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ESG_ERGOS: INDICATORS FOR THE SOCIAL PILLAR OF ESG FROM THE PERSPECTIVE OF ERGONOMICS AND HUMAN FACTORS

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Summary

The current concern with sustainability and the implementation of ESG (*Environmental, Social, and Governance*), has led companies to promote and define strategies to improve the well-being of workers, developing an organizational culture that values and prioritizes safety in search of a tangible demonstration of social responsibility. The integration between ESG and ergonomics benefits prevention actions to eliminate or minimize occupational risks, protect workers and contribute to healthier and more sustainable work environments. These actions can be measured through indicators. The objective of this article was to present a set of indicators focused on the social pillar of ESG to be used by companies from the perspective of Ergonomics and Human Factors. An exploratory research of a basic nature was carried out, with a qualitative-quantitative approach in three phases: i) survey of indicators used for ESG; ii) analysis of the indicators most cited in the literature and; iii) improvement of these indicators. It is noteworthy that the *Global Reporting Initiative* (GRI) was the most accessible and detailed indicator, leading to its selection. Based on the results, the following themes were determined as scope: Occupational Health and Safety (402) and Labor Relations (403). The indicators evaluated and proposed seek to ensure that ergonomics and human factors are adequately considered and integrated into the organizational strategy. This set of indicators was called ESG_ErgoS, which aims to contribute to sustainability from the social aspect in organizations from the perspective of ergonomics.

Keywords : ESG; Ergonomics; Human Factors; GRI; ESG_ErgoS.

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Abstract

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With the current concern for sustainability and the implementation of ESG practices (Environmental, Social, and Governance), companies have been promoting and defining strategies to improve workers' well-being, developing an organizational culture that values and prioritizes safety as a tangible demonstration of social responsibility. The integration between ESG and ergonomics benefits preventive actions to eliminate or minimize occupational risks, protect workers, and contribute to healthier and more sustainable work environments. These actions can be measured through indicators. The objective of this article was to present a set of indicators focused on the ESG social pillar to be used by companies from the perspective of Ergonomics and Human Factors. An exploratory, basic research study was conducted with a qualitative-quantitative approach in three phases: i) identification of indicators used for ESG; ii) analysis of the most cited indicators in the literature; and iii) improvement of these indicators. It is noteworthy that the Global Reporting Initiative (GRI) was the most accessible and detailed indicator, leading to its choice. Based on the results, the defined scope included the themes: occupational health and safety (402) and labor relations (403). The evaluated and proposed indicators aim to ensure that ergonomics and human factors are adequately considered and integrated into the organizational strategy. This set of indicators was named ESG_ErgoS, which intends to contribute to sustainability from a social perspective within organizations through the lens of ergonomics.

Keywords: ESG; Ergonomics; Human Factors; GRI; ESG_ErgoS.

1. INTRODUCTION

Companies are increasingly aware of corporate responsibility regarding the different aspects linked to sustainability. In this sense, the concept of ESG *(Environmental, Social, and Governance)* has gained prominence. ESG refers to the Environmental, Social, and Governance (ESG) principles and originates from the UN Global Compact in partnership with the World Bank, evoked in 2004. It aims to analyze a company and identify whether it is socially responsible, sustainable, and properly managed. Currently, ESG principles are arousing interest in both the public and private sectors and have been gaining relevance for senior management in organizations (Coutinho, 2021).

With its implementation, the definition of strategies to improve the well-being of workers is promoted, involving the development of an organizational culture that values and prioritizes safety at work, which is a tangible demonstration of social responsibility. These principles are the same as those promoted by Ergonomics, which seeks to ensure the health and well-being of workers.

Companies working to implement ESG recognize the importance of promoting safer, more sustainable, and ethical work environments, beyond a legal obligation and compliance with regulatory standards. The integration between ESG and ergonomics benefits both workers and companies. With preventive actions to minimize occupational risks, companies protect their workers and contribute to healthier and more sustainable work environments. Research points to the correlation of ergonomics and human factors issues with productivity and organizational sustainability that are more noticeable in the macroergonomic approach (Derenevich et al, 2022). In this sense, it is believed that macroergonomics can contribute, both by establishing indicators for ESG within the social aspect, and by providing methodologies that can be applied to the national scenario for classification in the UN model.

