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# STUDY ON THE ERGONOMIC IMPROVEMENT OF AN OFFICE CHAIR

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**Abstract:** The purpose of this paper is to present a study on optimizing a chair designed for office activities, focusing on improving its design and functionality. The need for this study arose from the desire to ensure adequate ergonomic conditions for students conducting laboratory work within the faculty, as well as for users purchasing chairs for personal use. The paper includes a market study that served as the foundation for the analysis, design, and optimization of the chair, providing relevant information about user preferences and needs. The first part of the paper concludes with the findings of the market study, which led to the approach taken in addressing this issue.

**Key words**: office, chair, study, design, ergonomics

## 1. Introduction

According to the classical definition, ergonomics is the interdisciplinary science that deals with the study of the relationships between humans, machines, and the working environment, with the aim of improving working conditions and increasing productivity (1). The field of ergonomics includes several disciplines that study humans and their environments, including anthropometry, biomechanics, physical therapy, physiology, cognitive psychology, organizational and industrial psychology. All of this knowledge is particularly essential for engineers (2).

Given the rapid technological development of recent years and the growth of all industrial sectors, much of the demanding physical work once performed by humans has been replaced by software, machinery, and advanced technologies. Despite the positive aspects, such as increased productivity and efficiency, time savings, cost optimization, significant reduction of human errors, and many other benefits, technological evolution also comes with a series of disadvantages. One significant drawback is the prevalence of office work, which involves spending many hours in front of a computer monitor in a static position, often one that is unfavorable to long-term health.

An increasing number of people now spend long periods working at desks, and the negative effects of poor posture are appearing at younger and younger ages. These effects could be prevented or corrected by implementing certain measures, as more individuals report related health problems.

Since an office worker spends approximately 80% of their time in sedentary positions (equivalent to about 6 hours per day (3)) various health issues may develop over time, such as musculoskeletal disorders (4), along with concentration difficulties and decreased productivity (5).

To eliminate unfavorable postures in office work, studies propose guidelines and design standards for workplaces so that employees can maintain correct posture (6). Proper sitting posture means keeping the head aligned with the torso, the back supported by the chair's backrest, and the feet resting on the floor or a footrest (7), (8). For example, using a footrest encourages the use of the backrest, which helps reduce strain on the spine, thus being considered an ergonomic element (8, 9, 10, 11).

## 2. Methodology

The research was conducted through an online questionnaire addressed to a sample of approximately 200 respondents over a two-week period, with the aim of obtaining information regarding the optimization/improvement of an office chair. Respondents were informed that their answers would remain

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anonymous and that the data would be used exclusively for academic purposes. The data collection instrument included both closed and open-ended questions, designed to capture quantitative aspects (such as chair usage duration, satisfaction level, allocated budget) as well as qualitative ones (such as color preferences and perceived discomfort).

The quantitative data were subsequently compiled and statistically analyzed, and the results were graphically represented for clearer interpretation. The qualitative responses were analyzed through thematic coding to identify the main preferences, dissatisfactions, and suggestions of the participants. This combination of quantitative and qualitative methods allowed for a detailed understanding of user experience and the factors influencing satisfaction and comfort in office chair use.

**3. Analysis and interpretation of results**

Regardless of the name used for it (market study, market research or opinion survey), this phase aims to understand and explore the market. The methods employed in market studies include the collection, compilation, analysis, and interpretation of data obtained regarding customers, products, services, market size, and competitors. Market studies help in launching, testing, and improving products and services, thereby increasing the product's success rate (12).

