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Carpet Product Preference using the Conjoint Analysis Method

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Abstract

The purpose of this research is to find out the majority of carpet profiles that have been chosen by consumers. This study uses a conjoint analysis method using SPSS software. The variables assessed in this study are the color, image, shape, and size of the carpet. The results showed that the picture of the carpet is the most important factor for consumers. The majority of respondents want a carpet with cartoon / abstract drawings with a square / rectangular shape, colored pattern and small size.

Keywords: Carpet; Conjoint Analysis; Respondent; SPSS; Variable

1. Introduction

Micro, Small, and Medium Enterprises (MSME) products are developing rapidly in Indonesia according to Portfolio Leader from Oxford Policy Management Ltd, Jonathan Mitchell (Wanto, 2019). The existence of MSMEs has absorbed the national workforce by 96.99 percent throughout 2018. Not only absorbing the workforce, but MSMEs also make a significant contribution to GDP (Gross Domestic Product) (Minardi, 2019). The contribution of MSMEs to the Indonesian economy is in its workforce. For workers, MSMEs managed to absorb 121 million workers in 2018 (Hartomo, 2019). The contribution of the micro, small and medium business sector (MSMEs) to the national gross domestic product is projected to grow by 5% throughout 2019 (Syarizka, 2019). Based on the data and facts mentioned earlier, a common thread can be drawn that the role of MSME is very important to move the economic life wheel. One of the MSME products that are in great demand by the public is a carpet product made from rasfur. There are several problems faced by MSME from carpets made from rasfur materials, namely the problem of determining the variation of products desired by consumers. The carpet manufacturers are often confused in determining the type of carpet profile that is what is desired by consumers.

The purpose of this study is to assist the carpet MSMEs in determining the variation of carpet products that should be produced. This research will use the conjoint analysis method using SPSS software.

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2. Methodology

This study uses a conjoint analysis method with the stages of the process can be seen in Fig. 1.

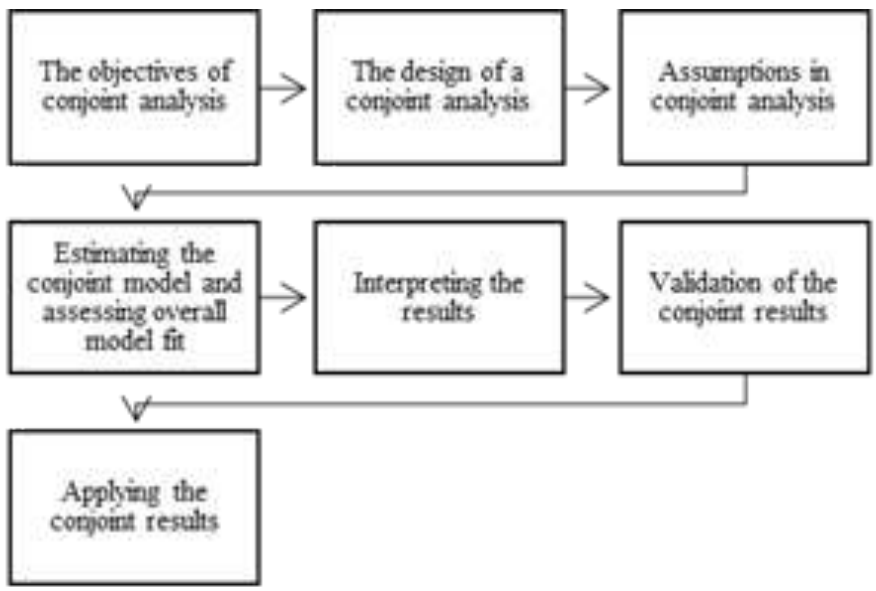

Fig. 1. Process stages of the conjoint analysis method

Conjoint analysis is a multivariate technique developed specifically to understand how respondents develop preferences for any type of object (Hair et al., 2010).

$$Y_1 = X_1 + X_2 + X_3 + \ldots + X_n \quad (1)$$

Y_1 in (1) is a dependent variable that can be categorized as metric and nonmetric.

X in (1) is an independent variable that belongs to the nonmetric category.

