SITEKIN: Jurnal Sains, Teknologi dan Industri, Vol. 22, No. 3, June 2025, pp.216 - 223
ISSN 2407-0939 print/ISSN 2721-2041 online

Evaluation of Rengginang MSME Production Performance with the Implementation of Quality Function Deployment (QFD)

Suhendi Irawan[1], Revinia Adisty[2], Derry Dardanella[3], Purana Indrawan[4], Sazli Tutur Risyahadi[5], Hendri Wijaya[6], Annisa Kartinawati[7], Fany Apriliani[8]
[1,2,3,4,5,6,7,8]Industrial management study program, College Vocational Study, IPB-University
Jl. Kumbang No. 14, Bogor City, West Java, 16164
Email: suhendiirawan1@apps.ipb.ac.id, reviniaadsty@gmail.com, derrydardanella@apps.ipb.ac.id, purana2009@apps.ipb.ac.id, sazlitutur@apps.ipb.ac.id, hendri.wijaya@apps.ipb.ac.id, annisakartinawati@apps.ipb.ac.id, fany.apriliani@apps.ipb.ac.id

ABSTRACT

This study aims to evaluate the production performance of Micro, Small, and Medium Enterprises (MSMEs) in rengginang production using the Quality Function Deployment (QFD) approach. Rengginang is a traditional Indonesian snack made from sticky rice, which has economic and cultural value but faces challenges in production consistency, hygiene, and capacity due to manual processing methods. The QFD method was applied to translate six key customer needs—such as production speed, hygiene, capacity, consistency, quality control, and product variation flexibility—into technical characteristics through the House of Quality (HoQ) matrix. Results showed that the most critical production need was achieving a drying process of no more than one day, followed by hygienic handling. These were translated into technical priorities such as high-speed drying machines and closed-drying systems. The relative weight analysis indicated that these technical improvements had a high impact on production performance with relatively moderate implementation complexity. This study provides MSME actors with a structured model to improve production efficiency and competitiveness based on customer-oriented planning.

Keywords: *Quality Function Deployment (QFD), House of Quality, MSMEs, Rengginang, Production Performance*

Introduction

Micro, Small, and Medium Enterprises (MSMEs) play an important role in the national economy, especially in supporting the community economy, job creation, income distribution, and poverty alleviation. [1], [2]. In Indonesia, MSMEs contribute around 61.1% to the national Gross Domestic Product (GDP) and absorb more than 97% of the workforce. [3]. This makes MSMEs the backbone of. The economy, especially in facing crises and maintaining local economic stability [4]–[9]. In addition, MSMEs are also a vehicle for preserving local wisdom, including Indonesia's diverse and rich traditional culinary delights.

One of the leading sectors in MSMEs is the traditional snack industry. Products such as rengginang and crackers made from sticky rice that are widely consumed by the community are worthy of being used as part of the community's businesses and have cultural values that must be preserved. [10], [11]Rengginang can be marketed widely in various regions of Indonesia and has a market potential that can continue to increase. [12]. This product has a relatively easy and simple processing method, besides having a high selling value. [13].

However, the absence of techno.logical assistance from the government to the Rengginang MSMEs [14] It makes entrepreneurs face various challenges in terms of production. Some of the main problems found include the drying process, which still depends on the weather and is carried out manually under the sun, inconsistent product quality, low hygiene, and limited production capacity. [15] Drying is carried out manually. The sun causes variability in quality and inefficient production time. In addition, the absence of quality standards due to weak knowledge and quality of human resources in the production process has an impact on the low competitiveness of rengginang MSME products, which are increasingly competitive. [11] [16]These limitations also worsen the image of MSME products when they compete with large-scale industrial products that have modern and more standardized production facilities.

Consumer demands for snacks are now increasing, especially in terms of food safety, appearance, durability, and sustainability of the production process, where materials and quality standards will affect their characteristics. [17]. Changes in people's lifestyles have also driven the emergence of demand for more practical and durable products, without reducing nutritional value and traditional taste. Even consumers are now increasingly concerned about environmentally friendly production processes, which require MSMEs to start implementing sustainable production principles. This requires MSME actors to not only maintain the authenticity of the product but also to innovate in aspects of processing and technology. Therefore, MSMEs need to evaluate and improve their production systems as a whole, especially in technical and quality aspects, based on customer needs.