To the question „Your age is between:"

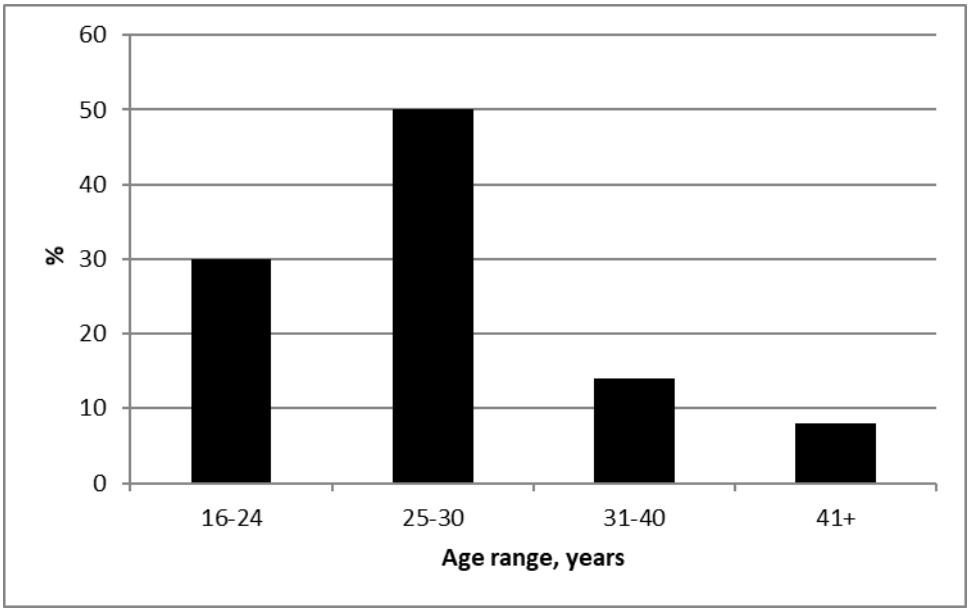


**Figure 1: Age of the respondents.**

The majority of respondents (60%) is within the range of 30-35 years, which indicates that the results reflect the perceptions of professionally active users.

Question no. 2: "Gender:"

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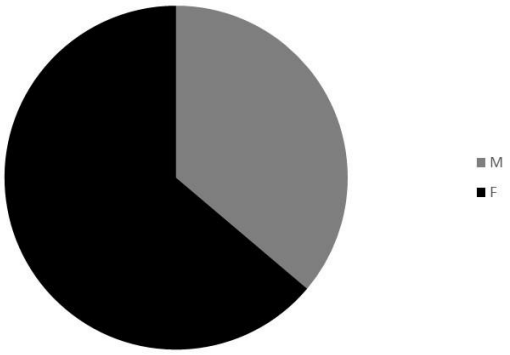


**Figure 2: Gender of the respondents.**

The gender distribution is balanced, with a slight predominance of women (63.83%).

Question no. 3: “Place of origin:”

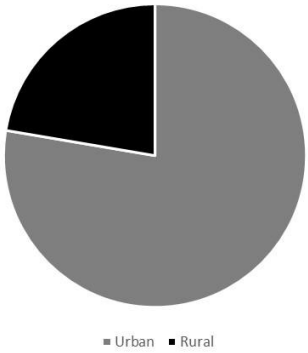


**Figure 3: Place of origin of the respondents**

Question no. 4: “Field of activity:” It can be observed that employees in office-related fields predominate (65%), which gives the study relevance for users of ergonomic chairs.

