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ANALYSIS OF THE RISK OF SILK TOFU PRODUCTION IN SMALL ENTERPRISE

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ABSTRACT

Silk tofu, a unique variant of tofu packaged in thin silk sheets that provides a significantly different texture and appearance, is the subject of this research. The study aims to investigate its nutritional value, sensory attributes, and market potential. MKM Silk Tofu 57 is a prominent producer of silk tofu located in Sidoarjo, specifically at jl. Beciro No.9, Beciro, Jumputrejo, Kec. Sukodono, Sidoarjo Regency. Throughout the production process, MKM Silk Tofu 57 faces numerous risks. Hence, a risk analysis is imperative to identify optimal solutions to reduce or eliminate these arising risks. This study delves into the risks encountered by MKM Silk Tofu 57 and proposes improvements to mitigate these risks. Utilizing qualitative data, such as the company's history, and quantitative data, including numerical figures, the research employed the Failure Mode and Effects Analysis (FMEA) method to assess the risks. The results of the risk assessment, based on the Risk Priority Number (RPN) calculations, identified the highest risk as the potential destruction of tofu during packaging, with an RPN value of 72. Risk management will be executed through the Service Quality method, encompassing five attribute methods: reliability, responsiveness, tangibility, assurance, and empathy .An observation conducted during this study yielded data and conclusions indicating the lowest satisfaction level in the assurance aspect. This signifies a lower level of accountability applied in the service provided by the silk tofu establishment, suggesting a need for enhancement in this area.

Keywords: FMEA, Silk Tofu, Risk

I. INTRODUCTION

Industrial development in Indonesia has made a major contribution to the economy. On the other hand, this also has an impact on the environment due to the release of industrial waste and increasingly intensive exploitation of resources in industrial development (Ibad & Putra, 2021). Improving quality is one of the things that needs to be considered so that a company can maintain its business. Product quality is important as the main key to success in ensuring consumer satisfaction. Quality is one aspect of the factor in winning increasingly competitive market competition. Good quality is a product that meets previously established standards. Quality products will indirectly increase consumer confidence so that they can increase consumer loyalty. Quality products will indirectly have an impact on company productivity and minimize production costs. Companies need to carry out continuous analysis and improvement to maintain the products they produce in accordance with predetermined specifications. Steps that can be taken to maintain products that comply with established standards are to implement quality control. Quality control is a quality control process in order to maintain the quality of the products produced (Hardono, 2019).

UMKM Silk tofu 57 is a well-known silk tofu producer in Sidoarjo. This MSME is located on Jl. Beciro No.9, Beciro, Jumputrejo, Kec. Sukodono, Sidoarjo Regency. In the silk tofu production process for MSMEs 57 there are many risks faced. Some of the risks faced are the quality of raw materials, changes in raw material prices, changes in consumer tastes, dependence on suppliers, marketing and sales risks. However, one of the biggest risks for SMEs is the quality of the raw materials. The main raw material in silken tofu production is soybeans. If the quality of the soybeans is poor or contaminated, it will affect the final quality of silken tofu such as crushed tofu, firm tofu, and yellowed tofu.

Thus, this research was carried out to analyze the risks in the silken tofu production system 57 using the FMEA (*Failure Mode and Effect Analysis*) method. The application of the FMEA (*Failure Mode and Effect Analysis*) method can help MSMEs to analyze risks in tofu production so that improvements can be made to reduce defective products. FMEA (*Failure Mode And Effect Analysis*) is a structured action to eliminate the possibility of failure modes occurring in the future. Therefore, the purpose of this research is to determine the number of possible failures that will occur in the Jelly Potter business. This will then be analyzed using the FMEA method and managed by the *Service Quality method* with the highest risk acquisition, which is expected to be able to overcome and avoid existing risks so that it can increase productivity in business. (Anthony, 2018).

II. LITERATURE REVIEW

2.1 Risk Management

Risk Management is an approach taken to risk, namely by understanding, identifying and evaluating the risks of a project. Risk management is a process that identifies, measures, develops, selects and manages options to deal with these risks. Proper risk management is risk management that applies future possibilities and is proactive rather than reactive. Thus, risk management not only reduces the tendency for risks to occur but also the impacts that arise. Risk management is a systematic process for managing risk. The four steps in the risk management process include: (1) *identify risk, (2) evaluate risk, (3) select risk management techniques* , and (4) *implement and review techniques* . Integrated and enterprise risk management is a new approach to risk management that considers the importance of managing all forms of risk, regardless of pure risk or speculative risk, which can affect a company's ability to achieve its strategic goals (Misra, 2020).

