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APPLICATION OF APPROPRIATE TECHNOLOGY AUTOMATION SYSTEMS FOR MAKING MARTABAK MANIS MACHINE FOR CAPACITY BUILDING IN MSMEs IN THE GRESIK REGION

Andianto Wahyu Nugroho[1,a], Slamet Riyadi[2,b], Siswadi Siswadi[3,c], Gatot Setyono[4,d], Wahyu Nugroho[5,e]

Mechanical Engineering Study Program, Wijaya Putra University[1,2,3,4,5]

Raya Benowo, Road No. 1-3 Surabaya, East Java, Indonesia[1,2,3,4,5]

[b]slametriyadi@uwp.ac.id

Abstrak.

Martabak merupakan makanan ringan yang sering dicari oleh masyarakat umum. Oleh karena itu, martabak merupakan komoditas yang memiliki prospek untuk dikembangkan sebagai usaha industri. Usaha penjualan martabak merupakan salah satu jenis usaha yang berpotensi untuk dikembangkan. Sehingga banyak pebisnis yang tertarik untuk menjual makanan jenis ini. Bisnis ini juga tidak membutuhkan modal yang besar namun memiliki keuntungan yang cukup besar yang dikenal dengan sebutan terang bulan. Martabak manis memiliki bahan utama antara lain tepung terigu, telur, air, gula, dan bahan pengembang adonan; ada juga penambahan jus. Adanya mesin ini diharapkan dapat meningkatkan kualitas dan kuantitas produk karena masih banyak pengusaha kecil di daerah gresik yang menggunakan alat tradisional dan melakukan proses pengadukan yang memakan waktu dan tenaga yang cukup banyak, maka dengan ini penulis membuat mesin martabak manis dengan kapasitas 25 kg/jam yang bertujuan untuk meningkatkan produksi, kualitas, dan kuantitas dengan hasil yang maksimal bagi UMKM di daerah Gresik.

Kata kunci: teknologi tepat guna, martabak manis, meningkatkan kapasitas.

Abstract.

Martabak is a snack that is often sought after by the general public. Therefore, martabak is a commodity with prospects to develop as an industrial business. Martabak's selling business is one type of business that has the potential to be developed. So many business people are interested in selling this type of food. This business does not require significant capital but has a sizable profit known as bright moon. Sweet martabak has main ingredients, including flour, eggs, water, sugar, and leavening dough agent; there is also the addition of juice. The existence of this machine is expected to increase the quality and quantity of products because there are still many small entrepreneurs in the Gresik area who use traditional tools and carry out a moving process that takes quite a lot of time and effort. Hence, the author now makes a sweet martabak machine with a 25 kg/hour capacity to increase production, quality, and quantity with maximum results for MSMEs in the Gresik area.

Keywords: *appropriate technology, sweet martabak, increasing capacity.*

Introduction.

MSMEs can always survive when the economy is not in good condition. MSME is a productive business to be developed to support macro and micro-economic development in Indonesia [1]. Small and Medium Enterprises (SMEs) in Indonesia contributed greatly to the national Gross Domestic Product (GDP) of 55.56% based on data from the Planning Bureau of the Ministry of Cooperatives and SMEs of the Republic of Indonesia in 2008. To expand market share and increase the competitiveness of SMEs, SMEs need an application that can integrate and automate SME business processes [2].

Martabak is one of the snacks that are often sought after. Therefore, martabak is a commodity with prospects for development as an industrial business. Marabak has many advantages, including adding aroma and flavor to bread, cakes, biscuits, and confectionery. Sweet martabak is a snack often found at street vendors throughout Indonesia [3]. It dramatically saves human resources, overcomes labour difficulties in the kneading dough, and can increase the production capacity of sweet martabak so that the sweet martabak industry can expand its business. The tools/machines used are not as long as they desire the tools/machines, but tools/machines that can save resources and use production facilities and can increase work productivity and have been studied technically by it, economically and socially [4]. Sweet martabak has the main ingredients, including flour, eggs, water, sugar, and dough. Wheat flour is the main component needed by the manufacture of sweet martabak. The primary role of wheat flour is in its protein, namely gliadin, and glutenin, which will react with water to form a new protein, namely gluten, and starch, which will expand and form a gel, which will continue to become a paste (gelatinated) when heated [5].