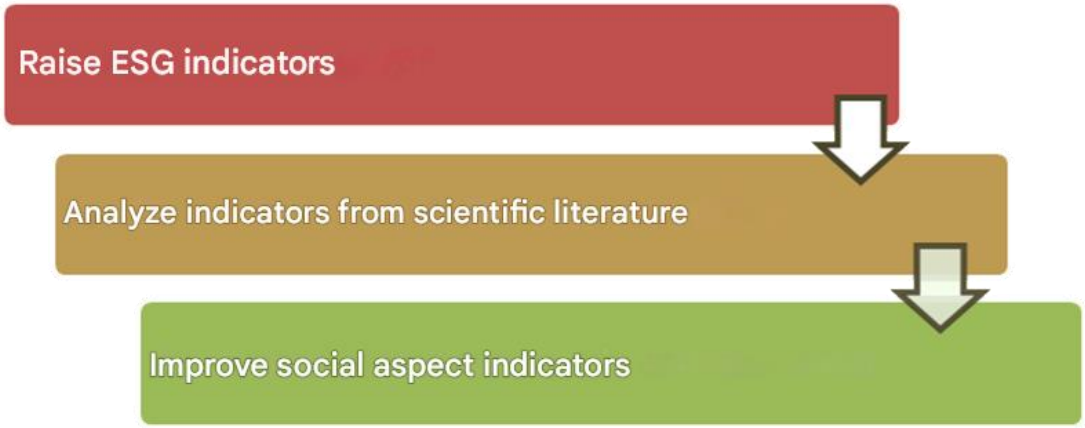
To measure these impacts, it is necessary to use indicators, and there is a gap in both the application and transparency of classification methodologies (Santos et al., 2023). Thus, the

objective of this article was to present a set of ESG indicators to be used by companies from the perspective of Ergonomics and Human Factors, specifically for the social pillar.

2. MATERIALS AND METHODS

In order to meet the proposed objective, exploratory research of a basic nature was carried out, with a qualitative and quantitative approach. From the point of view of technical procedures, bibliographical research and a survey stage were used (Silva & Menezes, 2005). To this end, the research was divided into three phases: i) survey of indicators used for ESG, based on scientific literature; ii) analysis of the most cited indicators in the literature, with an emphasis on human and social factors; and; iii) suggestions for improving these indicators so that human factors and ergonomics, from a macro perspective, can be taken into account in future applications of ESG in companies.

Figure 1 – Research phases



Source: Authors, 2025.

In the first phase, the literature search was carried out through the CAPES Journal Portal, with the terms “ESG” and “indicator" in September 2023. This initial search resulted in 563 (five hundred and sixty-three) articles. After this initial search, the filters “Portuguese Language” and “Spanish Language” were included, resulting in 24 articles. Of this total, 11 articles remained in Portuguese, removing duplicates. The articles were classified, categorized and analyzed in their entirety regarding their suitability to the topic, leaving a total of 4 articles with relevance to the scope of the research. It is believed that within the universe researched and because this is a recent topic, the selected articles contemplate a universe capable of representing an overview of the main indicators used by companies in terms of ESG.

The group with the most cited indicators was listed and used in phase II of this research in order to identify which aspects related to human factors were considered. To this end, the themes considered by the indicator were identified, as well as the objectives and requirements to be met. From this, the human factors, including social factors, considered in each of the requirements were listed.

Based on these results, during phase III, it was assessed whether such aspects would be sufficient to represent ergonomics and human factors from a macro perspective. To this end, a survey was conducted with the participation of 8 (eight) experts in the area of ergonomics, 3 (three) of whom were professionals certified by ABERGO. Thus, each requirement described in the previous phase was subjected to a critical analysis of the importance of applying

ergonomics in the company to meet the human and social factors listed in each theme of the indicator evaluated. Each participant assigned a score between 0 and 5, with 0 being not at all important and 5 being very important; generating a ranking with the simple arithmetic mean of the scores assigned.

In addition, each participant assigned a score between 0 and 5 to the same requirements on how clear the description of that requirement was, with 0 being not at all clear and 5 being very clear. It was possible, from these results, to generate a score of contribution priorities, considering the inverse of the average of clarity in relation to importance, following formula 1:

$$Priorização = \frac{5 - Clareza}{Importância} \quad (1)$$

Based on the priority requirements, the experts presented proposals for improvements that would contribute to ensuring that ergonomics and human factors were adequately considered. The frequency with which each item proposed by the experts was considered in this proposal of suggestions from the macro perspective of ergonomics.

