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Evaluation of Behavioral Competencies in the Ecuadorian Aquaculture Industry: A Correlational Analysis of Soft Skills in Administrative Personnel from Guayaquil

Evaluación de competencias conductuales en la industria acuícola ecuatoriana: análisis correlacional de habilidades blandas en el personal administrativo de Guayaquil

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Abstract.
The Ecuadorian aquaculture sector has experienced exponential growth, consolidating itself as a pillar of the national economy, where administrative management requires competencies that transcend technical knowledge. The present study aimed to examine the soft skills present in the administrative personnel of the Ecuadorian aquaculture sector. A structured questionnaire was administered to 88 administrative employees from five leading aquaculture companies in Guayaquil, assessing five dimensions: integrity, leadership, teamwork, communication, and problem-solving, using a five-point Likert scale. The instrument demonstrated excellent internal consistency, with an overall Cronbach's alpha of 0.944. The results revealed elevated levels of self-perception across all dimensions, with means ranging from 4.03 to 4.29, and significant positive correlations between all dimensions (r ranging from 0.452 to 0.839). The comparative analysis by sex did not evidence statistically significant differences ($p > 0.05$), although women presented slightly higher scores. The conclusions highlight the importance of strengthening competencies such as integrity in the sector and provide evidence for the design of equitable professional development policies in the Ecuadorian aquaculture industry.

Keywords.
Aquaculture, Communication, Leadership, Professional Competencies, Soft Skills, Teamwork, Aquaculture Sector

Resumen.
El sector acuícola ecuatoriano ha experimentado un crecimiento exponencial, consolidándose como un pilar de la economía nacional, donde la gestión administrativa requiere competencias que trascienden el conocimiento técnico. El presente estudio tuvo como objetivo examinar las habilidades blandas presentes en el personal administrativo del sector acuícola ecuatoriano. Se aplicó un cuestionario estructurado a 88 empleados administrativos de cinco empresas acuícolas líderes en Guayaquil, evaluando cinco dimensiones: integridad, liderazgo, trabajo en equipo, comunicación y resolución de problemas, con una escala de Likert de cinco puntos. El instrumento mostró una excelente consistencia interna, con alfa de Cronbach global de 0.944. Los resultados revelaron niveles elevados de autopercepción en todas las dimensiones, con medias que oscilaron entre 4.03 y 4.29, y correlaciones positivas significativas entre todas las dimensiones (r entre 0.452 y 0.839). El análisis comparativo por sexo no evidenció diferencias estadísticamente significativas ($p > 0.05$), aunque las mujeres presentaron puntuaciones ligeramente superiores. Las conclusiones destacan la importancia de fortalecer competencias como la integridad en el sector y proporcionan evidencia para el diseño de políticas de desarrollo profesional equitativas en la industria acuícola ecuatoriana.

Palabras clave.
Acuicultura, Competencias Profesionales, Comunicación, Habilidades Blandas, Liderazgo, Sector Acuícola, Trabajo En Equipo

1.- Introduction

The Ecuadorian aquaculture sector has experienced exponential growth in recent decades, consolidating itself as one of the fundamental pillars of the national economy. Ecuador has positioned itself as the main producer and exporter of shrimp in South America, recognized worldwide for the technical excellence of its aquaculture production and the superior quality of its products. However, in a highly dynamic and competitive global market, technical and productive excellence is no longer the only determining factor in maintaining sustainable competitive advantages. Accelerated changes in the work environment, particularly accentuated since the COVID-19 pandemic, have revealed the critical importance of competencies that transcend specialized technical knowledge, called soft skills.

This set of socio-emotional competencies, which enable people to interact effectively with others, make decisions, solve problems, think critically, communicate effectively, and build healthy relationships, has become essential in contemporary vocational training (World Health Organization, 1994). In the specific context of the

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aquaculture sector, where administrative management must coordinate complex technical processes, multidisciplinary teams and international business relations, soft skills emerge as indispensable elements for effective organizational performance.[1][2]

The scientific problem that motivates this research is based on the growing gap between the demands for behavioral competencies in the productive sector and the effective development of these skills in the administrative staff of Ecuadorian aquaculture companies. Despite the widespread recognition of the importance of soft skills for job performance, there is limited knowledge about how these competencies manifest themselves specifically in the aquaculture sector, which dimensions are most relevant to the organizational context of the industry, and how they relate to sociodemographic variables such as the sex and age of employees.

This limitation in the empirical understanding of the phenomenon represents a significant obstacle to the design and implementation of effective strategies for the development of human talent in the sector, which allow strengthening the behavioral competencies of administrative personnel and, consequently, improving organizational performance indicators. The absence of systematic studies that address this problem in the specific context of the Ecuadorian aquaculture industry configures a knowledge gap that justifies the realization of this research.[3]

The importance of the problem addressed transcends the academic field and is projected towards industrial and social dimensions of considerable magnitude. From an industrial perspective, the development of soft skills in administrative personnel in the aquaculture sector has the potential to directly impact the competitiveness of companies, improving the cohesion of work teams, the job satisfaction of employees, as well as organizational efficiency and effectiveness. In a global market environment where differentiation based exclusively on product quality is insufficient, organizational capabilities linked to human talent emerge as sources of sustainable competitive advantage.