Sweet martabak Martabak is a type of food that is familiar to Indonesians. The business of selling martabak is one type of business that has the potential to be developed by it. So many business people are interested in selling this type of food. This business also does not require significant capital but has a sizable profit. The more businesses selling this type of snack, the higher the competition. So MSME players are competing to renew or innovate their merchandise. It is done by attracting buyers to want to buy the product. The connoisseurs of these snacks are also wide, so traders need to learn more about predicting consumer behavior. Studying consumer behavior needs to be done by MSME actors if they want to start a business. They can produce goods or services according to consumer tastes by predicting consumer behavior. They can also explain why consumers want to buy an item or service, which influences someone to buy when that person buys, what type and model of goods will be purchased, or why confident consumers always ask many questions when making a purchase, or conversely, do not ask at all, or why confident consumers buy during the day or evening, and so on. Explanations like this are essential so that market designers and marketing can sell their products according to consumer needs. However, many companies fail to predict consumer behavior, so they fail to dominate the market [6].

Implementation Method.

Minister of home affairs regulation number 20 of 2010 concerning Community Empowerment Through the Management of Appropriate Technology (TTG), currently the role of technology is very important to boost the performance of SMEs and overcome the difficulties they often face in this case in this case producing quality commodity goods. Through a touch of technology and supported by reliable human resources, it is hoped that the quality of products produced by SMEs can be maintained, so that they can compete with foreign products and the profits generated can also be greater. By utilizing technology, SMEs can accelerate production and provide added product value. Utilizing appropriate technology, SMEs can speed up the production process and provide added value to products. If producers still do the process traditionally, SMEs can save time and increase production capacity with machines.

a. Field Survey

Field survey by surveying partner locations to identify the problems partners face when making tempeh chips. From the survey results to partner locations, making tempe chips, especially slicing tempeh into thin pieces, still uses the manual method, requiring particular expertise and a long time.

b. Discussion with Partners and Finding Problem Solving

Discussion with Partners and Finding Problem-Solving Based on the results of discussions with partners during the field survey, partner problems were found while making tempeh chips. The problem is the process of slicing tempeh which is still using the manual method. Based on the problems these partners face, a tool for the tempe slicing process is needed that is easy to use to reduce production time. As production time decreases, production capacity increases so that partner income increases.

c. Making a Tempe Slicing Machine

The process of making a tempe slicing machine begins with determining the design of a tempe slicing machine that is easy to operate. The next step, from the design that has been determined, is then carried out to design the components that have been determined based on the loads and other factors that occur in the Tempe slicing machine so that the machine is safe to use and has a long service life. This design stage also includes making working drawings which will later serve as a guide when making the machine [7]. A Tempe slicing machine was made at the Wijaya Putra University Mechanical Engineering Study Program workshop.

d. Testing Machine

The tempe slicing machine is finished, and before transferring technology to partners, trials are carried out on the machine that has been made [8],[9], [10]. It aims to ensure that the tempe slicing machine functions optimally.

e. Implementation of the machine

The Tempe Slicing Machine Trial Is Done, And The Results Are Following The Specifications. The Next Stage Is The Handover Of The Tempe Slicing Machine To Partners In Siliragung Village, Siliragung District. During the machine handover, a brief training was also conducted on the use of the tempe slicing machine and its maintenance process so that the use of the machine can be optimal and, with good maintenance, can increase the service life of the tempe slicing machine.

Figure 2. Implementation on Partners

This community service activity in Cerme District, Gresik Regency, is a collaboration between the Faculty of Engineering, Wijaya Putra University, and the local government to improve the quality of life with a strategy of developing sweet martabak small businesses for the local community which aims to carry out the planned program. The determination of the program was based on the results of brainstorming between officials, community leaders, and the Engineering Faculty Team, a community service activity program was determined, which included 1) the application of appropriate technology machines for the community and 2) increasing the quality and quantity of sweet martabak small businesses.

Before the team carries out all activities, the team will socialize the program to the community to increase participation in program implementation. The activity continued by making materials, providing counseling or training, and then assisting in the field [11]–[15].

Several sources and sweet martabak sellers at traditional markets in the Cerme sub-district, Gresik Regency, did this implementation. The data used in this study are qualitative and quantitative. The data is obtained directly or through primary data through interviews and questionnaires, as well as data obtained indirectly or secondary data from journals and previous research. In the first stage, the attributes of consumer needs were determined by interviews. Then the second stage is technical response data obtained from interviews with several SME entrepreneurs and journals.

