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Analysis of the Application of Ergonomics to Increase Productivity in Manufacturing Companies: A Systematic Review of the Literature

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Abstract

Nowadays, manufacturing companies consider ergonomics as a relevant factor in workstations, since it is a means to ensure productivity in the company and comfort and safety of employees. However, there is still resistance to the implementation of postural assessment methods during the various production processes of different manufacturing companies. Consequently, the main objective of this article is to analyze the advances in the application of ergonomics methods to improve productivity in manufacturing companies in America, Europe or Asia during the last 13 years. To fulfill this purpose, a systematic review of the literature was carried out, as well as a bibliometric analysis. The results will be of great value to manufacturing companies, especially those aiming to improve the efficiency of their processes, reduce musculoskeletal disorders (MSDs) and increase productivity. Therefore, the implementation of ergonomics involves the inclusion from the corporate level to the operational level; in addition, the participation of the workers who work directly in the production processes is important, since they play an important role in guaranteeing and optimizing the smooth and safe work of the processes. This article evidences the increase of productivity in manufacturing companies through the application of ergonomics and a considerable reduction of MSDs along the production processes.

Keywords
Workplace productivity, ergonomics, labor productivity, manufacturing

1. Introduction

Due to globalization, manufacturing companies have found it necessary to remain competitive and meet market demands, which leads them to reduce their operating costs to a minimum. In addition, the lack of competitiveness can affect the sustainability of the organization in achieving its objectives. Therefore, the search for competitiveness generates that the company focuses more on results and leaves aside the human factor; originating inconsiderate and mistreating working conditions (López et al., 2012). Human factors and ergonomics (HF/E) play an important role in ensuring and optimizing smooth and safe work processes (Reiman et al., 2021). In this regard, Boulila et al. (2018) note: "Musculoskeletal disorders (MSDs) constitute one of the most important problems in the manufacturing industry as they cause absenteeism and decreased performance of workers and generate significant consequences for companies." For a transition to sustainable manufacturing, human-centered factors play a central role in achieving sustainability-oriented operations throughout the supply chain (Nguyen et al., 2021). MSDs contribute to about 37% of recorded occupational hazards and 29% reduction in working hours between the years 2018 to 2019, which resulted in 6.9 million working hours lost in Great Britain and the annual cost of treating MSDs is estimated at about $171.7 million in industrialized countries (HSE, 2019). According to the General Organization for Social Insurance (GOSI), 69,000 occupational injuries were reported in Saudi Arabia in 2014. According to Brokers, in 2016, this increased to approximately 355,000 occupational injuries (as cited in Hadidi et al., 2019, p. 6). For such a reason, ergonomic design of workstations is a way to improve two aspects: productivity for the company and comfort and safety for employees.

1.1 Objectives

The main objective of the present research is to analyze the application of ergonomics methods to improve productivity in manufacturing companies in America, Europe or Asia, during the last 13 years through a respective bibliometric study. That is why we are motivated to answer the following questions:
Q1: How does the application of ergonomic methods influence workers' health?
Q2: Is there a relationship between the increase of productivity in the workplace and the decrease of musculoskeletal disorders?
Q3: In which countries in America, Europe or Asia have ergonomic methods been applied in manufacturing industries?
Q4: What results have been obtained with the application of ergonomic methods in manufacturing industries?
Q5: What is the risk level of personnel with respect to the ergonomic aspect in Latin American countries?

2. Literature Review

According to the World Health Organization, MSDs are one of the leading causes of absenteeism in the world. In industrialized countries, about one third of lost working days related to health problems are due to MSDs. Sixty percent of these days are related to localized back problems (Luttmann et al., 2003, p. 4). According to Schneider, studies conducted by an American ergonomics consultancy showed a decrease in absenteeism from 4% to just over 1% with an ergonomically designed work environment (as cited in Hernandez & Alvarez, 2008, p. 5). According to Hallman et al. work-related musculoskeletal disorders have been identified as the fourth leading cause of healthcare costs worldwide (as cited in Choobineh et al., 2022, p. 1). In 2005, in Europe, the social dimension of this problem was demonstrated. It was found that the proportion of workers performing repetitive manual labor has increased by about 4 %; moreover, 62 % of the population is exposed to a longer working time than a working day established by the; 50 % of the workers report having forced postures for at least a quarter of the time of the working day. As a consequence, in Europe, MSDs account for more than 50% of the occupational diseases that occur (Occhipinti & Colombini, 2010, p. 4). According to the International Labor Organization (ILO), 40% of total occupational accident and illness expenses are due to MSDs generally caused by dysergonomic risks (Société Générale de Surveillance [SGS], 2018).

