



## Work environmental and productivity in companies: a bibliometric analysis of scientific production

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### ABSTRACT

The physical context and interpersonal interactions within companies are of great importance for the proper functioning of the business ecosystem. Successful companies understand that the workplace directly influences productivity, as it directly affects those responsible for the functioning of operations, the employees. Understanding how this physical context influences productivity is of great importance, requiring studies on this topic to be carried out, as there are not many studies in this line. Therefore, the objective of this work was to carry out a bibliometric analysis of scientific production on the interaction between the work environment and productivity. For this, a bibliometric analysis was carried out with data from Web of Science – WOS, searching for articles that talk about this topic between the years 2013 and 2022, extracting information related to the annual evolution of publications, the main countries, institutions and researchers of the area and main articles. The survey reveals a significant increase in interest in this topic in recent years, with the United States leading the contributions. The predominant areas are Business Economics, Engineering and Public Environmental Occupational Health, indicating the interdisciplinary complexity of the subject and suggesting directions for future research.

### RESUMO

O contexto físico e as interações interpessoais dentro de empresas são de grande importância para o bom funcionamento do ecossistema empresarial. As empresas bem sucedidas entendem que o local de trabalho influencia diretamente na produtividade, pois atinge diretamente quem é responsável pelo funcionamento das operações, os colaboradores. Entender como esse contexto físico influencia na produtividade é de grande importância, exigindo que estudos sobre essa temática sejam realizados, visto que não se tem tantos trabalhos nessa linha. Dessa forma, o objetivo desse trabalho foi realizar uma análise bibliométrica da produção científica sobre a interação entre o ambiente de trabalho e a produtividade. Para isso, foi realizada uma análise bibliométrica com dados do Web of Science – WOS, buscando artigos que falam sobre essa temática entre os anos de 2013 a 2022, extraíndo as informações relacionadas a evolução anual de publicações, os principais países, instituições e pesquisadores da área e principais artigos. A pesquisa revela um aumento significativo de interesse nesse tema nos últimos anos, com os Estados Unidos liderando as contribuições. As áreas predominantes são Economia de Negócios, Engenharia e Saúde Ocupacional Ambiental Pública, indicando a complexidade interdisciplinar do assunto e sugerindo direções para futuras pesquisas.

### INFORMAÇÕES DO ARTIGO

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## Introduction

The connection between the physical context of companies and interpersonal interactions is seen as a strategy to boost the performance and innovative capacity of organizations. Given this understanding, many companies direct their investments towards creating work environments that encourage creativity and collaboration among members (Waber *et al.*, 2014).

Successful companies recognize the importance of transforming the work environment into a pleasant place, as this facilitates interpersonal relationships and boosts productivity. Furthermore, this approach contributes to reducing accidents, illnesses, absences and employee turnover (Chiavenato, 2010).

Lovelock *et al.* (2020) highlight stages that outline the companies' operations cycle, highlighting the interconnection between the well-being or discontent of employees, the satisfaction or dissatisfaction of customers, and, consequently, the company's profitability.

The employee efficiency plays a fundamental role in achieving goals and the success of an organization (Clements-Croome, 2015). With the growing importance of knowledge-based work, employees emerge as a company's most valuable asset, making it crucial to ensure their satisfaction and productivity as a competitive advantage (Rothe *et al.*, 2011).

The production efficiency, which constitutes productivity, is achieved when a company's employees are deeply motivated to achieve their goals. The job performance is influenced by a variety of factors, such as job satisfaction, motivation and support offered by the organization (Rodríguez-Aceves *et al.*, 2018).

It is undeniable that work is intrinsically linked to suffering, since the concepts of health and illness were historically shaped within companies, prioritizing productivity (Dejours, 1998). It is important to highlight that, in this context, workers' health is often subjugated in favor of organizational interests, which can generate negative consequences for both the individual and society as a whole.

According to Maslow (1943), there is a hierarchy that determines human behavior and how this is reflected in both the work environment and personal life. He emphasized that the human essence is constantly in search of basic safety, physiological, social, esteem and self-realization needs.

According to Chiavenato (2010), quality of life at work constitutes a complex concept that encompasses a variety of elements, such as satisfaction with the tasks performed, prospects for growth within the organization, recognition for performance achieved, remuneration perceived, the benefits provided, the interpersonal relationships within the team

and the company, the physical and psychological work environment, the autonomy to make decisions and the opportunity for engagement and active participation in the organization.