3. RESULTS

As part of a research protocol, the evaluation of the articles selected for review consists of the analysis of key topics (Carvalho, 2020). Specifically, the objectives and ESG indicators were identified in the four selected articles, as shown in Table 1.

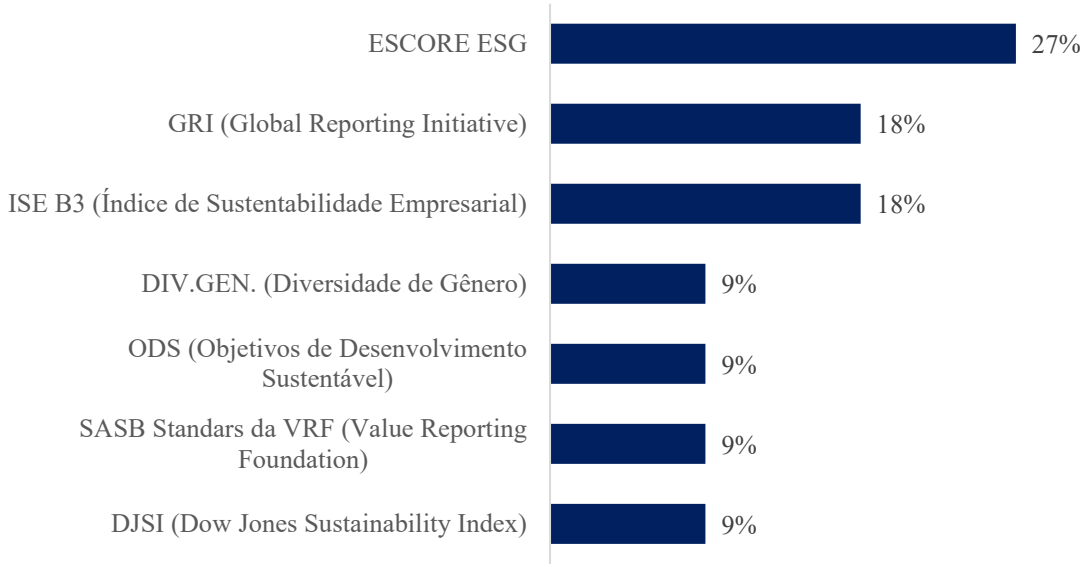
Table 1 – Analysis of articles

Art.	Title	Purpose of the article	ESG Indicators/Metrics cited in the article
1	Main divergences in ESG metrics and their impacts on the ratings of Brazilian banks	Demonstrate the main divergences between the ESG metrics used by rating agencies and their impacts on the ESG indicators of Brazilian banks.	DJSI (Dow Jones Sustainability Index), ISE B [3] (Corporate Sustainability Index), GRI (Global Reporting Initiative), SASB Standards from VRF (Value Reporting Foundation).
2	Analysis of the ESG score calculation adopted by banks and financial institutions for granting credit	Research the ESG SCORE and its importance in credit analysis.	ISE B3, SCORE ESG, GRI, PRI (Principles of Responsible Investment), SRI (Sustainable and Responsible Investment), SDGs (Sustainable Development Goals).
3	Assessment of ESG practices in banks listed in [B] [3]: verification of the effect of the composition of the board of directors and characteristics of the companies	Analyze whether the corporate governance characteristics of the board of directors, the capital structure and the economic-financial performance of companies influence ESG practices in banking institutions listed in [B] [3].	ESG SCORE; EMP SIZE (Company Size); ROA (Return on Assets); ADR (American Depositary Receipts); CRED. OPER. LOG (Logarithm of the Sum of Credit Operations); CAP. EST. (Capital Structure); GEN. DIV. (Gender Diversity); IND. CONS. (Independent Directors); BI (Board Interlocking).
4	Sustainable and market performance in Brazilian companies listed on [B] [3]: a causal approach between performances	Analyze the cause-effect relationship between sustainable performance and market performance of Brazilian companies listed on the Brasil Bolsa Balcão [B] [3], based on the methodology proposed by Jost (2018).	Environmental: ESG SCORE; Economic-financial: Return on Assets (ROA), Return on Equity (ROE), Return on Sales (ROS); Market performance: Tobin's Q, Market to Book, Share Price, Earnings per Share, Price/Earnings Ratio.

