Experimental Study on Design Layout of Online Store for Lampung Products in Indonesia

Aida sari[1], Dwi Asri Siti Ambarwati[2], Mudji Rachmat Ramelan[3], Nuzul Inas Nabila[4]
{aida.sari@feb.unila.ac.id[1], dwi.asri@feb.unila.ac.id[2], muji@feb.unila.ac.id[3], nuzul.inas@feb.unila.ac.id[4]}

Faculty of Economics and Business, University of Lampung, Jl. Sumantri Brojonegoro I, Bandar Lampung Indonesia.[1234]

Abstract. The aim of this study is to examine consumer perceptions that make consumers hold up or feel comfortable for a long time on web store as a results of layout on online store. This study conducts three types of layout through experimental studies. It also examines the effects of differences in layout on the perceived usefulness of consumers, perceived convenience by consumers, and entertainment and time spent by consumers on online store by using products derived from the production of several MSMEs in Lampung. The findings show that the benefits perceived by consumers will be better if the design used is the tree layout; the perceived ease for consumers will be better if using the pipeline layout; and entertainment is better to use the guiding pathway layout design.

Keywords: online shop, layout, tree layout, pipeline layout, guiding pathway layout.

1 Introduction

Online shops are increasingly growing, causing great competition in this service business. One makes consumers spending longer time on the website of online shop is layout from the store. The layout of online shop can be the design of the store, which is similar to a traditional store. Consumers feel happy shopping at a particular store if the layout design at the store makes it convenient for consumers to come [1].

The layout also affects the image of the online store. Attitudes and images of consumers really determine consumer purchasing decisions even to the satisfaction and loyalty of consumers [2], where consumer loyalty is the outcome in the marketing process.

The quality of the layout of the website of online shop includes unique visual appeal, clarity of page layout, navigation speed and level of up-to-date details [3]. Schaffer (2000) stated that 30% of consumers leave online shop without buying or ordering something because navigation on the site is difficult to understand. Unattractive design, the difficulty of evaluating product categories on one page is also an unpleasant experience for consumers when searching online shop [5].

Virtual layout and design according to Vrechopoulos et al. (2002) consists of grid/tree layouts, free-form/pipeline layouts and racetrack/guiding layouts. The free-form/pipeline layout type is significantly more useful when consumers find product lists on the site, but the grid/tree layout is the easiest to use compared to the other two types of layout, and the most entertaining is the free-form/pipeline layout. Griffith (2002) stated that tree layouts have a more positive influence on perceptions, consumer attitudes and consumer intentions to buy than tunnel/pipeline layouts. The difference in results from previous studies raises the curiosity of researchers to re-examine the effect of the three types of layout in online shop on the perception of consumers who use website of online shop.

This study examines the influence of the layout of online stores on consumer perceptions in the form of perceived benefits, perceived ease and perceived entertainment consumers who have used the site of online shop. This study uses online shop website that sells products from the MSMEs in Lampung. Some previous studies have different results on the effect of the three types of layout. According to Vrechopoulos et al. (2002), pipeline layout type is more effective in finding product lists and the most entertaining, while according to Griffith (2002) tree layout type has the most positive influence on perceptions, attitudes and intentions of consumers to buy products via online. Ijaz et al. (2016) conducted a study on three types of layout through experimental studies and looked at the effect of these layout differences on perceived usefulness of consumers, perceived convenience by consumers, entertainment and time spent on consumers on sites online.

Experimental research has very low external validity; therefore looking at cultural differences and the characteristics of participants in the research of Ijaz et al. (2016), we conduct an experimental study in Lampung

using products derived from the production of several MSMEs in Lampung. Identification of the problem on the different effects of the type of layout leads us to formulate the problems of do consumers have different perceptions on tree layout, pipeline or guiding pathway layout? The purpose of this study is to prove that consumers have different perceptions of tree layout, pipeline or guiding pathway layouts

2 Literature review and hypothesis development

Tree layout is a type of layout adapted from grid layouts on conventional store layouts, which is a hierarchical structure of categories products to sub-categories of products. This layout uses button "home" or "back" to visit the product category.

Pipeline layout is a layout adapted from free-form layouts in conventional stores. This layout aims to give consumers the freedom to move from another product category to the next category, usually provided a column "search" on the site page.

Guiding pathway layout is a layout adapted from racetrack layouts in conventional stores. On every page of the consumer site directed by the system on navigation through specific patterns in the store to reach or find the intended product. Direct access is only possible in adjacent product categories [8].

