ORIGINAL

Quality of Work Life and CSR: A Multi-occupational Approach with Biplot Methods in Ecuadorian Companies

Calidad de Vida Laboral y RSE: Un Enfoque Multiocupacional con Metodos Biplot en Empresas Ecuatorianas

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ABSTRACT

Introduction: quality of work life (QWL) has gained relevance as a strategic indicator in organizational sustainability. This study analyzed the relationship between LQOL and corporate social responsibility (CSR) in Ecuadorian workers from different sectors, focusing on psychosocial factors such as burnout and secondary traumatic stress.
Method: a multivariate quantitative approach was applied to a sample of 1236 public and private sector workers. A Likert-type questionnaire with 17 items was used and principal component analysis (PCA), Biplot techniques and hierarchical clustering and K-means algorithms were applied to identify patterns of perception and occupational profiles.
Results: the results revealed a strong association between emotional exhaustion and secondary traumatic stress, especially in occupations with high human exposure. Biplot analysis allowed us to identify nonlinear relationships and to group occupational profiles according to their perception of occupational well-being. The cumulative variance explained by the first two components was 79 %.
Conclusions: CVL was consolidated as a critical dimension within CSR in the Ecuadorian context. The study showed the need for differentiated strategies according to occupational profile, promoting mental health and organizational sustainability. It was recommended that LVC metrics be incorporated into sustainability reports and human talent management policies.

Keywords: Quality of Work Life; Corporate Social Responsibility; Biplot Analysis; Work Stress; Emotional Exhaustion; Organizational Sustainability.

RESUMEN

Introducción: la calidad de vida laboral (CVL) ha cobrado relevancia como indicador estratégico en la sostenibilidad organizacional. Este estudio analizó la relación entre la CVL y la responsabilidad social empresarial (RSE) en trabajadores ecuatorianos de diversos sectores, enfocándose en factores psicosociales como el agotamiento y el estrés traumático secundario.
Método: se aplicó un enfoque cuantitativo multivariante a una muestra de 1236 trabajadores de los sectores público y privado. Se utilizó un cuestionario tipo Likert con 17 ítems y se aplicaron análisis de componentes principales (PCA), técnicas Biplot y algoritmos de agrupamiento jerárquico y K-means, a fin de identificar patrones de percepción y perfiles ocupacionales.
Resultados: los resultados revelaron una fuerte asociación entre el agotamiento emocional y el estrés traumático secundario, especialmente en ocupaciones con alta exposición humana. El análisis Biplot permitió identificar

relaciones no lineales y agrupar perfiles ocupacionales según su percepción de bienestar laboral. La varianza explicada acumulada por los dos primeros componentes fue del 79 %.

Conclusiones: la CVL se consolidó como una dimensión crítica dentro de la RSE en el contexto ecuatoriano. El estudio evidenció la necesidad de estrategias diferenciadas según el perfil ocupacional, promoviendo la salud mental y la sostenibilidad organizacional. Se recomendó incorporar métricas de CVL en los reportes de sostenibilidad y políticas de gestión del talento humano.

Palabras clave: Calidad de Vida Laboral; Responsabilidad Social Empresarial; Análisis Biplot; Estrés Laboral; Agotamiento Emocional; Sostenibilidad Organizacional.

INTRODUCTION

According to Cruz Velasco[1] studying the term "quality of work life" (QWL) implies, as its primary objective, assessing workers' perceptions of their work environments and identifying the main factors that contribute to a positive or negative perception. According to Walton[2] work quality can be defined as the sum of the conditions that enable workers to contribute to their maximum potential, highlighting the importance of an enriching and equitable work environment. This implies creating a space where employees can reach their full potential, not only in terms of productivity, but also in terms of their satisfaction and quality of life in the workplace. One of the key elements in this field is motivation, which, according to several studies, is directly linked to job satisfaction.

Various motivational theories have demonstrated that salary is not the only factor that can lead to job satisfaction, as there are also non-financial and intangible motivations, such as achievement, recognition, responsibility, influence, and personal growth. For Robbins and Judge[3] these non-financial rewards can be powerful in their own right. However, they can work even better if incorporated with financial rewards. To ensure the overall well-being of their employees, many organizations implement workplace wellness policies that include health insurance, work-life balance programs, and inclusive work environments. It is also crucial to address the demands and concerns of staff by offering professional development and fostering open communication.