Source: Authors, 2025.

Of this information, the most relevant for the purpose of this research was the mention of which indicators were used in the approaches that are related to human factors and, from this list, it was possible to obtain the ranking of the most cited (figure 2).

Figure 2 – Ranking of the mentioned indicators



Source: Authors, 2025.

Of the three groups of indicators most cited in the selected articles, the GRI *(Global Reporting Initiative)* had greater accessibility and detailed metrics. Therefore, it was decided to evaluate only it.

GRI is an independent international organization that helps other institutions take responsibility for their impacts through global communication. To this end, it offers a set of standards that companies can use to prepare their sustainability reports (About GRI, 2024).

After analyzing the 38 standards presented by the GRI, 15 were selected due to their relationship with ergonomics and human factors. These standards were then listed in order to assess the clarity of the aspects of ergonomics and human factors as well as the importance of applying ergonomics in companies.

It can be seen in Figure 3 that, in terms of importance, all items were considered relevant, while in terms of clarity, the last two items — occupational health and safety and labor relations — presented the lowest scores.

To verify the validity of including these two items in the proposal of factors related to ergonomics in labor relations, the prioritization calculation was performed, presented in Table 1. With the result, it was possible to confirm the need to implement improvements that ensure that ergonomics and human factors are adequately considered in these two themes.

Figure 3 – Importance and Clarity

Source: Authors, 2025

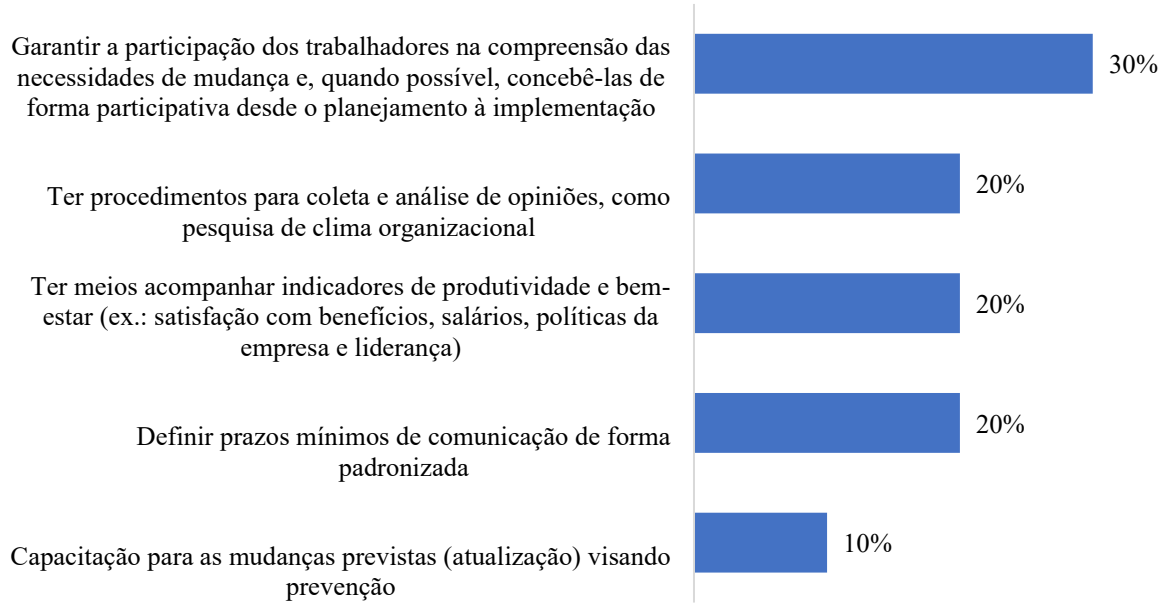
After identifying the priority themes, the ergonomists suggested adding indicators according to technical and tacit knowledge, presented in Figure 4 and Figure 5.

Table 1 – Prioritization

Theme	402	403	404	405	406	407	408	409	410	411	413	414	415	416	417
Prioritization	0.59	0.58	0.50	0.41	0.38	0.37	0.35	0.32	0.31	0.31	0.30	0.26	0.25	0.24	0.23

Source: Authors, 2025.