One systematic approach that can be used to integrate the voice of the consumer into technical production planning is Quality Function Deployment (QFD). QFD is a structured method used to meet customer needs, or in this case, the production process [18][19], [20] QFD is a quality management method developed by Yoji Akao in 1966 to translate consumer needs (WHATs) into technical characteristics (HOWs) in the production process. By compiling a House of Quality (HoQ) matrix, QFD helps business actors identify, prioritize, and respond to consumer needs.

Structurally, QFD directs business actors to understand what consumers want and how these needs can be realized in technical processes through systematic analysis. This is especially important for SMEs, because they tend to rely on experience and intuition rather than a data-based approach. QFD enables the transformation from a traditional approach to a systematic one, which ultimately increases productivity and process efficiency. By using QFD, details of quality perceptions are described in product characteristics, which are then used in the production process. [21]–[24].

The application of QFD in the food industry. The sector has been proven effective in various studies. A study by [19], [20], [25] Showed that QFD is able to increase production efficiency, reduce the number of product defects, and reduce unnecessary production stages. In addition, QFD allows the identification of critical points in the production process that can be improved to improve the final quality of the product. Even on a small and medium business scale, QFD remains relevant and applicable because it can be adjusted to the limited resources owned by MSMEs.

In the context of rengginang production, the use of QFD is very important because it can map the relationship between customer needs, such as taste, texture, cleanliness, and production speed, with technical aspects of production, such as temperature, drying time, and drying technology. This evaluation provides a strong basis for designing a more efficient and market-responsive production system. With QFD, MSMEs can not only improve production efficiency but also gain a deeper understanding of customer expectations. In addition, QFD can be used as a benchmarking tool for MSMEs to compare their performance with similar business actors in other regions or against national standards for the quality of traditional food products.

This study aims to evaluate the performance of rengginang MSME production using the Quality Function Deployment (QFD) approach. The focus is on identifying the main needs of the production process and determining technical priorities that can be improved. Thus, this study is expected to provide applicable strategic recommendations for rengginang MSMEs to increase competitiveness and production quality sustainably.

Research Methods

This research is a quantitative descriptive study with a case study approach on one of the rengginang-producing MSMEs. The aim is to evaluate and improve product quality based on production needs using the Quality Function Deployment (QFD) method. The data used in this study consists of primary and secondary data. Primary data is obtained through interviews with business actors to identify the production process, where interviews are conducted using semi-structured interview techniques to explore production requirements attributes (WHATs). Secondary data is obtained from literature, scientific journals, and other supporting documents related to the implementation of QFD and the quality of MSME production.

QFD Implementation Steps are carried out through the following stages:

1. Identification of Production Needs (WHATs)
   Production needs attributes are collected from questionnaires and grouped based on production dimensions such as production time, production hygiene, production capacity, production consistency, product quality produced, and flexibility of product type variations produced.
2. Importance Rating Assessment

Each attribute is given a score using a Likert scale between 1 and 5 based on the perception of production needs and how important the attribute is.

3. Identification of Product Technical Characteristics (HOWs)
   Through discussions and interviews, technical characteristics that affect the fulfillment of production attributes are determined, such as drying time, drying place, production flexibility, use of production machines, and temperature and production time settings.
4. Preparation of House of Quality (HoQ) Matrix
   The preparation of the QFD matrix is done by mapping the relationship between WHATs and HOWs, correlations between HOWs, and continuing with the calculation of target values.
5. Determination of Weight/Importance and Relative Weight Values
   This is done to determine which aspects are a priority to support the production process. At the same time, relative weight is used to determine the relative contribution of each user's needs to the overall production, using the formula:

$$\text{Weight/Importance} = \frac{\sum(Jumlah\ responden\ \times\ skala)}{Total\ responden} \quad (1)$$

$$\text{Relative ight} = \frac{\text{Weight/Importance}}{\sum \text{Total Weight/Importance}} \times\ 100\% \quad (2)$$

6. Data Analysis Techniques
   Data is analyzed quantitatively to compile and evaluate the House of Quality, identify technical priorities, and provide recommendations for improvement.
7. Evaluation Criteria
   Evaluation is based on the extent to which technical attributes can meet production needs and the gap between expectations and reality.

