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Management Analysis Of Hijab Users' Style Change By Using The Marcov Chain Method (A Case Study On The Students Of Indonesian Muslim University)

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Abstract— This research was conducted to find out the students' commitment and assessment of the types of Hijab they wear and to know the probability of the change of Hijab styles among the female students. The data used were the primary data collected through the distribution of questionnaires to 98 female students at Indonesian Muslim University. The data were obtained through the analysis done by using Markov chain method. Based on the result of the Markov Chain analysis method, most of the Hijab users were the users of square type Hijab that was 46.9% from the total. The result was followed by the phasminah Hijab and syar'i Hijab users which were as many as 27.55% and 16.34%, respectively. The least percentage was come from the users of direct type hijab as many as 9.17%. The conclusion of this research was that the number of hijab users at the campus was increasing as the support of Sharia-compliant Campus at Indonesian Muslim University.

Keywords— *hijab type, awareness, and Marcov Chain*

1.   Introduction

As the demand for hijab increased, the competition among the hijab producers was also increased. They are competing to become the market leaders. Hijab products offered by the hijab producers to attract consumers were also diverse, among others were by producing colors, models, and with price variations for the hijab market. With the options of hijab offered with various kinds of advantages and types, it was possible for a consumer to change the consumer's taste from the current hijab type she wear, to another. This change could not be determined with certainty, it was probabilistic or stochastic. Therefore, Markov Chains method could be used to predict the probability of the change the consumers may take from one hijaba type to another. For Students, hijab is used to cover their aurat, as a style of dressing, and as a tool to beautify themselves that is wear everyday. The types of hijab used by the students were also diverse, but they were mostly stucked on certain types of hijab such as square, pashmina, syar'i, and direct hijab. Of all groups of students wear hijab, they could be made as the research samples to analyze the possibility of the change of hijab users' style because the majority of hijab users came from female students.

2.   Markov Chain

Markov Chain is a mathematical technique commonly used for modeling various systems and business processes. This technique can be used to estimate future changes according to the dynamic variables in the past. The technique can also be used to analyze events that might occur in the future systematically. Transitional Probability is a change from one status to another in the next (time) period and is a random process expressed in probability. For more details, the description can be seen in the following table:

Table 1. Table Transition Matrix

From state:	To state:					
	1	2	..	j	..	n
1	P11	P12	..	P1j	..	P1
	P21	P22	..	P2j	..	N
I	Pi1	Pi2	..	Pij	..	..
.	Pn1	Pn2	..	Pnj	..	Pin

'n' in the table is the number of states in the process, while 'pij' is the possibility of transition from state i to state j. If it is currently in state i then row i of the above table contains the numbers pi1, pi2, pin is likely to change to the next state. Since the number represents the possibility, then all forget the non-negative and not more than one numbers. It can be mathematically understood as follows:

$$0 < pij < 1 \ i = 1, 2, ..., n………...............………..........…….(1)$$
$$\Sigma \ pij = 1 \ i = 1, 2, ..., n...................….….……………………..(2)$$

3. Research Method

This study was conducted at Indonesian Muslim University by distributing questionnaires to hijab users. The data was collected in March, 2016. The population of this study were the undergraduate students of 13 faculties of Indonesian Muslim whose the admission year was 2014-2015.

Table 2. List of Population

No.	Faculty	Total
1	Faculty of Islamic Studies	198
2	Faculty of Economics	1,338
3	Faculty of Engineering	261
4	Faculty of Law	796
5	Faculty of Literatures	422
6	Faculty of Fisheries	80
7	Faculty of Agriculture	198
8	Industrial Technology Faculty	318
9	Faculty of Medicine	234
10	Faculty of Computer Sciences	115
11	Faculty of Public Health	1,071
12	Faculty of Pharmacy	540
13	Faculty of Dentistry	105

(Source: Academic Administration and Cooperation Bureau of Universitas Muslim Indonesia, 2016)

The sampling process was done by taking simple random sampling proportionally in each department with the intention that the sample number for each department was in accordance with the population. As for the consideration in the selection of respondents in this study was undergraduate program students from 13 faculties of Indonesian Muslim University whose the admission year was 2014-2015 because the students were still actively attend the lectures. One of the methods used to determine the number of samples was the Slovin typeula (Sevilla et al, 1960: 182), it is described as follows:

$$n = \frac{N}{1 + Ne^2}$$ …………….........…..…………………….(3)

Description:
n: number of samples
N: number of population
e: error tolerance

In the data processing stage by using Markov Chain process this order was divided into several parts of steps to get the desired interpretation. The step was made by creating a table of the number of each Hijab type users, both present the data about their current hijab style and previous hijab style (when the research was conducted), based on the result of the questionnaires, by determining the pattern of brand switching (each of the types of hijab of the data collected to know the real market share interpretation (after the research conducted) and calculate the forecasting of the market share of Hijab types for the next period consisted of the first period after the research and the second period after the research.