"According to the National Business Group on Health, implementing an organizational approach to health and wellness has a long-term financial impact. Eliminating or controlling repetitive motion injuries saves a company up to $27,700 per case. Companies with health and productivity programs can reduce disability days by 10% to 35%, improving return-to-work (RTW) rates by at least 6% and a return on investment (ROI) of 3 to 15 times per dollar spent" (Elizondo, 2019, Opinion section, para. 11). Whereby, it could be estimated that, for a manufacturing company in Europe, the costs associated with a musculoskeletal pathology is 18% of all processes (Lazarus et al., 2014, p. 1). “A recent analysis of Global Burden of Disease (GBD) 2019 data showed that approximately 1.71 billion people globally live with musculoskeletal conditions. High-income countries are the most affected in terms of number of people – 441 million – followed by countries in the WHO Western Pacific Region with 427 million and South-East Asia Region with 369 million” (World Health Organization, 2022). According to Piedrahita, good ergonomic practices and their effects at the micro and macroeconomic level constitute an important input for sustainability as they aim to protect people against negative health consequences, promote the integrity of their health and quality of life and also reduce costs for companies (as cited in Munguía et al., 2018, p. 1). Similarly, Parsons (2000), Dianat et al. (2016) agree that the dynamics between the worker and the work environment can result in a series of physiological responses that directly or indirectly affect health and productivity (as cited in de Mattos et al., 2019, p. 1).

Bartolini et al. (2023) notes: “Ergonomics is a key factor in the improvement of health and productivity in workplaces. Past and recent studies widely investigated the impact of ergonomics and human factors on the design of workplaces and work processes in all industries``.According to the International Ergonomics Association (IEA, 2013) and the Human Factors and Ergonomics Society (HFES, 2016), they understand ergonomics as the scientific discipline concerned with understanding the interactions between humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design to optimize human well-being and overall system performance (as cited in McGowan, 2019, p. 1). Also, authors Kane and Kushwaha (2016), Trisusanto et al. (2020) agree that ergonomics is the scientific study of human-machine interaction in the workplace with the goal of improving worker performance, reducing stress, work fatigue and obtaining higher productivity. "They make it uncomfortable for sufferers to perform their work and worsen the quality of life at work; in their most severe manifestations, sufferers find it difficult to keep their jobs and are at risk of long-term work disability" (Yves Roquelaure, 2018, p. 10). Finally, regarding the various ergonomic assessment methods, we will focus on the three mentioned below:

2.1 Rapid Upper Limb Assessment (RULA)

Assesses the exposure of individual workers to ergonomic risk factors associated with upper extremity MSDs. It considers the biomechanical and postural loading requirements of job tasks / demands on the neck, trunk and upper extremities (Middlesworth, n.d., p. 2). "For a given posture RULA will obtain a score from which a certain Performance Level is established. This will indicate whether the posture is acceptable or to what extent changes or redesigns are needed in the post" (Diego-Mas, 2015, Ergonautas, para. 4).

2.2 Rapid Entire Body Assessment (REBA)

According to McAtamney and Hignett (2000), Coyle (2005), Motamedzade et al. (2011); REBA is a field tool for professionals, designed to facilitate the measurement and assessment of risks associated with work postures as part of the ergonomic workload; it is also sensitive to musculoskeletal risks in a variety of tasks, divides the body into segments to be coded individually, with respect to planes of motion, and provides a scoring system for muscle activity caused by static, dynamic, rapidly changing, or unstable postures (as cited in Schwartz et al., 2019, p. 1).

2.3 Ovako Working Analysis System (OWAS)

It allows the assessment of the physical load derived from the postures adopted during work. It is characterized by its ability to assess globally all the postures adopted during the performance of the task. Therefore, it provides less accurate assessments than the other methods. A risk category is assigned to each part of the body according to the relative frequency of the various positions adopted in the different postures observed. Finally, the analysis of the Risk Categories calculated for each observed posture will allow the identification of the most critical postures and positions, as well as the corrective actions needed to improve the position (Diego-Mas, 2015, Ergonautas, para. 4-7).