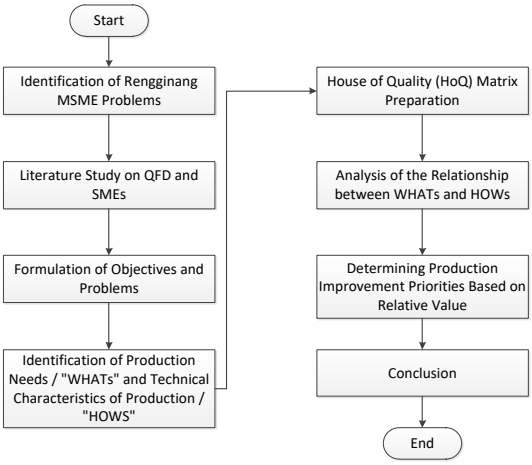


Figure 1. Research Flow Chart

Results and Discussion

The Quality Function Deployment (QFD) approach used in this study is in phase 4 of production planning, as shown in Figure 1. The fourth phase focuses on production planning, integrating all operations into concrete and measurable production planning. In the context of this study, the model is used to analyze and evaluate the performance of rengginang MSMEs, especially in the aspect of product drying.

This study uses the QFD approach at the production process stage. It provides an overview of how technical and operational actions in small business actors are implemented. This stage allows the identification of the most crucial technical characteristics, quality improvement priorities, and potential improvements to the production process that are in accordance with the capacity of MSMEs.

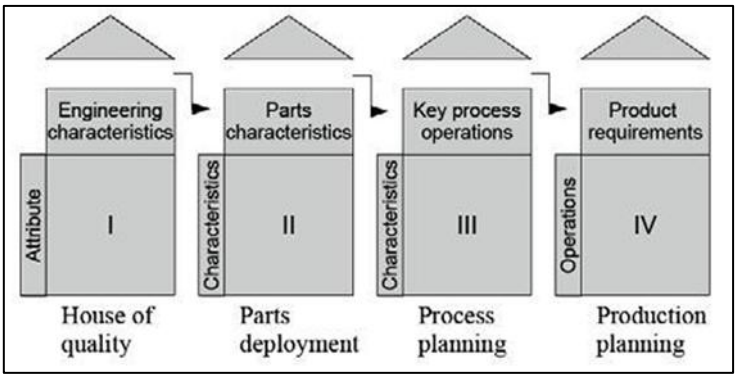


Figure 2. Four Phases of Quality Function Deployment [26]

Production requirements

Production requirements present production needs that reflect the relationship between key operations of the production process and the technical demands that must be met. Each production requirement is derived from the relevant process in the field, such as drying duration, quality control, and flexibility of product variants. For example, the need for "production can be done in one day" is technically described as "the rengginang drying process takes no more than one day". Meanwhile, the need for a more hygienic product is represented by a drying process that is free from dust contamination or pollution. This table is the initial foundation in understanding the relationship between the actual production process and the technical expectations that must be achieved.

Table 1. Production requirements of the rengginang production process

No	Key Process Operation	Production requirement
1	Production can be done in 1 day	The rengginang drying process takes no more than 1 day
2	More hygienic products	Not contaminated by dust pollution during the drying process
3	More production capacity than conventional systems	The fast-drying process shortens the production time, so that the production volume becomes greater
4	Production consistency	The amount of production does not depend on sunlight
5	Quality control	The temperature and production time can be determined on the production machine.
6	Flexibility of variants	Can dry various types of rengginang products

Production requirements are identified through interviews and observations. From the Table 1, six main attributes are considered important for carrying out the production process, namely: (1) the drying process does not take more than one day, (2) no contamination of dust or pollution during the drying process, (3) drying speed that allows for increased production volume, (4) production dependence that does not depend on sunlight, (5) the ability to regulate temperature and production time, and (6) flexibility in handling various variants of rengginang products. These attributes reflect the perception of needs in carrying out production to achieve product quality and efficiency, and are the basis for compiling the House of Quality (HoQ) matrix.

