JURNAL ILMIAH MANAJEMEN DAN BISNIS

Journal Ilmiah Manajemen dan Bisnis ISSN 2460-8424
Volume 10, No. 2, July 2024, 171-185 E-ISSN 2655-7274

Implementation of Association Rule Market Basket Analysis to Increase Sales Through Product Bundling Strategy at the Fashion Online Store

Arga Buana[1], Resista Vikaliana[2*]
Universitas Pertamina, Indonesia
Email: resista.vikaliana@universitaspertamina.ac.id

Abstract

Athaku Online Store is an online store that sells baby clothes and children's t-shirts by offering free design of images and writing on the products. The increase in the number of online stores has caused competition between online stores to become tighter, so that online stores need to develop business strategies by paying attention to consumer behaviour (Customer Relationship Management) which can be used as a basis to increase sales through product bundling strategies. The goal to be achieved in this research is to get an overview of the associations between products which will be used as a basis for making product recommendations to increase sales at the Athaku Online Store using data mining, namely association rules using an a priori algorithm. By collecting transaction data by consumers starting from January 1 to 30 September 2022 with a total of 4,229 transactions, analysis of the transaction data was carried out using a minimum support value of 0.15 and a minimum confidence value of 0.5 so that the results were obtained, namely 3 product association rules, which then validated the recommendations. by distributing questionnaires to 30 consumers of the Athaku online store. The product association rules that have been validated can be used as a basis for determining product bundling strategies in the Athaku online store. From the research results, it is known that there is an opportunity to increase sales for three products, namely Jumpers, Bloomers, and Bibs.

Article info
Article history:
Received :7 April 2024
Received in revised form 30 June 2024
Accepted: 15 July 2024
Available online: 31 July 2024

Keywords*:* Data Mining, Association Rule, Apriori Algorithm, Marketing Strategy

How to Cite: Buana, A. & Vikalina, R. (2024). Implementation of Association Rule Market Basket Analysis to Increase Sales Through Product Bundling Strategy at the Fashion Online Store. *Jurnal Ilmiah Manajemen dan Bisnis*, 10 (2), 171-185.

INTRODUCTION

The rapid advancement of technology, particularly the internet, has significantly altered human shopping behaviors with the emergence of e-commerce. Internet facilities serve as crucial tools for accessing information, communicating, and conducting electronic transactions, thereby becoming an integral part of daily life, both at home and in the workplace. One notable aspect of this transformation is the realm of shopping, where individuals have increasingly turned to online platforms, known as e-commerce, for their purchasing needs. In recent years, Indonesia has witnessed a remarkable surge in e-commerce growth, indicating a substantial increase in online transactions from 2014 to 2021.

Fashion products have emerged as one of the most popular categories in e-commerce, offering lucrative business opportunities for manufacturers to tap into online markets. Despite the benefits, e-

commerce faces challenges in maximizing sales potential. For instance, Online Store Athaku predominantly relies on social media channels for sales, indicating a need for strategies to enhance e-commerce performance. Hence, the adoption of data mining techniques becomes imperative to address this issue effectively. The objective of this research is to enhance sales at Online Store Athaku through a bundling strategy based on market basket analysis using the apriori algorithm. This approach aims to understand consumer purchasing patterns and implement strategies to optimize e-commerce sales. An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

Problem Formulation

Based on the background provided, the research problem in this study is to observe consumer behavior during purchase transactions and identify opportunities to enhance existing business strategies by implementing the Customer Relationship Management (CRM) concept. Therefore, a model utilizing data mining with the apriori algorithm is necessary to obtain association models among products sold at Online Store Athaku.

Objectives

The aim of this research is to obtain an understanding of the associations among products, which will be utilized as a foundation for generating recommendation products to enhance sales at Online Store Athaku.

Benefit Of Research

The research yields the following benefits:

- For Online Store Athaku, this study applies the Association Rule method as a useful tool for implementing bundling strategies and utilizes market basket analysis as a data mining technique to enhance sales by better understanding customer purchasing patterns.
- For the authors, this research provides new insights into association rules within the scope of MSME products. Additionally, it serves as a reference for association rule applications using market basket analysis in future research endeavors.

Problem Limitations

The scope of this research, used as limitations and assumptions, is as follows:

- Data collection and observations are conducted at Online Store Athaku.
- The data used in this study consist of sales transaction data over a period of 9 months, from January 1, 2022, to September 30, 2022.
- The bundling strategy mechanism to be offered is "same size."