2.2 MSMEs

Micro businesses are productive businesses owned by individuals and individual business entities that meet the criteria for micro businesses. Second, small businesses are productive economic businesses that stand alone. Micro, Small and Medium Enterprises (MSMEs) are economic activities carried out by the majority of Indonesian people as a basis for earning income. Data from the Ministry of Cooperatives and Small and Medium Enterprises (2015) states that the percentage of MSMEs in Indonesia reaches 90% and only 10% are large businesses. Even though MSMEs are not large businesses, their role in driving the country's economic sector cannot be doubted. MSMEs have played a major role in driving economic growth in Indonesia, of which 60% is contributed by MSMEs (Suyadi, 2018).

2.3 FMEA (Failure Mode And Effect Analysis)

FMEA (*Failure Mode And Effect Analysis*) is a structured action to eliminate the possibility of failure modes occurring in the future. FMEA is a methodology used to evaluate failures occurring in a system, design, process or *service* . Identification of potential failures is carried out by assigning a value or score to each failure mode based on the occurrence level , severity level *and* detection *level* .

Occurrence rate (*occurrence*) is the probability that the cause will occur and result in a form of failure during the period of product use. *Occurrence* is a rating value adjusted to the expected frequency and/or cumulative number of failures that can occur. *Severity* level is an assessment of the seriousness of the effects caused. In the sense that every failure that occurs will be assessed as to how serious it is. There is a direct relationship between effect and *severity* . For example, if the effect that occurs is a critical effect, the *severity value* will be high. Thus, if the effect that occurs is not a critical effect, then the *severity value* will be very low. The *detection* value is associated with the current control. *Detection* is a measurement of the ability to control or control failures that can occur. *Risk Priority Number* (RPN) is the product of multiplying the severity level, incident level and detection level. RPN determines the priority of failures. RPN has no value or meaning. The RPN value can be used to determine corrective action that is appropriate to the level of value obtained (Anthony, 2018).

2.4 Silk Tofu

Silken tofu is a coagulation product of whole soybean juice without pressing and whey separation stages, so that the curd formed has a very fragile texture. Tofu processing technology focuses on two main things, namely yield as a parameter from an economic perspective and texture as a parameter from a consumer acceptance perspective. Tofu Silk has a texture like soft cheese but is quite sturdy (does not crumble) when sliced. The type and concentration of coagulant used will influence the formation of the gel network structure due to differences in the strength of anions and cations on the water holding capacity (WHC) in soy protein gel. The types of coagulants commonly used in making silken tofu are calcium sulfate and glucono delta lactone. The difference in water content in the curd will also affect the hardness of the curd produced (Ramadhan, 2023).

III. RESEARCH METHODOLOGY

A. Types of research

The method used in this research is a qualitative analysis method. This research uses a qualitative method with a descriptive survey design using a qualitative approach which aims to investigate operational risks through the risk management process. Primary data comes from interviews while secondary data comes from technical books and journals which are used as data sources. Data collection techniques include conducting literature study interviews and documentation. Qualitative research is defined as “the study of nature or phenomena”, including “its qualities, its different manifestations, the context in which it occurs, or the point of view from which it can be perceived”, but does not include “its range, frequency and place in a randomly determined chain of cause and effect objective". This mal definition can be complemented by a further pragmatic rule of thumb: qualitative research generally includes data in the form of words, not numbers (Busetto et al., 2020)

B. Research sites

The object of the research is Small Enterprise which is located at Jl. Beciro No.9, Beciro, Jumputrejo, Kec. Sukodono, Sidoarjo Regency. The scope of this research is matters related to operational risk. The informant in this research is Mr. Heri as an employee and person in charge who really knows everything that happens during the daily silk tofu production process.

C. Method of collecting data

Based on this type of research, namely qualitative research, the data collection techniques used are document analysis, observation and interviews. These techniques and methods are needed to collect and process data obtained from the field so that it is hoped that this research will run smoothly and systematically. In this research, data collection methods used observation, interviews and documentation methods.