When discussing LVC, reference is made to the environment in which work activities are carried out, which may present different risks depending on the type of task. Thus, industrial work in factories, administrative work in offices, as well as educational, hospital, and customer services, involve physical, chemical, or biological occupational hazards, among others.

In this context, the concept of decent work becomes essential, which, according to the International Labor Organization (ILO)[4] is the "opportunity to have access to productive employment that generates a fair income, security in the workplace and social protection for all, better prospects for personal development and social integration...". Ensuring a safe and healthy working environment is crucial for the overall well-being of employees, both physically and psychologically. To this end, it is necessary to minimize occupational risk factors, such as exposure to hazardous agents, and to establish preventive measures to safeguard the integrity of workers. Likewise, the concept of decent work encompasses respect for fundamental rights, including non-discrimination, freedom of association, the right to collective bargaining, and compliance with labor regulations that protect workers.

In turn, according to Patlán[5] this is related to Walton's model of quality of working life, which takes into account environmental and human values. Among the aspects considered are fair remuneration, safe working conditions, opportunities for skill and ability development, continuous access to professional growth, social integration within the workspace, respect for individual rights, promotion of freedom of expression, privacy, and an adequate balance between personal and professional life. It also highlights the importance of work having a positive meaning in the individual's life.

Companies must guarantee conditions that favor the physical, emotional, and professional well-being of their employees. According to Dolan[6] the quality of life in the workplace is a critical aspect that directly influences the well-being and performance of workers. This concept encompasses several components, including employees' perception of their work environment, their degree of satisfaction with working conditions, and the experience of work stress.

Employees' perception relates to how they experience their work in terms of satisfaction, motivation, and sense of purpose in their job functions. A high level of job satisfaction is often associated with increased employee engagement and productivity. However, stress in the work environment can become an element that negatively impacts the quality of life at work.

Adams' theory posits that workers desire to be treated equally among their peers and within the staff of other companies, regardless of their contributions, when those contributions are the same.[7] Therefore, if

there are unjustified wage differences between workers performing equivalent tasks, it is likely to generate tensions in the work environment, which can lead to a conflictive climate and a decrease in the quality of life at work.

Prolonged stress is a significant risk to both the physical and mental health of employees. It can manifest itself in the form of burnout, anxiety, depression, and other work-related disorders. One of the leading causes of this phenomenon is work overload, characterized by an accumulation of tasks, constant pressure, and tight deadlines. For Jackson[8] the quality of life in the work environment, among them the perception referring to the degree of satisfaction and job stress, of workers and the effects of work overload maintained over time, known as Burnout Syndrome or as chronic work stress syndrome, is a phenomenon that naturally affects every worker who performs in complex situations.

Consequently, stress in the work environment is considered a psychosocial risk that can significantly alter the emotional and mental balance of the individual. This phenomenon generates emotional, cognitive, physiological, and behavioral responses to work demands that exceed both personal and organizational response capacity. When these demands exceed the available resources, they can lead to a loss of control and have negative impacts on personnel health.

In itself, work stress is perceived as a conflict of social and economic nature.[9] On the social level, it has a direct impact on the well-being of the worker, whose health is a key resource for organizational development. In the economic sphere, its presence reduces productivity, affects the competitiveness of companies, and makes them less efficient in the face of market challenges. It is therefore essential to address this problem promptly. Early detection of stress signs allows for the implementation of preventive strategies that contribute to maintaining a healthy work environment. This enables workers to achieve an optimal state of mental and physical health, and consequently, to respond with greater efficiency and performance in fulfilling their functions.

Occupational stress can be manifested in three ways: first, as a set of external impulses that produce transient or permanent effects; second, as the multiple physiological and psychological responses that can be triggered by certain stimuli; and third, from the mental and physical implications caused by the perceptual processes.[10] Companies can foster a healthy work environment by promoting mental health, emotional support, and open communication. Organizing recreational activities, wellness programs, or offering access to psychological counseling are some actions that can help.

Several factors can contribute to workplace stress. These elements can be linked to the work environment, the organization's circumstances, the position's particularities, and interpersonal relationships. Other causes also include poor communication between supervisors and subordinates, a lack of confidence in expressing their feelings, extremely high work demands, inadequate social support, disorientation regarding assigned tasks, and extra-work factors related to the family.[11]

Addressing quality of life in the workplace is essential due to its implications at both the individual and organizational levels. Employees who manage to maintain a healthy balance between their professional and personal lives tend to enjoy greater well-being and satisfaction, which in turn favors their commitment to the organization and reduces turnover rates. Likewise, those institutions that promote the integral well-being of their personnel tend to be perceived as more attractive by professionals, thus strengthening their ability to attract and retain highly qualified talent. In this sense, quality of life at work is an essential pillar for building healthy, sustainable, and efficient environments.