Assumptions

The assumptions in the implementation of this research are as follows:

- There are no changes in the types of product variations sold by Online Store Athaku during the data collection period.
- The use of a minimum support value of 0.15 and a minimum confidence value of 0.5 is based on similar research to this study.

- The current sales strategy employed by Online Store Athaku is a single-item product discount strategy.

REVIEW OF LITERATURE

Data Mining

Data mining is a technique used to discover interesting patterns and knowledge from large datasets. Essentially, it transforms large amounts of data into useful information. It encompasses various fields such as databases, machine learning, artificial intelligence, and statistics, hence also known as Knowledge Discovery in Database (KDD). The KDD process involves several stages, beginning with nontrivial extraction of implicit information from databases to generate new knowledge (Agusta, 2007). The stages of the KDD process are as follows:

1) Data cleaning involves removing irrelevant or inconsistent data from the actual dataset, correcting extraction errors to ensure the continuation of the data mining process.
2) Data integration is the merging of multiple data sources to reduce inconsistencies and redundancies in the generated data.
3) Data selection involves analyzing relevant data sourced from databases such as data warehouses, operational data, data marts, or transactional data, extracted based on necessity.
4) Data transformation involves converting heterogeneous data from different sources into a uniform format through techniques such as discretization, normalization, and hierarchy concepts.
5) Data reduction aims to compress, reduce the number, and dimensions of data containing random variables by replacing existing data with smaller values and analyzing principal components by transforming correlated variables into new ones.
6) Data mining is the application of methods to process patterns in data, sourced from databases, data warehouses, or web scraps. Methods in data mining include classification, association, and clustering techniques.

Association Rule

Association rule is a data mining technique aimed at identifying groups of items that frequently occur together (Agrawal, Imieliński, & Swami, 1993). It utilizes rules to identify relationships or patterns among items in transactional data, making it a key technique in data mining for uncovering associations between items using parameters such as support, confidence, and lift to gauge the strength of relationships between two items in transactional data. The parameters used in association rule to understand item relationships include:

- Support, which measures the frequency of an itemset appearing in all transactions in the database.
- Confidence, indicating the certainty or strength of the association between items in an association rule. Additionally, association rule can be used to discover patterns beneficial for businesses, such as identifying relationships between frequently purchased food items by customers in a store. By understanding these patterns, companies can make more informed decisions and improve business performance. In general, association rule is a useful technique for discovering patterns in

transactional data that can be used to predict business needs or trends, enabling companies to make informed decisions and enhance business performance.

Apriori Algorithm

The Apriori algorithm is a technique used in data mining to uncover patterns or relationships within transactional data. It is renowned for identifying frequently occurring itemsets using association rule techniques (Pracoyo & Seniwati, 2016). This method leverages the "apriori" principle, suggesting that items frequently purchased together are likely to continue appearing together in the future. Employing the Apriori algorithm for association rule decision-making necessitates setting minimum support and confidence values (Gama, Putra, & Bayupati, 2016). Two significant stages in the Apriori algorithm include:

- Join: This stage involves combining items until no further combinations can be formed.
- Pruning: Here, combinations failing to meet the predefined minimum support threshold are eliminated.

Several concepts utilized in the Apriori algorithm include:

- Support: It represents the probability of consumers purchasing various products together in all transactions. The support for the "X=>Y" rule denotes the probability of attributes X and Y occurring together. The support value is calculated using the formula:
  Support (A) = (Number of Transactions containing A and B) / (Total Transactions) × 100%
- Confidence: It signifies the probability of purchasing various products together, with one product being bought among them. For instance, items A and B with a confidence value of 80% imply that if a consumer buys item A, there's an 80% certainty they'll also buy item B. The confidence value is calculated using the formula:
  Confidence (A) = (Number of Transactions containing A and B) / (Total Transactions A) × 100%
- Other concepts include Minimum Support, Minimum Confidence, Itemset, Frequent Itemset, Support Count, Candidate Itemset, Combination of 2 Itemsets (F2), K-itemset, and Lift, with corresponding formulas and explanations provided.