3. Methods

In this chapter, the methodology applied during the research analysis process will be explained. For this, it is important to define a correct order of the steps to follow in order to obtain the exact information and data for the analysis and study of the topic. For the development of this study, the literature review was considered as a method based on rigorous objectives and criteria that allow transparency and replicability by other researchers. In addition; "The systematic review is a review or theoretical update of primary studies, with a systematic development of the data accumulation process (selection of studies, coding of variables, etc.), but where statistical procedures are not used to integrate the studies" (Ato et al., 2013, p. 5) that help to answer our general and specific research questions. The objective is to increase scientific knowledge, but without contrasting it with any practical aspect (Muntané, 2010, p. 221). In addition, an interpretive paradigm with a qualitative approach is proposed because we rely on observation in order to describe the qualities of a phenomenon or previous research. Likewise, the scope is exploratory-descriptive when the objective is to examine a topic or research problem that has been little studied, about which there are many doubts or which has not been addressed before (Hernández et al., 2014, p. 91). The first step carried out was to search for and collect information; in a systematic literature review, the fundamental thing is to collect a large amount of information in order to understand the topic in depth. The second step was to perform a statistical analysis to obtain numerical information; and finally, the last step was to perform a bibliometric analysis. After that, we reviewed and compiled the literature on our research topic, which is: Application of ergonomics to increase productivity in manufacturing companies. The methodology used was PRISMA, in which questions and objectives were raised to define the scope of the research before starting the search for articles with information relevant to our topic. After carrying out the information search, we found a large number of articles related to the research topic in question. This will help us to fulfill the objective of the research, which is to examine the topic in depth in order to gather accurate and updated conclusions.

4. Data Collection

In the first search, the advances in the application of ergonomics methods to improve productivity in manufacturing companies in America, Europe or Asia were analyzed based on a systematic review of academic articles published during the last 13 years. Based on the questions posed for the specific objectives, a selection of articles that are part of the research study was made, the following inclusion criteria were considered:

- Studies developed in manufacturing company contexts.
- Studies proposing ergonomic methods in relation to productivity.
- Articles preferably in English.
- Articles published in scientific journals.
- Articles published between 2011 and 2023.

Likewise, articles that are not related to manufacturing companies, articles that do not present the various ergonomic methods, working conditions and worker health and safety, and studies that do not aim to increase productivity were excluded. For the selection of the articles, a detailed search was carried out in databases recognized by the academic community. This search yielded the following reliable databases: Scientific Electronic Library Online (SciELO), Red de Revistas Científicas de América Latina y el Caribe, España y Portugal (Redalyc), Dialnet, Scopus, Proquest, Science Direct and Web of Science. The search terms used were {"workplace productivity" and "ergonomics" and "labor productivity" and "manufacturing"}. The following filters were also applied: journal articles, areas (engineering, social sciences, human sciences and production), year (2011-2023).

Table 1. Combination of strings used in the overall search

Search Terms	Applied Query	Search Results
“Workplace productivity” and “ergonomics”	(TITLE-ABS-KEY (workplace AND productivity) AND TITLE-ABS-KEY (ergonomics)) AND PUBYEAR > 2010	444
“ergonomics” and “labor productivity”	(TITLE-ABS-KEY (ergonomics) AND TITLE-ABS-KEY (labor AND productivity)) AND PUBYEAR > 2010	137
“Workplace productivity” and “manufacturing”	(TITLE-ABS-KEY (workplace AND productivity) AND TITLE-ABS-KEY (manufacturing)) AND PUBYEAR > 2010	365
“ergonomics” and “manufacturing”	(TITLE-ABS-KEY (ergonomics) AND TITLE-ABS-KEY (manufacturing)) AND PUBYEAR > 2010	1764

We considered the title of the research, the keywords and the abstract to define the descriptor, which was: Workplace productivity - ergonomics. This yielded a significant number of articles. From this, 444 articles were obtained. Those that did not meet the inclusion criteria were discarded, thus obtaining 185 articles; each article was subjected to an individual analysis, and those that did not meet the inclusion criteria were excluded. This resulted in the selection of 45 articles. During the review of the articles, software VOSViewer was used to improve the visualization of the findings on the subject and the evolution of the data collected throughout the process; in addition, Microsoft Excel pivot tables, worksheets and registers were used.