IV. RESULTS AND DISCUSSION

A. Risk Identification

Based on the conditions existing in MSMEs, several risks can be identified as shown in the following table:

Table 4.1 Risk Identification of Silk Tofu MSMEs 57

Risk Factors	Risk Indicators
Soaking Soybeans	1. Employee negligence in regulating the soaking time for soybean seeds 2. Mixing good quality soybeans with bad ones
Soybean Milling	1. Damage to the grinding machine 2. Employee negligence in the milling process resulted in mixed waste with soybeans
Pouring Soybeans into a Steam Machine	1. Falls caused by uneven footing 2. It is difficult to see when using a steam engine due to the lack of lighting in the area 3. Employee negligence in handling raw materials resulting in raw materials spilling
Cooking Process	1. The health and safety of workers is disturbed when cooking tofu coconut milk 2. The tofu coconut milk is not cooked 3. Wood as a fuel for cooking does not produce maximum combustion
Process of Giving Vinegar	1. The processed tofu is less dense 2. Employee negligence in incorrect dosage when administering vinegar
Process of Printing Tofu	1. Spilled tofu coconut milk 2. Liquid waste that damages the carrying capacity of the environment
Tofu Pressing Process	1. Damaged press tool 2. Slippery production area
Tofu Cutting Process	1. Tofu disintegrates when cutting 2. Incorrect size of tofu pieces

Risk Factors	Risk Indicators
Inspection Process	negligence in inspecting rejected products (crushed tofu)
Packing Process	You know it's destroyed during packaging

A cause-and-effect diagram is a schematic technique used to see possible locations of quality problems. This diagram is useful for showing the main factors that influence quality and have consequences for the problem. Data were obtained by observing and conducting interviews with MSMEs. The problems usually faced by MSMEs are depicted in the following cause-and-effect diagram:

Figure 4.1 Fishbone Diagram

B. Risk Analysis

After knowing the various risks that could occur, a risk analysis was carried out using the FMEA method. FMEA is a form of risk analysis and generally aims to determine the priority of risks in order to identify recommended actions that need to be taken. The production risk assessment analysis for the MSMEs was carried out using the FMEA method.

Table 4.2 Calculation of SLD Values Using the FMEA Method

PROSES	KODE	KEJADIAN RISIKO	S	L	D
PERENDAMAN KEDELAI	R1	Kelalaian pegawai dalam mengatur waktu perendaman biji kedelai	3	2	2
	R2	tercampurnya biji kedelai kualitas yang baik dengan yang buruk	4	3	3
PENGGILINGAN KEDELAI	R3	Rusaknya mesin penggiling	5	1	1
	R4	Kelalain pegawai dalam proses penggilingan sehingga tercampurnya sampah dengan biji kedelai	4	2	3
PENUANGAN KEDELAI KEDALAM MESIN UAP	R5	Terjatuh yang dikarenakan pijakan kaki tidak rata	4	2	2
	R6	Sulit melihat saat menggunakan mesin uap yang dikarenakan kurang nya pencahayaan di area tersebut	4	5	1
	R7	Kelalain pegawai dalam menangani bahan baku sehingga bahan baku tumpah	4	2	2
PROSES MEMASAK	R8	Terganggunya kesehatan dan keselamatan pekerja ketika memasak santan tahu	4	3	2
	R9	Santan tahu tidak matang	3	3	2
	R10	Kayu sebagai bahan bakar untuk memasak tidak menghasilkan pembakaran yang maksimal	4	2	1
PROSES PEMBERIAN CUKA	R11	Hasil olahan tahu kurang padat	4	2	3
	R12	Kelalaian pegawai dalam takaran yang tidak tepat saat pemberian cuka	3	2	1
PROSES MENCETAK TAHU	R13	Tumpahnya santan tahu	4	3	4
	R14	Limbah cair yang merusak daya dukung lingkungan	3	3	1
PROSES PRESSING TAHU	R15	Rusaknya alat press	4	2	1
	R16	Area produksi yang licin	4	3	1
PROSES PEMOTONGAN TAHU	R17	Hancurnya tahu saat pemotongan	4	3	3
	R18	Tidak sesuainya ukuran potongan tahu	3	5	3
PROSES INSPEKSI	R19	kelalaian dalam menginspeksi produk reject (tahu hancur)	3	4	2
PROSES PACKING	R20	Hancurnya tahu saat pengemasan	4	3	6

Based on the results of the RPN calculation to determine the highest risk, the highest risk results were found to be the risk of the Packing Process Risk Variable with the RPN value obtained being 72.