Customer Relationship Management (CRM)

Customer Relationship Management (CRM) is an approach aimed at maintaining customer loyalty and providing maximum service to consumers. In a company setting, CRM aims to deliver the best service to customers and ensure their satisfaction according to their needs. This is based on consumer patterns, enabling companies to offer tailored deals, services, and programs (Kotler & Keller, 2008). CRM entails a series of strategic processes to support competition, provide value to both consumers and producers, and develop profit strategies (Alipour, Idris, Ismail, & Karimi, 2011). It involves engaging with customers to enhance their value and foster loyalty continuously (Temporal & Trott, 2001). Thus, CRM fosters customer collaboration to find optimal solutions by enhancing consumer value continually, aiming to secure customer loyalty. There are four main types of CRM:

1) Strategic CRM focuses on developing a company culture that prioritizes customers, aiming to maintain and win better value than competitors.

2) Operational CRM deals with specific business functions like marketing, customer service, and sales.
3) Analytical CRM involves activities such as discovering, storing, extracting, processing, interpreting, and reporting customer data for analysis based on strategic and tactical needs.
4) Collaborative CRM involves communication using technology to maximize value for the company, partners, and customers (Buttle, 2009).

Lemeshow

When employing survey methods for data collection, it's crucial to determine the sample size. The Lemeshow formula is a statistical test used to determine sample size in populations with unknown distributions (Lemeshow & David, 1997). The Lemeshow formula is as follows:

n = (z^2 1 − α/2 P(1 − P))/d^2)

Where:

n = Required sample size

Z = Confidence level

P = Proportion level

d = Precision level.

The standard confidence level used is typically 95% in statistical tests (Sugiyono, 2013). The formula calculates the standard error of the mean, where Z represents the number of standard errors.

Bundling Strategy

Bundling involves combining two products into a single package at a specific price, typically more economical than the total price of the individual products if purchased separately (Royan & Frans, 2004). Additionally, bundling serves as a marketing practice where two or more products or services are offered together in a special package (Guiltinan, 2013).

In summary, bundling is a technique used by companies to offer multiple products simultaneously to customers in one package. Bundling usually entails combining products frequently purchased together or those that provide additional value to each other. By offering products in a bundled package, customers receive greater benefits and value from their purchase, thus becoming more interested in buying.

RESULTS AND DISCUSSION

Problem Description

Online Store Athaku offers custom-designed baby clothing through its website and e-commerce platform, providing customers with the convenience of online transactions. Despite the benefits it offers, the business faces challenges, particularly intense competition in the e-commerce industry. The emergence of new companies offering similar products or services has heightened competition and put pressure on product prices. To address this, Online Store Athaku needs to offer high-quality and appealing products to customers, along with promotional packages. This can be achieved by enhancing sales strategies through product bundling tactics.

Data Collection

Data collection involves the process of acquiring necessary data for this study, obtained from Online Store Athaku. The data used comprises sales transactions from January 2022 to September 2022, including attributes such as product names, product codes, and quantities. On average, Online Store Athaku conducted 470 transactions per month through its e-commerce platform. These data were compiled in .csv format, with product codes provided. Product codes simplify data processing, representing the names of products sold by Online Store Athaku.

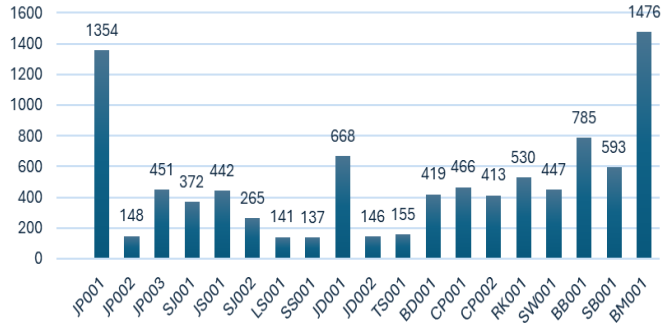

Figure 1. Sales Frequency

In Figure 1, the frequency of product sales via e-commerce channels from January to September 2022 is depicted. Among the 19 products sold, some are notably more popular, serving as criteria for strategic decisions to enhance sales.

The Customer Portfolio comprises general consumer data in the business. Based on transaction data, insights into consumer behaviour, such as the number of products purchased and the purchasing method, were obtained. Analysis reveals that consumers made transactions ranging from purchasing a minimum of 1 item to a maximum of 6 items. Specifically, there were 1,713 transactions involving the purchase of one item and 2,516 transactions involving the purchase of multiple items, accounting for 59.6% of the total 4,229 transactions. This indicates a tendency among Online Store Athaku customers to purchase multiple products in a single transaction, suggesting potential product bundling opportunities. The customer portfolio of Online Store Athaku is visually represented in Figure 2.