Having knowledge of the work environment and motivation is essential for the growth of worker productivity. Motivating individuals implies enabling them to acquire determination, confidence and a deep commitment in the pursuit of established objectives. This stimulus is essential for them to achieve success through their work activities. Understanding the mechanisms underlying human motivation is an essential skill so that managers can truly count on the collaboration of team members (Chiavenato, 2005).

Some researchers have dedicated themselves to studying the relationships between the environment and productivity, highlighting that companies need to evaluate and promote the quality of life of their employees in order to perform well (Kurogi *et al.*, 2021). In the case of production chains, poor quality in the environment can cause a large number of defective products (Sobhani *et al.*, 2019), this reduction in productivity is even noticed in home office work, where the lack of a suitable location and equipment, results in low productivity (Rodrigues *et al.*, 2022).

Understanding the relationship between the work environment and productivity is necessary to carry out research within this context. According to Oliveira *et al.* (2013), bibliometric research plays an essential role in the dissemination of scientific production, and its purpose is achieved through the application of techniques that evaluate the influence of researchers and journals, allowing the identification of profiles, trends and thematic areas. Moraes *et al.* (2013) shares a similar perspective, highlighting that bibliometric research consists of an analysis of scientific productions, providing support for the creation of new works.

Bibliometric analysis aims to examine scientific or technical activities through quantitative studies of publications, representing a versatile method for evaluating the quantity of information sources available (Silva *et al.*, 2011). Therefore, the objective of this work was to carry out a bibliometric analysis of scientific production on the interaction between the work environment and productivity in companies between the years 2013 and 2022, so that these data serve as input for future research.

## **Methodology**

### ***Research Methodology***

The study followed a bibliometric approach, through the application of mathematical and statistical techniques, a methodology adapted from Silva and Pinto (2023). As mentioned by Martins (2008), bibliographic research is the starting point of any investigation, characterized by the collection of information from various sources such as books, magazines,

articles, newspapers, websites and other written publications, duly made available to the public.

Research was carried out in the Web of Science (WOS) database, as it is one of the largest repositories of scientific articles and citations in the world, which brings together articles from journals widely recognized by the scientific community (Zhu & Liu, 2020). Data collection was carried out using the WOS advanced search, where all key words were searched in English, using search strings connected by the Boolean operator AND, resulting in: work AND environment AND productivity AND companies. After the searches, the title, abstract and keyword information were tabulated in Excel® spreadsheets, to apply the inclusion *criteria*.

### ***Inclusion and exclusion criteria***

Following inclusion *criteria* were applied: I- Studies on the relationship between the work environment and productivity in companies; II- Articles; III- Articles published between 2013 and 2022, with the aim of understanding the scenario of the topic before, during and after the COVID-19 pandemic.

### ***Data analysis***

Information taken from the article was: I- frequency of publications over time; II- topics covered and areas of knowledge; III geographic distribution; IV- magazines that publish works; V- institutions and funding agencies linked to the work; VI- Authors; VII- keywords. The data taken from the articles were tabulated and analyzed using graphs and tables, created using Excel®. The trend line of the annual publications graph was plotted following an exponential regression.

### **Results and discussion**

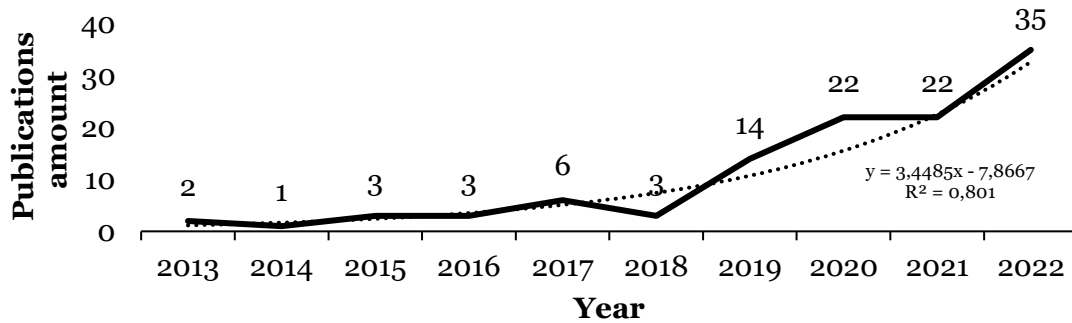
A total of 386 articles were found in the Web Of Science database. After applying the eligibility *criteria*, documents published in article form on the influence of the work environment on company productivity between the years 2013 and 2022, 111 articles remained, which were used for the analysis.

