

# Design of Men's Casual Bags with Tumpar Embroidery Motif using the Kansei Engineering Method and the Ergonomic Model

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**Abstract**—This study aims to determine product attributes of men's casual bags using embroidery tumpar motif from the design and product specifications according to user needs. Tumpar is embroidery from the Dayak tribe in East Kalimantan, Indonesia and has a unique motif. This study uses the Kansei Engineering method. The purpose of the Kansei Engineering method is to translate the image of consumers or consumer feelings into real design components in order to obtain flexible bag product specifications according to consumer desires. The objects observed were 55 men respondents who were given an online questionnaire due to the Covid 19 pandemic situation. From the the result of SPSS 25 abaout analysis factors that influence the design of men's casual bags, it is concluded that ergonomic factors and innovative factors greatly influence the design of the bag. The specification of ergonomics are small size, sling bag mode, light weight, netral color and need space to put personal items. The specification of innovative are simple but unique design, material from a combination of leather and natural materials, and regional cultural elements.

**Keywords**—Casual Bags, Tumpar Embroidery, Kansei Engineering, Ergonomic, innovative.

## I. INTRODUCTION

Bags have become a necessity that can facilitate our daily activities. A bag is a closed container that can be carried around. The materials for making bags include paper, plastic, and others. A bag that can be carried on your back is called a backpack, while a large bag to hold clothes is called a suitcase.

Bag users are from children to adults. The development of fashion is currently very fast, one of them is bag design. In the past, bags only functioned to carry goods, but now their function is more to enhance your appearance or for mere fashion purposes. Advertising is a medium that can accelerate the development of bag designs. These advertisements have succeeded in making the bag one of the best-selling fashion products to date. This makes people's mindset and behavior change, from seeing only a bag as a tool to lift objects to a part of fashion that can beautify and elevate the wearer's degree.

Design cannot be separated from the development of ideas, technical development, production processes and market enhancement. Trends will be formed from users, so that many models come and go. Based on its function,

most of the bag users are women, but with the development of bag models that are universally designed, many men also complement their fashion styles by using bags.

Bags that have elements of good health are those that have good ergonomic value. One of the ergonomic factors is the anthropometric dimension [1]. Bags that have elements of good health are those that have good ergonomic value. One of the ergonomic factors is the anthropometric dimension [2][3].

The most popular men's bag is the backpack, but nowadays men use a casual bag for their fashion i.e. sling bag, brief case, messenger bag, waist bag.

Sulam tumpar is the same embroidery in general, what distinguishes it is the embroidery motif [4]. Sulam tumpar is embroidery from the Dayak tribe in East Kalimantan, Indonesia. This embroidery motif is very unique when applied to fashion products such as men's casual bags.



Fig 1. Tumpar embroidery motif

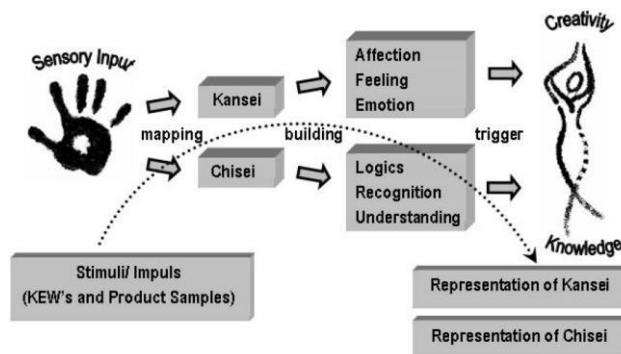


Fig 2. The working principle of Kansei Engineering

Lifestyle is a feature of a modern world, or what is commonly called modernity lifestyle and fashion have become a part inseparable from modern society in this era of globalization. The current design direction is towards personal identification, where the design adapts to the user's desires, character and lifestyle apart from design, shape and model, a design cannot be separated from ergonomic factors.

Kansei Engineering is a type of technology that translates customer feelings into design specifications [5]. In the Kansei method, emotional research requires all sensory input from the user.

