

# MBKM Strengthening Model Through the Empowering of SME Metal Craftsmen in Pasir Mukti Village of Bogor, Indonesia

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*Abstract* - Metalcraft activities in the Citeureup sub-district, especially in the village of Pasir Mukti, have been going on for about 20 years from generation to generation. However, economically, this activity has not significantly raised the welfare of the craftsman community. Various parties have thought about this, including through the Ministry of Public Works and Housing and the Department of Settlement and Housing Development (DPKPP) who have assisted in the construction of workshops through the Kotaku Program, the Bogor Regency Government through the Department of Trade and Industry has assisted in workshop machinery, the Company has assisted through the CSR Program. On the other hand, the workshop has become the responsibility of the Village Owned Enterprise (Bumdes) in managing the workshop. The purpose of empowering SMEs for metal craftsmen is to increase the performance of SMEs metal business, productivity and also welfare of craftsmen. The method used is skill training and business assistance, especially in business management and diversification of metal products. The results of the training activities are the preparation of workshop equipped with work equipment, the provision of Occupational Health and Safety (K3) materials, Product Innovation, Basic Workshop Practices, and mentoring activities to produce innovative products, including services. This activity involves final year students of mechanical engineering who also become assistant instructors in training activities. As a follow-up step, the Pasir Mukti Bumdes Workshop can continue to synergize and collaborate with the campus, which can be used as a place for student internships and several Independent Campus BKPs such as Village Development, Thematic Community Service Programs, Independent Projects/Studies in the context of achieving the performance indicator of Independent Campus.

*Index Terms* - Product innovation, SME Empowerment, Metal craftsmen, MBKM Program

## INTRODUCTION

Metal products are one of the superior products of Bogor Regency which are located in Pasir Mukti Village, Sukahati and Tarikolot, Citeureup District. The local government of Bogor Regency has made icons in these villages as thematic villages that will be used as an integrated training center for marketing metal industrial products in the Citeureup District because the area has also been producing metal industries since the 1980s, and continues to this day. Small and Medium Enterprises (SMEs) are the main economic support for the residents of Citeureup District. Metal handicrafts are one of the featured products of Pasir Mukti village in Indonesia. The Pasir Mukti people metal craftsmen business is currently included in the SME category. The owner manages the metal handicrafts enterprise and makes their house as a home, workshop, and warehouse as seen in Figure 1. The human resources' limited capabilities, skills, and knowledge or insight result weak management, organization, and business performance. Several products are made, Such as pans, cake molds, pans, trash cans, etc. Currently, the production and marketing system is still home-industry, where every family has production activities at home with simple equipment. Figure 1 shows a metal craft production room in one of the residents' houses. The use of non-standard equipment and work methods accompanied by a production process that is integrated with people's homes certainly has a high risk.



Fig 1. Portrait of SMEs metal craftsmen in Pasir Mukti Village

Small and medium-sized enterprises (SMEs) are a key engine of growth for most developing countries in South and Southeast Asia. SMEs play a significant role in the national economy's development and employment [1]. The typical characteristic of

SMEs is considered small and run by not more than five employees, are managed by an owner with lower-level educational background, join local distribution chains, and is unwilling to expand their business coverage [2]. The economy of Pasir Mukti has mostly driven SMEs metal craftsmen. Based on local government data collection, 150 SMEs families work as metal craftsmen. This has been going on for a long time, starting from the 1980s, and has been going on for a generation. In Indonesia, metal craftsmen are one of the hereditary professions [3]. Even so, the craftsmen face many barriers and obstacles, both external and internal, in the field of production and processing, marketing, capital, human resources, and technology [4]. To overcome these problems, metal craftsmen need guidance from experts, especially from universities.

Since 2020, the Indonesian government has issued an MBKM program that has become a new paradigm of the education system, especially universities in Indonesia [5]. This policy gives students independence in constructing their own knowledge and interests [6]. It trains university students to be more adaptive, meaning that the students should be ready to leave their comfort zone, extending learning outside their campus such as internships, teaching in the region, research collaboration, student exchanges, and others according to their passion. All of these activities must be supervised by a lecturer [7]. To support these activities, Universities must cooperate with various parties, and one of them is small and medium enterprises. With the MBKM program, this research utilizes metal craftsmen in Pasir Mukti village as a field laboratory to get the real problems. In campus, lecturers and students use those problems as a real case study [8]. So, this study aims to make a model collaborative for metal craftsmen in Pasir Mukti village to improve their business. This collaboration has several parties, namely the craftsmen, government, large enterprises, NGOs, and universities.

