

## Analysis of Digital Marketing Performance Against Maggot (*Hermetia Illucens*) Marketing Effectiveness

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### ABSTRACT

*Maggot or Black Soldier Fly (Hermetia illucens) is a source of good quality protein. A household business can produce maggots, so developing and increasing production and marketing using digital marketing is necessary. It is believed that improving marketing performance can increase the readiness of producers to increase their maggot production, open new business opportunities, and empower the community's economy. This study aims to determine the effectiveness of maggot marketing using digital marketing with regression analysis methods. The research tended to experimental research with a descriptive approach to measuring the effectiveness of the digital marketing of mangosteen. The study was carried out in Surabaya, Malang, and several cities in East Java at maggot production and sales centers from January until June 2022. Respondents' identities were previously identified as producers, sellers, and potential buyers and were recommended by both producers and sellers. The results showed satisfaction with conventional marketing results, fear of being unable to serve a broader market, understanding of business development strategies, and understanding of product quality. The magnitude of the influence of the five variables can be explained by 42.6% percent. Of the five significant variables, only one variable that contributes to the reduction in the effectiveness of maggot marketing is the variable of satisfaction with the acquisition of conventional marketing results.*

**Keywords:** *Correlation; Regression analysis; Digital Marketing; Maggot.*

## INTRODUCTION

One of the constraints in manufacturing artificial feed is an animal protein source derived from fish flour. Fish flour is an imported commodity to date. In 2016 Indonesia imported fish feed raw materials up to 221,564 tons [5]. Fish flour, used as a source of animal protein, often fluctuates at a high price. Therefore, there is a need for alternative feed sources of animal protein substitutes for fish flour [12].

Alternative feed is expected to answer the current manufacturer feed problem that prices continue to rise, the problem of pollution of the water environment due to the buildup of feed leftovers, and the appearance of various diseases that cause death in fish [7]. Alternative sources of fish flour replacement proteins are ingredients available in abundant quantities and do not compete with humans in their utilization. The alternative feed source in question is a maggot [8].

Maggot or Black Soldier Fly (*Hermetia illucens*) is a good source of protein, which household-scale businesses can produce. Maggot production costs are meager, with its easy cultivation techniques and short forwards in implementation time. However, it provides a high level of productivity, and through good production unit planning, production can last continuously during the desired period [6].

The price of maggot production is meager because its products can be developed from the degradation of household organic waste, markets, livestock waste, and other public facilities of organic waste production. With the ability to degrade organic waste, maggot production could potentially develop massively as a source of high-grade protein feed. People are already starting to know and develop this business, but the marketing scale is still limited. Production of maggot potentially developed massively as a source of high-grade protein for feed. People were already starting to know about and develop this business, but the marketing scale was still limited.

Preliminary research has been done to see any problems or constraints that affect maggot marketing. The results of preliminary research found factors considered to be an obstacle in marketing maggot production, among others. 1) mascara-kat users still need to know more in-depth about the specifications and benefits of maggot, 2) not well known the manufacturer and how to buy it quickly, 3) taste amused interacting (holding) maggot, 4) doubt the quality of nutrition, 5) considered no more practical compared to the manufactured feed of dry and neatly packaged factory.

Based on these factors, there is a need to develop maggot marketing techniques using digital marketing so that marketing performance can be improved. Marketing strategies through digital marketing proved to have an effect of up to 78% on the competitive advantage of sellers in marketing their products. Marketing performance is believed to be quickly addressed by producers' readiness to

produce large quantities of maggots while opening new business opportunities and empowering society's economy. The research aims to know the effectiveness of maggot marketing using digital marketing with regression analysis methods [18].

## **LITERATURE REVIEW**

### **Digital Marketing**

Digital Marketing is technology activities used to help marketing activities improve consumer knowledge by tailoring their needs [11]. According to AMMA (American Marketing Association), digital marketing is an institutional activity and process facilitated by digital technology to create, communicate and convey points to consumers interested parties [9]. Sawicky said digital marketing is the exploitation of digital technology used to create a channel to achieve potential recipients to achieve company goals by fulfilling more effective consumer needs [13]. Furthermore, Shakti and Andi Gunawan mentioned that digital marketing is a marketing technique that uses electronic devices and internet networks using various digital media techniques such as websites and social media [4]. In summary, digital marketing is an activity in achieving marketing goals through applying technology and digital media, especially the internet.