This research is written to describe aspects of men's casual bags design that prioritize the emotional aspects (Kansei Engineering) and the Ergonomic aspects of users. If the Kansei Engineering method is carried out in a manner right, it will produce a product that is not only efficient but has aesthetic and ergonomic value.

## II. LITERATURE REVIEW

### 2.1. Kansei Engineering

Kansei comes from Japanese to describe the expression of one's impression of, situations, artifacts and surroundings. The Kansei process begins with gathering functions related to feelings, emotions and intuition, through the five senses (namely sight, hearing, smell, taste and skin sensation). Figure 2 shows the Kansei and five sensory processes in the brain structure [6].

In general the working principle from kansei engineering seen in figure 2 [7]. Discussions related to experiences that occur within the design team prior to the idea creation activity are another step in the design development process. [8].

Kansei design, inspired by Japanese philosophy and culture, is founded on a non-reductionist point of view. By focusing on the central relationship between humans and the world or the environment around them, it is hoped that it can generate dynamism, and more opportunities for creativity [9][10].

Kansei engineering (KE) is known as a user-oriented technology investigate the emotional needs of users and determine the relationship between emotions and the design features of a product [11]. Kansei can be used for developing strategies, new products, marketing campaigns and market segmentation projects at the near future [12].

Customer input in product development can be done through direct customer feelings. The role of the customer can provide a clear problem allocation to the emotional design orientation of the product. This can significantly enhance the customer's emotional experience [13].

Kansei refers to sensitivity, feelings and emotions [14][15][16]. Kansei is defined as a high function of the brain associated with emotions, sensitivity, feelings, experiences [17]. Research using Kansei involves sensitivity, precision, feelings and emotions that are aligned through the 5 (five) sense; sight, hearing, smell, taste as well skin sensation. The term Kansei was then translated into an engineering method called Kansei Engineering.

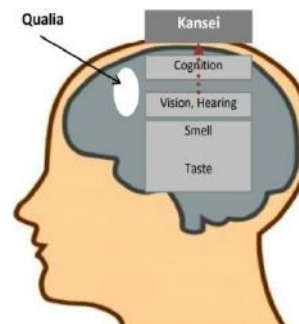


Fig. 3. The Process of Kansei

## 2.2. Kansei Engineering Techniques

In using the Kansei engineering method, input from respondents are required. respondents play an important role as input in the next process to analyze product design characteristics [18]. Consumer kansei measurement techniques depending on the methodology of the type KE will be used. There are at least 8 types of KE namely as follows [19][20].

- a) Type 1 is Category Classification : In Kansei Type-I, the first step is to determine the product strategy and create a concept in its design. Then collect the Kansei words related to the concept.
- b) Type 2 is the Kansei Engineering System : In Kansei Type II, it has a mathematical and statistical system for connects Kansei with the nature of a product. Kansei Engineering consists of a database that combines a number of Kansei words, images, knowledge, design, and color about the relationship between data.
- c) Type 3 is the Hybrid Engineering System : Kansei Type III is almost similar to Kansei Type II. The difference between the two types is that Kansei Type II can only change the consumer into a Kansei design parameters while Kansei Type III can predict the nature of a a product that is better known as a hybrid system.
- d) Type 4 is Kansei Engineering Modeling : This type of Kansei Modeling implements a mathematical model that aims to predict consumer feelings into words.
- e) Type 5 is Virtual Kansei Engineering : This type of Kansei Engineering is an extension of the KES technique that uses virtual reality (VR), a powerful technology for placing consumers in 3D virtual environment
- f) Type 6 is Collaborative KE Design : Collaborative Kansei Engineering Designing is a type of Kansei that is supported by the system Internet.
- g) Type 7 is Concurrent KE : Concurrent engineering methods are used for integrating the design department with the production department. Design stage divided into 2 stages, namely the project planning stage and the conceptual design stage.
- h) Type 8 is Rough Set KE : A way to use rough set theory in Kansei Engineering considering multiple users and/or multiple Kanseis.