Weight/importance and relative weight

The basis for calculating weight/importance is done using a Likert scale of 1–5, which is then processed into a numeric score and converted into a percentage. From these results, the attribute “drying process no more than one day” obtained the highest weight of 5.0, or equivalent to 20%, indicating that time efficiency is the main factor in consumer preferences. The other five attributes each have a score of 4.0 with a relative weight of 16%. Weight importance is indicated using a decimal value, while relative weight shows the percentage of the weight importance value of the whole. This information is used to weight the rows in the House of Quality, as well as to help determine technical priorities in the development of the production system. The results of calculating weight/importance and relative weight can be seen in Table 2, as follows.

Table 2. Calculation of weight/importance and relative weight

No	*Demanded Quality*	Scale					*Weight/ Importance*	*Relative Weight* (%)
		1	2	3	4	5		
1	The rengginang drying process takes no more than 1 day	0	0	0	0	1	5,0	20
2	Not contaminated by dust pollution during the drying process	0	0	0	1	0	4,0	16
3	The fast-drying process shortens the production time, so that the production volume becomes greater	0	0	0	1	0	4,0	16
4	The amount of production does not depend on sunlight	0	0	0	0	1	4,0	16
5	The temperature and production time can be determined on the production machine	0	0	0	1	0	4,0	16
6	Can dry various types of rengginang products	0	0	0	1	0	4,0	16
Total							**25**	**100**

Description:
0 > X ≥ 1 Not Important
1 > X ≥ 2 Less Important
2 > X ≥ 3 So-so
3 > X ≥ 4 Important
4 > X ≥ 5 Very Important

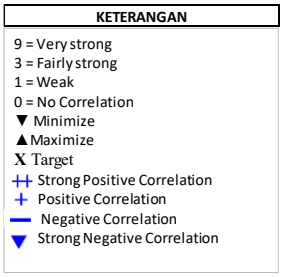
Quality characteristics

Quality characteristics are designed in response to production needs. In quality characteristics, the specification of needs is explained in detail so that the specifications of the needs required to achieve production quality are known specifically. There are six main technical characteristics, namely: (1) the drying process only takes a few minutes, (2) drying is carried out in a closed room, (3) the drying process can be carried out repeatedly for various products, (4) the production process is carried out using a machine, (5) there are temperature and time settings in production, and (6) the drying machine can be used for various types of rengginang products. These characteristics are arranged as column components in the House of Quality. They will be analyzed further to determine the strength of the relationship to consumer needs and the level of difficulty of implementation.

Table 3. Quality Characteristics

No	*Quality Characteristics*
1	The rengginang drying process only takes a few minutes.
2	Drying is done in a closed room.
3	The drying process can be done many times for different products.
4	Production is done using a machine.
5	There are temperature and time settings for production.
6	The drying machine can be used for various products.

The results of the application of the Quality Function Deployment (QFD) method in rengginang MSMEs show that six main attributes are important needs of consumers, including: the rengginang drying process that does not take more than one day, free from dust contamination during the drying process, fast and efficient drying, production dependence that does not depend on sunlight, the ability to control temperature and production time, and machine flexibility in handling various product variants. The importance value of these attributes ranges from 4 to 5, where the attribute regarding fast drying duration gets the highest priority. This shows that consumers really expect increased time efficiency and cleanliness in the rengginang production process.