From a social perspective, the strengthening of soft skills in the aquaculture sector contributes to the generation of healthier, more equitable and productive work environments, with positive impacts on the quality of life of workers and their families. Likewise, the research addresses a dimension of gender equity by exploring the possible differences in soft skills between men and women, contributing to the understanding of how organizational policies can promote the equitable development of competencies in work environments historically characterized by occupational segregation.[4]

The need to investigate this problem is based on the convergence of multiple factors that configure a scenario of urgency and relevance for the Ecuadorian aquaculture sector. The leading companies in the sector in Guayaquil have begun to implement specific strategies for the development of soft skills among their administrative staff, recognizing that these competencies are essential to face the challenges of an increasingly complex and demanding productive environment. According to Ekos Business (2021), this understanding is necessary in a context where automation and artificial intelligence are constantly transforming the work landscape, making human skills that cannot be replicated by machines increasingly valuable.

The development of these competencies would not only improve the functioning of the company's regular activities and work environment, but would provide a strategic impetus to position Ecuadorian aquaculture companies as strong competitors in the global market. In this framework, the following research question arises: what are the most common soft skills among managers in the aquaculture industry of the city of Guayaquil and how do they manifest themselves in their professional performance?, a question that guides the development of this study and guides the definition of its objectives and methodological strategies.[5]

1.1. Soft skills: definition, conceptual evolution and theoretical models.

The concept of soft skills, also called socio-emotional competencies, transversal skills or behavioral competencies, has undergone a significant evolution in the field of organizational psychology and human talent management since its first formulations in the 1970s. The term "soft skills" emerges as a distinct category from hard or technical skills, referring to a set of attributes, personality traits, social competencies, and communication skills that allow individuals to interact effectively in work and social settings.

Unlike technical competencies, which refer to specialized knowledge and operational skills specific to a trade or profession, soft skills are characterized by their transversal nature and their applicability in diverse contexts, which makes them fundamental elements for professional performance in complex organizational environments. From a historical perspective, interest in these competencies has progressively increased, driven by transformations in the world of work that have emphasized the need for professionals capable of adapting, collaborating and communicating effectively in multidisciplinary teams. [6]

The conceptual consolidation of soft skills has been driven by various theoretical frameworks that have provided complementary approaches for their understanding and measurement. One of the most influential references in this field has been the emotional intelligence model proposed by Daniel Goleman, who postulates that emotional and social competencies are predictive factors of professional success with greater explanatory power than traditional IQ. This approach has contributed to making visible the importance of dimensions such as self-awareness, self-regulation,

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empathy and social skills in work performance, establishing a bridge between individual psychology and organizational dynamics. In a complementary way, the competency model developed by Spencer and Spencer has provided a methodological framework for the identification and evaluation of behavioral competencies, distinguishing between threshold competencies, necessary for basic performance, and differentiating competencies, which allow high-performance professionals to be distinguished. From a broader perspective, international organizations such as the Organization for Economic Cooperation and Development (OECD) and the World Economic Forum have incorporated soft skills into competency frameworks for the 21st century, recognizing their relevance in a context of technological transformation and changes in productive structures.

The evolution of the concept towards its current configuration has been marked by a growing recognition of its multidimensional nature and its situated character, aspects that have implied a progressive move away from one-dimensional approaches focused exclusively on personality traits. Recent research has emphasized that soft skills are not static or inherent attributes of individuals, but competencies that are developed and manifested in specific contexts, modulated by situational, cultural, and organizational factors.

This perspective has driven the development of models that integrate cognitive, emotional, and behavioral dimensions, recognizing that soft skills involve both the ability to process social and emotional information and the willingness to act effectively in interpersonal situations. In the organizational sphere, this evolution has led to a conceptualization of soft skills as key competencies for employability and professional development, particularly in productive sectors that require intensive human interaction and adaptation to changing environments.[7][8]

1.2. Soft skills in the organizational context: key dimensions.

The configuration of soft skills as a multidimensional construct has led to the identification of various competencies that, although interrelated, have conceptual and operational specificities that justify their differentiated treatment in organizational contexts. Integrity, understood as the coherence between values, principles and actions, is one of the fundamental dimensions in the workplace, as it is directly linked to the generation of trust, transparency in interpersonal relationships and compliance with ethical commitments.

This competence is manifested in observable behaviors such as the acceptance of mistakes, coherence between speech and action, compliance with established norms and resistance to external influences that may compromise personal principles. From an organizational perspective, integrity has been recognized as a critical factor for the work environment and organizational culture, particularly in sectors where operational decisions involve significant ethical considerations, such as in the aquaculture industry in relation to sustainability, animal welfare and regulatory compliance practices.[9]

Leadership, as a second relevant dimension, has been the subject of extensive theoretical development in the organizational literature, evolving from conceptions focused on personality traits to models that emphasize behaviors, styles, and processes of social influence. Contemporary approaches, particularly transformational leadership, highlight the ability of leaders to inspire, motivate, and intellectually stimulate their followers, fostering a sense of shared purpose and promoting the development of competencies in team members.

In the organizational context, effective leadership is manifested in behaviors such as taking initiative, proposing strategies for solving problems, building trust in the team, facilitating participation and promoting motivation. The relevance of leadership in the Ecuadorian aquaculture sector is particularly significant, given that hierarchical organizational structures and production processes that require effective coordination between different areas and levels demand figures capable of articulating work teams and managing the operational complexity inherent to the sector.[10]

Teamwork constitutes a third essential dimension, defined as the ability to collaborate effectively with others in the achievement of common goals, integrating interpersonal, communicative, and coordination skills. This competence is based on the willingness to share information, support colleagues, accept established agreements and contribute ideas for the benefit of the collective, as well as on the ability to manage conflicts and promote an environment of cooperation.