According to Tandon et al. (2017), the perceived benefits of variables consists of three indicators as follows.
Leisure Time. The convenience of time provides potential alternative ways for consumers to save time in shopping online rather than traditional stores.
Product Benefits. Product benefits refer to the variety and description of products offered to consumers. Online shops provide product variations rather than traditional stores, therefore consumers need to see product descriptions to get the best deals. Explanation of product descriptions can help consumers to choose products according to their needs.
Benefits of Promotion. The benefits of promotion have an impact on consumers' interest in buying. Promotion is very useful for consumers to compare prices or get products at lower prices. Attractive promotional offers can be good criteria for visits website.

Based on Ghosh (1994) and Lewison (1994), the layout of the grid layout in conventional stores and Russell (2009) is very helpful for consumers in finding the products they have planned to buy and when adapted to the layout of stores online it will be in accordance with the type of tree layout.

According to Nielsen (2012) the usage relates to the ease of users to be able to learn to manage the systems used such as: the ease of memorizing basic functions, the level of efficiency of the website designed the level of error avoidance and general satisfaction of users in terms of management. Tandon et al. (2017) argued the perceived usefulness of variables consists of three indicators as follows.

Ease of use. Ease of use is a level or condition where a person believes that using a technology system more flexible, easier to understand, and easier to operate.
Ease of Purchase. Ease of purchase refers to the clarity of information offered to consumers to make it easier to choose and buy products.
Ease of Understanding. Ease to understand is associated with websites that are clear and understandable as the language used, the more detailed the information pages and the transaction process in order to facilitate the consumers to get the product in practice.
Ease of Ordering. Ease of ordering is an activity related to consumers before making a purchase on the website, such as easily tracking orders and easily cancelling orders.

In free-form layout in conventional store, consumers find it easier to explore stores, which in this online store are in accordance with the pipeline layout [14], [15]. Layout design for the online store can increase the level of pleasure of consumers who have experienced transactions in the store [16]. Retailers who use racetrack layout can create entertainment value for consumers [17].

Hypothesis: There are differences in consumer perception on the layout tree layout, pipeline or guiding pathway layout in online store website.

3 Research method

The research design used was a laboratory experiment. According to Sekaran & Bougie (2010), laboratory experiments are one of the experimental designs that are artificially designed and there are controls and manipulations to build causality among the variables used in research. Experimental Procedure; this research was conducted by giving treatment to the participants as stimulus of layout in online store with a different design. The experiment used was a 3x1 factorial design and the variable that became the treatment variable was the layout of online store site. Treatment level in this study consists of online store sites with type of tree layout, pipeline layout and pathway layout.

In the implementation of this experiment, it used between-subject design; participants were divided into three groups randomly, i.e. each participant was known and had the same opportunity to be in any group of the three groups. Each participant is subject to one treatment that exists from three types of online store layout, so that each group gets a different type of layout of online store. Questionnaires were given to participants when participants had entered and conducted transactions on the online store site with the treatment of each type of layout.

Development of treatment in this study was carried out by considering the layout design of online stores, the name of online stores and the types of products sold at online stores that became a stimulus in this experimental study. The name of online stores used is Pesolam (Order Souvenirs from Lampung) which sells products produced by the MSMEs in Lampung. The reason for using online shop is that in the future the website pages that have been designed can be used continuously to help MSMEs in Lampung in marketing their products so that they can reach a wider sales scope.

Manipulation checks are carried out by giving questionnaires to participants; previously participants were given treatment related to the layout of online stores. The questionnaire given to participants for manipulation checks contained questions about participants' perceptions about each of layout designs for online stores that they had tried on the website.

The variables used in this study are perceived usefulness/benefits, convenience, and entertainment as the dependent variable (Y), while the layout of online stores with the type of tree layout (X1), the layout of online stores with the type of pipeline layout (X2) and layout of online stores with pathway layout (X3) type as an independent variable.

The measurement of the independent variables will be done through a check of manipulation of treatment, which are online store sites with three different types of layout, which is carried out at the beginning of the experimental study process. Measurement of dependent variables in this study using a Likert scale. Likert scale is used to measure the perception of usability, convenience and entertainment. Data Analysis Method using MANOVA was applied in this study to compare the mean between the experimental groups.

4 Results and discussion

Manipulation checks

Manipulation check is examined to determine whether the participants were able to distinguish the type of online store layout consisting of Tree Layout, Pathway Guiding Pipeline Layout and Layout. Manipulation checks were performed on thirty participants. The results of manipulation check are analysed using One Sample t-Test.