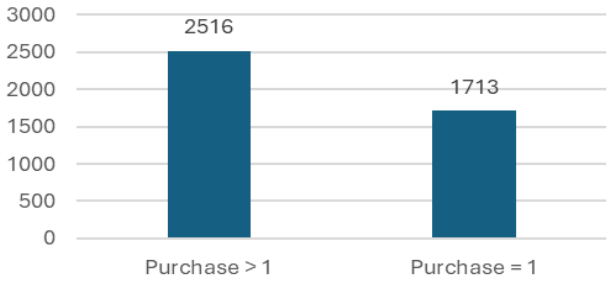

Figure 2. Customer Portofolio

Based on Figure 2, pattern association mining can be conducted on sales transaction data, given the prevalence of consumers purchasing multiple products. Additionally, product purchases were made through e-commerce platforms such as the website, Shopee, Tokopedia, among others.

Data Processing

Data processing involves the processing of collected data to generate association patterns using the association rule method and the apriori algorithm. The data, in .csv format.

The following are the steps in processing data using association rules:

1) Data cleaning and integration involve removing missing or inconsistent data due to input errors and integrating data from various sources to reduce inconsistencies and data redundancy. In this study, cleaning is unnecessary as the sales transaction data obtained from Online Store Athaku are complete, and integration is not required as the data comes from a single source, ensuring consistency and no redundancy.
2) Data selection and transformation: In a transaction, there are repeated product codes; hence, only one product code is included to eliminate redundant data. Additionally, data transformation involves using a single product code to represent the sold items in sales transaction data.
3) Data mining entails processing the required data attributes, which are the product codes sold in each transaction. Based on sales transaction data through e-commerce channels, consumers purchased a minimum of 1 and a maximum of 6 products in a single transaction. Thus, data with a minimum of 2 product items per transaction were used to identify association patterns among product items. The focus of this study is to find associations among items; therefore, data with only one product item sold were not used. The transaction data input into the Jupyter Notebook application can be seen in Table 1.

Table 1. Transaction Data

Transaksi	Produk 1	Produk 2	Produk 3	Produk 4	Produk 5	Produk 6
1	JP003	BM001	BB001	SW001		
2	JD001					
3	SJ002					
…						
19	JP001	BM001	BD001	JP003	BM001	
…						
28	JP003	BM001	SB001	JP001	CP001	BD001
…						
4228	TS001	BM001	BD001			
4229	JP003	RK001				

4) Validation of rule results is performed by calculating the lift value for each rule.
5) Validation of recommendations is carried out through a survey, where an online questionnaire is distributed and subsequently analyzed using the SPSS application. SPSS is used to measure and produce valid data by conducting validity and reliability tests, simple linear regression analysis, and t-tests.

The values of minimum support and minimum confidence are determined by the user. Previous similar studies used a minimum support of 0.15 (15%) and a minimum confidence of 0.5 (50%), resulting in 2 rules. This choice of minimum support and minimum confidence was deemed sufficient for obtaining quality rule results. Higher support and confidence values lead to fewer rules generated but higher accuracy. Therefore, for this study, a minimum support of 0.15 (15%) and a minimum confidence of 0.5 (50%) were selected.

The apriori algorithm is employed in utilizing association rule techniques to process sales transaction data from Online Store Athaku. This is done to derive rules regarding the association among product items in the transaction data. By using the predetermined minimum support and minimum confidence values, rule results for products were obtained and are presented in Table 2.

Rules Results

The results of the data processing are presented in the table below:

Table 2. Rules Results

No	Antecedents	Consequents	Support	Confidence	Lift
1	BM001	JP001	0.276917	0.506541	1.020787
2	BB001	BM001	0.182360	0.596879	1.091820
3	BB001	JP001	0.162495	0.531860	1.071810

Based on Table 2, it is observed that there are 3 rules generated from the data processing. In Table 2, there are 4 attributes in the data processing results, which are explained as follows:

1) Antecedents are the "if" components.
2) Consequents are the "then" components. Both antecedents and consequents represent products from Online Store Athaku.
3) Support is the probability of an itemset occurring in all transactions.
4) Confidence is the probability of purchasing a set of items together; if item A is purchased, item B will also be purchased.
5) Lift is the validation measurement of a generated rule. A rule is considered valid if the lift value is greater than one.