4. Data Processing

Based on the questionnaires and calculation results, we can know the initial market share of Square type Hijab has master the current market among student and become the Market Leader of 46 respondents or 46.9%.

Table 3. Early Market Share of Hijab Types

NO.	HIJAB TYPE	USERS IN MARCH 2016	PROPORTION
1	Square	46	46.9%
2	Phasminah	27	27.5%
3	Syar'i	16	16.3%
4	Direct	9	9.2%
Total		98	100.0%

Source: Processed Data (2016)

Phasminah type hijab has became the Market Follower which it was ranked in the second place with 27 respondents or 27.5%. The next top users came from Syar'i type hijab as much as 16 respondents or 16.3%, and the least users came from direct type hijab as much as 9 respondents or 09.2%. Further, each of the earliest acquisitions of the market share of the hijab types would be presented in Table 5.5.

5. Analysis of Hijab Type Change

Users' tastes often change in using a product. The change of hijab type is the most common symptom among female students and consumers in general. The next is the process of calculating data for respondents who had changed the type of hijab to produce the pattern of change of the hijab type of one to another hijab type, so the real data of each users of hijab type could be obtained.

To understand about the shifting appetite or consumer movement from one type of hijab to the other hijab types, the data is presented in Table 5.6.

Table 4. The Number of Current and Previous Hijab Types Users

No.	Hijab Type	Number of Previous Hijab Types User	Number	Lost	Number of Current Hijab Types User
1	Square	29	30	13	46
2	Phasminah	35	15	23	27
3	Syar'i	9	7	0	16
4	Direct	25	5	21	9
Total		98	57	57	98

Source: Processed Data (2016)

Table 5.6 shows the most popular types of hijab today: the square hijab used by 46 out of 98 people. This square type of hijab changed from the previous hijab user used by 29 people that currently increased to 46. Where the square type of Hijab obtain additional users from other brands as many as 30 people but it lost as many as 13 people who moved to other types of hijab. The second type of hijab after the square hijab is the Phasminah hijab. Phasminah hijab type previously worn by 35 people, currently decreased to 27 people. Where the type of phasminah hijab obtain additional users from other brands as many as 15 people but it lost as many as 23 people who moved to other types of hijab. Further, shar'i type hijab which was originally in demand by 9 people increased from 7 people to 16 people. The direct type of hijab previously used by 25 people, decreased to 9 people. Where the type of direct hijab get additional from other brands as many as 5 people but it lost as many as 21 people who moved to other types of hijab. For more detail information, the data obtained and loss of users in each type of hijab were shown in Table 5.7 and Table 5.8. Table 5.7 contains the data about the decreased user in the hijab types. Table 5.8 contains data about about the decreased user of hijab types.

Table 5. Data on Users of Various Hijab Types

Hijab Type	Data Obtained			
	Square	Phasminah	Syar'i	Direct
Square		21	0	9
Phasminah	6		0	9
Syar'i	2	2		3
Direct	5	0	0	
Total	13	23	0	21
	Loss			

Source: Processed Data (2016)

Table 5.7 shows that the square type Hijab obtained an additional 30 people, which was derived from the phasminah hijab type as many as 21 people, and from direct hijab as many as 9 people. Phasminah hijab type acquired an additional of 15 people, which came from the Square type hijab users as many as 6 people and from the direct type hijab users as many as 9 people. The type of Syar'i Hijab received an additional of 7 people, from the type of Hijab Square users as many as 2 people, 2 people from Phasminah hijab users, and 3 people from direct type hijab users. The type of direct hijab obtained an additional of 5 people from the square type hijab users as many as 5 people.

Table 6. Data Losing of Various Types of Hijab Users

HIJAB TYPE	LOSS			
	SQUARE	PHASMINAH	SYAR'I	DIRECT
Square		6	2	5
Phasminah	21		2	0
Syar'i	0	0		0
Direct	9	9	3	
Total	30	15	7	5
	Data Obtained			

Source: Processed Data (2016)

Table 5.8 describes the data lost of the users of hijab types that moved to other hijab types. The types of square hijab lost 13 users, which 6 users moved to the type of Phasminah hijab, 2 people to the type of Syar'i hijab, and 5 people to the type of direct hijab. Phasminah Hijab Type lost 23 users, which 21 people moved to the type of Square Hijab, and 2 people to the type of Syar'i Hijab. The type of Syar'i Hijab did not experience any loss as the square type hijab, 9 people moved to the type of phasmina hijab. The type of direct hijab lost 21 people, which 9 people moved to h and 3 people moved to the type of Syar'i hijab. Table 5.9 is a table showing the pattern of the change of the hijab type users from one type to another. The (horizontal) row is a previously selected hijab and the column (vertical) is the currently selected hijab by the users. Square Hijab users who currently as many as 46 people from 16 loyal users, 21 people moved from Phasminah, and 9 people moved from hijab directly. The Users of Phasminah Hijab who currently as many as 27 people consists of 12 loyal users, 6 people moved from Square Hijab, and 9 people from direct hijab. So on for other brands, it can be read from the row (horizontal) that is the pre-selected brand and the column (vertical) is the currently selected brand. What's interesting is that every brand has its loyal users. Such as the square type Hijab that has 16 loyal users, the type of Pahsminah hijab that has 12 loyal users, the type of Syar'i hijab that has 9 loyal users, and the direct hijab has 4 loyal users.

