



MAKING AN ANTISEPTIC CREAM FROM RED BISH LEAF EXTRAK (PIPER CROCATUM RUIZ & PAV)

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Abstract

Red betel is a plant that has many benefits as a medicinal plant, red betel plant is a source of traditional medicinal ingredients that are widely used from generation to generation. some antiseptics inhibit growth against Escherichia coli and Staphylococcus aureus. The research stages used included the collection and processing of samples, the characteristics of simplicia, phytochemical screening, the manufacture of ethanol extracts by maceration using 96% ethanol solvent, and the antibacterial activity test using the agar diffusion method using a paper barrier against Escherichia coli and Staphylococcus aureus by measuring the zone diameter. inhibit bacterial growth. The results of the examination of the characteristics of the red betel leaf simplicia powder showed total ash content of 9.65%, acid insoluble ash content of 1.20%. The results of the phytochemical screening examination contained chemical compounds of the phlovonoid group, saponin tannins, and triterpenoid steroids. The ethanol extract of red betel leaf has antibacterial activity against Escherichia coli and Staphylococcus aereus. The results of the antibacterial activity test for the ethanol extract of red betel leaf against Escherichia coli bacteria obtained KHM 100 mg/ml with a diameter of 25 mm from Staphylococcus gereus and obtained KHM 100 mg/ml with a diameter of 28 mm.

Keywords: Antibacterial Test, Red Betel Leaf Escherichia coli, Staphylococcus aureus

INTRODUCTION

Medicinal plants are a source of traditional medicinal ingredients that are widely used for generations. One of them is red betel leaf, which is known as red betel, green betel, black betel, yellow betel, and silver betel (Ministry of Health, 1980). Red betel is a plant that has many benefits as a medicinal plant (Ministry of Health, 1980). There are various kinds of betel plants, in this study the red-stemmed betel plant with green leaves (*Piper crocatum* Ruiz & Pav.), belonging to the Piperaceae family, was used. This betel plant grows vines on other plants, red betel leaves have the characteristics of leaves that are round eggs or oval eggs, at the base they are shaped like a rather round heart.

Red betel leaf (*Piper crocatum* Ruiz & Pav.) contains essential oils, phenyl compounds, propanoids and tannins (Ministry of Health, 1989). The compounds in betel leaf have many beneficial effects. This plant has the ability of several antiseptics, antioxidants, and fungicides, inhibits the growth of several types of bacteria, including: *Escherichia coli*, *Salmonella* sp, *Staphylococcus aereus*, *Klabsiella*, *Pasteurella*, and can kill *Candida Albican*, red betel plant also has the properties to restrain bleeding and wound healing on the skin (Haryadi, 2010).

Yosi Research, (2019). An antiseptic is a chemical substance that has a work to destroy microorganisms or inhibit their work, so that they can prevent an infection from occurring. Antiseptics can be distinguished from disinfectants from their place of work, where antiseptics are used on living things and disinfectants are used for inanimate objects. Antiseptics can also be distinguished from antibiotics in that the action of antibiotics is specific to certain microorganisms, and antiseptics work more generally.

Research Mega A, Oktavianingtyas Y. 2013. Mentions red betel can be utilized in the form of cream preparations used as anti-acne cream with a comparison of album variations because the base has a function as an emulsion stabilizer in cream preparations and functions as a lubricant. Cream is a semi-solid preparation in the form of a viscous emulsion containing not less than 60% water, used for external use (National Formulary, 1978). Creams have the advantage of being easily washed off, non-sticky, providing a moisture effect on the skin and can spread well. Creams can be divided into two types, namely, oil-water type creams and water-oil type creams (Kuswahyuning and Sulaiman, 2008).

The World Health Organization (WHO) has advised countries to take advantage of the use of traditional medicine in the health sector. In addition, the Indonesian government also supports traditional medicinal plants as an alternative treatment because Indonesia is rich in plants that are efficacious as medicines for all diseases, including diseases caused by microbes (Anonymous, 2012).

LITERATURE REVIEW

Red Betel Leaf (*Piper crocatum* Ruiz & Pav)



Figure 1. Red Betel Plant

Red betel vines grow on fences or trees. The characteristic feature of this plant is its round, purplish green stems and no flowers. Research has been conducted that red betel extract contains flavonoids, tannins, alkaloids (Safithri et al., 2007), saponins and flavonoids (Anonymous, 2006 cit Sulistyani et al., 2007). Based on research by Sulistyani et al, (2007) chromatographically, red essential oil contains kavikol, phenol, eugenol, trans-selinen. Red betel has many benefits in traditional medicine, has the potential to cure various types of diseases. There is a lot of experience that using red betel can reduce uric acid, lower blood pressure, treat hepatitis and ulcers. In addition, red betel can be used as an antiseptic, and has a hypoglycemic effect (Anonymous, 2006 cit Sulistyani et al., 2007).

Red betel can also be used as a medicine for coughs, asthma, inflammation, throat and nose inflammation (Haryadi, 2010).

Antiseptic

Antiseptics are chemical compounds used to inhibit or kill micro-organisms in living tissue, which has a limiting effect and prevents infections from getting worse. Antiseptic used on mucosal surfaces, forests and infected wounds. The ideal antiseptic is able to inhibit the growth and destroy bacterial cells, bacterial or fungal spores, viruses and protozoa, without damaging the host's or host's tissues. Antiseptics used in single preparations or in combination with other ingredients such as detergents, soaps, powders, deodorants, and toothpaste. (Djide, 2008;349-359).

Extraction

Extraction is the activity of withdrawing soluble chemical substances so that they are separated from insoluble materials using a liquid solvent. Active compounds contained in essential oils, alkaloids, flavonoids, and others. Knowing the active compounds contained in simplicia will facilitate the selection of solvents by means of proper extraction, Directorate General of Food and Drug Administration, 2000. Extracts are extracting vegetable or animal simplicia according to a suitable method, outside the direct influence of sun damage, Directorate General of Drug and Food Control, 1979.

Cream

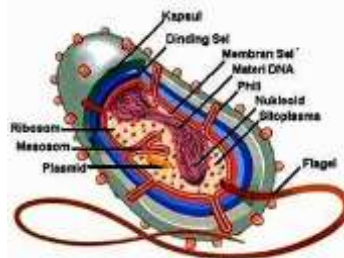
Cream is a semi-solid dosage form containing one or more drug ingredients dissolved or dispersed in suitable base ingredients. This term has traditionally been used for semi-solid preparations that have a relatively liquid consistency formulated as water-in-oil or oil-in-water emulsions (Anonymous, 2014). Cream contains not less than 60% water and is intended for external use (Anonymous, 1979). Cream is a semi-solid emulsion system with a not clear appearance. Its consistency and properties depend on the type of emulsion, whether it is water-in-oil or oil-in-water (Lachman et al., 1994).

Skin

The skin is a layer or tissue that covers the whole body and protects the body from harm that comes from outside. The skin is a part of the body that needs special attention to beautify beauty, apart from this the skin can help find the disease that the patient is suffering from. The skin is also called the integument or cutis which grows from two types of tissue, namely epithelial tissue which grows the epidermis layer and connective tissue (support) which grows the dermis layer (deep skin). The skin has a subtly woven arrangement of nerve fibers that is useful for feeling the whole or as a touch tool and is an indicator for obtaining a general impression by seeing changes in the skin (Syarifuddin, 2009).

Bacteria

Bacteria are typical prokaryotic cells and are unicellular. The cell contains a mass of cytoplasm. Bacterial cells are round, rod and spiral in shape. Reproduction mainly by simple binary fission i.e. asexual process. Among the bacteria there are those that can cause disease in humans and animals (Pelczar and Chan, 1988).



Picture 2. General Anatomy of Bacteria

Antibacterial Test Method

Antibacterial testing method is carried out to determine the effectiveness of a substance against microorganisms. There are 2 kinds of antibacterial testing methods viz diffusion method and dilution method.

Cosmetics

Cosmetics comes from the Greek word "kosmetikos" which means the skill to decorate, organize. The definition of cosmetics in the regulation of the Minister of Health of the Republic of Indonesia No.445/Menkes/Permenkes/1998 is a preparation or combination of materials that are ready for use on the outside), teeth and oral cavity to clean, add attractiveness, change appearance, protect them so that they remain in good condition. well, improves body odor but is not intended to treat or cure any disease.

Phytochemical Screening

Phytochemical screening is a qualitative analysis of secondary metabolite compounds. An extract from natural materials consists of various kinds of secondary metabolites that play a role in its biological activity. These compounds can be identified with reagents that are able to provide characteristics of each group of secondary metabolites (Harborne, 1987). Various methods that can be used to identify secondary metabolites present in an extract include.

METHOD

This research is an experimental laboratory study consisting of making red betel leaf extract using the maceration method with 96% ethanol solvent and testing of physical characteristics which consist of organoleptic, homogeneity, fast power stability, pH, and spreading power. The sample in this study was cream leaf extract of red betel leaves (*Piper crocatum* Ruiz. & Pav.). the testing stages with several stages, First Antibacterial activity test was carried out on a 10 ml base and red betel leaf extract cream against *Staphylococcus aureus* and *Eschericia coli* bacteria with the media used NA. The cream base was tested against *Staphylococcus aureus* and *Eschericia coli* then the cream was tested against *Staphylococcus aureus* and *Eschericia coli* using the disc diffusion method.

Petri dishes were incubated at 37°C for 24 hours. Second, a phytochemical screening was carried out to determine the class of compounds found in ketepeng leaves.

RESULTS AND DISCUSSION

Contents Results and Discussion

Red betel leaves vines or creepers, can reach about 5-10 m in length, stems round, red-purple green, segmented with 3-8 cm long segments, one leaf on each node of the plant. Single leaf, stiff, seated alternate leaves, leaf shape oblong-oblong, the surface of the upper leaf blade is slightly convex, shiny, the lower surface of the leaf is concave with protruding leaf veins, leaf length 6-15 cm, Leaf width 4-7 cm, leaf base color is green on both surfaces, green above with reddish-pink green below, lower surface purplish dark red green. Red-purplish petiole, 2.6-3 cm long, the base of the petiole on the leaf blade is slightly in the middle, about 0.7-1 cm from the lower edge of the leaf. The results of the examination of the simplicia characterization of red betel leaves are in table 1 below

Table 1 Total ash content, and insoluble acid ash of red betel leaf simplicia

No	Simplicity characteristics	Results
1	Total ash content	9.56%
2	Acid insoluble ash content	1.20%

Based on table 1 the results of determining the total ash content of red betel leaf simplicia were obtained 9.56%, this is in accordance with the standardization of total ash content of simplicia in general with the conditions listed on the Indonesian Medika Stamp, namely not more than 10% (Directorate General of Drug and Food Control, 1995). For acid insoluble ash content of 1.20%.

Table 2 Results of phytochemical screening of red betel leaf simplisa powder

No	Class of chemical compounds	Results
1	Flavonoids	+
2	Alkaloids	+
3	Saponins	+
4	tannins	+
6	Steroids/triterpenoids	+

Information : + = give result, - = didn't work

Based on table 2 it is known that red betel leaf simplicia contains chemical compounds, namely flavanoids, tannins, saponins, and steroids/triterpenoids. These compounds are attracted by the nature of ethanol which has polar hydroxyl groups and nonpolar alkyl groups (Wibraham and Matta). According to Robinson (1995), flavanoids, saponins and steroids/triterpenoids are chemical compounds that have potential as antibacterial and antiviral agents.

Table 3 Data on determining the type of emulsion cream for red betel leaf ethanol extract

No	Formulas	Methyl blue solubility in the preparation
1	Formula 1	-
2	Formula 2	√

The results of the emulsion type test in table 3 show that the cream formula with a concentration of 5% can dissolve methyl blue. This proves that the type of cream emulsion made is O/O. The results of determining the type of preparation emulsion can be seen in Appendix 10.

Table 4 Data on pH measurements of red betel leaf cream preparations

No	preparation	Observation time (Days)													
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14
1	F1	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	F2	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Based on measurements of the pH of the formula during observation, there was no significant change in pH which indicated that the pH of the cream preparation was stable. The test results on the pH of the cream preparations obtained show that the cream preparations produced are in accordance with the pH of the skin and can be used safely and do not cause irritation to the skin because according to Balsam and Sagarin (1972), the pH of cream preparations suitable for skin pH is between 5 and 8.

Table 5 Data on stability examination of red betel leaf cream preparations

No	preparation	Observation time (Days)														
		0th h			1st H			3rd h			5th h			7th h		
		x	Y	Z	X	Y	z	x	y	z	x	y	Z	X	y	Z
1	F1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	F2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The results of the organoleptic examination of the preparations were carried out for changes in the shape, color and smell of the preparations. Sedian is declared stable if it does not change shape, color, and smell (Draelos and Thaman, 2006). From the results of the organeleptic stability test, the cream of red betel leaf extract did not change shape, color and smell during 3 weeks of storage at room temperature, it was declared stable.

Table 6 Results of measuring the diameter of the inhibition area for the growth of Staphylococcus aureus and Escherichia coli bacteria.

EEBPT concentration (mg/ml)	Diameter of inhibition area for bacterial growth (mm)*	
	<i>Staphylococcus aureus</i>	<i>Escherichia coli</i>
100	28.00mm	25.00mm
Blank	-	-

The data above shows that red betel leaf extract is effective in inhibiting the growth of Staphylococcus aureus and Escherichia coli bacteria. Plant extracts with minimum inhibitory concentrations (MIC < 100 µg/ml have very active antibacterial activity; MIC between 100-500µg/ml have moderately active antibacterial activity; MIC > 1000 µg/ml have weak antibacterial activity (Silva, et al., 2013) Based on the results of the tests that have been carried out, it can be concluded that the Minimum Inhibitory Concentration (MIC) of the ethanol extract of red betel leaves is in the range <100 µg/ml, which means that the antibacterial activity is weak.

The results of measuring the diameter of the inhibition area of the ethanol extract of red betel leaves on *Staphylococcus aureus* bacteria at a concentration of 100 mg/ml obtained a diameter of 28.00 mm and for *Escherichia coli* bacteria at a concentration of 100 mg/ml obtained a diameter of 25.00 mm.

Table 7 Data on irritation test of red betel leaf extract cream

Reaction	Volunteer									
	1	2	3	4	5	6	7	8	9	10
Erythema	-	-	-	-	-	-	-	-	-	-
Edema	-	-	-	-	-	-	-	-	-	-

From table 7 it can be seen that there are no side effects in the form of erythema and edema, this indicates that the preparation does not irritate the skin.

CLOSING

Conclusion

Based on the research that has been done it can be concluded that:

1. Check up result Macroscopic simplification of red betel leaves shows a brown dry powder, very bitter taste, and has a distinctive betel aroma;
2. The results of examining the simplicia characteristics of red betel leaf obtained a total ash content of 9.56%, and an acid insoluble ash content of 1.20%;
3. The results of the phytochemical screening showed that the simplicia of red betel leaves contains flavanoids, tannins, saponins, and steroids/triterpenoids;
4. The test results on 5% red betel leaf cream preparation obtained homogeneity preparations, M/A emulsion type, preparation pH 6;
5. Test results for checking the stability of cream preparations that do not change color, smell, and break the emulsion;
6. The results of the antibacterial activity test of the ethanol extract of red betel leaves have antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*.

Suggestions and Acknowledgments

After doing this research, it is hoped that there will be further studies that make more concentrations to be able to determine the maximum concentration that can still inhibit bacterial growth *Staphylococcus aureus* and *Escherichia coli* with a strong inhibitory response. In addition, you can look for the Minimum Inhibitory Level (MIC) and Minimum Killing Rate (KBM) of red betel leaf extract against *Staphylococcus aureus* and *Escherichia coli* bacteria.

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THE RELATIONSHIP BETWEEN ANXIETY IN PATIENTS WITH DIABETES MELLITUS AND INCREASED BLOOD SUGAR LEVELS IN THE WORKING AREA OF THE TANAH JAWA HEALTH CENTER, SIMALUNGUN DISTRICT, 2020

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Abstract

Diabetes mellitus can cause complications that affect all organs in the body. Anxiety is a response to the disease that is felt by the sufferer as pressure, discomfort, anxiety, disappointment because they are tired of the medication regulations that must be carried out resulting in the patient's blood sugar levels not being controlled properly. blood sugar levels in the working area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020. The research design is This type of research is cross-sectional conducted in August - October 2020. The population and sample in this study were all diabetes mellitus patients in the work area Tanah Jawa Community Health Center, Simalungun Regency, in 2020, namely as many as 30 people. The results of the study showed that the majority of respondents experienced moderate anxiety, namely as many as 12 people, while a minority experienced severe anxiety, namely as many as 2 people, the majority of respondents experienced increased blood sugar levels, namely as many as 24 people, while the minority did not experience increased blood sugar levels, namely as many as 6 people. From the results of the chi-square test, the cross-table of knowledge and attitudes obtained a p-value of $0.009 < 0.05$. It can be concluded that anxiety has an influence on increasing blood sugar levels in people with diabetes mellitus in the working area of the Tanah Jawa Health Center, Simalungun Regency, in 2020. This research can provide guidance and motivation for diabetes mellitus clients in controlling blood sugar levels and provide additional information for patients and families implementing prevention and control

Keywords: *Anxiety, Increased Blood Sugar Levels*

INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disease resulting from impaired insulin secretion, impaired insulin action, or both (American Diabetes Association (ADA), 2014). The presence of these disorders results in sugar in the blood being unable to be used by the body's cells as energy, which in turn causes high blood sugar levels. in high blood pressure or hyperglycemia (International Diabetes Federation (IDF), 2013). Increased blood sugar levels will cause various complaints such as polyphagia, polydipsia and polyuria. Polyphagia is excessive hunger caused by cells in the body not getting energy. Polyuria is excessive frequency of urination, while polydipsia is excessive thirst (Arisman, 2010).

Data (WHO), suggests that the number of Diabetes Mellitus clients in Indonesia in 2000 reached 8.43 million people and is estimated to reach 21.257 million people in 2030. Even at this time the prevalence of Diabetes Mellitus in Indonesia ranks fourth in the world after India, China and the United States. (MOH RI, 2012).

The prevalence of DM sufferers in the world is currently around 382 million people

and is feared to increase by 55% to 592 million people in 2035 (IDF, 2013). According to the IDF in 2013, there are 10 countries with the largest population of diabetes. China ranks first with 8.5 million sufferers which is predicted to be 14.1 million in 2035. Based on research results in 2013 in Indonesia there were 2.1%DM sufferers, whereas in 2007 the prevalence was 1.1%. This has shown an increase in the prevalence of DM (Riskesdas, 2013).

Diabetes mellitus is the cause of death 4-5 times compared to other diseases in developing countries. From year to year, people with diabetes mellitus continue to increase, until now there are 177 million sufferers in the world, and in 2025 it is estimated that there will be an increase of 300 million people with diabetes mellitus. WHO states that there will be an increase in diabetes mellitus sufferers, especially in ASEAN countries in the 21st century (Muslim, 2014).

According to Riskesdas (2013), the prevalence of diabetes mellitus in Indonesia in 2013 was 2.1%. Of the several provinces in Indonesia, the highest prevalence was in the province of South Sulawesi, which was 3.4%. It is estimated that in 2030 there will be an increase of 21.3 million people, because of this Indonesia is in fourth place. The prevalence of diabetes mellitus in Central Java province is also not much different from what is happening nationally. In 2015 the highest cases of diabetes mellitus were in Demak district, with the number of non-insulin dependent diabetes mellitus of 13,435 people (Central Java Provincial Health Office, 2015).

Based on data from the Demak District Health Office in 2015 cases of non-insulin dependent diabetes mellitus were ranked second after essential hypertension. The number of people with diabetes mellitus in 2014 was 3,204 people. In 2015 cases of non-insulin dependent diabetes mellitus increased by 17,442 people. The highest prevalence of non-insulin dependent diabetes mellitus cases is located at the Bonang I Health Center with 1,250 old cases and 974 new cases (Demak District Health Office, 2015).