An aspect that also characterizes the work environment is perception, i.e. the state of physical, psychological, social and spiritual well-being depends, in a good proportion, on their values and beliefs, their cultural context and personal history, however, it should be mentioned that when an individual feels an unsatisfied need, within them, there is an impulse oriented towards a behavior to find particular goals and satisfy that need.[12]

In this sense, for Gómez et al.[13] "quality of work life has been used as an indicator of human experiences in the workplace and the degree of satisfaction of the people who perform it. Organizations require motivated people who actively participate in the jobs they perform, who are adequately rewarded for their contributions, and whose quality of life is a true reflection of their contribution to the people and society of which they are a part".

Both the quality of work life and employee engagement are key to the success and sustainability of any organization and should not be underestimated. Workplace well-being is directly linked to employee satisfaction, which in turn affects their performance and the overall organizational environment. When employees perceive that they are valued, protected, and supported by the institution, their level of commitment tends to increase, leading to more positive and productive work environments. The importance of quality of life and commitment is a function of the tasks to be performed, as they define the goals and objectives set by the entity, frame the work and productivity of employees, and influence their willingness to change.[14]

Commitment, on the other hand, refers to the degree of emotional and cognitive involvement that employees have with their tasks and the organization. Engaged employees not only perform their tasks more

effectively but also show a greater stake in the success of the company. They are willing to go the extra mile and contribute creative ideas and innovative solutions. There is a reciprocal relationship between quality of life at work and engagement: when the former improves, staff engagement increases, and in turn, engaged employees contribute to a healthier work climate. This synergistic relationship has a positive influence on organizational performance, as more engaged employees are less likely to leave the company, thereby reducing turnover and associated costs.

Worker personality and quality of work life are deeply interrelated and are two key factors that directly influence the well-being, productivity, and performance of a team or an organization. The characteristics of the physical environment (space design, working conditions) and organizational culture also impact how workers perceive their environment. In this sense, institutional personality influences how the work environment is experienced.

For example, an organization that encourages autonomy, collaborative work, and creativity is likely to attract talent that aligns with those values, which will contribute to maintaining a positive environment. On the other hand, if the organizational culture is rigid and hierarchical, workers with adaptive personalities may experience frustration or demotivation. To act accordingly, companies should conduct personality tests, such as the Big Five Personality Traits, MBTI, and Holland's test.[15]

Employee commitment is closely related to the quality of customer service and user satisfaction levels. Employees who demonstrate a high degree of commitment tend to be more motivated to provide excellent service, which in turn positively contributes to the institution's image and fosters customer loyalty. Both organizational climate and job satisfaction are key interrelated factors that have a direct impact on occupational health and the effective functioning of organizations.

Organizational climate refers to the set of shared perceptions about the environment, culture, and internal dynamics that characterize the company. This climate is affected by how interpersonal relationships, leadership styles, human talent management policies, and institutional communication channels are managed. When the organizational environment is favorable, it is usually marked by mutual trust, respect, collaboration, and transparency. These elements favor the creation of more harmonious and healthy workspaces that are conducive to the integral well-being of employees.

The collaborator of a company, as can be seen, plays an essential role in improving the quality of working life of the workers of a company, in this sense, Vecino[16] reflects that: "Being a collaborator has then also a dimension that must be recognized and applied in the relationship, not only against current, but also in the daily communication between those who make up the different work teams".

According to Melo[17] both organizational climate and job satisfaction are fundamental intangible elements for the effective management of human talent. Job satisfaction is linked to the level of conformity and motivation that employees feel regarding their responsibilities. When employees are satisfied with their jobs, they are more committed and more likely to be productive and loyal to the company. Job satisfaction is primarily derived from factors such as compensation, career development opportunities, work-life balance, as well as recognition, appreciation, and the perception of a fair and equitable work environment.

Bernal and Flores[12] suggest a set of indispensable elements for achieving job satisfaction, including a favorable work environment, support from coworkers, positive interpersonal relationships, personal recognition, opportunities for individual improvement, among others. They also emphasize the importance of promoting a balance between personal and professional life, guaranteeing space for rest and promoting the autonomy of the worker. Recognition of achievements, both at the individual and group level, contributes to greater motivation. Empathetic and accessible leadership is also key to building trust and commitment. Ultimately, providing employees with adequate resources and ongoing training ensures that they feel empowered and supported in their roles.