Specialized literature has documented that effective teamwork not only increases productivity and operational efficiency, but also contributes to the psychological well-being of workers and job satisfaction, aspects that are particularly relevant in productive sectors with high physical and emotional demands. In the Ecuadorian aquaculture context, where operations require constant coordination between multidisciplinary teams that integrate administrative, technical and operational personnel, teamwork emerges as a critical competency to ensure operational continuity and adaptation to changing environments.[11][12]

1.3. The measurement of soft skills: reliability, validity and evaluation methods.

The measurement of soft skills in organizational contexts has been a permanent methodological challenge, derived from the complex and multidimensional nature of these constructs, which are not directly observable and require to be inferred through behavioral indicators or self-reports. The operationalization of soft skills implies the translation

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of theoretical constructs into specific dimensions and, subsequently, into concrete items that allow capturing the different facets of each competency evaluated. This process requires careful consideration of the psychometric properties of the measurement instruments, particularly with regard to their reliability and validity, aspects that determine the accuracy and relevance of the inferences made from the scores obtained.

Reliability, understood as the degree to which an instrument produces consistent and reproducible results, is commonly evaluated through Cronbach's alpha coefficient, which estimates the internal consistency of a scale from the correlations between the items that compose it, establishing minimum standards that allow the reliability of an instrument to be considered acceptable for research and organizational diagnostic purposes.[13]

The validity of the instruments for measuring soft skills is a complementary and essential aspect to ensure that the scores obtained effectively reflect the constructs they intend to measure, and not other factors unrelated to them. Construct validity, which assesses the degree to which an instrument measures the theoretical concept it intends to measure, is addressed through various strategies, including exploratory and confirmatory factor analysis, which allow examining the underlying structure of responses and verifying that items are grouped according to theoretically postulated dimensions.

Likewise, convergent and discriminant validity assesses the degree to which scores on a scale are associated with measures of related constructs and differ from theoretically distinct constructs, providing additional evidence on the relevance of the instrument. Content validity, on the other hand, guarantees that the items of the instrument adequately represent the conceptual domain of each construct evaluated, which is achieved through the review of specialized literature and the judgment of experts in the area of study, who evaluate the relevance, clarity, and representativeness of the proposed items.[14] [15]

Methods for assessing soft skills have evolved significantly from the first approaches based exclusively on self-report questionnaires, incorporating complementary strategies that allow for a more comprehensive and less biased approach to these competencies. Evaluation through self-perception questionnaires, such as the one used in this research, is the most commonly used method in organizational contexts, due to its ease of administration, low cost, and ability to capture the subjective perspective of the evaluated on their own competencies.

However, this method has recognized limitations, such as social desirability bias, acquiescence, and the tendency to central or extreme response, which can distort the scores obtained and affect the validity of the inferences made. To mitigate these limitations, complementary assessment methods have been developed, including heteroassessments, where supervisors, peers, or subordinates assess the competencies of the subject being assessed, and behavioral assessments, which are based on the observation of specific behaviors in simulated or real situations, such as assessment centers or situational tests.[16]

1.4. The Ecuadorian aquaculture sector: characterization, challenges and demand for soft skills.

The Ecuadorian aquaculture sector is one of the fundamental pillars of the national economy, positioning itself as the main producer and exporter of shrimp in Latin America and as one of the world leaders in the production of this species. The aquaculture industry in Ecuador has experienced sustained growth in recent decades, consolidating a production chain that integrates larval production, fattening, processing and marketing activities, generating direct and indirect employment for a significant portion of the country's coastal population.

The province of Guayas, and particularly the city of Guayaquil, have become the epicenter of this productive activity, housing the main companies in the sector and concentrating the centers of administrative and commercial decision-making. From an economic perspective, the aquaculture sector contributes substantially to the Ecuadorian trade balance, generating foreign exchange that exceeds billions of dollars annually, and constituting an engine of development for coastal communities that depend directly or indirectly on this productive activity.[17]

The industrial classification of the sector under code A0321.02 of the International Standard Industrial Classification (ISIC) REV. 4.0, corresponding to aquaculture in marine and brackish waters, places aquaculture companies within a specific normative and regulatory framework that establishes standards of production, animal health, traceability and environmental sustainability. This regulatory framework, which includes both national provisions and international market requirements, imposes significant challenges for organizations in the sector, demanding not only specialized technical skills, but also soft skills to manage regulatory complexity, coordinate multidisciplinary teams, and adapt to permanent regulatory changes.

The need to comply with international quality and sustainability standards, particularly in demanding markets such as the United States, Europe and Asia, has driven an organizational transformation in aquaculture companies, which have had to professionalize their management structures and strengthen the competencies of their human capital to maintain their competitiveness in global markets.[18]

The Ecuadorian aquaculture sector faces permanent challenges that configure a highly demanding and dynamic work environment, where soft skills emerge as critical competencies for professional performance. Variability in

oceanographic and climatic conditions, the incidence of diseases such as white spot syndrome and acute hepatopancreatic necrosis, fluctuations in international prices, and global trade tensions are factors of uncertainty that demand adaptive and problem-solving capacities at all organizational levels. Likewise, the growing pressure from consumers and international organizations towards sustainable and socially responsible production practices has raised the ethical and environmental standards that companies in the sector must meet, requiring professionals with solid skills in integrity, transparency and ethical decision-making. In this context, soft skills are not merely desirable attributes, but strategic competencies that determine the ability of organizations to anticipate and respond effectively to the contingencies of the environment, maintaining operational continuity and competitiveness in an increasingly demanding global market.[19]

1.5. Soft skills and sociodemographic variables: differences by sex and age.

The analysis of soft skills as a function of sociodemographic variables, particularly sex and age, has been a field of growing interest in organizational research, motivated by the need to understand how individual and contextual factors modulate the development and manifestation of these competencies in work environments. The specialized literature has documented differential patterns in the self-perception of soft skills between men and women, although the findings have not always been consistent, evidencing the influence of cultural, occupational and methodological factors on the observed results.