Type 1 diabetes is diabetes caused by absolute insulin deficiency due to damage to pancreatic P cells. Meanwhile, type 2 diabetes is a condition where the amount of insulin is sufficient, but cannot be used or resistance occurs (ADA, 2014). Type 2 DM is the largest contributor, around 90% -95% of those with diabetes (ADA, 2011). In Central Java, there are 0.06% type 1 DM sufferers and 0.55% type 2 DM sufferers. In Salatiga, there were 1,115 cases of type 1 DM and 9,104 cases of type 2 DM (Dinkes, 2012). Based on data obtained from the medical records section of the Salatiga Hospital, there were 143 type 2 DM outpatients from January to March 2014.

Diabetes mellitus can cause complications that affect all organs in the body. If this disease is not controlled properly it will result in an increase in blood glucose levels (hyperglycemia). Hyperglycemia can cause various complications, namely metabolic complications such as diabetic ketoacidosis; microvascular complications such as kidney and eye disease; complications of neuropathy such as neurological disease; as well as macrovascular complications, namely myocardial infarction, stroke and peripheral vascular disease. To prevent these complications, clients must comply with the four pillars of management including health education, meal planning or diet, regular physical exercise

and medical therapy for life.

Complications that occur in diabetes mellitus result in physical, psychological, and social changes. One of the psychological changes that commonly occur is anxiety in people with diabetes mellitus. Several things that cause anxiety include low level of knowledge about diabetes mellitus, lack of information about diabetes mellitus from health workers, pressure from doctors, and lack of rest time. Anxiety is a response to the disease that is felt by the sufferer as pressure, discomfort, anxiety, disappointment because they are tired of the medication regulations that must be carried out so that the patient's blood sugar level cannot be controlled properly (Taluta, Mulyadi, & Hamel, 2014).

Anxiety experienced by people with diabetes mellitus can result in changes in daily life and disruption of the hormone system in the body. However, not all sufferers are able to adapt and overcome this anxiety, so that anxiety becomes sustainable which can cause sufferers to experience depression (Novita, 2013).

The number of diabetes mellitus respondents who experienced mild and moderate levels of anxiety with adaptive coping mechanisms was 50% and maladaptive coping mechanisms were 6.25% while the level of severe anxiety with adaptive coping mechanisms was 12.5% and maladaptive coping mechanisms were 31.25% (Taluta, Mulyadi, & Hamel, 2014).

The results of Wiyadi's research (2012) found that there was a significant relationship between anxiety levels and blood sugar levels in DM clients. A good introduction to anxiety in DM clients is one of the efforts that needs to be done through a holistic approach). The results of the initial study found that there were more DM clients at the Bukit Hindu Health Center compared to other health centers in the city of Palangka Raya. This is what makes the authors interested in doing this research by focusing on the emotional condition of DM clients, namely anxiety. Prolonged anxiety in DM clients can increase blood sugar levels and even serious DM complications.

Research on the effect of anxiety on blood glucose levels in DM sufferers was previously conducted at the Banyuanyar Public Health Center in Surakarta in 2013. Murdiningsih and Ghofur's research used a sample of 34 DM sufferers in the area. The sampling technique used was total sampling, namely the entire population was included in the study. Data analysis in this study used the product moment correlation test or the Pearson test. The results of this study showed that there was a significant influence between anxiety and blood sugar levels in DM sufferers (Murdiningsih *et al*, 2013)..

Based on the background above, the researchers wanted to research the relationship between anxiety in patients with diabetes mellitus and increased blood sugar levels in the working area of the Tanah Jawa Community Health Center, Simalungun Regency, in 2020

LITERATURE REVIEW

Worry

Anxiety is an emotional state characterized by physiological arousal, an unpleasant feeling of tension and a feeling of apprehension or a state of worry that complains that something bad will happen soon (Suliswati, 2005). Stuart (2014) revealed that anxiety is an

emotional response to an assessment that describes a state of worry, anxiety, fear, unrest accompanied by various physical complaints.

This situation can occur in various life situations and illness disorders. In line with the statement of Suliswati and Stuart according to (Donsu, 2017) revealed anxiety is a non-specific symptom and autonomic nervous activity in response to ambiguity, non-specific threats that are often found and often a normal emotion.

Anxiety is common in people who suffer from chronic or genetic diseases. In diabetes mellitus with complications that can cause gangrene to amputation cause physical disability and require a long treatment (Kurniali, 2013). Diabetes mellitus requires regulation of diet, activity and treatment. Ignorance about diabetes mellitus will further increase the emotionality of sufferers related to relationships with other people. This will increase anxiety and change everything in his life (Novitasari, 2012).

According to Nevid (2005) there are several factors that can cause anxiety in a person, namely a foreign environment, loss of independence so that they experience dependence and need the help of others, separation from a partner or family, financial problems, lack of information, threats of more severe illness and treatment problem.

Diabetes mellitus

Diabetes Mellitus is a disease caused by high levels of sugar in the blood due to impaired insulin secretion and a complex chronic disease characterized by hyperglycemia due to impaired insulin secretion, insulin action, or both. The state of chronic hyperglycemia from diabetes mellitus is associated with long-term damage, impaired function and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels (American Diabetes Association, 2017).

Diabetes Mellitus is a chronic (chronic) disease that occurs when the pancreas (stomach salivary glands) does not produce enough insulin or when the body does not effectively use insulin. Insulin is an important hormone that is produced in the pancreas gland of the body, and transports glucose from the bloodstream to the body's cells where it is converted into energy. Lack of insulin or the inability of cells to respond to insulin causes high blood glucose levels, or hyperglycemia, which is a hallmark of diabetes mellitus (International Diabetes Federation, 2017).

Blood Sugar Levels

Blood glucose is a term that refers to glucose levels in the blood whose concentration is tightly regulated by the body. Glucose that flows through the blood is the main source of energy for body cells. Generally the level of glucose in the blood remains within the limits of 4-8 mmol/L/day (70-150 mg/dl), this level increases after eating and is usually at its lowest level in the morning before people consume food (Mayes, 2009). Blood glucose levels vary throughout the day which will increase after eating and return to normal within 2 hours. Normal blood glucose levels in the morning after fasting the night before are 70-110 mg/dL blood. Blood glucose levels are usually less than 120-140 mg/dL at 2 hours after eating or drinking fluids containing glucose or other carbohydrates (Price, 2008).

Normal blood glucose levels tend to increase mildly but gradually after age 50, especially in sedentary people. An increase in blood glucose levels after eating or drinking stimulates the pancreas to produce insulin thereby preventing further increases in blood glucose levels and causing blood glucose levels to decrease slowly (Guyton, 2009).

METHOD

Method of collecting data

Data collection is a process of approaching the subject and the process of collecting the characteristics of the subjects needed in a study. The steps in data collection depend on the research design and the technical instruments that will be used in the research (Nursalam, 2008). This study used a questionnaire to collect data. That was done by the researchers themselves. Before the questionnaires were distributed to respondents, the researcher first explained the objectives, benefits and research procedures to be carried out and asked for their willingness to participate as research respondents. If the prospective respondent is willing, the respondent is asked to sign an agreement to become a respondent.

Types of research

This type of research is cross sectional, which is a research design by making observations at the same time (Hidayat.AA, 2009). This is intended to find out whether there is a relationship between anxiety in patients with diabetes mellitus and increased blood sugar levels in the working area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020

Processing and analysis of data

1. Data processing

The collected data is then processed manually with the following steps:

- a. *Editing* is an activity to check and improve the contents of the questionnaire.
- b. *coding* is coding, namely changing data in the form of sentences or letters into numeric data or numbers.
- c. *Processing (data entry)* is the answer from each respondent in the code entered into the computer program.
- d. *Cleaning* is cleaning every data that has been entered, needs to be checked again to see the possibility of code errors, incompleteness, then corrections are made (Notoatmodjo, 2010).

2. Data analysis

- a. Univariate analysis

Univariate data analysis was carried out to describe the characteristics of each independent and dependent variable. Given the categorical data, the results of the analysis are presented in the form of a frequency distribution table.

b. Bivariate Analysis

Bivariate analysis was carried out to see whether there was a relationship between the independent variable (Anxiety) and the dependent variable (Increased Blood Sugar Levels) using a computer with the Chi Square statistical test or Chi Square (χ^2) table, where $\alpha = 0.05$, namely by the formula:

$$X^2 = \sum \frac{(fo - fe)^2}{fe}$$

$$fe = \frac{(\sum Baris)(\sum Kolom)}{Total}$$

Where:

fo = observation frequency

fe = expected frequency

RESULTS AND DISCUSSION

A. Results

1. Univariate analysis

This analysis is to obtain an overview of the frequency distribution of the variables studied. From the univariate analysis performed, the following results were obtained:

a. Demographic Data

Demographic data of respondents in this study include age, gender, education, occupation. To see the frequency distribution of the characteristics of the respondents in the Work Area of the Tanah Jawa Community Health Center, Simalungun Regency, see table 4.1.

Table 5.1. Frequency Based Distribution Respondent Demographic Data Associated with Anxiety in Diabetes Mellitus Patients with Increased Blood Sugar Levels in the Working Area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020

No	Demographic Data	F	%
1	Age		
	36 – 45 Years	5	16,7
	46 – 55 Years	10	33,3

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	>55 Years	15	50.0
2	Gender		
	Man	13	43,3
	Woman	17	56,7
3	Education		
	SD	3	10.0
	JUNIOR HIGH SCHOOL	5	16,7
	SENIOR HIGH SCHOOL	15	50.0
	PT	7	23,3
4	Work		
	Farmer	4	13,3
	Trader	8	26,7
	Self-employed	7	23,3
	civil servant	5	16,7
	TNI/Polri	0	0
	Doesn't work	6	20.0

From table 5.1. above, it was found that the majority of respondents were >55 years old, namely 15 people, while the minority aged 36-45 years, namely 5 people. The majority of female respondents were 17 people, while the male gender minority were 13 people. The majority of respondents have high school education, namely as many as 15 people, while a minority of elementary school students, namely as many as 3 people. The majority of respondents work as traders, namely as many as 8 people, while the minority as farmers, as many as 4 people.

Table 5.2. Frequency Based Distribution Respondents' Anxiety Levels Related to Increased Blood Sugar Levels for Patients with Diabetes Mellitus in the Work Area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020

No	Worry	F	%
1	There isn't any	6	20.0
2	Mild Anxiety	10	33,3
3	Moderate Anxiety	12	40.0
5	Severe Anxiety	2	6,7
6	Panic	0	0

From table 5.2. above it was found that the majority of respondents experienced moderate anxiety, namely as many as 12 people, while the minority experienced severe anxiety, namely as many as 2 people

Table 5.3. Frequency Based Distribution Increased Blood Sugar Levels of Respondents Related to Anxiety Levels of Diabetes Mellitus Patients in the Work Area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020

N	Increased Blood Sugar Levels	F	%
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o			
1	Increase	24	80.0
2	Not Increasing	6	20.0

From table 5.3. above it was found that the majority of respondents experienced an increase in blood sugar levels, namely as many as 24 people, while the minority did not experience an increase in blood sugar levels, namely as many as 6 people

2. Bivariate Analysis

Bivariate analysis was carried out to see the relationship between the independent variables and the dependent variable. From the bivariate analysis using the chi-square test, the following results can be obtained:

Table 5.4. Cross Table of Anxiety Levels Associated with Increased Blood Sugar Levels in Patients with Diabetes Mellitus in the Working Area of the Tanah Jawa Community Health Center, Simalungun Regency in 2020

o	N	Anxiety Level	Blood Sugar Levels				Total	p-value
			Increase		Not Increasing			
			f	%	f	%		
1		There isn't any		6,7		13,3	6	0,009
2		Mild Anxiety	8	26,6	2	6,7	10	
3	12	Moderate Anxiety	12	40	0	0	12	
4	2	Severe Anxiety	2	6,7	0	0	2	
5	0	Panic	0	0	0	0	0	
		Total	4	80	20	20	100	

From the results of table 5.4. above it can be seen that of the 6 respondents (20%) who did not experience anxiety, 2 people (6.7%) experienced increased blood sugar levels while 4 people (13.3%) did not experience increased blood sugar levels. Of the 10 respondents (33.3%) who experienced mild anxiety, 8 people (26.6%) experienced increased blood sugar levels while 2 people (6.7%) did not experience increased blood sugar levels. Of the 12 respondents (40%) who experienced moderate anxiety, 12 people (40%) experienced increased blood sugar levels. Of the 2 respondents (6.7%) who experienced severe anxiety, 2 (6.7%) experienced increased blood sugar levels.

From the test results *chisquare* cross table of anxiety levels with increased blood sugar levels then obtained a p value of 0.009 < 0.05. It can be concluded that anxiety has an influence on increasing blood sugar levels in people with diabetes mellitus in the working area of the Tanah Jawa Health Center, Simalungun Regency, in 2020.

B. Discussion

In accordance with the research objectives and hypotheses proposed in this study. So the discussion of research results is directed at the relationship between the independent variable (anxiety level) and the dependent variable (blood glucose).

Based on the results of the Chi-Square test there is a significant relationship ($p = 0.009$) between the level of anxiety and blood sugar levels when between anxiety levels and blood sugar levels in respondents

According to Van Son et al, 2011 states that the emotional condition of DM sufferers reduces the quality of life, interferes with glycemic control and increases the risk of complications and increases mortality. According to Lane et al (2000) anxiety can increase blood sugar levels even though the significance of HBA1c is weak

Biological factors that play a role in this disorder are "neurotransmitters". There are three types of neurotransmitters that play a role in this disorder, namely, norepinephrine, serotonin, and gamma amino butyric acid or GABA. But the neurotransmitter that plays a major role in generalized anxiety disorder is serotonin. Whereas norepinephrine mainly plays a role in panic disorder. 17 Psychosocial factors also play a role in anxiety disorders, such as the environment which is very important for the occurrence of anxiety. The connection with the experience of separation in early childhood can also cause anxiety, especially separation from both parents. Bowlby's love theory suggests that this kind of separation leads to feelings of insecurity, which are reactivated in later life.

In the opinion of DM disease researchers can cause anxiety, especially those who are already chronic and complications arise, on the other hand anxiety in DM sufferers can increase sugar levels (hyperglycemia). For this reason, education for DM sufferers is needed to reduce anxiety levels and control blood sugar levels. Suggestions for research are 1). In the treatment of DM patients, psychological factors should also receive the same attention as physical factors. 2). Provide health education to DM patients to reduce anxiety levels so that blood sugar levels can be controlled. 3). For future research, the sample size should be larger. 4). It is necessary to educate DM sufferers in order to reduce anxiety levels and control blood sugar levels.

CLOSING

Conclusion

Based on the results of the research that has been carried out and described in the discussion that was exposed in the previous chapter, the researcher can provide the following conclusions:

1. The majority of respondents experienced moderate anxiety, namely as many as 12 people, while a minority experienced severe anxiety, namely as many as 2 people
2. The majority of respondents experienced an increase in blood sugar levels, namely as many as 24 people, while the minority did not experience an increase in blood sugar levels, namely as many as 6 people
3. From the results of the chi-square test, the cross-table of knowledge and attitudes

obtained a p-value of 0.009 <0.05. It can be concluded that anxiety has an influence on increasing blood sugar levels in people with diabetes mellitus in the working area of the Tanah Jawa Health Center, Simalungun Regency, in 2020.

Suggestion

1. For Respondents

This research can provide guidance and motivation for diabetes mellitus clients in controlling blood sugar levels and provide additional information for patients and families implementing prevention and control.

2. For health centers

Provide input and benefits for health service institutions, especially in nursing to improve services in the management of diabetes mellitus, especially in maintaining blood sugar levels within the normal range

3. For Educational Institutions

To add references to medical-surgical nursing in controlling blood sugar in the body by identifying anxiety in patients with diabetes mellitus and can be used as a tri darma form of higher education lecturers by providing counseling.

4. For Further Research

This research can also be used as a guide in conducting further research on anxiety in people with diabetes mellitus

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BUILDING A HEALTHY INTERNET WITH MIKROTIK

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Abstract

The development of the digital world and technology plays an active role in everyday human life and activities. The use of the digital world and technology provides a lot of information so that it can be accessed easily so that it is not uncommon for the use of technology to be used for things that are not good, such as accessing sites that contain negative content. Not everyone knows how to filter sites that contain negative content, so we need a system that can filter sites that contain negative content. This study aims to build a system that can filter sites on the internet so that healthy internet use can be implemented. Sites are filtered using a web proxy proxy. Data collection was carried out using the literature study method, system design, topology design, and filter application. Testing of blocked sites using a browser. The results of this study web proxies can block sites such as URLs, websites, keywords, and the download process of a file. Web proxies cannot block some sites with certain domains. Filtering with a web proxy takes quite a long time because of the many configurations needed.

Keywords: Healthy Internet, Web Proxy, Mikrotik

INTRODUCTION

The development of the digital world and today's technology plays an important role in everyday life. Almost all human activities depend on technology. One form of technological development is the existence of the internet. The internet provides extraordinary benefits to its users, ranging from education, health, business, and even social culture. On the education side, the internet helps students and teachers find subject matter and carry out the teaching and learning process online (online). But the availability of the internet can also have positive and negative impacts for users.

The positive impact that is obtained with the existence of the internet is the convenience provided to users in obtaining the information needed. While the negative impact is the lack of restrictions in accessing existing information, so that the internet is used for bad purposes such as opening porn sites, gambling, violent fraud, and social networking. Of course, this is a particular concern for parents, considering that many teenagers can easily access the internet, both via mobile phones and computers, so it is not uncommon to find teenagers who misuse internet advances.

One of the cases of abuse of internet progress by teenagers occurred in May 2016. During that period there were 6 cases of crimes of internet abuse by teenagers, namely hacking Instagram, pornography, online fraud, incitement via Facebook, bomb threats, to online prostitution. (news.detik).com, 3 June 2016).

Given this, it is necessary to find a solution that can provide restrictions to users in terms of using the internet so they can maintain it healthy use of the internet. Based on this

background, the authors try to make a solution, namely by Building a Healthy Internet with Mikrotik. By building a healthy internet with Mikrotik, users will have limitations in accessing information so that it will not have a negative effect on internet users. Internet users can no longer access negative sites such as pornography, violence, social networking and gambling. With the construction of a healthy internet, it will support positive activities for both students, workers, and other users who actively use the internet, so that internet use continues to follow existing ethical paths.

LITERATURE REVIEWS

Basic Concepts of Computer Networks

A computer network is the connection of two or more computers with a connecting cable (in some cases, without cables or wireless as a link), so that computers can exchange information with each other. (Muhammad m & I hasan) The purpose of using a computer network is:

- a) To share resources, such as sharing printers, CPU, memory, hard drives, and others.
- b) For communications such as email, instant messaging, chat, and others.
- c) To access information such as web browsing, file servers, and others. (Andi publisher)

Oshi Layer

The OSI model was published by the International organization for Standardization (ISO) in 1984. The OSI model can be used to explain how computer networks work. The OSI model divides various network functions into seven layers. The seven layers are:

1. Physical
2. Link Data
3. network
4. Transport
5. Sessions
6. Presentations
7. Application

Definition of Healthy Internet

The internet (interconnection networking) is a global communication network that is open and connects millions and even billions of computer networks of various types and types, using types of communication such as telephone, satellite, and so on.

Healthy internet is the use of the internet in accordance with the limits, ethical and does not make people anti-social. Can provide benefits including increasing knowledge, learning, and supporting positive activities (educational, social, cultural).

Understanding Mikrotik

MikroTik was originally a small company (now it has become a big company) headquartered in Riga, Latvia, a country in Europe. MikroTik was originally built by John Trully and Arnis Riekstins in 1995.

The history of Mikrotik began in 1996 in Moldova, when John and Arnis began to combine Linux and MS DOS systems with AERONET Wireless LAN (W-LAN) technology with a speed of around 2Mbps.

Definition of Build

Build comes from the basic word wake (verb) which means to establish, build, repair, rise and rise.

