CSA IN JERUKGAMPING VILLAGE: TTG CRACKERS SEPARATION MACHINE TO INCREASE SMI'S PRODUCTION

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Abstract

Micro, small, and medium industry (MSMI) is one of the main components for improving the economy of village communities. This existence is expressed by the development of MSMI in rural areas. Most of the MSMIs that are progressing rapidly in business development are MSMIs that operate in various business fields. This condition spurred the village community's confidence to brand their village as a creative MSMI village. Small and medium industry (SMI) with the Cracker Mawar brand is one of the SMIs developing in Jerukgamping Village, Krian District, Sidoarjo Regency, East Java Province. The process of producing crackers from raw materials to finished products takes a minimum of one day and a maximum of two days. This is due to the drying process, which still relies on the hot sun. This traditional production system creates various obstacles in business development, including: (i) the accumulation of crackers that are still stuck to each other; (ii) the production process cannot be completed in one day (exceeds working hours); (iii) the remains of crackers that are still attached; (iv) the production process is not optimal; and (v) the resulting output does not match the input. With the various business development obstacles faced by SMI Cracker Mawar, the Community Service Activity of the Department of Industrial Engineering Team, Faculty of Engineering, Universitas 17 Agustus 1945 Surabaya is to provide assistance in increasing SMI's production capacity with the TTG Cracker Separator Machine at SMI in Jerukgamping Village, Krian District, Sidoarjo Regency. In this way, micro, small, and medium industries (MSMI) as the economic pillars of Jerukgamping Village can develop better so that the welfare of the community will increase.

Keywords: Community Service Activities (CSA), Jerukgamping Village, TTG Cracker Separator Machine, Production Capacity, SMIs

Abstrak

Industri mikro, kecil, dan menengah (IMKM) adalah salah satu komponen utama untuk meningkatkan perekonomian masyarakat desa. Eksistensi ini dinyatakan dengan pengembangan IMKM di pedesaan. Sebagian besar IMKM yang maju pesat pengembangan bisnisnya adalah IMKM yang bergerak di berbagai bidang bisnis. Kondisi ini memacu kepercayaan masyarakat desa untuk membuat branding desanya dengan desa IMKM kreatif. Industri Kecil dan Menengah (IKM) dengan merek Krupuk Mawar merupakan salah satu IKM yang berkembang di Desa Jerukgamping, Kecamatan Krian, Kabupaten Sidoarjo, Provinsi Jawa Timur. Proses produksi kerupuk dari bahan mentah menjadi produk jadi membutuhkan waktu paling cepat satu hari dan paling lama dua hari. Hal ini disebabkan proses penjemuran yang masih mengandalkan terik panas matahari. Sistem produksi yang masih tradisional

ini menimbulkan berbagai kendala dalam pengembangan usahanya, antara lain: (i) Terjadinya penumpukan kerupuk yang masih menempel satu sama lain; (ii) Proses produksi tidak dapat terselesaikan dalam satu hari (melebihi jam kerja); (iii) Sisa kerupuk yang masih menempel; (iv) Proses produksi tidak maksimal; dan (v) Output yang dihasilkan tidak sesuai dengan input. Dengan berbagai kendala pengembangan bisnis yang dihadapi IKM Krupuk Mawar maka Kegiatan Pengabdian Kepada Masyarakat dari Tim Program Studi Teknik Industri, Fakultas Teknik, Universitas 17 Agustus 1945 Surabaya adalah untuk memberikan Pendampingan Peningkatan Kapasitas Produksi IMKM dengan TTG Mesin Pemisah Krupuk pada IMKM di Desa Jerukgamping, Kecamatan Krian, Kabupaten Sidoarjo. Dengan demikian, Industri mikro, kecil, dan menengah (IMKM) sebagai pilar perekonomian Desa Jerukgamping dapat berkembang dengan lebih baik sehingga kesejahteraan masyarakatnya akan semakin meningkat.
Kata Kunci: *Kegiatan Pengabdian kepada Masyarakat (PkM), Desa Jerukgamping, TTG Mesin Pemisah Krupuk, Kapasitas Produksi, IKM*