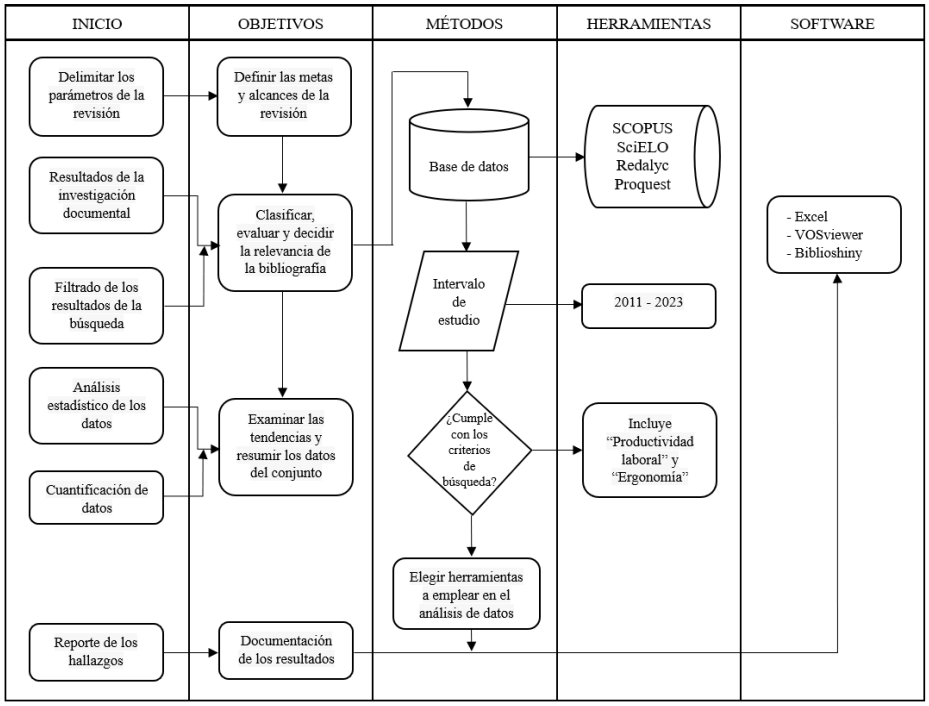

Figure 1. Flow of the Source Collection Process

Figure 1 presents in a sequential manner each of the actions carried out in the research of the respective topics. This starts from the very beginning of the research, where the objectives to be achieved are established and the methods and instruments used to collect the information required for a rigorous and validated research are detailed. Likewise, information is provided about the software used in the creation of resources and data management.

4.1 Bibliometric analysis

The analysis covered the totality of the articles collected following the criteria set out in Table 1, resulting in a set of 444 articles related to "Workplace productivity" and "ergonomics". This search is characterized by a breadth that includes more than 600 different authors, where they share several keywords during the analyzed articles and an impressive set of more than 8,000 bibliographic references (Figure 2). In terms of the distribution of publications by country, the United States ranks first. This coincidence is remarkable, since the United States focused on the study of different forms, methods and procedures of application of the various ergonomics evaluation methodologies in manufacturing and other industries throughout the study time.

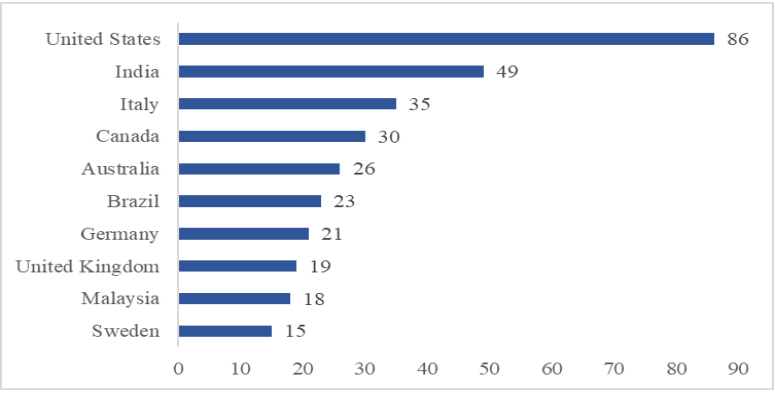

Figure 2. Distribution of Sources by Country

Figure 3 illustrates the authors' participation in the years of study of this article. The review of this article was based on reference documents created with the contributions of Botti, L.; Carneiro, P.; Battini, D..; Constantinescu, C.; and Holtermann, A.; who have extensive experience in the subject and cover in depth various methodologies, procedures and applications in several industries.