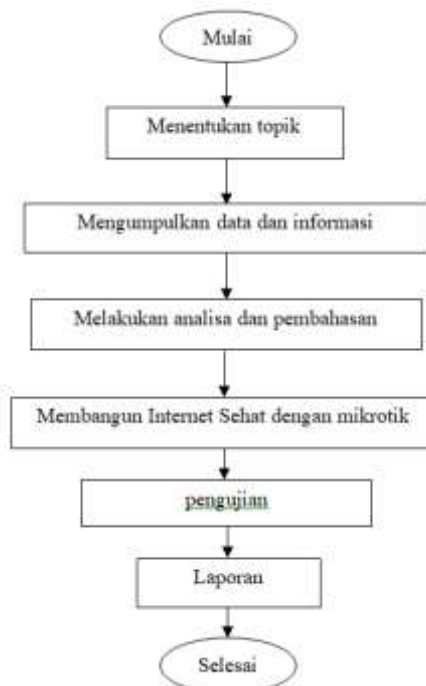
Mikrotik Proxy Servers

Proxy server is a server that is placed between a client application and the server application that is contacted. Client applications can be web browsers, FTP clients, and so on. While server applications can be in the form of web servers, FTP servers and so on. The proxy server that is placed between the client and the server application can be used to control or monitor data packet traffic that passes through it.

METHODS

Research design

Systematic steps are needed in a study so that the design that is made is orderly and according to plan. The flow of this design will be made in the form of a flowchart to explain the steps to be carried out. The design flow created can be seen in Figure 4.



Picture of research design flow

Test results

After the system has been successfully built, the next step is testing the results. Testing the results will be carried out by trying to access negative sites that have been previously blocked using a proxy whether they can still be accessed or not. The results of

this study are in the form of a filtering system for sites that contain negative content using a proxy.

Method of collecting data

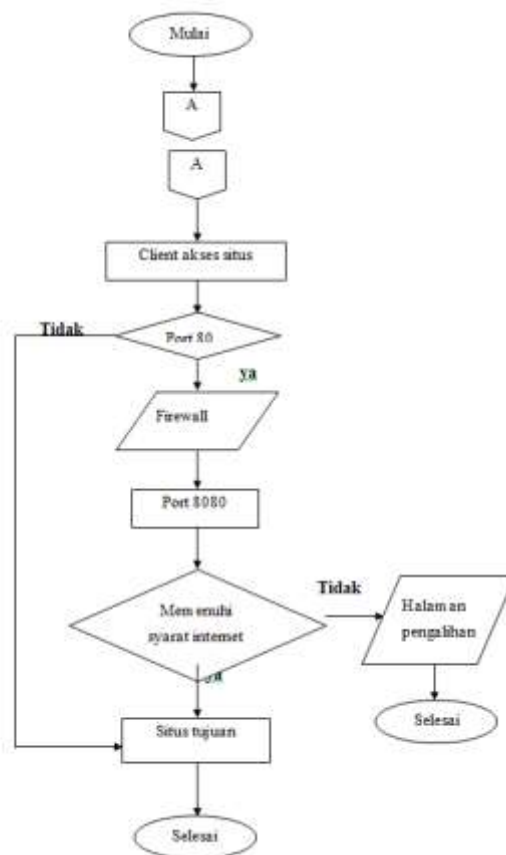
The data collection methods used in this study are as follows:

Study of literature

The author uses the literature study method, namely by collecting journals from the internet and books as a theoretical basis, so that material about building a healthy internet with a proxy has a good and appropriate foundation and knowledge.

Mikrotik Proxy Flow

The blocking flow using the proxy web proxy in this study is as follows:



Picture of proxy proxy web flow

1. Requests from the client to a site via port 80 will be forwarded to port 8080, which is a web proxy port with a redirect function from the firewall, otherwise the request will be forwarded directly to the destination.
2. Furthermore, the web proxy will block sites that do not meet predetermined healthy internet criteria
3. Blocked requests will be forwarded to the redirect page

4. Requests that meet the rules of healthy internet use will be forwarded directly to the destination page site

The network topology used

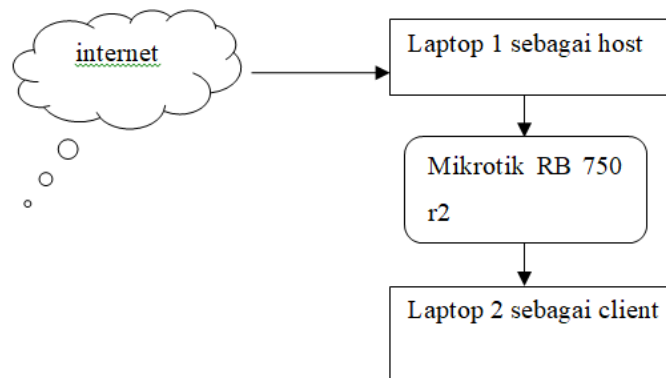


Image of the built network topology

The topology above is the topology that will be used in building a healthy internet. The topology above uses 2 laptops that have functions as a host and client. The host laptop will provide an internet connection to the proxy via a LAN cable and then forward it to the client laptop. The topology uses a laptop as a host because the RB 750 r2 proxy does not yet support wireless connections, so the internet network is forwarded using a LAN cable to the proxy. The laptop client here functions to configure and test whether the healthy internet that is built later is running as it should or not.

RESULTS AND DISCUSSION

Connecting Mikrotik To The Internet

IP settings

The first step is to provide an IP address that can connect to the internet with the same IP class. Ether 1 on the proxy is used for the interface that will connect to the internet. The steps can be seen in the following image:



Figure Filling the ip address on ether 1

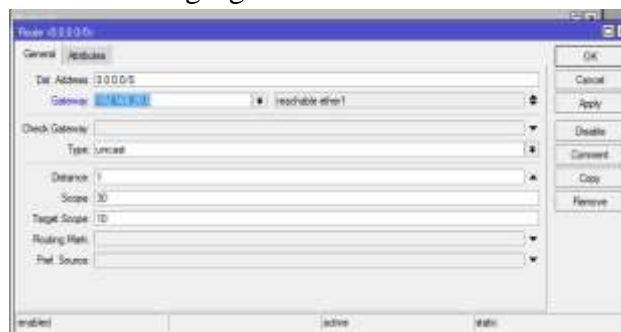
The picture above is a display picture of filling in the IP address address on the proxy. The steps taken are as follows:

1. Do a remote proxy using the Winbox application from a laptop
2. Click IP in the display on the left on the proxy
3. Then select addresses and click the + sign to add the ip to be used, the ip used is 192.168.20.10
4. Then in the interface menu select ether 1
5. Then click apply then ok to save the settings that have been made

The steps above are how to add an IP manually on ether 1. Entering an IP can be done automatically, but ether 1 must already be connected to an internet source, for example a modem or cable that has been connected to another internet source.

Gateway settings

The gateway serves as a path to the destination, namely the internet. Gateway settings can be seen in the following figure:



Gateway settings image

The steps taken in setting the gateway are as follows:

1. Click IP on the left of the main proxy display
2. Then click routes
3. In the main route view, click the + icon
4. Then in the dst address fill in with ip 0.0.0.0
5. The IP gateway used is 192.168.20.5
6. Click apply then ok to save

Mikrotik DNS settings

The DNS settings on the proxy are intended so that the proxy can access sites on the internet. DNS itself is a mapping of ip addresses to a name. For example <http://www.google.com> is an ip address converted to a DNS.

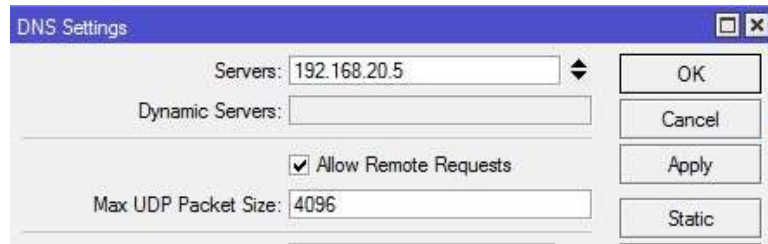


Figure 6. DNS settings

The steps taken for the DNS settings contained in the image above are as follows:

1. Click IP on the left of the main view of the proxy
2. Then select DNS
3. Then enter the previous IP gateway, namely 192.168.20.5
4. Then put a checkmark on Allow Remotes Request
5. Then click apply then ok to save the settings

Client IP address

After the above steps have been completed, the next step is the IP client experience.

The steps taken are as follows:

1. Click start on the bottom left of the laptop you are using
2. Double click on the control panel
3. Then select network and internet
4. Then click network and sharing center
5. Click on the local area connection that is used to connect the client to the proxy (in this case the author uses local area connection 4)
6. Select properties
7. Then double click internet protocol version 4
8. Then enter the IP address that has the same class as the proxy
9. Enter the ip address that is on ether 2 to be the gateway on the client pc
10. Then click ok to save

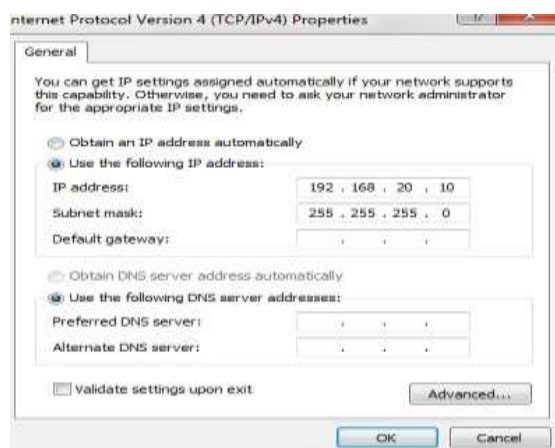


Figure 9. Filling in the IP client

Test the client connection with the proxy

After completing the IP addressing on the proxy and the client, the next step is to test the connection between the client and the proxy whether it is connected or not. The steps for testing the connection are as follows:

1. Click start on the laptop client
2. In the search field enter the word cmd and then enter
3. Then type ping 192.168.20.1 (ip proxy)

If it is already connected, a command will appear as shown below:



Figure Testing the connection from the client to the proxy

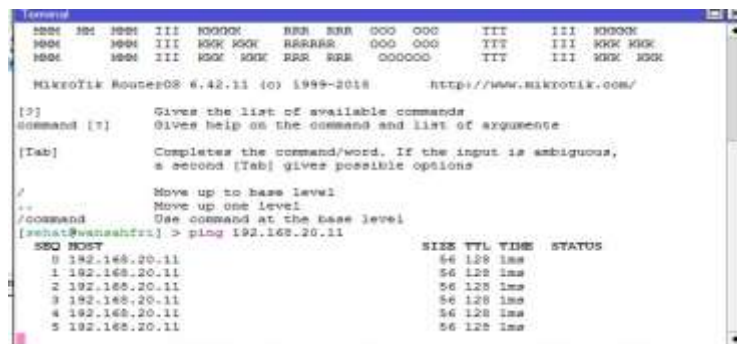


Figure Testing the connection from the proxy to the client

Enable Web Proxies

To start blocking websites that will be blocked, the first step to take is to activate the web proxy on the proxy. the steps to activate the web proxy are as follows:

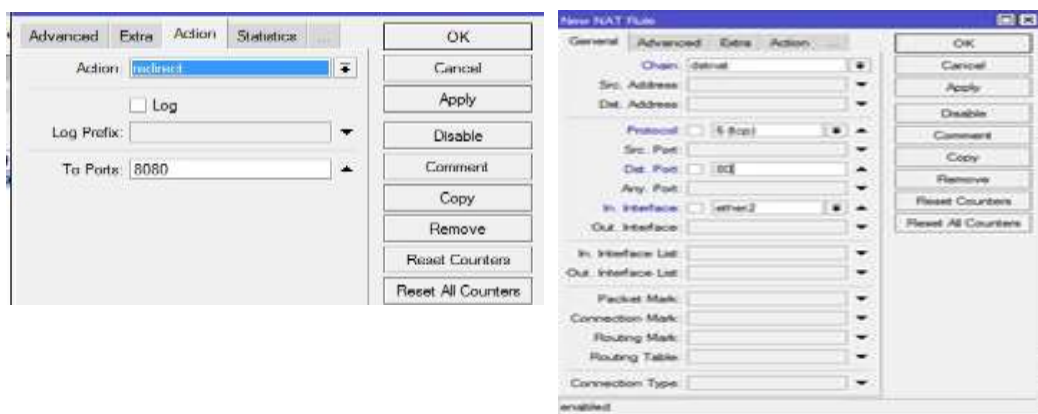


Figure Activating web proxy

The explanation about the picture above about the steps to activate the web proxy on the proxy is as follows:

1. Click the IP menu on the proxy
2. Select the web proxy menu
3. Check the enable option
4. Determine the port proxy will work, in this case the author uses port 8080, which is the default port on the proxy
5. Click apply then OK to save the settings that have been made

After completing the previous steps, the web proxy on the proxy is active as a Regular HTTP Proxy, which means that if a client wants to use this proxy setting, it must be set manually in each client's web browser by pointing to the IP proxy 8080. So that you don't need to make settings one by one. one on the web browser client, then this can be done by changing the proxy web proxy Aagr to function as a transparent proxy. The method used is to utilize the NAT feature to divert all HTTP (tcp 80) browsing traffic originating from the client to the internal web proxy feature that was previously activated. The steps taken are as follows:



Transparent proxy configuration image

The picture above is the steps to change the web proxy to function as a Transparent proxy. The configuration steps are as follows:

1. Click the IP option on mikrotik
2. Then click the NAT option
3. Then click the + sign
4. Change the options in the chain to "dstnat"
5. Then in the protocol options change to "6(tcp)"
6. In Dst.port, enter the number 80 because the port for deflecting browser traffic is port 80
7. Then move on to the action tab
8. In the action option, change it to redirect
9. And the option to port change to 8080
10. Then click apply and ok to save

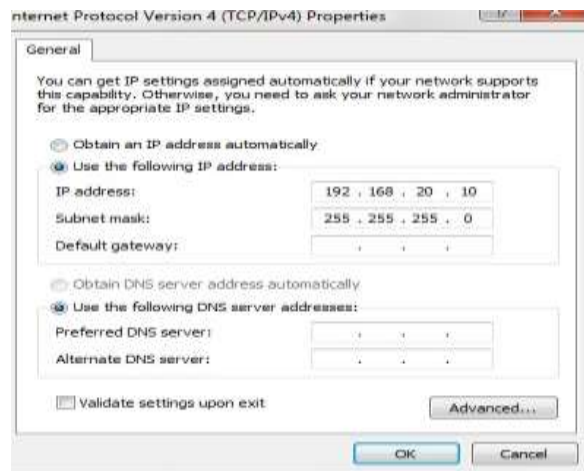


Image Charging client ip

Make lists of sites and download processes that will be blocked.

The list of URLs that will be blocked can be seen in the following table:

Table List of URLs that will be blocked using a web proxy

URLs	No web proxies	Using web proxies
www.xvideos.com	Allow	Deny
www.zedge.com	Allow	Deny
www.Pornhub.com	Allow	Deny
www.ganool.com	Allow	Deny
www.gamawap.com	Allow	Deny
www.gratisindo.com	Allow	Deny
http://vkwap.com/ytube	Allow	Deny
http://keepvid.com	Allow	Deny
http://3gpsearch.com	Allow	Deny
www.wapdam.com	Allow	Deny
http://videos.yaaya.mobi	Allow	Deny
http://youtubemyway.com	Allow	Deny
http://3gpfind.com	Allow	Deny
http://mywibes.me	Allow	Deny
http://www.mv3gp.com	Allow	Deny
http://freemobilvideos.com	Allow	Deny

The table above is a table that contains negative sites (porn videos) that will be blocked using the proxy. If blocked sites are accessed using a browser, the page will automatically be redirected to <https://com977755463.wordpress.com/>. The page is a healthy internet block site created for redirect pages only, so there is no other information on the blog. The display of the redirect page can be seen in the following image:



Image Redirection page display

System Testing

System testing is done by trying to access blocked sites using a browser. The results of testing the system that has been built are as follows;

Testing Access to Urls Containing Porno Content

Image Trial access www.xvideos.com

The image above is a display of the url www.xvideos.com which has been blocked using a proxy web proxy but with a redirect page that has not been made so that access is not forwarded to other sites. Here is a view from www.xvideos.com which has been blocked and made a redirect page. The next test is testing the site www.zedge.com which in this case was successfully blocked using a proxy web proxy.

CLOSING

Conclusion

Mikrotik web proxies can block urls in the form of http and websites that contain negative content, namely gambling and violence. Web proxies can also block urls that contain certain words. In addition to blocking web sites, a proxy can also be used for cache object storage. When a client accesses the same object or content, it doesn't need to use an internet connection and bandwidth so access will be faster. However, web proxies cannot block websites with https urls such as www.facebook.com, www.instagram.com, and www.twitter.com. Web proxies are not able to block a word that is not in the form of a url. Web proxies are also unable to block games that are currently very popular with teenagers today. Web proxies cannot block a site that has a domain other than “.com”, as in the previous chapter on blocking the <http://mywibes.me> site. The site has a “.me” domain so it cannot be blocked using a web proxy

Suggestions and Acknowledgments (if any)

Research on building a healthy internet with a proxy would be better if it used more than one blocking method, so that sites that cannot be blocked using a web proxy can be blocked with other blocking methods. Blocking sites should be carried out in stages and still carry out checks on sites that have been blocked, because the address of a site that contains negative content tends to change frequently.

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BUILDING A HEALTHY INTERNET WITH MIKROTIK

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THE INFLUENCE OF RAW MATERIAL QUALITY AND PRICE ON CONSUMER DECISIONS BUY BROILER PRODUCTS 1 AT PT. INDOJAYA AGRINUSA MEDAN

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Abstract

This study aims to determine whether the quality of raw materials and prices have a significant effect on consumer decisions in buying broiler 1 products at PT. Indojoya Agrinusa Medan and how much influence the quality of raw materials and prices have on consumer decisions in buying broiler 1 products at PT. Indojoya Agrinusa Medan. The method used in this study is a quantitative method with several tests, namely reliability analysis, classical assumption deviation test and linear regression. Based on the regression results of the primary data processed using SPSS 18, the multiple linear regression equation is obtained as follows: $Y = 4.234 + 0.109 X1 - 0.781 X2$. Partially, the raw material quality variable ($X1$) has a significant influence on purchasing decisions, as evidenced by the t count $> t$ table ($8.977 > 2.012$). Meanwhile, the price variable ($X2$) does not have a significant effect on purchasing decisions, as evidenced by the value of t count $< t$ table ($1.821 < 2.012$). Simultaneously, raw material quality ($X1$) and price ($X2$) variables have a significant influence on purchasing decisions. This means that the hypothesis in this study is accepted, as evidenced by the calculated F value $> F$ table ($26.080 > 3.20$). Raw material quality ($X1$) and price ($X2$) variables are able to contribute to the purchasing decision variable by 68.1% while the remaining 31.9% is influenced by other variables not examined in this study. From the conclusion above,

Keywords: *Quality of Raw Materials, Prices, and Purchasing Decisions*

INTRODUCTION

Background of the problem

Every established company must have a purpose. Besides seeking the highest profit, the company also has another goal, namely achieving the survival and development of the company. In order to achieve this goal, the company needs to pay attention to the company's activities, which include the products produced, competitive prices and the right distribution channels. The development of the world of livestock continues to grow, seeing the development of technology to produce livestock significantly. The success of the business partners is the main key that the company has succeeded in creating good animal feed for consumption by broiler chickens.

PT. Indojoya Agrinusa Medan is a company that produces broiler chicken feed with various grades. For now, many have been produced to meet customer needs. PT. Indojoya Agrinusa Medan sells products to all broiler livestock entrepreneurs wherever they are. PT. Indojoya Agrinusa Medan produces broiler chicken feed on a large scale so it has stock in the warehouse. Business partners often complain that animal feed is not fresh, so consumers

are afraid of the quality of raw materials. Then employees often provide the wrong level of animal feed due to employee negligence in understanding the types of animal feed and the price for each type of animal feed has a fairly high price difference even though the quality of animal feed is not much different.

Formulation of the problem

Based on the description on the background and identification of the problems described above, the problems that will be studied in this study are:

1. Does the quality of raw materials and prices have a significant effect on consumer decisions in buying broiler 1 products at PT. Indojaya Agrinusa Medan?
2. How much influence the quality of raw materials and prices on consumer decisions in buying broiler 1 products at PT. Indojaya Agrinusa Medan?

Research purposes

The research objective used was to analyze how much influence the quality of raw materials and prices have on consumer decisions in buying broiler 1 products at PT. Indojaya Agrinusa Medan.

Benefits of research

The benefits expected from this research are theoretically useful for the development of economics, especially for the development of management science, especially in marketing management regarding raw materials and determining selling prices.