This approach enables to nonparametrically identify and estimate the causal effects of many treatment components (Hainmueller et al., 2013). There are several terms in conjoint analysis. Attributes are components for determining product value. Level is a real expression of the attribute condition (Ikemoto et al., 2011). A profile card is a combination of one level for each component (Ikemoto et al., 2011). If consumers decide that they prefer certain profile cards, there is a trade-off between attributes, this explains the criteria used by consumers to choose products (Ikemoto and Yamaoka, 2011). Conjoint analysis is a statistical technique based on survey results that can be used in marketing research in order to determine how respondents assess the various attributes that make up a new product (Kuhmaier et al., 2019). Utility estimation is firstly generated from the ranking of participants in each profile to calculate the conjoint value (Mogilski et al., 2019). Conjoint analysis is useful for measuring how respondents exchange various options and their respective attribute levels (Steiner and Meibner, 2019).

There are five common conjoint analysis tasks. They are:

1. full-profile ratings
2. full-profile rankings
3. partial-profile ratings

4. choices among profiles
5. direct ratings of importances

This study uses SPSS software version 25.

3. Results and Discussion

This research was conducted to determine the type of carpet profiles that are most in-demand by consumers. There are four attributes of the carpet, namely color, image, shape, and size.

Types of color:

- plain color
- color pattern

Image type:

- cartoon image,
- pictures of flora or nature,
- pictures of fauna,
- abstract images

Shape Type:

- a square or rectangular shape,
- polygon shape,
- the shape of a circle or ellipse

Size Type:

- large size,
- small size

Each respondent will assess a combination of existing products with numbers 1 to 5, in the order of scale as follows:

1. Very dislike the stimuli of the product
2. Do not like the stimuli of the product
3. Simply Like the stimuli of the product
4. Like the stimuli of the product
5. Very like the stimuli of the product.

From the answers of numbers 1 to 5, conjoint analysis can be done to find out the type of carpet product desired by the majority of respondents. Steps or stages in Conjoint analysis:

- Make a combination of products or stimuli
- Making stimuli with SPSS
- Making a conjoint with SPSS

The results of data collection from many respondents were written in SPSS.

Here are the overall results of Conjoint Analysis:

Table 1. Utilities

		Utility Estimate	Std. Error
COLOR	Plain	- 0,326	0,210
	Pattern	0,326	0,210
IMAGE	Cartoon	0,414	0,363
	Flora or Nature	0,396	0,363
	Fauna	-1,225	0,363

	Abstract painting	0,414	0,363
SHAPE	Square or rectangular	1,176	0,279
	Polygon	-0,606	0,328
	Circle or ellipse	-0,569	0,328
SIZE	Large	-0,248	0,210
	Small	0,248	0,210
	(Constant)	2,116	0,221

From table 1, it can be seen about attribute, that:

3.1. Color

Because the utility for the color pattern is positive, in general, respondents prefer carpets with patterned colors. A negative sign on a plain color means that the respondent doesn't like carpets with plain colors or one color.

3.2. Image

Because the utility of cartoon and abstract character drawings is positive and has a greater value than the picture of flora or nature, in general respondents prefer the cartoon or abstract picture carpet. The order of the carpet images preferred by respondents is as follows:

1. cartoon or an abstract painting
2. flora or nature
3. fauna

Values for cartoons and abstract paintings have the same value, which means the respondents consider both equally good.

3.3. Form

Because the utility for square or rectangular shapes is positive, in general, respondents like a square or rectangular carpets.

The order of the shape of the carpet preferred by respondents is as follows:

1. square or rectangular
2. circle or ellipse
3. polygon

Values for square and rectangular have the same value, which means the respondents consider both equally good.

3.4. Size

Because the utility for small size is positive, in general, respondents like small-sized carpets. The size of a large carpet with a negative sign means that most respondents do not like large-sized carpet.