The explanations of the results in Table 2 are as follows:

1) Antecedents BM001 and consequents JP001 with a support of 0.27 (27%) and confidence of 0.50 (50%) indicate that 27% of all transaction data containing items BM001 and JP001 are purchased together by customers, and 50% of customers who purchase item BM001 will also purchase item JP001. The resulting lift is greater than 1, specifically 1.02, indicating validity based on support and confidence. Therefore, rules with antecedents BM001 and consequents JP001 can be recommended for implementation in Online Store Athaku.
2) Antecedents BB001 and consequents BM001 with a support of 0.18 (18%) and confidence of 0.59 (59%) suggest that 18% of all transaction data containing items BB001 and BM001 are purchased together by customers, and 59% of customers who purchase item BB001 will also purchase item BM001. The resulting lift is greater than 1, specifically 1.09, indicating validity based on support and confidence. Therefore, rules with antecedents BB001 and consequents BM001 can be recommended for implementation in Online Store Athaku.
3) Antecedents BB001 and consequents JP001 with a support of 0.16 (16%) and confidence of 0.53 (53%) explain that 16% of all transaction data containing items BB001 and JP001 are purchased together by customers, and 53% of customers who purchase item BB001 will also purchase item JP001. The resulting lift is greater than 1, specifically 1.07, indicating validity based on support and

confidence. Therefore, rules with antecedents BB001 and consequents JP001 can be recommended for implementation in Online Store Athaku.

Validation Of Recommendations

Validation is a crucial stage in assessing the accuracy of the established model by comparing the association model results with the field conditions. The selection of survey methods for validating the results is driven by the need for faster turnaround time and cost-effectiveness (Rojabi, 2019).

Therefore, the validation of recommendations is conducted with the aim of understanding the acceptance of rules, which are bundling product recommendations from Athaku Online Store, by consumers. The survey process involves several steps (Adiyanta, 2019):

1) Determining the number of respondents for the survey. The minimum number of respondents needed is calculated using the Lemeshow formula. In this study, the Lemeshow formula is utilized to determine the required sample size, resulting in 30 respondents.
2) Identifying respondent characteristics. In this research, the respondents are consumers of the Athaku Online Store.
3) Designing survey questions regarding purchasing decisions related to the bundling product promotion strategy. Likert scale is employed for questionnaire responses to measure attitudes and opinions. The Likert scale consists of 5 indicators ranging from strongly disagree (score 1) to strongly agree (score 5). The questionnaire is designed based on a conceptual framework for the survey, as depicted in Figure 3.

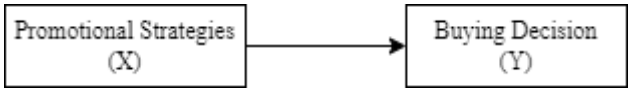

Figure 3. Survey Conceptual Framework

4) Gathering responses from respondents who have completed the survey based on the bundling product promotion strategy (X) and purchasing decision variables (Y). The responses are compiled and analyzed using SPSS software to assess validity, reliability, simple linear regression, and partial tests (t-tests).

In this study, classical assumption tests are not conducted because they are primarily used for multiple linear regression analysis. As the research employs simple linear regression with only one independent variable (the bundling product promotion strategy), the analysis focuses on simple linear regression tests.

Validity Test

Validity testing is an essential process to assess the validity of collected data, whether it be instruments or statements (Sugiyono, 2013). In this study, the validity of the bundling product strategy variable (X) and the purchasing decision variable for bundling products (Y) is examined by calculating the total scores from the questionnaires provided to each respondent.

Validity testing is conducted using SPSS software, comparing the calculated r value with the significant r table value, which is set at 5% or 0.05 (Ghozali, 2005). A value is deemed valid if the calculated r value is greater than the table r value, with a sample size of 30, yielding a value of 0.361.

The results of the validity test for the bundling product strategy variable (X) and the purchasing decision variable (Y) are depicted in Figures 4 and 5.

