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The Effectiveness of SKKNI Based Motorcycle Technician Training to Increase the Competitiveness of the Regional Automotive Workforce

Fuad Abdillah

PJJ PVTM Universitas Ivet

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*Correspondence: Fuad Abdillah
Email: fuadabdillah88@gmail.com

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Abstract: The purpose of this study is to evaluate the effectiveness of motorcycle technician training based on the Indonesian National Work Competency Standards (SKKNI) in enhancing the competitiveness of the workforce in the automotive industry in specific areas. Although injection motorcycle technology has become the industry standard, a labor competency gap still hinders business. This study employs a quantitative approach with a descriptive-analytical design to collect data from 32 alums of UPT-BLK training in Grobogan Regency, using non-participatory observation, documentation, questionnaires, and literature reviews. The data were analyzed using multiple linear regression in SPSS. The results showed that the variables of Labor Needs (X1) and SKKNI Standard Injection Motorcycle Service (X2) contributed 95.5% to the Industrial World variable (Y). The value of the calculated F (21.399) is greater than the F of the table (2.69), and the significance of 0.045 is lower than 0.05. According to the t-test, Labor Needs had a positive and significant effect (t = 3.276; p = 0.082). On the other hand, SKKNI-standard service schemes show adverse effects, which require further investigation. This study demonstrates that SKKNI-based training is generally effective in enhancing the skills of technicians and addressing the gaps between vocational training and industrial needs. These results make a strategic contribution to the development of competency-based training policies and suggest that the curriculum be adapted to the needs of the job market in the current era of vehicles.

Keywords: Labor Needs, SKKNI, Injection Motorcycle Technicians, Training Effectiveness

Introduction

The injection technique has become a global standard for motorcycles because it can replace conventional carburetor systems, offering improved fuel efficiency and enhanced engine performance (Amaral et al., 2023). The engine control unit, or ECU, is the primary component of the fuel injection system, responsible for controlling the distribution of current to all engine components (Xu & Cho, 2021). Ideal injection pressure also improves engine performance while minimizing fuel deficit usage.

Indonesians prefer to drive on motorcycles, which account for 106,657,952 units, or about 84 percent of the total vehicles in the country (Rachman et al, 2022). Because it is practical, easy to use, inexpensive, and affordable, these vehicles are well-liked (Hendro

Prastyo et al, 2023). However, technical problems often occur that cause damage to the injection motorcycle, resulting in inconvenience for its users (Ginting & Hasugian, 2020) Therefore, to guarantee optimal vehicle performance, good maintenance through training or instruction is essential (Rusalam et al, 2020).

The business architecture must be adapted to keep pace with the growth of the motorcycle market (Fuquen, 2020). This will improve efficiency and increase competitiveness in the Automotive Industry (Surono et al, 2024). The vehicle industry is in dire need of a qualified and professional workforce (Xiaoxu et al., 2020). To improve the quality of human resources in this sector, the Indonesian National Work Competency Standard (SKKNI) has been used (Surono et al., 2024). Previous studies have shown a correlation between the standardization of mechanical workers' abilities and their productivity. There is also a correlation between industry needs and educational levels in human resource management (Timora & Kuala, 2021).

SKKNI-based training has proven effective in enhancing the competence of injection motorcycle technicians to meet industry requirements (Enterprises, 2023). This training program aims to improve the quality of the workforce through training and skills education by relevant laws and regulations (Salsabila & Hertati, 2022). To achieve this goal, it is necessary to develop national work competency standards (SKKNI) as a basis for developing relevant training programs (Fuah et al, 2020). Workers must hold a certificate of competency recognized by the Professional Certification Board, as companies without qualified employees will be at a disadvantage compared to those with qualified employees (Trisanty, 2021)0 (Prihatno, 2021).

Literature review

Injection-motorcycle technology has transformed the automotive industry worldwide. As the number of motorcycles in Indonesia increases, so does the demand for maintenance and repair services (Puspitasari & Hamdi, 2023).

However, the mismatch between contemporary technological needs and the qualifications of the workforce presents a significant challenge. While many technicians still rely on conventional methods, injection vehicles require an understanding of complex electronic systems, sensors, and computer diagnostics (Zhang & Li, 2022). This mismatch is exacerbated by the lack of synchronization between training programs and real industry needs, especially at the regional level (Sukardi et al, 2019). To address this problem, the Indonesian government has created SKKNI as a standard framework for professional certification and vocational training. One of the objectives of SKKNI, according to Mahdane et al. (2018), is to ensure that employees have relevant, standardized, and nationally recognized skills. Djati et al. (2022), a framework that outlines the minimum competencies required for various professions in Indonesia. It includes the knowledge, skills, and attitudes required for a specific job role.