Figure 4 - Inclusion suggestions



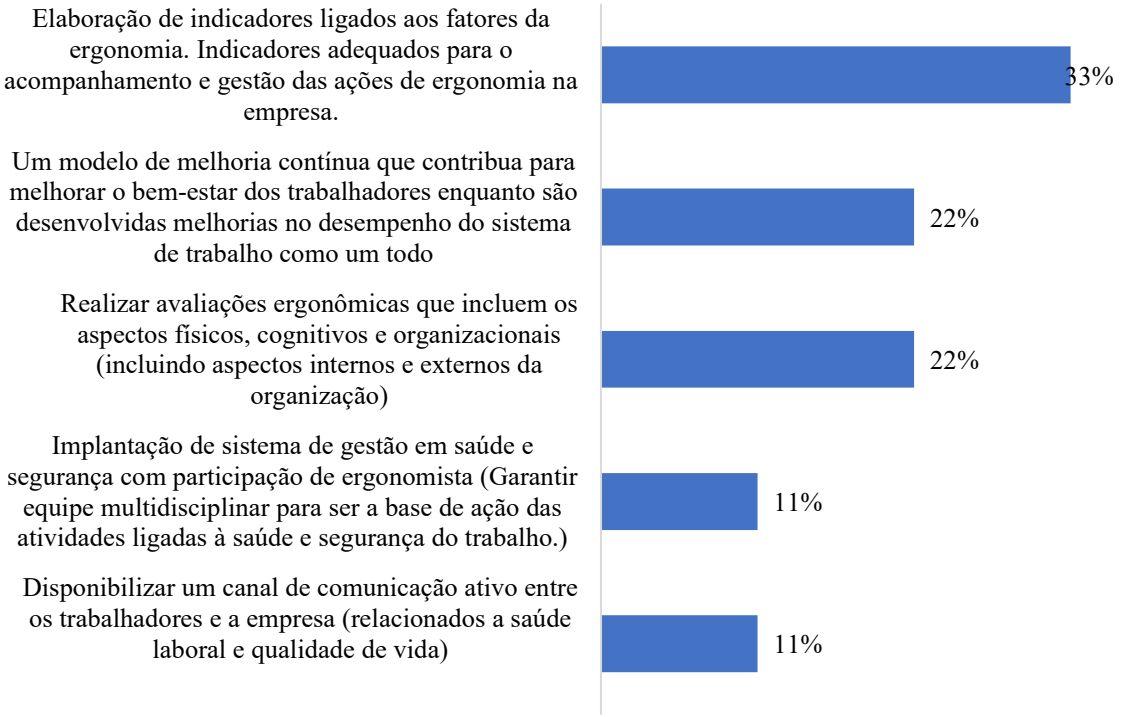
Source: Authors, 2025

In the topic Labor Relations (402), gaps were identified in relation to ergonomics and human factors. To address these deficiencies, five metrics were suggested: ensuring the participation of workers in understanding and implementing changes in a participatory manner; establishing procedures for collecting and analyzing opinions, such as organizational climate surveys; creating means to monitor productivity and worker well-being indicators; defining minimum communication deadlines in a standardized manner; and training workers to communicate changes, ensuring that they are made in a uniform and efficient manner.

Based on suggestions from the ergonomists consulted, the indicators for inclusion in the Labor Relations theme (402) were defined, represented as “Initial” in table 2. Subsequently, this initial proposal underwent improvements, resulting in the column entitled “After”.

Regarding the topic Occupational Health and Safety (403), although it is comprehensive in terms of worker safety, it does not adequately address ergonomic aspects. It is essential to develop specific indicators to monitor and manage ergonomic actions in the company. Adopting a continuous improvement model will contribute to the well-being of workers and improve the performance of the work system as a whole. Ergonomic assessments should consider physical, cognitive and organizational aspects. In addition, the implementation of a health and safety management system should include the participation of ergonomics, with an active communication channel between workers and the company.

Figure 5 - Inclusion suggestions



Source: Authors, 2025.

Similarly to theme 402, for theme Health and Safety at Work (403) the initial proposal and improvement were developed, as can be seen in table 3.