Correlations

		X1	X2	X3	X4	X5	Total
X1	Pearson Correlation	1	.471**	.048	.374*	.395*	.636**
	Sig. (2-tailed)		.009	.802	.042	.031	.000
	N	30	30	30	30	30	30
X2	Pearson Correlation	.471**	1	.582**	.675**	.561**	.891**
	Sig. (2-tailed)	.009		.001	.000	.001	.000
	N	30	30	30	30	30	30
X3	Pearson Correlation	.048	.582**	1	.457*	.120	.600**
	Sig. (2-tailed)	.802	.001		.011	.527	.000
	N	30	30	30	30	30	30
X4	Pearson Correlation	.374*	.675**	.457*	1	.519**	.803**
	Sig. (2-tailed)	.042	.000	.011		.003	.000
	N	30	30	30	30	30	30
X5	Pearson Correlation	.395*	.561**	.120	.519**	1	.726**
	Sig. (2-tailed)	.031	.001	.527	.003		.000
	N	30	30	30	30	30	30
Total	Pearson Correlation	.636**	.891**	.600**	.803**	.726**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 4. Test The Validity Of Promotional Strategies (X)

In Figure 4, the validity test results for the bundling product strategy variable (X) show that the calculated r value is equal to the total person correlation, which is then compared with the table r value.

Correlations

		Y1	Y2	Y3	Y4	Y5	Total
Y1	Pearson Correlation	1	.717**	.557**	.528**	.404*	.799**
	Sig. (2-tailed)		.000	.001	.003	.027	.000
	N	30	30	30	30	30	30
Y2	Pearson Correlation	.717**	1	.672**	.608**	.655**	.918**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	30	30	30	30	30	30
Y3	Pearson Correlation	.557**	.672**	1	.441*	.262	.731**
	Sig. (2-tailed)	.001	.000		.015	.163	.000
	N	30	30	30	30	30	30
Y4	Pearson Correlation	.528**	.608**	.441*	1	.606**	.790**
	Sig. (2-tailed)	.003	.000	.015		.000	.000
	N	30	30	30	30	30	30
Y5	Pearson Correlation	.404*	.655**	.262	.606**	1	.748**
	Sig. (2-tailed)	.027	.000	.163	.000		.000
	N	30	30	30	30	30	30
Total	Pearson Correlation	.799**	.918**	.731**	.790**	.748**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 5. Test the Validity of Buying Decision (Y)

In Figure 5, the validity test results for the purchasing decision variable (Y) also show that the calculated r value is equal to the total person correlation, which is then compared with the table r value.

Table 3. Validity Test Results

Indikator	r Count	r Table	Results
X1	0.636	0.361	Valid
X2	0.891		Valid
X3	0.600		Valid
X4	0.803		Valid
X5	0.726		Valid
Y1	0.799		Valid
Y2	0.918		Valid
Y3	0.731		Valid
Y4	0.790		Valid
Y5	0.748		Valid

Based on the conclusion drawn from the validity test results in Table 3, it is evident that variables X and Y are valid, as the calculated r values are greater than the table r value of 0.361. Thus, it can be concluded that the statements based on the indicator variables created and distributed to respondents via the questionnaire are measurable.

Reliability Test

Reliability testing serves as a key indicator for assessing questionnaire measurements comprising various variables. The final stage of reliability testing involves measuring the levels of prediction, consistency, stability, and accuracy (Sugiyono, 2013). Reliability testing measures the consistency of respondents in answering questions on the questionnaire. A study can be deemed reliable if the alpha value is greater than the crisis value (0.60) with df = N-2 and a significance level of 5% (Gama, Putra, & Bayupati, 2016). Conversely, a study is considered unreliable if the alpha value is less than the crisis value (0.60) with df = N2 and a significance level of 5%. The results of the reliability test can be seen in Figures 6 and 7.

In Figure 6, the reliability test results for the bundling product strategy variable (X) are depicted.

Cronbach's Alpha	N of Items
.760	5

Figure 6. Promotional Strategy Reliability Test Results (X)

In Figure 7, the reliability test results for the purchasing decision variable (Y) are shown.

Cronbach's Alpha	N of Items
.853	5

Figure 7. Buying Decision Reliability Test Results (Y)

Based on the results in Table 4, it is evident that the Cronbach's Alpha values are greater than the alpha values, indicating that variables X and Y are reliable.

