

The Study of Vocational School Development at Makassar Using Interpretative Structural Modelling (ISM)

Mohammad Ahsan Mandra
Automotive Engineering Education Department
Universitas Negeri Makassar
 Makassar, Indonesia
 mohammad.ahsan.sm@unm.ac.id

Abstract—Vocational School is one of the institutions which have the responsibility for the preparation of human resources in accordance with their fields. The purpose of this study is to describe the general description of vocational schools in Makassar today. The data collection used questionnaire, whereas data analysis techniques used Interpretative Structural Modeling (ISM). Based on the results of expert opinion, it was found the eleven sub-element of constraint, namely: (1) the low innovation of learning method (2) the low effective in utilization of laboratory, (3) the low quality of human resources, (4) a curriculum that is less flexible, (5) the quality of graduates is not standardized, (6) did not build a partnership that benefits all parties, (7) the limited of laboratory facilities, (8) the role and responsibilities of the government still low, (9) cross sector cooperation is still weak, (10) the lack of participation of industry, (11) access to the industry is still lacking. Furthermore, it was found the eleven sub-element of constraint, namely: (1) the low innovation of learning method (2) the low effective in utilization of laboratory, (3) the low quality of human resources, (4) a curriculum that is less flexible, (5) the quality of graduates not standardized, (6) did not build a partnership that benefits all parties, (7) the limited of laboratory facilities, (8) the role and responsibilities of the government still low, (9) cross sector cooperation is still weak, (10) the lack of participation of industry, (11) access to the industry is still lacking.

Keywords—*vocational school, education, makassar*

I. INTRODUCTION

ASEAN Economic Community (AEC) is a challenge for countries incorporated in the Association of South East Asian Nations (ASEAN). According to [1], one of the characteristics of the AEC is the existence of a single market and production base. As in [2], the characteristics of a single market and production base in AEC is supported by five elements, one of which is the flow of educated workforce and the free flow of capital. It confirms that the Human Resources (HR) quality plays an important role.

According to [3], Indonesia's ranks of human resource was 108th of 187 countries in the world. It reports that the quality of Indonesian human resources is still relatively low. One way to improve the quality of human resources can be done through a quality of education. Quality of education will produce quality human resources.

As explained in [4], vocational education is one of the institutions which is responsible for the preparation of human

resources in accordance with their fields. Vocational education was designed to develop the skills, abilities, understanding, attitudes, and habits that are meaningful and productive work [5]. According [6] tradition of vocational education is to prepare students for work. Education and vocational training is education that prepares the formation of skills, skills, understanding, behavior, attitudes, work habits, and appreciation of the jobs needed by the business community/industry. Vocational education is essentially based on a curriculum that equips graduates with the skills to fill certain jobs or open their own business field. Additionally, vocational schools may also be intended to raise the local advantage as the competitiveness of the nation's capital [7].

There are many vocational school graduates who have not been absorbed in the industrial world due to lack of relevance of vocational school curriculum with worker competencies required. The number of students who are unemployed may be due to lack of competence of students with the needs of industry. This is because the curriculum in previous years used continuously without adjustment and consolidation with the progress of the business world. So the goal of vocational schools to reduce unemployment can't be achieved effectively [8].

The development of vocational education programs need clear justification. Justification for vocational education programs is that there is a real need in the employment of Field work or in business and industry. When oriented curriculum on students, then the support for the curriculum comes from the employment opportunities available to graduates.

The problems of vocational education in Makassar today include the relevance of the curriculum to the needs of the workforce so that there are many vocational school graduates are not absorbed into the industry. In addition, the lack of collaboration between schools and industry are also factors that determine the success of vocational education. Therefore, we need a strategy to develop vocational education. It can contribute to improving the quality of human resources that are reliable, skilled and highly competitive so as to reduce the unemployment rate as well as to fill the gap of skilled personnel that have been complained by the business and industry. The development of vocational education policy requires co-operation, support and full participation of government and non-government, business and industry.

