

# Analysis Of The Alignment Of Education With Industry In Sumatera Island

Rakhma Oktavina; Ratih Wulandari; Ainul Haq

Industrial Engineering, Gunadarma University, West Java, Indonesia  
oktavina@staff.gunadarma.ac.id, ratih\_wulandari@staff.gunadarma.ac.id, ainul@staff.gunadarma.ac.id

## ABSTRACT

Educational alignment in the world of work was a comprehensive attempts to synchronize the national education system with the labor need which would resulted a suitable practice. Demand mapping and analysis of its quality, quantity, locations, and periods would be one of alignment program that aimed to identify and to project the labor need in terms of qualification, competence, and number requirements. The purpose of this activity is to analysis the Alignment Of Education With Industry In Sumatera Island in support of national development which refers to MP3EI 2011-2025. Labor demand forecasting were made through system approach. System modeling approach was defined as a represent system which described its application in actual conditions. The approach resulted a trend analysis modeling technique based on time series data and Causal Loop Diagram (CLD) model. This approach system would be applicable mainly as strategic effort to fulfil labor need in each economic pathways.

**Keywords:** Alignment, Education, Industry, Forecasting, Causal Loop Diagram

## 1. Introduction

Aligning education with the world of work is a comprehensive attempt to synchronize with the national education needs of the workforce, resulting in the alignment in practice. Mapping and analysis of the demand side in the dimensions of quality, quantity, location and time is one of the alignment programs that aim to identify and project the needs of the workforce in terms of qualification, competence and number. Mapping and analysis of the demand side is also useful to know the rate of supply is generated each year in each sector and location, know the characteristics of the workforce needs of the graduates, analyzing supply all levels of integration than absorptive capacity by sector workforce to be able to provide recommendations quality improvement strategies education in the adjustment of education to the needs of the workforce, as well as to analyze the needs of human resources in all sectors of the economy based on the needs of the pathways which refers to the Master Plan for the Acceleration and Expansion of Indonesian economic Development (MP3EI) 2011-2025. The alignment framework can be seen in Figure 1.

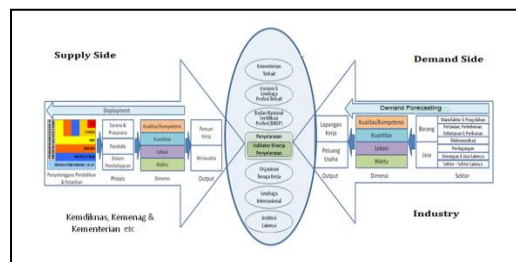


Figure 1. Framework of Alignment of Education with Industry

MP3EI's development has been on 8 main programs, namely agriculture, mining, energy, industrial, marine, tourism, and telecommunications, as well as the strategic development of the area. The eight main program consists of 22 major economic activities. Distribution of seed industry which shows the main economic activities in six economic pathways can be seen in the following figure.



**Figure 2. Distribution of Main Activities in Any Economy pathways of MP3EI**  
Sources: Penprinas MP3EI (2012)

The purpose of this activity is to analysis the Alignment Of Education With Industry In Sumatera Island in support of national development which refers to MP3EI 2011-2025. More specifically, this activity aims to forecast and mapping needs of the demand for vocational education in the primary economic activity in Sumatera’s economic pathways, and to conduct a needs analysis of the demand side of vocational education in the economic pathways of Sumatera Island.

## 2. Research Method

### 2.1 Data

Time series data were used in this research. Sources of data in this study consists of primary and secondary data. Primary data obtained from the survey results to the proposed study area, namely economic pathways Sumatera, to verify the results projected human resource needs in the field of vocational (SMK, BLK, CGC Polytechnic) in the related department. Secondary data were obtained from the collection of relevant data and references regarding the human resource needs of vocational (SMK, BLK, CGC Polytechnic) in the main economic activity of economic pathways of Sumatera, which is derived from the association and relevant ministries.

Primary data collection techniques in depth interview approach to the relevant sources, using instruments such as questionnaires, with the proportional sampling basis, to produce verification of the projected needs of human resources in the field of vocational major economic activity in the region of Sumatera Economic Pathways. Secondary data collection techniques through inventory data needs of the main economic activities in the economic pathways Sumatera.

Based MP3EI, the main economic activity on the island of Sumatera is based palm, rubber, coal, shipbuilding, steel, KSN Sunda Bridge. Based on the deployment location of the main economic activities in the development of economic pathways in Sumatera, the verification of the location specified projection results (survey) as follows.