Table 7. Brand Switching Pattern

Hijab Type		Moved to				
		Square	Phasminah	Syar'i	Direct	Total Previous Respondents
From	Square	16	6	2	5	29
	Phasminah	21	12	2	0	35
	Syar'i	0	0	9	0	9
	Direct	9	9	3	4	25
Total Current Respondents		46	27	16	9	98

Source: Processed Data (2016)

And if it is assumed that the change between the selected the hijab styles was considered as stable, then the transition probability could be made as shown in Table 5.10.

Table 8. Transition Probability of Previous and Current Respondents

Hijab Type		Moved to			
		Square	Phasminah	Syar'i	Direct
From	Square	0.552	0.207	0.069	0.172
	Phasminah	0.600	0.343	0.057	0.000
	Syar'i	0.000	0.000	1.000	0.000
	Direct	0.360	0.360	0.120	0.160
Market Share		0.296	0.357	0.092	0.255

Source: Processed Data (2016)

In Table 5.10, it could be seen that the users of the square Hijab type was 55.2%, moved from the square type hijab to the Phasminah type hijab as much as 20.7%, moved to the Syar'i type hijab as much as 6.9%, and moved to Direct type Hijab as many as 17.2%. Phasminah type hijab had 34.4% of loyal users, 60% of the users moved to Square type Hijab and 5.7% of the users moved to Syar'i type hijab. Syar'i type hijab had 100% of loyal users. Direct type Hijab had 16% of loyal users, 36% of the users migrated to the Square type hijab, 36% of the users moved to Phasminah type hijab, and 12% of the users moved to Syar'i type Hijab.

The last row of the table shows the previous market share for all types of hijab.

6. Market Share Prediction of Hijab Types with Markov Chain

To predict the market share of hijab types in the future the typeula 2.6 by multiplying the market share in the first period with the transition probability matrix calculation can be used. Based on Table 5.9 it is known that (Q) and the transition probability matrix P are as follows:

$$Q=\begin{pmatrix}0.296\\0.357\\0.092\\0.255\end{pmatrix} \quad P=\begin{pmatrix}0.552 & 0.207 & 0.069 & 0.172\\0.600 & 0.343 & 0.057 & 0.000\\0.000 & 0.000 & 1.000 & 0.000\\0.360 & 0.360 & 0.120 & 0.160\end{pmatrix}$$

To predict the market share of hijab types in the first period, the market share in the second period is as follows:

And the prediction of the market share of various types of hijab in the third period is as follows:

Table 9 Market Share Period First, Second Period, and Third Period Table

No.	Hijab Type	Market Share in the First Period	Market Share in the Second Period	Market Share in the Third Period
1	Square	46.94%	45.74%	42.17%
2	Phasminah	27.55%	22.47%	20.61%
3	Syar'i	16.34%	22.25%	27.83%
4	Langsung	9.17%	9.54%	9.39%
	Total	100.00%	100.00%	100.00%

Source : The Data Processed through POM QM Application Software (2016)

7. Analysis And Discussion

From the table above, the market share of the various types of hijab used by the students of Indonesian Muslim University can be seen. The popularity of the square type Hijab decreased its market share, from 46.94% in the first period to 45.74% in the second period, and 42.17% in the third period. The market share of the Phasminah hijab also gradually decreased, if in the first period it reached 27.55%, in the second period became 22.47%, and in the third period it rose to 20.61%. The Syar'i type Hijab in the first period had the market share of 16.34%, in the second period it increased to 22.25%, and in the third period it rose again to 27.83%. The market share of the direct type hijab in the first period was 9.17% then it increased in the second period to be 9.54%, and in the third period it decreased to 9.39%.

8.   Conclusion

The students' loyalty or judgment to the hijab types they wear can be seen from their use of square type hijab as much as 55.2%, then 20,7% of them moved from Square type Hijab to Phasminah type hijab, 6,9% of them moved to hijab Syar'i type hijab, and the last 17.2% moved to Direct type Hijab.

The Probability of the change of the users' hijab types preference can be seen from the market share of the various types of hijab worn by the female students of Indonesian Muslim University. The market share of the square type hijab as the popular hijab type slowly decreased from 46.94% in the first period to 45.74% in the second period, and 42.17% in the third period.

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