The business fields included in the handicraft sub-sector, which refers to the 2005 Indonesian Standard Classification of Business Fields (KBLI) in the Indonesian Ministry of Trade [9], include Group 28920, namely industrial services for materials for various special works on metals and goods of Metal which includes industrial activities of coating, polishing, coloring, engraving, hardening, polishing, welding, cutting, and various special work on metal or metal goods [10]. The concept of corporate social responsibility has been adopted as a continuing commitment in business to behave ethically and contribute to economic development while improving the quality of life of the workforce and ensuring the health and well-being of their families as well as the local community and society.

The concept of corporate social responsibility has been adopted as a continuing commitment in business to behave ethically and contribute to economic development while improving the quality of life of the workforce and ensuring the health and well-being of their families as well as the local community and society. the concept of sustainable development consists of economic, social, and environmental dimensions [11]. Findings in Italy of a lead-acid battery recycling worker who developed anemia and polyneuropathy due to lead poisoning. The presence of mercury in urine exceeds the biological exposure index reported in alkaline battery recycling workers. There is also the potential for exposure to toxic levels of other heavy metals, such as cobalt, lead, and copper from recycling lithium-ion batteries. Four US factories that recycle lead-coated copper telephone wire were closed after workers were found to have high blood lead levels [12]. The risk of developing health problems in humans due to exposure to toxic metals is related to many factors. Assessment of the adverse effects of environmental pollution with lead on the health and development of children in the area surrounding a copper smelting plant or the toxic impact of manganese on the Central Nervous System (CNS) in arc welders. [13] Inadequate training, inappropriate use of Personal Protective Equipment (PPE), protocol deviations, and errors in PPE doffing have been shown to result in self-contamination and transmission of infectious diseases. The evidence-based skills training framework is effective in training while ensuring high levels of PPE compliance and prevention of healthcare-associated infections. Scalable, reproducible and easy-to-implement PPE training will enable healthcare institutions.[14]

Limited capabilities, skills and knowledge or insight of human resources result in weak management, organizational and business performance. The results of the product evaluation show that metal products generally have certain characteristics related to market share. Several functional products that are needed by the community such as pans, coriander, various cake molds, pans, rice cake molds, trash cans, and others can be marketed directly to Citeureup Market or through collectors. Although various efforts have been made, it is still felt that they are not attracting market interest. Some things can be used as material for further evaluation, such as designs that still look monotonous, don't have a brand, workers who are only part-time, not too trained and with modest wages. In addition, they are still weak in terms of product promotion, most of them do not have business licenses, management is still too simple and conventional or has not been managed professionally, and product stock is limited, because they tend to serve orders only. The various inefficiencies that occur cause prices to not be able to compete in the market, so they seem expensive. The purpose of empowering SMEs for metal craftsmen is to increase the performance of SMEs metal business, productivity and also welfare of craftsmen. The implementation of worker protection by providing training on the use of personal protective equipment (PPE) is an important and inseparable part of this entire series of training activities.

The Occupational Health and Safety (OHS) program is an effort made by the company to prevent accidents and occupational diseases. OHS must always be reviewed in accordance with existing developments so that the OHS program can be dynamic. The causes of accidents are classified into 2, namely unsafe action and unsafe conditions [15]

## METHOD

The method used in community empowerment through training and mentoring is the Participatory Action Research (PAR) method. PAR is a research method that is carried out in a participatory manner among members of the community in a lower class community whose enthusiasm is to encourage transformative actions to liberate society from the shackles of ideology and power relations (change in better living conditions). Thus, according to the term PAR has three main pillars, namely the research

methodology, the action dimension, and the participation dimension. This means that PAR is carried out by referring to certain research methodologies, must aim to encourage transformative action, and must involve as many citizens or community members as possible as the PAR implementers themselves.