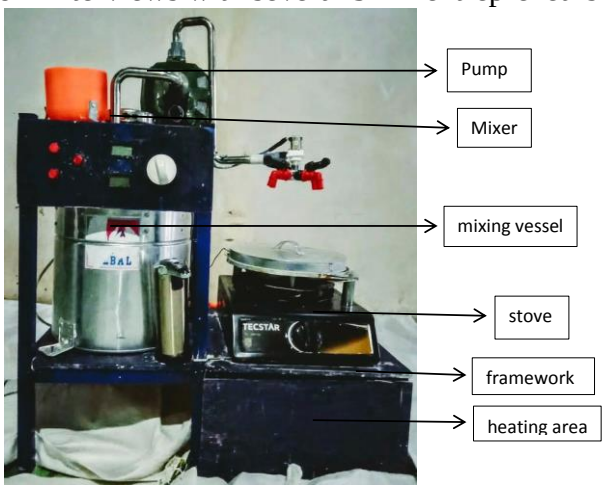

Figure 2. Automation systems for making martabak manis machine.

Results and Discussion.

These community service activity programs in Cerme District, Gresik Regency, were selected after deliberations between village community leaders, village officials, and academics from the Mechanical Engineering Study Program at Wijaya Putra University. The selected programs are adapted to the environmental conditions and situations in the area. This service program implements appropriate technology and guidance for MSME actors - sweet martabak. These programs worked well, on time, and according to the original plan because of the active participation of the Cerme sub-district community. There was a solid collaboration between the community, village officials, and the Mechanical Engineering Study Program Team.

Implementation of appropriate technology by designing sweet martabak making machines. sweet martabak making machine consists of several components, including an electric motor which functions to convert electrical energy into mechanical motion energy, where the mechanical energy is in the form of rotation from the motor. Pot is one of the kitchen utensils used as a cooking tool, this cooking pot is made of layers of stainless steel which functions to make it sticky and evenly cooked. The size of the stainless steel pan is 300x300x1 mm. A stove is a cooking utensil that produces high heat, where the fuel is in the form of LPG to provide heating, either to heat the room where the stove is located or to heat the stove itself, and the items placed on it using LPG fuel. The pump is a tool for pumping liquid with a certain pressure where this tool consists of 2 suction and exhaust valves. Heater is a device that generates high heat, where the fuel is in the form of electricity to provide heating, either to heat the room where the heater is located or to heat the heater itself, and the items placed on it.

The design analysis standard for the sweet martabak machine with a 12 kg/hour capacity is designed to make it easier for users. An important component of the analysis of the design of the sweet martabak machine with a capacity of 12 kg/hour includes iron which functions as a supporting leg so that the stirring can be sturdy when the machine is used, and it is hoped that it can provide comfort and support activities in its use. Construction Type The type of electric motor in the design of the sweet martabak machine with a capacity of 12 kg/hour has frame specifications: iron pipe hollow 2x4 cm tube/cylinder: capacity 12 kg, dimensions (p x l x h) cm: 300 x 60 x 300 cm, maximum electric power: 500 W/200 aV, hot fuel process: LPG, transmission rpm, 20-40 rpm. With this sweet martabak-making machine, it can reduce production time. As production time

decreases, production capacity increases so that partner income increases. A comparison of conventional manufacturing and using machines can be seen in Table 1.

Table 1. Comparison of conventional and machine-made sweet martabak

Description	Konvensional	Machine
The resulting sweet martabak	1.5 kg	12 kg
Time required	1 hour	1 hour

Conclusion.

The output of this community service activity is a machine for making sweet martabak which is easy to operate and maintain. It is hoped that with this machine, the results of this community service program can increase partners' production capacity. The faster and more sweet martabak is made, the product yield will increase relatively quickly, so that partners' income will increase compared to the manual method done by partners. Analysis of the design of the sweet martabak machine with a capacity of 12 kg/hour is designed to make it easier for users. An essential component of the analysis of the design of the sweet martabak machine with a capacity of 12 kg/hour includes iron which functions as a supporting leg so that the stirring can be sturdy when the machine is used, and it is hoped that it can provide comfort and support activities in its use.

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