**Table 1. Forecasting Area of Verification Results (Survey)**

No	Lokus	Main Economic Activities
1.	Banten Province	Iron Steel, Electronics, KSN Selat Sunda
2.	Lampung Province	Palm, Rubber, KSN Selat Sunda
3.	South Sumatera Province	Palm, Rubber, Coal
4.	North Sumatera Province	Palm, Rubber
5.	Riau Province	Palm, Rubber
6.	Batam City	Electronics, Ship craft

### 2.2 Data Processing and Analysis

Description workforce needs was done on the demand side of the economic activities that are featured on Sumatera Economic Pathways, such as palm, rubber, coal, shipbuilding, steel, KSN Selat Sunda Bridge (JSS), and electronic.

Analysis of field labor fulfillment vocational was needed to illustrate the process of alignment between education and the business world will be illustrated through the analysis of the association workforce needs in the vocational education sector. According to time series data, the types of forecasting methods that will be tested among other distinguished of several terms that depend on the way see it, namely Linear Regression, Moving Average, smoothing Exponential. Forecasted labor needs on the demand side of vocational education sector carried out on SMK, BLK, CGC and Polytechnic, with due consideration of vocational education is expected to produce human resources capable of building the nation through their knowledge and skills. Analysis of the results of forecasting associated with the level of support for the current MP3EI, and contains recommendations vocational education development patterns that support MP3EI effectively.

### 3. Result and Discussion

#### 3.1. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity Oil Palm in Riau Province

Economic Activity of Oil Palm in Riau Province consist of Oil Palm plantations and Oil Palm Industry.

**Table 2. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Oil Palm plantations in Riau Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	618.146	7	0,001
2014	624.585	26	0,004
2015	623.346	45	0,007
2016	625.946	63	0,010
2017	624.646	82	0,013

Based on table 3.1, can be seen that the availability of graduates in the field of labor according to the needs of the oil palm plantation KE in Riau Province is still very small at an average of 0.007%. This suggests that the need to increase the number of graduates in the field of science relevant to the activities of the plantation economy, among other disciplines of Agriculture, Business and Management (Economics), and Administration.

**Table 3. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Oil Palm Industry in Riau Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	84.266	49	0,058
2014	80.523	56	0,070
2015	76.781	64	0,083
2016	73.038	71	0,097
2017	69.295	78	0,113

Based on the table above, it can be seen that the availability of graduates in the field of labor according to the needs of the KE palm oil processing in Riau Province is still very small, which is an average of 0.08%. This suggests that the need to increase the number of graduates in the field of science relevant to the economic activities of palm oil processing, among other disciplines of Industrial Engineering, Food Technology, Mathematics, Business and Man-

agement (Economics), and Administration.

### 3.2. Forecasting Results of Workforce Needs and Graduates of Higher Education to Support Economic Activity Rubber in North Sumatera Province

Economic Activity of rubber in North Province consist of rubber plantations and rubber Industry.

**Table 4. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Rubber plantations in North Sumatera Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	181.941	96	0,053
2014	182.278	89	0,049
2015	182.388	83	0,046
2016	182.202	75	0,041
2017	182.289	69	0,038

Based on the table above, it can be seen that the availability of graduates in the field of labor according to the needs of the TO Rubber Plantation in North Sumatra province is still very small, which is an average of 0.05%. This suggests that the need to increase the number of graduates in the field of science relevant to the activities of the plantation economy, among other disciplines of Agriculture, Business and Management (Economics), and Administration.

**Table 5. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Rubber Industry in North Sumatera Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	7.288	42	0,576
2014	7.385	44	0,596
2015	7.513	38	0,506
2016	7.395	40	0,541
2017	7.431	42	0,565

Based on the table above, it can be seen that the availability of graduates in the field of labor according to the needs of the TO Rubber Processing in North Sumatra province is still very small, namely 0.2%. This suggests that the need to increase the number of graduates in the field of science relevant to the economic activity of rubber processing, among other disciplines of Industrial Engineering, Chemical Engineering, Mathematics, Business and Management (Economics), Civil Engineering, Geomatics, and Administration.

### 3.3. Forecasting Results of Workforce Needs and Graduates of Higher Education to Support Economic Activity Coal in South Sumatra Province

**Table 6. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Coal Industry in South Sumatera Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	25.719	23	0,089
2014	26.426	38	0,144

2015	25.935	52	0,201
2016	26.027	67	0,257

Based on the table above, it can be seen that the availability of graduates in the field of labor according to the needs of the TO Coal in southern Sumatra province is still very small, which is an average of 0.6%. This suggests that necessary to increase the number of graduates to the field of science relevant to the conomic activities of coal, among other disciplines of Industrial Engineering, Chemical Engineering, Mathematics, Business and Management (Economics), Civil Engineering, Geomatics, and Administration.

Administration.