Table 2 - Suggestions for indicators in theme 402

Home	After
Ensure the participation of workers in understanding the need for change and, where possible, designing it in a participatory manner from planning to implementation	Ensure the participation of workers in identifying the need for changes related to work processes.
	Design changes in processes in a participatory manner with employees, from planning to implementation.
Have procedures for collecting and analyzing opinions, such as organizational climate research	Have procedures for collecting and analyzing employee opinions on company processes, such as organizational climate research.
Have the means to monitor productivity and well-being indicators (e.g. satisfaction with benefits, salaries, company policies and leadership)	Have the means to track productivity and well-being indicators (e.g. satisfaction with benefits, salaries, company policies and leadership)
Define minimum communication deadlines in a standardized manner	Define minimum deadlines for communicating organizational changes that affect employees
Training for expected changes (update) aiming at prevention	Training for the planned changes aimed at prevention

Source: Authors, 2025.

Table 3 - Suggestions for indicators in theme 403

Home	After
Development of indicators linked to ergonomic factors. Suitable indicators for monitoring and managing ergonomic actions in the company.	Monitor the results of ergonomics actions in the company.
A continuous improvement model that contributes to improving the well-being of workers while developing improvements in the performance of the work system as a whole.	Establish a continuous improvement model that contributes to improving the well-being of workers while developing improvements in the performance of the work system as a whole.
Conduct ergonomic assessments that include physical, cognitive and organizational aspects (including internal and external aspects of the organization).	Conduct ergonomic assessments that include physical, cognitive and organizational aspects, including internal and external aspects of the organization.
Implementation of a health and safety management system with the participation of an ergonomist (Ensure a multidisciplinary team to be the basis for action in activities related to occupational health and safety).	Implement a health and safety management system with the participation of an ergonomist (Ensure a multidisciplinary team to be the basis for action in activities related to occupational health and safety).
Provide an active communication channel between workers and the company (related to occupational health and quality of life).	Provide active communication channel(s) between workers and the company (related to occupational health and quality of life).

Source: Authors, 2025.

After the improvement, assessment methods were proposed for each indicator. As an example, we present the proposals generated for “Providing active communication channel(s) between workers and the company (related to occupational health and quality of life)”, highlighted in Table 4.

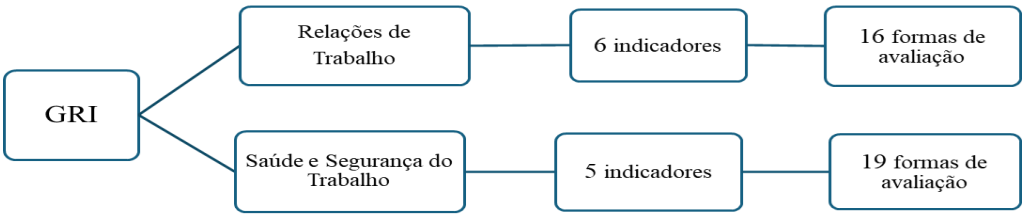
Table 4 - Proposed forms of assessment

1.1	Are there active communication channels between workers and the company?
1.2	Number of channels available
1.3	Percentage of these channels in which there is a procedure for managing negotiations, including responses to these communications for the worker
1.4	Company adoption percentage (number of people using per total number of employees)
1.5	Percentage of actions taken related to occupational health and quality of life / actions resulting from suggestions received through communication channels
1.6	Percentage of workers who are aware of communication channels

Source: Authors, 2024.

In the work carried out with the two indicator themes, Labor Relations and Occupational Health and Safety, 11 indicators and 35 proposals for assessment methods were suggested, presented in figure 5.

Figure 5 - Summary of suggestions by indicator



Source: Authors, 2025.

The set of these indicators was named **ESG_ErgoS** , since it represents relevant aspects of ergonomics and human factors in organizations, specifically those related to the social aspects of ESG. It is emphasized that this initial proposal must be subject to a process of continuous improvement. The ESG_ErgoS indicators and assessment methods are listed in Tables 5 and 6.