Nonetheless, there are still structural barriers that prevent SKKNI-based training from being effective. Curriculum inconsistencies (65.11%), limited facilities (78.31%), and low industry involvement (60.71%) are the main barriers in automotive training (Sutiman et al.,

2022). Additionally, strategic, organizational, and cultural obstacles also impact the implementation of SKKNI in the field (Vigfússon et al, 2021). Mahdane et al (2018), even noted the low level of effectiveness of SKKNI-based training, indicating that program evaluation and optimization are needed.

Furthermore, there have been few studies that comprehensively evaluate the contribution of training to the competitiveness of the workforce at the regional level (Bionics, 2023). In the era of Industry 4.0, technology adaptation is no longer an option, but a must. Anger et al (2023), emphasizes that automation does not necessarily eliminate jobs, but forces workers to reskill and upskill. Therefore, competency-based training such as SKKNI must be designed responsively to technological and job market dynamics (Pekerja & Era, 2022).

Accurate mapping of workforce needs is also key to the success of the training. Thandlam et al.(2023), suggests the need for a comprehensive mapping model to identify skills gaps. In the automotive context, this means that training must be tailored to local advantages, dominant vehicle types, and customer service demands (Bastiaan, 2019). Partnerships between training institutions and the business/industry (DUDI) are a strategic solution to ensure the relevance and effectiveness of training (Mustafa, Azlan, et al., 2022).

Based on the background and literature review, this study aims to first identify the level of labor needs for local industrial requirements, Second, evaluate the effectiveness of the injection motorcycle service scheme in meeting the needs of the local industry, and Third, map the labor needs and injection motorcycle service schemes to the identified needs. This research will likely contribute to filling the knowledge gap by empirically evaluating the effectiveness of SKKNI-based training at UPT-BLK Grobogan Regency, as well as mapping its regional contributions to the industrial world.

Methodology

Design

This study uses a quantitative approach with a descriptive-analytical design to identify, analyze, and test variables related to the effectiveness of SKKNI-based motorcycle technician training. This design was chosen because it allows researchers to test hypotheses and explain causal relationships between variables.

Population and sampling

The research population consists of 48 alums from the UPT-BLK Grobogan Regency motorcycle technician training program who have completed the program within the last three years (2021–2023). The sample was taken using the Taro Yamane formula with an error rate of 10%, resulting in 32 respondents who were considered to be a saturated sample due to the relatively small and homogeneous population size. The saturated sampling technique was chosen to ensure a comprehensive representation of the entire population.

Instruments

Table 1. Research Instruments

Variabel	Dimension	Indicator	Number of Items
Labor needs (X1)	Understanding the needs of the industry	Understand the types of skills required by modern workshops and be aware of the latest technological developments in injection-motorcycle systems.	4
	Relevance of training to the job market	Training materials by industry demands, Suitability between the competencies taught and field needs	4
	Job readiness	Readiness to work in the workshop after training, and Able to face technical challenges in the world of work	4
SKKNI standard injection motorcycle service (X2)	Application of standard procedures	Implement service procedures according to SKKNI, using SOPs in every repair	4
	Mastery of technology and tools	Able to use scanning tools and electronic diagnostic tools, able to read data from the ECU and sensors	4
	Mastery of technical competencies	Able to fix problems with the injection system independently, and understand the electronic fuel control system	4
	Certifications and knowledge competencies	Having a certificate of competency after training, the certification is recognized and rewarded by the workplace workshop	4
Industrial World (Y)	Labor absorption	Get a job in a workshop after training, and get a placement according to your competencies	4
	Work productivity	Able to complete the service in an efficient time, receiving a high volume of work from the workshop	4
	Quality of service	Customers are satisfied with the repair results, with minimal complaints or repair returns	4
	Labor competitiveness	Earn competitive wages, and be able to compete with other technicians	4

Data Analysis

Data analysis was carried out in two stages, a). Descriptive analysis was used to describe the distribution of frequencies, averages, and categories of variables (Labor Needs, SKKNI Standard Services, Industrial World, b). Inferential analysis includes: classical assumption tests (normality, multicollinearity, heteroscedasticity), Multiple linear regression analysis to test the influence of independent variables on dependent variables, hypothesis tests (t-test and F-test), and Determination coefficient tests (R^2) to determine the contribution of independent variables to dependent variables.