Introduction

Micro, small, and medium industries (MSMIs) have an important role in developing the national economy. Apart from its role in developing the economy and absorbing labor, MSMI also has a role in equalizing development results. MSMI must be continuously developed and play an active role so that it can advance and compete with other economic actors. If not, MSMI, which acts as the heart of the national economy, will not be able to develop well (Putri, 2016; Putri, 2022). Micro, small, and medium industry (MSMI) is one of the main components for improving the economy of village communities. This existence is expressed by the development of MSMI in rural areas. Most of the MSMIs that are progressing rapidly in business development are MSMIs that operate in various business fields. This condition spurred the village community's confidence to brand their village as a creative MSMI village. Creative MSMI has a dynamic nature that requires adjustment, innovation, and an entrepreneurial spirit to upgrade and advance the business. Several factors that influence business include: (i) Knowledge of entrepreneurship, meaning that you must have knowledge of business activities, including cash bookkeeping, capital allocation, and understanding marketing strategies. An entrepreneur must have a proactive character, be full of enthusiasm, and not depend on other parties to start something; (iii) Choose a business based on personal capacity (skills and talents); (iv) Dare to take business risks from unexpected possibilities in the future; (v) Confidence to continue trying and facing business risks; (vi) Entrepreneurial intelligence in facing business risks, including: intelligence for solving problems/problem solutions and making business decisions; (vii) Creativity to manage business as capital to face business competition; (viii) Teamwork from all parties involved in the business; (ix) Patience and persistence in facing business challenges; (x) Business connections to develop business; and (xi) Effective marketing to market and promote the business (Putri, 2023). The development of MSMI is hampered by various factors such as inadequate marketing strategies, product sales not reaching targets, raw materials of non-standard quality, insufficiently trained human resources, low-educated human resources, production facilities still traditional, production process technology still not modern, minimal sources of capital, financial administration is not yet professional (family system), production costs are still high, which has an impact on high selling prices, product innovation is still not well developed, and weak distribution and promotion networks (Putri & Abdulrahim, 2017).

Sidoarjo Regency is one of the districts in East Java. As one of the supports for the city of Surabaya, called Gerbangkertosusilo, Sidoarjo Regency is an area experiencing rapid development. This is characterized by the large number of industries in this area. The nicknames of Sidoarjo Regency are Bandeng City and Shrimp City. Sidoarjo Regency is located between 112.5 and 112.9 degrees East Longitude and 7.3 and 7.5 degrees South Latitude. The territorial boundaries of Sidoarjo Regency are, namely: (i) the northern boundaries: Surabaya City and Gresik Regency; (ii) the southern boundary: Pasuruan Regency; (iii) the western boundary: Mojokerto Regency; and (iv) the boundary to the east: Madura Strait. Sidoarjo Regency is the smallest and most densely populated district in East Java. The area of Sidoarjo Regency is 714.27 km2, flanked by the Surabaya River (32.5 km) and the Porong River (47 km). The population of Sidoarjo Regency, based on the results of the 2020 Population Census, is 2,082,801 people. Population density based on the 2020 Population Census is 2,916 people per km2 (Daniswari, 2022). Sidoarjo Regency administratively consists of 18 sub-districts, including: Sidoarjo, Buduran, Gedangan, Sedati, Waru, Taman, Krian, Balongbendo, Prambon, Tulangan, Tarik, Krembung, Wonoayu, Sukodono, Jabon, Tanggulangin, Porong, and Candi (Ichwan, 2023).

Jerukgamping Village is a village in Krian District, Sidorjo Regency, East Java Province. Jerukgamping Village is located on the border with Wonoayu District, Taman District, Driyorejo District, and Balongbendo District. Jerukgamping Village has a strategic location because it is close to Krian Market, the train station, and several factories in Krian District. Most of the people of Jerukgamping Village are entrepreneurs, including: opening a grocery store, selling meat in front of their house at night, selling crackers, and several residents who work selling meatballs in their homes. Jerukgamping Village consists of 2 hamlets, namely Jeruk Hamlet and Gamping Hamlet, which cover 17 RTs and 3 RWs. Generally, in several Indonesian villages, there are still strong cultures that have been passed down from generation to generation (Wikipedia, 2023). The micro, small, and medium industry (MSMI) crackers are one of the MSMIs that are developing in Jerukgamping Village, Krian District, Sidoarjo Regency, East Java Province. One of them, the small and medium industry (SMI), Mawar crackers, belongs to Mr. Rizal, who started his business in 2006. This SMI has only produced Mawar cracker types from the past until now (as presented in Figure 1).

Figure 1. Small and Medium Industry (SMI) Crackers with the Mawar Brand
(Source: Field Documentation, 2024)

SMI crackers with the Mawar brand use two types of production systems, namely make-to-stock (MTS) and make-to-order (MTO). The production capacity per day is 150 kg. This SMI employs 8 workers to handle the production process. The process of producing Mawar crackers from raw materials to finished products takes a minimum of one day and a maximum of two days. This is due to the drying process, which still relies on the hot sun. This traditional production system creates various obstacles in business development, including: (i) the accumulation of crackers that are still stuck to each other; (ii) the production process cannot be completed in one day (exceeds working hours); (iii) the remains of crackers that are still attached; (iv) the production process is not optimal; and (v) the resulting output does not match the input.

