**The Competency of Vocational Graduates in The Fields Of Mechanics, Business and Workshop Management According to The Needs of The Motorcycle Automotive Industry**

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**Abstract**. This study aims to determine the need for mechanics, business and workshop management competencies from competencies in the vocational motorcycle engineering and business curriculum according to the automotive industry of the motorcycle industry. Research subjects were 8 motorcycle automotive companies in the field of production or service services. The results of the study are as follows: mechanics competence in the "very needed" category curriculum, business and management competencies in the "very needed" category curriculum, overall competency in the "very needed" category curriculum, and there are 15 competencies needed but not provided in the curriculum.

1. **Introduction**

The role of the automotive industry sector is one of the sectors that become Indonesia's investment, in 2015 the automotive industry sector had added value of 174 trillion rupiah or became the third largest among other industries in Indonesia [1]. The most popular automotive industry in Indonesia is the car and motorcycle industry, and consists of the fields of planning, development, production and maintenance. Based on data from the Indonesian Ministry of Industry, a total of 1.46 million workers were absorbed reaching 2013 with the largest absorption in dealers, workshops, and sales of non-official parts as mechanics, operators, etc. So it can be concluded that one of the largest industries in Indonesia is the automotive industry.

Vocational education is one type of education that is able to prepare students to graduate and be able to work in certain fields [2]. It is intended that graduates can have the knowledge, skills and competencies to be able to work after graduating from the world of education. The effort is for graduates to work and be able to work competently so that they can improve and continue their lives. Vocational secondary education in Indonesia, one of which is Vocational High School (SMK).

The world of work is one of the final goals of vocational graduates to achieve after graduating from the world of education, both in industry, entrepreneurship, business, or institutions and professions in government. Educational programs must be able to provide students with the competence of attitudes, knowledge and skills provided in the learning process that they go through [3]. Thus the world of education can afford to equip students with attitudes, knowledge and skills to become professionals to be able to enter the workforce. One that affects the competency of students is the curriculum.

The curriculum used in vocational high school (SMK) was developed by a government agency namely the National Education Standardization Agency (BSNP). The curriculum structure contained in the form of core competencies (KI) and basic competencies (KD) in the 2013 curriculum for each expertise, one of which is automotive engineering. There is a change in the spectrum of vocational education in Automotive Engineering namely SMK Motorcycle Engineering into SMK Motorcycle Engineering and Business in end 2017 [4]. It is intended that SMK graduates not only become mechanics, but also become workers in the business and management of motorcycle workshops.

If the curriculum is irrelevant, the curriculum does not mean the life of the community [5]. So in the development of the existing curriculum must be based on the characteristics of vocational education to develop skills to prepare graduates to work [6]. Based on this explanation, it is very much needed research on curriculum in vocational engineering and motorcycle business on the needs of competence in the automotive motorcycle industry.

1. **Method**

The subject of this research is the motorcycle automotive industry company (ATPM) incorporated in the Indonesian motor vehicle industry association (GAIKINDO) in Yogyakarta. The subjects used were 8 industrial companies. The selection of this subject uses cluster sampling techniques that represent every motorbike automotive industry in Yogyakarta.

The company referred to in the qualification of this production and / or service service is a company engaged in motorcycle production or a company engaged in the field of motorcycle service services or both.

**Tabel 1**. Motorcycle Automotive Industry (ATPM)

|  |  |  |
| --- | --- | --- |
| No. | Company Name | Type of business |
| 1. | PT. Astra Motor Honda | Service  |
| 2. | PT. Yamaha Deta Yogyakarta | Service  |
| 3.  | PT. Suzuki Indojaya Ambarukmo | Service  |
| 4. | PT. Sumber Buana Motor Kawasaki | Service  |
| 5.  | CV. Kharisma Motor Viar Yogyakarta  | Service  |
| 6.  | PT. TVS Motor Yogyakarta | Service  |
| 7 | PT. Kharisma Piaggio Vespa | Service  |
| 8 | PT. Mega Andalan Kalasan (MAK) | Production |

The instrument used must meet the validity and reliability requirements. To find out the instrument's validity and reliability, a trial run need to be performed. The trial results are used to determine the validity and reliability of the instrument [7]. This research instrument uses a questionnaire with a Likert rating scale with four answer choices and columns for competency advice.