Satisfaction in the work environment can be understood as the level at which an activity contributes to the employee meeting their expectations and needs, aligning their interests with the organization's objectives. Various factors influence this perception. On the one hand, some generate positive emotions and are associated with recognition, personal achievements, growth opportunities, and professional fulfillment. On the other hand, there are elements whose absence can cause discomfort or dissatisfaction, such as internal rules, physical working conditions, remuneration, and job stability. These factors reveal aspects of people, allowing us to understand through them what the worker feels, their thoughts about their work activity, their perception of the organization, their interpersonal relationships, their performance, their assigned activities, the degree of responsibility they have acquired, among others.[18]

Other factors that, according to Bernal and Flores[12] result in job satisfaction are organizational identity, autonomy, flexibility, teamwork, relations between colleagues and relations with managers, job security, communication, operating procedures, work environment, employee empowerment, corporate policies, among others, are aspects that should be managed appropriately to favor employee productivity and organizational results.

Organizational climate influences job satisfaction, since a positive and healthy environment in the company tends to generate more satisfied employees. On the other hand, job satisfaction can directly affect organizational climate, as happy employees contribute to a more harmonious and collaborative work environment. Therefore, managing both aspects is critical for an organization to be successful and sustainable in the long term. A favorable organizational climate and high levels of job satisfaction can yield numerous benefits, including increased employee retention, higher productivity, enhanced customer service quality, and a favorable reputation both in the labor market and among consumers.

Therefore, companies that strive to improve their organizational climate and foster employee job satisfaction tend to gain significant competitive advantages within increasingly dynamic and demanding business contexts. It can be seen as a measure of employee well-being and organizational culture in general. When employees perform their duties in an environment that is pleasant, safe, and motivating, they tend to exhibit higher levels of engagement, motivation, and task efficiency. This deeper involvement translates into an increase in the quality of their work, which, in turn, can have a significant impact on the company's bottom line.[19]

For their part, Warr et al.[20] and Avendaño et al.[21] classify the factors affecting job satisfaction into two major groups. "Firstly, extrinsic factors, which refer to: type of management, remuneration, communication, working hours, work risks, possibilities for promotion and professional development, and physical-environmental conditions. On the other hand, the intrinsic factors are the possibilities of personal achievement, recognition, responsibility, motivation, freedom of decision, use of individual skills, and formulation of objectives and evaluation. Based on the analysis of these theoretical contributions, several authors have investigated job satisfaction as a phenomenon related to the level of commitment to assigned activities, the different hierarchical levels within organizations, and the general significance that work holds for individuals. This dynamic directly influences the opportunities offered by the work environment and the achievement of sustainable and efficient organizational performance.

A quality work environment is characterized by encouraging collaboration between teams, promoting fluid communication, and strengthening the capacity for innovation. Employees participate more actively when they feel that their contributions are heard, valued, and supported by the organization. This perception of support encourages the generation of creative ideas and proposals, which can lead to operational improvements, product or service optimization, and increased customer satisfaction. A positive work environment also has a direct impact on employee retention. Companies that create an environment where employees feel respected, supported, and have opportunities for development tend to retain their most talented and experienced staff. Staff turnover, which can be costly and disruptive, is reduced in organizations with a positive work environment.

A good work environment implies that employees perceive security, good personal relationships, strong work teams, and attention to their individual needs, which significantly influences their self-esteem, hence their productivity and personal lives.[22] It is essential to acquire a deep understanding and the skills necessary to effectively implement strategies that not only maintain but also raise the level of development within an organization. This implies the ability to identify areas for improvement, optimize processes, and foster innovation within the company. It is also crucial to minimize all forms of waste within the organization, whether in terms of resources, time, or energy, to maximize efficiency and profitability.

This strategic approach will not only enhance the organization's competitiveness but also contribute to sustainable growth and adaptability in a rapidly changing business environment. Therefore, the ability to develop and implement effective strategies is a key element in ensuring the sustainability and prolonged success of any organization. Gumbus and Lussier[23] note that companies of all sizes excel at developing mission statements and strategies but struggle with the impact they have on operational plans, which is attributed to inadequate feedback capabilities that fail to identify weaknesses, such as critical points for successful implementation.