					Column#	1	2	3	4	5	6	Comparative Assessment		
					Direction of improvement	▲	X	▲	▲	▲	▲			
					Minimize (▼), Maximize (▲), Target (X)									
Row #	Max Relationship Value in Row	Relative Weight	Weight/Importance	Demand Quality (WHATs) / Quality Characteristic (HOWs)		The rengginang drying process only takes a few minutes	Drying is done in a closed room	The drying process can be done many times for different product	Production is done using a machine	There are temperature and time settings for production	The drying machine can be used for various products	MSME Rengginang Barokah	Competitor A	Competitor B
1	9	20	5,0	The rengginang drying process is no more than 1 day		9	0	0	3	3	0	4	2	2
2	9	16	4,0	Not contaminated by dust pollution during the drying process		0	9	0	0	0	0	4	2	2
3	9	16	4,0	The fast drying process shortens the production time so that the production volume becomes greater		9	0	0	3	3	0	4	3	3
4	9	16	4,0	The amount of production does not depend on sunlight		3	3	0	9	3	0	5	2	2
5	9	16	4,0	The temperature and production time can be determined on the production machine		0	0	0	3	9	0	4	2	2
6	9	16	4,0	Can dry various types of rengginang products		0	0	9	3	3	9	5	5	5
				Dificulty Rating (1=*Easy to Accomplish*, 10=*Extremely Difficult*)		7	3	6	4	6	7			
				Max Relationship Value in Column		9	9	9	9	9	9			
				Total Weight/Importance		372,0	192,0	144,0	348,0	348,0	144,0			
				Total Relative Weight		24,0	12,4	9,3	22,5	22,5	9,3			
				MSME Rengginang Barokah		3	3	3	5	4	5			
				Competitor A		1	2	3	1	2	2			
				Competitor B		1	2	3	1	2	2			

Figure 3. House of quality rengginang production process

In response to these production needs, six technical characteristics (HOWs) have been designed, namely the use of a drying machine that only takes one day, drying carried out in a closed room, the ability of the machine to dry repeatedly without depending on weather conditions, the use of automatic machines in the production process, adjustable temperature and time settings, and the ability of the machine to dry various variants of rengginang products. Based on the matrix of the relationship between consumer needs and technical characteristics, it is known that a fast-drying machine and the use of a closed room have a very strong relationship (the highest weight value), so that they are the main priorities in technical planning.

The relative weight analysis shows that the most priority technical characteristics to be implemented are the development of a drying machine that can speed up the production process and maintain the hygienic quality of the product. Meanwhile, technical characteristics such as multi-purpose machines and automatic control systems are also important, but have a higher level of implementation difficulty. This can be seen from the difficulty rating value, which shows that some characteristics require greater resources, training, and costs, such as multi-purpose machines (rating 7) and automatic temperature and time settings (rating 6). Therefore, in the early stages of development, MSMEs are advised to prioritize technical aspects that have a major impact on consumer satisfaction but with an affordable level of implementation difficulty, such as the use of closed rooms and daily capacity drying machines.

When compared to its competitors, MSME rengginang barokah has advantages in all aspects of demand quality (WHATs) and quality characteristics (HOWs). In terms of demand quality, MSME Rengginang Barokah excels in terms of production that does not depend on sunlight. In contrast, in quality characteristics, it excels in terms of production carried out using machines, and drying machines can be used for various products. This is because MSME rengginang barokah already has a rengginang drying machine compared to its competitors, who do not have machines and still rely on sunlight in the drying process of their products.

With this QFD approach, MSME rengginang can design production process improvements systematically and based on customer needs. This process not only increases production efficiency but also strengthens product competitiveness in the market by improving production quality and consistency.

Conclusion

This study shows that six main attributes are important needs in the rengginang production process, namely short drying duration (no more than one day), process hygiene (free from contamination), high production capacity, consistency of production results, control of temperature and production time, and flexibility in processing various product variants.

By mapping these need attributes into six technical characteristics through the House of Quality (HoQ) matrix, the main technical priorities that need to be developed are obtained, such as the use of high-speed drying machines and closed-space production systems. These priorities are based on the highest weight importance and relative weight values, which indicate that time efficiency and cleanliness are the main factors in technical decision making.