Table 4. Reliability Test Results for Variables X and Y

No	Variable	*Cronbach's Alpha*	*Alpha Values*	Results
1	Promotional Strategy Reliability Test Results (X)	0.760	0.60	Reliabel
2	Buying Decision Reliability Test Results (Y)	0.853	0.60	Reliabel

Simple Regression Linear Test

Simple linear regression testing is a measure of the dependency relationship between variable X and variable Y (Sugiyono, 2013). The results of the regression test on variables X and Y using SPSS software are presented below.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160.047	1	160.047	256.757	.000[b]
	Residual	17.453	28	.623		
	Total	177.500	29			

a. Dependent Variable: Y

b. Predictors: (Constant), X

Figure 8. Regression Test for Variables X and Y

In Figure 8, the regression test results for variables X and Y are displayed. Based on Figure 8, it can be concluded that the calculated F value is 256.757 with a significance level of 0.00 < 0.05. Therefore, the regression model can be used to predict participation or influence the bundling product promotion strategy (X) and the purchasing decision of bundling product (Y). In this study, a significance level of 0.05 is used because it is not research requiring the smallest possible error rate, such as studies on human health where it may affect someone's life. With a significance level of 5% or 0.05, errors that may occur in the sample can be accepted up to 2 respondents out of 30 respondents.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.950[a]	.902	.898	.790

a. Predictors: (Constant), X

Figure 9. Regression Model Results

In Figure 9, the results of the regression model indicate that the correlation value (R) between bundling product promotion strategy and purchasing decision of bundling product is 0.950. Additionally, the R square value is 0.902, meaning that the bundling product promotion strategy (X) contributes 90.2% to the purchasing decision of bundling product (Y). Thus, 9.8% of consumer purchasing decisions are influenced by factors other than those analyzed in this research.

O-Test

The t-test is a measurement of the significance of a regression model in research for each variable partially, namely the independent variable in the form of bundling product promotion strategy and the dependent variable in the form of the purchasing decision of bundling product. The results of the t-test using SPSS software can be seen in Figure 10.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.683	1.268		-.539	.594
	X	.991	.062	.950	16.024	.000

a. Dependent Variable: Y

Figure 10. T-test results

Based on Figure 10, the t-test results are obtained where the dependent variable is influenced by the independent variable if the calculated t value > t table. The calculated t value can be seen in Figure 4.10, which is 16.024, while the t table value is 2.048, meaning that there is a positive and significant influence between the bundling product promotion strategy and the purchasing decision of bundling product.

Recommendation Validation Analysis

After conducting various statistical tests on the bundling product promotion strategy and the purchasing decision of bundling product variables using SPSS software, it is found that they have a positive and significant influence on consumer interest in purchasing bundling products. If the recommendations offered to consumers by Online Store Athaku become more suitable, the chances of increasing e-commerce sales will also be higher. Consequently, it can also increase the revenue of Online Store Athaku. Below is the percentage of respondents' responses to the bundling product promotion strategy and the purchasing decision of bundling product.

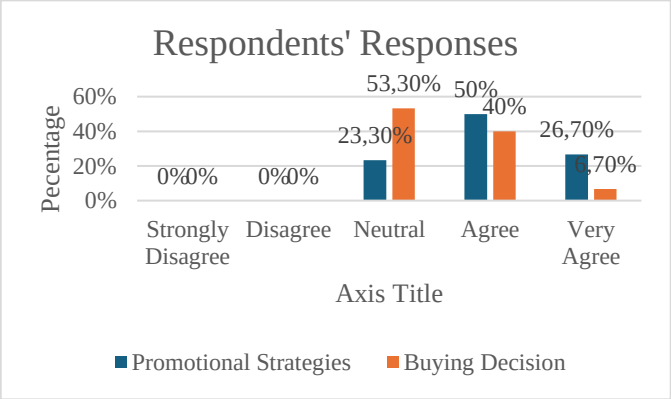

Figure 11. Respondents' Responses

As seen in Figure 11, the percentages obtained from the total scores of respondents are categorized into intervals and show that 50% of respondents agree with the recommended bundling product promotion strategy, and 40% agree to purchase the bundled product. Meanwhile, 26.70% of respondents strongly agree with the recommended bundling product promotion strategy, and 6.70% strongly agree to purchase the bundled product. Thus, based on the respondents' responses, it can be concluded that the respondents are relatively in favor of the bundling product promotion strategy and relatively agree to purchase the recommended bundling products.