Some studies have reported that women tend to perceive themselves as having higher levels in dimensions related to communication, empathy and interpersonal skills, while men tend to have higher scores in competencies associated with leadership and problem-solving, although these differences tend to reduce when controlling for contextual and occupational variables. From a theoretical perspective, these differences have been attributed to differential socialization processes that emphasize different behavioral and attitudinal patterns in women and men, as well as to occupational segregation that concentrates each group in job roles that reinforce certain competency profiles.[20]

In the area of age differences, research has suggested that soft skills are not static attributes, but rather competencies that are developed and consolidated throughout the life cycle, influenced by work experience, professional maturity and exposure to diverse situations in organizational contexts. Longitudinal studies have documented that dimensions such as leadership, problem-solving, and communication tend to increase with age and career path, reflecting experiential learning and the accumulation of social and psychological capital over time.

On the other hand, other skills such as adaptability or flexibility could present differentiated trajectories, with higher levels in young populations facing changing work environments and demands for rapid adaptation. In the organizational context, these age trajectories have significant implications for the management of human talent, suggesting the need to design differentiated professional development strategies that recognize the particularities of each age group and enhance their specific strengths.[21]

The interaction between sex and age in the configuration of soft skills has received increasing attention in the literature, recognizing that patterns of competence development may differ between men and women throughout their professional careers. Recent research has suggested that gender differences in soft skills tend to fade with age and experience, which could reflect organizational socialization processes that modulate initial dispositions and promote adaptive behavior patterns based on the demands of the work environment.

This finding is consistent with theoretical perspectives that emphasize the situated and dynamic nature of soft skills, which are developed in interaction with organizational contexts and accumulated professional experiences. In the Ecuadorian aquaculture sector, where work populations with different trajectories and demographic characteristics coexist, understanding these interactions is relevant for the design of talent development policies that consider both age particularities and gender differences in the configuration of behavioral competencies.[22][23]

This research is aimed at the systematic examination of soft skills in the administrative staff of the Ecuadorian aquaculture sector, with the purpose of generating empirical knowledge that contributes to the understanding of these competencies in a productive context of high economic and social relevance. To this end, a general objective has been defined that articulates the central purpose of the study, as well as a set of specific objectives that operationalize the different dimensions of the research problem. This structure of objectives allows the problem raised to be addressed in a comprehensive way, ensuring coherence between the research questions, the methods used and the expected results.

The general objective of this research is to examine the soft skills present in the Ecuadorian aquaculture sector administrators and the professional development strategies implemented by the leading companies in the sector in the city of Guayaquil. This purpose is articulated around the need to characterize the soft skills profile of administrative personnel, identify the most developed competency dimensions and those that present the greatest opportunities for improvement, as well as understand the organizational practices aimed at strengthening these competencies in the specific context of the Ecuadorian aquaculture industry.

The specific objectives have been structured to address the different dimensions of the research problem in a systematic way. First, it seeks to describe the sociodemographic

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characteristics of the sample, including the distribution by sex and age of the administrative staff of the participating aquaculture companies, in order to contextualize the findings and facilitate comparison between population subgroups. Secondly, it is proposed to evaluate the reliability and internal consistency of the measurement instrument used, by calculating Cronbach's alpha coefficient for each of the five dimensions evaluated (integrity, leadership, teamwork, communication and problem solving), as well as for the questionnaire as a whole, guaranteeing the psychometric validity of the measurements made. Thirdly, it is proposed to analyze the levels of self-perception of soft skills in the five dimensions evaluated, identifying the most developed competencies and those with relatively lower levels, as well as the variability in the responses of the participants. Fourthly, it seeks to determine the existing correlations between the different dimensions of soft skills, exploring the interdependent relationships that are established between the behavioral competencies evaluated and their configuration as a system of interrelated skills. Finally, it is proposed to compare the levels of soft skills between men and women, as well as between different age groups, in order to identify possible differences associated with these sociodemographic variables and explore their implications for the management of human talent in the sector.

These objectives are directly related to the methodology used in the research, which combines a quantitative design of descriptive-correlational scope with the application of a structured questionnaire that measures the five dimensions of soft skills, as well as with the expected results, which include the characterization of the competency profile of administrative staff, the identification of significant relationships between the dimensions evaluated, and the identification of differences by sex and age. The achievement of these objectives will generate relevant empirical evidence for decision-making in the field of human talent management in the Ecuadorian aquaculture sector, as well as for the design of professional development strategies aimed at strengthening soft skills in the administrative staff of companies in the sector.

This research makes significant contributions in the scientific, methodological and practical fields, contributing to the development of knowledge in the field of soft skills and its application in specific productive contexts. From a scientific perspective, the study contributes to the understanding of soft skills in a productive sector of high economic relevance such as Ecuadorian aquaculture, addressing a gap in empirical knowledge documented in the specialized literature. The research provides systematic evidence on the structure, levels and relationships between the different dimensions of soft skills in the management staff of aquaculture companies, as well as on the differences associated with sociodemographic variables such as sex and age. These findings enrich the existing knowledge about behavioral competencies in specific organizational contexts and contribute to the consolidation of a theoretical body that recognizes the importance of the sectoral context in the configuration of soft skills.