References

[1] W. P.Tyas, O. O. Sianturi, and J. K. P.H, "Analisis Kebijakan Pemerintah Dalam Pengembangan Usaha Mikro Kecil Dan Menengah (Umkm) Berbasis Rumah (Home-Based Enterprises/Hbe) Di Kota Semarang, Surakarta, Boyolali, Salatiga, Dan Surabaya," *J. Pengemb. Kota*, vol. 8, no. 1, pp. 78–89, 2020, doi: 10.14710/jpk . 8.1.78-89.

[2] S.Vinatra, A.Bisnis, U.Veteran, andJ.Timur, "Peran Usaha Mikro, Kecil, dan Menengah (UMKM) dalam Kesejahteraan Perekonomian Negara dan Masyarakat," *J. Akuntan Publik*, vol. 1, no. 3, pp. 1–08, 2023, doi: 10.59581/jap-widyakarya.v1i1.832.

[3] A. T.Novitasari, "Kontribusi Umkm Terhadap Pertumbuhan Ekonomi Era Digitalisasi Melalui Peran Pemerintah," *JABE (Journal Appl. Bus. Econ.*, vol. 9, no. 2, p. 184, 2022, doi: 10.30998/jabe.v9i2.13703.

[4] D.Hanggoro, "Dampak Serta Usaha Pemulihan Umkm Pasca Pandemi Covid-19," *JISMA J. Ilmu Sos. Manajemen, dan Akunt.*, vol. 1, no. 5, pp. 743–748, 2022, doi: 10.59004/jisma.v1i5.253.

[5] H. Ernanto and S.Hermawan, "Pengembangan UMKM Berbasis Lokal Dalam Mendorong Perekonomian Ranting Aisyiyah Candinegoro," *Indones. J. Law Econ. Rev.*., vol. 14, no. 1, pp. 6–14, 2022.

[6] M. J.Shofa, W. O.Widyarto, R.Wiliyanto, A.Mahirah, and F. I.Firmansyah, "Strategi Digital Shelf Management UMKM dengan Algoritma Apriori," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 8, no. 2, pp. 125–131, 2022.

[7] B.Praditya andF. A.Ekoanindiyo, "Perancangan Alat Penyangrai Biji Melinjo Menggunakan Metode RULA (Rapid Upper Limb Assessment) Di UMKM Melinjo Sukorejo," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 9, no. 2, pp. 521–528, 2023.

[8] R.Rahmawati, "Analisis True Customer Needs Produk Raja Menggunakan Model Kano Dan Quality Function Deployment Pada Umkm Tiu Ramata Di Kabupaten Sumbawa," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 8, no. 2, pp. 324–334, 2022.

[9] R.Puspitaningsih, K.Liana, andL.Irianti, "Faktor yang Mempengaruhi UMKM Dalam Mengadopsi Komputasi Awan Di Kota Bandung," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 8, no. 2, pp. 202–208, 2022.

[10] W.Heldayanti, U.Salawati, andH.Firmansyah, "Analisis Finansial Usaha Pengolahan Rengginang (Studi Kasus pada Usaha " Rengginang RG 33 di Kota Banjarbaru) Financial Analysis Of Rengginang Processing Business (Case Study on " Rengginang RG 33 in Banjarbaru City)," vol. 2, no. 2, pp. 129–134, 2018.

[11] L. Hakim and A.Kibtiyah, "Penguatan Manajemen Mutu Rengginang Ketan Putih Pelestarian Budaya Makanan Khas Daerah," *Pros. Semin. Nas. Sains …*, pp. 1–6, 2021.

[12] Y.Adiyanto, "Analisis Strategi Pemasaran Makanan Tradisional Ranginang (Rengginang) Di Kabupaten Pandeglang Yoga Adiyanto Universitas Serang Raya Email : Yogaunsera29@gmail.com ABSTRAK Pandeglang merupakan daerah yang banyak menghasilkan makanan tradisional , baik y," vol. 13, no. 02, pp. 267–276, 2020.

[13] N. Y.Lestari, "Pelatihan umkm inovasi dan pemasaran pembuatan rengginang di desa tegalurung," vol.