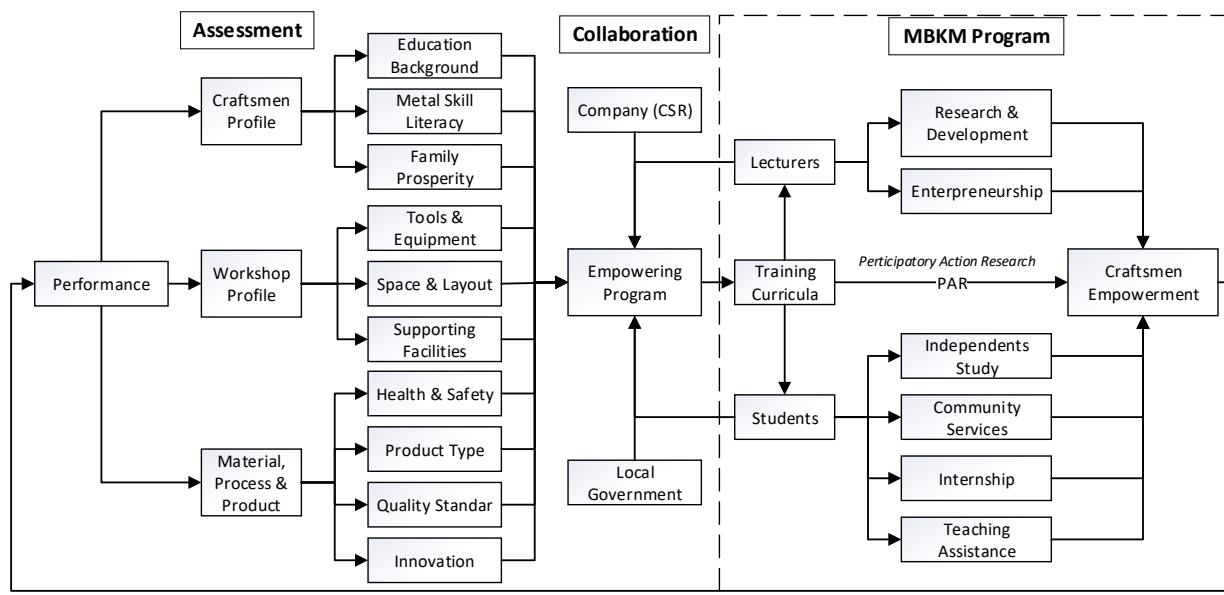


Fig 2. MBKM Strengthening Model

### RESULT

University mentoring activities are carried out in total by optimizing the potential that has been owned by BUMDES, which is in the form of old machine tools that are repaired to be reusable. Two plate cutting machines and punch have been moved to the new workshop and have been repaired (overhaul) and have been electrical installations. Thus both machines are ready to be operated in support of metal product production activities. Community empowerment activities have been carried out on December 21-23 2021 for 30 metal craftsmen participants. Empowerment is carried out through various theoretical and practical trainings as well as exploring the potential and problems of craftsmen using the PAR (Participatory Action Research) method.



Fig 3. Metal Craftsmen Empowerment Program

Practical activities were carried out at the Pasir Mukti Village workshop by making watermelon cutting tools and salted egg making plates, all of which used food grade materials (SS 304 stainless steel). The salted egg making machine is in the form of a low-pressure cork-like vessel assembled with a low pressure compressor, installed with a pressure gauge, safety valve and pressure control. This activity is part of a series of mentoring for Metal Crafts UKM which has been carried out in Pasir Mukti Village, Bogor Regency which has been carried out by Ibn Khaldun University, Bogor since 2019. During the training, all participants in an orderly manner used personal protective equipment while doing their jobs as metal craftsmen.

Efforts to prevent workplace accidents in the industry that are not running well can be a threat to the safety of workers. The Government of the Republic of Indonesia since 2015 requires all industrial sectors, especially the manufacturing industry, to implement a good and correct OHS system. Elements that must be considered in building safe behavior in the behavior of using PPE, elements forming an OHS culture, include; psychological aspects of workers which consist of the level of knowledge, expectations, and motivation. The second element is the aspect of worker behavior and aspects of the organization and situation [16]. Protection measures are aimed at protecting the workforce by minimizing the risk of work accidents and occupational diseases. Companies must carry out risk control by implementing a hierarchy of hazard control, namely elimination, substitution, technique, administration, and the use of personal protective equipment in accordance with the magnitude of the risk that may occur. If the company has made control efforts by elimination, substitution, technique, and administration but there are still potential hazards that pose a risk of work accidents and occupational diseases, the company must seek the final control, namely

the use of PPE.[17]. Personal protective equipment (APD) is very important to use when carrying out activities in the workshop. APD is a set of safety equipment used by workers to protect all or most of the risks of work environment hazards to accidents and diseases due to work. In this regard, basic knowledge is needed for workers, because it is a factor that affects workers in the use of APD. If the workers have good knowledge, then the workers will use APD well as well.[18]

### DISCUSSION

The performance of metal craftsmen, especially in Pasir Mukti Village, is currently still relatively low. This is indicated by the various problems faced by the craftsman community which were grouped into 3 at the time of the assessment, namely Craftsmen, Workshops, Materials/Processes/ Products.