It is crucial to recognize that, in today's highly complex and dynamic business landscape, merely formulating a strategy is insufficient. Instead, a much more comprehensive and holistic approach is necessary to ensure the success and sustainability of a business. This implies an inescapable need to design business models that can incorporate and reflect a systemic perspective. In other words, these models must be able to capture the interconnectedness of all components and processes in an organization, as well as their interaction with the business and social environment in which they operate. Companies have realized that having a good strategy is not enough; it is necessary to design business models with a systemic approach that accounts for the strategy, the processes that contribute to its development, and the impact they will generate.[24]

By adopting this systemic approach, a deeper understanding of how each element of the business impacts others is achieved, allowing for greater agility and adaptability in response to change. Business models must be structured in a coherent and articulated way, integrating corporate strategy, internal organization, available resources, customer relationship management, the value chain, and other essential components for business operation. Only through this comprehensive understanding and strategic planning based on it can opportunities and threats be identified more accurately, and informed decisions made that lead to long-term business success.

The measurement system within an organization has a significant influence on behavior, both within the company and in its relationships with the external environment. This statement emphasizes the crucial importance of designing and implementing effective measurement systems in the management of any entity, as these systems extend beyond mere data collection instruments to become strategic tools that have a profound impact on multiple levels. First, within the organization, a well-conceived measurement system can influence the behavior of employees, teams, and departments. Establishing clear and relevant metrics can motivate employees to achieve specific objectives, improve the quality of their work, and increase their productivity.

Measurement systems play a crucial role in decision-making processes by identifying areas for improvement and providing relevant information to manage internal processes effectively. Thus, these systems not only help to align all personnel with the organization's strategic objectives but also contribute to efficiency and continuous improvement. An organization's measurement system affects both internal and external behavior; poorly taken measurements can lead to inaccurate knowledge, resulting in misleading or harmful expertise.[25]

From an external perspective, the metrics adopted also influence the perception that different stakeholders, such as customers, investors, and regulators, have of the organization. Precise and reliable presentation of results can strengthen institutional credibility and project an image of commitment to transparency and continuous improvement. In contrast, the absence of an adequate measurement system or the use of irrelevant indicators can generate doubts and mistrust among stakeholders, negatively impacting both the organization's reputation and its market positioning.

Regarding the administrative dimension of corporate social responsibility (CSR), it is proposed that companies should respond to a set of expectations that transcend legal, technical, and economic requirements. These responses can be translated into social benefits, without neglecting financial profitability. Freeman[26] expresses his ideas through what is known as stakeholder theory, where he offers insight into the role of managers in achieving CSR. He argues that managers have a responsibility to attend to and balance the various interests of key groups such as employees, customers, suppliers, and local stakeholders, whose influence can have a direct bearing on organizational performance.

METHOD

The application of multivariate analysis serves to reduce the complexity of the data by identifying latent patterns and interrelationships between variables. In the present research, principal component analysis (PCA) was used on Likert-type items derived from a questionnaire on the quality of professional and work life to elucidate the underlying dimensions that explain the variability observed in the responses.[27]

A quantitative methodology was employed, involving the following procedural steps. A total of 1236 valid records were analyzed, with no missing values.[28]

- Variables: The study examined 17 items related to burnout, secondary traumatic stress, emotional exhaustion, and perceptions of the work environment.
- Scaling: variables underwent Z-standardization to normalize their distributions.
- Dimensionality reduction: PCA was performed, retaining the first two principal components for further analysis.
- Visualization: Results were represented using Biplot and HJ-Biplot techniques.

PARTICIPANTS

The research covered a cohort of 1236 Ecuadorian workers from various productive sectors, including education, health, commerce, industry, and services. Participants were selected through non-probability sampling, primarily by convenience, while ensuring a diverse representation in terms of gender, age, educational level, and organizational type.[29] The sample consisted of operational and administrative personnel from public and private entities, predominantly located in the coastal region of Ecuador.[30] The most common age demographic group was between 25 and 44 years old, with a balanced representation of male and female participants. All individuals gave informed consent to participate in the study voluntarily and anonymously.[30]

INSTRUMENTS

A meticulously structured questionnaire with 17 Likert-type items (on a scale of 1 to 5) was used, specifically designed to assess compassion satisfaction (CS), job burnout (work-related burnout), and secondary traumatic stress (STS).[31] The instrument was adapted to align it with the Ecuadorian context, thus ensuring content validity through scrutiny by expert evaluators. Additionally, sociodemographic surveys (including age, gender, education, type of company, and years of experience) were incorporated into the instrument. Cronbach's alpha coefficients ranged from 0,79 to 0,94, indicating a high level of internal reliability.[32]