Table 1. One Sample T-Test Tree Layout Results

Type of Treatment	Mean	Sig. (2 tailed)
Tree Layout	4.1	
Pipeline Layout	2.1	0.000
Guiding pathway	2.2	

From the results of the first manipulation check which is the tree design layout, the average value for the layout tree is 4.1, while for the other two types of layout design, the pipeline layout and guiding pathway layouts are 2.1 and 2.2. Based on the results of these calculations, the participants agreed that the first manipulation given was the tree layout.

Table 2. One Sampel T-Test Pipeline Layout Result

Type Of Treatment	Mean	Sig. (2 tailed)
Tree Layout	2.3	0.000
Pipeline Layout	3.9	

Guiding pathway	2.0	

From the results of the second manipulation check which is the design of the pipeline layout, the average value for the pipeline layout is 3.9, while for the other two types of layout designs, the tree layout and guiding pathway layouts are 2.3 and 2.0. Based on the results of these calculations, the participants agreed that the second manipulation given was the layout design of the pipeline.

Table 3. One Sampel T-Test Guiding Pathway Layout Result

Type Of Treatment	Mean	Sig. (2 tailed)
Tree Layout	2.2	
Pipeline Layout	2.2	0.000
Guiding pathway	3.8	

From the results of the third manipulation check which is the guiding design of the pathway layout, the average value for guiding the pathway layout is 3.8, while for the other two types of layout designs, the layout and pipeline layouts are 2.2 and 2.2. Based on the results of these calculations, the participants agreed that the third manipulation given was the design of the guiding pathway layout.

Hypothesis test
Testing the hypothesis of the type of online store layout consists of Tree Layout, Pipeline Layout and Guiding Pathway Layout, tested using MANOVA analysis tools with the assistance of SPSS 21.0 for Windows software.

Homogeneity of variance test
The initial assumption of homogeneity of variance should be confirmed in testing the hypothesis by conducting the MANOVA test. Assumption of the same variance is a requirement of testing with the MANOVA test; if the assumptions are not met then the F test is not sufficient for testing the average population group. The study applies Levene's test of homogeneity of variance to test the homogeneity of variance. The results of Levene's Test of perceived benefits and perceived entertainment are significant of more than 0.05, so that it meets MANOVA requirements, while for ease of perceived variance is not the same.

MANOVA test
In this study, hypotheses 1, 2 and 3 were tested with Multivariate of Variance (MANOVA). Manova analysis tool is used to be able to find out the results of different tests from the group average. The following is a Table 4 that shows the results of the Manova test conducted to test hypotheses 1, 2 and 3.

Table 4. Between-Subject Effect MANOVA Test Result

Dependent Variable	Mean square	F	Sig.
Perceived Usefulness	1.264	5.907	0.004
Perceived Ease	2.502	13.630	0.000
Perceived Entertainment	3.405	13.791	0.000

Table 4 shows that the Variable Tree Layout, Pipeline Layout and Guiding Pathway Layout affect consumers' perceptions of perceived benefits, perceived ease and perceived entertainment.

The average value of the benefits perceived by consumers when using a website with a design of tree layout of 4.456 which is the highest value compared to the design of pipeline layout and the guiding pathway layout that is equal to 4.1. This means that there is a significant difference between the average value of the benefits perceived by consumers when using the design of tree layout compared to the pipeline layout and guiding pathway layout.

The average value of convenience perceived by consumers when using a website with a design of pipeline layout is 4.483, which is the highest value compared to the tree layout and guiding pathway layout design, 3,975 and 3,991 respectively. This indicates that there is a significant difference between the average value of the benefits perceived by consumers when using the design of pipeline layout compared to the tree layout and guiding pathway layout.

The average value of entertainment perceived by consumers when using a website with the design of guiding pathway layout is 4,450 which is the highest value compared to the tree layout and pipeline layout design of 3,858 and 3,875 respectively. This means that there is a significant difference between the average value of the benefits

perceived by consumers when using the design of the guiding pathway layout compared to the tree layout and guiding pipeline layout.

5 Discussions

The layout design of an online store is something that needs to be considered because it greatly affects consumer perceptions when browsing the online store. Usefulness, ease and entertainment perceived by consumers greatly influence consumer purchasing decisions and the desire of consumers to re-purchase the products in the online store [2].