### 3.4. Forecasting Results of Workforce Needs and Higher Education Graduates to Support Economic Activity Food and Beverage Industry in Banten Province

**Table 7. Forecasting Result of Workforce Needs and Graduates of Higher Education to Support Economic Activity of Food and Beverage Industry in South Sumatera Province**

Year	Forecasting Result (person)		Percentage (%)
	Workforce Needs	Graduates of Higher Education	
2013	31047	271	0.87%
2014	31062	272	0.88%
2015	31077	278	0.89%
2016	31067	294	0.95%
2017	31069	308	0.99%

Based on the table above, it can be seen that the availability of graduates in the field of labor according to the needs of the TO foods beverages in Banten Province is still very small, which is an average of 0.9%. This suggests that the need to increase the number of graduates in the field of science relevant to the economic activities of food and beverages, among other disciplines of Agriculture, Fisheries, Industrial Engineering, Mechanical Engineering, Business and Management, Health and Safety, social sciences, law, and psychology.

## 4. The Causal Loop

Through in dept interview to the local government, desk study, and analysis of forecasting result, established a causal relationships are as follows:

1. Market demand
2. Number of Production
3. Job Sector
4. Demand of Labor
5. Supply of Labor
6. Labor requirement
7. Index of Wages and Income
8. Population
9. Informal sector employment
10. Number of Education Institutions
11. Number of Graduate
12. Labor Force Participation Rate

Because of some of the every unit has a meaningful role modeling the relationship, so they were formed in a cause and effect diagram and marked as "S" and "O" can be seen in the figure below

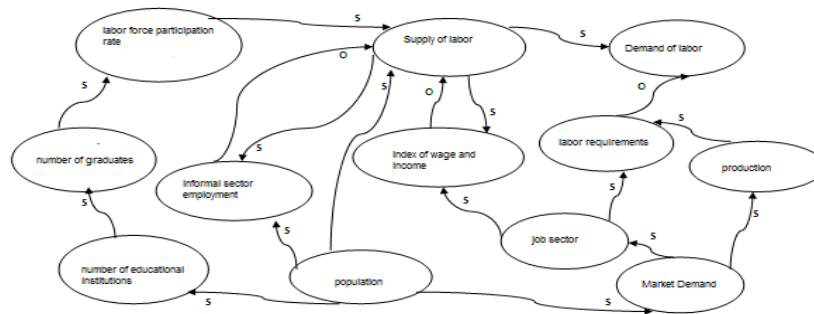


Figure 3. CLD model system approach to Alignment of the workforce and Higher Education Graduates

## 5. Conclusion

1. Labor demand Forecasting made in the centers of major economic activity, as well as forecasting of college graduates performed on samples of higher education located in the centers of major economic activity.
2. Model Forecasting of manpower requirements consists of three main stages, namely the identification stage, the stage of model development, and model implementation phase.
3. Modeling techniques used in this study is to follow the trend and the type of data based on time series data, so it can be seen forecasting method has the best accuracy to be recommended next projection process.
4. By understanding the systems approach model of CLD, it can be seen more clearly that the strategies and efforts to alignment workforce issues with the number of graduates not only pay attention or focus on the sustainability of the number of firms or the number of schools both internally and externally merely used to do, but a lot of some thing to note carefully in because each unit can affect each other or result in impacts between one another.

## 6. References

- [1] National Education Minister. (2003). Law Of The Republic Of Indonesia No. 20 / 2003 About National Education System, Jakarta : National Education Ministry Office.
- [2] President of Republic of Indonesia. (2010). Government Regulation Of The Republic Of Indonesia No. 17 / 2010 About Management And Operation Of Education, Jakarta : Secretariat of the Republic of Indonesia Office.
- [3] President of Republic of Indonesia. (2005). Government Regulation Of The Republic Of Indonesia No. 19 / 2005 About National Education Standards, Jakarta : Secretariat of the Republic of Indonesia Office.
- [4] National Education Minister. (2007). Regulation of National Educational Minister No. 19 / 2007 on the Standard of Education Management Education of Elementary school and High school, Jakarta : National Education Ministry Office.
- [5] National Education Minister. (2007). Regulation of National Education Minister No. 49 / 2007 on Non Formal Education Management Standards, Jakarta : National Education Ministry Office.
- [6] Muhammad, Hamid. (2010). Guidelines For Alignment Mapping The Demand Side And The Supply Side Of The Year 2010, Jakarta: Directorate of Non-Formal and Informal Education, National Education Ministry Office.
- [7] Hogarth, Robin M. and Spyros Makridakis. (1981). 'Forecasting and Planning: An Evaluation', *Management Science, INFORMS*, vol. 27(2), pages 115-138, February.
- [8] West, Mike and Jeff Harrison. (1997) 'Bayesian Forecasting and Dynamic Model (2nd Ed.)', Springer.