On the methodological level, the study provides the validation and application of a soft skills measurement instrument adapted to the context of the Ecuadorian aquaculture sector, providing evidence on its psychometric properties in this specific population. The reliability coefficients obtained, which far exceed the acceptable thresholds in all the dimensions evaluated, support the usefulness of the instrument for future research in the sector and provide a methodological basis for its application in other similar production contexts. Likewise, the research contributes to the development of systematic procedures for the evaluation of soft skills in the organizational field, integrating considerations on the reversal of negative items, the analysis of internal consistency, and the evaluation of differences between population subgroups. These methodological contributions are relevant for the academic and professional community interested in the measurement of behavioral competencies in diverse organizational contexts.

From a practical perspective, the study offers valuable information for the management of human talent in the Ecuadorian aquaculture sector, providing empirical evidence that can guide the design of professional development policies and programs. The findings regarding the levels of soft skills in the different dimensions evaluated allow us to identify areas of strength and opportunities for improvement, facilitating the prioritization of training interventions aimed at strengthening specific competencies. Particularly relevant is the identification of integrity as the dimension with relatively lower levels, which suggests the need to implement specific strategies for the strengthening of ethical and behavioral competencies in the sector's administrative staff. Likewise, the absence of significant differences by sex in the soft skills evaluated provides evidence that supports the design of equitable professional development policies that recognize the strengths of all employees regardless of their gender, and that promote equal opportunities in access to training and development programs.

Finally, the study contributes to the sustainable development of the Ecuadorian aquaculture sector by providing an empirical basis for decision-making in human talent management, recognizing that investment in the development of soft skills constitutes a strategic factor for organizational competitiveness in an increasingly demanding global market. The evidence generated allows companies in the sector to better understand the behavioral competencies of their administrative staff and design development strategies aligned with the needs of the productive environment, thus contributing to the training of more complete, adaptable professionals capable of facing the challenges of a constantly evolving sector. In a context where automation and artificial intelligence are transforming the labor landscape, the strengthening of

human skills that cannot be replicated by machines acquires strategic relevance, positioning companies that invest in the development of these skills as leaders in their respective markets and contributing to the positioning of the Ecuadorian aquaculture sector as a benchmark of excellence and sustainability in the region.

2.- Materials and methods.

2.1 Research design and approach

The present research is framed within a non-experimental design of descriptive-correlational scope, with a quantitative approach that allows to characterize the soft skills of the administrative staff of the Ecuadorian aquaculture sector and explore the relationships between the dimensions evaluated. The study adopts a cross-sectional design, since the data were collected at a single time point, which allows obtaining a snapshot of the state of soft skills in the population studied without intervention on the variables of interest. This design is appropriate to achieve the proposed objectives, since it allows describing the characteristics of the sample, establishing relationships between dimensions and comparing population subgroups without experimental manipulation. [24]

2.2 Population and sample

The study population included administrative employees of five leading aquaculture companies in the city of Guayaquil, classified under the industrial code A0321.02 of the International Standard Industrial Classification (ISIC REV. 4.0), corresponding to aquaculture in marine and brackish waters. The selection of the participating companies was made through intentional or convenience sampling, considering their position in the sector, their volume of operations and their willingness to participate in the research. The final sample consisted of 88 participants, distributed in 51 women (58.0%) and 37 men (42.0%), aged between 21 and over 30 years, of which 72 (81.8%) belonged to the age group of 21 to 30 years and 16 (18.2%) to the group of more than 30 years. The sample size was adequate for the statistical analyses proposed, considering the statistical power requirements for the correlation tests and comparison of means expected.[25]

2.3 Measuring instrument

The data collection instrument consisted of a structured self-administered questionnaire, designed to assess five dimensions of soft skills: integrity, leadership, teamwork, communication, and problem solving. The questionnaire included 50 items distributed in the five dimensions, with 10 items for integrity (P3 to P12), 12 items for leadership (P13 to P24), 8 items for teamwork (P25 to P32), 10 items for communication (P33 to P42) and 10 items for problem solving (P43 to P52). Additionally, the instrument incorporated two sociodemographic questions to characterize the sample: age (P1), with categories "21 to 30 years" and "over 30 years", and sex (P2), with categories "female" and "male". The soft skills items were presented on a five-point Likert scale, where 1 corresponded to "never", 2 to "almost never", 3 to "sometimes", 4 to "almost always" and 5 to "always". The questionnaire was designed and validated through expert judgment, considering the relevance, clarity and representativeness of the items for each dimension evaluated, and was subjected to reliability analysis using Cronbach's alpha coefficient, which yielded values greater than 0.70 in all dimensions and an overall value of 0.944, indicating an excellent internal consistency of the instrument.[26]

2.4 Data collection procedure

Data collection was carried out during the period between the months of [indicate period] of the year [indicate year], with prior authorization from the human resources departments of the participating companies and the signing of informed consents by the respondents. The questionnaire was administered digitally using online survey platforms, ensuring anonymity and confidentiality of responses. Participants received standardized instructions for completing the instrument, including an explanation of the purpose of the research, the voluntary nature of participation, and the absence of consequences derived from their responses. The estimated time to complete the questionnaire was approximately 15 to 20 minutes. Once the data were collected, the database was cleaned, verifying the integrity of the responses and the absence of outliers or inconsistencies that could affect the quality of the analyses.[27]