### ***Publication time trend***

Observing the trend of article publications with reference to the topic described, it can be noted that from 2013 to 2018 there was a low number of publications, accounting for only 18 publications in total, compared to the last years from 2019 to 2022, which its turn, they had a total of 93 publications. In the year 2022 alone, 35 articles were published on this topic, accounting for 31.5% of the total of the last 10 years researched, also highlighting the pandemic period mentioned above, which obtained 83.8% of the total publications made (figure 1).

**Figure 1.**

*Number of publications per year*



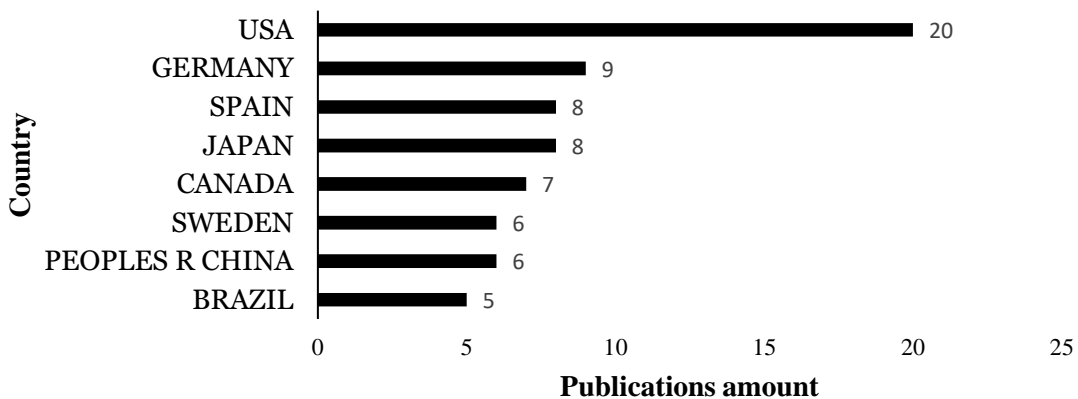
*Note: Made by own author (2024).*

**Countries and institutions that published**

Among countries that published the most on the topic are: the United States (20 articles), Germany (9), Japan (8) and Spain (8). The sum of publications made between both countries reaches a total of more than 40% of publications on the topic in the respective years researched, with the United States standing out with 20 publications. Others countries have a similar frequency of publications, varying from seven to two publications throughout the period researched, with Brazil having a publication rate of five articles focused on the topic (figure 2).

**Figure 2.**

*Countries that published*

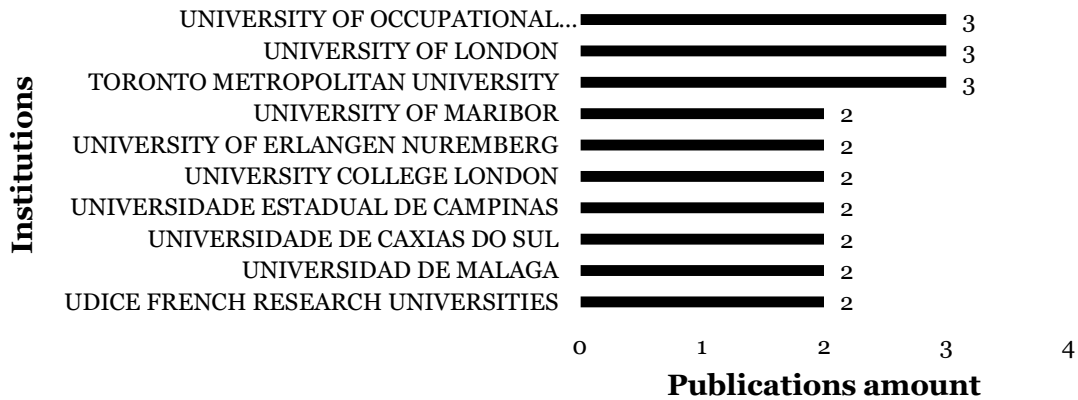


*Note: Made by own author (2024).*

Among institutions that had the highest number of production on the topic, Toronto Metropolitan University, University Of London and University Of Occupational Environmental Health Japan stand out, both with 3 publications each (Figure 3).