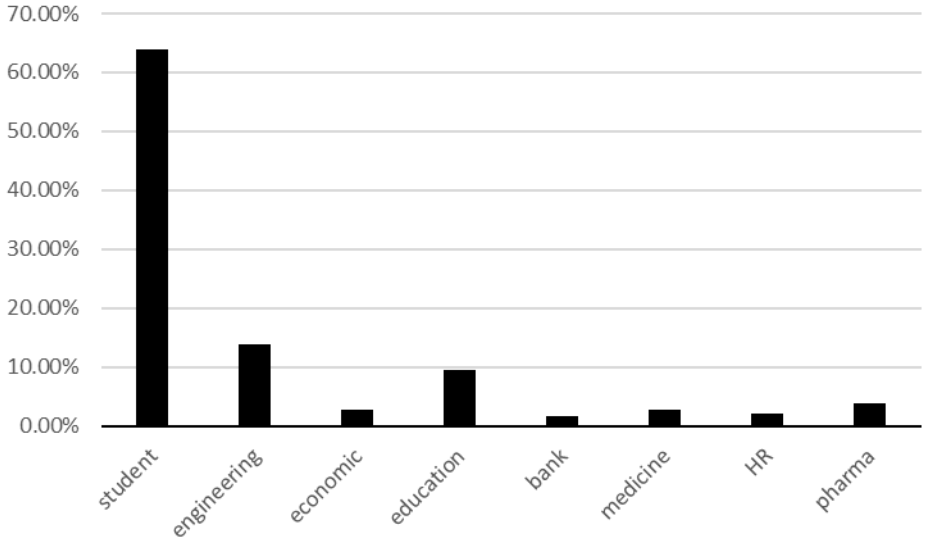


**Figure 4: Field of activity of the respondents.**

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Question no. 5: “How much time do you spend on average each day sitting on a chair?” The majority of respondents spend between 4 and 8 hours seated, highlighting the importance of comfort and ergonomic support.

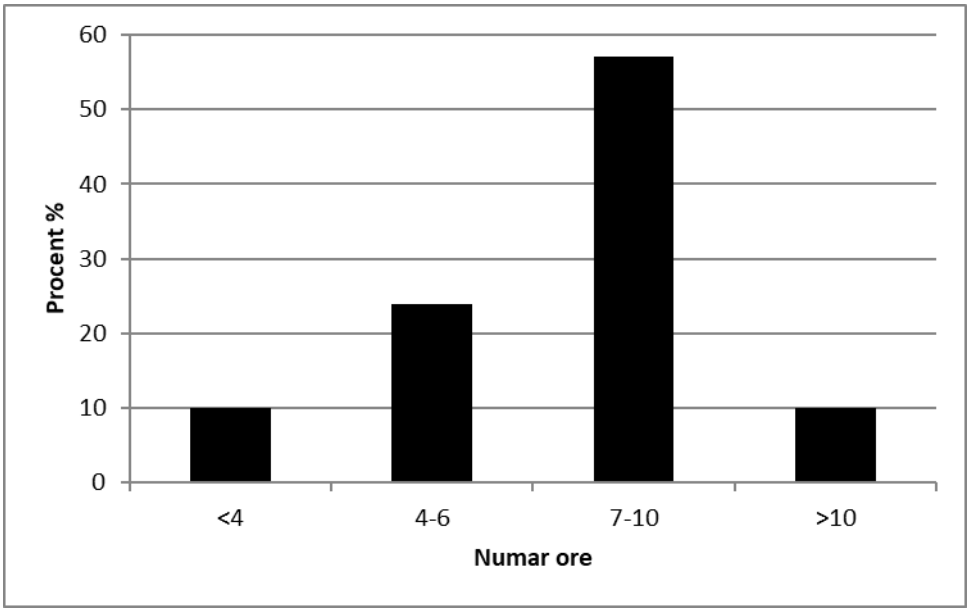


**Figure 5: The average daily time interval spent sitting by the respondents.**

Question no. 6: “Do you currently own an office chair?”

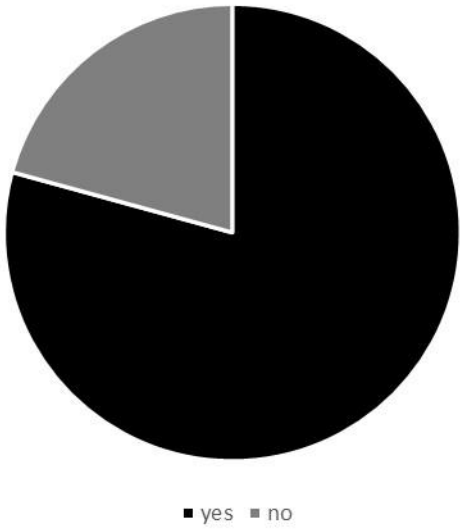


**Figure 6: Respondents who own an office chair.**

Question no. 7: “If your answer to question no. 6 was YES, how satisfied are you with the performance of your chair (on a scale from 1 to 5)?”