1, no. 2, pp. 131–139, 2023.
[14] D. I. K.Ciparay, "Analisis tantangan dan peluang bisnis rangginang di kecamatan ciparay," pp. 833–843, 2015.
[15] A.Jaharani, F.Nurkhotimah, I.Normalita, E. D.Fithrotunnisa, and R.Jannah, "Upaya Peningkatan Omset Wirausaha Desa Cikadueun Cara Pembuatan Produk Rangginang," vol. 02, pp. 10–12, 2025.
[16] A.Adil, A.Muhid, R.Anggriani, G.Indrayanto, andD.Tilani, "Pelatihan Manajemen Produksi untuk Meningkatkan Kualitas Produk Rengginang Opak Dapur Inaq Muhid," *ADMA J. Pengabdi. Dan Pemberdaya. Masy.*, vol. 4, no. 2, pp. 293–302, 2024, doi: 10.30812/adma.v4i2.3396.
[17] A. V. Lakalay, L.Ega, and G. H.Augustyn, "Karakteristik Kimia dan Organoleptik Rengginang Formulasi Biji Hotong dengan Tepung Jagung (Zea mays L .) Chemical and Organoleptic Characteristics of Rengginang Hotong Seed Formulation with Corn Flour (Zea mays L.)," *J. Agrosilvopasture-Tech*, vol. 3, no. 1, pp. 13–19, 2024.
[18] A.Agarwal, "Investigating design targets for effective performance management system: an application of balance scorecard using QFD," *J. Adv. Manag. Res.*, vol. 18, no. 3, pp. 353–367, 2020, doi: 10.1108/JAMR-05-2020-0075.
[19] M. L.Teklehaimanot, "Customer–Centric informal business marketing in Africa: the case of Ethiopian MSMEs," *Small Enterp. Res.*, vol. 30, no. 2, pp. 154–170, 2023, doi: 10.1080/13215906.2022.2086610.
[20] M.Singh, "Analysis and prioritization of Lean Six Sigma enablers with environmental facets using best worst method: A case of Indian MSMEs," *J. Clean. Prod.*, vol. 279, 2021, doi: 10.1016/j.jclepro.2020.123592.
[21] A.Hasibuan *et al.*, "Service Quality Improvement by Using the Quality Function Deployment (QFD) Method at the Government General Hospital," *J. Phys. Conf. Ser.*., vol. 1363, no. 1, 2019, doi: 10.1088/1742-6596/1363/1/012095.
[22] L. Nurhayati and L. M. C.Wulandari, "Analisis Peningkatan Kualitas Layanan Dengan Metode Servqual Dan QFD (Studi Kasus: Koperasi Delta Sari Sidoarjo)," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 8, no. 2, pp. 244–253, 2022.
[23] M. R.Radyanto, "Pengembangan Desain Produk Penyangrai Biji Melinjo Menggunakan Metode Quality Function Deployment (QFD)," *... J. Has. Penelit. Dan Karya Ilm. ...*, 2023, [Online]. Available: http://ejournal.uin-suska.ac.id/index.php/jti/article/view/23678
[24] P. M. Putra and P.Prihono, "Penggunaan Metode Kano-QFD Dalam Pengembangan layanan Terhadap Kepuasaan Pelanggan Restoran (Studi Kasus: McDonald Taman Geluran)," *J. Tek. Ind. J. Has. Penelit. Dan Karya Ilm. Dalam Bid. Tek. Ind.*, vol. 9, no. 2, pp. 514–520.
[25] A.Al-Dwairi, O.Al-Araidah, andS.Hamasha, "An Integrated QFD and TRIZ Methodology for Innovative Product Design," *Designs*, vol. 7, no. 6, 2023, doi: 10.3390/designs7060132.
[26] R. Ginting and M.Riski Satrio, "Integration of Quality Function Deployment (QFD) and Value Engineering in Improving the Quality of Product : A Literature Review," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 1003, no. 1, 2020, doi: 10.1088/1757-899X/1003/1/012002.