Identification of Ergonomic Factors of Rattan Bag Handicraft Products in Indonesia

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Abstract: Ergonomics is a field of science that pays attention to the suitability of products with humans as users. One of the products used by humans is handicraft products. Rattan handicrafts are works of art that have great opportunities for improving the economy in Indonesia. One of these handicraft products is a bag made of rattan. Rattan bags continue to be developed in production and innovation to meet market needs. With these market opportunities following the direction of the Indonesian government's policy to increase rattan craft innovation, this study aims to find the application of ergonomic factor analysis to rattan bag handicraft products in Indonesia by reviewing previous studies, sources, journals, books, and websites. From the SLR and PRISMA method findings, most references mentioned the importance of ergonomics in increasing product innovation of rattan bags through the importance of the user's anthropometric role in designing rattan bags. It also includes the importance of ergonomic handle designs, placing items in the bag for easy to find, and using rattan materials that are processed in such a way that they are more robust in accommodating loads and safe and comfortable in designing rattan bags in Indonesia.

1 INTRODUCTION

Rattan is the second most important economic product of forest products after bamboo (Pratono, 2019). Rattan raw materials can be sold directly and can also be used as material for the manufacture of handicraft and furniture products. One of the producers of rattan raw materials in the world is Indonesia, where around 70-80 percent of rattan raw materials are produced in Indonesia (Octavia & Nugroho, 2019).

With high rattan resources, it provides an excellent opportunity for Indonesia to make and develop products made from rattan, especially handicrafts made from rattan. This handicraft in the form of woven rattan has existed since ancient times in Indonesia. One of the points in the Master Plan for Indonesia's National Industrial Development 2015-2035 states that to increase industrial development in Indonesia, it can rely on increasing competitiveness and product quality, one of which is rattan handicrafts.

From the master plan, the rattan handicraft industry is expected to achieve quality products to improve Indonesia's economy by 2020-2035. One of the steps taken to achieve the appropriate quality of rattan handicraft products is to increase research and innovation activities in developing rattan handicraft product designs (Perindustrian, 2015).

Various types of rattan handicraft products that are commonly made are baskets, bags, and mats. Rattan bags have the potential to develop product innovations from a variety of materials and shapes. The shape and uniqueness of the rattan bag have various forms that can attract buyers. As a product, rattan bags need to be developed in order to have better product quality. Product quality can be developed through an ergonomic design (Armougum, Gaston-Bellegarde, Joie-La Marle, & Piolino, 2020).

In determining the direction in developing rattan bag products that have innovations according to the directions of the master plan, it is necessary first to know the extent to which ergonomic factors play a role in the development of handicraft products made of rattan bags. Therefore the ergonomic requirements of rattan bag craft products in Indonesia will be an essential part of meeting consumer needs and satisfaction and will further affect the economic value of the product itself.

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This study was conducted to find the application of ergonomic factor analysis to rattan bag products in Indonesia by reviewing previous studies. The final result of this research using A Systematic Review and PRISMA will later seek conclusions about the role of ergonomic factors in developing product innovation, especially rattan bag handicraft products in Indonesia.

2 LITERATURE REVIEW

2.1 Handicraft from Rattan

Products from rattan can be found in the form of furniture and handicraft products. Rattan is one of the natural raw materials for non-timber forest products used to manufacture various products. According to Gu and Zhang (2020), rattan raw materials can be processed through traditional handicraft techniques. Rattan strips can be arranged and made to support each other in the webbing to provide a product's flexible, lightweight, comfortable, and durable support.

Indonesia is one of the world's largest producers of rattan raw materials. These rattan plants are often found in Kalimantan, Sumatera, and Sulawesi. Since ancient times in Indonesia, processing raw rattan materials has been an art of production from furniture and handicraft products. These handicraft products can function as a tool to carry or store garden and forest products.

Figure 1. is an example of a rattan bag handicraft product that was most often used to store garden products and animal hunts on the island of Kalimantan, Indonesia (DekranasdaKaltim, 2015).