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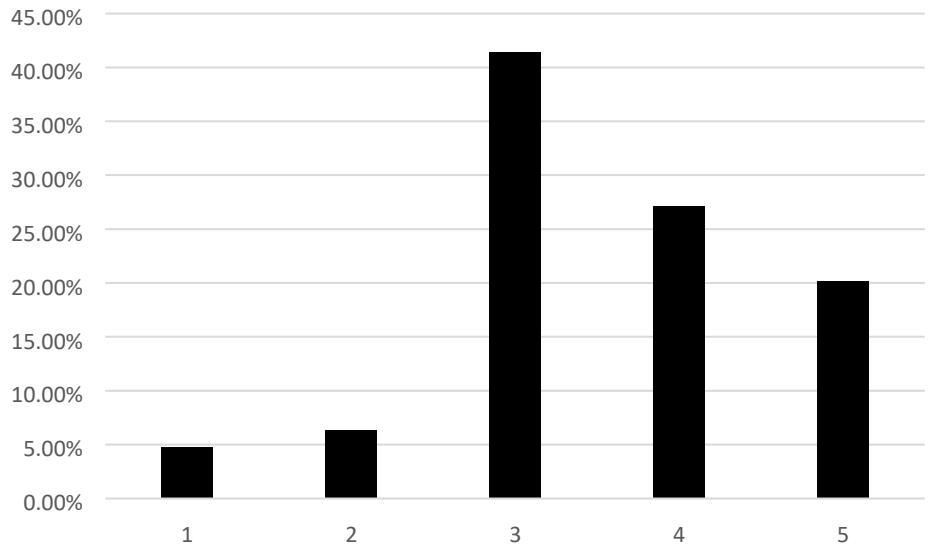


**Figure 7: Level of satisfaction of the respondents.**

Question no. 10: "As a result of sitting at your desk, have you ever experienced discomfort in your legs?"

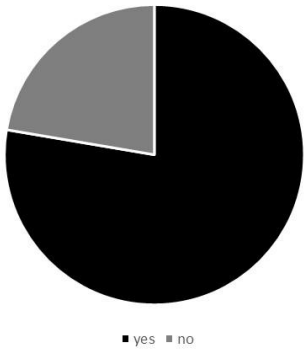


**Figure 8: The percentage of respondents who experienced leg discomfort as a result of sitting at their desk.**

Question no. 11: "If your previous answer was YES, how often do you experience this discomfort?"

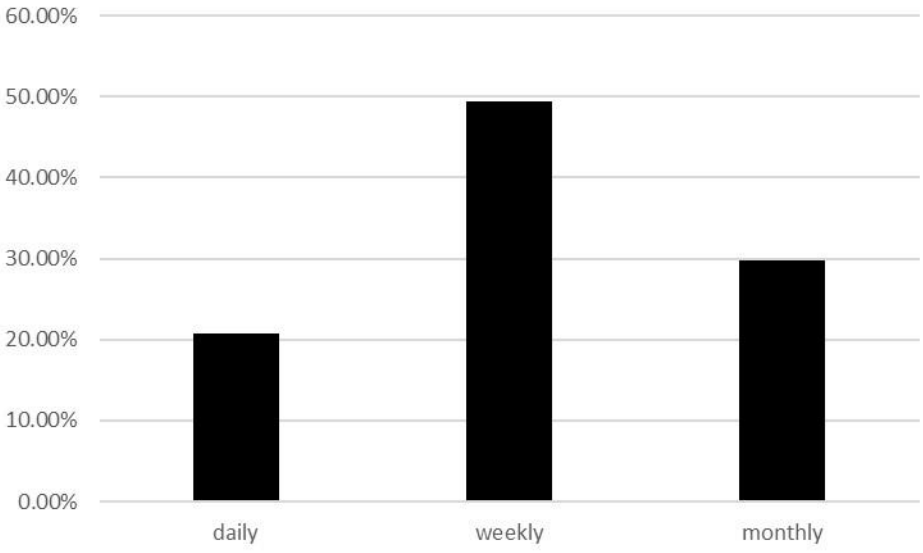

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**Figure 9: Frequency of leg discomfort.**

Question no. 12: "On a scale from 1 to 5, how important do you think it is to integrate a footrest into the chair?"