The research objectives were: (1) Describing the general description of vocational schools in Makassar today, (2)

Determining the constraints in developing vocational schools, and (3) Determining the needs to develop vocational schools.

II. METHOD

The data collection used documentation, questionnaire and interviews with experts in the field of vocational education; university lecturers, senior teachers and industry practitioners. Furthermore, the data were analyzed using Interpretative Structural Modelling (ISM).

Interpretative Structural Modelling (ISM) is a methodology used to identify relationship among specific items, which define a problem or issue; it was firstly developed in 1970's [9]; [10]. ISM is interpreted as judgement of the selected group for the study deciding whether and how the variables are related [11]. Interpretative Structural Modelling is a review process in which the group generated structural models to look at the complex subject of a system through a carefully designed patterns using graphics and sentences. ISM analyzes the elements of the system and break them down into the form of graph of direct relationship between the elements and levels of hierarchy. The elements can be a policy objective, the target organization, assessment factors and others.

The first step that needs to be done in the ISM analysis is to determine the elements that are in accordance with the existing problems. Furthermore, the sub-elements are arranged on each element selected. The selection of the elements and sub-elements of the preparation was done on the results of discussions with experts. The assessment results were arranged in Structural Self Interaction Matrix (SSIM) which was made in the form of a table Reachability Matrix (RM) by replacing V, A, X, O by number 1 and 0. The Matrix was then converted into a closed matrix. This was done to correct the matrix meet the rules of transitivity that if A affects B and B affects C, then A must affect C. The next step was to develop a hierarchy of each sub-element of the element to be assessed and classified them into four sectors, whether sub-elements included in the Autonomous sector, Dependent, Linkage or Independent .

Sector I: weak driver to weak dependent variables (Autonomous) means that the sub-elements included in this sector are generally not associated with the system and may have little relationship although the relationship can be strong.

Sector II: weak driver to strongly dependent variables (dependent) means that the sub-elements in this sector are not free.

Sector III: strong driver - strongly dependent variables (Linkage) means that sub-elements that go in this sector should be examined carefully because of the relationship between the sub-elements are unstable.

Sector IV: Strong driver-weak dependent variables (Independent) means that the sub-elements that go into the rest of the sector are part of a system called the independent variables.

III. RESULT AND DISCUSSION

In the development of vocational education in the city of Makassar, the elements studied were constraints and needs in the development of vocational education.

A. General Description

This real condition of education provision is a condition or state which is actually happening on the implementation of the vocational education system in general. The real condition that was evaluated related to aspects of relevance.

Makassar currently has 8 state vocational high schools and 73 private vocational schools, with the number of students as many as 19,985. Most of the Vocational High Schools are in the field of technology, while others are in economics, fashion, food, tourism and information technology.

In addition, most employment are available in the food and beverage industry, as many as 21,992 people in 2007, followed by furniture industry and other manufacturing industries as many as 1,187 people. Industrial goods non-metal mining is up to 9708 people, and the timber industry, goods of wood (not furniture) is up to 8023 people. While other industries labor absorption is below 1000 people [12]. If being viewed from the side of the absorption of the workforce it seems clear that the course developed in vocational schools did not yet support the development of the industry. Supposedly, the development of vocational schools is also directed to the sector where the industry is growing rapidly.

When being analyzed further, industries/companies developed in South Sulawesi are more on industrial processing of agricultural produce/natural resources and has not moved to the high-tech industry. High-tech industries such as the list of industry classification has not been touched by this CBS. The data could be assumed that the industry engaged in this field and employment in the sector is not much. While the development of vocational schools lead to even more high-tech courses. The founders are more likely to develop vocational courses that are well-known in the community as than those are required by local industry. It seems clear that the establishment of vocational schools is not sufficient through market analysis.

B. Constraints in the Development of Vocational Education

Based on the results of expert opinion, found the eleven sub-elements of constraint, namely: (1) the low innovation of learning method (2) the low effectiveness in utilization of laboratory, (3) the low quality of human resources, (4) a curriculum that is less flexible, (5) the quality of graduates which are not standardized, (6) did not build a partnership that benefits all parties, (7) the limited of laboratory facilities, (8) the role and responsibilities of the government are still low, (9) cross sector cooperation is still weak, (10) the lack of participation of industry, (11) access to the industry is still lacking.

