CHAPTER III

RESEARCH METHOD

3.1 Instrument of Study

The data is obtained from the owner of Sinar Karya Furniture in the form transaction receipts. The transaction mostly in excel format or spreadsheet format that directly given by the owner for observation and experiment. The observation was started on April 4^{th,} 2015. After the experiment is done, next the experiment can be started by using the data. The implementation of the apriori algorithm using Adobe Dreameweaver CS6. With the appropriate format of txt type, the data will be proceed to determine the relation between existing item in the transaction.

3.2 Data Sources

The data source is anything than can give the data information widely. There are 2 source data used in this study:

1. Primary data are sales transaction in Sinar Karya Furniture within January 2012 until July 2012
2. Secondary data used in this research is obtained from the relevant reference, "Data Mining Concept and Techniques" by Jiawei Han and Micheline Kamber [6].

3.3 Technique Analysis Data

In the study using method of CRISP-DM with the following steps:

3.3.1 Business Understanding phase

The purpose of this study is to find a relation between items that are often purchased by customers simultaneously, to facilitate organize inventory.

At the initial stage, researchers are looking dataset is in the form of sales transactions in the Sinar Karya Furniture in January 2012 until July 2012.

3.3.2 Data Understanding Phase

The data used in this study are primary data obtained directly from the Sinar Karya Furniture. Sales transaction data at the Sinar Karya Furniture in January 2012 until July 2012. Most of the data are in payment bills and a few are in excel format. Some important attributes in the dataset are product name and quantity. The attributes show what the products purchased in each transaction.

In table 10. below shows the product used in this study. Only the products with a total of more than 5 records are taken in this study.

Table 10. Name of Items

No.	Name of Items
1	Almari buku
2	Bufet
3	Kursi tamu
4	Meja pot
5	Sofa
6	Kursi makan
7	Kursi teras
8	Tempat tissu
9	Nakas
10	Tempat tidur
11	Almari jam
12	Almari sudut
13	Meja kantor
14	Meja konsul
15	Almari kanopi

16	Tolet
17	Meja ketapang
18	Almari hias
19	Meja makan
20	Almari salju

Need to be done discretization (break down domain or local calculations into several areas called grid, mesh or cell) because the column Name of Items above has a wide range. The details name of product will show in table 11. below:

Table 11. Discretization value “Name of Items”

No	Discretization value	Name of Items
1	Almari buku	Almari buku palembang ukir pintu 3 + kunci
		Almari buku palembang polos pintu 3 + kunci
		Almari buku palembang ukir pintu 4
		Almari buku palembang ukir pintu 2
2	Bufet	Bufet syafila 1m
		Bufet syafila melati 2m
		Bufet mawar baru 2m
		Bufet palembang 2m
		Bufet rafles 2m
		Bufet bagong mawar 2m
		Bufet mawar pilar 4 persegi 2m
		Bufet mawar pilar 4 persegi 150
		Bufet mawar baru 150
		Bufet mawar salur 150
		Bufet emeral nonjol 2m
		Bufet cincin lengkung 2m

		Bufet safilia renda 2m
		Bufet bagong mawar 150
3	Kursi tamu	Kursi tamu ganesa mawar besar
		Kursi tamu romawi stil
		Kursi tamu grand father
		Kursi tamu sudut cobra bambu
		Kursi tamu kobra mini mawar
		Kursi tamu madura kalpataru lengkung
		Kursi tamu kalpataru persegi
		Kursi tamu sedan aceh
		Kursi tamu kartini teratai
		Kursi tamu sudut kaca salju melati
		Kursi tamu sudut kaca lompong
		Kursi tamu gajah mada
		Kursi tami kartini kalpataru
		Kursi tamu anyaman
		Kursi tamu romansa
		Kursi tamu flamboyan aceh
		Kursi tamu madura mawar mahkota
		Kursi tamu flamboyan mawar
		Kursi tamu kartini mawar
		Kursi tamu romawi raja
		Kursi tamu bunndel kawung
		Kursi tamu inggris
		Kursi tamu luxury
		Kursi tamu sudut bundel batik
		Kursi tamu pita mawar
		Kursi tamu minimalis bundel batik
		Kursi tamu flamboyan kalpataru
		Kursi tamu gendhong salju layang
		Kursi tamu virginia