C. Risk Management

Based on the results of the RPN calculation to determine the highest risk, the highest risk result was found to be the risk of destroying the tofu during packaging with the RPN value obtained being 72. Risk management will be carried out using the *Service Quality method* . *Service Quality* is the fulfillment of customer needs and desires and the accuracy of delivery to match customer expectations. So it can be concluded that *Service Quality* is a method for assessing customer needs and desires whether they meet their expectations or not, and that is where the role of this method is to assess them. *Service Quality* is expressed in five dimensions, namely tangible , *reliability*, *responsiveness*, *assurance*, and *empathy* .

List pertanyaan									
KUESIONER PENILAIAN QUALITY SERVICE PADA UMKM TAHU SUTRA 57									
Keterangan:									
1. Sangat Tidak Puas									
2. Tidak Puas									
3. Lumayan Puas									
4. Puas									
5. Sangat Puas									
No.	Aspek	Kode	Atribut	E&R	1	2	3	4	5
1	Reliability	R1	Bagaimana kesan Anda terhadap rasa tahu sutra yang Anda beli terakhir kali?	Ekspektasi					
				Realita					
		R2	Bagaimana pendapat Anda tentang konsistensi dan tekstur tahu sutra kami?	Ekspektasi					
				Realita					
		R3	Apakah proses penyajian atau kemasan tahu sutra kami telah memenuhi harapan Anda?	Ekspektasi					
				Realita					
2	Responsiveness	Re1	Apakah Anda memperhatikan perbedaan signifikan dalam tekstur tahu sutra yang Anda beli di berbagai tempat atau	Ekspektasi					
				Realita					
		Re2	Seberapa sering Anda memilih tahu sutra kami dibandingkan merek lain, dan apa alasan di balik pilihan tersebut?	Ekspektasi					
				Realita					
		Re3	Bagaimana tingkat kepuasan Anda terkait harga tahu sutra kami jika dibandingkan dengan kualitas dan rasa yang Anda	Ekspektasi					
				Realita					
		Re4	Apakah ada variasi atau inovasi rasa yang Anda harapkan dari produk tahu sutra kami di masa mendatang?	Ekspektasi					
				Realita					
3	Tangible	T1	Bagaimana pengalaman Anda dalam menemukan dan membeli tahu sutra kami?	Ekspektasi					
				Realita					
		T2	Apakah Anda membagikan pengalaman atau merekomendasikan tahu sutra kami kepada orang lain?	Ekspektasi					
				Realita					
		T3	Apa yang menurut Anda menjadi keunggulan utama dari tahu sutra kami dibandingkan merek lain yang Anda coba?	Ekspektasi					
				Realita					
		T4	Apakah harga tahu sutra ini sebanding dengan kualitasnya?	Ekspektasi					
				Realita					
4	Assurance	A1	Apakah Anda merasa informasi yang disediakan tentang tahu sutra ini memadai?	Ekspektasi					
				Realita					
5	Emphty	E1	Seberapa responsif layanan pelanggan terhadap keluhan atau pertanyaan terkait tahu sutra ini?	Ekspektasi					
				Realita					
		E2	Seberapa jauh Anda setuju bahwa tahu sutra ini memberikan nilai gizi yang baik?	Ekspektasi					
				Realita					

Figure 4.2 Results of the Expectation Questionnaire

Average total expected return:

1. *Reliability*

R1=42/11=3.81

R2 = 45/11 = 4

R3 = 40/11 = 3.63

Average = 3.84

2. *Responsiveness*

Re1 = 38/11 = 3.45

Re2 = 34/11 = 3.73

Re3 = 44/11 = 4

Re4 = 41/11 = 3.73

Average = 3.47

3. *Tangibles*

T1 = 44/11 = 4
T2 = 40/11 = 3.63
T3 = 38/11 = 3.45
T4 = 37/11 = 3.36
Average = 3.61

4. *Assurance*

A1 = 37/11 = 3.36

5. *Empathy*

E1 = 39/11 = 3.54
E2 = 38/11 = 3.45
Average = 3.5

Reality is something that is real or actually happens in an event or experience. Sometimes reality does not match expectations or images before trying or receiving the service.