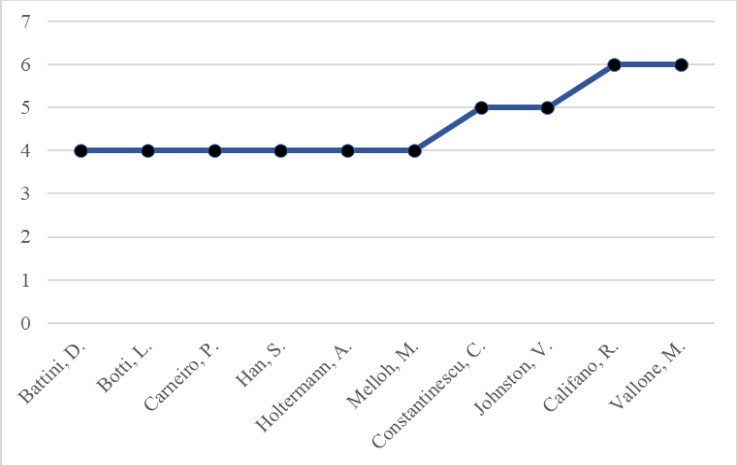

Figure 3. Authors' contribution in the last 13 years

For the word matching analysis in Figure 4, the VOSviewer tool was used to visualize the relationship of keywords among existing publications. As expected, the two most prominent groups on the map are "Ergonomy" and "Manufacturing", with a total of 1,864 matches. In addition, the relationship with terms such as "Productivity", "Musculoskeletal disorders", "Risk assessment" and "Human engineering" can be seen.

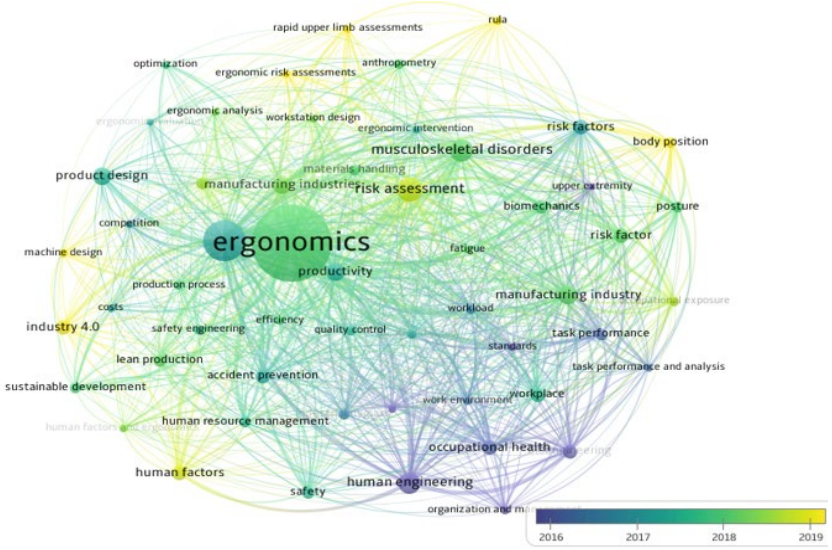

Figure 4. Word matching analysis

5. Results and Discussion

5.1 Numerical Results

Table 2 below shows the contributions and advantages of the application of ergonomic methods to increase productivity in manufacturing companies.

Table 2. Contributions and advantages of the application of ergonomic methods.