**Tabel 2**. Classification of Competency Needs

| Classification | Description | Score |
| --- | --- | --- |
| Much Needed (MN) | If this competency is needed and the intensity of the work is very high | 4 |
| Needed (N) | If this competency is needed and the work intensity is high | 3 |
| Quite Needed (QN) | If sufficient competence is needed and the intensity of the work is quite high | 2 |
| Less Needed (LD) | If there is less competency needed and the intensity of the work is very little | 1 |

The data analysis of this study used quantitative descriptive statistics with percentages to provide a description of the variables obtained in this study.

1. **Result and Discussion**

From the results of the analysis conducted using percentages, the results are obtained as follows:

*3.1 Competence in the motorcycle automotive industry in Mechanics competence*

**Tabel** **3**. Mechanics competence

| **Competence** | **Basic Competence** | **Percentage** | **Category** |
| --- | --- | --- | --- |
| *General* | Reading and Doing Technical Drawing | 71.87 | Needed |
| Understanding Engine Basics | 95.83 | Very Needed |
| Understanding Occupational Safety and Health | 100 | Very Needed |
| Understanding Desoldering and Basic Formation | 62.5 | Needed |
| Using OMM (Operation Maintenanceace Manual) | 81.25 | Very Needed |
| Understanding Pneumatic and Hydrolic Systems | 78.13 | Very Needed |
| Understanding Simple Electricity | 100 | Very Needed |
| Understanding and Using Handtools | 96.88 | Very Needed |
| Using a Measuring Instrument | 97.5 | Very Needed |
| Using Grease, seal, fastern etc. | 100 | Very Needed |
| Caring for the Battery | 100 | Very Needed |
| *Engine* | Repair cylinder heads and their accessories | 100 | Very Needed |
| Repair the lubrication system | 100 | Very Needed |
| Repair the cooling system | 100 | Very Needed |
| Repair the intake and disposal system | 100 | Very Needed |
| Repair cylinder blocks and their accessories | 100 | Very Needed |
| Repair fuel injection system | 100 | Very Needed |
| Repair the carburetor system | 100 | Very Needed |
| Repair the manual transmission system | 100 | Very Needed |
| Repair the automatic transmission system | 93.75 | Very Needed |
| Repair the manual clutch system | 100 | Very Needed |
| Repair the automatic clutch system | 87.5 | Very Needed |
| *Chasis* | Repair the hydraulic brake system | 100 | Very Needed |
| Repair the mechanical brake system | 100 | Very Needed |
| Repair the ABS brake system | 100 | Very Needed |
| Repair rim and tyre | 87.5 | Very Needed |
| Repair suspension | 93.75 | Very Needed |
| Repair the steering system | 100 | Very Needed |
| Repair the rear wheel drive chain | 100 | Very Needed |
| Repair the types of frame | 84.38 | Very Needed |
| *Electical* | Repair the lighting system | 96.88 | Very Needed |
| Repair instrument and signal systems | 100 | Very Needed |
| Repair the starter system | 100 | Very Needed |
| Repair conventional ignition systems | 100 | Very Needed |
| Repair electronic ignition systems | 100 | Very Needed |
| Repair the charging system | 100 | Very Needed |
| Repair security system repairs | 100 | Very Needed |
| Repair the injection system and reset the fault code | 100 | Very Needed |

Competencies for mechanic competence provided include 4 main competencies. Each competency has basic competencies to determine the competencies students must master to become a mechanic after graduation. General competence is the basis of scientific knowledge in the field of engineering, engine competence is competence related to existing machines on motorbikes, the field of chassis is a field related to the frame, steering and brake systems on motorcycles, and the electrical field is a field related to electricity in motorcycle.