By using ISM, the results of the analysis showed the distribution of each sub-element occurred in four sectors (sector I, II, III, and IV as shown in Figure 1). It was seen that the obstacles sub element (3), (7), and (8) were located at sector IV (independent sector) which is a key elements that

influence and contribute to a high level of other sub elements in the development of vocational education and make the third sub-element as a driving force (power driver) were great, but has little dependence on the other sub elements in development of vocational education in the city of Makassar.

Any changes to the third sub-elements will affect the other, so it needs to be studied carefully. If not handled properly, that will be a major limiting factor for the development of vocational education. The fact is that some vocational schools in Makassar not receive assistance for facilities and infrastructure, uneven distribution of teachers at each school, and the role of government through regulation that is not maximized. It is the responsibility of the government that must be considered in the development of vocational education in the city of Makassar.

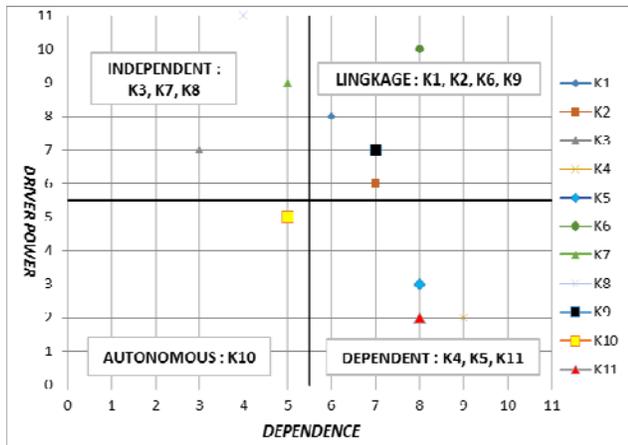


Fig. 1. Matrix of Driver Power-Dependence on Element of Constraints in the Development of Vocational Education

The quality of human resources that is still inadequate requires the government to be responsible in solving this problem. If this is not addressed, it will be a factor inhibiting the development of vocational education in the region. Then, the constraint of limited laboratory facilities and infrastructure at some schools also be a limiting factor in this development. Laboratory facilities and infrastructure such as buildings and completeness of equipment for practical activities is needed in the development of vocational education in this region. Furthermore, the responsibility of government needed to address both the above constraints, so the development program can be successfully carried out. Similarly, when associated with the elements of the above constraints, the human resource development in the field of productive skills, the provision of facilities and infrastructure practice, as well as the government's responsibility in terms of the regulation is the main requirement that must be met in order to develop vocational education in the city of Makassar.

Another sub-elements which act as obstacle in the development of vocational education in the city of Makassar are: (K1), (K2), (K6), and (K9). Sub-element is located on the third sector (linkages) which is a sub-element that has the driving force (power driver) to the successful development of vocational education, but has a dependency with other sub-

elements. Any action against sub-elements will affect the success of the development of vocational education and vice versa if the sub-element is getting less attention, it can affect the development of vocational education failure.

While sub-element (K4), (K5), and (K11) occupy the second sector (dependence sector) which means that the third sub-element is a result of remedial actions from another elements. In other words, if some obstacles such as sub-elements that mentioned above are met, then the effort to improve the quality of graduates and access to the industry is important for the initiated. The last obstacle sub-elements that occupies the first sector (autonomous sector) is the lack of active participation of industry (K10). It is a sub-element that is not associated or has a little relationship with the other sub-elements. Hierarchical structure of the relationship between obstacle sub-element of vocational education development in the city of Makassar in details can be seen in Figure 2 below.