	"MSDs are especially a major problem among workers with physically demanding work where pain can make it difficult to perform daily work tasks" (Sundstrup et al., 2020, p. 1). "Several studies suggest that errors, scrap rates, and rework would decrease significantly with the integration of ergonomics into the production system" (Zare et al., 2016, p. 3).
	"This work imparts knowledge and awareness of the importance of addressing ergonomic issues from a developing country context as these types of work in developing country contexts are rare" (Karuppiah et al., 2020, p.16).
	"Worker participation is an important factor for problem identification and for interventions/modifications in workplaces" (Colim et al., 2020, p. 6).
Authors' reflectaos	"The increase in MSDs also had a negative impact on economic growth. Employee compensation for occupational diseases increased from RM2.65 million in 2009 to RM14.05 million in 2014 " (Mazli & Mohd, 2020, p. 1).
	"The focus on ergonomics is increasing rapidly in the world, including Indonesia, the United States, Argentina, Brazil, Chile, Colombia, Mexico, and Peru. These countries pay special attention to the well-being and health of workers by creating regulations and control bodies" (Nelfiyanti & Zuki, 2020, p. 5).
	According to Kujawinska et al. the application of ergonomic intervention not only has an impact on productivity, but also contributes significantly to sustainable production, i.e., creating an awareness among employees that the organization recognizes them as the most valuable resource (as cited in Kandananond, 2018, p. 2). According to Yeow and Sen, they demonstrated in an electronics company that low-cost physical ergonomic interventions can produce a 30% reduction in errors in the factory and an 11% reduction at customer sites. Productivity increased by 50% and the factory increased profits by $950,000 per year (as cited in Zare et al., 2016, p. 13).
Data demonstrating the benefits of ergonomics application	According to Vieira et al. after integrating ergonomics into a lean production system in a Brazilian automobile factory, it was found that the percentage of vehicles without rework increased from 48% to 78%. There was also a decrease in absenteeism and accidents and an increase in productivity (as cited in Zare et al., 2016, p. 14). "In terms of transfer distance and OMH, the selected design gave the improvements of 23.88% and 22.92%, respectively, compared to the current design. While, for transfer time, it gave an improvement of 34.01%" (Suhardi et al., 2018 p.27). "RAMP is the most comprehensive tool in terms of number and types of risk factors, and is the only tool that supports all MSD risk in a systematic way" (Rosea et al., 2020, p.8).

Implementation of ergonomic methods	"The application of the RULA method, combined with self-reported musculoskeletal symptomatology questionnaires, has also shown an important contribution to the risk assessment of musculoskeletal disorders in jobs with manufacturing and repetitive type tasks" (Colim et al., 2020, p. 4). "The proper implementation of Lean Manufacturing brought substantial improvements in the process, it becomes a strategic tool that involves all areas of a company, not only because of its various applications within an organization, but because it can be applied in any type of company and can be adjusted to different scenarios with excellent results" (Burgess et al., 2018, p. 292). "Using virtual reality software and CAD/CAM Tools it is possible to merge development and engineering processes. Since it offers the designer the freedom to try different new solutions, as the tool available to them allows them the context of experimentation" (Marzano et al. 2012, p. 6).
Technology and ergonomics	"The benefits of adopting lean construction, as highlighted in the paper, are immense and will make the industry more resource efficient" (Maradzano et al., 2019, p.220). "Automated software has been developed for the simulation and design of the operator's workplace, which can be used in the design of new models for mining excavators. The program functions allow you to create the required light level in the workplace and the excavator's outdoor spaces, also to reduce the harmful effects of vibration due to the optimal selection of anti-vibration devices" (Tortorella et al., 2020, p. 6). "The enumerative algorithm, which analyzes feasible work rotation schedules that meet ergonomic criteria that take into account the presence of groups of workers requiring less risk exposure" (Boenzi et al., 2016, p. 1671).
The risk situation of the manufacturing sector	"In the risk factors for the development of MSDs, it was noted that it was strongly related to bending over, i.e., prolonged trunk flexion. This posture is inherent in many rural activities that must be performed close to ground level. In particular, the identification of bending as a risk factor was found in most of the selected papers (51.9%)." (Benos et al., 2020, p. 14). "In the manufacturing industry, effective inclusion of ergonomics in processes and facilities has been shown to decrease disability-related costs, overtime or overtime, medical care, and incident premiums or fines" (Munguía et al., 2018, p. 2). "Work activities in the meat processing industry are technically manual and physical. The evaluation of workers in the deboning of an Italian ham in a processing company confirms the high ergonomic risk due to manual handling tasks" (Botti et al., 2015, p. 635).

5.2 Graphical Results

Productivity improvement in manufacturing processes is directly linked to the adoption of ergonomic practices in manufacturing companies, attention to occupational health in the work environment, promotion of a culture of accident prevention and risk assessment. Likewise; the importance of human factors during production processes and the implementation of technology, lead to a significant decrease in musculoskeletal problems of workers and promote optimal standards of control and management of human resources; thus, achieving a decrease in costs related to disability, overtime, medical care and premiums or fines for incidents (Figure 5).

