

## ORIGINAL ARTICLE

# DESIGN SPECIFICATIONS OF ERGONOMIC SOFA THROUGH SOFA MAKERS PERCEPTION: A CASE STUDY IN MALAYSIA

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## ABSTRACT

*Development of ergonomic sofa design is a design process that has the basic framework specification and type of material that is applied on the sofa design. This is due to human consumption that is closely related to ergonomic design of this specification which will affect human physical. To achieve this goal, a survey involving 30 respondents of sofa makers was conducted to get feedback regarding the sofa design specifications. Survey questions emphasize on the basic specifications and material dimensions of sofa materials used. The results of data analysis show that the size of basic dimensions and materials is essential in designing an ergonomic sofa. The survey is very important to find out the basic specifications in the development of ergonomic design through perception of sofa maker.*

**Keywords:** Quality of life, young adults, rural, unemployed, chronic diseases, mental distress

## INTRODUCTION

The future development of furniture industry depends on the extent to which it is able to respond to the needs of present and future conditions where by government support should be to strengthen the competitiveness of furniture entrepreneurs<sup>1</sup>. Although the functions, objectives and functions of a design as a whole is not clear, the attention given to the concept of ergonomics in product design and response from consumers will generally provide comfort and suitability to the limits of human physical capabilities and produce a high quality product<sup>4</sup>. A design was created to provide a basis for process design specification in understanding the creation of quality product identity<sup>2</sup>.

History shows that most people do not want to think about the chairs they sit on, yet highly complex tasks are involved in producing the chair that they need to learn to sit down and finish it<sup>3</sup>. However the reality of concepts and methods in industrial design in Malaysia at present is more focused on designing a beautiful, inexpensive and brief chair. Many studies focused on risk factors and actions in a design that increases the probability of pain, suffering and injury due to a mistake from the early stage of design process. However, this risk is reduced when the seat support area and the dynamic nature of the

existing movement exist. Although ergonomics is one of the functions that is taken for granted, contributions of past studies have had many impacts on a perfect product<sup>4,5</sup>. Hence, human consumption factor in determining the function and role of a product should be taken into account in the process of designing a product.

Technological developments are very closely related to ergonomics as they look to the harmony of human and operate the product when used together<sup>6</sup>. Ergonomic is dependent on the ability of people. So the design of a product should be adapted to the physical characteristics of humans that takes into account the aspect of movement of human activities, views, thoughts and others in the current situation<sup>7</sup>. So this study serves to establish some main specifications that are very important in the development process in line with ergonomic sofa design factor for human consumption. The researchers also noticed that the basic specification is supported in an ergonomic design development process improvement. Product design is rarely considered in the creation of entirely new products, but it is so in modifying existing products to the level of the most efficient and perfect<sup>8</sup>.

## RESEARCH METHODOLOGY

Researchers have developed a method of classification as an important tool in the development of furniture design including public participation in the design process. A questionnaire survey was developed in order to identify the perception of sofa makers related to ergonomic design and comfortability of sofa. The

respondents were randomly selected in the vicinity of industrial and small entrepreneurs in Kelantan. It involves 30 respondents in order to identify the perception of sofa makers on the size and material specifications to suit the needs of today's design of ergonomic sofa. Public participation can create a sense of ownership, provide a better understanding of the specific local context and be able to reflect the ideas of society in Malaysia<sup>9</sup>.

**Development of design methods:**

- a) Questionnaire survey: In this study, researchers have developed a questionnaire to be distributed to existing sofa makers around the industrial and small entrepreneurs in Kelantan, involving 30 respondents to identify the perception of sofa maker regarding the size specifications and requirements in the development of ergonomic sofa design nowadays. In addition, unstructured observations, such as photos and notes of the data from the field have also been used.
- b) The flow chart of the development method of sofa design.

