



Automation and Innovation with Computational Techniques for Futuristic Smart, Safe and Sustainable Manufacturing Processes pp 273–297

[Home](#) > [Automation and Innovation with Computational Techniques for Futuristic Smart, Safe and Sustainable Manufacturing Processes](#) > [Chapter](#)

Identification and Classification of Design Attributes for a Product to Verify Ergonomic Factors in Office Chairs

[Gabriela Pérez Potter](#) , [Aide Aracely Maldonado Macías](#),
[Juan Luis Hernández Arellano](#) & [César Omar Balderrama Armendáriz](#)

Chapter | [First Online: 23 November 2023](#)

30 Accesses

Abstract

Prolonged seated posture in office work directly affects the safety and performance of the worker. Human sustainability refers to the care of people in their health and quality of life, and ergonomic design is one of the means to preserve human resources in

workspaces. This chapter uses Kano Model and Factor Analysis to determine and classify the design attributes for an ergonomic factor tester product for office chairs. Two stages were considered in the development process; the first referred to the application of the Kano Model, applied to a sample of 29 office workers, and the second one, to the realization of the factorial analysis, applied to 87 users related to the use of office chairs. For both studies, the attributes were divided into two groups, one referring to the ergonomic chair's characteristics and the other to the testing product. As a result, a total of 9 ergonomic attributes for the chairs and eight design attributes for the product were obtained, which were classified mainly as attractive attributes for the user; in turn, they were grouped into 3 and 2 groups, respectively; therefore, the analyzed variables can be encompassed.

Keywords

Kano model **Factorial analysis** **Office char**

This is a preview of subscription content, [log in via an institution](#).

▼ Chapter

USD 29.95

Price excludes VAT (Mexico)

- Available as PDF
- Read on any device

- Instant download
- Own it forever

Buy Chapter

> eBook	USD 109.00
> Hardcover Book	USD 139.99

Tax calculation will be finalised at checkout

Purchases are for personal use only

[Learn about institutional subscriptions](#)

References

Alberruche Lucas P (2015) Silla Ergonómica. Universidad Carlos III de Madrid. Tesis de Licenciatura

Castro Carrasco M (2016) Ergonomía y Calidad Laboral. Prev Riesgos Laborales 5:1–11

Dainoff MJ (2019) Ergonomics for the management of musculoskeletal disorders. CRC Press

Davidescu AAM, Apostu SA, Paul A, Casuneanu I (2020) Work flexibility, job satisfaction, and job performance among romanian employees- Implications for sustainable human resource

management. Sustain 12:

<https://doi.org/10.3390/su12156086>

Daza Beltrán C, Becerra OR, Bernal ML (2014)

Importancia en la evaluación integral de sillas de oficina. Pontif Univ Javeriana.

<https://doi.org/10.13140/RG.2.1.3051.9766>

DeVellis RF (2017) Scale development: Theory and applications. Sage Publications

Field A (2013) Discovering statistics using IBM SPSS Statistics. Sage

González-Rodríguez MR, Díaz-García C, Varela-Vázquez P (2019) Exploring the relationship between customer satisfaction and loyalty using the Kano model, quality characteristics, and demographic variables. J Bus Res 95:363–373

Hair JF, Black WC, Babin BJ, Anderson RE (2019) Multivariate data analysis. Pearson

Hendrick HW, Kleiner BM (2002) Macroergonomics: Theory, methods, and applications. CRC Press

Hern C, Hern JL (2001) Las teorías del diseño El modelo de Kano en el diseño de Productos. 1–11

Hignett S (2003) Work-related back pain in nurses. *J Adv Nurs* 41(6):5–12

Hsieh PJ, Lin YS (2019) Applying the Kano model and grey relational analysis to improve customer satisfaction in the airline industry. *J Air Transp Manag* 74:117–127

IBM (2015) El procedimiento Análisis factorial. In: *IBM SPSS Statistics Base*. pp 419–459

Janwantanakul P, Sitthipornvorakul E, Pirunsan U (2018) The effects of office ergonomics intervention on reducing musculoskeletal symptoms of office workers: a systematic review and meta-analysis. *Hum Factors Ergon Manuf Serv Ind* 28(5):255–267

Jones AB, Smith CD, Brown EF (2018) Assessing attribute importance in the context of the Kano model, customer satisfaction, and customer loyalty. *J Bus Res* 91:88–96

Kee D, Karwowski W, Soares M (2019) Effects of chair design on musculoskeletal discomfort, productivity,

and seated posture of workers: A review. *Int J Ind Ergon* 69:225–238

Kumar S (2017) *Ergonomics: A practical guide*. CRC Press

Lee K, Park K, Yoon J (2017) A study on using the Kano model to analyze customer satisfaction in the automobile industry. *J Distrib Sci* 15(3):5–13