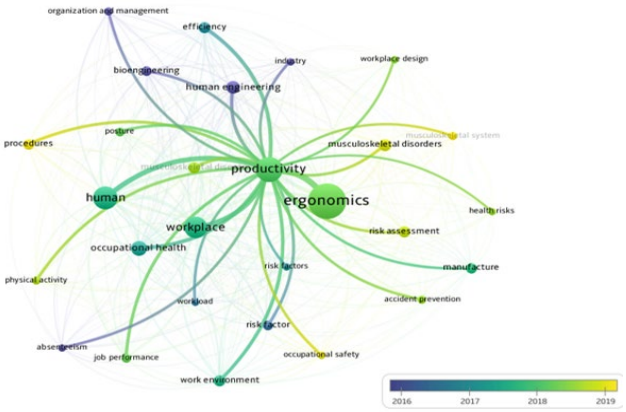

Figure 5. Focus of the cluster related to Productivity

In manufacturing companies, ergonomics is a relevant factor during production processes since it allows the work and the system to adapt to human capabilities and limitations; thus, achieving better performance of people in their tasks and at the same time, increasing productivity, efficiency and reduction of costs associated with occupational injuries. On the other hand, the application of ergonomic evaluation methods (RULA, REBA or OWAS) are of vital importance for the identification of workers' exposure to risk factors, seeking to improve efficiency, safety and comfort in the work environment and the interaction between machines and people. Likewise, this will allow the creation of standardized procedures, a culture of prevention of musculoskeletal disorders and the generation of automated processes in the production chain.

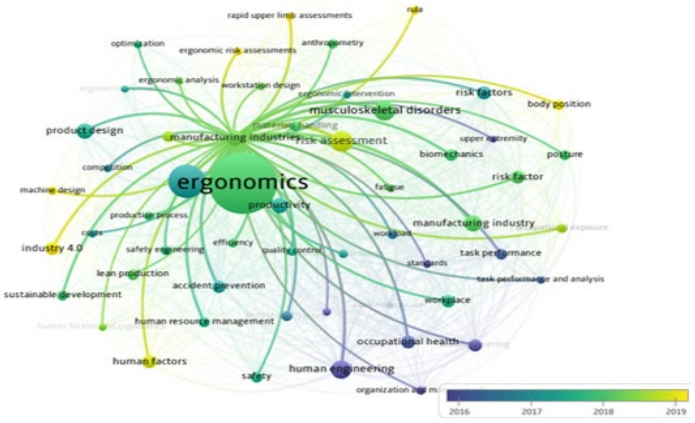

Figure 6. Focus of the cluster related to Manufacturing Industry

As shown in the Figure 6, "Human Engineering" is a point of intersection when it comes to ergonomics and manufacturing companies; since Human Engineering focuses on designing systems and workplaces so that they are safe, efficient and comfortable for the people who use them, taking into account the needs of the users themselves. In addition, they consider factors such as physical ergonomics (body postures and movements), cognitive ergonomics (mental processes and cognitive load), and organizational ergonomics (factors related to the work environment and social interaction). All of the above has led to a change in the functioning of production processes; thus driving an increase in productivity and efficiency of processes and a notable reduction in the number of cases of musculoskeletal disorders. At present, most manufacturing companies have developed a work plan according to their processes and ensuring the safety and comfort of their workers (Figure 7).