With the various business development obstacles faced by SMI Cracker Mawar, the Community Service Activity of the Department of Industrial Engineering Team, Faculty of Engineering, Universitas 17 Agustus 1945 Surabaya is to provide assistance in increasing SMI's production capacity with the TTG Cracker Separator Machine at SMI in Jerukgamping Village, Krian District, Sidoarjo Regency. In this way, micro, small, and medium industries (MSMI) as the economic pillars of Jerukgamping Village can develop better so that the welfare of the community will increase.

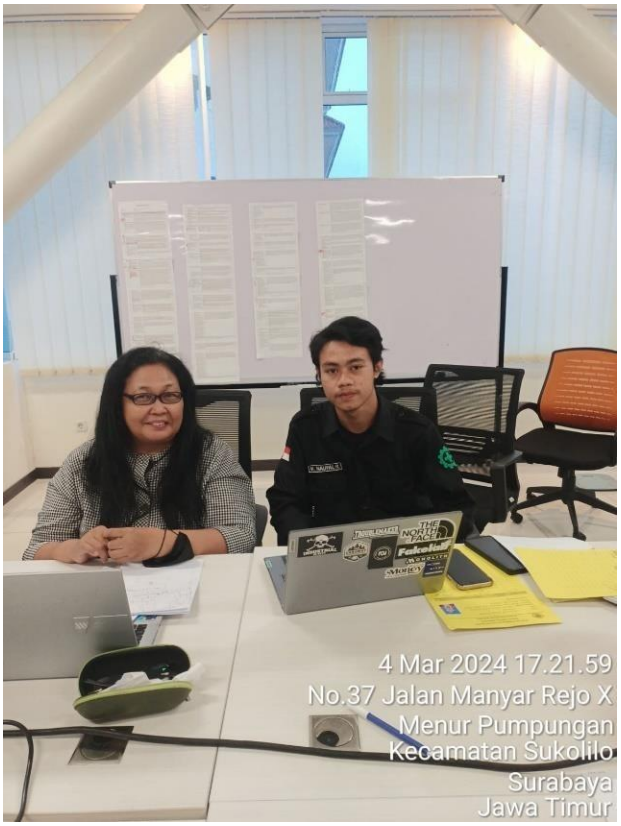


Figure 2. Community Service Activity Team, Department of Industrial Engineering, Faculty of Engineering, Universitas 17 Agustus 1945 Surabaya

Activity Methods

The location for community service activity is a small and medium industry (SMI), Crackers with the Mawar Brand, in Jerukgamping Village, Krian District, Sidoarjo Regency, East Java Province. Activity time is March–May 2024. The stages of community service activities are as follows: (i) visiting SMI Mawar Cracker directly; (ii) interviewing the owner of SMI, namely Mr. Risal, to record the profile of IKM and the problems faced in developing its business; and (iii) providing assistance in increasing the production capacity of SMI Mawar Crackers with TTG Cracker Separator Machines.

Results and Discussion

A. SMI Cracker Production Process with the Mawar Brand and Its Constraints

There are six stages in the Mawar brand cracker production process, including: (i) mixing the dough manually (by hand). The dough consists of water, salt, garlic, and tapioca flour (Process 1), (ii) rolling the dough using a dough mixer (Process 2), (iii) molding the dough using a machine (Process 3), (iv) steaming dough using a steaming oven (Process 4), (v) drying rose crackers directly under sunlight (Process 5), and (iv) separating crackers that are still stuck to each other (Process 6). The rose cracker production process is presented in Figure 3. This figure represents (a) cracker production activities under the Mawar brand; (b) stamping cracker dough by machine; and (c) steaming the dough in a steaming furnace. The Mawar cracker drying process is presented in Figure 4. This figure represents (a) the arrangement of Mawar crackers on a woven drying mat; (b) drying Mawar crackers under direct sunlight; and (c) the storage of crackers that have been dried in the sun. The process of separating crackers, which is carried out manually (Process 6), results in the resulting output not being optimal (the output does not match the input). This condition resulted in the separation process taking quite a long time, so it could not be completed on the same day and had to be continued the next morning. In addition, this separation process is only carried out by two workers.