Li W, Mo R, Yu S, et al. (2020) The effects of the seat cushion contour and the sitting posture on surface pressure distribution and comfort during seated work. *Int J Occup Med Environ Health* 33:675–689.
<https://doi.org/10.13075/IJOMEH.1896.01582>

Mondelo PR, Gregoria Torada E, de Pedro González O, A. GFM (2001) *El trabajo en oficinas, 1ra Edició*. Ediciones UPC, Barcelona

Mondelo P, Gregori E, Blasco J, Barrau P (2014) *Diseño dimensional de puestos de trabajo*

Nakamura K, Kano N (2002) Two-dimensional quality: A Kano model approach. *J Qual Eng Soc* 28(1):39–48

O'Sullivan K, McEvoy MP (2021) Office chair design and ergonomics: A critical review. *Appl Ergon* 93:

Peñahora M, Sanz G, Álvarez Bayona T (2018) NTP 1.129 Criterios ergonómicos para la selección de sillas de oficina

Salazar Peñaloza MA, Restrepo Sánchez ML (2021) Propuesta diseño ergonómico de puestos de trabajo en oficinas de la empresa de aceites y lubricantes. Escuela Colombiana de Carreras Industriales ECCI

Sánchez Fuentes C (2018) APLICACIÓN DEL MODELO DE KANO A SERVICIOS DE SALUD

Santos AD, Filho MG, Santos ED, Rodrigues EM (2021) Satisfaction, loyalty and Kano model: a systematic literature review. *Rev Gestão e Proj* 12(3):76–90

Sehrawat N, Rai R (2020) A systematic literature review of Kano model applications. *J Model Manag* 15(2):340–372

Smith J (2020) An investigation of customer preferences using the Kano model and Google Forms. *J Consum Res* 45(2):201–215

Streiner DL, Norman GR (2015) Health measurement scales: A practical guide to their development and use. Oxford University Press

Tabachnick BG, Fidell LS (2019) Using multivariate statistics. Pearson

Vink P, Kuijt-Evers LF (2018) User-centered design. In *Handbook of Human Factors and Ergonomics*. CRC Press

Yousuf M, Butt HA, Mujtaba BG (2019) How do customers react to Kano model-driven product development? A moderated mediation analysis. *total Qual Manag Bus Excell* 30(9–10):1069–1089

Author information

Authors and Affiliations

**Architecture, Design and Art Institute,
Autonomous University of Ciudad Juárez, Av. Del
Charro 450 Norte. Col. Partido Romero, Juárez,
Chihuahua, México**

Gabriela Pérez Potter

**Department of Electric and Computing
Engineering, Institute of Engineering and
Technology, Autonomous University of Ciudad
Juárez, Av. Del Charro 450 Norte. Col. Partido
Romero, Juárez, Chihuahua, México**

Aide Aracely Maldonado Macías

**Architecture, Design and Art Institute, Design
Departamento, Autonomous University of Ciudad
Juárez, Av. Del Charro 450 Norte. Col. Partido
Romero, Juárez, Chihuahua, México**

Juan Luis Hernández Arellano

**Architecture, Design and Art Institute,
Autonomous University of Ciudad Juárez, Av. Del
Charro 450 Norte. Col. Partido Romero, Juárez,
Chihuahua, México**

César Omar Balderrama Armendáriz

Corresponding author

Correspondence to [Gabriela Pérez Potter](#).

Editor information

Editors and Affiliations

**Departamento de Ingeniería Industrial,
Tecnológico Nacional de México/I.T. Tijuana,
Tijuana, Mexico**

Arturo Realyvásquez Vargas

KIIT University, Bhubaneswar, Odisha, India

Suchismita Satapathy

Universidad Autónoma de Ciudad Juárez, Ciudad

Juárez, Chihuahua, Mexico

Jorge Luis García Alcaraz

Rights and permissions

[Reprints and permissions](#)

Copyright information

© 2024 The Author(s), under exclusive license to Springer Nature Switzerland AG

About this chapter

Cite this chapter

Potter, G.P., Macías, A.A.M., Arellano, J.L.H., Armendáriz, C.O.B. (2024). Identification and Classification of Design Attributes for a Product to Verify Ergonomic Factors in Office Chairs. In: Realyvásquez Vargas, A., Satapathy, S., García Alcaraz, J.L. (eds) Automation and Innovation with Computational Techniques for Futuristic Smart, Safe and Sustainable Manufacturing Processes. Springer, Cham.
https://doi.org/10.1007/978-3-031-46708-0_11

[.RIS](#) [.ENW](#) [.BIB](#)

DOI	Published	Publisher Name
https://doi.org/10.1007/978-3-031-46708-0_11	23 November 2023	Springer, Cham

Print ISBN	Online ISBN	eBook Packages
978-3-031-46707-3	978-3-031-46708-0	Engineering
		Engineering (R0)

Publish with us

[Policies and ethics](#)