Table 2. Importance values

Importance Values	
COLOR	13,050
IMAGE	39,053
SHAPE	37,809
SIZE	10,087
Averaged Importance Score	

From table 2, it can be seen the important factor, in general, respondents consider the image of the carpet to be the most important factor in assessing or perhaps buying a carpet (39,053%). The order based on the level of importance according to some respondents is:

1. image
2. shape
3. color
4. size

Based on the number of interests can be seen if the value of the image and shape are almost close to the level of importance according to the respondents. Based on the importance value, it can be seen that the color and size values are almost close to the level of importance according to respondents. If seen from the level of importance of the size of the carpet size, so it can be concluded that this is the smallest number in table 2. Then the most considered size factor of the carpet is not important.

Table 3. Correlations

	Value	Sig.
Pearson's R	0,897	0,000
Kendall's tau	0,691	0,000
Kendall's tau for Holdouts	0,400	0,164

In table 3, it can be seen the correlation output, it looks very good because the correlation number for the sample is high, 0.897.

4. Conclusions

Based on the results of this study it was found that the image of the carpet is considered the most important factor by most consumers in choosing or buying carpets made from rasfur. Based on the results of this study it was found that the size factor of the carpet is considered the least important factor by most consumers in choosing or buying carpets made from rasfur. The majority of respondents want a carpet with cartoon / abstract images with a square / rectangular shape, colored pattern and small size. The existence of this research is expected to increase the development of carpet products made from rasfur so that it can be accepted by people who like to buy carpet products and hopefully can meet the desires of the majority of consumers. For further research, the development of carpet business strategies can be done with other methods that can increase the level of sales of rasfur-made carpet products. This research continues is to advance the productivity of MSMEs, especially home industry products that are popular in the community such as carpets. Further research should be carried out to increase the role of the younger generation of productive working age to continue to strive to create new jobs.

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References

A. Minardi. (2019, Sept. 20). UMKM Pilar Ketenagakerjaan, Perlu Belajar dari Jerman [Online]. Available: https://reaktor.co.id.

D. Syarizka. (2019, Jan. 9). Kontribusi UMKM terhadap PDB 2019 Diproyeksi Tumbuh 5% [Online]. Available: https://ekonomi.bisnis.com.

Hartomo. (2019, June 19) The Economy website [Online]. Available: https://economy.okezone.com.

Ikemoto, and T. Yamaoka, 2011. "Conjoint Analysis Method That Minimizes the Number of Profile Cards," In: Stephanidis C. (eds) HCI International. Communications in Computer and Information Science, vol 173. Springer, Berlin, Heidelberg.

J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, 2010. Multivariate Data Analysis, Pearson Prentice Hall: New Jersey.

J. Hainmueller, D. J. Hopkins, and T. Yamamoto, 2013. "Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments," Political Analysis, pp. 1–30.

Kuhmaier, M., Harrill, H., Ghaffariyan, M.R., et al., 2019. Using Conjoint Analyses to Improve Cable Yarder Design Characteristics: An Austrian Yarder Case Study to Advance Cost-Effective Extraction. Forests, 10, 165.

Mogilski, J. K., Vrabel, J., Mitchell, V. E. & Welling, L. L. M., 2019. The primacy of trust within romantic relationships: Evidence from conjoint analysis of HEXACO-derived personality profiles. Elsevier: Evolution human and behavior, 1016, pp.1-10.

M. Steiner, M. Meihner, 2018. A User's Guide to the Galaxy of Conjoint Analysis and Compositional Preference Measurement, Marketing ZFP, 40, pp. 3-25.

Wanto. (2019, Aug. 7). Daya Saing UMKM Jadi Kunci Pertumbuhan Ekonomi Indonesia [Online]. Available: https://indonesiadevelopmentforum.com.

Appendix A. Output from SPSS

A.1. Recoded Values

Original Value		Recoded Value	Value Label
COLOR	1	1	Plain
	2	2	Pattern
IMAGE	1	1	Cartoon
	2	2	Flora or Nature
	3	3	Fauna
	4	4	Abstract painting
SHAPE	1	1	Square or rectangular
	2	2	Polygon

	3	3	Circle or ellipse
SIZE	1	1	Large
	2	2	Small

Recoded values are used in computations.

A.2. Model Description

	N of Levels	Relation to Ranks or Scores
COLOR	2	Discrete
IMAGE	4	Discrete
SHAPE	3	Discrete
SIZE	2	Discrete

All factors are ortogonal.