LITERATURE REVIEW

Theoretical review

Definition of Raw Materials

According to Wibowo, he argues that "raw materials are an important factor that also determines the level of cost of goods and the smoothness of the business production process".¹ According to Herjanto, he argues that "raw materials are goods that will become part of the finished product which costs can easily be followed".² Based on the general understanding, the difference in the meaning of the words between raw and raw materials can be interpreted as follows. The general understanding of the term raw material can have the meaning of a basic material that can come from various places, where the material can be used to be processed with a certain process into another form that is different from its original form.

While the general understanding of raw materials is raw materials that form the basis of making a product where these materials can be processed through certain processes to be

¹ Wibowo. 2014. Marketing Management. Rajawali Press Publisher. 4th printing. Jakarta.

² Herjanto Eddy. 2010. Operations Management. Grasindo Publisher. Jakarta.

made into other forms. Based on the understanding between raw materials and raw materials above, there are several examples of manifestations of the term raw materials, some of which are silver ore, which has an important meaning in the silver-making industry, another example is wheat, which is the seed of the plant when it is dried and roasted. processing can produce flour where this wheat seed is very useful for the flour-producing industry.

Types of Raw Materials

The types of raw materials according to Herjanto are as follows:³

1. Direct raw materials

Direct raw materials or direct materials are all raw materials that are part of the finished goods produced. The costs incurred to purchase direct raw materials have a close relationship and are proportional to the amount of finished goods produced.

2. Indirect Raw Materials

Indirect raw materials or also known as indirect materials, are raw materials that play a role in the production process but are not directly visible in the finished goods produced.

Definition of Price

According to Kotler and Armstrong, price can be narrowly defined as the amount of money billed for a product or service.⁴Or it can be broadly defined as price as the sum of the values that consumers exchange for the benefits of owning and using a product or service that enables a company to earn a reasonable profit by being paid for the customer value it creates.

Pricing Purpose

Realistic pricing goals require periodic monitoring to determine the effectiveness of the company's strategy. According to Tjiptono, there are basically four types of pricing, namely:⁵

1. Profit oriented goals. This goal is known as profit maximization. In the era of global competition, where conditions are very complex and many variables affect the competitiveness of each company, profit maximization is very difficult to achieve, because it is very difficult to accurately estimate the amount of sales that can be achieved at a certain price level.
2. Volume oriented goals. In addition to profit-oriented objectives, there are also companies that set their prices based on certain volume-oriented objectives or what are commonly known as volume pricing objectives. Prices are set in such a way as to achieve sales volume targets, sales value or market share.

³Wibowo. 2014. Marketing Management, 237

⁴ Kotler, Armstrong 2012. Marketing Management 2. Millennium Edition. PT. Independent Pledge. Jakarta.

⁵Tjiptono, Fandy. 2014. Brand Management and Strategy. Publisher Andi: Yogyakarta.

3. Image-oriented goals. The image of a company can be formed through a pricing strategy. Companies can charge high prices to create or maintain a prestigious image.
4. Price stabilization objective. In a market where consumers are highly price sensitive. If a company lowers its price, its competitors must lower their prices as well. Conditions like these underlie the formation of the objective of price stabilization in certain industries whose products are highly standardized (for example petroleum).
5. other purposes. Prices can also be set with the aim of preventing entry of competitors, maintaining customer loyalty, supporting resale or avoiding government interference.

Consideration Factors In Pricing

Pricing methods according to Tjiptono can be broadly grouped into four main categories, namely demand-based, cost-based, profit-based and competition-based pricing methods.⁶

1. The demand-based pricing method is a method that emphasizes the factors that influence customer tastes and preferences rather than factors such as costs, profits and competition. Customer requests are based on various considerations, including:
 - a. Customers' ability to buy (purchasing power)
 - b. Customer's ability to buy.
 - c. A lifestyle product in the customer, which concerns whether the product is a status symbol or just a product that is used daily.
 - d. The benefits that the product provides to the customer.
 - e. Prices of substitute products.
 - f. Potential market for the product.
 - g. The nature of non-price competition.
 - h. General consumer behavior.
 - i. Segments in the market.
2. Cost Based Pricing Method. In this method the main price determining factor is the supply or cost aspect, not the demand aspect. Prices are determined based on production and marketing costs added by a certain amount so as to cover direct costs, overhead costs and profits.
3. Profit-Based Pricing Methods. This method seeks to balance revenues and costs in pricing. This effort can be carried out on the basis of specific profit volume targets or expressed in the form of a percentage of sales or investment. This profit-based pricing method consists of target profit, pricing, target return on sales pricing, and target return on investment pricing.
4. Competition-Based Pricing Methods. Apart from being based on cost, demand or profit considerations, prices can also be set on the basis of competition, namely what competitors are doing. Competition-based pricing methods consist of customary pricing; above at or below market pricing ; loss leader pricing; and scaled bid pricing.

⁶Tjiptono, Fandy. 2014. Brand Management and Strategy, 154

Price Indicator

The indicators used in pricing include (Kotler and Armstrong):⁷

1. **Selling Price Determination.** Pricing decisions, like other marketing mix decisions, must be buyer oriented. Effective buyer-oriented pricing involves understanding how much value consumers place on the benefits they receive from the product and setting prices accordingly.
2. **Price Elasticity.** How responsive is demand to a change in price. If demand barely changes because of a small change in price, then the demand is inelastic. If demand changes a lot, we call the demand elastic. The more inelastic the demand, the more likely sellers are to raise prices.
3. **Competitor Price Growth.** Another factor that influences a company's pricing decisions is competitors' prices and possible competitors' reactions to the company's pricing actions. A consumer who tends to buy a product based on price evaluations and the value of other similar products. Price indicators are:
 - a. **Price affordability.** Price affordability is the actual price of a product that is written on a product, which must be paid by the customer. What this means is that customers are likely to look at the final price and decide whether to receive the good value expected. Customer expectations in seeing prices are:
 - 1) The price offered is affordable by customers financially.
 - 2) Pricing must be in accordance with the quality of the product so that customers can consider it in making a purchase.
 - b. **Discounts/discounts** Discounts are price discounts given by the seller to the buyer as a reward for certain activities from the buyer that are pleasing to the seller. There are various types of discounts, such as:
 - 1) **Quantity discounts** are price discounts given to encourage consumers to buy in larger quantities, thereby increasing overall sales volume. In practice, quantity discounts are often not in the form of cash discounts, but additional units received for the same amount of payment (bonus or free goods) given to consumers who buy in large quantities.
 - 2) **Seasonal discount** is a price discount that is given only at certain times. Seasonal discounts are used to encourage purchases of items that will not be needed for some time to come.
 - 3) **Cash discount** is a price discount given to buyers for paying their accounts in a period, and they make payments on time.
 - 4) **Trade discounts** are given by manufacturers to dealers (wholesalers and retailers) who are involved in distributing goods and performing certain functions, such as sales, storage and record keeping.
 - c. **Payment method.** Method of payment as a procedure and mechanism for payment of a product/service in accordance with existing regulations. Ease of making payments can be used as a consideration for customers in making purchasing decisions. Because if the payment facility is still inadequate or does not make it

⁷Kotler, Armstrong 2012. Marketing Management 2,452

easier for the customer, this can result in new problems for the customer. There are four indicators that can be used to measure the price of an item according to Pepadri and Sitinjak (in Wibowo and Karimah, namely):⁸

- 1) Price reference
- 2) Prices are relatively cheaper
- 3) Reasonable price
- 4) Appropriate sacrifice and price in accordance with the benefits.

Based on this description, the price indicators used in this study include: affordability, discounts, methods of payment.

Definition of Purchase Decision

A product can be said to have been consumed by consumers if the product has been decided to be purchased. The decision to buy is influenced by the value of the product being evaluated. If the perceived benefit is greater than the sacrifice to get it, the urge to buy it is higher. Conversely, if the benefits are smaller than the sacrifices, then usually the buyer will refuse to buy and generally switch to evaluating other similar products. In most people, consumer buying behavior is often initiated and influenced by many stimuli from outside themselves, both in the form of marketing stimuli and stimuli from their environment. The stimulus is then processed within oneself according to personal characteristics, before finally making a purchase decision.

Setiadi defines a decision as involving a choice between two or more alternative actions or behaviors. Decisions always require a choice between several different behaviors. A consumer who wants to make a choice, then he must choose an alternative choice.⁹ If the consumer does not choose an alternative choice, then this is not a situation where the consumer makes a decision.

According to Kotler and Armstrong, "Consumer buyer behavior refers to the buying behavior of final consumers - individuals and households that buy goods and services for personal consumption", this understanding can be interpreted that purchasing decision behavior refers to the final buying behavior of consumers, both individually, and households buying goods and services for personal consumption.¹⁰

Purchasing Decision Making Process

According to Kotler and Armstrong, consumers will go through 5 (five) stages of the buying decision process. These stages are:¹¹

1. Problem Introduction. The process of buying with the recognition of a problem or need, the buyer recognizes a difference between the actual situation and the state he

⁸Wibowo. 2014. Marketing Management, 5

⁹ Setiadi, Nugroho. 2010. Consumer Behavior. 4th printing. Revised Edition. Kencana Publisher. Jakarta.

¹⁰Kotler, Armstrong 2012. Marketing Management 2,157

¹¹? Kotler, Armstrong 2012. Marketing Management 2,176

wants. This need can be driven by stimulation from within the buyer or from outside. For example, normal people's needs are thirst and hunger will increase until they reach a threshold threshold and turn into a drive based on existing experience. A person has learned how to overcome these urges and he is driven towards the one type of object that is known to satisfy those urges.

2. Consumer Information Search. Behavior after the purchase is looking for information depending on the strength of the drive needs, the amount of information owned, the ease of obtaining information, additions and satisfaction obtained from information seeking activities. Usually the amount of information-seeking activity increases as the consumer moves from a limited decision problem-solving situation to a maximum problem-solving situation.
3. Alternative Evaluation. Information obtained from prospective buyers is used to obtain a clearer picture of the alternatives they face and the attractiveness of each alternative. Producers must try to understand how consumers know the information they get and arrive at certain attitudes about brand products and decisions to buy.
4. Buying decision. Producers must understand that consumers have their own way of handling the information obtained by limiting the alternatives that must be selected or evaluated to determine which one to buy.
5. Behavior After Purchase. If the goods to be purchased do not provide the expected satisfaction, then the buyer will change his attitude towards the brand of the goods to a negative attitude, and even get satisfaction from the goods he has purchased, the desire to buy the brand of goods tends to become stronger. Producers must reduce feelings of displeasure or negative feelings towards a product by helping consumers find information that justifies consumer choices through communication directed at people who have recently purchased their products.

Factors Influencing Purchase Decision

According to Setiadi, purchasing decisions from buyers are strongly influenced by the following factors:¹²

1. Cultural Factors

- a. Culture

Culture is the most basic determinant of a person's desires and behavior.

While other creatures act on instinct, human behavior is generally learned.

- b. Sub-culture

Each culture consists of smaller sub-cultures that provide more specific identification and socialization for its members. Sub-cultures can be divided into four types: nationalist groups, religious groups, racial groups, and geographic areas.

- c. Social class

¹²Setiadi, Nugroho. 2010. Consumer Behavior, 10

Social classes are relatively homogeneous and enduring groups in a society, which are hierarchically structured and whose membership has similar values, interests, and behaviors.

2. Social Factors

a. Reference Group

A person's reference group consists of all groups that have a direct or indirect influence on a person's attitude or behavior.

b. Family

The family can be divided into two in the buyer's life, namely the orientation family and the procreation family. Orientation family is a person's parents.

d. Role and Status

A person generally participates in groups throughout his life, family, clubs, organizations. A person's position in each group can be identified in terms of roles and status.

3. Personal Factors

a. Age and Stages in the Life Cycle

A person's consumption is also shaped by the stage of the family life cycle. Several recent studies have identified stages in the psychological life cycle.

b. Work

Marketers try to identify groups of workers who have above average interest in certain products and services.

c. Economic Situation

A person's economic situation is made up of disposable income, savings and assets, ability to borrow and attitude towards spending versus saving.

d. Lifestyle

Lifestyle is a pattern of living in the world that is expressed by one's activities, interests and opinions. Lifestyle describes "a person as a whole" who interacts with the environment. Lifestyle also reflects something behind a person's social class.

e. Personality and Self-Concept

Personality is a psychological characteristic that is different from each person who views his response to the environment which is relatively consistent. Personality can be a very useful variable in analyzing consumer behavior.

4. Psychological Factors

a. Motivation

Some needs are biogenic, these needs arise from a certain psychological state, such as hunger, thirst, discomfort. Meanwhile, other needs are psychogenic, namely needs that arise from certain physiological conditions, such as the need to be recognized, the need for self-esteem or the need to be accepted.

b. Perception

Perception is defined as the process by which a person selects, organizes, interprets input information to create a meaningful picture of this world.

c. Learning Process

The learning process describes changes in a person's behavior that arise from experience.

d. Beliefs and Attitudes

Belief is a descriptive idea that someone has towards something.

METHOD

This research was conducted at PT. Indojoya Agrinusa Medan which is located at Jl. Raya Medan-Tj. Morawa Km. 12,8. Bangsari Village. Regency. Deli Serdang, Medan 20362, Indonesia. Tel: (62-61) 7940211. Fax: (62-61) 7940223. Website:www.japfacomfeed.co.id. E-mail:inusa@mdn.japfacomfeed.o.id. PT. Indojoya Agrinusa Medan, the writer chose as the research location because the writer works every day at PT. Indojoya Agrinusa Medan. In this study the research subjects were consumers of PT. Indojoya Agrinusa Medan who bought broiler 1 animal feed products. While the research object is the variables to be studied, namely the quality of raw materials (X1), price (X2), and purchasing decisions (Y) for broiler 1 products at PT. Indojoya Agrinusa Medan. The population in this study are all consumers who buy broiler 1 products at PT. Indojoya Agrinusa Medan as many as 50 consumers. This sampling technique is called saturated sampling technique or census. Data analysis techniques in this study using quantitative techniques were used to test the effect of the independent variables and the dependent variable.

RESULTS AND DISCUSSION

Multiple Linear Regression Analysis

The results of multiple linear regression analysis can be seen in the table below:

Table
Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Betas		
1	(Constant)	.4234	.4189		.011	.317
	Raw material quality	.109	.087	0.110	.977	.000
	Price	-.0781	.0087	0.783	.821	.214

a. Dependent Variable: Purchase_Decision

Source: SPSS Output Version 20, data will be processed in 2022

The multiple linear regression equation is obtained as follows:

$$Y = 4,234 + 0.109 X1 - 0.781 X2$$

1. Constant (a) = 4,234 shows a constant value, where if the independent variable = 0 then the dependent variable = 4,234, meaning that if there is no quality of raw materials and prices, the purchase decision is still worth 4.234.
2. The regression coefficient of the variable quality of raw materials (X1) = 0.109 indicates that the quality of raw materials has a positive effect on purchasing decisions, so that if the quality of raw materials is increased by 1 unit, the purchasing decision will increase by 0.109.
3. The regression coefficient of the price variable (X2) = -0.781 indicates that price has a negative effect on purchasing decisions, so that if the price is increased by 1 unit, the purchasing decision will decrease by 0.781.

Partial Hypothesis Test (t test)

In the Coefficients table, the calculated t value is also obtained. The calculated t value is then compared with the t table value at $\alpha = 0.05$. The value of t table on df (nk) where n is the number of samples and k is the number of variables both independent and dependent variables, then $50 - 3 = 47$. At df 47 with $\alpha = 0.05$ the value of t table is 2.012.

The calculated t value of the variable quality of raw materials (X1) is equal to 8,977, thus $t_{count} > t_{table}$, then H_0 is rejected and H_1 is accepted which means that the raw material quality variable (X1) has a significant influence on purchasing decisions.

The calculated t value of the price variable (X2) is equal to 1,821, thus $t_{count} < t_{table}$, then H_0 is accepted and H_1 is rejected, which means that the price variable (X2) has no significant effect on the quality of purchasing decisions.

Simultaneous Hypothesis Test (Test F)

Anova or analysis of variance is a joint regression coefficient test (F test) to test the significance of the effect of several independent variables on the dependent variable. The results of the F test can be seen in the following table:

Table

ANOVA b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1038,780		519,390	50,277	,000a
	Residual	485,540	7	10,331		
	Total	1524,320	9			

a. Predictors: (Constant), Price, Raw Material_Quality

b. Dependent Variable: Purchase_Decision

Source: SPSS Output Version 20, data will be processed in 2022

In the Anovab table, the calculated F value is 50.277 while the F table value is 3.20. Thus, F count > F table means that the raw material quality and price variables together have a positive and significant effect on purchasing decisions.

Determination Coefficient Test (R2)

The coefficient of determination (R2) of the regression results can be seen in the table below:

Table

Summary modelb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,826a	0,681	0,668	3,2141

a. Predictors: (Constant), Raw material quality, Price

b. Dependent Variable: Quality of service

The value of the coefficient of determination (R2) from the regression result is 0.681, meaning that the raw material quality and price variables contribute 68.1% to the purchasing decision. This result is the result of (R2 x 100%), while the remaining 31.9% is influenced by other variables not examined in this study.

CLOSING

Conclusion

From the results of the research that has been discussed by processing and questionnaires and using several tests, the following conclusions can be drawn:

1. Partially, the raw material quality variable (X1) has a significant influence on purchasing decisions, as evidenced by the t count > t table (8.977 > 2.012).

Meanwhile, the price variable (X2) does not have a significant effect on purchasing decisions, as evidenced by the value of t count < t table (1.821 < 2.012).

2. Simultaneously, raw material quality (X1) and price (X2) variables have a significant influence on purchasing decisions. This means that the hypothesis in this study is accepted, as evidenced by the calculated F value > F table (50.227 > 3.20).
3. Raw material quality (X1) and price (X2) variables are able to contribute to the purchasing decision variable by 68.1% while the remaining 31.9% is influenced by other variables not examined in this study.

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INCOME ANALYSIS OF DODOL AGROINDUSTRY BUSINESS (CASE STUDY: PASAR BENGKEL VILLAGE, PERBAUNGAN DISTRICT, SERDANG BEDAGAI REGENCY, NORTH SUMATRA PROVINCE)

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Abstract

In accordance with this definition, it is permissible to add other ingredients in the manufacture of fruit dodol, such as glutinous rice flour, tapioca flour and coloring agents, as well as preservatives. The ingredients added must comply with not more than the specified rules. The dodol industry in Perbaungan District, especially in Pasar Bengkel village, is the most dominant agro-industry. The dodol agro-industry is not a new business for the local community. This activity has been going on for decades and is well known to many people, both at the local level and in North Sumatra Province and even dodol Pasar Bengkel has found a place as a souvenir which is in great demand by domestic tourists visiting Serdang Bedagei.

Keyword: Industry, income ,And business

INTRODUCTION

Dodol agro-industry is a traditional food that is quite popular in several regions in Indonesia. Dodol is classified into two, namely dodol made from fruits and dodol made from flours, including rice flour and glutinous rice flour. Dodol is made from crushed fruit flesh and then cooked with the addition of sugar and other food ingredients.

In accordance with this definition, it is permissible to add other ingredients in the manufacture of fruit dodol, such as glutinous rice flour, tapioca flour and coloring agents, as well as preservatives. The ingredients added must comply with not more than the specified rules.

The dodol industry in Perbaungan District, especially in Pasar Bengkel village, is the most dominant agro-industry. The dodol agro-industry is not a new business for the local community. This activity has been going on for decades and is well known to many people, both at the local level and in North Sumatra Province and even dodol Pasar Bengkel has found a place as a souvenir which is in great demand by domestic tourists visiting Serdang Bedagei.

The aims of the study were: to test the demand and income generated from dodol agro-industry.

The research objectives are:

- a. To find out the amount of revenue and income derived from dodol agro-industry.
- b. To find out the availability of dodol agroindustry production inputs to correct weaknesses in order to increase the processing business.
- c. To find out whether the dodol agroindustry is financially feasible.

LITERATURE REVIEW

The flour used for mixing fruit dodol can be in the form of glutinous rice flour, sago flour. The flour functions to improve the texture so that the dodol isn't too tough. The flour used can be ready-to-use in packs that can be purchased at the market or supermarket. Especially for glutinous rice flour, you can make it yourself.