Result and Discussion

In the Results section, summarize the collected data and the analysis performed on those data relevant to the issue that is to follow. The Results should be clear and concise. It should be written objectively and factually, and without expressing personal opinion. It includes numbers, tables, and figures (e.g., charts and graphs). Number tables and figures consecutively in accordance with their appearance in the text.

The results of the descriptive analysis showed that most respondents (31.2%) had a high understanding of the labor needs in the regional automotive industry, while only 3.1% were in the low category (Figure 1).

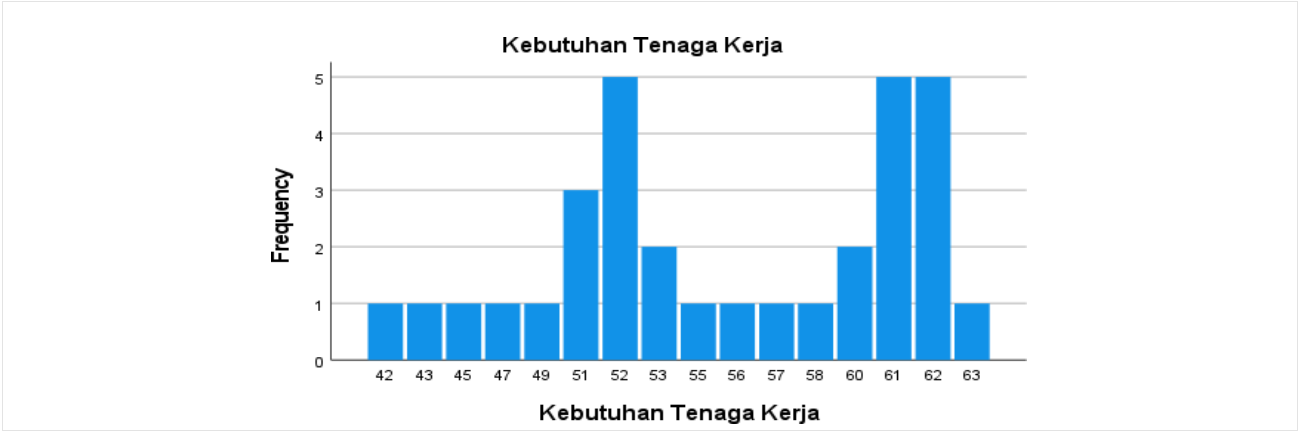

Figure 1. Labor Needs Diagram

These findings indicate that the training at the UPT-BLK of Grobogan Regency has provided participants with an adequate understanding of the dynamics of industrial needs.

Table 1. Multiple Regression Analysis Test Results

	Unstandardized	**coofficients**	**Standardized coefficient**		
Model	B	Std.Error	Beta	t	Sig
costant	436.871	35.494	-	12.308	.007
Labor Needs	1.925	.588	.817	3.276	.082
Standardized Injection Service SKKNI	-4.674	.777	-1.500	-6.016	.027

Based on the results of multiple linear regression (Table 1), the regression equation is obtained as follows: $Y = 436.871 + 1.925X_1 – 4.674X_2$

From this equation, it can be interpreted that every one unit increase in the Labor Needs variable (X_1) will increase the Industrial World variable (Y) by 1.925 units, with a positive and significant influence ($t = 3.276$; $p = 0.082 < 0.10$). However, the SKKNI Standard Injection Motorcycle Service variable (X_2) showed a negative influence of -4.674, although it was statistically significant ($t = -6.016$; $p = 0.027$).

Table 2. Test Results F

model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1428.716	2	714.358	21.399	.045b
	Residual	66.767	2	33.383		
	Total	1495.483	4			

Dependent Variable: Industrial World

Predictor : (Constant), SKKNI Standard Injection Service, Labor Needs

The results of the F test (Table 2) show the value of F calculated = 21.399 > F table = 2.69, with a significance of 0.045 < 0.05. Thus, the null hypothesis is rejected, and it can be concluded that together, the variables of Labor Needs (X_1) and SKKNI Standard Services (X_2) have a significant effect on the Industrial World (Y).