Digital Marketing is a method of marketing using social media and websites to market products widely to consumers. Sales can be used as one of the current product marketing alternatives to increase the effectiveness of digital marketing. Proven social media has the potential to increase sales effectiveness [15]. Marketing strategies through digital marketing affect up to 78% of the competitive advantage of sellers in marketing their products [18]. Digital marketing through social media proved to help consumers more interested in buying products because consumers feel become more effective and easier to buy with an online system [17].

### **Marketing Effectiveness**

Marketing effectiveness is an effort to inform and persuade consumers directly or indirectly about the products or brands sold. In this case, digital marketing is beneficial to sellers in introducing the product widely and massively in unison for less cost. The use of social media as a marketing tool greatly helps sellers or companies reduce marketing costs compared to when sellers or companies use traditional marketing channels that cost higher [1].

Support marketing activities need to be done not only through conventional or old ways but also should use social media to reach all desired consumers better [19]. In addition, social media has changed the behavior of users using the internet. Meanwhile, the application of social media in the primary marketing sector of SMEs is not optimal for developing and promoting the company's business [3]. Many

contents on social media contain information, videos, or images that are not as furious as the company's purpose. The implementation of integrated marketing communications aims to build a company brand in the minds of consumers or customers [10].

### **Hypothesis**

Partial or individual parameters testing is performed on as many as 12 variables with the following hypotheses.

#### Hypothesis (X1)

H0: marketing skills with digital media have no effect

H1: marketing skills with influential digital media

#### Hypothesis (X2)

H0: Satisfaction of the acquisition of conventional marketing results has no effect

H2: Satisfaction with the acquisition of conventional marketing results is influential

#### Hypothesis (X3)

H0: Understanding the breadth of marketing networks has no effect

H3: Understanding the breadth of the marketing network is influential

#### Hypothesis (X4)

H0: Fear of not being able to serve a broader market has no effect

H4: Fear of not being able to serve a broader market influence

#### Hypothesis (X5)

H0: Understanding of strategy for developing a business has no effect

H5: Understanding of influential business development strategies

#### Hypothesis (X6)

H0: Lazy to pack and send no effect

H6: Lazy to pack and send influential

#### Hypothesis (X7)

H0: Pessimism on cost has no effect

H7: Pessimistic about cost

**Hypothesis (X8)**

H0: Worrying about not paying off has no effect

H8: Worry not about paying off the influence

**Hypothesis (X9)**

H0: Not understanding the mechanism of banking has no effect

H9: Not understanding the mechanism of influential banking

**Hypothesis (X10)**

H0: The processing skills for extensive marketing have no effect

H10: Processing skills for influential broad marketing

**Hypothesis (X11)**

H0: Quality understanding has no effect

H11: Important quality understanding

**Hypothesis (X12)**

H0: Competitive readiness has no effect

H12: Influential competitive readiness

**RESEARCH METHODS****Research Design**

Experimental research with a descriptive approach aims to digitally measure the effectiveness of maggot marketing performance. The research was conducted in Surabaya, Malang, and several cities in eastern Java on maggot production and sales centers from January to June 2022.

Research data is obtained from structured interviews with 120 respondents deliberately selected by purposeful purposive sampling techniques. Structured interviews are conducted securely, where a group of previously trained surveyors assists researchers in understanding, conveying, and converting information into research data according to the factors studied.