4	Meja pot	Meja pot cumi
		Meja pot tabung bulat lc 3
		Meja pot tabung oval lc 3
		Meja pot tabung persegi lc 3
		Meja pot mawar laci
		Meja pot mawar lc 7
5	Sofa	Sofa thailand melati laci 2m
		Sofa mawar kaki gajah 2m
		Sofa day bed rahwana rata 2m
		Sofa sofia mpb, lgn krem
		Sofa tamu madura mawar lengkung
		Sofa tamu kupu-kupu
		Sofa mawar mini, clarisa brown
		Sofa tampar, clarisa maron
		Sofa mawar bulat, clarisa brown
		Sofa tamu mawar mini, clarisa maron
6	Kursi makan	Kursi makan balero toraja
		Kursi makan minimalis kawung coret
		Kursi makan balero teratai
		Kursi makan kartini mawar
		Kursi makan perancis tgn motif golkar, cleo yellow
		Kursi makan perancis, clarisa maron
		Kuris makan perancis tgn, clarisa maron
		Kursi makan balero melati
		Kursi makan kartini bambu
		Kursi makan geblek kasur tgn, clarisa maron
		Kursi makan minimalis salju coret
		Kursi makan baler anggrek
		Kursi makan minimalis kalpataru kerawang
		Kursi makan ganesa mawar
		Kursi makan kerawang, clarisa maron

		Kursi makan kartini kalpataru
		Kursi makan salina dimensi, clarisa maron
7	Kursi teras	Kursi teras kartini kalpataru
		Kursi teras yuyu sandaran
		Kursi teras sedan aceh
		Kursi teras santana kalpataru
		Kursi teras kencana
		Kursi teras ganesa
		Kursi teras cantik
		Kursi teras minimalis rambut
		Kursi teras kartini teratai
		Kursi teras santana aceh
		Kursi teras sedan kalpataru
		Kursi teras yuyu ukir
8	Tempat tisu	Tempat tisu mawar
		Tempat tisu anyaman
9	Nakas	Nakas majapahit
		Nakas aulia
		Nakas gebyok kepang
		Nakas tiara mawar
		Nakas kanopi mawar
		Nakas adinda
10	Tempat tidur	Tempat tidur rahwana
		Tempat tidur levina
		Tempat tidur bagong mawar
		Tempat tidur tawakal mawar
		Tempat tidur adinda
		Tempat tidur tawakal mawar lengkung
		Tempat tidur rahwana tiara fersase
		Tempat tidur aulia kepang
		Tempat tidur melati

		Tempat tidur rahwana tulip
		Tempat tidur majapahit
		Tempat tidur peluru super
		Tempat tidur tiara mawar
11	Almari jam	Almari jam majapahit, jam seiko
		Almari jam mawar pilar tiang ukit, jam seiko
		Almari jam mawar anggur bengkok, jam seiko
		Almari jam cleopatra pakai tiang, jam seiko
		Almari jam mawar pilar polos, jam seiko
		Almari jam mpb 1826, jam seiko
		Almari jam mawar mpb 1828, jam seiko
12	Almari sudut	Almari sudut emeral pintu 1
		Almari sudut mawar byur pintu 2
		Almari sudut katek pintu 2
		Almari sudut majapahit
		Almari sudut cicin pintu 2
13	Meja kantor	Meja kantor 150 kaki bubut ukir keliling mpb 724
		Meja kantor cipendil
14	Meja konsul	Meja konsul kencana
		Meja konsul bambu
		Meja konsul melati
		Meja konsul pita bengkok
		Meja konsul pita setengah lingkaran
15	Almari kanopi	Almari kanopi bagong mawar laci pintu 4
		Almari kanopi majapahit laci pintu 3
		Almari kanopi majapahit laci pintu 4
		Almari kanopi bagong mawar laci pintu 3
		Almari kanopi majapahit laci pintu 2
		Almari kanopi adinda laci pintu 2
		Almari kanopi adinda laci peluru pintu 4
16	Tolet	Tolet majapahit