## III. METHOD

1. Initial research design : at this stage the target group, market and specifications of new products
2. Collect Kansei word gathering: Kansei words can be adjectives, nouns, verbs and sometimes sentences. This stage is part of the Category Classification method is a structural tree of events main to other parts of the incident
3. Preparation of the Differential Semantic (SD) questionnaire: Differential Semantics (SD) is a measure psychological. At this stage, kansei words that have been collected previously paired with the opponent of kansei words
4. Distributing questionnaires SD I : This stage is carried out by distributing questionnaires to customers and batik sellers for evaluate each pair of words that kansei has designed.
5. Statistical analysis I : Kansei I word selection is done with several statistical methods such as validity test, test reliability and factor analysis.
6. Design : The statistical analysis results above are a number design categories and elements to suit kansei men's casual bag customer.

## IV. FINDINGS AND DISCUSSION

### 4.1. Target Group, Gap, and New Product Spesification

The object of the study was men aged over 20 years. The questionnaire was distributed online due to the Covid 19 pandemic conditions towards 55 respondents who live in the East Kalimantan region. Gap in this research focused on customers who want a casual bag for men who have a new look according to the customer's emotions.

At the end of the research, product specifications are wanted to be achieved in the form of a new motif Bag for men with characteristics a design adapted to the male character, also according to the principles of ergonomics.

### 4.2. Collect Kansei Word

Kansei word collection is obtained from distributing questionnaires to users. From the results of the collection of kansei words, 46 kansei words are obtained which will then be classified based on 10 categories and finally will be used as the basis for making semantic differential I questionnaires. Category Classification of Kansei Word shown in Table 1. Category Classification is a method for reduce data by creating levels (levels) from main concept to sub-level concept.

Table 1 Category Classification

<b>Exclusive</b>	<b>Cool</b>	<b>Formal</b>	<b>Contemporer</b>	<b>characterized</b>
elegant	Fashionable	traditional	Mix	typify
Deluxe	Modern	old fashion	up to date	designed
elite		out of date	present	indicate
classy		Classic		Specify
luxurious				
<b>Ergonomics</b>	<b>Identity</b>	<b>Awesome</b>	<b>accessory</b>	<b>innovative</b>
comfort	alignment	eye catching	detail	futuristic
functional	closeness	amazing	specific	new
aesthetic	uniformity		attribute	unique
Efficient	similaarity		point	
			feature	

$R_{table} < R_{count}$  means the data is valid and can be used for further testing (Table.3).

Table 3 Validity Score

	Rcount	R table	Ket
<b>Exclusive (X1)</b>	0.773	0.266	Valid
<b>Cool (X2)</b>	0.592	1.266	Valid
<b>Formal (X3)</b>	0.846	2.266	Valid
<b>Contemporer (X4)</b>	0.856	3.266	Valid
<b>Characterized (X5)</b>	0.672	4.266	Valid
<b>Ergonomics (X6)</b>	0.884	5.266	Valid
<b>Identity (X7)</b>	0.813	6.266	Valid
<b>Awesone (X8)</b>	0.843	7.266	Valid
<b>eature (X9)</b>	0.952	8.266	Valid
<b>Innovative (X10)</b>	0.909	9.266	Valid

4.3. Semantic Differential I Questionare

Table 2 Semantic Differential I Questionare

<b>Exclusive</b>	5	4	3	2	1	Non exclusive
<b>Cool</b>	5	4	3	2	1	Unfashionable
<b>Formal</b>	5	4	3	2	1	Unformal
<b>Contemporer</b>	5	4	3	2	1	Classic
<b>characterized</b>	5	4	3	2	1	Uncharacterized
<b>Ergonomics</b>	5	4	3	2	1	Not ergonomic
<b>Identity</b>	5	4	3	2	1	unidentity
<b>awesone</b>	5	4	3	2	1	awful
<b>feature</b>	5	4	3	2	1	entity
<b>innovative</b>	5	4	3	2	1	uninnovatif

4.4. Statistical Analysis

- Validity test

Validity test is to determine validity whether or not a questionnaire. if the question is able to reveal something which you want to measure in a study, the questionnaire is valid.