Based on the results of interviews, the education of craftsmen and their families is relatively low, which is generally at the elementary, junior high and even those who have not been educated even though they have entered high school age. This condition requires a breakthrough so that the craftsmen and their families have a better level of education. Therefore, in the future, non-formal education with the equivalence of Packages A, B and C will be pursued for the people of Pasir Mukti Village with a special curriculum that combines the Package Program as well as Workshop Skills. The community empowerment program has used the non-formal education approach through skills in making handicrafts which are used as production activities as well as alternative new jobs[19]. The impact of the community empowerment program through craft SMEs is an increase in the family economy (increase in income, increase in purchasing power and increase in savings).



Fig 4. Knowledge Improvement (Class activities)

The results of the assessment of metal craftsmen show that their educational background is relatively low, their skills are also low and their welfare is still subsistence/low category.



Fig 5. Empowering of Metal Craftmen Skill

Regarding the existence of workshops, production activities are generally still carried out in homes mixed with households, it is natural that the business is less than optimal and less professional in running the business. Workshop problems faced today are mainly in terms of equipment and machinery, limited space and layout, and the lack of supporting facilities.

Table 1. Basic Equipment for Workshop Revitalization

No.	Name of Equipment	Utility
1	Sitting Drilling Machine	Used for metal materials
2	Cutting grinding machine	metal cutting tools
3	Electric Welding Inverter	Electric welding equipment
4	clamp tool on the workbench	Tools on the workbench
5	Work bench equipment	Workshop work equipment
6	Gas welding equipment	Gas (oxygen) welding equipment
7	Hand drill	Hole drill hand
8	Hand grinder	Grinder to tidy up welded joints
9	Work bench	A workbench for placing various tools and work
10	Materials for practice	Stainless materials for practice
11	Welding wire material	Welding wire for welding purposes (connection)
12	Product sample	Used as a sample in training

Source: Workshop Team, 2021

Procurement of materials/materials for craftsmen is still very dependent on 2<sup>nd</sup> party suppliers, so that in terms of prices it is relatively expensive and the quality is difficult to control. Likewise, in terms of the production process, the health and safety aspects (K3) have not been considered, the types of products are not too varied, the quality is still below the standard and innovative superior products have not emerged so that they can compete in the free market.

The results of the metal craftsmen training are innovative products in the form of salted egg making machines and watermelon cutting tools. Both of these products should be mass-produced immediately if the results of the study show a large number of enthusiasts. The watermelon cutter can also be used as a pizza or melon cutter and in the future it can be modified according to other uses (Fig. 6).



Fig 6. Product Inovation

Various problems that arise require an empowerment program that involves stakeholders, including the involvement of the Business World with its CSR Program, the Regency Government with its Facilitation Program and Universities that will prepare an integrated curriculum to improve performance in this Metal Crafts UKM. Universities can take advantage of the MBKM Program as an opportunity to programmatically involve the academic community, lecturers and students in the MBKM scheme and achieve IKU (Key Performance Indicators). Of the 8 BKP (Forms of Learning Activities), this empowerment activity is at least related to 6 BKP, namely: research and development, entrepreneurship, independent studies, Real Work Lectures, Internships and Teaching Assistance. all of these BKP activities lead to community empowerment of craftsmen through a PAR (Participatory Action Research) approach. The model for strengthening the MBKM program so that it is optimal should be a sustainable program that can ultimately improve the performance of Metal Craft SMEs, especially in Pasir Mukti Village. If this model is successful, it can certainly be applied to similar Metal SMEs in other places.