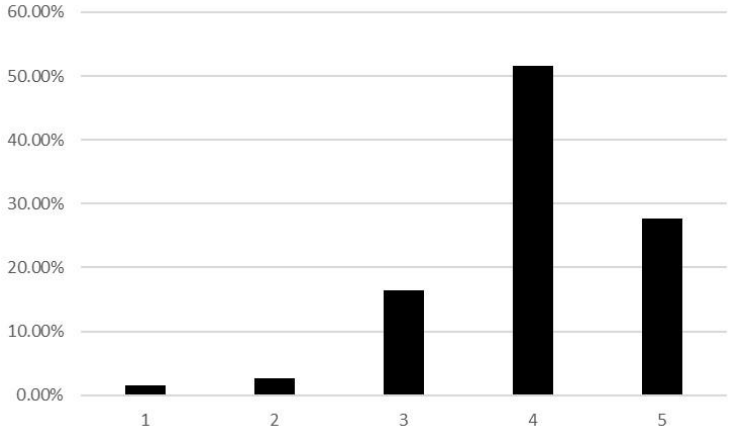


**Figure 10: Level of importance of integrating a footrest.**

Question no. 13: "Since color is an important factor from both a decorative and psychological point of view, please specify your preferred color" (Table 1).

**Table 1. Preferences about the chair's color**

| Color | Answers |
|---|---|
| **BLACK** | 78 |
| **WHITE** | 8 |
| **GRAY** | 17 |
| **BROWN** | 24 |
| **BLUE** | 24 |
| **BEIGE** | 15 |
| **GREEN** | 8 |
| **RED** | 6 |
| **DON'T KNOW** | 8 |

Question no. 15: "What amount are you willing to spend on an ergonomic chair?"

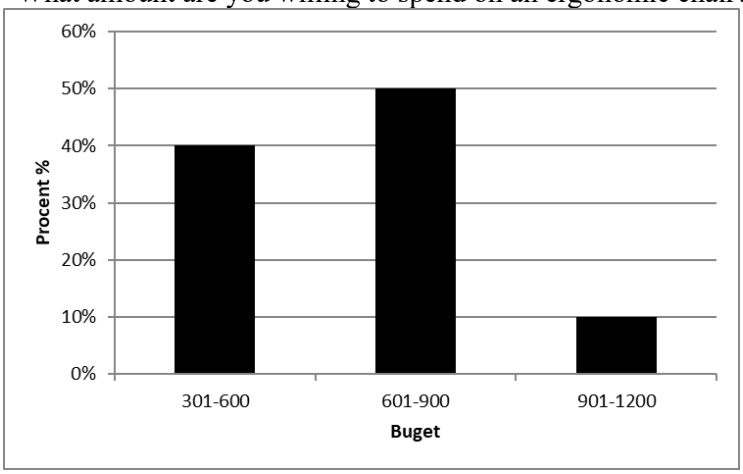


**Figure 11: The amount allocated for the purchase of an ergonomic chair..**

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Following the analysis of the responses, it can be observed that the majority of respondents are between 25 and 30 years old, followed by those in the 16–24 age range. The ratio of female to male respondents is 120:68, with 146 coming from an urban environment.

It is also observed that approximately 47.87% of respondents spend on average 7–10 hours per day sitting, followed by 30.85% who spend 4–6 hours per day.

Regarding the amount they are willing to pay for the purchase of an ergonomic chair, 58 respondents allocated between 601–900 lei, 48 respondents between 301–600 lei, and so on.

## 4. Conclusions

The results obtained highlight the real need to optimize an ergonomic chair intended for prolonged office use. According to the responses, the identified target audience is young, urban, and willing to invest in a product that offers a balance between functionality, comfort, and aesthetics. The discomfort experienced in the lower limbs is a clear indication of the importance of structural improvements to the chair. There is a high level of receptiveness toward additional features such as a footrest, adjustability, or visual customization.

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