The function of sugar in making dodol besides being a sweetener is also a flavor enhancer and preservative. The sugar that is widely used is brown or coconut sugar and white sugar (tula cane).

Citric acid can be found in shops, supermarkets or chemical shops. In making fruit dodol, apart from being a preservative, citric acid is needed to add flavor to dodol, especially for fruits that taste less sour and not sour.

A commonly used preservative is benzoate, either in the form of benzoic acid or salt (sodium benzoate). The maximum limit obtained is 500 ppm or 0.5g/kg of material. In making fruit dodol, you should choose clean salt. The salt has the function of adding to the flavor of the dodol so it tastes savory. The added vanilla can be in the form of powder or liquid (essence). The addition of vanilla serves to improve the aroma, especially fruit dodol made from flour. The amount added is half a teaspoon per kg of ingredients (vanilla in powder form) or a tablespoon for vanilla in liquid form.

Ascorbic acid or vitamin C needs to be added specifically for fruit lunkhead without adding flour. The addition of vitamin C aims to replace the lost vitamin C in the cooking process. Pectin is found in every fruit, whether raw, ripe or ripe. However, not all fruits have a high content of peetiin. In making fruit dodol, the addition of peetin is useful for increasing the yield or saving cooking time because pectin accelerates the clumping process.

Theoretical basis

Small industry

Small industry is an industry that seeks to increase family income, so that the aim of advancing small industry is not solely to increase income for the poor in rural areas, but to provide job opportunities for rural communities.

According to Soekarwati (1999), small industry is the processing of agricultural products and is part of the four parts of the agribusiness sub-system, namely the sub-system of providing production and agricultural inputs, farming, yield processing, marketing and coaching.

The importance of small industries in the economic development process of developing countries, especially with conditions such as Indonesia where the number of workers with low education, abundant natural resources, limited capital, rural economy is still "underdeveloped" and lame income distribution, very close related to the nature of the industry. The main characteristics of small industries include:

1. The production process is very labor-intensive (*labour intensive*)

2. Seeing these characteristics, small industry is not only considered as an important element of government policy to increase employment opportunities, but also as an instrument that is quite effective in the formation, increase and distribution of income.
3. Small industries are more numerous in rural areas and their activities are more "agricultural-oriented", both from a demand and supply point of view. Therefore, small industries are not only important as a sector that provides many job opportunities and provides main and additional income for rural communities, but also a basis for the agribusiness-based industrialization process in rural areas.
4. In general, small industries use simple technology that is more suitable for local conditions.

The main source of financing for the production process generally comes from the savings of the business owner himself. Therefore, small industry is also very important as an instrument to allocate "loal savings/investment" more optimally. Small industry is also very important as a sector that can better meet the needs of large industries which are generally located in urban areas.

Production Factors

In carrying out a business activity is influenced by several factors of production, namely labor, capital and management. The location of these factors of production in the right amount will provide optimum income. On the other hand, the use of inappropriate production factors will lead to inefficiencies, namely a waste of production factors that can reduce profits. The amount of capital is very influential on the scale of the business. This is based on the premise that the greater the business capital, the less efforts to take actions that lead to efficiency, due to weak supervision of production factors (raw materials, supporting materials and labor). The limited supply of labor around small business areas means that efforts to control the use of factors of production are getting better.

The source of labor for a business can come from family and outside the family workforce. The potential workforce of a business is the number of potential workers available in a family. The allocation of family labor to a business varies. This depends on the season and the nature and work of the business. The greatest outpouring of labor in business is during the production process (Fadholi, 1989).

Production cost

Production costs are all expenditures that must be incurred by producers to obtain factors of production and other supporting materials that are utilized so that certain products that have been planned can be realized properly. Usually production will always appear in every economic activity where business is always related to production, the emergence of

costs is closely related to the need for inputs (factors) or other sacrifices used in these production activities.

In general, production costs are divided into two, namely: Variable costs are those that are intended to procure factors of production whose nature changes or varies depending on the product that has been planned, such as raw materials, supporting materials, labor and others. Fixed costs are those that are intended for financing factors of production whose nature remains unchanged even though the product produced changes. This cost is obtained from adding up the total cost (total fixed cost) with the formula:

$$TC = TFC + TVC$$

Where :

TC= Total Cost (total cost)

TFC= Total Fixed Cost (total fixed cost)

TVC = Total Variable Cost (Soekartawi, 1993)

Receipt Income

Income or income from a citizen is the result of selling the factors of production owned to the production sector. In this case the production sector buys factors of production to be used as production inputs at prices prevailing in the market for factors of production. Acceptance is the production value or it can also be called gross income. Gross farm income (Gross Farm Income) is defined as the value of the product. Total business within a certain period, whether sold or not sold. In estimating gross income, all product components not sold must be valued at market prices. Total business expenditure is defined as the value of all inputs that are used up or issued in production. Business net income (Net Farm Income) is the difference between the gross income of the business and the total expenses of the business (Soekartawi, 1989).

The difference between income or gross receipts and expenses is defined as the value of all inputs issued in the production process. Mathematically:

Where : π = Profit or net income

TR = Total Revenue

TC = Total Cost (Tohir, 1987).

Operating income is the amount of revenue minus expenses incurred in business activities, and this is called net income (Net Farm Income). Operating expenses consist of paid and unpaid expenses. Unpaid expenses plus net income are part of family income (Soekartawi, 1984).

METHOD

Research Location Determination Method

This research was conducted in Pasar Bengkel Village, Perbaungan District, Serdang Bedagai Regency. The determination of the research area was determined by purposive sampling. Purposive sampling is a way of taking samples that are done deliberately with a note that the sample represents the population. The basic consideration in determining the area of this research is because in the area along Jalan Pasar Bengkel many dodol are cultivated as a source of family income.

Method of collecting data

The data collected consisted of secondary data and primary data. Primary data were obtained from sample entrepreneurs using the waawncaar method using a list of questions that were prepared in advance. While secondary data were obtained from related institutions or agencies and were relevant to this research as a source of literature.

Data Analysis Methods

The data obtained in the study were first tabulated and then analyzed descriptively.

For hypothesis (a), using descriptive analysis by observing the availability of dodol agroindustry. The availability of production inputs is sufficient if more than 70% of the sample states that they have no difficulty in obtaining raw materials,

For hypothesis (b), analyzed by tabulation method, as follows:

$$TR_i = Y_i \cdot p_y$$

TR : Total Revenue (total revenue) sales of dodol.

: Production obtained in processing dodol. P_y :

Selling price of lunkhead

$$Pd = TR - TC$$

Pd: Lumpy business income

TR : Total receipts (total revenue) of dodol

TC : Total cost of dodol

For objective (c) the formula is used:

$$OIR = TR/TC$$

Where :

OIR = Output-input Ratio (Efficiency level)

TR= Total Revenue

TC= Total Cost (total cost)

Production, Cost of Production and Acceptance

The amount of dodol production every day depends on the amount of consumer demand. If demand increases, more dodol will be produced than the demand per month. Production in this case is the amount of dodol produced in one month. While revenue is the amount of production multiplied by the selling price of dodol per unit. The amount of production, selling price and revenue of dodol business can be seen in the following table.

Table 16. Average Production, Production Costs and Revenue of Dodol Business in Pasar Bengkel Village, Perbaungan District, 2013

No	Description	Production Amount		Reception (IDR)
		Cauldron	kg	
1.	Dodol with durian flavor	38,57	578.50	9,256,000.00
2.	Pandan flavored dodol	40,73	611.00	9.165.000.00
3.	Vanilla flavored dodol	120.38	1805.00	26,431,600.00
Amount		120.38	1805.00	26,431,600.00

Source: Primary Data
Processed

Table 16 can be seen that the average production of dodol businesses in Pasar Bengkel Village, Perbaungan District, is durian flavored dodol 578.50 kg/month, pandan flavored dodol 611.00 kg/month and vanilla flavored 616.20 kg/month, with an average of - the average production cost of IDR 17,254,327.54. With an average selling price of durian flavored lunthead of IDR 9,256.00/kg, pandan flavor of IDR. 9,165.00/kg and vanilla flavor of Rp. 8,010.60/kg, so that an average income of Rp. 26,431,600.00/month is obtained.

Dodol Business Net Income

From the sales of dodol, a number of revenues are obtained. The revenue earned by dodol entrepreneurs is reduced by the total production costs, so net income from the dodol business is obtained. Table 17. Average Net Income of Dodol Business in Pasar Bengkel Village, Perbaungan District in 2013.

No	Description	Amount (Rp/month)	Amount (Rp/pot)
1.	Reception	26,431,600.00	219,568.03
2.	Production cost	17.254.37,54	143,332.18
3.	Net income	9,177,272.46	76235.86

Table 17 shows that the income from the dodol business is IDR 26,431,600.00/month. Net income is the amount of revenue earned after deducting total production costs. The net income of the dodol business is Rp. 9,177,272.46/month.

Efficiency of Dodol Agroindustry

The efficiency measurement criterion used in the dodol business in the research area is the output input ratio (OIR). To calculate OIR, the following formula is used:

—

If the OIR is greater than one, then the business is efficient where the entrepreneur enjoys the benefits of his business or the entrepreneur can save part of his income. For more details can be seen in the following table.

Table 19. Revenue, Net Income, Production Costs and OIR of Dodol Business in Pasar Bengkel Village, Perbaungan District, Serdang Bedagai Regency in 2013.

No	Description	Amount
1.	Reception	26,431,600.00
2.	Production cost	17,254,327.54
3.	OIR	1.53

From Table 19 above it is known that the OIR of the toothpaste business in the study area is 1.53. This shows that the OIR is greater than one so that the dodol business is efficient. In the dodol business in the research area, for every 1 (one) unit sacrificed by the entrepreneur, 1.53 units were received. The higher the revenue and the lower the cost, the higher the OIR, the smaller the OIR. To achieve even higher OIR it is necessary to do so.

CLOSING

Conclusion

Based on the results of research and discussion, the following conclusions are obtained:

1. The net income of the dodol industry in the research area is Rp. 9,177,272.46/month
The availability of dodol agro-industry production inputs in the research area is quite available,
2. namely 85% of entrepreneurs do not experience difficulties in providing production inputs. The dodol business has been efficient in the research area where the OIR of the dodol industry is 1.53.

Suggestion

In connection with the results of the study, the authors provide the following suggestions:

1. For the government, it is necessary to provide soft loans for dodol entrepreneurs and help dodol marketing businesses, so that dodol home industries can increase production.
2. It is hoped that the dodol home industry needs to increase its production so that more family income and employment can be obtained.

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EXPLORING THE IMPACT OF LEADERSHIP STYLE, SCHOOL HEAD, SUPERVISION, BUDGET, AND INFRASTRUCTURE ON TEACHER COMPETENCE AND MOTIVATION AND ITS EFFECT ON STUDENT ACHIEVEMENT WITHIN UPTD EDUCATION IN PANCALANG KUNINGAN

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Abstract

This study aims to examine the influence of the leadership style of the UPTD head, the leadership style of the principal, the role of the school supervisor, BOS school and the infrastructure on student achievement by being mediated by the competence and motivation of the teacher. Data derived from the results of filling out questionnaires by as many as 124 respondents. Descriptive analysis was used to assess the average for each indicator of the research variable, followed by using the Partial Least Square technique with the help of the Smartpls program. The results of the study showed that the leadership style of the UPTD head, the leadership style of the principal and BOS funds did not affect the level of teacher competence, but it affected the motivation of the teacher. Likewise the role of school supervisors and infrastructure influences teacher competency, but does not affect teacher motivation, the high role of school supervisors and the complete facilities and infrastructure do not support teacher motivation but tend to influence teacher competency. While teacher motivation is not a determinant of high and low student achievement, but the high and low teacher competencies influence student achievement, this shows that the higher the teacher's competency, the higher student achievement.

Keywords: Leadership, Supervisor, Infrastructure, Competence, Motivation, Achievement

INTRODUCTION

Background

Education is an important and beneficial aspect of human life. Through education, students are guided, educated with the aim of making them believers and devoted to God Almighty, noble-minded, responsible, and improve their lives. Education teaches good attitudes, knowledge, and skills that enable the creation of a skilled, creative, intelligent, insightful generation with a strong sense of togetherness to build themselves and together build the nation. This is in line with the national education goals stated in the Indonesian Law No. 20 of 2003, Article 3 on the National Education System, which aims to develop the abilities, shape the character and civilization of a dignified nation in order to educate the potential of students to become people who believe in and are devoted to God Almighty, have noble character, are healthy, knowledgeable, creative, and become democratic and responsible citizens.

In Sri Astutik Suharini's research on "The Influence of Professional and Pedagogical Competence of Islamic Religious Education Teachers on Students' Learning Motivation and

Achievement at SMAN 1 Cerme Gresik in 2016," it is explained that there is a positive and significant influence of professional and pedagogical competence on students' learning achievement, as indicated by the significance value of professional competence of 0.011 and the significance value of pedagogical competence of 0.010, both of which are smaller than the probability of 0.05.

Similarly, Fajar Ratiningrum's research shows that school supervisors, principals, and work commitment have an influence on the pedagogical competence of elementary school teachers in Seputih Banyak Sub-district, Central Lampung Regency, in 2017. Even the influence of supervision in the form of school supervisor supervision is very significant for the pedagogical competence of elementary school teachers.

According to Aharidla Royhan, there is a significant influence between productive teacher work motivation and student achievement at SMKN 3 Yogyakarta. This is indicated by the correlation coefficient of 0.570, which means the correlation is quite strong, which means that the contribution of motivation to achievement is 32.5%. Through the F test, influence of teacher work motivation on student learning achievement is that the higher the motivation, the higher the student learning achievement.

Suparno emphasizes the positive and significant influence of the situational leadership style of the school principal on teacher performance, with a significance value of 0.022, which is smaller than the required probability of < 0.05 . The teacher performance variable examined uses pedagogical competence indicators, meaning that the leadership style of the school principal has a significant influence on teacher competence. Similarly, Eva Tri Susanti confirms the significant influence of situational leadership style on work motivation in the bank. This is also emphasized by Agung Prasetyo, who states that there is a significant influence of leadership style on employee performance, with the employee performance indicator in this case being work motivation.

In summary, the problem with learning in schools within the jurisdiction of UPTD Pendidikan Kecamatan Pancalang Kabupaten Kuningan is that every year there are various competitions related to the ability to absorb students from various subjects, but student achievement is suspected to be low. This is due to students lacking motivation and needs in learning. Teachers use less interesting learning methods which make students become bored during class. They also rarely use media or teaching aids during the learning process which leads to students not understanding the material being taught. Low student motivation is influenced by external factors, such as teachers who lack motivation and maximal competence.

The motivation of the teacher is a key factor in students' learning process. The lack of motivation and insufficient competence of every teacher in the Pancalang district, especially

elementary school teachers, is due to several factors. External factors that can increase the teacher's motivation are a weak understanding of their rights and obligations as civil servants that have consequences for regulations at all levels, and the lack of enforcement of regulations that reward or punish civil servants in the form of realized actions.

To improve the teaching and learning process, teachers should use more interesting learning methods and teaching aids, which will help students to understand and be more interested in the learning process. Meanwhile, the government should focus on the development of human resources to provide incentives to employees to increase their motivation and skills. In conclusion, the implementation of policies that can enhance teacher motivation, as well as the provision of better resources, could lead to improved learning outcomes for students in the Pancalang district.

LITERATURE REVIEW

The term "prestasi belajar" originated from the Dutch word "prestatile" which in Indonesian means achievement or result of effort. This term is widely used in various fields such as sports, arts, and education. In the realm of education, periodic tests are conducted to determine the level of student absorption of the given subject matter. Based on the results, the teacher assesses the student's learning achievement.

According to Sardiman (2011), learning achievement is the result of measuring students' performance after undergoing the learning process. Learning achievement is a real ability that results from the interaction between various factors that influence learning, both internally and externally. Djamarah (2012) defined learning achievement as the impressions that result in changes in an individual as a result of learning activities, which is in line with Hamdani's (2011) opinion that learning achievement is the impression that results in changes in an individual as a result of an activity. Learning achievement is a measure of how far a student can achieve the set goals.

Based on the above descriptions, it can be concluded that learning achievement is a result obtained from an activity that leads to behavioral changes. Achievement is indicated by test scores or grades given by the teacher as a result of the student's efforts. Learning achievement is said to be perfect if it meets the three aspects of cognitive, affective, and psychomotor, and conversely, it is considered unsatisfactory if a person has not met the target criteria.

From the expert opinions above, the author concludes that learning achievement is the result of measuring students who have undergone the given lessons in the form of grades or scores from the teacher to the students within a certain period of time. Learning achievement is a benchmark for a student's success in achieving the set learning goals.

Academic achievement is the result of the interaction between several factors that influence both internally and externally. According to Dalyono (2012), the success or failure of someone in learning is influenced by several factors that affect academic achievement, including internal factors such as health, intelligence and talent, interests and motivation, and learning methods, as well as external factors such as family, school, community, and the surrounding environment. According to Slameto (2010), the factors that influence academic achievement are classified into two categories: internal and external factors. Internal factors are the factors that exist within the individual who is learning, while external factors are the factors that exist outside the individual.

The professionalism of educators is manifested through a teaching certificate. In article 1 clause (12), it is emphasized that "a teaching certificate is a formal proof of recognition given to teachers and lecturers as professional educators." Empowering all the potential of students can only be done if teachers have good abilities both in terms of quality and quantity in their fields of expertise. Something that describes qualifications is called competence. Teacher competence is the ability that must be possessed by teachers from the pre-school level, elementary level, and secondary level and can be categorized into two categories: general competence and specific competence. General competence is the abilities and skills that must be possessed by every teacher in the educational level. While specific competence is the abilities and skills that must be specifically possessed by certain educators in accordance with the level and type of education they pursue.

According to Wayne F. Cascio in Sunyoto (2012), motivation is "a force generated from someone's desire to satisfy their needs, such as hunger and thirst." As stated by Robert C. Berk in B. Uno (2010), motivation comes from the word motive, which can be interpreted as "a driving force to start an activity in a behavior." Gibson, as cited in B. Uno (2012), defined motivation as a willingness to exert a high level of effort toward organizational goals, conditioned by the effort's ability to satisfy an individual's needs. David McClelland in B. Uno (2012) believed that a motive is the reintegration by a cue of a change in an affective situation, where motive is the implication of learned considerations marked by a change in affective situations. Therefore, it can be understood that the main elements of motivation are effort, organizational goals, and needs. If someone is motivated in performing their task, they will try their best to produce high performance. Meanwhile, all efforts made by someone are directed towards achieving goals. The element of needs is an internal state that causes certain results to seem attractive.

Unsatisfied needs motivate individuals to achieve them. Motivation can be defined as a factor that causes and maintains an individual's behavior. Motivation is a psychological characteristic of humans that contributes to one's commitment. From the various opinions above, the author concludes that experts interpret motivation differently where there are differences in the emphasized factors. Motivation is closely related to behavior and job

performance. Motivation is directed towards achieving goals. And the provision of motivation cannot be separated from the concept of human needs.

According to Kurniadin et al. (2012), leadership style is a collection of characteristics used by leaders to influence subordinates to achieve organizational goals. It can also be said that leadership style is a pattern of behavior and strategies frequently preferred and applied by a leader. Furthermore, leadership style is the attitude, gestures, and appearance chosen by a leader in carrying out their leadership duties (Priansa, 2014). Thus, leadership style is used and demonstrated by a leader to try to influence the behavior of others. This is in line with Prasetyo's (2006) definition in Rusdiana (2015) that defines leadership style as the way used in the leadership process implemented in a person's leadership behavior to influence others to act according to what they want.

Based on the understanding that has been explained, leadership style is the way chosen and used by a leader in carrying out their leadership duties to influence the behavior of their subordinates so that the organization's goals can be achieved. The behavior displayed by a leader in influencing their subordinates' activities will show the characteristics of their leadership. So, there is no one best leadership style among all the styles available. However, there is effective leadership. The most effective leadership is the one that is most capable of influencing and motivating subordinates to achieve the set goals (Andang, 2014).