Overall competency to be a mechanic contained in the vocational curriculum in the engineering and motorcycle business is highly needed by the automotive motorbike industry with high work intensity. However, there are 2 basic competencies with sufficient intensity are reading and doing technical drawings, and understanding desoldering and basic formation. The two basic competencies are the intensity of the work done a little, because the service sector tends to do more repairs and replacements, while in the field of production is needed in the field of design and assembly. So the SMK graduates must master all 4 main competencies in the curriculum to become a mechanic.

Although almost all competencies are needed in the present, but in the future the possibility of vehicles, one of which is a motorcycle that will switch to full electric power. It has been agreed that various countries in the next few years will switch to fully electric power. It is expected that in future mechanic curriculum development, the mechanic competence in the conventional engine field must be reduced or replaced with supporting competencies for electric-based vehicles. Because the principle of vocational education is for education in the future, so that if it does not change it will be left behind.

*3.2 Competence in the motorcycle automotive industry in Business And Workshop Management*

**Tabel** **4**. Business And Workshop Management Competence

| **Competence** | **Basic Competence** | **Percentage** | **Category** |
| --- | --- | --- | --- |
| Workshop Management | Creating an automotive workshop organizational structure | 93.75 | Very Needed |
| Register the factors that influence the success of the workshop | 93.75 | Very Needed |
| Implement Law Invite employment | 93.75 | Very Needed |
| Determine the administration of the workshop | 100 | Very Needed |
| Make work plans | 93.75 | Very Needed |
| Carry out complaint handling | 100 | Very Needed |
| Carry out workflows in the workshop | 100 | Very Needed |
| Evaluating work performance reports | 87.5 | Very Needed |
| Carry out the training and development of workshop human resources | 87.5 | Very Needed |
| Workshop safety management | Overcoming various occupational accidents | 100 | Very Needed |
| Carry out handling emergencies | 100 | Very Needed |
| Performing handling automotive maintenance workshop waste | 100 | Very Needed |
| Management of Mechanic Performance | Apply the principles of professional technicians | 100 | Very Needed |
| Carry out teamwork | 100 | Very Needed |
| Using work quality control methods | 93.75 | Very Needed |
| *Service Advisor* | Carry out periodic maintenance of equipment | 100 | Very Needed |
| Explain the types of workshop services | 100 | Very Needed |
| Analyze the initial damage to the vehicle system | 100 | Very Needed |

Competencies for business and workshop management consist of 4 main competencies. Management workshop competencies are related to planning to evaluation of the workshop, workshop safety management competencies are related to safety management at workshops that become safety standards, Management of Mechanic Performance competencies are related to performance management of each mechanic available to maintain the quality of work, and service advisor is a competency that must master conditions as mechanic, promotional, and can handle customers

Overall competency to become a worker in the field of business and workshop management contained in the vocational curriculum in the engineering and motorcycle business is very much needed by the motorbike automotive industry with high work intensity. This new competency in the engineering and business curriculum of the motorcycle as a whole has met the demands of the motorcycle automotive industry in the field of production or service services in Yogyakarta. So the SMK graduates are required to be able to master the whole, and for teachers must be able to provide suitable material because this competency is a new competency so that the material for making theory was lacking of source.

*3.3 Competence in the motorcycle automotive industry in the field of production or service*

**Tabel** **5**. All competence

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Type** | **Competence** | **Percentage** | **Category** |
| 1 | Mechanics  | *General* | 89.45 | Very Needed |
| 2 | *Engine* | 98.30 | Very Needed |
| 3 | *Chasis* | 94.79 | Very Needed |
| 4 | *Electical* | 99.61 | Very Needed |
| 5 | Business and Workshop Management | Workshop Management | 94.44 | Very Needed |
| 6 | Workshop safety management | 100.00 | Very Needed |
| 7 | Management of Mechanic Performance | 97.92 | Very Needed |
| 8 | *Service Advisor* | 100.00 | Very Needed |
| Rata-rata | 96.81 | Very Needed |

In general, the aim of the change in expertise in vocational engineering motorcycle to technical engineering and motorcycle business is to accommodate the career paths of vocational graduates who work in the field of motorcycle production and / or service. That is because there is no field in SMK that can understand the business and management of automotive workshops. So that later graduates of SMK engineering and motorcycle business not only become mechanics, but can be recruited to become a workshop manager because they have obtained material that meets the competency requirements to become experts in the business and management of motorcycle workshops found in the automotive motorcycle industry in the production field and / or service in Yogyakarta.