The respondents consist of manufacturers, sellers, and potential buyers of maggot in the maggot marketing chain. The identity of respondents was identified as maggot producers, maggot sellers, and potential buyers who have been identified previously and recommended by manufacturers and sellers to research. Variables used in this study:

**Table 1. Research Variable**

<i>Variable</i>	<i>Variable Identification</i>
<i>Y</i>	<i>Maggot Marketing Effectiveness</i>
<i>X<sub>1</sub></i>	<i>Marketing skills with Digital Media</i>
<i>X<sub>2</sub></i>	<i>Satisfaction of results from conventional Marketing</i>
<i>X<sub>3</sub></i>	<i>Understanding of network breadth Marketing</i>
<i>X<sub>4</sub></i>	<i>Fear of not being able to serve a more comprehensive market</i>
<i>X<sub>5</sub></i>	<i>Understanding of strategy developing business</i>
<i>X<sub>6</sub></i>	<i>Lazy to pack and send</i>
<i>X<sub>7</sub></i>	<i>Pessimism on cost</i>
<i>X<sub>8</sub></i>	<i>Worrying is not paid</i>
<i>X<sub>9</sub></i>	<i>Not Understanding Mechanisms of Banking</i>
<i>X<sub>10</sub></i>	<i>Processing Skills for extensive marketing</i>
<i>X<sub>11</sub></i>	<i>Product quality understanding</i>
<i>X<sub>12</sub></i>	<i>Competitive readiness</i>

### Methods and Techniques of Data Analysis

The analysis method used is regression analysis. Regression analysis helps researchers get information on factors that affect dependent variables. Model of regression analysis method

$$y_i = \beta_0 + \beta_1 X_1 + \epsilon_i \quad (1)$$

The dependent Variable (Y) is a random variable influenced by the independent variable (X).  $Y_i$  is the notation of the dependent variable, the residual value of the resulting model. In regression analysis, some assumptions must be met other than random variables, namely independent, identical and normal distribution assumptions (Johnson & Battacharyya, 2010). A theory study uses several significant independent variables against dependent variables to get the best models. These variables can be analyzed by the analysis regression method. The method in analysis that can model data with independent variables more than one is called multiple regression analysis. Model in theory for multiple regression analysis as follows.

$$y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon_i \quad (2)$$

Model Parameters Testing for the tested hypothesis is with the following test statistics.

$$t = \beta_1 - \beta_1 S \sqrt{S_{xx}}, \quad (3)$$

## RESULTS

Independent (X) variables in regression analysis are not allowed to have a relationship with each other. Therefore, calculations are done to see the relationship between independent variables (X) using the correlation value of pearson. There are four variable relationships: positive relationships, negative relationships, close relationships, and weak relationships. Relationships between variables are said to be positive when the value of the first variable increases the value of the second variable. Conversely, the relationship between variables is said to be negative when the value of the first variables increases the value of the second variable. The relationship between variables is said to be close when the correlation value is close to 1 or -1 and vice versa.

**Table 2. Correlation Value Independent Variable Person Variable Factor of Maggot Marketing Effectiveness**

Variable	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>
X <sub>1</sub>		0,174	0,009	0,046	-0,095	-0,040	-0,023	0,057	0,033	-0,101	0,033	0,053
X <sub>2</sub>			-0,074	-0,021	-0,072	0,011	-0,069	0,011	-0,056	-0,020	0,035	0,066
X <sub>3</sub>				-0,014	-0,018	0,059	0,122	0,091	0,098	0,237	0,020	-0,052
X <sub>4</sub>					0,048	0,154	0,065	0,068	-0,090	0,042	0,068	0,075
X <sub>5</sub>						0,244	0,016	-0,174	-,167	0,056	-0,170	0,019
X <sub>6</sub>							0,105	-0,023	-0,076	0,239	-0,003	0,022
X <sub>7</sub>								0,134	0,139	0,083	0,134	-0,221*
X <sub>8</sub>									-0,105	0,056	-0,171	0,235*
X <sub>9</sub>										-0,089	0,050	-0,137
X <sub>10</sub>											0,126	0,053
X <sub>11</sub>												-0,010

Source: Data Processing Results, 2022.