Table 3 Determination Test Results

Model	R	R Square	Adjusted R Square	Std.Error of the Estimate
1	.977a	.955	.911	5,77784

Predictors : (constant), SKKNI Standard Injection Service, Labor Needs

The Adjusted R^2 value = 0.955 indicates that 95.5% of the variation of the Industrial World variable (Y) can be explained by both independent variables (X_1 and X_2). The rest (4.5%) were influenced by other variables outside the model, such as instructor quality, industry involvement, or external factors such as government policies.

Discussion

The level of labor needs against the needs of local industries

Through descriptive analysis, the study's results revealed the level of competency gap among injection motorcycle technicians in various regional industries. The results show that most respondents (31.2%) have a high level of understanding related to labor needs, resulting in a gap (Sukardi et al., 2019), which answers and provides a clear picture of the distribution of technician competencies at the regional level. The results align with the notion that SKKNI-based training can significantly enhance technician competencies (Enterprises, 2023). This finding is also in line with the research findings (Relationship & Industrialization, 2020), which indicate a positive correlation between industrial production and labor needs.

Effectiveness of the Injection Motorcycle Service Scheme

The effectiveness of training based on the Indonesian National Work Competency Standards (SKKNI) was thoroughly evaluated through a partial hypothesis test (t-test). The results show that the Labor Needs variable (X1) has a significant influence on the Industrial World (Y). With a t-value of 3.276, greater than the t-value of 2.042 in Table 2, the gap (Fauziyah et al, 2024) is resolved with empirical evidence supporting the effectiveness of SKKNI training. Research Leader et al. (2024) state that SKKNI-based training can significantly increase the competitiveness of the workforce.

Using a determination coefficient (R2 = 0.978), this study maps the specific labor needs of injection motorcycle technicians by the demands of contemporary industry. The results showed that the combination of the variables Labor Needs (X1) and SKKNI Standard Injection Motorcycle Service (X2) accounted for 95.5% of the variability in the Industrial World (Y), thereby filling the gap McKeirnan et al. (2022) by identifying relevant labor needs. These results align with research by Impresso et al. (2017), who found that mapping labor needs based on industry standards can enhance operational and research efficiency. Info (2024) emphasizes that the training curriculum must be adapted to the needs of the job market.

Mapping of workforce needs and the injection motorcycle service scheme

Barriers to the implementation of SKKNI in the regional automotive industry were identified through a multicollinearity test, which revealed no strong correlation between independent variables (VIF value < 10), and a data normality test, which indicated a normal data distribution (sig. value 0.200 > 0.05). Therefore, the difference in the study results between Anisa et al. (2022) and Soares et al. (2022) is addressed by confirming that the barriers faced by technology, organizations, and curricula can be reduced through competency-based training. Study by Škrinjarić (2022) shows that competency-based training can reduce organizational and technological challenges. Mustafa et al. (2022) also emphasize the importance of cooperation between training institutions and industry players to overcome barriers to SKKNI implementation, supporting these findings.

Research Implications and Contributions

This research succeeded in filling three critical gaps in the literature

a) Uncover the level of labor needs at the regional level with empirical data.
b) Evaluate the effectiveness of SKKNI-based training quantitatively, even though anomalies were found in the adverse effects of the service scheme.
c) Mapping the needs of the workforce according to industry demands can serve as the basis for preparing a more responsive training curriculum. These findings make a significant contribution to the development of vocational training policies, particularly in efforts to align training programs with job market needs.

Conclusion

This study successfully determined the level of labor demand for injection motorcycle technicians in the regional automotive industry, evaluated the effectiveness of SKKNI-based training, and identified the specific needs of the workforce about current industry requirements. According to the descriptive analysis results, most participants (31.2%) understood the needs of the workforce well. On the other hand, the results of the multiple linear regression test showed that the Labor Needs variable (X1) had a significant impact on the Industrial World (Y). The t-cal value of 3.276 is greater than the t-value in Table 2.042. The results of the determination test also showed that the combination of the variables of Labor Needs and Motorcycle Service had a significant impact on the Industrial World. To enhance the competitiveness of the workforce of injection motorcycle technicians, this

research makes a significant contribution to the development of SKKNI-based training policies. In addition, this study offers recommendations for education/training programs to adapt to the needs of the job market, especially the regional automotive industry.

To strengthen the findings and policies produced, it is suggested that further research expand the scope of the region, conduct longitudinal studies on alumni careers, explore obstacles to SKKNI implementation in depth, and develop competency mapping models that are adaptive to the demands of Industry 4.0. In addition, it is important to evaluate curriculum gaps and strengthen partnerships between training institutions and industry to realize a truly link and match training system.

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