Table 5 – Employment Relations (402)

Indicator	Assessment Forms
Training for the planned changes aimed at prevention	Are there records of training for the planned changes?
	In the training, what percentage of workers from the impacted areas are involved?
	Is there feedback on the training?
Define minimum deadlines for communicating organizational changes that affect employees	Is there communication of changes prior to implementation?
	Is there a minimum period established for disclosing changes before implementation?
	If so, what are the deadlines for disclosing changes?
Have the means to track productivity and well-being indicators (e.g. satisfaction with benefits, salaries, company policies and leadership)	Are there indicators that reflect the impacts on the health and well-being of workers related to the changes implemented?
	Are there means for managing these indicators? (e.g.: monitoring goals, action plans, etc.)
Have procedures for collecting and analyzing employee opinions on company processes, such as organizational climate research	Is there a survey to collect and analyze employee opinions?
	Are there strategies to ensure anonymity? Is the data processed by the company itself?
Ensure the participation of workers in identifying the need for changes related to work processes.	Do workers participate in identifying the needs for change?
	Percentage of worker suggestions in the change survey that are implemented;
	Percentage of workers who contribute to the assessment of change needs.
Design changes in processes in a participatory manner with employees, from planning to implementation	Is there worker participation in planning changes?
	Is there worker participation in implementing changes?
	Is there worker participation in post-implementation validation of changes?

Source: Authors, 2025.

Table 6 – Occupational Health and Safety (403)

Indicator	Assessment Forms
Provide active communication channel(s) between workers and the company (related to occupational health and quality of life).	Are there active communication channels between workers and the company?
	Number of channels available;

	Percentage of these channels in which there is a procedure for managing negotiations, including responses to these communications for the worker;
	Company adoption percentage (number of people using per total number of employees)
Implement a health and safety management system with the participation of an ergonomist (Ensure a multidisciplinary team to be the basis for action in activities related to occupational health and safety).	Is there a health and safety management system?
	Percentage of implementation of health and safety management system with participation of ergonomist as member.
Conduct ergonomic assessments that include physical, cognitive and organizational aspects, including internal and external aspects of the organization.	Are ergonomic assessments carried out in the company?
	Frequency of carrying out ergonomic assessments in the company;
	Ergonomic assessments include the following aspects:
	Physical domain?
	Cognitive domain?
	Organizational domain?
Establish a continuous improvement model that contributes to improving the well-being of workers while developing improvements in the performance of the work system as a whole.	Is there a continuous improvement model that contributes to improving workers' well-being?
	Maturity level:
	0% - No continuous improvement model 50% - Has a continuous improvement model, but does not include evidence of worker well-being and/or improvement of the system as a whole 100% - Has a continuous improvement model and has evidence of improved worker well-being and improvements in system performance
Monitor the results of ergonomics actions in the company.	Are the results of ergonomic actions in the company monitored?
	Number of ergonomics actions implemented divided by proven positive results
	Number of improvement actions divided by the number of improvement actions show proven results in worker well-being and/or system performance
	Number of improvement actions divided by the number of improvement actions that establish means of measuring the expected results.

Source: Authors, 2025.

It is worth noting that the work of developing these indicators was carried out by the Technical Committee of Macroergonomics of the Brazilian Ergonomics Association (ABERGO), involving, among others: certified professional ergonomists, engineers, physiotherapists and administrators.

4. CONCLUSIONS

The objective of this article was to suggest improvements in the ESG indicators used by companies from the macro perspective of Ergonomics and Human Factors. The analysis of the articles selected for this research revealed a significant focus on ESG *(Environmental, Social, and Governance) objectives and indicators.* It is noteworthy that the GRI presented the most accessible and detailed indicators, leading to its selection for evaluation.

The analysis of clarity and importance highlighted the need for improvements in the indicators for the topics Labor Relations and Occupational Health and Safety. The prioritization of the topics confirmed the relevance of including and improving these aspects in ergonomic assessments.

To this end, a group of ergonomists suggested new metrics and indicators. In the topic of Labor Relations (402), the importance of worker participation, collection of opinions, monitoring of productivity and well-being, standardized communication and training was highlighted. In the topic of Occupational Health and Safety (403), the need for indicators for ergonomic actions, a continuous improvement model, comprehensive assessments (physical, cognitive and organizational) and a management system with active communication were emphasized.

The set of indicators developed was called ESG_ErgoS, which seeks to represent relevant aspects of ergonomics and human factors considered and integrated into the organizational strategy, specifically those related to the social aspects of ESG. It is emphasized that this initial proposal must be subjected to an evaluation process in search of continuous improvement.

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