Figure 1: Handicraft rattan bags (DekranasdaKaltim, 2015).

2.2 Ergonomic Factors in Handicraft

Today, handicraft rattan bags in Indonesia made by industry are now shifting from storing gardening products to functions for modern living needs, such as rattan fashion products used when going to shopping centers or traveling to tourist attractions, and can even be used at formal events. Figure 2 is an example of rattan handicrafts as bags that can be used in these activities (Manika, 2021).

Figure 2: Rattan handicraft products and their functions today (Manika, 2021).

With the addition of the function of the rattan bag product into a fashion bag product, it is necessary to design a rattan bag product design that is more comfortable, aesthetic, and creative that is adapted to its function as a fashion product today.

According to Choi et al. (2021); (Leung, Shin, Han, & Jiao, 2021), developing an ergonomic product design must pay attention to human activities as users. The development of innovative products such as more ergonomic handicrafts can result in higher user satisfaction because the products are more comfortable and safe to wear (Aminy & Purwaningrum, 2021; Kim, Sung, Saakes, Huang, & Xiong, 2021).

2.3 The Systematic Literature Review Method

The systematic literature review (SLR) method identifies, reviews, evaluates, and interprets all available research with topic areas of interest. The SLR method can be carried out through systematic review and identification of journals, which follow the steps or protocols set (Triandini, Jayanatha, Indrawan, Putra, & Iswara, 2019).

A systematic literature review was carried out to guide identification and analysis. A systematic review was undertaken to serve many vital roles in synthesizing the state of knowledge in the field. In addition, this review can also answer questions that otherwise cannot be answered by studies (Akhigbe, Zolnourian, & Bulters, 2017; Gonçalves, Castro, Araújo, & Heineck, 2018; Page et al., 2021).

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) aims to improve the quality of systematic reviews to produce more transparent results. Preferred reporting items for systematic review and meta-analysis guidelines

(PRISMA) were adopted to explore the literature systematically. PRISMA can be done through the stages of Identification, Screening, and eligibility (Hulshof et al., 2021; Oluleye, Chan, & Olawumi, 2022).

3 METHOD

This research will use A Systematic Literature Review. The steps in this research are :

a)Research Questions
Research Questions are made based on the research objectives to be achieved later.

b)Search Process
The data search process is carried out to answer research questions from journals, proceedings, and books.

c)Inclusion and Exclusion Criteria
This step is to decide whether the data obtained are feasible or not in SLR research.

d) Quality Assessment
The data that has been obtained will be analyzed and evaluated in SLR research based on the following quality assessment criteria questions.

e) Data Collection
Data collection is the stage where data for research is collected.

f) Data Analysis
At this stage, the data that has been collected will be analyzed.

g) Deviation from Protocol
As a result of the study, the authors wrote several changes to the deviation from protocol.

4 RESULT AND DISCUSSION

a) Research Question
Research Question based on the purpose of this research are several questions, namely:

RQ1: What are the ergonomic factors in the development of rattan bag products from 2016-2022?

RQ2: What are the ergonomic factors in supporting the development of rattan bag products in Indonesia?

b)Search Process.
The process of searching for data in this study to answer research questions came from journals, proceedings, and books which were carried out using search engines from sites such as Scopus, Google Scholar, and Springer Journal.

c) Inclusion and Exclusion Criteria.
In this step, it is necessary to decide whether the data obtained are feasible or not in SLR research. The feasibility of this study is based on:

1. Data used in the period 2016 - 2022.
2. Data was obtained through Scopus, Google Scholar, and Springer journals sites.
3. The data used only relates to ergonomic factors in developing handicraft products made of rattan bags in Indonesia.

d) Quality Assessment
The data that has been obtained will be analyzed and evaluated in this SLR study. The data is based on the following quality assessment criteria questions:

QA1: Are journals, proceedings or books discuss about ergonomics in the development of rattan bag published in 2016-2022?

QA2: Does the journal discuss ergonomics in the development of rattan bag products in Indonesia?