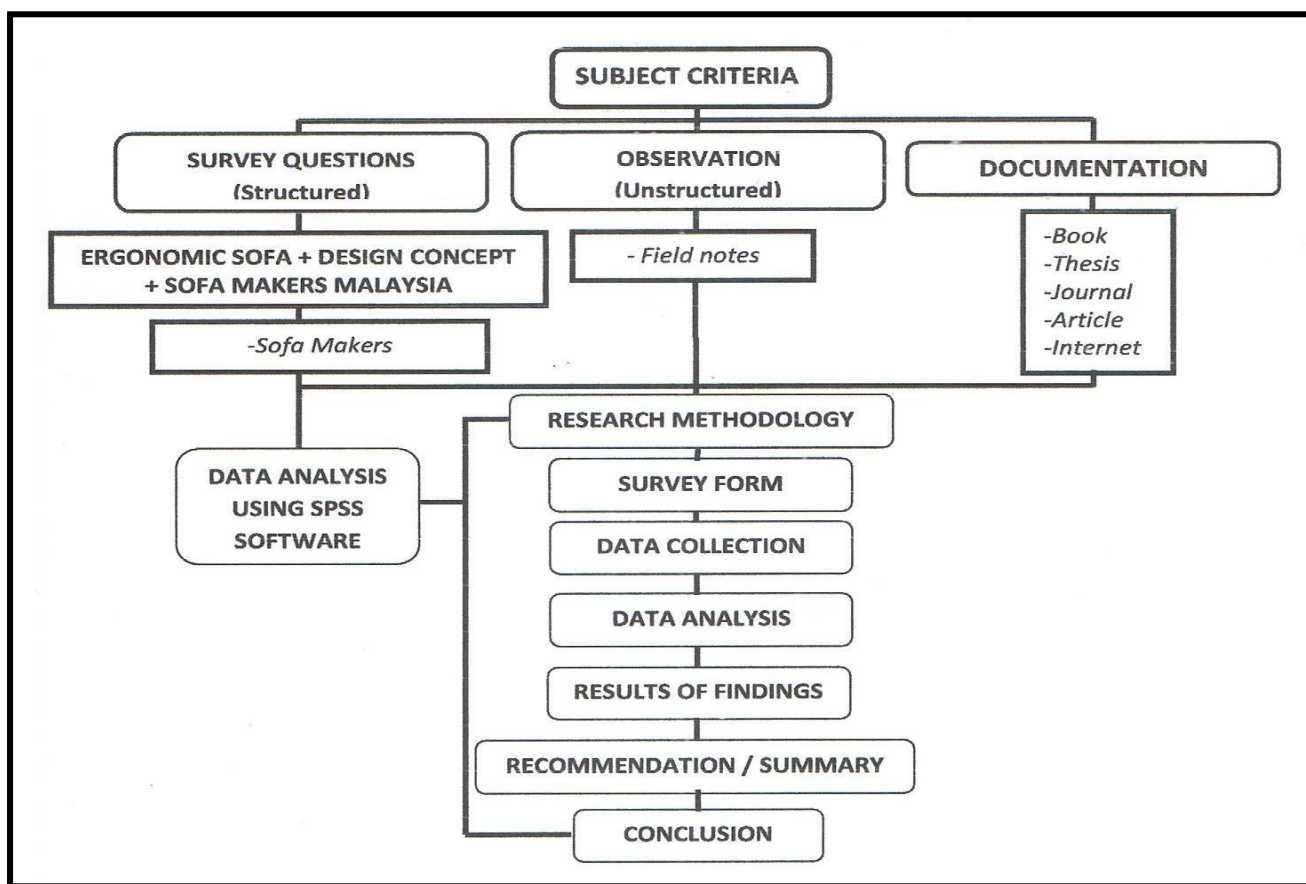


Figure 1 - Flow chart of the research methodology used in this study

**RESULTS ANALYSIS AND DISCUSSION**

Sofa manufacturer's feedback was gathered from a questionnaire distributed among 30 people that are involved in the sofa making industry and small entrepreneurs of sofa makers. The survey has focused on typical dimension of a sofa, type

of material, sofa manufacturing process, the application of technical drawing and the perception of sofa makers about sofa making. This section presents the results and discussion on eight dimensions (A-H as in Figure 2) related to sofa design.