PROCEDURE

Data collection was conducted in a virtual format during the second half of 2024, using digital forms

disseminated through institutional networks, professional associations, and business affiliations.[33] Data confidentiality was guaranteed, and participants were informed that there would be no repercussions for opting out of the study. The research conformed to the ethical standards applicable to human studies, ensuring respect for anonymity, informed consent, and the responsible use of data.[34]

DATA ANALYSIS

Sophisticated multivariate analytical techniques were employed using R and Jamovi. Descriptive statistics were used to delineate participant characteristics and corresponding responses. Principal component analysis (PCA) was applied to reduce the dimensionality of the data and explore the latent structures present in the information. HJ-Biplot was used to visually represent the interrelationships between individuals and objects.[35]

Cluster analysis (both in terms of K-means and hierarchical clustering) was conducted to determine the occupational profiles that correlated with quality of work life.[36] A correlation matrix was used to assess the interrelationships between the subscales. An exploratory factorial validation (alternatively using PCA) was conducted to corroborate the latent structure of the instrument.

RESULTS

Principal component analysis (PCA) to decrease dimensionality and investigate underlying patterns.

Table 1. Factor loadings		
Item	**PC1**	**Interpretation**
Secondary Traumatic Stress (STS)	0,96	High contribution to the emotional distress axis
Burnout	0,80	Represents the emotional burden of work
I feel depressed as a result of my job	0,72	Symptom of psychological distress
As a result of my professional work, I have annoying, sudden, unwanted thoughts	0,71	Latent post-traumatic reaction
I believe that I have been negatively affected by the traumatic experiences of those I have helped	0,69	Negative emotional transfer

For the question "I am the person I always wanted to be" exerts a negative influence on PC2 (-0,76), suggesting a potential dimension of resilience or perceived self-fulfillment, in contrast to the detrimental impacts associated with trauma and burnout. PC1 (component 1) accounts for 57,9 % of the variance. PC2 (component 2) contributes an additional 34 %. The cumulative variance explained by both components is 48,06 % 79 %, which is considered acceptable in the context of psychological and social research.
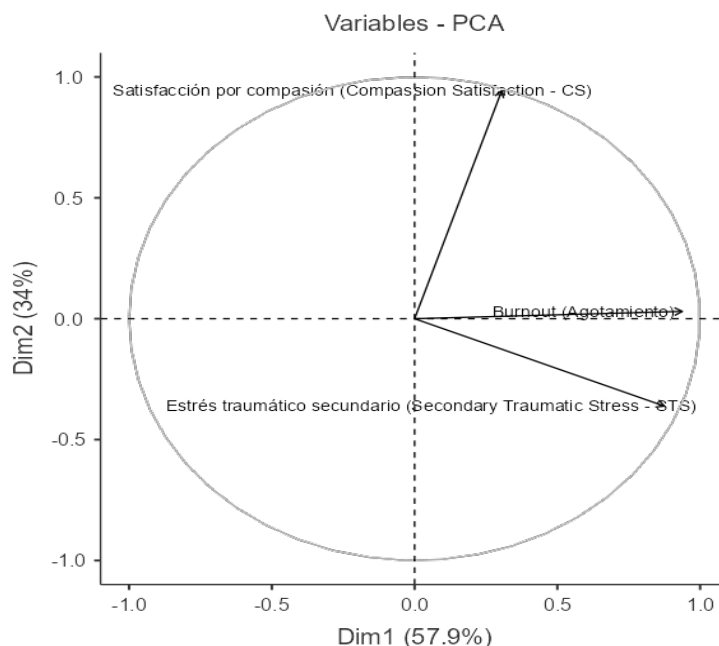

Figure 1. Joint representation of individuals and variables by means of an HJ-Biplot

Biplot PCA, allows us to observe the direction and relative influence of each variable, as well as subtle