Validity test using SPSS 25 with 10 variables from the classification of kansei word categories, obtained valid results for each variable. he value of

- Reliable Test

Reliability test shows consistency and stability of a score (measurement scale). Reliability is different with validity because it focuses on consistency issues and more attention to accuracy problem. To find out the reliability value of the 10 measured variables is from the cronbach alpha value. The data is reliable because Cronbach alpha 0. 941 (Table 5). If Cronbach alpha value  $\geq 0.6$  then the variable is reliable.

Table 4 Reliability Score

Reliability Statistics	
Cronbach's Alpha	N of Items
.941	10

4.5. Factor Analysis

Factor analysis is a reduction procedure data in multivariate statistical techniques. With the correlation between variables will be formed a new variable (variable latent) which is less number than the variable initial (manifest variable).

In the Kansei concept Engineering System, the results of this factor analysis will be focus space in determining

the items and product design categories based on image or feeling customers in the word kansei.

From the results of this factor analysis (Fig. 5) it is known that in choosing the casual men's bag based on feelings or images the product is influenced by 2 factors. That factors are grouping 10 existing variables into ergonomics factor and innovation factor (table 3 and table 4).

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.832	68.317	68.317	6.832	68.317	68.317	5.001	50.011	50.011
2	1.353	13.534	81.851	1.353	13.534	81.851	3.184	31.839	81.851
3	.675	6.751	88.602						
4	.407	4.070	92.672						
5	.274	2.738	95.410						
6	.191	1.915	97.325						
7	.094	.939	98.264						
8	.085	.855	99.118						
9	.056	.562	99.680						
10	.032	.320	100.000						

Extraction Method: Principal Component Analysis.

Fig. 4 Total Variance Explained

	Component Matrix <sup>a</sup>	
	Component	
	1	2
x1	.791	-.296
x2	.552	.774
x3	.858	.123
x4	.843	.480
x5	.702	-.579
x6	.903	-.009
x7	.815	.048
x8	.848	-.277
x9	.961	-.035
x10	.916	-.083

Extraction Method: Principal Component Analysis.  
 a. 2 components extracted.

Fig. 5 Components Matrix

	Rotated Component Matrix <sup>a</sup>	
	Component	
	1	2
x1	.816	.215
x2	.003	.950
x3	.629	.596
x4	.411	.879
x5	.907	-.066
x6	.732	.530
x7	.637	.510
x8	.852	.264
x9	.804	.527
x10	.796	.462

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 3 iterations.

Fig.6 Rotate Componen Matrix

Table 5 Analysis Factors

	Variable	Score	Name of factors
1	Exclusive	0.816	Ergonomics
	Formal	0.629	
	characterized	0.907	
	Ergonomics	0.732	
	Identity	0.637	
	awesone	0.852	
	feature	0.804	
2	innovative	0.796	Innovative
	Cool	0.950	
	Contemporer	0.879	

4.6. Spesification Design

From the analysis of the factors, the influence of the casual men's bag design are ergonomic factors and innovation factors. Then, a further questionnaire was distributed to find out what the ergonomics and innovation criteria are needed, and the average results were obtained :

Table 6 Specification Design

Ergonomic	Innovative
<ul style="list-style-type: none"> <li>Bags need space to put vehicle keys, cigarettes / vape, note books, pen,</li> </ul>	<ul style="list-style-type: none"> <li>Simple but unique design</li> </ul>

wallet or handphone.	<ul style="list-style-type: none"> <li>Material from a combination of leather and natural materials (ulap and sulam tumpar doyo)</li> <li>regional cultural elements</li> </ul>
<ul style="list-style-type: none"> <li>Small Size</li> <li>Sling Bag is more popular than waist bag and backpacker.</li> <li>Light weight</li> <li>Netral color</li> </ul>	

## V. CONCLUSION

From the analysis and discussion, it can be concluded that :

1. The design of men's casual bags is influenced by ergonomic and innovative factors.
2. The specification of ergonomics are small size, sling bag mode, light weight, netral color and need space to put vehicle keys, cigarettes/vape, note book, wallet or handphone.

The specification of innovative are simple but unique design, material from a combination of leather and natural materials, and regional cultural elements (tumpar embroidery motif)

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