Average total Reality results:

1. *Reliability*

R1=43/11=3.91
R2 = 34/11 = 3.09
R3 = 38/11 = 3.45
Average = 3.48

2. *Responsiveness*

Re1 = 31/11 = 2.82
Re2 = 36/11 = 3.27
Re3 = 41/11 = 3.73
Re4 = 38/11 = 3.45
Average = 3.32

3. *Tangibles*

T1 = 39/11 = 3.55
T2 = 40/11 = 3.64
T3 = 35/11 = 3.18
T4 = 11/25 = 2.27
Average = 3.16

4. *Assurance*

A1 = 25/11 = 2.27

5. *Empathy*

E1 = 40/11 = 3.64
E2 = 31/11 = 2.82
Average = 3.23

From the calculation results above, it can be seen that all the assessment scores for these 5 aspects all show that expectations are always greater than reality, which means that treatment is needed from all sides to be able to thin or reduce this gap. To make it easier to make improvements by sorting the aspects above so that it is easier to prioritize them in future improvements. To sort the aspects/dimensions above starting from the highest gap to the lowest.

Assurance = 1.82 expectation > reality
Tangible = 1.09 expectation > reality

Reliability = 0.63 expectation > reality
Responsiveness = 1.00 expectation > reality
Empathy = 0.63 expectation > reality

The following is the order of improvement from highest to lowest aspects starting from *assurance<reliability, responsiveness<tangible<empathy* . This means that the main aspect in making improvements is in the *assurance section* which has a gap of 1.82. After getting the assessment results of the gaps for each aspect/dimension, the next step is to determine the gap or gap between reality and expectations for each attribute. Determining the GAP score can be done by subtracting the resulting score from each reality attribute from the expected attribute. GAP = Reality Attribute - Expectation Attribute The following is the comparison/gap between reality and expectations. After getting the results of the GAP calculation, the next step is to sort the main priorities for improvement. Priority is what comes first or is the most important.

	ekspektasi	realita	GAP	prioritas
R1	3,81	3,91	0,10	9
R2	4,09	3,09	-1,00	2
R3	3,63	3,45	-0,18	7
Re1	3,45	2,82	-0,63	5
Re2	3,09	3,27	0,18	6
Re3	4,00	3,73	-0,27	10
Re4	3,36	3,45	0,09	12
T1	4,00	3,55	-0,45	13
T2	3,63	3,64	0,01	14
T3	3,45	3,18	-0,27	3
T4	3,36	2,27	-1,09	4
A1	4,09	2,27	-1,82	1
E1	3,54	3,64	0,10	11
E2	3,45	2,82	-0,63	8

Figure 4.4 Gap Assessment Results

The highest gaps are usually the ones that require the most improvement and should be a priority for improvement. The highest gap shows that customer desires for actual service are still lacking, because service quality is what determines customer satisfaction. service quality as an effort to fulfill consumer needs and desires as well as accuracy of delivery in keeping with consumer expectations. Therefore, improvements are needed to increase customer satisfaction in the services implemented. To fulfill customer desires, the priority ranking can be seen in Table 4. Based on the results of the ranking calculation, the priority for improvement is code (R1), namely the *assurance section* .

D. Monitoring

At this monitoring stage, the MSME does not only involve the management of the MSME itself but also involves all employees, because the MSME has a variety of quite complex problems that really require a deeper understanding. . What can be done is regular evaluation of the effectiveness of the risk management measures implemented. Thus, there is a need for an innovative solution in managing risk management so that activities in MSMEs remain stable.

V. CONCLUSION

Based on the results and discussion above, it can be concluded that:

Silk Tofu is a business in the field of silk tofu production which is run using a franchise system. When running a business, you will definitely be faced with various kinds of risks. In this report, risk identification is carried out where there are 4 risk factors with risk indicators, risk analysis using the FMEA method with the largest RPN, namely 72.

The risk with the largest RPN is that the tofu is destroyed during packaging and has an impact on infrastructure, getting an RPN of 72. Lack of employee accuracy and not being careful in the packaging process can create losses for Silk Tofu MSMEs because tofu that is destroyed during the packaging process cannot be sold. Therefore, risk management is carried out using the *service quality method* so that Silk Tofu MSMEs are able to improve the quality of their production.

After the risk is managed, *monitoring is carried out* . Where silk tofu 57 must carry out regular evaluations of the effectiveness of the risk management measures implemented. Carry out continuous monitoring of silken tofu production and potential risk changes that may arise. Thus, there is a need for an innovative solution in managing risk management so that activities in "Silk Tofu" MSMEs remain stable.

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