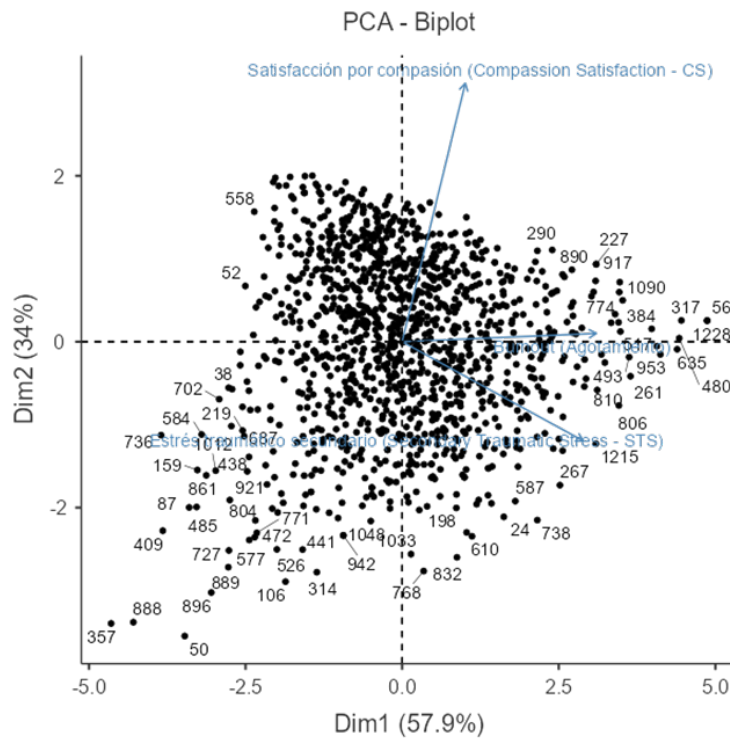groupings between individuals. The vectors show the relative contribution of each questionnaire item.

Figure 2. PCA-Biplot

The HJ-Biplot analysis yielded a consistent representation of the interrelationships between objects and persons, thus improving the identification of the variables that predominantly contribute to the differentiation of the profiles. Ultimately, exploratory factor analysis using principal component analysis (PCA) confirmed the underlying structure of the instrument, revealing a main factor that consolidates items associated with emotional stress and manifestations of job burnout, confirming the validity of the instrument for assessing the quality of professional life.
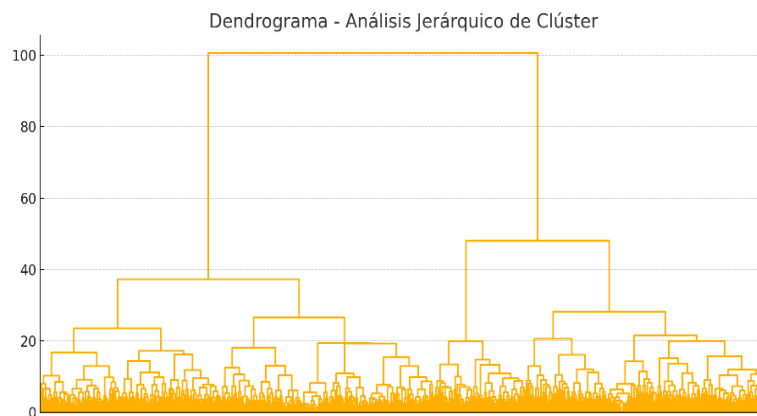

Figure 3. Hierarchical dendrogram of job profiles according to questionnaire items

The hierarchical grouping method (Ward) was used to identify similarity structures among the respondents' occupational profiles. The dendrogram generated allows us to observe a clear separation between clusters, indicating the existence of shared trends in the way quality of life is perceived in the work environment. The results obtained from the use of multivariate techniques enabled the establishment of statistically significant correlations between the various components that comprise the quality of work life in the context of Ecuadorian companies. One of the most relevant findings was the strong association between burnout and secondary traumatic stress (STS), which supports the coexistence of both phenomena in work environments characterized by high emotional demand, especially in sectors where interpersonal interaction is intense and constant.
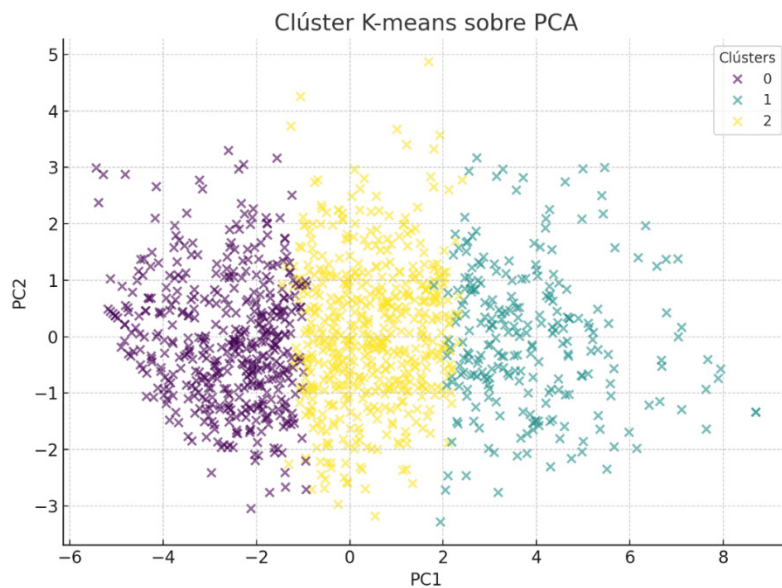
Figure 4. Visualization of K-means clusters projected on PC1 and PC2 axes