The main task of school supervisors is to carry out professional guidance and training for teachers and supervisory tasks that include academic and managerial supervision. Technically, the main tasks of school supervisors include four tasks: arranging school supervision programs, monitoring the implementation of 8 national standards, assessing administrative, academic, and functional aspects, and carrying out special area supervision. This activity aims to improve the performance of teachers in learning and improve the performance of school principals in managing education. According to Regulation No. 30 of 2013 regarding the Functional Position of School Supervisors and their Credit Numbers, the task of school supervisors is to carry out academic and managerial supervision tasks in educational units which include arranging supervision programs, carrying out coaching, monitoring the implementation of 8 national standards, assessing, guiding and providing professional training for teachers, evaluating the results of the supervision program implementation, and carrying out supervisory tasks in special areas.

Assignments are divided into three categories: young, middle, and senior school supervisors. All tasks are the same, but senior supervisors provide guidance to middle and young supervisors. The tasks of school supervisors are (1) arranging school supervision programs; (2) carrying out teacher coaching; (3) monitoring the implementation of the curriculum standards, process standards, graduation competency standards, and assessment standards; (4) conducting teacher performance assessments; (5) evaluating the results of the

supervision program implementation in their assigned schools; (6) arranging professional guidance and training programs for teachers in KKG/MGMP/MGP and similar organizations; (7) carrying out coaching and professional training for teachers; and (8) evaluating the results of coaching and professional training for teachers.

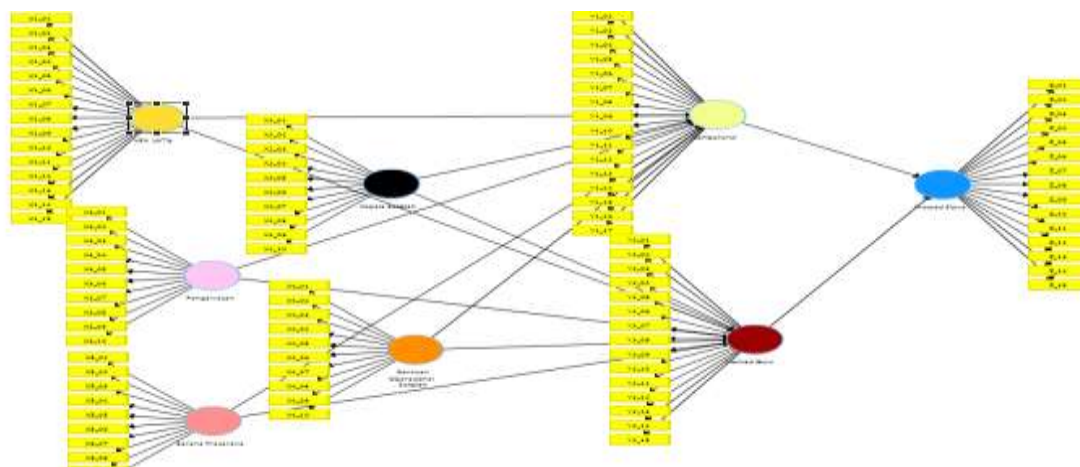
METHOD

In accordance with the problems and objectives proposed in this study, namely to obtain an empirical picture of the Leadership Style of the Head of UPTD, the Leadership Style of the Principal, the Role of Supervisors, School BOS and infrastructure on the Competence and Motivation of teacher work that has an impact on student achievement, the research method that will be used is a descriptive method carried out through a survey. Research using this method is directed to reveal problems that occur in the present, namely at the time of the research and are actual.

The research method used is the survey method. According to , the survey method is used to obtain data from certain places by means of researchers collecting data, for example by distributing questionnaires, tests, and structured interviews. (Sugiyono, 2013)

Based on the type of data to be analyzed, this study uses a quantitative approach. Quantitative research is directed to answer the problems posed through technical data analysis by using statistics as a tool. To test the relationship of the variables to the twelve hypotheses proposed in this study. will be analyzed using SmartPLS 3.0 software. In accordance with the hypothesis that has been formulated, in this study starting from the measurement of the model (*outer model*), the structure of the model (*inner model*) and testing the hypothesis. The analysis can be carried out by the Partial Least Square (PLS) method. (Jogyanto , 2009)

PLS is a multivariate statistical technique that performs comparisons between multiple dependent variables and multiple Independent variables. PLS is one of the variant-based SEM statistical methods designed to solve multiple regression when there are specific problems with the data such as small research sample size, missing data and multicollinearity. The selection of the PLS method is based on the consideration that in this study there are two latent variables that are formed with formative indicators and form a moderating effect. The formative model assumes that a latent construct or variable affects an indicator by which the direction of the causality relationship from the construct to the indicator or manifest . Here's the design of the study: (Ghozali, 2006)



Research Method and Design Drawings

RESULTS AND DISCUSSION

In this study, descriptive analysis was used to see an overview of respondents' characteristics and an overview of research variables based on the results of filling out a questionnaire. Descriptive analysis of respondents' characteristics was carried out by making a Frequency distribution table while descriptive analysis of research variables was carried out by calculating the average value and standard deviation on each indicator of the research variable.

Description of Respondent Characteristics

The number of respondents in this study was 124 respondents, all of whom were teachers in the UPTD environment, based on the data collected, the following are the results of a descriptive analysis of respondents' characteristics according to gender, age and position of respondents:

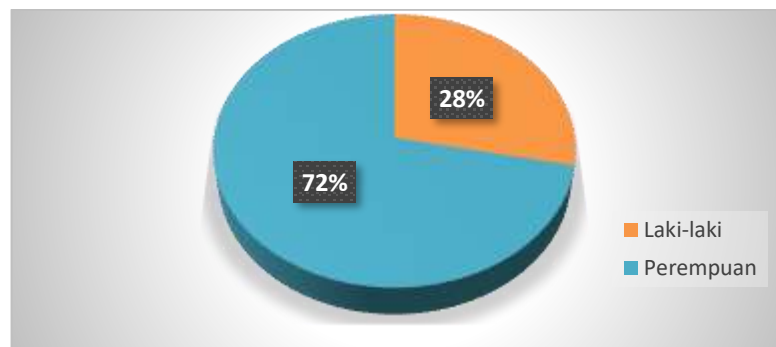
a. Gender

Table 1 Gender Characteristics

Gender	Frequency	Percentage
Men	35	28.2
Women	89	71.8
Total	124	100

Source : Processed data

Based on the results of the descriptive analysis in table 1, the results of the analysis showed that of the 124 respondents studied, most of the respondents were female (89%), while the remaining 11% of respondents were male.



Respondent Characteristic Image

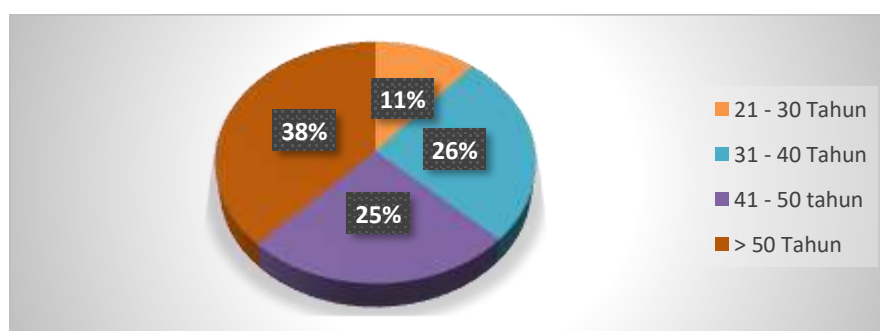
b. Age

Lose 2 Age characteristics of respondents

Age	Frequency	Percentage
21 - 30 Year old	14	11.3
31 - 40 Year old	32	25.8
41 - 50 Year old	31	25
> 50 Year old	47	37.9
Total	124	100

Source : Processed data

Based on the results of the descriptive analysis in table 2, the results of the analysis showed that of the 124 respondents studied, most of the respondents were > 50 Years old (37.9%), while the remaining 11.3% of respondents were aged 21 - 30 Years old, as many as 25.8% of respondents aged 31 - 40 Years old and as many as 25% of respondents aged 41 - 50 Years old. The age of the respondents can be more clearly seen in the following figure:



Respondent's Age Characteristics Image

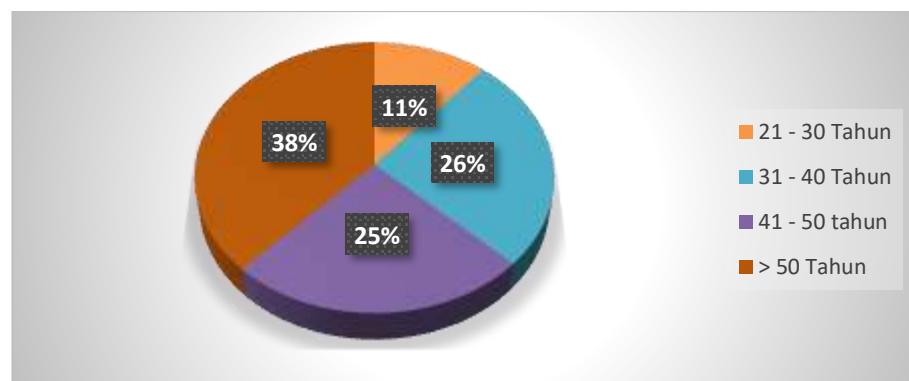
c. Position

Table 3 Respondents' Job Characteristics

Position	Frequency	Percentage
PNS	78	62.9
THL	46	37.1
Total	124	100

Source : Processed data

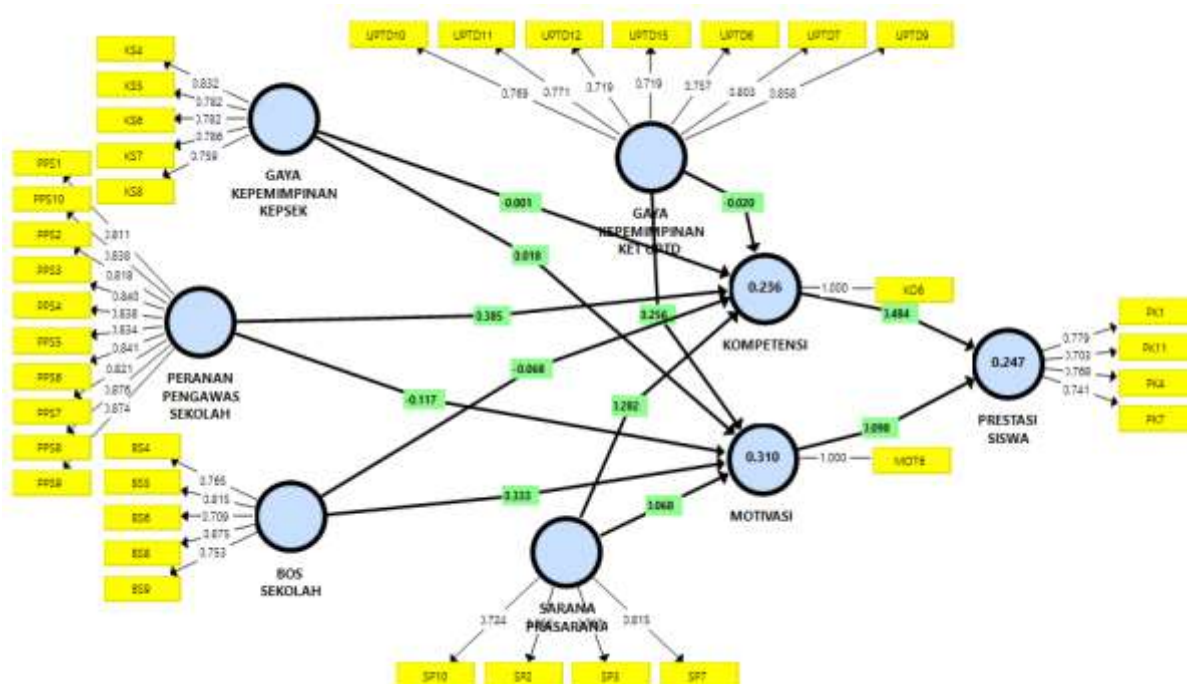
Based on the results of the descriptive analysis in table 3, the results of the analysis showed that of the 124 respondents studied, most of the respondents were civil servants (62.9%), while the remaining 37.1% of respondents were THL. The respondent's job title can be more clearly seen in the following figure:



Respondent's Job Title Characteristics Image

Research Results

From the results of the study obtained as in the following figure:



Based on the figure above, the discussion of the test results of the 5 variables tested using the PLS tool can be explained as follows:

Statistically, it has been proven that the variables that affect teacher work motivation are the leadership style of the head of the UPTD Education and BOS funds. Meanwhile, the situational leadership style of the principal, supervisor and infrastructure has no effect on the motivation of teachers' work in research at the Pancalang Education Unit. This research is in accordance with the previous research, namely the Agung Prasetyo Year old 2017 research with the title Leadership Style and Its Influence on the performance of BPRS employees of Mitra Agro Usaha Bandar Lampung. There is an influence of leadership style on employee performance, in which case the employee's performance indicator is work motivation.

The Head of UPTD Education greatly influences the motivation of teachers' work based on research and facts in the field. This is understandable because of the fact that the position of head of the UPTD Education, which stands for the Education Office, has the authority to propose various policies related to the continuity and personal needs of a teacher, both in terms of career path and placement of teacher and principal formations as well as monitoring the performance assessment of teachers and principals.

The range of control of supervision, assessment and guidance is very effective with the existence of the position of head of the sub-district Education Unit in encouraging teacher work motivation. Based on this research, it has been proven that the Regulation of the Minister of Home Affairs No. 12 Year old 2017 concerning the Abolition of Structural Positions in the UPTD Education which will be replaced with general functional positions (staff) is unfounded and tendentious and very contrary to the spirit of educational progress. Because the existence of staff as an extension of the Education Office does not have any

authority. Its authority is only limited to collecting data from schools to education offices and receiving data from the education office to be distributed to schools. Meanwhile, there are quite a lot of problems in the complexity of teachers and schools, including affecting teacher performance.

In addition to the leadership style of the head of the UPTD Education, statistically the BOS Fund also affects the motivation of teachers' work. The allocation of funds from BOS for the implementation of various activities in schools whose allocation is for honorariums for both civil servants and honorary workers is very helpful in increasing teacher work motivation.

Statistically, the variables that affect the competence of a teacher are obtained from the role of school and infrastructure supervisors. Meanwhile, the leadership style variables of the head of UPTD and school BOS have no effect. This is in accordance with previous research Based on research conducted by Fajar ratiningrum with the research title The Influence of School Supervisors, Principals and Work Commitment to the Pedagogic Competence of Elementary School Teachers in Seputih Many District, Lampung Tengah Regency Year old 2017 shows that the influence of supervision in the form of supervision of school supervisors is very significant on the Pedagogic Competence of teachers in elementary schools.

In fact, the ability of teachers in schools is quite good with the role of school supervisors who carry out their duties in the form of academic supervision. The implementation of academic supervision carried out by the school supervisor directly guides and directs teachers in the process of scientific transformation in classroom learning. In addition to the role of supervisors that affect the competence of teachers, another influence is infrastructure. The managerial presence of infrastructure is very supportive of teacher competence. Teachers always need various means to hone and conduct experiments on various theories before they are given to students, so that their competence can increase.

The use of infrastructure in addition to conducting various experiments is also used to provide concrete examples in the learning process so as to attract interest in learning to students.

Four of the five variables studied each had a significant effect on both motivation and competence. Variables The leadership style of the head of UPTD and BOS is very influential on the motivation of the teacher's work while the Variable Role of supervisors and infrastructure has a significant effect on competence. One interesting thing is that there are differences in the results of previous studies related to the principal's leadership style towards teacher work motivation. Based on Suparno's research entitled The Effect of Work Motivation and Situational Leadership of Principals on the Performance of State Junior High School Teachers in Pematang District, Pematang Regency, Year old 2007, it shows that there is an influence of Positip and signippion the principal's situational leadership style on Teacher Performance by 0.022 is less than the probability required < 0.05 . Meanwhile, the Teacher Performance Variables studied used pedagogic competency indicators, which

means that the influence of the principal's leadership style greatly affects teacher competence.

Conditions in the field can be explained as follows: The authority of the principal, which is only limited to the teacher performance assessment process (PKG) in employee work targets (SKP) is often not implemented optimally. Sometimes teacher performance assessments (PKG) are made by teachers themselves and according to their own wishes. This is due to the length of time the principal has served in the school and the lack of implementation of the minister of education regulations regarding the rotation of principals. It should be that the principal who has finished carrying out his duty period is transferred to another school to avoid bad habits or fatigue. However, the principal rotation policy only applies in one sub-district and is less effective because teachers already know the character of the principal in the region. In addition, motivation is also influenced by the length of time teachers are in the same school and the process of reward and punishment that is less effective. The large shortage of civil servant teachers in elementary schools, especially in Pancalang sub-district and generally in Kuningan Regency, has caused school principals to look for volunteer teachers only to meet minimum service standards. This is due to the moratorium on civil servant revenue imposed in Kuningan Regency because 70% of the regional budget is used for employee spending, while only 30% is for development spending.

In addition to the influence of the principal's leadership style on work motivation, the situational work leadership style also differs in results on the competence of the teacher in this case pedagogical competence. Based on Suparno's research entitled *The Effect of Work Motivation and Situational Leadership of Principals on the Performance of State Junior High School Teachers in Pemalang District, Pemalang Regency, Year old 2007*, it shows that there is an influence of Positip and signippion the principal's situational leadership style on Teacher Performance by 0.022 is less than the probability required < 0.05 . Meanwhile, the Teacher Performance Variables examined use pedagogic competency indicators, which means that the influence of the principal's leadership style greatly affects teacher competence.

The influence of teacher motivation that is not optimal from the situational leadership style of the principal has an impact on the competence of the teacher. There are several factors that can explain the impact:

First, perfunctory teacher performance assessment (PKG) prevents teachers from being assessed based on actual competence. The principal only gives instruction in the learning process without conducting a competency evaluation.

Second, the encouragement of motivation through the development of existing teacher competencies, such as the Teacher Working Group (KKG), has not gone well. KKG activities are often just a mere formality and the methods have not been in line with expectations. Although many education and training are organized by the education office and the education quality assurance agency (LPMP), it has not been integrated in learning and is not trained at the KKG level. All these factors contribute to the low motivation and competence of teachers.

Based on the results of statistical tests that affect student learning presupposition from the variables of competence and motivation, it can be applied as in previous studies revealing different results related to factors that affect student learning achievement. The first research by Sri Astutik Suharini found that teacher competence has a positive and significant influence on student learning achievement, with a sig value of Professional Competence of 0.011 and a sig value of Pedagogic Competence of 0.010. Meanwhile, the second study by Aharidla Royhan found that teacher work motivation had a significant influence on student learning achievement, with a correlation coefficient of 0.570 and a price determinant coefficient of 0.325. However, statistical tests show that teacher work motivation does not significantly affect student learning achievement. A simple regression equation shows that the higher the teacher's work motivation, the higher the student's learning achievement. In addition, observations and trials conducted by a school supervisor showed that understanding the characteristics and abilities of students as well as training with a programmatic schedule can improve student learning achievement, as can be seen from the increase in the ranking of the Pancalang sub-district in athletic sports activities at the district level.

Field conditions show that there is no difference in terms of motivation between those who carry out their duties earnestly and those who do not, especially in terms of salary earnings and benefits. The payment of teacher certification for civil servants is the same for both. However, the data shows that the number of Freelance Daily Workers (Honorary) is almost the same as the number of civil servants. We know that THL/Honorary work motivation is based on income that is not optimal and not worthy of life, which has an impact on the low work motivation of teachers.

CLOSING

Conclusion

In the context of leadership, a study shows that the leadership style of the head of the UPTD has no significant effect on teacher competence. This means that the level of teacher competence is not influenced by the leadership style of the head of the UPTD. However, the leadership style of the head of the UPTD has a positive and significant effect on teacher motivation. The better the leadership style of the head of the UPTD, the higher the teacher's work motivation, and vice versa.

The same study also shows that the leadership style of the school principal has no significant effect on teacher competence. Whether the leadership style of the school principal is good or not does not affect teacher competence. The same goes for teacher motivation, the leadership style of the school principal does not affect it.