The highest value of consumer perception is in the design of pipeline layout, which is considered the easiest to use because there is a search column that makes it easy for consumers to directly search for items that they want to buy at the online store. The highest value on consumer perceptions about the benefits perceived when exploring the online store is in the design of layout tree because consumers can see a list of products based on category more clearly. For consumers who do not have a definite choice of what products will this purchase can be very helpful when looking at the list of products described by the online store. The highest value on entertainment perceived is in guiding the pathway layout because consumers can explore the types of similar product categories, so that in this layout consumers can get more information about alternative products from the products they buy, which of course can add time when used by consumers when browsing online stores.

6 Conclusion

Consumers have the perception that the design of tree layout more helpful for making purchases compared to the design of pipeline layout or guiding pathway layout.

Consumers have the perception that the design of pipeline layout is easier to use compared to the tree layout or guiding pathway layout design.

Consumers have a perception that the design of the guiding pathway layout offers more entertainment for them when navigating in online stores compared to the tree layout or pipeline layout design.

7 Implications / limitations and suggestions for further research

For further research, it is expected that this research can help to develop further research, and then it is suggested to further researchers to be able to add sample selection to non-student samples but in general, so that the findings can be generalized to the population as a whole.

Practitioners who have online stores or will create online stores should pay more attention to the layout design of the online store that will be used, must be adjusted to the characteristics of the intended consumer and the type of goods sold at the online store.

References

[1]   T. Liang and H. Lai, "Effect of store design on consumer purchases: van empirical study of on-line bookstores," *Inf. Manag.*, vol. 39, pp. 431–444, 2002.
[2]   M. Levy and B. . Weitz, *Retailing Management*. New York: McGraw-Hill Irwin, 2004.
[3]   R. L. Wakefield, M. H. Stocks, and W. M. Wilder, "The Role of Web Site Characteristics in Initial Trust Formation," *J. Comput. Inf. Syst.*, vol. 45, no. 1, pp. 94–103, 2004.
[4]   E. . Schaffer, "A better way for web design," *Inf. Week*, p. 194, 2000.
[5]   J. B. B. Ii and R. M. Lee, "InterShop: Enhancing the Vendor/Customer Dialectic in Electronic Shopping," *J. Manag. Inf. Syst. ISSN*, vol. 11, no. 4, pp. 9–31, 1995.
[6]   A. . Vrechopoulos, G. . Papamichail, and G. . Doukidis, "Identifying patterns in internet retail store layouts," *Financ. Eng. E-Commerce Supply Chain*, pp. 231–245, 2002.
[7]   D. A. Griffith, "An examination of the influences of store layout in online retailing," *J. Bus. Res.*, vol. 58, pp. 1391–1396, 2002.
[8]   M. F. Ijaz, W. Tao, J. Rhee, Y.-S. Kang, and G. Alfian, "Efficient Digital Signage-Based Online Store Layout: An Experimental Study," *Sustainability*, vol. 8, no. 511, pp. 1–20, 2016.
[9]   U. Tandon, R. Kiran, and A. Sah, "Analyzing customer satisfaction : users perspective towards online shopping," *Nankai Bus. Rev. Int.*, vol. 8, no. 3, pp. 226–288, 2017.
[10]   A. Ghosh, *Retail Management*, 2nd Editio. New York: The Dryden Press, 1994.

[11]   D. . Lewison, *Retailing*, 5th Editio. New York: Macmillan Publishing Company, 1994.

[12]   M. . Russell, "Narrowcast Pricebook-Driven Persuasion: Engagement at Point of Influence, Purchase and Consumption in Distributed Retail Environments," *JSW*, vol. 4, pp. 365–373, 2009.

[13]   J. Nielsen, "Usability 101: introduction to usability," 2012. [Online]. Available: www.nngroup.com/articles/usability-101-introduction-to-usability/. [Accessed: 01-Jul-2020].

[14]   F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *Manag. Inf. Syst. Q.*, vol. 13, no. 3, pp. 319–340, 1989.

[15]   S. P. Needel, "Understanding consumer response to category management through virtual reality," *J. Advert. Res.*, no. July-August, pp. 61–67, 1998.

[16]   D. Vazquez and M. Bruce, "Design management - the unexplored retail marketing competence," *Int. J. Retail Distrib. Manag.*, vol. 30, no. 4, pp. 202–210, 2002.

[17]   M. Levy and B. . Weitz, *Retailing Management*, 4th Editio. New York: McGraw-Hill Irwin, 2001.

[18]   U. Sekaran and Bougie, *Research Methods For Business: A Skill Building Approach*, 2nd ed. USA: Wiley, 2010.