*3.4 Competencies needed are not provided in the curriculum according to the automotive industry*

**Tabel** 6. Competencies required but not provided

|  |  |  |
| --- | --- | --- |
| **No** | **Competence**  | **Basic Competence**  |
| 1 | *Chassis* | Repair Propeler, Axle Shaft and Differential |
| 2 | *Chassis* | Replace combi/unified brake system (CBS/UBS) |
| 3 | *Electrical* | Understanding and Using Diagnosis Tools, Scanners and etc; |
| 4 | *Electrical* | Repairing the idling/start and stop system (ISS/SSS) |
| 5 | *Engine* | Carry out maintenance of a Continuously Variable Transmission (CVT) system |
| 6 | *Engine* | Understanding and maintaining 2-stroke valve system (KIPS) |
| 7 | *General* | understanding of the types of lubricants, grease etc. |
| 8 | *General* | understand Electricity Wiring Diagrams |
| 9 | Workshop Management | Carry out cleaning workshops and workplaces; |
| 10 | Management of Mechanic Performance | Understanding briefing and prayer activities when going to work |
| 11 | Management of Mechanic Performance | implementing and understanding new product training and product mastery |
| 12 | *Service Advisor* | Inspection after treatment |
| 13 | *Service Advisor* | Determine the type of motorcycle service work |
| 14 | *Service Advisor* | Provide technical consultation |
| 15 | *Service Advisor* | Offering service products, parts and accessories |

Based on the existing competence in curriculum of SMK motorcycle engineering and business has not met all the expectations of the industry. That is because there are still competencies that do not yet exist in the curriculum. 15 basic competencies included in mechanical competence are 8 competencies consisting of chassis competencies (2 items), electrical competencies (2 items), engine competencies (2 items), and general competencies (2 items). While in business competency and workshop management there are 7 competencies consisting of Workshop Management competencies (1 item), Management of Mechanic Performance Competencies (2 items), and Service Advisor competencies (4 items).

Overall it is expected that in the future in curriculum development it can add advice and input from the motorcycle automotive industry, so that there will be a match between the graduate providers, namely vocational education and graduate users, namely the motorcycle automotive industry. Adding input content from industry does not have to change all available subjects, but can be included in the material for each subject in school

1. **Conclusion**

Based on the results of the research and discussion above, it can be concluded that the mechanics, business and workshop manager competencies in the vocational engineering curriculum and the motorcycle business are in accordance with the competency needs of the automotive motorcycle industry in Yogyakarta. It was found that from the mechanics competence contained in the vocational curriculum in the motorcycle engineering and business required by the automotive motorbike industry in the field of production or service services in Yogyakarta, overall a percentage of 95.54% was obtained or the category of "Very needed". However, there are 2 competencies that are more suitable in the field of production.

Business and workshop management competence is a new competency in the SMK Engineering and motorcycle business curriculum. However, as a whole, a percentage of 98.09% or the "very needed" category with the competency needs of the motorcycle automotive industry is related to business and workshop management in the industry. But it must still be developed in accordance with the development needs of the industry.

Overall, the category of mechanical competence, business and management of motorcycle workshop competencies provided in the curriculum of Engineering and Business Vocational motorcycles has a percentage of 96.81% or a category that is "very needed" by the automotive industry in the field of production or service services in Yogyakarta.

The world of the automotive motorcycle industry is not satisfied with the competencies of the vocational engineering and motorcycle business, because there are still several competencies that have not been provided in the curriculum. There are 15 basic competencies added in the future curriculum development to fit the existing competencies in the automotive motorcycle industry in Yogyakarta.

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