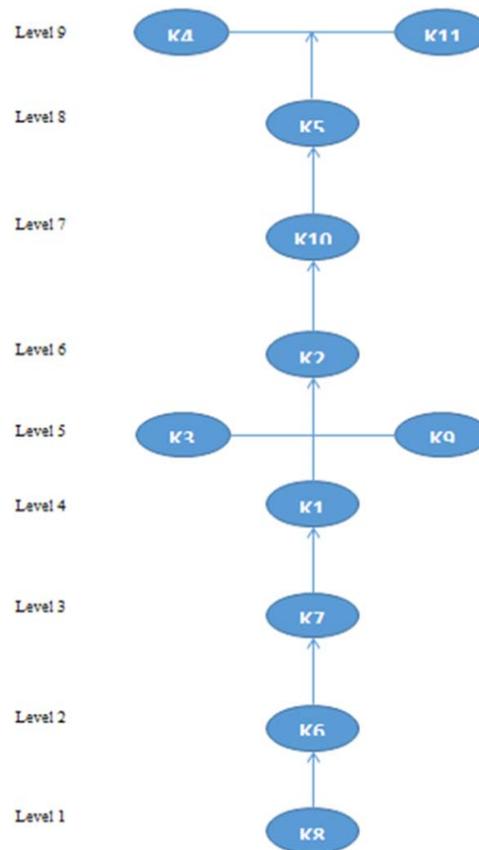


Fig. 2. Hierarchy Structure of Constraints Sub Element in Development of Vocational Education at Makassar

Figure 2 shows that the handling of the obstacles encountered in the development of vocational education in the city of Makassar can be done through several stages. At an early stage what is needed is the role and responsibility of the

government through the formulation of policies that encourage partnerships that benefit all parties, then make improvements to the infrastructure facilities as a laboratory container fundamentals increase the competences needed to enter the workforce. This is in line with the opinion of [13]; [14]; [15] who stated that the availability of facilities and infrastructure adequate for practices become imperative for students to master the competencies appropriately. Disclosed by [16] indispensable cooperation of industry by vocational education in order to meet the needs of students' competencies and following the technological developments in the industry.

The next stage is to improve the quality of human resources and cross-sector cooperation in supporting the development of vocational education. Then increase the cross-sector cooperation, and enable the participation of industry, so that the quality of vocational education outcomes is increasing. Thus, the access to the industry will also increase. This is consistent with the statement: "... improves the VET sector's capacity to increase access to vocational education and training of quality and relevance to the workplace " [17]. As stated by [18], the meaning of relevance in the world of education is "... the fit between the process and the materials provided in education with the needs of the market".

Some of the strategies that have made the Directorate of Vocational to prepare graduates to be ready for work, among others: changing and improving curriculum tailored to the needs of the world of work and industry, fulfilling a teacher in a short time, the fulfillment of cheap equipment, and implementation of trade and service industry Indonesia based on Partnership of vocational school and industry. The efforts made to improve the organization of the learning process to be more effective and efficient [19]. One of the programs carried out provide experience and practice the knowledge and skills already acquired in school to the real conditions in the world of work [20].

C. Vocational Education Development Needs

In the development of vocational education, based on the results of expert opinion that there are 12 sub-elements necessary requirements, among others: (K1) the development of flexible curricula, (K2) standardized of laboratory facilities and infrastructure, (K3) the equal industrial partners, (K4) the culture of vocational schools, (K5) adequate human resources, (K6) support from the government policies that encourage the participation of industry, (K7) developing continuous assessment and quality assurance, (K8) the implementation of school-based management, (K9) the specific vocational education laws (K10) the study on the characteristics of alumni and the needs of the workforce, (K11) schools' business unit that supports the achievement of competencies, and (K12) the application of IT in the vocational school system. Of the twelve sub-elements were then analyzed using the ISM methods to get the key element needed to develop to increase the quality of vocational school. ISM analysis results are presented in Figure 3 below.