On the other hand, the role of the school supervisor has a positive and significant effect on teacher competence. The greater the role of the school supervisor in the learning process,

the higher the teacher competence, and vice versa. However, the role of the school supervisor does not affect teacher motivation. The size of the role of the school supervisor does not affect teacher work motivation.

The size of the school's BOS funds does not affect teacher competence. The level of teacher competence is not influenced by the amount of BOS funds provided by the government. However, the school's BOS funds have an effect on teacher motivation. The better the management of the school's BOS funds, the higher the teacher's work motivation, and vice versa.

School facilities and infrastructure have a positive and significant effect on teacher competence. The better the school facilities and infrastructure, the higher the teacher competence, and vice versa. However, school facilities and infrastructure do not affect teacher motivation. The level of teacher work motivation is not determined by the facilities and infrastructure available.

In the end, teacher competence has a positive and significant effect on student achievement. The higher the teacher's competence, the higher the student achievement, and vice versa. However, teacher motivation does not affect student achievement. The level of student achievement is not influenced by the level of teacher motivation.

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CASE STUDY INCOME ANALYSIS OF COCONAT PALM SUGAR BUSINESS IN SIMPANG KIRI DISTRICT, SUBULUSSALAM CITY

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Abstract

This study aims to see how much income farmers earn. This research was conducted at the end of November 2018 to February 2019. The data used are primary and secondary data. This research was conducted using direct interview techniques with 23 (twenty three) respondents, in this case the processing of coconut brown sugar and also using written data in the form of documents obtained from the Simpang Kiri District office. This study aims to determine the feasibility of coconut brown sugar business in Simpang Kiri District, Subulussalam City. The data analysis method used in this study is to use the formula for analysis of costs, income and profits. Meanwhile, to calculate business feasibility, the formula used is the Revenue Cost Ratio (R/C), Break Even Point (BEP) and Return On Investment (ROI). The results showed that the average profit received by the coconut brown sugar business craftsmen was Rp. 10,284,428., / per month. Based on the calculation of business feasibility, the R/C is 1.63, the production BEP value is Rp. 1147 kg. BEP price Rp. 8,719, and ROI 63.06%. So it can be concluded that the coconut brown sugar business in Simpang Kiri District, Subulussalam City is feasible to pursue.

Keywords: *Income, Palm Brown Sugar*

INTRODUCTION

Indonesia is an agrarian country where the livelihood of the majority of the population is in the agricultural sector. Development in the agricultural sector always gets top priority in every stage of development, because in terms of various sectors, agriculture is one sector that can support the pace of national economic growth. Meanwhile, according to Mugiono et al (2014) one of the agricultural sub-sectors that is quite important for national development is the plantation sub-sector. The plantation commodity that is being conserved by the community is coconut.

According to Irmawati et al (2015) agricultural products are generally produced as raw materials that are easily damaged and are not durable, so they require a processing process in order to increase added value through processed products in the form of semi-finished and finished goods. One of the processing industries made from agricultural products is the coconut brown sugar industry. Coconut brown sugar is a type of sugar made from coconut sap, which is the liquid produced from tapping the flower stalks of the coconut plant

Coconut brown sugar or known in trade as Javanese sugar or brown sugar is produced from the trade of coconut tree sap (Krisnamuthi in Puspita, 2016). Coconut sugar is one of the sweeteners for food derived from coconut sap processing. Coconut sugar is mostly traded in the form of solid lumps with a geometric structure that varies depending on the printing place used at the time of manufacture. Coconut sugar can be consumed as a sweetener for

food or drinks as well as other sweeteners such as granulated sugar, siwalan sugar, and so on. However, it is also used as a raw material in several food industries, including soy sauce and instant drinks. Compared to several other types of sugar, coconut sugar has both advantages and disadvantages. One of the disadvantages of coconut sugar is its quality, which varies too much due to its nature as a people's industry. In addition, some of the coconut sugar circulating in the market invites preservatives that are harmful to health. However, this deficiency is actually not an innate characteristic of coconut sugar but rather a lack of good way of responding.

The sugar commodity is currently a strategic commodity in Indonesia. This condition is caused by the emergence of various reasons as follows: 1) sugar products are consumed by all levels of society as food and beverage products; 2) sugar production has been carried out by entrepreneurs from the on-farm to off-farm level; 3) the existence of this product is able to touch many dimensions of the machine concerning the technical, economic, social and political sides.

The Director General of Plantations (2013) estimates that the national need for coconut sugar consumption in 2014 will reach 5.7 million tons, with an allocation of 2.96 million tons for direct public consumption and 2.74 million tons for industrial needs. However, until now domestic sugar production has not been able to cover the total national demand. The results of the national sugar symposium in 2012 reported that the average national producer was only able to meet about half of the total demand. The current government policy to cover the total need is to import sugar from international sugar producers.

Simpang Kiri District is one of the sub-districts in Subulussalam City, most of the area is an agricultural area, and is recorded as a coconut and brown sugar producing center. Coconut brown sugar is a source of income for the residents of Simpang Kiri District, Subulussalam City. Given the economic value of coconut brown sugar processing business, it is necessary to conduct research aimed at: 1) knowing the total production costs of coconut brown sugar manufacturing business; 2) knowing the level of income from coconut brown sugar farming; 3) determine the level of business feasibility of making brown sugar in the Simpang Kiri sub-district, Subulussalam City.

LITERATURE REVIEW

Farm Income

According to Suyanto (2000) income is the amount of funds obtained from the utilization of production factors owned. These sources of income include: 1) Rent of property used by other people, for example renting out houses and land; 2) Wages or salaries for working for other people or being a civil servant; 3) Interest for investing in a bank or company, for example depositing money in a bank and buying shares; 4) The results of self-employed businesses, for example trading, farming, setting up companies, or farming. Income or income is money received by a person from the company in the form of salaries, wages, rent, interest and profits including various benefits, such as health and pensions.

According to Djali (2008) people who have a small income, the results of their work are only to meet their daily needs. For middle-income families, they are more focused on

meeting proper basic needs such as food, clothing, housing, education and others. Meanwhile, families who have high incomes and are well-off will fulfill all their wishes, including the desire to send their children to a higher level of education. The community needs a large amount of funding to send their children to school, thus requiring a sacrifice in education. The sacrifice of education is considered as an investment in the future. Funding allocated for education is not solely consumptive in nature, but rather an investment in the context of increasing the capacity of the workforce to produce goods and services. Education in schools is one part of investment in order to improve the ability of human resources.

farming

According to Suratiah (2015) farming science is the science that studies how a person cultivates and coordinates production factors in the form of land and the natural surroundings as capital so as to provide the best possible benefits. As a science, farming science is a science that studies how farmers determine, organize, and coordinate the use of factors of production as effectively and efficiently as possible so that the business provides the maximum possible income.

According to Adiwilaga in Novitarini (2018) farming science is a science that investigates everything related to the activities of people doing agriculture and problems that are specifically reviewed from the position of the entrepreneur himself or farming science, namely investigating the ways of a farmer as an entrepreneur in compiling, managing and running that company.

On the contrary, according to Mosher in Novitarini (2018) farming is community farming from the word farm in English. Dr. Mosher defines a farm as a place or part of the earth's surface where farming is carried out by a particular farmer, whether he is an owner, tenant or salaried manager. Or farming is the collection of natural resources found in that place that are needed for agricultural production such as land and water, improvements made to the land, sunlight, buildings erected on the land and so on. Meanwhile, according to Kadarsan in Novitarini (2018) farming is a place where a person or group of people tries to manage elements of production such as nature, labor,

Coconut Brown Sugar

Coconut is a multi-purpose plant, all parts of this plant are useful for human life. From coconut trees, you can get food, beverages, industrial materials, building materials, household appliances. Coconut fruit can be utilized by processing it into copra, coconut oil, grated dry coconut, coconut coir fiber, shell charcoal, sap and coconut sugar, and nata de coco. Nira can be used as a healthy fresh drink, besides that it can also be used to make coconut sugar, vinegar, palm wine, jaggery, and others (Puspita, 2016).

According to Dyanti in Puspita (2016) Nira is a sweet liquid contained in the flowers of coconut plants whose shoots have not opened and are obtained by tapping. In general, people use coconut sap for the manufacture of coconut sugar. Making coconut sugar is an effort to increase farmers' income, even farmers' income is higher than selling fresh coconut when the price of coconut in the market is declining. Types of coconut sugar based on the

shape there are ant sugar, namely coconut sugar in the form of fine granules, printed sugar and shell sugar which are printed in small molds or in shells.

METHOD

Place and time of research

This research was conducted in Simpang Kiri District, Subulussalam City. Where the research area is determined purposively (purposive). This is based on the consideration that in this area most of the population is a producer of coconut brown sugar. Research implementation is planned from the end of November 2018 to February 2019.

Research Form

The form of this research is research using the census method. According to Sugiono (2012) Censusing is a sampling technique when all members of the population are used as samples. This is often done when the population is relatively small, less than 30 people, or research that wants to make generalizations with very small errors. Another term for a saturated sample is a census, where all members of the population are sampled.

Population and Sample

a. Population

The object in this research is society Mukti Makmur Village, Suka Makmur Village, and Makmur Jaya Villagewho are in ToSubulussalam City Simpang Kiri sub-district. The research location was determined because Simpang Kiri sub-district is a center for coconut brown sugar production in Subulussalam City. The population and sample in a study need to be determined with the aim that the research carried out actually gets the data as expected. Population is a set of data that has the same characteristics and becomes an object of inference. Inference statistics bases itself on two basic concepts, the population as all data, both real and imaginary, and the sample, as part of the population used to make inferences (approach/description) to the population from which it originates.

b. Sample

The definition of sample according to Sugiyono (2013) is part of the number and characteristics possessed by the population, samples taken from this population must be truly representative. Sample size is the number of samples to be taken from a population.

According to Arikunto and Suharsimi (2012) if the total population is less than 100 people, then the total sample is taken as a whole, but if the population is greater than 100 people, then 10-15% or 20-25% of the total population can be taken. Based on this research, because the total population is not greater than 100 respondents, the authors take 100% of the total population in Mukti Makmur Village, Suka Makmur Village, and Makmur Jaya Village, namely se much 21 peoplerepondents from the three villages. Thus the use of the entire population without having to draw a research sample as a unit of observation is referred to as a census technique.

Data collection technique

There are 2 (two) types and sources of data used in this study, namely:

1. Primary Data, namely data obtained directly from the source. This data was obtained by conducting interviews and a list of questions to coconut brown sugar entrepreneurs who were used as research objects.
2. Secondary data is obtained from literature studies, research centers, scientific journals, statistical agencies, research results or previous studies and other data sources.

Data analysis method

Data collected in the field and tabulated are then transferred to a tabular form according to the needs of the analysis. For hypothesis testing tested with cost and profit analysis.

RESULTS AND DISCUSSION

Research Results

Production Cost Analysis of Coconut Brown Sugar

Production costs include fixed costs and variable costs. Fixed costs are the cost of equipment depreciation and variable costs include raw material costs, labor costs and supporting material costs. Fixed costs are a type of cost incurred in one production process that is fixed in amount and does not change. In carrying out the coconut brown sugar production process, the fixed costs include the depreciation of the equipment used, which is calculated based on the economic life of each equipment. Variable costs are costs incurred in the production process depending on the size of the production produced. Variable costs include costs used to purchase raw materials (coconut juice), labor, lime, firewood, sugar, cardboard, plastic rope and duct tape.

Fixed Costs of Palm Sugar Business

Fixed costs are costs whose total amount remains within a certain range of activity volume and depends on the type of business activity. Fixed costs in the coconut brown sugar business are the cost of depreciation of equipment.

The cost of tools and equipment in one processing of coconut brown sugar in Simpang Kiri District, Subulussalam City during the production period (1 month) is an average of Rp. 29,350.57 per business per month. Depreciation costs are presented in table 1 as follows.

Table 1. Equipment Depreciation Costs During the Production Period (1 month)

Jenis Alat	Harga (Rp)	Unit	Usia Teknis	Biaya Penyusutan			Persentase (%)
				Penuh	1 Bulan	1 Hari	
Parang	50,870	1	3	50,870	1,392.86	46.43	4.75
Wajan	376,087	1	5	376,087	6,379.06	212.64	21.73
Batu asah	11,739	1	1	11,739	978.26	32.61	3.33
Tungku	172,609	1	3	172,609	4,794.69	159.82	16.34
Susuk wajan	25,348	1	1	25,348	1,824.28	60.81	6.22
Gayung	14,826	1	1	14,826	1,176.67	39.22	4.01
Cetakan	24,043	1	1	24,043	1,763.19	58.77	6.01
Penyaring	15,000	1	1	15,000	1,250.00	41.67	4.26
Ember	26,913	1	1	26,913	1,842.26	61.41	6.28
Tong besar	68,261	1	4	68,261	1,321.55	44.05	4.50
Baskom	29,304	1	1	29,304	1,936.78	64.56	6.60
Jeregen	47,870	1	2	47,870	1,911.46	63.72	6.51
Keranjang	27,043	1	1	27,043	2,253.62	75.12	7.68
Terpal	10,217	1	2	10,217	525.90	17.53	1.79
	900,130			900,130	29,350.57	978	100

Source: Primary Data Processed, 2019

Based on table 1 above, it can be seen that in the production process to produce output is inseparable from costs. The cost itself can be interpreted as the value of all the unavoidable or necessary economic sacrifices, which are estimated and measurable to produce a production. Costs calculated in the coconut brown sugar processing business are classified into 2 (two) types, namely fixed costs and variable costs which are calculated during the production period (1 month).

Variable Cost of Palm Sugar Business

Variable costs are costs whose total changes in proportion to changes in the volume of activity. The variable costs of research on the coconut palm sugar business in Simpang Kiri District, Subulussalam City can be seen in table 2.

Table 2. Total Variable Costs of Coconut Brown Sugar Business for One Month.

Variabel	Harga (Rp)	Satuan	Jumlah (Rp)	Persentase (%)
Nira Kelapa (Liter)	3.000	414	1.241.739	7,63
Tenaga Kerja	7.255	3	19.874	0,12
Kapur gmbg	7.391	6	44.669	0,27
Kayu bakar	278.696	1	278.696	1,71
Gula pasir	9.800	1.480	14.508.261	89,12
Kardus (Kg)	1.304	76	98.904	0,61
Tali plastik	5.478	12	65.739	0,40
Lakban	10.522	2	21.043	0,13
Jumlah			16.278.925	100

Source: Primary Data Processed, 2019

Based on table 7 above, in the coconut palm sugar processing business in the Simpang Kiri sub-district, variable costs include production facilities (consisting of raw

materials for sap and supporting materials such as lime, sugar, firewood, cardboard, plastic rope and labban) and labor. The amount of production facilities and labor in the coconut brown sugar processing business during the production period (1 month) averages Rp. 16,278.925 per month.

Total Cost of Palm Sugar Business

The total cost of a business is the total cost, which consists of fixed costs and variable costs. Each business has a different total cost, where the total cost of a business is determined by the amount of fixed costs and variable costs in the coconut brown sugar business in Simpang Kiri District, Subulussalam City, which is the object of this research. The total cost of the business can be seen in the following table:

Table 3. Total Cost of One Month Brown Sugar Business.

Uraian	Total
Biaya Tetap (Rp)	29.351
Biaya Variabel (Rp)	16.278.925
Total Biaya (Rp/bulan)	16.308.276

Source: Primary Data Processed, 2019

Based on table 3 above, it can be seen that the use of total costs in the coconut brown sugar business in Simpang Kiri District, Subulussalam City is Rp. 16,308,276 per month from the sum of the total fixed costs and total variable costs.

Analysis of Palm Sugar Business Revenue

Revenue is the total value of products sold within a certain period of time multiplied by the selling price which is measured in rupiah units (Rp). Details of coconut brown sugar business income in Simpang Kiri District, Subulussalam City can be seen in table 4 below:

Table 4. Breakdown of Income from Palm Sugar Business (Rp/month)

Uraian	Total
Hasil Gula (Kg)	1.870
Harga Rata-rata Gula (Rp)	14.217
Total Pendapatan (Rp/bulan)	26.592.703

Source: Primary Data Processed, 2019

Based on table 4 above, it can be explained that total revenue is the product of the physical quantity and the price prevailing at that time. The table above shows the production of coconut brown sugar obtained by craftsmen during the production period (1 month) an average of 1,870 Kilograms per month, where the price prevailing at the time of the study was Rp. 14,217 per kilogram, then the income from the processing of coconut brown sugar is an average of Rp. 26,592,703 companies per month.

Analysis of coconut brown sugar business income

The profit is a reduction of the total income and the total costs incurred in the coconut brown sugar business in Simpang Kiri District, Subulussalam City. A business is said to be profitable if the total income received is greater than the total costs incurred. Details of the profits earned in the opaque cracker home industry business can be seen in table 5 below:

Table 5. Average income of Coconut Brown Sugar Business (Rp/month)

Uraian	Total
Hasil Gula (Kg)	1.870
Harga Rata-rata Gula (Rp)	14.217
Penerimaan (Rp)	26.592.703
Biaya - biaya	
- Biaya Tetap (Rp)	29.351
- Biaya Variabel (Rp)	16.278.925
Keuntungan (Rp/bulan)	10.284.428

Source: Primary Data Processed, 2019

Table 5 explains that the results of data processing on the coconut brown sugar business in Simpang Kiri District, Subulussalam City during the production period (1 month) the average total profit earned by coconut brown sugar craftsmen was Rp. 10,284,428 per month.

Break Even Point (BEP) Coconut Brown Sugar Business

BEP is a condition where the company does not make a profit and does not suffer losses. Calculation of Production Break Event (BEP) and Calculation of Price Break Event (BEP) can be seen below:

$$\text{Break event (BEP) Produksi (Kg)} = \frac{\text{Total Biaya}}{\text{Harga Jual}} = \frac{16.308.276}{14.217} = 1.147$$

$$\text{Break event (BEP) Harga (Rp)} = \frac{\text{Total Biaya}}{\text{Jumlah Produksi}} = \frac{16.308.276}{1.870} = 8.719$$

From the calculation above, it can be seen that the production BEP is 1,147 kg and the price BEP is Rp. 8.719. Meanwhile, the average value of coconut brown sugar business production in Simpang Kiri District, Subulussalam City is 1,870 Kg with a selling price of Rp. 14,217. It can be concluded that this amount is greater than the production BEP and price BEP, so this business is said to be profitable.

Return On Investment (ROI) of Palm Sugar Business

Return On Investment (ROI) is an analysis to see how much profit can be obtained from the total capital invested in a business.

$$\text{Return On Investment (ROI)} = \frac{\text{Laba Usaha (Rp)}}{\text{Modal Usaha (Rp)}} \times 100 \%$$

$$\text{Return On Investment (ROI)} = \frac{10.284.428}{16.308.276} \times 100\% = 63,06 \%$$

From the ROI calculation above, it can be seen that the ROI value obtained is 63.06%. This percentage shows that the coconut brown sugar business in Simpang Kiri District, Subulussalam City only gets 63.06% profit from the amount of capital issued for 1 month. This figure shows that the coconut brown sugar business in Simpang Kiri District, Subulussalam City, received a profit of IDR 63.06 for every IDR. 100 cost invested.

Revenue Cost Ratio (R/C Ratio)Coconut Brown Sugar Business

Every effort that is carried out aims to achieve profitable results. RC Ratio analysis is carried out to determine the extent to which the business is profitable in a certain period. The R/C Ratio value obtained from the coconut brown sugar business in Simpang Kiri District, Subulussalam City is 1.63, this value indicates that for every Rp. 1.00 of costs incurred, the brown sugar business will receive revenue of Rp. 1.63. R/C values can be seen more fully in Table 6.

The value of the R/C ratio is greater than 1, meaning that the coconut brown sugar business in Simpang Kiri District, Subulussalam City is profitable, because the revenue earned is greater than the costs incurred. Based on the R/C Ratio value obtained in the coconut brown sugar business, it can be said that the coconut brown sugar business is profitable.