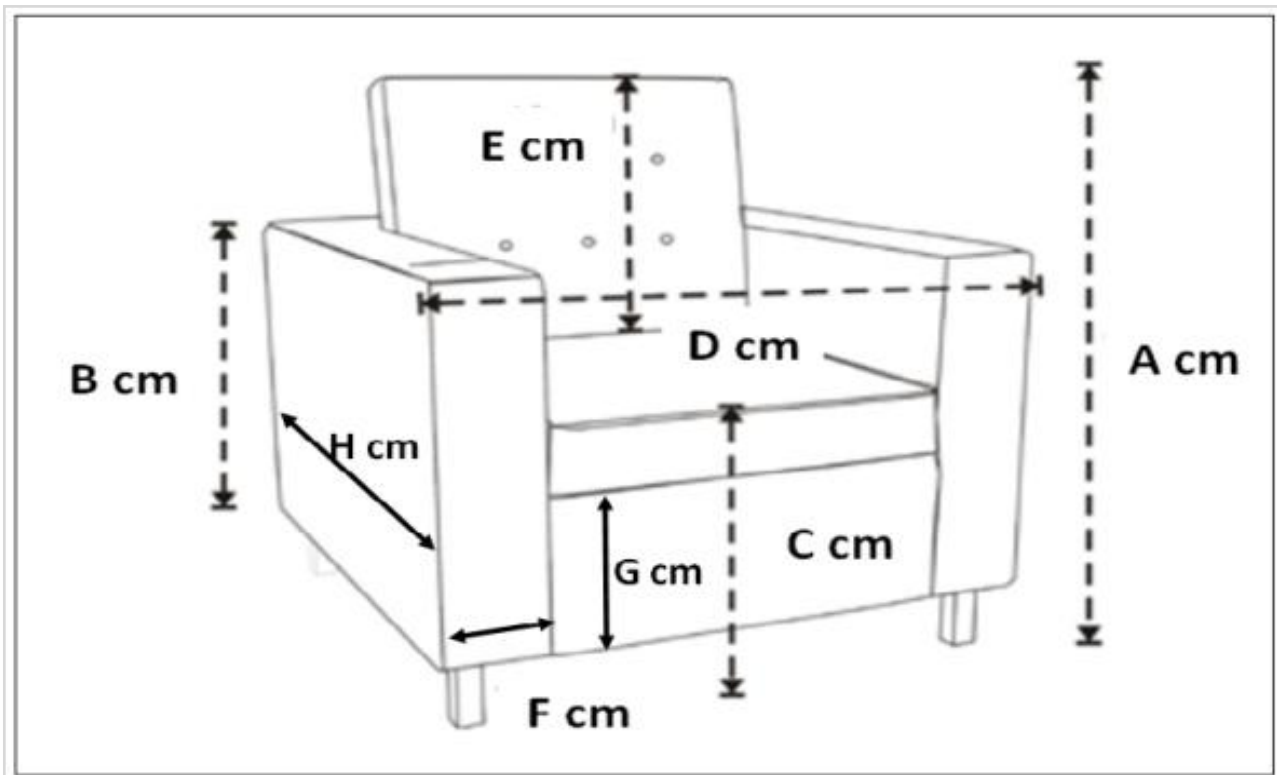


Figure 2 - Eight dimensions (A-H) of sofa design

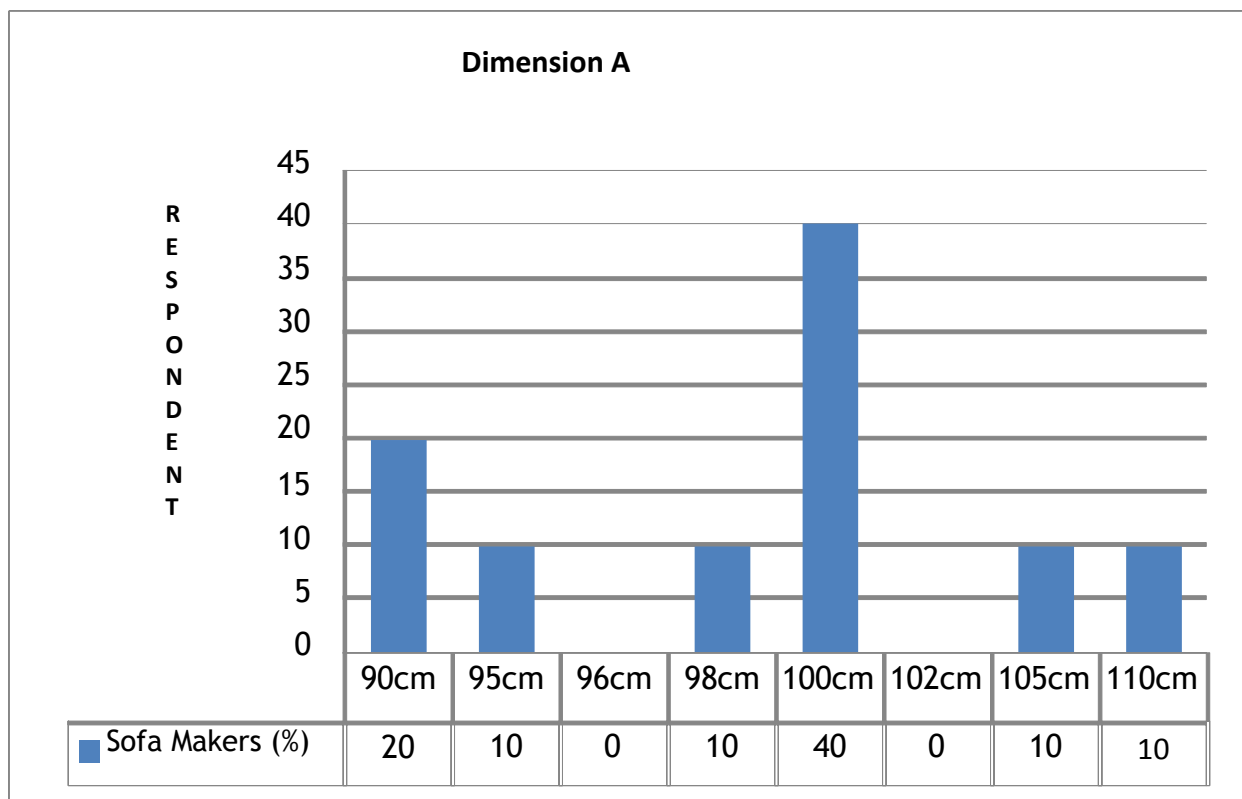


Figure 3 - Percentage of respondents' tendency for dimension

The results in Figure 3 show the percentage of respondents' tendency for dimension A which refers to total height of sofa chairs that are often requested by market and booking. The average tendency of respondents to choose

dimension A of the size 100cm is 40%. The results show that 20% of respondents choose the size of 90cm. While the dimension of sizes 95cm, 89cm, 105cm and 110cm were chosen by 10% respondents each.

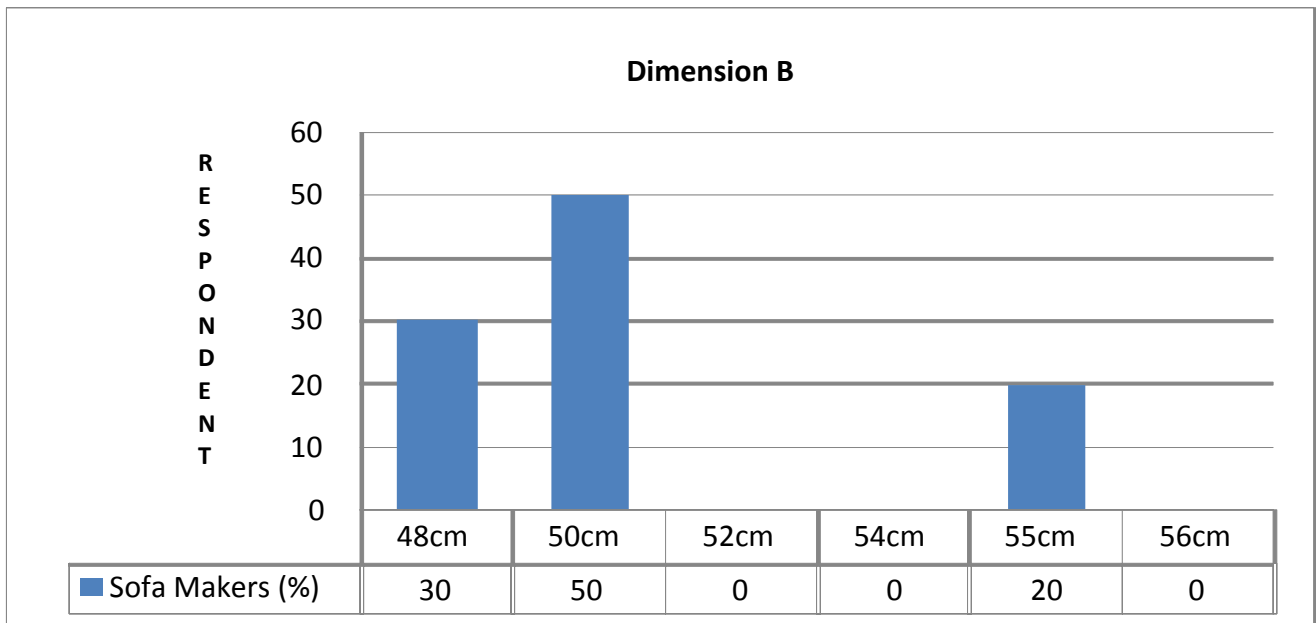


Figure 4 - Percentage of respondents' tendency for dimension B

Figure 4 shows the percentage of respondents' tendency for dimension B which refers to the distance dimension between the arm rest and under. The percentage of sofa makers tend to use dimensions of 50cm in size is 50% compared with 30% that use the size of 48cm. While there

are only 20% of respondents choosing dimensions 55cm in size. This indicates that the sofa makers prefer dimension B with a queen size which is 50cm in size as the typical dimensions.

