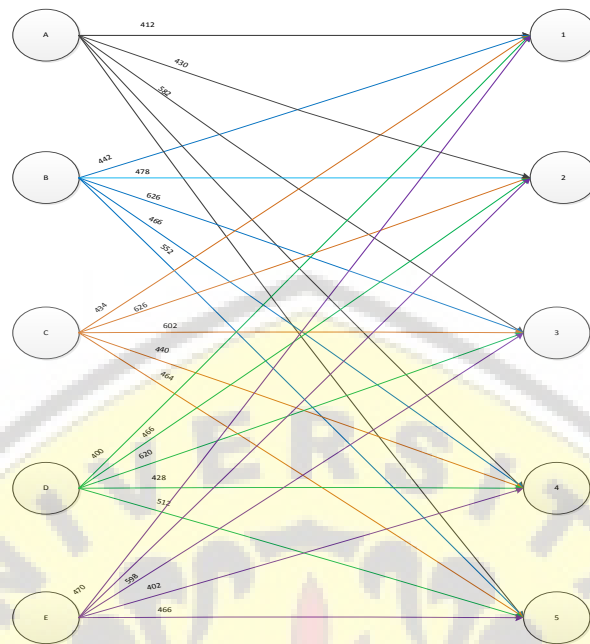


Figure 1. Cost of Assignment to Several Markets

2. Theoretical Background

Expatriation is now an important problem. Multinational companies as business actors must be faced with this expatriation activity. People sent in expatriation activities are called expatriates. Expatriates introduced from different cultures.

Based on the type of assignment, there are several types of expatriate assignments. This type of assignment is based on the duration of the assignment and also the advantages of the assignment [3]: (1) Long Term: Lasts between 1 and 5 years, can also be extended, expatriate family is expected to move, (2) Short Term: Temporary Transfer in between 3 and 12 months and families usually don't move, (3) commuting: Temporary transfers that allow all employees to live in their home country in full, usually on weekends. Employees who work in the host country on weekdays only, (4) Business Travel: Temporary transfers between 3 and 6 months, usually on a business visa, not with a work permit from the host country. And the family does not move, (5) Short-term / temporary transfers where the company travels from home country to another business that requires face-to-face meetings or meeting for a while, then returns to home country, family does not participate, (6) Accommodation: Jobs provided by an organization in the host country at the request of employees during a certain period requested or initiated by the employees themselves or also compilation of expatriate partners are also offered to work by the company's leadership; (7) Interregional: Temporary transfers where the host country and host country are from different Southeast Asian countries together, (8) One-way transfers: Permanent transfers where the company breaks away from the country of origin and becomes a local company from the host country with no funds or options to return to the country of origin, (9) Localization: Transition from the recipient of the right to a employment status in the host country where the employee is in accordance with the host country of the host country, (10) Unlimited: Temporary transfers does not have an end date but is still in the category of non-permanent assignment, (11) Rotation: Temporary transfers that work for several days approved in the host country and for several days in the country of origin (taken from the country of origin), host country or other countries), (12) Sequential: Recipients of this assignment are expatriates for the host country without returning to the parent country.

Based on the types of assignments, PT AHSTI can choose the type of assignment that can really

optimize the purpose of opening the new market. While to determine each project leader in which market, the calculation of adjustments to the estimated costs is carried out. Optimal assignments are selected at the selected costs.

3. Research Methods

The method used in this study is interviews and documentation. The interview is conducted directly with the head of PT AHSTI to find out the area where the new market is opened. While documentation is done by copying documents about the analysis of the initial market opening conducted by PT. AHSTI. From the data obtained then analysis using the Hungarian method.

The Hungarian method is a method commonly used to solve assignment problems where this method can be applied to the process of optimizing assignment problems. This method is used because of its easy in calculation. Calculations can be done manually or using software. Calculations are chosen based on optimal allocation, namely at the smallest cost[2].

4. Results and Discussion

Project costs are estimated by the research and development department of PT AHSTI. In this assignment, the smallest cost will be chosen. In this section, the expatriate code and the assignment method will be presented

Code expatriate can be seen in the following table:

Table 2. Expatriates data to be assigned to the Market Opening project

No.	Code	Origin
1.	A	AHSTI
2.	B	AHSTI
3.	C	Inter-regional
4.	D	Long-term assignment
5.	E	Long-term assignment

Source: PT .AHSTI Jember

Table 3 describes the cost calculations using the Hungarian method.

Table 3. Calculation of assignment costs

No.	Project Leader	Market	Operational Cost (in hundreds of millions rupiah)
1.	Expatriate A	Kalimantan	650
2.	Expatriate B	Sulawesi	550
3.	Expatriate C	Java 1	430
4.	Expatriate D	Java 2	400
5.	Expatriate E	Java 3	410
Total Cost			2.440

Source: Calculation Data

Based on Table 3 according to the results of calculations using the Hungarian method, Expatriate A assigned Kalimantan, expatriate B assigned to Sulawesi, Expatriate C assigned Java 1, expatriate D to Java2 and expatriate E to Java 3, while the optimal total cost obtained by PT AHSTI is Rp. 2.440.000.000, -

Expatriate assignment activities must be approved properly because sending expatriates requires not a small amount of money. Many of them failed because it is not easy for them to adjust to the new

country. Especially if the expatriates also take their families to the destination. Based on calculations using the Hungarian method obtained by certain expatriates in certain regions according to minimal costs.

At present there are two expatriates at PT AHSTI who can be assigned to the opening of new areas, namely in the markets of Kalimantan and Sulawesi. They were chosen for markets outside Java because they first lived in Indonesia so they could estimate the culture and thinking that would live there. While three other people must take from their home countries, the Philippines. Assignment types can be selected as in theoretical background, namely: for the type of expatriate, the type of assignment is chosen Inter-regional: namely temporary transfers where the home country and host country of the household exchange the same information. This can be done because Indonesia and the Philippines are in the same region as those of Southeast Asia. For expatriates and assignments to Java, long-term assignments can be chosen that can be completed between 1 and 5 years but can also be extended, usually for the type of expatriate family assignments that accompany. This type of assignment is recommended to be chosen because the market in Java is more stable and must be developed again as a market that already exists.

With greater consideration, this calculation can be used by PT. AHSTI to assign expatriates to several new markets to be opened. By calculating carefully costs because the failure of expatriates can be minimized.

According to [9] expatriate adjustments is a hot issue. Expatriate assignments require good planning. At present the assignment failure often occurs because expatriates cannot adjust to the destination country. The high cost of expatriation especially if expatriates take their families with them requires companies to manage them more effectively.

5. Conclusion

The assignment of expatriates at PT. AHSTI can use interregional and long-term assignments. Both types of assignments are in accordance with the conditions of the new market to be opened. The geographic area of the opening of the market must be known by the expatriate so that adjustments do not become obstacles. Future works related to this research can be conducted by considering other methods to solve this assignment problem.

Acknowledgement

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