The development of this SME is expected to involve interested parties in fostering metal craftsmen in Bogor Regency. Likewise, cooperation with prospective buyers, suppliers and product designers is needed so that the products produced are in accordance with the buyer's expectations. Small creative industries can benefit by establishing cooperative relationships with buyers, suppliers and designers. However, cooperation with competitors does not have a significant impact on innovation [20]. Metal pengrajin faces complex problems caused by interrelated, including the imperpation of human and financial resource limitations, availability of materials and traditional technologies. Pengrajin not only has to deal with external issues, such as the global economic crisis, bypassing trends and abundance of industrial-scale products that resemble handicraft products at cheaper prices in the market, but also have to face internal conflicts in the community market. [21] In the training also presented Desainer who acted as a partner, motivator, assistant, mediator and evaluator for craftsmen. Craftsmen has different motivations considering his

position as a craft entrepreneur, craft worker, craft designer and/or craft artist. Support will only be effective when it matches the motivation associated with each craftsman.

The involvement of artisans in the entire process of formulating actions aimed at promoting industry can produce positive results. This kind of collective action through participatory activities tends to show signs of positive support from the wider community and is important for the development of society because it brings social and economic benefits. Participatory design for metal products by supporting the development of quality and design skills through community-based collaboration. These efforts are associated with the dynamics of local communities by placing a focus on understanding the motivations, cultures, relationships and tendencies of grouping and working by engaging in pro-active behavior according to each participant's motivations. Thus the PAR method that has been applied in training and mentoring is seen as effective in improving the level of skills and knowledge of craftsmen. [21]

The strategy to increase the number of metal SMEs production is training and tool assistance. The training provided includes entrepreneurship and SME training as well as training, such as training, metals, and so on. Another strategy that can be done to increase metal production SMEs is to strengthen linkages between SMEs. This strategy is carried out by establishing a partnership framework with the government (central and local) or private companies and partnerships between SMEs. The local government becomes the facilitator to initiate partnerships with large companies around the workshop.

The mentoring strategy is also carried out through the development of a network of cooperation with other Artisan SMEs, Suppliers of production materials and marketing. Understanding about social networks in the SME sector is very important to strive for because it is proven that the effect of this network can increase the income of artisan communities. SMEs in the creative industries subsector are not only significant for increasing revenue, but can also stimulate the growth of this metal craft business. The efek of social networking innovation can heal the entrepreneurial spirit in the craftsmen. In addition, SMEs benefit from building relationships with buyers, suppliers, and designers. However, cooperation with competitors does not have a significant impact on the innovation of this network development, so it can be ignored. Substantial implications can be utilized by practitioners and policymakers interested in enhancing the innovation of cooperative network development, especially the craft sector.[20]

The empowerment of metal craftsmen through basic workshop training and the development of product innovations and marketing techniques has increased the capacity and technical ability of the craftsmen so that they are ready to become resilient entrepreneurs. In addition, workshop activities become more lively with various production activities producing metal works. MBKM activities involving Lecturers in artisan community empowerment activities are realized in the preparation of training and mentoring curriculum. While for students empowerment activities begin with independent study, community service through mentoring, internships in workshops and teaching assistance.

Empowerment of these craftsmen has a broad impact on improving the performance of both artisan performance, workshop performance and performance in the production process. The improvement in the performance of craftsmen is seen from the aspects of formal education, skills and well-being. Improvement of workshop performance includes the availability of workshop equipment, arrangement and supporting facilities. While improving the performance of the production process includes improved work safety, product diversity (diversification), improvement of product quality and various product innovations.

The success of this community empowerment activity can not be separated from the role and contribution of stakeholders who are concerned with the development of metal-based SMEs. The main stakeholders in question are:

The Central Government through the Ministry of Public Works and Public Housing through the KOTAKU (City Without Slums) Program has provided workshop development assistance for Metal Craftsmen, including developing environmental access roads with concreteization.

Bogor Regency Government through Bapedalitbang has conducted workshop development planning by allocating a number of funds for the purchase of modern machinery and equipment that will be prepared by the Trade and Industry Office for the 2022 budget year with items as tabled below.