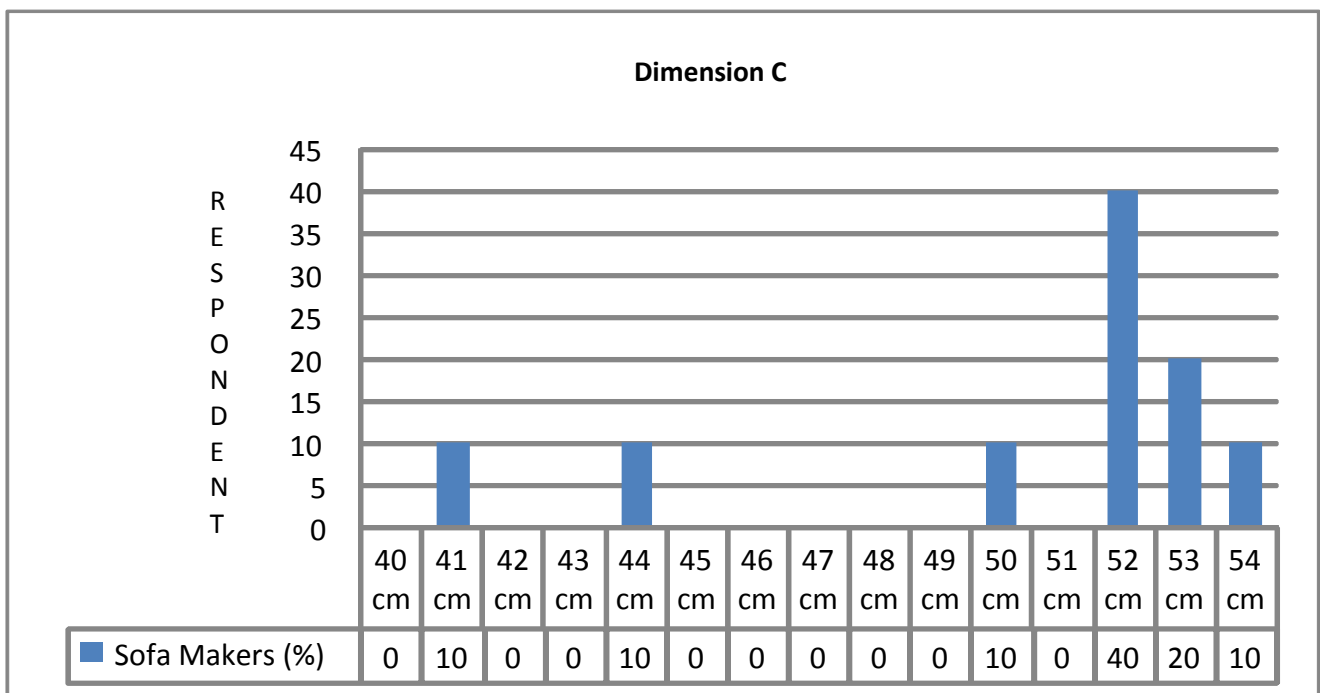


Figure 5 - Percentage of respondents' tendency for dimension C

Figure 5 shows the percentage of respondents' tendency for dimension C, which refers to seating level and down. 40% of manufacturers have chosen 52cm in size of dimension sofa bed followed by 20% that have chosen size 53cm.

While the dimensions of size 41cm, 44cm, 50cm and 54cm have the same percentage of respondents' tendency which is 10%. However, the size of this dimension is greatly influenced by the thickness and style type being used.