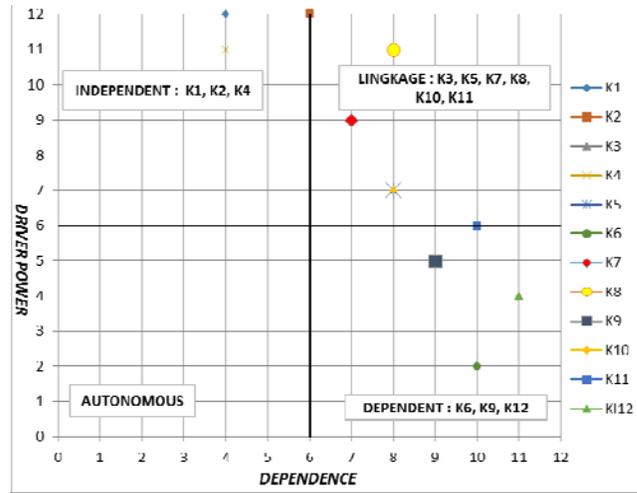


Fig. 3. Matrix of Driver Power – Dependence of needs Sub Element for Vocational Education Development

Based on the analysis as shown in Figure 3, it was shown that the sub-element (K1), (K2), and (K4) were located at sector IV which needed sub-element of the program that has a contribution to the other sub-elements. It is a sub element that has the great driving force (power driver) in the development of vocational education, and the dependence (dependence factor) is low on other elements. These three sub-elements were being sub key elements in the development of vocational education needs, so that any changes in the sub-element will affect the other, so it needs to be studied carefully.

While sub element (K3), (K5), (K7), (K8), (K10), and (K11); located on the third sector which is sub elements (linkages) of other sub elements. Sub elements in this sector has a great driving force (power driver factor) to the success of the program but has a high dependency (dependence factor) as well. Any action on the sub-elements of these needs will affect the success of development programs, more elements, and conversely the lack of attention to the sub-element was then able to influence the development of vocational education program failure.

The needs of sub elements located on the second sector were: (K6), (K9), and (K12). The third sub-element is a sub-element attributable to the fulfillment of other program. In other words, these elements have their sub dependence (dependence factor) which was high on the fulfillment of the needs of other programs and do not have high driving force (power driver factor). Hierarchical structure relationship sub elements of vocational education development needs in the city of Makassar in detail can be seen in Figure 4.

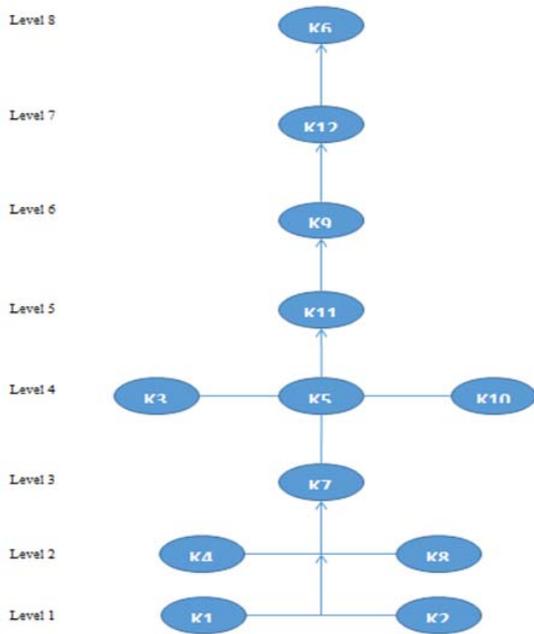


Fig. 4. Hierarchy Structure of Needs of Vocational Schools Development in Makassar Sub Elements

IV. CONCLUSION

To produce a competence workforce, it is necessary to involve industry in curriculum development and school activities. Necessary adequate infrastructure for the implementation of curriculum effectively and efficiently. Need for the mutually beneficial partnerships with various industries to change the educational system of output oriented to job oriented. Each opening the new department of vocational school should be accompanied by a reliable feasibility study so that the programs that are opened completely in line with the potential of the regions. Vocational programs should be developed in accordance with the environmental conditions, characteristics of learners, and the development of science and technology. The plan to increase the number of vocational school so more percentage of general high school should be reconsidered. The quality of vocational education needs to be improved to meeting with national education standards.

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