Analysis of the Payback Period of Coconut Brown Sugar Business

Payback Period Analysis aims to determine the time required to cover the investment. Payback Period calculation can be seen below:

$$PP = \frac{\text{Investasi}}{\text{Keuntungan}} \times \text{tahun} = \frac{16.308.276}{10.284.428} \times 1 = 1,59$$

From the calculation above, it can be seen that the Payback Period of the coconut brown sugar business in Simpang Kiri District, Subulussalam City is 1.59 years. This value implies that the time needed to recover investment costs is 1.59 years.

Table 6. ROI Value, R/C Ratio and Payback Period of Coconut Brown Sugar Business

Uraian	Total
Hasil Gula (Kg)	1.870
Harga Rata-rata Gula (Rp)	14.217
Penerimaan (Rp)	26.592.703
Biaya Total (Biaya Tetap + Biaya Variabel) (Rp)	16.308.276
Keuntungan (Rp/bulan)	10.284.428
<i>Return On Investment</i> (ROI)	63,06
<i>Revenue Cost Ratio</i> (R/C)	1,63
<i>Payback Period</i> (PP)	1,59

Source: Primary Data Processed, 2019

Based on table 6 above, it can be seen that the return on investment is 63.06% while the Revenue Cost Ratio is 1.63% and the payback period is 1.59%. From the explanation above, the coconut brown sugar business is feasible.

CLOSING

1. The total production cost of the coconut brown sugar business in Simpang Kiri District, Subulussalam City, which is incurred by craftsmen for one month is Rp. 16,308,276 and an average profit of Rp. 10,284,428 and the average revenue is Rp. 26,592,925.
2. The coconut brown sugar business in Simpang Kiri District, Subulussalam City has a production BEP value of 1,147 Kg and a price BEP value of Rp. 8719, the ROI value is 63.06% and the R/C value is 1.63 so it can be concluded that the coconut brown sugar business in Simpang Kiri District, Subulussalam City is feasible to cultivate.

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AN IMPROVED CYBER SECURITY FRAMEWORK FOR EDUCATION INSTITUTIONS IN INDONESIA

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Abstract

One of the trends in the world of Education is Education technology. The COVID-19 pandemic forces us to accelerate using educational technology to keep the learning process in educational institutions around the world running. However, in adapting and using educational technology, it turns out that there is a factor of concern, namely cyber security. Because almost all educational technology platforms use the internet, cyber security is something that we inevitably have to deal with. Moreover, it turns out that during this covid19 pandemic, cybersecurity attacks have also increased along with the increase in the use of educational technology. Due to the high number of attacks and a large number of security holes in the Education technology platform adopted by educational institutions, So in this study, the authors will evaluate existing standards, models, and frameworks, identify fundamental and critical cybersecurity problems in several educational institutions in Indonesia, and propose a better security framework to address cybersecurity problems in educational technology in institutions.

Keywords: cyber security, educational technology, Security Framework

INTRODUCTION

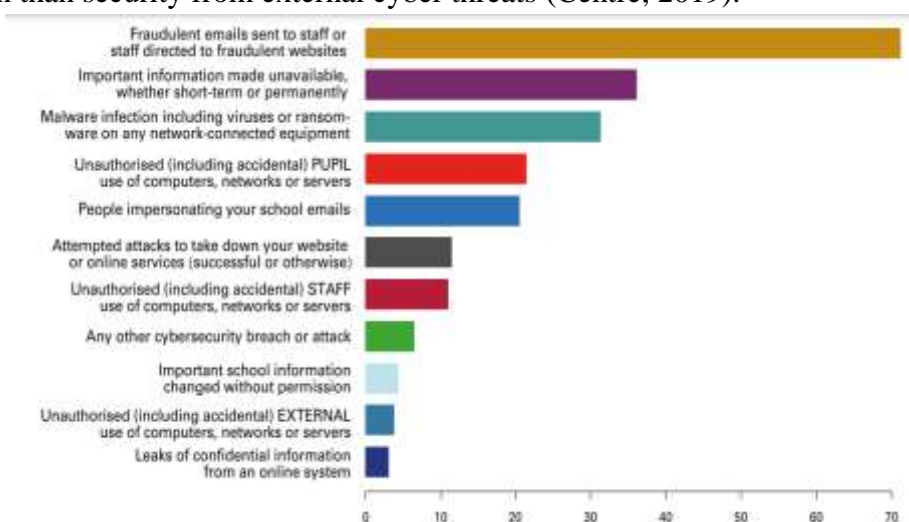
The public and the world of education were shocked by the emergence of the COVID-19 pandemic, which made technological developments change so fast. A tremendous impact was felt in the field of Education, which at the same time gave rise to several trends and issues. For education to continue to run well as it should, the world of education must adapt quickly to various factors that affect learning. Because by understanding trends and issues in the world of education can help educational institutions create learning environments, systems, and tools to support learning effectiveness.

At the beginning of 2020, it was reported that the development of internet use in Indonesia was very rapid. There were recorded active smartphone users connected to the internet, twice the number of internet users, which shows that the average Indonesian has two smartphones. In addition, the number of active social media users is 160 million, with a population increase of 1.1% from the previous year, followed by an increase in the number of internet users, smartphone users, and social media users (Kemp, 2020).

In this year of covid19, internet penetration and the use of information technology have increased compared to the previous year, increasing the potential for cyber-attacks. Educational institutions are one of the targets of cyber attacks because educational institutions contain valuable data that can be exploited. However, many educational institutions are currently not ready to face cyber-attacks because of the lack of awareness of educational institutions on cyber security, such as not understanding the procedures for dealing with various cyber attacks. Several critical issues on cyber security in educational institutions (Wijayanto & Kom, 2020) that is:

1. The high use of information technology and computers in universities increases the risk of cybercrime occurring in educational institutions.
2. Lack of knowledge of the importance of information data security and digital forensics in educational institutions.
3. Many educational institutions have not implemented Cyber Security Management Standards.

2017 to 2018 Joint Information Systems Committee (JISC) survey concluded that staff and students played a significant role in various cybercrime incidents (Goud, 2018). This happens because staff and students are direct users of technology in their respective educational institutions. In addition, Internet users are the most dangerous group in cybersecurity because they have access to various internal services that are less security concern than security from external cyber threats (Centre, 2019).



Source : (Centre, 2019)

LGfL (London Grid for Learning), in collaboration with NCSC (National Cyber Security Center), researched cyber security in 432 schools in the UK and produced several findings, namely (Centre, 2019) :

1. 97 percent of schools stated that losing access to IT services was a significant nuisance.
2. 35 percent of schools train their staff in cybersecurity.
3. 92 percent are aware of and welcome to support their non-IT staff with cybersecurity skills.
4. 83 percent of schools have experienced at least one cybersecurity incident. For example, 69 percent experienced phishing attacks and 35 percent experienced inaccessibility.
5. All schools have some security technology.
6. 98 percent of schools have antivirus and firewall protection.
7. Vigorous use of cybersecurity, such as mobile device management and two-factor authentication, is relatively infrequent.
8. 85 percent of schools have cybersecurity development rules and plans.
9. Less than 49 percent of schools stated that they were ready to accept cyber attacks.

Due to the high number of attacks and a large number of security holes in the Education technology platform adopted by educational institutions, So in this study, the authors will evaluate existing standards, models, and frameworks, identify fundamental and critical cybersecurity problems in several educational institutions in Indonesia, and propose a better framework to address cybersecurity problems in educational technology in institutions.

LITERATURE REVIEW

An essential aspect of the application of information systems is the development of security-related issues in information systems (Chaudhry et al., 2012). Helping network administrators perform their duties efficiently is a constantly researched and investigated problem along with technological developments. In addition, various security issues that need to be known and addressed at the technical and managerial level are a challenge in security issues in information systems (Sadowsky et al., 2003). One of the essential things in information system security is addressing a problem with appropriate precautions as early as possible.

Educational institutions, companies, and government bodies rely heavily on information systems to carry out daily activities in providing their products and services. With the increase in constraints on the information system, it will be a complex problem because it is in the essential system. Thus, the security of information systems is an essential function. This function must be managed and appropriately managed for the maintenance of various services. Good governance is one of them by implementing a proactive system when low costs also accompany problems. Thus, the governance of information system security has its own set of requirements, challenges, activities, and different types of rules (Bowen et al., 2006)

Security becomes a priority when information systems have been tampered with and hacked. Various forms of system destruction, such as spreading viruses, are carried out automatically in the system, while those responsible for information system security must take precautions manually. This is a form of weakness also in security governance (Oriyano, 2017). It all makes the world have to be more focused on securing information systems. Security measures should be taken appropriately to ensure there is no data leak. A comprehensive security framework must be created (Patil, 2008)

In the industrial sector, the blueprint of the company's architecture is a long-term strategy needed to develop information systems. It also serves to balance business and information technology and to add value to the company. One of its essential dimensions is security (Shen et al., 2009)

One example is the modern banking sector is a company increasingly dependent on the internet and information technology to operate its business and interact in its market. Threats, violations, and attacks on the banking world have increased in recent years. Attacks from inside and out have cost trillions of dollars a year to the business. Therefore, a proper framework is needed to organize and secure information systems. Furthermore, it is necessary to examine and compare general and specialized elements to design an optimal and efficient framework (Ula et al., 2011)

Security becomes even more attractive because it is a strategic issue that is even advisable to be removed from the IT domain and aligned with the corporate governance approach with the aim of a security framework designed to be appropriate and following their respective companies (A.A, 2013) IBM's IBM security framework and IBM Security Blueprint explore fears of threats to business systems and information technology. IBM's framework governs risk and cost governance, as well as compliance with business policies. It further demonstrates how these drivers can be translated into security capabilities and needs represented within the framework, enabling better enterprise security. Over the past few decades, industry groups and standards bodies developed frameworks that served as the basis for specific security aspects, and this IBM framework represents many frameworks in detail. To help organizations with their security challenges, IBM created a bridge to address the communication gap between business and security technical perspectives to enable simplification of thoughts and processes (Buecker et al., 2013)

Furthermore, one of the developments in the internet world is an information system based on cloud computing, and this architecture is trendy these days because it has many advantages. Cloud computing architecture is utilized primarily by colleges because, generally, colleges are limited to server resources. In addition, there are already several recommended frameworks for cloud computing such as the European Network and Information Security Agency (ENISA), Cloud Security Alliance (CSA), National Institute of Standards and Technology (NIST) (Negara & Andryani, 2014), Because of the crucial security issues of this information system, in addition to the framework, Intel formed a Security group that is a new business unit that collaborates with McAfee. This Emiratization focuses on accelerating the security of businesses and organizations from various security risks (Framework & Clear, 2014)

Securing sensitive data is becoming increasingly important for educational institutions. Information Security Management System (ISMS) is a systematic approach to establishing, implementing, operating, monitoring, reviewing, maintaining, and improving information security (Haufe et al., 2016). Although ISMS is formed from various existing security standards, it still has many shortcomings because it is considered not mature enough.

NIST and COBIT are commonly used as security references and even become the primary reference for designing new security (Stewart, 2016). In one of its publications, NIST states that organizational risks include many types of risks, such as program management risk, investment risk, legal liability risk, safety risk, inventory risk, supply chain risk, and security risk. Security risks associated with the operation and use of information systems are just one of the many components of an organization's risks handled by those responsible for the management of risks in an organization or company (Calumpang & Dilan, 2016)

The executive order assigns NIST to develop a framework for improving security in critical sectors to produce common standards that can be used by a variety of critical sector organizations and are critical to assessing and managing their security risks. This framework is designed to complement the organization's risk management processes and security programs. This framework applies broadly, regardless of size, industry, or security sophistication (Department of Defense, 2019)

Information security (IS) should be integrated into the governance of institutions and considered a governance challenge that includes adequate reporting, accountability, and risk management. The implementation of good information security governance (ISG) provides strategic alignment, risk management, resource management, performance measurement, and value delivery. Several publications have discussed this area. However, there has been no identified success determinant that ensures improvement across areas of effective governance. We need a framework of best practices across areas of effective IS governance that supports institutions to survive and thrive (Gashgari et al., 2017)

Most organizations recognize that security is essential to information system development, but business costs and performance often take precedence over security. Although security awareness is growing, most organizations focus on implementing security only at the commissioning stage of system development and trying to incorporate system security by force into the final design, resulting in the ineffective implementation of system security (CSA Singapore, 2017)

Research in security approaches, both technical and non-technical, continues. Due to the growing need for security, an alternative approach combines technical and non-technical methods. In this way, it is expected to find new, better ways to use (Koskosas, 2013)

Given the increasing and seriousness of cyberattacks, we must be aware of the need to stay one step ahead. The issuance of security frameworks aims to support regulated entities to have proper security governance and build a robust infrastructure together with the necessary controls and prevention. A framework that articulates proper control and provides guidance on how to assess maturity levels. The adoption and implementation of this framework is expected to enhance security (Saudi Arabian Monetary Authority (SAMA), 2017)

LITERATURE REVIEW

An essential aspect of the application of information systems is the development of security-related issues in information systems (Chaudhry et al., 2012). Helping network administrators perform their duties efficiently is a constantly researched and investigated problem along with technological developments. In addition, various security issues that need to be known and addressed at the technical and managerial level are a challenge in security issues in information systems (Sadowsky et al., 2003). One of the essential things in information system security is addressing a problem with appropriate precautions as early as possible.

Educational institutions, companies, and government bodies rely heavily on information systems to carry out daily activities in providing their products and services. With the increase in constraints on the information system, it will be a complex problem because it is in the essential system. Thus, the security of information systems is an essential function. This function must be managed and appropriately managed for the maintenance of various services. Good governance is one of them by implementing a proactive system when low costs also accompany problems. Thus, the governance of information system security has its own set of requirements, challenges, activities, and different types of rules (Bowen et al., 2006)

Security becomes a priority when information systems have been tampered with and hacked. Various forms of system destruction, such as spreading viruses, are carried out automatically in the system, while those responsible for information system security must take precautions manually. This is a form of weakness also in security governance (Oriyano, 2017). It all makes the world have to be more focused on securing information systems. Security measures should be taken appropriately to ensure there is no data leak. A comprehensive security framework must be created (Patil, 2008)

In the industrial sector, the blueprint of the company's architecture is a long-term strategy needed to develop information systems. It also serves to balance business and information technology and to add value to the company. One of its essential dimensions is security (Shen et al., 2009)

One example is the modern banking sector is a company increasingly dependent on the internet and information technology to operate its business and interact in its market. Threats, violations, and attacks on the banking world have increased in recent years. Attacks from inside and out have cost trillions of dollars a year to the business. Therefore, a proper framework is needed to organize and secure information systems. Furthermore, it is necessary to examine and compare general and specialized elements to design an optimal and efficient framework (Ula et al., 2011)

Security becomes even more attractive because it is a strategic issue that is even advisable to be removed from the IT domain and aligned with the corporate governance approach with the aim of a security framework designed to be appropriate and following their respective companies (A.A, 2013) IBM's IBM security framework and IBM Security Blueprint explore fears of threats to business systems and information technology. IBM's framework governs risk and cost governance, as well as compliance with business policies. It further demonstrates how these drivers can be translated into security capabilities and needs represented within the framework, enabling better enterprise security. Over the past few decades, industry groups and standards bodies developed frameworks that served as the basis for specific security aspects, and this IBM framework represents many frameworks in detail. To help organizations with their security challenges, IBM created a bridge to address the communication gap between business and security technical perspectives to enable simplification of thoughts and processes (Buecker et al., 2013)

Furthermore, one of the developments in the internet world is an information system based on cloud computing, and this architecture is trendy these days because it has many advantages. Cloud computing architecture is utilized primarily by colleges because, generally, colleges are limited to server resources. In addition, there are already several recommended frameworks for cloud computing such as the European Network and Information Security Agency (ENISA), Cloud Security Alliance (CSA), National Institute of Standards and Technology (NIST) (Negara & Andryani, 2014), Because of the crucial security issues of this information system, in addition to the framework, Intel formed a Security group that is a new business unit that collaborates with McAfee. This Emiratisation focuses on accelerating the security of businesses and organizations from various security risks (Framework & Clear, 2014)

Securing sensitive data is becoming increasingly important for educational institutions. Information Security Management System (ISMS) is a systematic approach to establishing, implementing, operating, monitoring, reviewing, maintaining, and improving information security (Haufe et al., 2016). Although ISMS is formed from various existing security standards, it still has many shortcomings because it is considered not mature enough.

NIST and COBIT are commonly used as security references and even become the primary reference for designing new security (Stewart, 2016). In one of its publications, NIST states that organizational risks include many types of risks, such as program management risk, investment risk, legal liability risk, safety risk, inventory risk, supply chain risk, and security risk. Security risks associated with the operation and use of information systems are just one of the many components of an organization's risks handled by those responsible for the management of risks in an organization or company (Calumpang & Dilan, 2016)

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METHOD

This chapter describes the design of research in this research for the achievement of research objectives. It starts by identifying the vital variables that affect cybersecurity in educational institutions obtained from previous research. Then the selected variables are made questionnaires containing questions to be given to respondents in educational institutions in Indonesia to find new variables or maybe even eliminate existing variables with quantitative methods, descriptive statistical data analysis. Vital variables are included in the next stage, namely verification, clarification, and validation by experts with qualitative methods to get recommendations in solving cybersecurity problems in educational institutions. The recommendations of these experts become the basis in the formulation of a model of improvement of cybersecurity frameworks in educational institutions to be made.

RESULTS AND DISCUSSION

The increasing access to various digital services in educational institutions will also increase the number of security vulnerabilities (Aldheleai et al., 2015; Salimovna, 2019). Furthermore, because of the COVID-19 pandemic, many educational institutions have just switched to using various technology services for education. However, they do not understand how important the safety factor is in the various technologies they adopt (Shivshankar & Paul, 2016). In addition, the main challenge of cybersecurity in various educational service technologies is the lack of attention to security itself (Adetoba B. T., 2016) and the security factor being something that is often overlooked (Besimi et al., 2009). Furthermore, although this cybersecurity issue is considered very important, the literature and references to research and investigate it are still insufficient (Savulescu et al., 2015). One of the success factors in implementing technology in educational institutions lies in cyber security itself (Abdul Majid et al., 2015). Not to mention that many systems, services, and technology for education are generally powerless when exposed to cyber-attacks (Derawi, 2015). This makes it a unique and significant challenge to research (Bandara et al., 2014; Jianming, 2007). Currently, cybersecurity in educational institutions is highly dependent on the role of humans. In addition, there is no systematic mechanism for testing cybersecurity vulnerabilities (Violettas et al., 2013), so specific techniques or mechanisms are needed to improve cybersecurity in educational institutions (Bhatia et al., 2018). This research will try to find the critical factors in cyber security in educational institutions from various technical and non-technical perspectives to formulate a framework for improving cyber security in educational institutions in Indonesia.

CLOSING

Conclusion

The phenomena in the field and the visible research gaps are very relevant to be explored further. The limitations of previous research on educational technology cybersecurity in educational institutions are the main background of this research. Because at this time, when humanity is preoccupied with handling the COVID-19 pandemic, it turns out that cyber security in educational institutions is one of the objects that are widely exploited for various purposes that are detrimental to educational institutions.

The massive increase in the exploitation of cybersecurity during the COVID-19 pandemic has become an exciting phenomenon. This phenomenon will be observed to obtain several essential factors for designing and formulating a new cybersecurity framework in Educational Institutions.

Research and testing will be carried out in several educational institutions in Indonesia that have adopted various educational technologies in their educational institutions. The initial stage of the research is to identify and validate various cyber security factors from previous research and from the survey results to be conducted. Furthermore, it was followed by conducting a follow-up survey to experts in the field of cyber security.

This research is expected to obtain new findings theoretically and practically, which can be implemented in the framework of proposed improvements, and ends with a brief discussion about the importance of this research to provide input for further research.

The contents of the bibliography are written in Times New Roman 12 font and written with 1.15 spaces. The bibliography is a source of reference/reference which is used as a reference for manuscript writing. Writing a bibliography is a source of reference/reference that is used as material for citations to writing manuscripts. Writing a bibliography uses the rules of The Chicago Manual of Style (CMS). The number of reference sources used as a manuscript bibliography is at least 10 titles of scientific literature (80% primary references, and 20% secondary references). Primary reference sources, such as: journals, research reports, theses, teris, dissertations, and proceeding papers. Secondary reference sources, such as: books and internet sources. We recommend writing citations using the Mandeley reference manager application

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