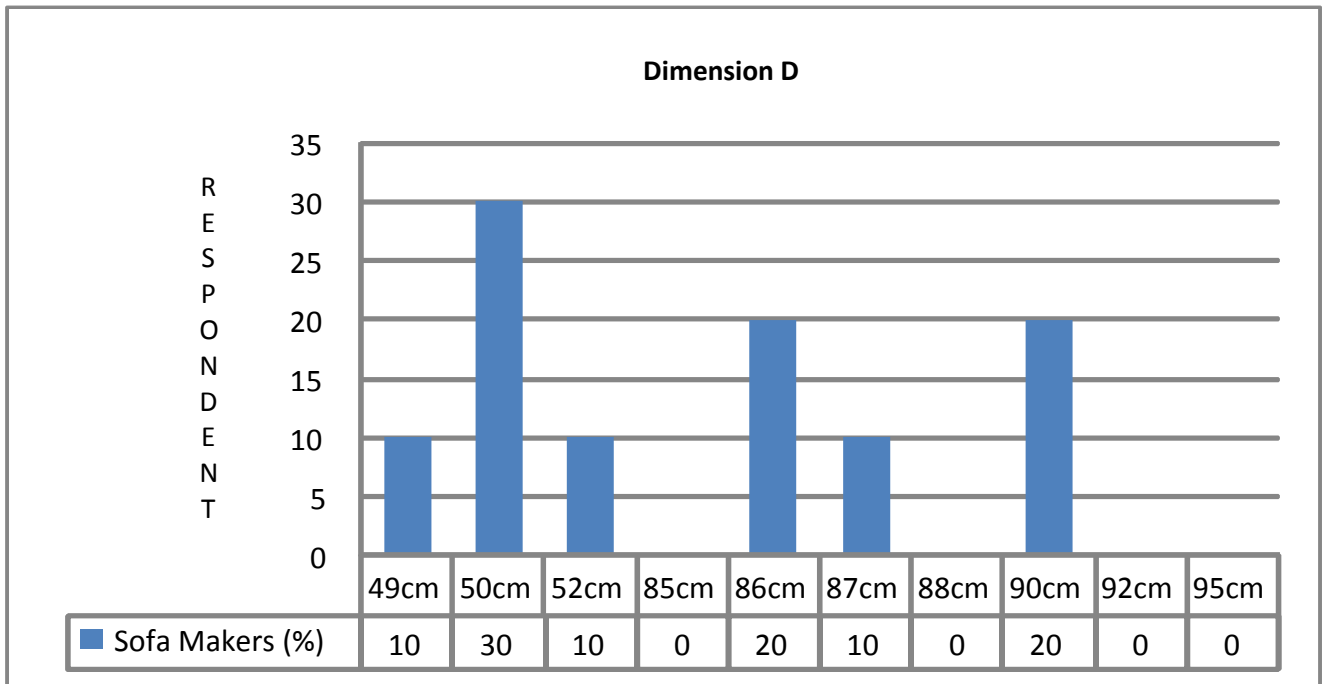


Figure 6 - Percentage of respondents' tendency for dimension D

Figure 6 shows that the tendency of respondents for dimension D, which refers to the width of sofa chair is 30% would chose the dimensions of size 50cm followed by the size of 86cm and 92cm that have the same percentage of respondents

which is 20%. While the queen size 49cm, 52cm, and 87cm also got the same percentage of 10%. This indicates that the sofa maker prefers D dimension with 50cm in size as the size of conventional dimensions.

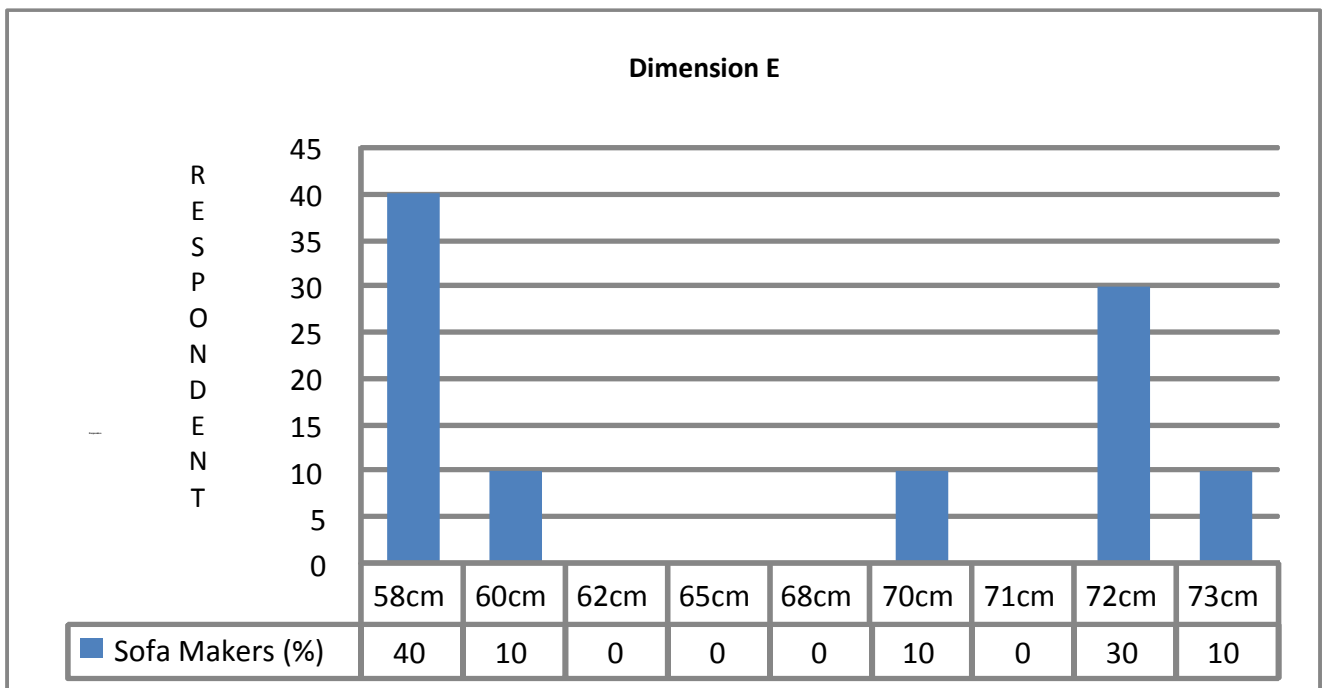


Figure 7 - Percentage of respondents for the tendency of trend dimension E

Figure 7 shows the percentage of respondents to the selection of the trend in size of the height of E dimension back rest. It is found that the highest percentage is 40%, for which the manufacturers prefer dimensions size of sofa bed in the division of 58cm. This is followed by 30%

respondents choosing the size of 72cm. While the queen size 60cm, 70cm and 73cm are less used by the sofa manufacturers with 10% of respondents. Thus, sofa makers that are represented by 40% of respondents prefer the size of 58cm as the conventional dimensions.