From each research obtained, an answer value for each of the questions above will be given, namely:

1. Y (Yes): for the role of ergonomic factors in ergonomics research in developing rattan bag products in Indonesia during the 2016-2022 period.
2. N (No): the role of ergonomic factors is not used in research on the development of rattan bag products in Indonesia during the 2016-2022 period.

e) Data Collection
Data collection is the stage where data for research is collected. The data collection process can be seen in Figure 3.

f) Data Analysis.
At this stage, the data that has been collected will be analyzed to show:

1. The role of ergonomic factors in the development of rattan bag products from 2016-2022 (referring to RQ1).
2. The role of ergonomics used in research on rattan bag products in Indonesia (refer to RQ2).

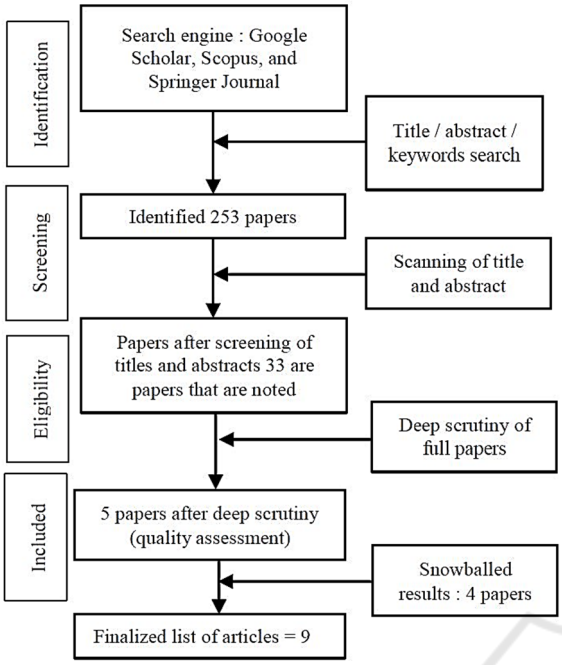

Figure 3: Flowchart articles selection.

g) Deviation from Protocol

As a result of the study, the authors wrote several changes to the deviation from protocol:

1. Identify the role of ergonomic factors in developing rattan bag products in Indonesia (Research Question).
2. Collect journals, proceedings, and books to answer and ensure the role and analysis of ergonomics in developing rattan bag products in Indonesia as needed, as shown in Table 1.
3. Expand the description of SLR.

Table 1: Quality assessment results from articles.

No	Years	QA1	QA2
1	2016	37	1
2	2017	50	1
3	2018	48	0
4	2019	61	0
5	2020	32	1
6	2021	21	2
7	2022	9	0
Sum		253	5

Data Analysis

Data analysis from the literature review results with the snowballed process is shown in table 2.

Table 2: Articles that have been selected from the process.

No	Authors/ Years	Gaps	Results
1	(Shyafary & Rahman, 2016)	Ergonomic analysis to determine the weight of the bag and product dimensions according to the user's anthropometry.	The bag is designed using rattan as an accent as well as elevating local wisdom from the use of rattan raw materials.
2	(Ho & Nirmal, 2017)	Ergonomic handles on bag products can provide a comfortable feeling when using the bag.	In addition to the need for a handle on the bag, it is also necessary to pay attention to the volume of bags users can carry.
3	(Shyafari & Pahrani, 2017)	The size of the rattan bag must be adjusted to the user's anthropometry, and the material used needs to be reviewed in terms of safety and comfort when used.	Human measures closely related to comfort can be traced through anthropometric science to achieve comfort and functionality of the product.
4	(Bitan, Ramey, & Milgram, 2019)	The importance of placing items in the bag is needed when it will be used, easy to find, and reach the user.	Designing a new bag requires attention to the ease of finding equipment in terms of each part's position, shape, and color.
5	(Wulandari & Puspitasari, 2020)	Ergonomics is a supporting factor in maximizing the aesthetic value of rattan products.	This research discusses the production process of making products from woven rattan and aims to determine product comfort standards,
6	(Ramadan & Al-Tayyar, 2020)	The load on the bag should not exceed 10	Exploration of bag design development based on