		Tolet dialova
		Tolet aulia kepang
17	Meja ketapang	Meja ketapang krw kaki tinggi 120x80, kc
		Meja ketapang krw kaki tinggi 50x50, kc
18	Almari hias	Almari hias segi enam mahkota
		Almari hias paloma mawar byur pintu 5
		Almari hias TV emeral pisah 3m
		Almari hias TV pisah palembang mawar 230
		Almari hias mawar byur persegi pintu 4
		Almari hias patra los pintu 2
		Almari hias mawar byur persegi pintu 2
		Almari hias paloma mawar byur pintu 3
		Almari hias mawar love pintu 4
		Almari hias belgium pintu 3
		Almari hias new cleo pintu 2
		Almari hias TV pisah BCA palembang 230
		Almari hias patra anggrek nonjol pintu 4
		Almari hias emeral pisah pintu 6
		Almari hias TV pisah bulgaria 220
19	Meja Makan	Meja makan mawar ceplok persegi
		Meja makan dimensi oval
		Meja makan balero melati
		Meja makan gendhongan full ukir
		Meja makan setengah gendhong ukir
		Meja makan mawar ceplok oval
		Meja makan dimensi persegi
20	Almari salju	Almari salju cacah laci pintu 3
		Almari salju coret laci pintu 4
		Almari salju layang laci pintu 4

3.3.3 Data Preparation Phase

Since the study applied association rules, the attributes need to be adjusted to fit the binary representation table as shown in Table 11. The variables are changed to be the name of the items and then filled with binary representation (1 for purchased item and 0 for not purchased item). There are 20 attributes provided. The quantity of purchased items will not be used since the study only discovers the relation of items. There are 500 records in the dataset.

Table 12. Binary representation

	1	2	3	4	5	6	7	8	9	10	…etc	20
1	1	0	1	1	0	1	1	1	0	0	…	…
2	0	1	1	1	0	1	0	0	0	0	…	…
3	1	1	1	0	1	1	1	0	0	1	…	…
4	0	1	0	0	0	1	0	0	1	0	…	…
5	0	1	1	0	1	0	0	0	0	1	…	…
6	0	1	1	0	1	1	1	1	0	0	…	…
7	0	0	1	1	0	1	1	0	0	0	…	…
8	1	0	1	0	1	0	0	0	1	1	…	…
9	1	0	1	0	0	1	0	0	0	1	…	…
10	0	0	1	0	1	1	1	0	0	1	…	…
… etc	…	…	…	…	…	…	…	…	…	…	…	…
500	…	…	…	…	…	…	…	…	…	…	…	…