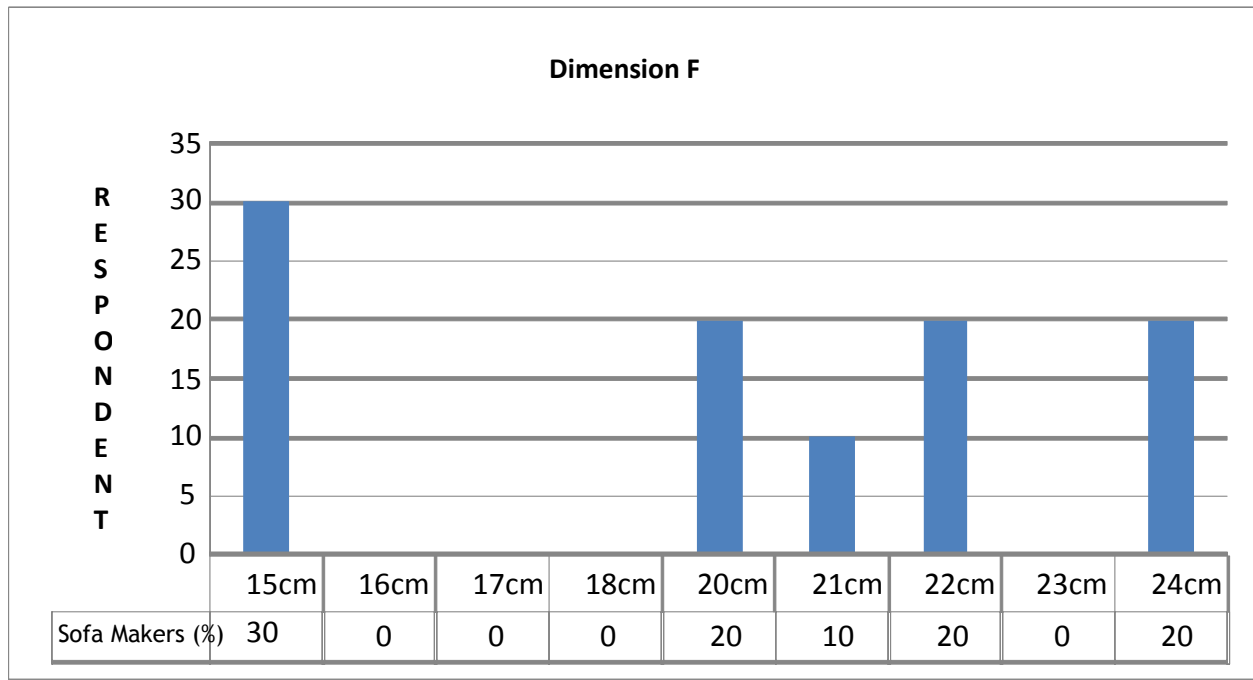


Figure 8 - Percentage of respondents' tendency for dimension F

Figure 8 shows the percentage of respondents' tendency for dimension F which indicates the width of the arm rest and under. The result shows that most 40% respondents chose the highest dimension of 51cm in size. There are three dimension which have the same

percentage of 20% namely the size of 20cm, 22cm and 24cm. Respondents are less selective in size of 21cm which is 10% of respondents. This shows that the majority of sofa makers prefer dimension F with 15cm in size as the size of the common dimension.

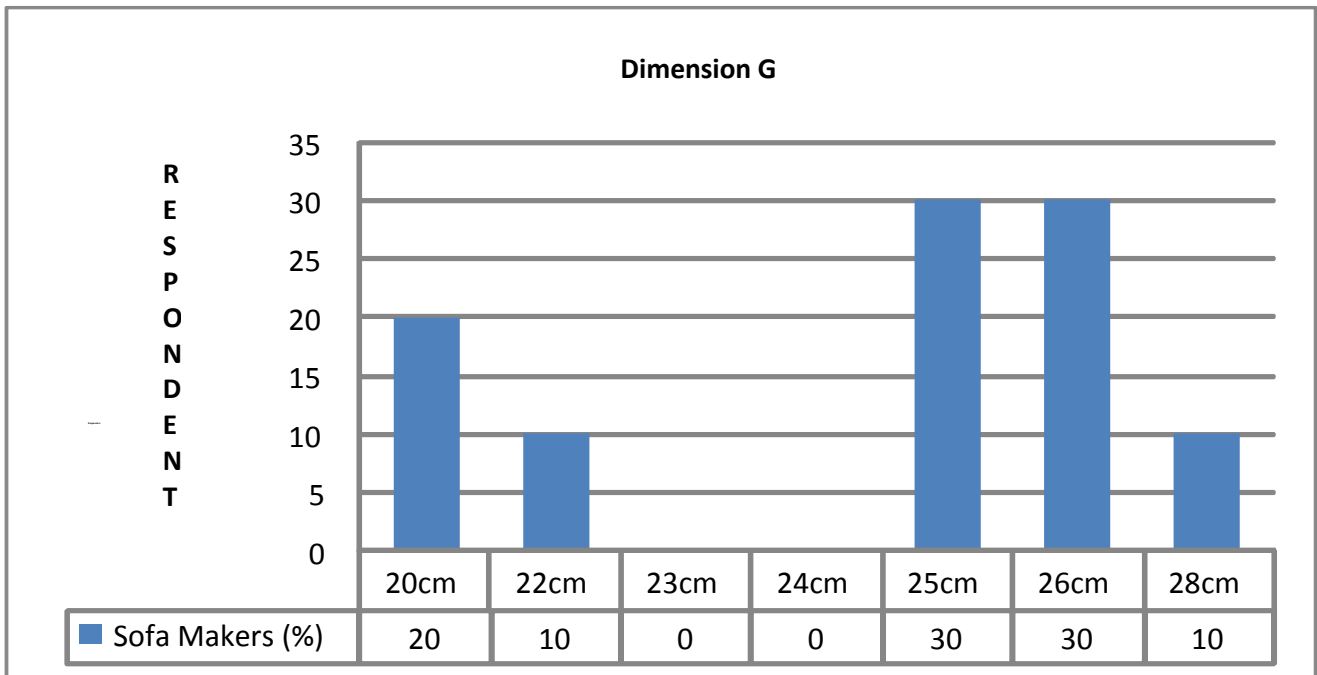


Figure 9 - Percentage of respondents' tendency for dimension G

Figure 9, it indicates the percentage respondents tendency for dimension G. It refers to the dimension between the frame and the seat bottom. Figure 9 shows that the average dimensions of 25cm and 26cm have the same percentage of 30% respondents, followed by

20cm in size which is 20% respondents. In the other hand, dimension size of 22cm and 28cm were chosen by 10% of respondents. This indicates that the sofa makers prefer dimension G with a queen size between 25cm and 26cm in size as the typical dimensions.