2.5 Data analysis

Data processing and analysis was performed using SPSS statistical software version 26.0 for Windows. Prior to the main analysis, the items written in the negative direction were inverted, specifically items P8, P10 and P12 of the integrity dimension, and item P45 of the problem-solving dimension, applying the transformation formula valor_invertido = 6 − valor_original. This transformation ensured that all items were oriented in the same direction, where higher scores indicated higher skill levels. Subsequently, the average scores per dimension were calculated for each participant, averaging the items corresponding to each construct.[28, 28]

The reliability analysis of the instrument was carried out using Cronbach's alpha coefficient, calculated both for each dimension and for the questionnaire as a whole, evaluating the internal consistency of the scales. For the descriptive analysis, measures of central tendency (mean and median), dispersion measures (standard deviation, minimum and maximum) and measures of distribution form (asymmetry and kurtosis) were calculated for each of the five dimensions. The normality of the distributions was evaluated by the asymmetry coefficient, considering values within the range of -2 to +2 as indicative of an approximately normal distribution. For the correlational analysis, Pearson's correlation coefficient was applied, evaluating the relationships between the five dimensions of soft skills. This analysis was performed both for the total sample and for the subgroups defined by sex and age, in

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order to explore the stability of the relationships between dimensions in different population segments.

The comparative analysis by sex was performed using Student's t-test for independent samples, after verification of the assumption of homogeneity of variances by Levene's test. Descriptive statistics were calculated for each group (mean and standard deviation), the value of the t-statistic, the degrees of freedom, the level of significance and the size of the effect using Cohen's d. For the interpretation of the effect size, the conventional criteria were considered: 0.2 as a small effect, 0.5 as a medium effect and 0.8 as a large effect. The level of statistical significance was established at $\alpha = 0.05$ for all tests performed. Additionally, correlation analyses segmented by sex and age were carried out, in order to explore the consistency of the relationships between dimensions in the different population subgroups, calculating Pearson's coefficients and their corresponding levels of significance.[29]

3.- Results.

SECTION 1: METHODOLOGY – Instrument

Table 1.- Correct Structure of Dimensions

Dimension	Items	Quantity
Integrity	P3 – P12	10 items
Leadership	P13 – P24	12 items
Teamwork	P25 – P32	8 items
Communication	P33 – P42	10 items
Problem Solving	P43 – P52	10 items
Total	P3 – P52	50 items

The dimensional structure of the measurement instrument, presented in Table 1, establishes an operational framework for the evaluation of five fundamental behavioral competencies in the workplace: integrity, leadership, teamwork, communication, and problem solving. This five-dimensional configuration, composed of 50 items distributed asymmetrically (range of 8 to 12 items per dimension), responds to the inherent complexity of each construct evaluated, where dimensions such as leadership require a greater density of indicators to capture the multidimension of the phenomenon.

From a methodological perspective, the assignment of items P3 to P12 for the integrity dimension, with a total of ten items, allows addressing both attitudinal and behavioral aspects associated with ethical coherence and transparency in the organizational environment. Similarly, the leadership dimension, with twelve items (P13 to P24), operationalizes competencies linked to team management, initiative taking and the generation of trust, critical aspects in the management of human talent within the aquaculture sector, characterized by defined hierarchical structures and production processes that demand effective coordination.[30]

The teamwork dimension, consisting of eight items (P25 to P32), represents the smallest structure of the instrument, which suggests a more specific and delimited conceptualization of the construct, focused on interpersonal collaboration and group cohesion. On the other hand, communication and problem solving, each with ten items (P33 to P42 and P43 to P52 respectively), address dimensions related to communicative effectiveness and analytical capacity to face operational contingencies, particularly relevant competencies in the aquaculture sector, where decision-making in environments of high productive and sanitary variability requires precise communicative exchanges and rapid adaptive responses.

The proposed distribution of items presents a balanced coverage of the competencies evaluated, with an adequate relative weight for each construct, although the teamwork dimension, having a smaller number of items, could present limitations in terms of psychometric stability, an aspect that will be addressed in the reliability analysis. From the point of view of organizational engineering and human talent management, this dimensional structure offers an analytical framework that allows diagnosing strengths and areas for improvement in the soft skills of the administrative staff of the Ecuadorian aquaculture sector, facilitating the design of training interventions aligned with the demands of the productive environment.

Table 2.- Results of Cronbach's Alpha by dimension

Dimension	Items	Cronbach's alpha	Interpretation
1. Integrity	P3 - P12 (10 items)	0.724	Acceptable
2. Leadership	P13 - P24 (12 items)	0.913	Excellent
3. Teamwork	P25 - P32 (8 items)	0.894	Good/Excellent
4. Communication	P33 - P42 (10 items)	0.920	Excellent
5. Problem Solving	P43 - P52 (10 items)	0.938	Excellent
Total Questionnaire	P3 - P52 (50 items)	0.944	Excellent

The reliability coefficients obtained for the soft skills measurement instrument, presented in Table 2, show a differentiated psychometric behavior between the dimensions evaluated, with values ranging from 0.724 for completeness to 0.938 for problem solving, while the overall coefficient of the questionnaire reaches a value of 0.944. This set of results allows us to affirm that the instrument, as a whole, presents an outstanding internal consistency, far exceeding the minimum recommended threshold of 0.70 established in the specialized literature for basic research purposes, and placing itself in the range considered as excellent for the measurement of psychosocial constructs in organizational contexts.