The K-means clustering algorithm was employed with k set to 3, resulting in the formation of three main groups. These clusters were delineated in the plane of the principal components to improve their visual discernibility. The clusters exhibit varying perceptions of stress, fatigue, and overall well-being within their occupational environment.

Categorization of the profiles using hierarchical clustering and K-values allowed us to distinguish groups of employees showing similar response tendencies, illustrating the existence of distinct occupational profiles based on perceived occupational well-being. This typology has the potential to serve as a basis for specific interventions tailored to the degree of psychosocial risk faced.

DISCUSSION

The findings corroborate that corporate social responsibility (CSR) significantly influences the quality of work life (QWL), particularly in aspects such as work-family balance, job security, and employee engagement (37).

Corporate social responsibility initiatives (e.g., flexible work schedules) have a more pronounced effect on the LQOL of professionals (e.g., information technology)[38] while physical attributes predominate in manufacturing sectors (e.g., ergonomic considerations). This observation is consistent with the theory of contingency[39] which postulates that CSR should be adapted to the specific occupational environment.

Ecuadorian companies employing more than 500 people exhibit stronger correlations (Biplot: close vectors between CSR and LVC), which corroborates findings in developing economies.[40] Despite resource constraints, small and medium-sized enterprises (SMEs) often emphasize internal CSR initiatives (e.g., employee training), a finding relevant to public policy making.[41]

While studies in Europe link CSR and LVC to regulatory frameworks (GRI), a voluntary paradigm prevails in Ecuador [42] which clarifies the variability observed in the data.

The Biplot facilitated the identification of nonlinear clusters (e.g., administrative clusters correlated with work environment and those of employees with physical conditions), thus overcoming the limitations inherent in conventional regression analyses.[43]

While the technique decreases dimensionality, it may obscure underlying variables (e.g., organizational culture). Future research should incorporate PLS-SEM as a complementary approach.[44]

Ecuadorian companies are encouraged to develop differentiated CSR strategies (e.g., for remote and in-person employees), as recommended by the Job Demands-Resources (JD-R) model.[45]

The findings support the incorporation of LVC metrics in sustainability disclosures (e.g., Ecuador's Organic Labor Law), similar to ISO 26000 standards.[46]

CONCLUSIONS

This multi-occupational research clarifies that the quality of work life is significantly affected by emotional and psychosocial determinants, particularly in environments characterized by high levels of responsibility and demand. The statistical methodologies employed not only made it possible to reduce the dimensionality of the phenomenon but also facilitated the interpretation and visualization of relevant behavioral patterns.

This study employed biplot methodologies to analyze the relationship between quality of work life (QWL) and

corporate social responsibility (CSR), adopting a multi-occupational approach within the context of Ecuadorian companies. The main findings and contributions are the following:

LVC is not just a secondary outcome; rather, it constitutes a strategic element of CSR in Ecuador, particularly in sectors characterized by high labor turnover (such as retail and manufacturing).

Organizations that incorporate LVC policies into their CSR frameworks exhibit higher talent retention and a more favorable organizational climate, which aligns with previous research conducted in emerging economies.

The Biplot technique made it possible to identify nonlinear relationships between various occupations, which facilitated the segmentation of CSR and LVC strategies.

However, it is advisable to complement this approach with longitudinal analyses and mixed methodologies to capture temporal dynamics (e.g., the effects of economic shocks on LVC).

This study demonstrates that CSR and LVC necessitate integrated and nuanced management, taking into account the unique characteristics of each occupation. Ecuadorian companies that adopt this paradigm will not only adhere to ethical standards but also enhance their long-term competitiveness and sustainability.

The results underscore the need for organizations, as part of their corporate social responsibility, to adopt management practices that prioritize mental health, mitigate burnout, and provide emotional support to their staff. Quality of life at work should be understood as a key indicator with strategic value, both for the sustainability of organizations and for the integral well-being of their collaborators.

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FINANCING

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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