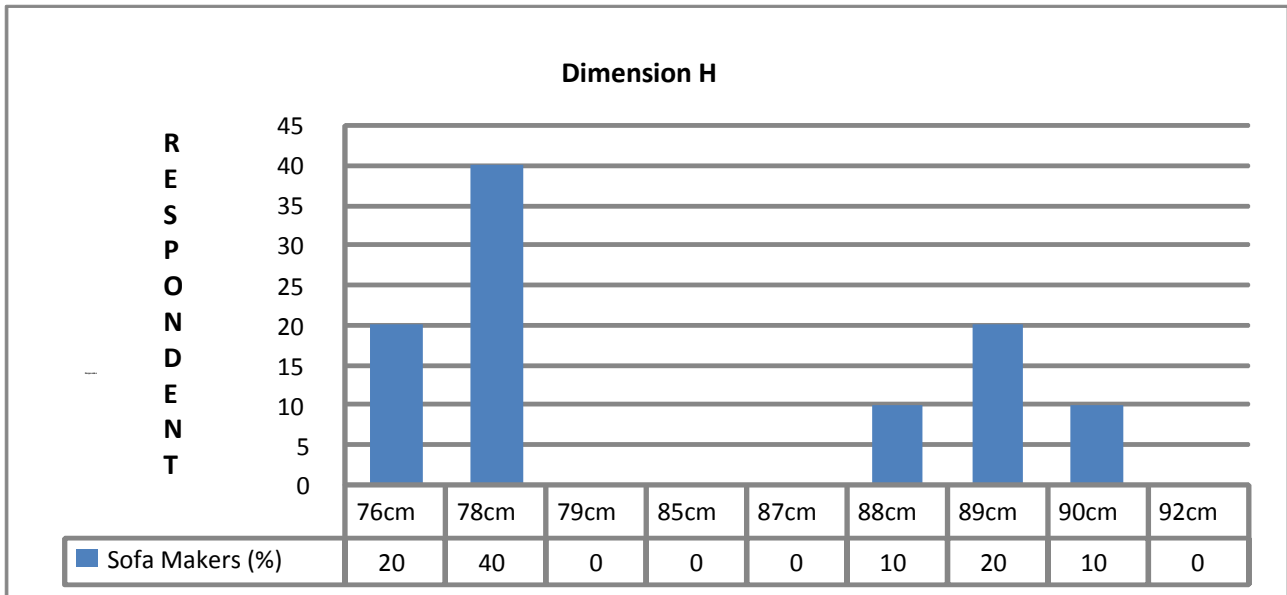


Figure 10 - Percentage of respondents' tendency for dimension H

Figure 10 shows the percentage of respondents' tendency for dimension H. It points out the width of the front of the arm rest to the back. The majority 40% of respondents chose the dimensions size of 78cm, followed by measurement of the size of 76cm and 89cm,

which has the same percentage of 20% respondents. In the meanwhile, the size of 88cm and 90cm got the same percentage of 10% respondents. This indicates that the sofa makers prefer dimension H with 78cm in size as the size of conventional dimensions.