3.3.4 Modelling Phase

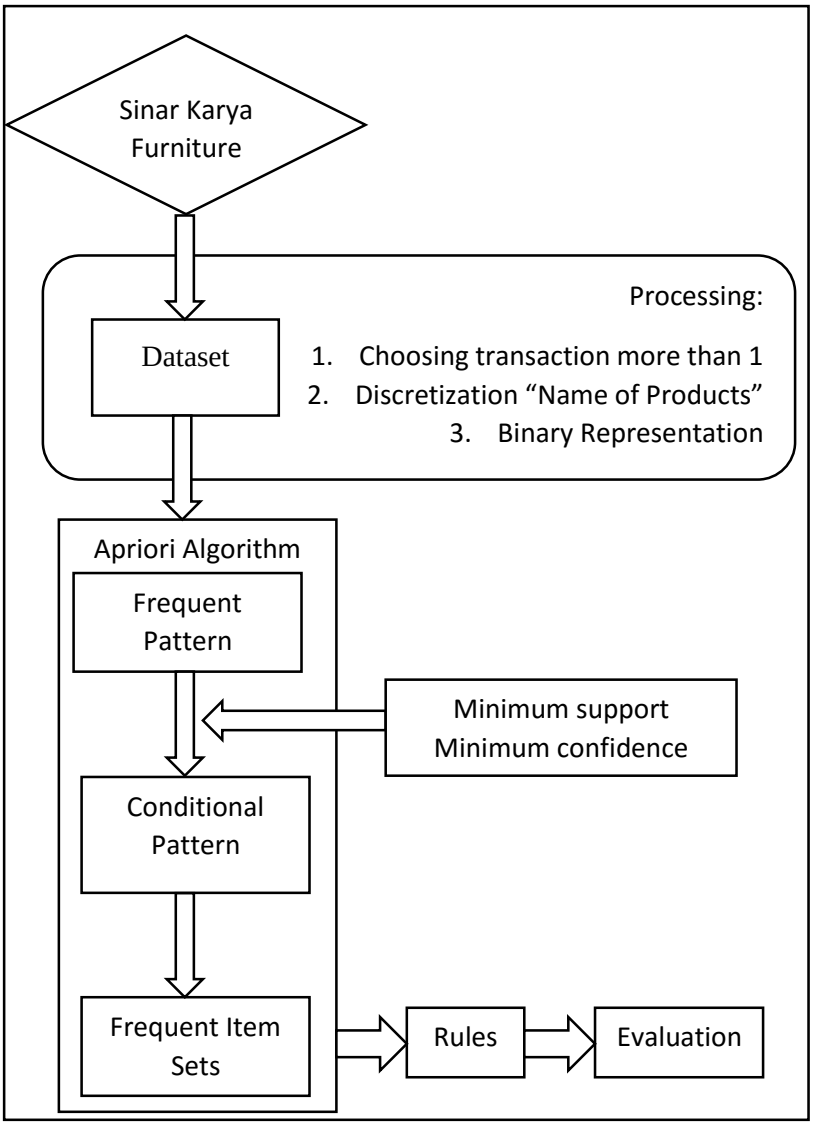

Figure 3. Model proposed for the study

As shown in Figure 3 above, the study discovers association rules using Apriori algorithm. The method will compress the dataset into a frequent pattern. After will be fragmented and scanned by comparing the determined minimum support and minimum confidence until frequent itemset generated. Then the rule will be made by the method that will use the frequent itemset.

3.3.5 Evaluation Phase

In this step, the evaluation performed to check the quality of the method before deployed. The evaluation determined by the minimum support and minimum confidence according to the equation (2) and equation (4):

$$Support\ P(A,B) = \frac{Sum\ of\ transaction\ that\ contains\ A\ and\ B}{Sum\ of\ transaction} \quad (2)$$

$$Confidence\ P(B|A) = \frac{Sum\ of\ transaction\ that\ contains\ A\ and\ B}{Sum\ of\ transaction\ that\ contains\ A} \quad (4)$$

3.3.6 Deployment Phase

Since the method has been evaluated, the study result can be deployed.

3.4 Application Design

After the result of study discovered, an interface of market basket analysis will be made to help the user using an application and will show the interacting appearance.

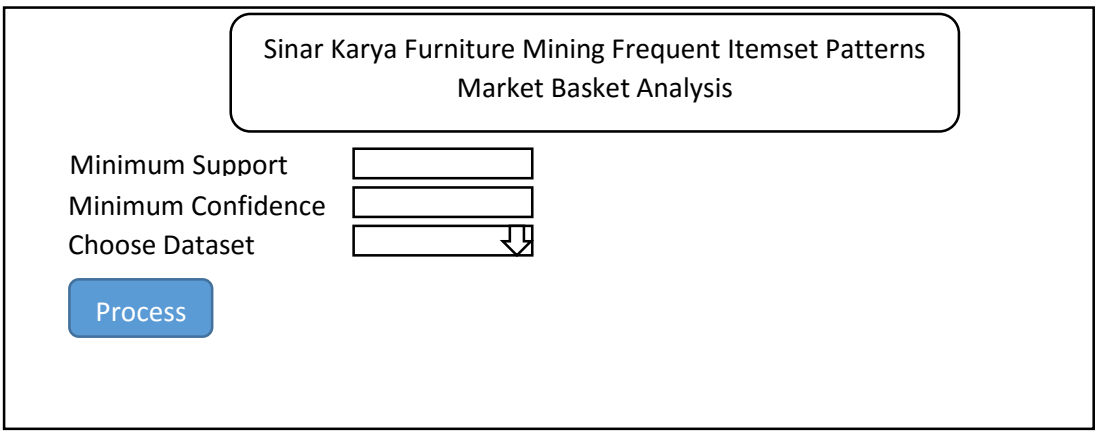

Figure 4. Application interface of market basket analysis

The interface adopts simple interface with relatively small window. It has some input button and radio button as shown in Figure 4. The page will process the input from the user and produce the association rules using apriori algorithm.