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The highest reliability value corresponds to the problem-solving dimension (α = 0.938), which indicates that the ten items that compose it (P43 to P52) maintain a high level of intercorrelation, coherently measuring the underlying construct related to analytical capacity and decision-making in the face of contingencies. This finding is particularly relevant from an engineering perspective, given that the Ecuadorian aquaculture sector faces permanent operational and sanitary challenges, where effective problem solving is a critical competence for production continuity. The high internal consistency suggests that the items manage to adequately capture the cognitive and procedural dimensions involved in this competence.

The communication dimension has a coefficient of 0.920, reflecting an excellent homogeneity among its ten items (P33 to P42), which address aspects related to expressive clarity, active listening and perception of the emotional state of the interlocutors. From the point of view of social engineering and organizational management, this result is consistent with the interdependent nature of effective communication in work environments that require coordination between multidisciplinary teams, as occurs in the aquaculture companies studied, where the accurate transmission of technical and operational information is essential.

The leadership dimension reaches a coefficient of 0.913, evidencing that the twelve items that make it up (P13 to P24) maintain a high internal consistency, supporting the validity of the constructed evaluated. This result acquires particular relevance in the context of the aquaculture sector, where organizational structures require leadership figures capable of articulating work teams, promoting motivation and managing production processes. The excellent reliability observed suggests that the instrument adequately captures the behavioral and attitudinal dimensions associated with leadership, including the capacity for initiative, the generation of confidence and the promotion of participation.

The coefficient obtained for teamwork (α = 0.894), although it is in the good to excellent range, is slightly lower than that observed in the previously analyzed dimensions. This difference could be attributed to the smaller number of items that make up this dimension (eight items, P25 to P32), since the alpha coefficient is sensitive to the number of elements that make up the scale. However, the value achieved far exceeds the threshold of 0.80 considered as good reliability, which allows us to affirm that the dimension consistently measures the construct associated with interpersonal collaboration and group integration.

The integrity dimension has the lowest coefficient of the instrument (α = 0.724), although it remains within the acceptable range. This result deserves particular attention from the psychometric point of view, since it suggests that the ten items that compose it (P3 to P12) present a moderate homogeneity, possibly due to the multifaceted nature of the construct integrity, which encompasses dimensions such as honesty, transparency, coherence between values and actions, and acceptance of errors. aspects that, although related, can manifest themselves in a differentiated way depending on the situational contexts. From an ethical and organizational perspective, this finding invites reflection on the complexity of measuring constructs linked to ethical behavior in work environments, where implicit norms and organizational incentives can influence participants' responses.

The overall coefficient of the questionnaire (α = 0.944) confirms that the instrument as a whole presents excellent internal consistency, exceeding the value of 0.90 that the specialized literature considers as indicative of outstanding reliability. This result validates the five-dimensional structure of the instrument and supports its usefulness for organizational diagnostic purposes in the Ecuadorian aquaculture sector, providing a solid empirical basis for decision-making in human talent management and design of soft skills development programs. The high overall reliability suggests that, although the dimensions evaluate differentiated constructs, all of them are oriented towards the measurement of a common domain related to interpersonal and behavioral competencies in the workplace, which is consistent with the theoretical framework underlying the instrument.

SECTION 2: RESULTS – Characterization of the sample

Table 3.- Descriptive statistics of the sample – Sociodemographic variables (n = 88)

Variable	Category	Frequency	Percentage
Age (P1)	21-30 years	72	81.8%
	More than 30 years	16	18.2%
Sex (P2)	Female	51	58.0%
	Male	37	42.0%

The characterization of the sample, presented in Table 3, reveals a demographic composition that presents relevant particularities for the interpretation of the results in the context of the Ecuadorian aquaculture sector. The age distribution shows a marked predominance of participants belonging to the age range of 21 to 30 years, which represents 81.8% of the sample (72 cases), while the group over 30 years of age constitutes only the remaining 18.2% (16 cases). This age asymmetry suggests a mostly young administrative labor population, which could reflect the dynamics of hiring and retaining talent in the aquaculture sector of the region, characterized by a growing demand for professionals in early stages of their occupational development.

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From an organizational engineering and human resources management perspective, the concentration of the sample in the young age segment is consistent with the trends observed in productive sectors with high operational demand, where the incorporation of recently graduated personnel or those with limited experience responds both to the needs of generational renewal and to the availability of specialized training programs in the aquaculture area. This finding becomes relevant when considering that the soft skills evaluated in this study, particularly those related to leadership and problem solving, are usually developed and consolidated with experience and professional career, so the levels observed could be influenced by the relative youth of the sample.

Regarding the sex variable, the results indicate a slightly unbalanced distribution in favor of the female sex, which represents 58.0% of the participants (51 cases), compared to 42.0% corresponding to the male sex (37 cases). This proportion offers valuable information on the composition of administrative personnel in aquaculture companies in Guayaquil, suggesting a significant female presence in administrative roles, although slightly higher compared to the distribution typically observed in traditionally masculinized productive sectors. This data is particularly relevant from the perspective of gender equity studies in the workplace, especially considering that the Ecuadorian aquaculture sector has historically been characterized by a marked occupational segregation based on gender.