		percent of the body weight.	primordial studies and testing the developed backpack by comparing it with existing bags.
7	(Samri & Rudiyanto, 2021)	Products made of comfortable rattan require anthropometric data to determine the size of an ergonomic handle.	Appropriate ergonomics and anthropometry play a role in product development using rattan material.
8	(Andansari, Keliwar, & Pristanti, 2021)	Material is one of the factors that can increase the emotions of bag users.	Factors influencing people's preferences in choosing a bag of attractiveness, color, material, design, and variance.
9	(Sudana & Mohamad, 2021)	Convenience and anatomical size of the product that does not fit the user can affect the user's comfort.	The concept of developing arts and crafts can be carried out through diversification and innovation in production, product, and distribution technology, according to technological advances and market dynamics.

From snowballed obtained nine articles related to the research objectives, namely identifying and analyzing the application of ergonomic factors in handicraft products of rattan bags in Indonesia. In searching articles from journals, proceedings, and books obtained from 2016-2022, 253 articles were identified as articles about ergonomics, bags, and rattan. This process was followed by a screening process through abstracts and titles so that 33 articles were obtained. The process is carried out for better results by conducting a quality assessment through the eligibility process, and five articles have been selected. In this process, the snowballing process will be continued.

From the nine articles obtained after the snowballing process, conclusions can be found from the identification and analysis of the application of ergonomic factors to rattan handicraft products in Indonesia, namely:

1. The importance of using user anthropometric data in designing rattan bags. To design an ergonomic rattan bag, anthropometric data is used to measure the bag strap's dimensions and length. Anthropometric data used as the basis for the minimum size are from Asian ethnic groups, with the female gender in the 50th percentile. Figure 4 is an example of applying the length of a rattan bag sling strap with a size of 64 cm.

Figure 4: The length of the bag strap (Shyafary & Rahman, 2016).

2. The importance of ergonomic handle design on rattan bags. Ergonomic handles can be the size and shape of the handles and straps on the bag. An ergonomic handle can provide comfort when used. Figure 5 is an example of a handle on a bag that is not ergonomic.

Figure 5: Non ergonomic handle (Ho & Nirmal, 2017; Samri & Rudiyanto, 2021).

3. It is important to place items in the bag when it is used so that it is easy to find. The need for placing items in the bag will form the spaces in the bag into several parts. This makes it possible for the bag to have one area for placing items and an item area for other products such as keys, wallets, and cell phones.

4. The rattan bag material used must have comfort and safety when used. Its importance to use rattan material that is processed in such a way that it is more comfortable, safe and robust in accommodating the load carried in the bag. The use of a combination of materials and the shape of the rattan weave can affect it. The shape of woven rattan with various motifs, as shown in Figure 6, can be selected and adjusted to the designed bags' needs, functions, and sizes.

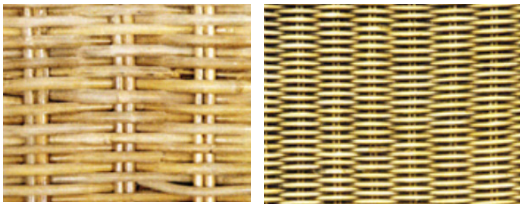

Figure 6: Some examples of rattan motifs (Samri & Rudiyanto, 2021; Wulandari & Puspitasari, 2020).

Thus, in developing innovative rattan bag handicraft products in Indonesia in the future, it is crucial to pay attention to these ergonomic factors.

5 CONCLUSIONS

In search of journals, proceedings, and books obtained from 2016-2022, 253 articles were identified that wrote about ergonomics, bags, and rattan in Indonesia. There are nine articles related to the research objectives, which contain the importance of the user's anthropometric role in designing rattan bags, the importance of ergonomic handle designs, placing items in the bag as needed when it will be used so that it is easy to find and the use of rattan materials that are processed in such a way that they are stronger, safer and more comfortable in carrying loads on rattan bags.

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