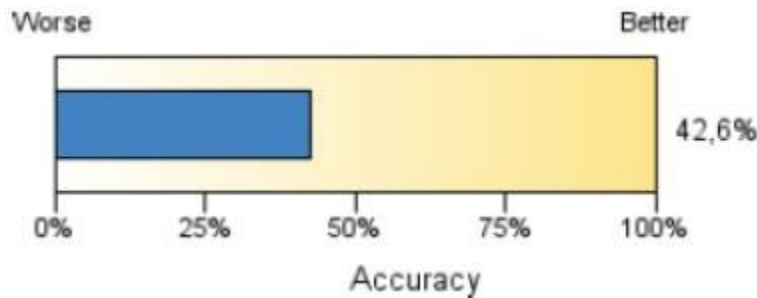
Table 2 below shows the value of correlation between independent variables of factors that affect the effectiveness of maggot marketing with digital marketing. The independent variables detected have a weak positive relationship: the variable marketing skills with digital media (X<sub>1</sub>) with satisfaction of acquiring conventional marketing results (X<sub>2</sub>), understanding of the breadth of marketing networks (X<sub>3</sub>), fear of not being able to serve the wider market (X<sub>4</sub>), worrying not paying (X<sub>8</sub>), not understanding banking mechanisms (X<sub>9</sub>), quality understanding (X<sub>11</sub>), and competing readiness (X<sub>12</sub>). Weak negative relationships: variable marketing skills with digital media (X<sub>1</sub>) with understanding business development strategy (X<sub>5</sub>), lazy to pack and send (X<sub>6</sub>), and pessimistic to cost (X<sub>7</sub>).

The independent variable relationship of the influence factor of the effectiveness of maggot marketing by line meets the assumption of multicollinearity. The whole variables in Table 2, no one has a

close relationship between variables. That way, the analysis can be continued to the next stage of analysis regression to get any factor that affects the effectiveness of maggot marketing with digital marketing techniques.

Pessimistic variables against costs ( $X_7$ ) and worry unpaid ( $X_8$ ) are significant, with significant grades of 15% or 0.15 with competitive readiness variables ( $X_{12}$ ). This indicates a link between these variables, but regression analysis can be continued because the correlation value between variables can be said to be weak. Value of pessimistic relationship to cost ( $X_7$ ) with competitive readiness of ( $X_{12}$ ) -0.221 or 22%. Negative signs indicate an unbalanced relationship when one variable increases, while the correlation value indicates a more significant tightness from 1 or 22%, far from 100%.

Regression analysis is used to obtain information on what factors affect the effectiveness of maggot marketing with digital marketing. Based on the analysis results, the accuracy of the variable value of the effectiveness of the maggot marketing can be explained by the independent variable of 42.6%, and the question is explained by other variables, as seen in Figure 1.



Source: Data Processing Results, 2022.

**Figure 1. Percentage of R-Square Data Accuracy**

The image explains the contribution of independent variables of factors that affect the effects of maggot marketing in digital marketing. The magnitude of the contribution is described with blue diagrams.

In regression analysis, there are two stages of testing the significance of parameters to ensure the influence factor of marketing is garnered. The first test is simultaneous and partial testing. Simultaneous testing of parameters with the initial hypothesis that all independent variables do not affect the effectiveness of maggot marketing with digital marketing systems. While the al-alternative hypothesis is all over, at least one independent variable affects the effectiveness of maggot-timing systems with digital marketing systems.

The results of the simultaneous testing of parameters are known in Table 3 that. The significant value is  $0.000 < 0.15$ . Thus, the initial hypothesis is rejected, and the alternative hypothesis is accepted.



The conclusion is that at least one independent variable affects the effectiveness of maggot-timing systems with digital marketing systems. The analysis proceeded to the estimation stage of partial parameters, aiming to determine which independent variables affect the effectiveness of maggot marketing.

**Table 3. Value Simultaneous Significance of Maggot Marketing Effectiveness**

<i>Variable</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>sig</i>
<i>Regression</i>	39212,925	12	3267,744	4,155	0,000
<i>Residual</i>	77855,075	99	786,415		
<i>Total</i>	117068,000	111			

Source: Data Processing Results, 2022.