**Figure 3.**

*Institutions that published*



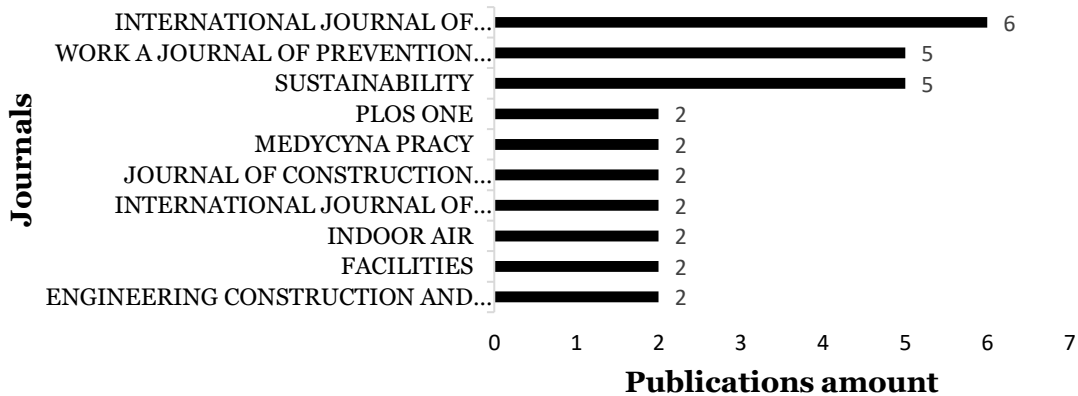
*Note: Made by own author (2024).*

**Journals that published and thematic of studies**

Taking into account journals that had the most publications, we highlight the *International Journal of Environmental Research and Public Health, Sustainability and Work*, a journal of prevention assessment rehabilitation, responsible for a total of 16 publications in the period researched, indicative of centralization and interest in the respective magazines for publications (figure 4).

**Figure 4.**

*Journals that published*

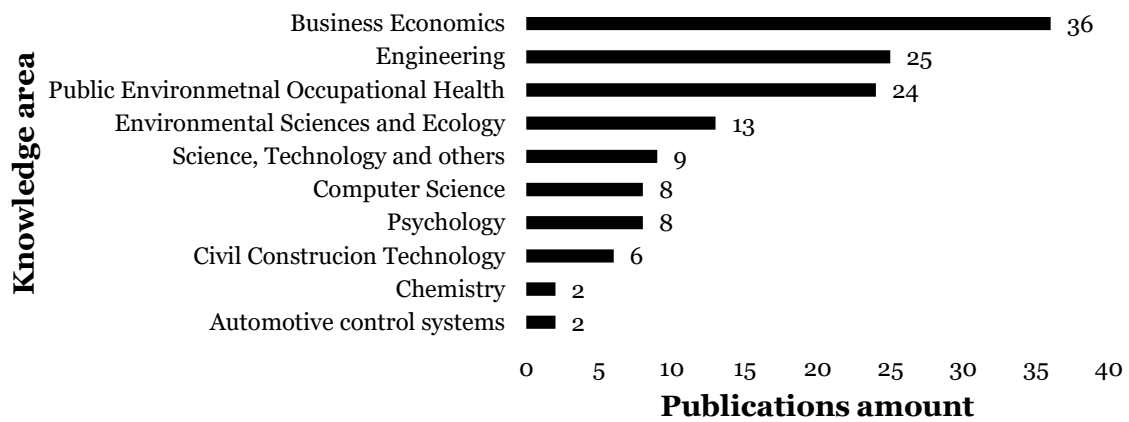


*Note: Made by own author (2024).*

Among thematic areas that articles are related to, we highlight the area of Business Economics, Engineering and Public Environmental Occupational Health, holding more than 75% of the areas most related to this topic and which has the largest number of publications (figure 5).

**Figure 5.**

*Knowledge area in articles*



*Note: Made by own author (2024).*

***Published authors and main works***

Among authors who published the most on the topic, we have Nagata T. leading the number of publications, totaling 3 publications in the period studied, while the other researchers had a similar number of publications, varying from one to two publications (figure 6). Among the works published by the authors, the ones that stood out the most within the theme were those in table 1. Despite this highlight, the works with the highest number of citations are not from the authors who published the most (Table 2).

**Figure 6.**

*Amount of published authors*



*Note: Made by own author (2024).*

**Table 1.***Main works of authors that published about thematic*

<b>Authors</b>	<b>Year</b>	<b>Title</b>	<b>Journal</b>	<b>References</b>
Kurogi, K., Ikegami, K., Eguchi, H., Tsuji, M., Tateishi, S., Nagata, T., ... Ishimaru, T.	2021	<i>A cross-sectional study on perceived workplace health support and health-related quality of life</i>	<i>Journal of Occupational Health</i>	6
Sobhani, A., Wahab, M. I. M., & Jaber, M. Y.	2019	<i>The effect of working environment aspects on a vendor–buyer inventory model</i>	<i>International Journal of Production Economics</i>	15
Rodrigues, E. A., Rampasso, I. S., Serafim, M. P., Leal Filho, W., & Anholon, R.	2022	<i>Productivity analysis in work from home modality: An exploratory study considering an emerging country scenario in the COVID-19 context</i>	<i>Work</i>	2