Table 1. Workshop Equipment Support from Local Government

No.	Component Code	Descriptions	Specification
<b>Spending Grants of Goods to Nonprofit, Voluntary and Social Institutions that Already Have a Registered Certificate</b>			
<b>A. Tooling and Electrical Machinery</b>			
1	1.3.2.03.01.01.001	Lathe	410 x 1000 mm
2	1.3.2.03.02.12.005	Table Drill machine	Drill & Mill
3	1.3.2.03.01.02.007	Grinder Machine	Grinding Wheel 8 "
<b>B. Production Machinery</b>			
1	1.3.2.17.01	Spandek production machine	Roll Y-Y
2	1.3.2.04.01	Universal Plastic Enumeration Machine	50-100 Kg / hour
3		Plate and pipe Working	

No.	Component Code	Descriptions	Specification
		Machine	
4	1.3.2.03.02.13.030	Hand Grinding Machine	4 inch
5	1.2.3.03.02.12.028	Hand Electric Drilling Machine	Chuck 13 mm
<b>C. Manual Plate Work Equipment</b>			
1	1.3.2.03.02.08.001	Tanggem/ Ragum Table	6 inch
2	1.3.2.03.02.08.002	Plate Scissors	2 mm
3	1.3.2.03.02.07.008	Drill Bit	Besi Dia 1 s/d 13 mm
<b>D. Machine Parts and Installation</b>			
1	1.1.7.01.02.08.001	Lathe / servo motor	Cable installation, Sekering, Panel etc.
2	1.1.7.01.02.08.001	Drill machine	Cable installation, Sekering, Panel etc.
3	1.1.7.01.02.08.001	Spandek Printing Press	Cable installation, Sekering, Panel etc.
<b>E. Tooling Tools</b>			
1	1.3.2.03.02.08.001	Ragum Machine	Angle and Rotate
2	1.3.2.03.02.07.004	Lathe Chisel	Widia, TC and Stalk sets
3	1.3.2.03.01.01.007	Cut Grinda Machine	WD 14"
4	1.3.2.03.02.05.001	Toolkit	Wera 05003755001 8100 SA All-in Zyklop Speed Ratchet Set, 1/4" drive, with holding function, metric, 42pieces
5	1.3.2.03.02.01.002	Work Bench Tool	Full standards
<b>F. Welding Machine</b>			
1	1.3.2.03.02.08.003	Gas Welding Equipment	Oxygen Tubes, slang, regulator
2	1.3.2.03.02.08.003	Acetyline tube	Acetylene Tube
3	1.3.2.03.02.08.001	Electric Welding Equipment	900 watts (Printing)
<b>G. Test Materials</b>			
1	1.3.2.03.02.05.010	Physical Maker (Diess)	Mild Steel ST 60 / tool steel
2	1.3.2.03.02.05.010	Coil Galvalum	Roll spandek galvalum material
<b>H. HSE Equipment</b>			
1	1.3.2.15	"Helmets, welding glasses, weld shields, leather gloves, safety shoes,	Material: Hard ABS Plastic Overall Size L x W x H : approx. 30cm x 23cm x 16cm /
<b>I. Work clothes &amp; miscellaneous</b>			
1	1.1.7.01.02.08	Spare parts / Service Purchases	Overhoul
	1.1.7.01.02.09	Old Ponch Machine	Hydrolic Power Pack, Valve, Selenoid,
3		Old Cutting Machine	
4	1.3.2.03.01.01.018	Finishing	L Series
5	1.3.2.03.01.01.028	Compressor	Hand Polishing

Source: Bappedalitbang, Bogor Regency, 2021

The Village Government which has initiated the establishment of Village Owned Enterprises (BUMDES), supported by village community leaders, acts as workshop managers as well as business coordinators, consisting of metal craftsmen.

Community Services Responsibility (CSR) from several large companies operating in pasir mukti village area, has allocated a number of jobs that can be carried out by BUMDES.

Some NGOs that partner with the Government in the assistance of metal craft businesses and facilitate marketing with outside buyers.

Universities that have provided training and mentoring, both by lecturers and students through community service programs and MBKM.

The overall role and contribution of stakeholders is very real for the economic growth of the village through the empowerment of metal craftsmen.

### CONCLUSION

Some conclusions are stated as follows:

The activity of empowering Metal Crafts UKM carried out by universities using the MBKM scheme program is able to improve the skills of metal craftsmen and in general will improve the performance of Metal Crafts UKM in Pasir Mukti Village, Bogor Regency.

In the end, if this program is implemented in a sustainable manner, it will improve the welfare of the craftsmen's family.

In this activity, the government has visited the wider community through mass media so that lecturers and students, craftspeople, government, and business districts can be more enthusiastic and play an active role in this effort. (<https://www.radarbogor.id/2021/12/24/uika-latih-puluhan-pengrajin-logam-desa-pasir-mukti/>)

### ACKNOWLEDGEMENT

Highly appreciation and special thanks to the Directorate General of Higher Education, Research and Technology for sponsoring this activity.

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