(a) (b) (c)

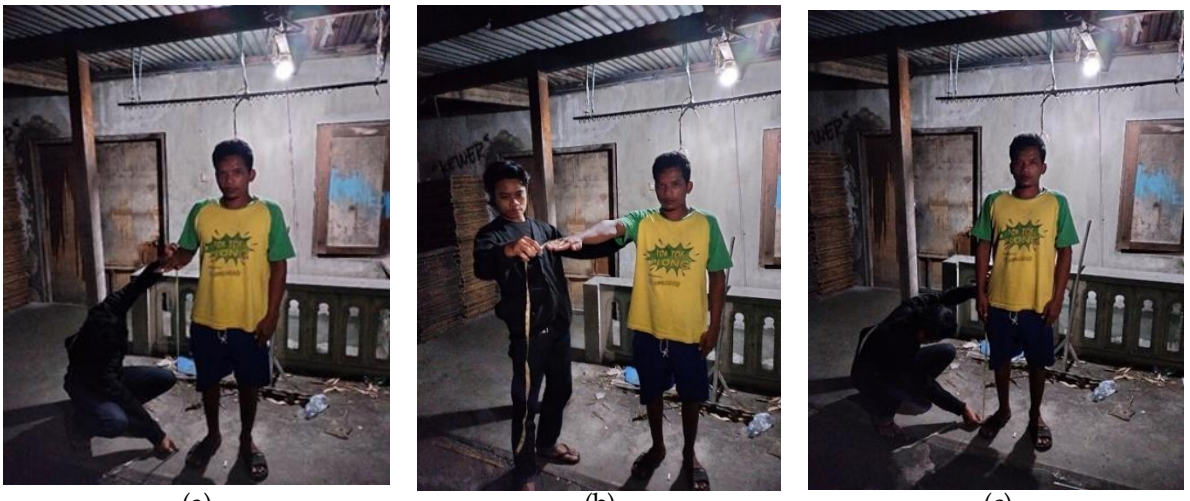
Figure 3. SMI Cracker Production Process with the Mawar Brand
Source: Field Documentation (2024)

(a) (b) (c)

Figure 4. Process of Drying Mawar Crackers
Source: Field Documentation (2024)

B. TTG Manufacturing Process for Cracker Separator Machine

The Community Service Activity of the Department of Industrial Engineering Team, Faculty of Engineering, Universitas 17 Agustus 1945 Surabaya is to provide assistance in increasing MSMI's production capacity with the TTG Cracker Separator Machine at micro, small, and medium industry (MSMI) in Jerukgamping Village, Krian District, Sidoarjo Regency. In this way, MSMI, as a pillar of the economy of Jerukgamping Village, can develop better so that the welfare of the community will increase. One effort to speed up the process of separating crackers that are still stuck together and only require one worker is to design a cracker-separating machine. This machine takes into account ergonomic aspects and specifications to suit the conditions at SMI Mawar Cracker. The solution to this problem is carried out so that workers are comfortable when operating the machine and the output produced per day can increase.



(a) (b) (c)

Figure 5. Process of measuring the body of workers at SMI Cracker Mawar
Source: Field Documentation (2024)

Figure 5 presents the process of measuring the bodies of workers at SMI Mawar Cracker. This figure consists of (a) elbow height when standing; (b) the distance the arm extends forward, measured from the shoulder to the tips of the fingers; and (c) standing waist height. The results of these measurements are anthropometric data. Furthermore, anthropometric data will be used to determine the dimensions of the Mawar cracker separating machine. Figure 6 presents a Mawar cracker separating machine.

Figure 6. Results of Separating Mawar Crackers with the TTG Cracker Separation Machine
Source: Field Documentation (2024)

C. Increased Production of Mawar Crackers

The output of cracker separation carried out manually is 28 kilograms per hour, with a cost of production of IDR 18,765 per kilogram. With an average production output per day, it produces an output of 113.5 kilograms in 200 minutes. The output for separating crackers using a cracker separating machine is 95 kilograms per hour, with a cost of production of IDR 16,690. With production results per day, it produces an output of 150 kilograms in 95 minutes. The increase in output in the process of separating rose crackers is 67 (95 minus 28) kilograms per hour, and the time required is 105 times faster. Savings on cost of production value are IDR 2,075 (IDR 18,765 minus IDR 16,690) per kilogram.

Conclusion

The Community Service Activity of the Department of Industrial Engineering Team, Faculty of Engineering, Universitas 17 Agustus 1945 Surabaya is to provide assistance in increasing MSMI's production capacity with the TTG Cracker Separator Machine at micro, small, and medium industry (MSMI) in Jerukgamping Village, Krian District, Sidoarjo Regency. In this way, MSMI, as a pillar of the economy of Jerukgamping Village, can develop better so that the welfare of the community will increase. Some of the positive impacts of community service activities include the following: (i) increased output in the Mawar cracker

separation process by 67 kilograms per hour; (ii) the time needed is 105 minutes faster; and (iii) savings in the value of the cost of production of IDR 2,075 per kilogram.

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