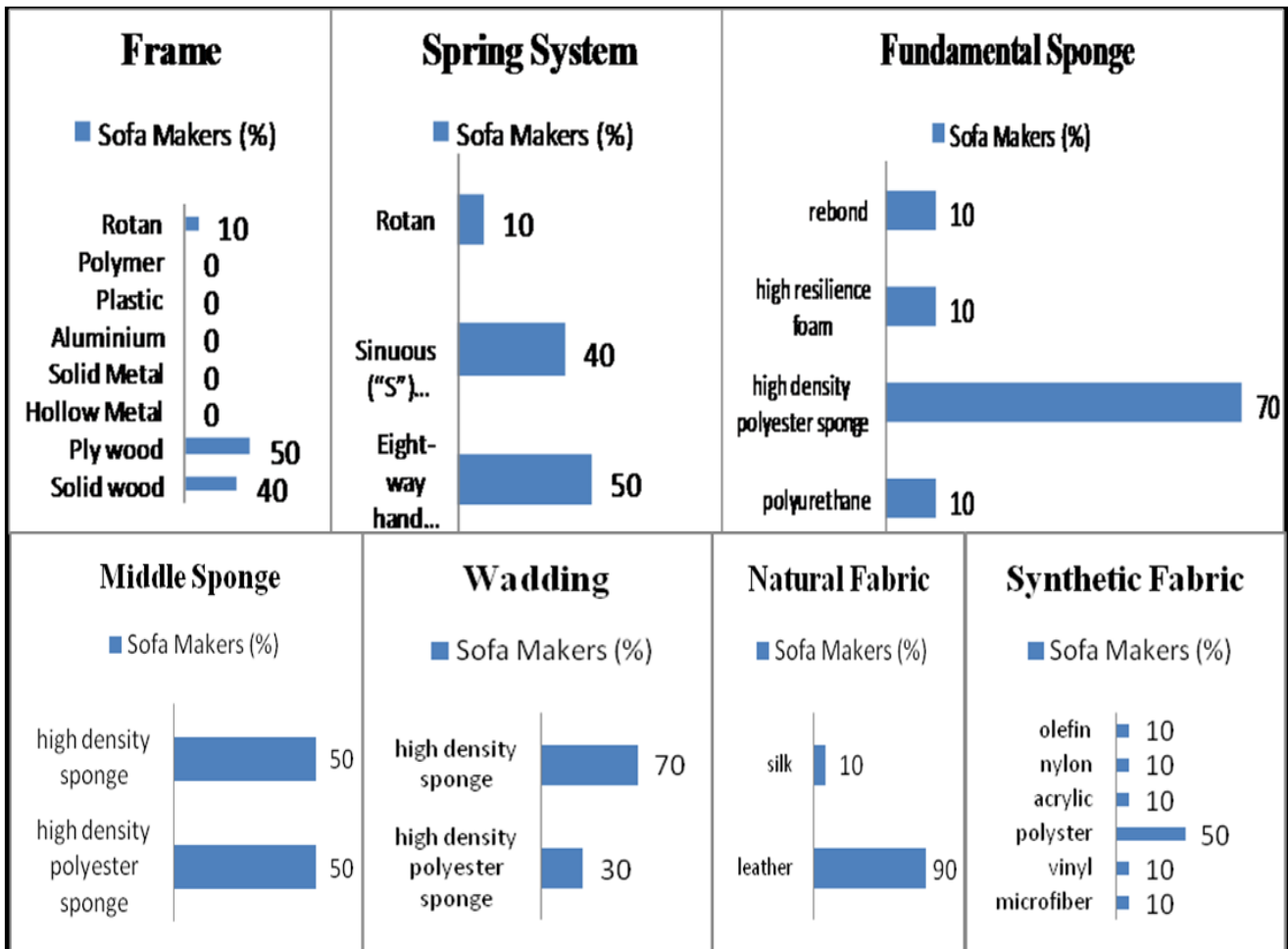


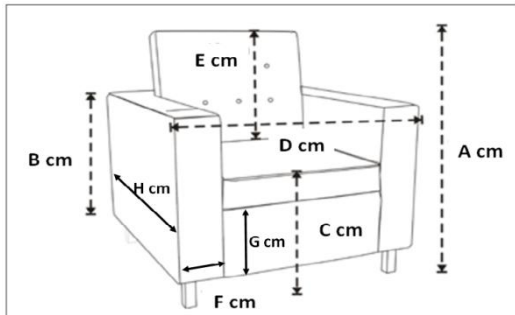
Figure 11- Percentage of respondents' tendency for the trend

Figure 11 shows the percentage of the respondents' tendency to the selection of materials such as frames, spring system, fundamental sponge, middle sponge, wadding, natural fabric and synthetic fabric. Ply wood, solid wood and rattan are the frame's materials that were chosen by 50%, 40% and 10% respondents respectively. Next trend is spring system which are, eight-way hand tied springs, chosen by 50% respondents followed by sinuous coils ("S") Springs 40% respondents and 10% respondents have chosen cane. While for the fundamental sponge, high density polyester sponge is 70% respondents, a polyurethane, high resilience foam and re-bond each of it was

chosen by 10% of respondents. Next is middle sponge, which is high density polyester sponge and high density sponge, both have the same popularity in respondents' selection which indicates 50% of respondents each. For wadding, 70% of respondents have chosen high density sponge and high density polyester sponge have been chosen by 30% of respondents. The leather is chosen by 90% of respondents as the natural fabric in making sofa compared to 10% of respondents that chose silk. In addition 50% of respondents use polyester as synthetic fabric in sofa manufacturing compared to microfiber, vinyl, acrylic, nylon and olefin.

**Table 1 - Overall results of conventional dimensions and materials specification for basic ergonomic sofa design**

Frequently Dimension	Space
A	100 cm
B	50 cm
C	52 cm
D	50 cm
E	58 cm
F	58 cm
G	25 cm - 26 cm
H	78 cm



Types of Materials		Sofa Makers (%)
Frame	Ply Wood	50
Spring System	Eight-way hand tied spring coils	50
Fundamental Sponge	High Density Polyester Sponge	70
Middle Sponge	High Density Polyester Sponge	50
Wadding	High Density Sponge	70
Natural Fabric	Leather	90
Synthetic Fabric	Polyester	50

Table 1 summarises the results of the overall dimensions of conventional and basic specifications of materials for ergonomic design obtained from the sofa makers as the respondents. Sponge sofa wraps around the frame plays a key role in determining the level of comfort in the ergonomic design of the sofa. In addition, the material used is also very important to give the impact of changes to the common dimensions such as thickness of sofa span and span type used. However, the basic specification of sofa framework needs to be adapted with materials that will be used to get a perfect ergonomic design.

**DISCUSSION**

Based on Table 1 above it can be said that the factor of human consumption is closely related to ergonomic design. This is because the perceptions of sofa makers are included in the process of designing a product. The aim is to understand what is required in today's market from the collected data which is then interpreted into the specification request. In addition, basic specifications are followed and the use of quality materials are combined and developed into an ergonomic sofa design. At the final stage, ergonomic sofa design is developed into a final product specification and by translating all the important details so that the product is marketable. This design was developed by taking into account the perspective of sofa makers to produce a new ergonomic sofa design which is suitable for use in Malaysia.



## CONCLUSION

In this study, the researchers propose to create some of the main specifications that are important in the development process in line with ergonomic sofa design that indicate Malaysian identity in order to establish a successful new idea in sofa design development in Malaysia. The researchers also give thought to the basic structure which consists of market products, technology, and perceptions of sofa makers for product improvement process. Therefore, to ensure product excellence, ergonomic aspects need to be considered to be in line with the needs and tastes of consumers. Accordingly, it will give major implications in the development of ergonomic design to improve the quality of sofa productivity in the furniture industry in Malaysia.

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