**Table 4. Estimation of Maggot Marketing Effectiveness Parameters**

<i>Variable</i>	<i>Coefficient</i>	<i>std.error</i>	<i>T</i>	<i>sig</i>
<i>(Constant)</i>	-89,28	34,287	-2,604	0,011
<i>X<sub>1</sub></i>	-0,942	1,537	-0,613	0,541
<i>X<sub>2</sub></i>	-4,031	2,132	-1,891	0,062*
<i>X<sub>3</sub></i>	2,101	2,045	1,028	0,307
<i>X<sub>4</sub></i>	5,163	3,098	1,667	0,099*
<i>X<sub>5</sub></i>	4,627	2,945	1,571	0,119*
<i>X<sub>6</sub></i>	8,745	2,401	3,642	0,000
<i>X<sub>7</sub></i>	-2,494	1,818	-1,372	0,173
<i>X<sub>8</sub></i>	0,240	2,922	0,082	0,935
<i>X<sub>9</sub></i>	0,338	2,573	0,131	0,896
<i>X<sub>10</sub></i>	3,508	2,471	1,420	0,159
<i>X<sub>11</sub></i>	8,325	2,750	3,028	0,003*
<i>X<sub>12</sub></i>	-3,058	2,685	-1,139	0,258

Source: Data Processing Results, 2022.

Table 4 is known to be the significant value of variables for all independent variables, significant variables  $X_2$ ,  $X_4$ ,  $X_5$ , and  $X_{11}$ . Significant value of the  $X_2$  variable is  $0.062 < 0.15$ . So that an alternative hypothesis can be concluded. The conclusion is that the satisfaction of acquiring conventional marketing results is influential. Significant value of the  $X_4$  variable is  $0.099 < 0.15$ . So that an alternative hypothesis can be concluded. The conclusion is that fear cannot serve a broader market influence. Significant value of the  $X_5$  variable is  $0.119 < 0.15$ . So that an alternative hypothesis can be concluded. The conclusion obtained is understanding the strategy for developing an influential business. Significant value of the  $X_{11}$  variable is  $0.003 < 0.15$ . So that an alternative hypothesis can be concluded. The conclusion obtained is the presence of clear quality understanding. This shows that variables that affect the effectiveness of maggot marketing with digital marketing systems are the satisfaction of acquiring conventional marketing

results. Besides that, digital maggot marketing is also affected by fear of being unable to serve a broader market, understanding strategies for developing businesses, laziness in packing and send, and quality understanding. Based on influential variables, so regression analysis models can be written as follows:

$$Y = 4,155 - 0,942 X_1 - 4,031 X_2 + 2,101 X_3 + 5,163 X_4 + 4,627 X_5 + 8,745 X_6 - 2,494 X_7 + 0,240 X_8 + 0,338 X_9 + 3,508 X_{10} + 8,325 X_{11} - 3,058 X_{12}$$

## DISCUSSION

Any increase in perception of manufacturers, sellers, and potential buyers of maggot about the satisfaction of conventional marketing results increased by 10 times, and the effectiveness of maggot marketing with a digital marketing system will decrease by 40. In this case, manufacturers, sellers, and buyers in one area still do not understand the digital marketing system because they are familiar with conventional systems such as selling in the market. Promos are directly assessed as more effective than digital marketing systems.

Any increase in understanding of respondent business development strategies (producers, sellers, and potential buyers of maggot) increased by 10 times, and the effectiveness of marketing with digital marketing will increase by 46. With more understanding of the respondents and the importance of a digital marketing strategy that can reach the broader market, the more influential maggot marketing is against the digital marketing system.

## CONCLUSION

Factors that affect the effectiveness of maggot sales are variable satisfaction with conventional marketing results, fear of not being able to serve a broader market, understanding of business development strategies, and understanding of product quality. The magnitude of the four variables can be explained by 42.6%, while other variables explain others.

## SUGGESION

Advice given to manufacturers and sellers is the need to train to build awareness of the importance of digital marketing. Digital marketing can improve sales effectiveness and provide an understanding of what steps to take, such as managing social media, determining prices, and creating attractive packaging to increase sales. The limitations of this study are time and research cost.

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