*Note: Made by own author (2024).***Table 2.***Articles with references*

<b>Authors</b>	<b>Year</b>	<b>Title</b>	<b>Journal</b>	<b>References</b>
Buckley, J. P., Hedge, A., Yates, T., Copeland, R. J., Loosemore, M., Hamer, M., Bradley, G., & Dunstan, D. W.	2015	<i>The sedentary office: an expert statement on the growing case for change towards better health and productivity</i>	<i>British Journal of Sports Medicine</i>	254
Tavares, F., Santos, E., Diogo, A., & Ratten, V.	2020	<i>Teleworking in Portuguese communities during the COVID-19 pandemic</i>	<i>Journal of Enterprising Communities</i>	73
Kersemaekers, W., Rupperecht, S., Wittmann, M., Tamdjidi, C., Falke, P., Donders, R., Speckens, A., & Kohls, N.	2018	<i>A workplace mindfulness intervention may be associated with improved psychological well-being and productivity</i>	<i>Frontiers in Psychology</i>	65

*Note: Made by own author (2024).*





A notable point is that many of works were directed to the pandemic period specifically, with the work of Tavares *et al.* (2020), who evaluated teleworking in Portuguese communities during the pandemic, the second most cited and identified an adaptive difficulty on the part of workers due to changing their routine and reduced performance due to not having an adequate environment and tools to perform their functions.

Kamalakaran and Chakraborty (2020) highlight that occupations of the world population, including work, have been negatively impacted by the coronavirus pandemic. The social distancing imposed by Covid-19 created obstacles for people's social and occupational participation, presenting new adaptation challenges with regard to the performance of work activities.

As pointed out by Seligmann-Silva *et al.* (2010), financial globalization and the spread of social precariousness on a global scale, combined with technological advances and emerging management practices, caused rapid changes in the labor scenario. These transformations have impacted working conditions, often resulting in harm to workers' health, due to the high level of stress present in work spaces.

As for countries and institutions that contributed most to research on the topic, United States stands out as leader. Others notable countries include Germany, Japan and Spain, where the sum of publications from these four countries represents more than 40% of total publications in the period studied. These results are expected, considering that these countries also lead and are examples of the business sector and scientific production.

The pandemic and major disasters have had numerous significant effects on the field of work and on workers themselves. There was a substantial change in the routine of this population, with a notable increase in workload, especially in essential and health areas. At the same time, there was an increase in the workforce, without adequate minimum health and sanitary conditions being ensured (Rodrigues, 2023).

When it comes to thematic areas covered by articles studied, Business Economics, Engineering and Public Environmental Occupational Health stand out, showing the concern and growing interest of countries in understanding and consequently having tools to improve interrelationships within the companies and improve the performance of their workers through better working conditions.

According to studies by contemporary authors, companies that adopt modern management models have prioritized investing in the quality of life of their employees as a crucial motivating factor to obtain competitive advantage. On the other hand, organizations that neglect this approach run the risk of stagnation and eventual obsolescence, becoming prey to a cycle of failure (Massi and Camargo, 2021). This indicates that research on the influence

of the work environment on company productivity is strongly linked to these areas of knowledge mentioned above.

The work space represents the place where people dedicate a significant part of their lives. The impacts of the activities carried out go beyond the professional environment, directly affecting other areas of coexistence and the quality of life of workers. It is essential to recognize that the conditions of the work environment not only influence the well-being of employees during working hours, but also have lasting effects on their physical, mental and social health, thus influencing their life outside of work and their personal relationships.

In summary, results demonstrate growing attention to the relationship between work environment and productivity in recent years, with a significant concentration of publications in United States and other European nations. Furthermore, research on the topic is rooted in areas such as Business Economics, Engineering and Public Environmental Occupational Health, demonstrating the interdisciplinarity of this field of study. These findings can serve as a basis for future in-depth research on the topic and its implications.

### **Final considerations**

There is a positive interesting in studies on the work environment and productivity and the main countries that are interested in the topic are already developed countries, such as United States, Germany and Spain. The pandemic played a crucial role in increasing publications on the subject and should be the starting point for more studies to be carried out.

With this growing interest in the area, more work must be carried out and this research directly contributes to the topic, being able to guide future research and showing that developed countries are concerned about the work environment and their workers.

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