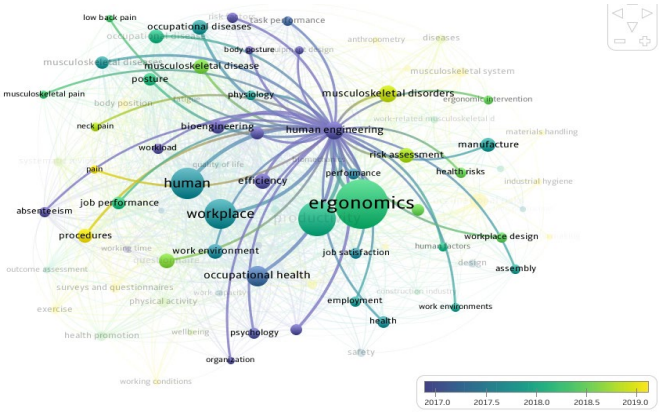

Figure 7. Focus of the cluster related to Human Engineering

5.3 Proposed Improvements

After carrying out an exhaustive study on ergonomics and its impact on manufacturing companies, a definition will be proposed that will more clearly evidence its relationship in application: "At a time when ergonomics and technology are increasingly being applied and adopted to improve various processes; achieve greater automation, increase productivity, reduce labor costs and comply with regulations related to workers' health, the application of ergonomics is revealed as a crucial issue to implement. Since this leads to reduced health care and workers' compensation expenses, it promotes greater efficiency, effectiveness, productivity and profitability in the company. In addition, it contributes to the retention of human talent by demonstrating commitment to the safety, well-being and comfort of workers; and finally, it enhances the company's image by boosting its corporate social responsibility with all members of the company." Makhbul et al. (2022) notes: “The effects of ergonomics in the work environment need to be emphasized in an organization as they can affect organizational performance. An awareness of the impact of work processes and technology on humans has led to the ongoing research on ergonomic concepts in achieving organizational goals” (p. 2). At the organizational level, the implementation of various ergonomics methods in processes with low productivity rates was validated; however, the implementation of good ergonomic practices is also hindered by workers' misperceptions and their unwillingness to participate, when, ironically, the workers themselves are the ones who benefit the most (Munguía et al., 2018, p. 3).

5.4 Validation

The research has revealed that the different ergonomics methodologies offer innovative and practical approaches for implementation in the production processes of manufacturing companies. The next step will be to define how to apply these methodologies and evaluate the impact they generate in addressing the problems mentioned in the scientific articles studied. The advance of technology is continuous and, in parallel, studies on the application of ergonomics are becoming known. However; in less developed countries, there is a lack of use and/or application of ergonomic evaluation methods since they are mostly focused on large-scale production and human factors are not considered during the process. Therefore, it becomes a great challenge to generate an awareness of ensuring the safety and health of workers and implement technology to evaluate jobs and thus provide greater safety, comfort and quality of life to workers in manufacturing companies (sector where there is a high rate of presence of musculoskeletal disorders, due to the pace and activities themselves). “Prevalence of work-related musculoskeletal disorders in the upper limbs, especially in the shoulders and upper back was high in Iran. The overall prevalence of musculoskeletal disorders was 31.8% for neck, 36.8% for shoulders, 17.4% for elbows, 34.6% for the wrist and 38.1% for upper back” (Parno et al., 2017, p. 10). Battini et al. (2020) notes: “According to some estimations for the manufacturing sector, 12.5% of the workforce missed days of work due to illness or injury in 2015. In the European Union, more than 40 million workers are affected by musculoskeletal disorders (MSDs) (about one in seven people), while in the US, MSDs represent about 30% of occupational injuries. In the US, the median number of days absent from work due to WMSDs was 10 in 2012, while in the European Union this figure was about 12 days” (p. 2). Likewise, there are intelligent solutions that allow improving sequencing and scheduling processes in terms of ergonomics and time, achieving a balance between ergonomics and productivity, there are devices that can be used to collect various types of data during the execution of tasks; besides being non-invasive as they are light and easy to carry, and do not interfere in the work environment. According to Bräunig, the German Social Accident Insurance (DGUV) reported in 2013 that the investment in

improving working conditions through preventive measures induce on a long-term financial benefits with a coefficient of 1,445 in manufacturing industries (as cited in Constantinescu et al., 2020, p. 1).

6. Conclusion

The present research work has focused on a field of study that has been explored and which is in constant revision since it is in a constant transition of research, innovation and implementation of technology, which allow ergonomics to adapt to the current needs and of the present study. The context of a dynamic world and prevailing in a high rate of competitiveness, demands the need to implement various methodologies and analysis of ergonomics application in manufacturing companies; such as: RULA, REBA, OWAS, symptomatological questionnaires and others; have facilitated and provided the collection of information, data and ways to implement ergonomics in production processes where a low rate of productivity is evidenced; in addition, they have served as a starting point for the exploration and implementation of new feasible solutions. However, it was evidenced the existence of limitations and disadvantages that directly and indirectly affect the traceability of the implementation of ergonomics evaluation methods, so it is important to focus future studies towards the implementation process and the significant role played by the various ergonomics evaluation methods in improving productivity at the organizational level. It is important to give an impulse to the exhaustive analysis carried out on the role of ergonomics in the large number of studies on the application of ergonomics in production processes through a systematic approach of bibliographic review. Currently, large companies are looking for the coupling of ergonomics as part of their production processes, in search of obtaining positive results in processes where low productivity due to musculoskeletal disorders has been evidenced. Finally, after performing the bibliometric analysis, it is evident that research on the various ergonomics methodologies to be used for the benefit of workers belonging to manufacturing companies, are under constant research analysis. The suggested review aims to explain the link between ergonomics and productivity and the benefits at the organizational level through the implementation of ergonomics during the production processes and with the purpose of reducing musculoskeletal disorders and increasing the productivity rate throughout the process.

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