Managerial Implications

Based on the research findings, three bundling products have been identified as recommendations for marketing strategies in e-commerce sales channels: Bloomers (BM001) and

Jumper (JP001), Bibs (BB001) and Bloomers (BM001), and Bibs (BB001) and Jumper (JP001). Sales potential is noted for these bundled products, including Bloomers (BM001), Jumper (JP001), and Bibs (BB001). These findings stem from several statistical tests conducted on the bundling product promotion strategy and the purchasing decision of bundled products variables. The promotion strategy significantly influences consumer purchasing decisions, indicating consumer interest in the offered bundled products through e-commerce channels. Therefore, it is reasonable for Online Store Athaku to implement a marketing strategy involving the recommended bundled product promotion to enhance sales in e-commerce channels.

CONCLUSION

The research conducted on Online Store Athaku aims to establish an association model among product items to serve as the basis for recommending bundled products while observing customer relationship management (CRM) concepts. Utilizing data mining association rule and apriori algorithm on e-commerce sales transaction data from Online Store Athaku, the following outcomes were obtained:

1) By applying a minimum support of 0.15 and minimum confidence of 0.5, and subsequent validation, three rules were derived for product items:
   - Purchasing Bloomers attracts buyers to also purchase Jumpers.
   - Purchasing Bibs attracts buyers to also purchase Bloomers.
   - Purchasing Bibs attracts buyers to also purchase Jumpers.
2) Three association rules were generated from the association among product items at Online Store Athaku. These results can form the foundation for crafting marketing strategies based on CRM principles by offering bundled product promotions to Online Store Athaku consumers.
3) Based on the validation results obtained from surveys/questionnaires and measured through classical assumption tests, validity tests, reliability tests, simple linear regression tests, and t-tests, three bundled product opportunities emerged to enhance sales on the Online Store for three products: Bloomers, Jumpers, and Bibs.

REFERENCES

Adiyanta, F. (2019). Hukum dan Studi Penelitian Empiris: Penggunaan Metode Survey sebagai Instrumen Penelitian Hukum Empiris. *Administrative Law and Governance Journal*.

Agrawal, R., Imieliński, T., & Swami, A. (1993). Mining Association Rules Between Sets of Items in Large Databases. *ACM SIGMOD Record*.

Agusta, Y. (2007). K-Means Penerapan, Permasalahan dan Metode Terkait. *Jurnal Sistem dan Informatika*.

Alipour, F., Idris, K., Ismail, I., & Karimi, R. (2011). Learning Organization and Organizational Performance: Mediation Role of Intrapreneurship. *European Journal of Social Sciences*.

Buttle, F. (2009). *Customer Relationship Management: Concepts and Technologies.* Amsterdam:

Elsevier Ltd.

Gama, A. W., Putra, I. D., & Bayupati, I. A. (2016). Implementasi Algoritma Apriori Untuk Menemukan Frequent Itemset Dalam Keranjang Belanja. *Majalah Ilmiah Teknologi Elektro*.

Ghozali, I. (2005). *Aplikasi Analisis Multivariate dengan SPSS.* Semarang: Badan Penerbit UNDIP.

Guiltinan. (2013). Consumers Satisfaction With Online Group Buying-an Incentive Strategy. *International Journal of Retail & Distribution Management*.

Kotler, P., & Keller, K. (2008). *Manajemen Pemasaran.* Jakarta: PT Index.

Lemeshow, S., & David, J. (1997). *Besar Sampel dalam Penelitian Kesehatan (terjemahan).* Yogyakarta: Gadjah Mada University Press.

Pracoyo, S., & Seniwati, E. (2016). ALGORITMA APRIORI UNTUK PENEMPATAN BUKU DI PERPUSTAKAAN SMK MA'ARIF 1 WATES. *Sistem Informasi Universitas Amikom*.

Rojabi, A. (2019). *Survey Research (Research Methodology)*. Dipetik December 2022, dari UX Afdan (Medium).

Royan, & Frans, M. (2004). *Creating Effective Sales Force.* Yogyakarta: Andi Offset.

Sugiyono. (2013). *Metodelogi Penelitian Kuantitatif, Kualitatif Dan R&D.* Bandung: CV Alfabeta.

Temporal, P., & Trott, M. (2001). *Memaksimalkan Nilai Merek Melalui Kekuatan Relationship Management.* Jakarta: Salemba.