The majority female representation in the sample could be associated with the administrative nature of the positions evaluated, in contrast to the operational and technical areas of the aquaculture sector, where male participation tends to be predominant. From the point of view of human talent management, this distribution suggests the need for organizational policies that promote gender equity at both administrative and operational levels, as well as the development of leadership and decision-making competencies in work teams, considering diversity as a factor that enhances innovation and organizational effectiveness.

It is important to note that the sociodemographic characteristics of the sample, with its predominance of young and female participants, should be considered as contextual factors in the interpretation of the results related to soft skills. The youth of the sample could imply differential levels of development of certain behavioral competencies, particularly those that are consolidated with work experience and professional maturity, while the composition by sex raises questions about possible patterns of differential socialization in the development of interpersonal and communicative skills in the aquaculture work environment. These aspects will be addressed in the subsequent comparative analyses, which will allow evaluating whether the differences observed in the dimensions evaluated are statistically significant or respond to variations attributable to the sociodemographic characteristics of the participants.

SECTION 3: RESULTS – Descriptive statistics

Table 4.- Descriptive statistics by dimension (with inverted items)

Dimension	Media	Desv. East.	Minimum	Maximum	Asymmetry	Curtosis
Integrity	4.04	0.68	1.90	5.00	-0.82	0.94
Leadership	4.25	0.86	1.00	5.00	-1.21	1.73
Teamwork	4.26	0.94	1.00	5.00	-1.31	1.53
Communication	4.24	0.93	1.00	5.00	-1.31	1.74
Problem Solving	4.29	0.95	1.00	5.00	-1.35	1.69

The descriptive statistics presented in Table 4 reveal remarkably high levels of self-perception in all the dimensions evaluated, with means ranging from 4.04 for completeness to 4.29 for problem solving, on a Likert scale of 1 to 5 points. These values suggest that the study participants perceive themselves to have a high level of development in the behavioral competencies assessed, exceeding the midpoint of the scale and approaching the upper limit of response. From an organizational perspective, this finding is particularly relevant for the Ecuadorian aquaculture sector, since it indicates a favorable self-perception of soft skills in administrative personnel, which could constitute a significant intangible asset for companies in the sector.

The dimension with the highest mean corresponds to problem solving (M = 4.29, SD = 0.95), followed by teamwork (M = 4.26, SD = 0.94) and leadership (M = 4.25, SD = 0.86). These scores suggest that participants attribute greater development to competencies related to analytical capacity, group collaboration and team management, critical aspects for performance in productive environments characterized by the need for rapid response to operational and health contingencies, as occurs in the aquaculture sector. Communication reached a mean of 4.24 (SD = 0.93), placing it at a level similar to that of the previously mentioned dimensions, while integrity had the lowest mean (M = 4.04, SD = 0.68), although still in a range considered high.

It is important to note that all dimensions have means greater than 4.0, which in the Likert scale used corresponds to "almost always" in the continuum of response that goes

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from "never" to "always". This pattern of responses could be influenced by a social desirability bias, a frequent phenomenon in studies of self-perception of psychosocial competencies, where participants tend to overestimate their abilities in dimensions positively valued by the organization and society. From a technical point of view, this finding suggests the need to complement self-perception measurements with behavioral performance evaluations or with third-party observations (heteroevaluations) to obtain a more objective approach to the real development of these competencies in the work environment.

The observed standard deviations reveal that the integrity dimension has the least variability (SD = 0.68), indicating greater homogeneity in participants' responses compared to the other dimensions. On the contrary, problem solving (SD = 0.95) and teamwork (SD = 0.94) show the greatest dispersions, suggesting a greater heterogeneity in the self-perception of these competencies among the participants. This differential variability could be associated with the nature of the constructs evaluated: while integrity refers to ethical and normative principles that tend to be internalized more uniformly, problem-solving and teamwork are more linked to situational experiences and particular work trajectories, which could generate greater differences in individual perceptions.

Distribution shape analyses reveal negative asymmetries across all dimensions, with values ranging from -0.82 for integrity to -1.35 for troubleshooting. These coefficients indicate a concentration of responses at the high values of the scale, consistent with the high means observed. Positive kurtoses, with values between 0.94 for integrity and 1.74 for communication, suggest leptocurtic distributions, characterized by a higher concentration of cases in the central zone and less extended tails than expected in a normal distribution.

From the perspective of organizational engineering and human talent management, these results suggest that administrative personnel in the Ecuadorian aquaculture sector perceive themselves to have a solid level of soft skills, particularly in dimensions related to problem solving and teamwork, critical competencies for performance in highly complex production environments. However, the relatively lower integrity score raises questions about organizational factors that could influence the self-perception of ethical conduct, as well as about institutional policies aimed at strengthening ethical coherence and transparency in labor practices in the sector. The elevation of scores in all dimensions above 4.0 invites reflection on the need to implement complementary evaluation mechanisms that allow contrasting self-perceptions with objective indicators of behavioral performance, thus contributing to a more comprehensive understanding of the development of soft skills in the Ecuadorian aquaculture context.

SECTION 4: RESULTS – Global correlations

Table 5.- Matrix of correlations between dimensions (Pearson)

Dimension	Integrity	Leadership	Teamwork	Communication	Problem Solving
Integrity	1.000				
Leadership	0.531	1.000			
Teamwork	0.514	0.736	1.000		
Communication	0.531	0.752	0.839	1.000	
Problem Solving	0.452	0.673	0.745	0.734	1.000

All correlations are significant with $p < 0.01$

The Pearson correlation matrix presented in Table 5 reveals positive and statistically significant associations ($p < 0.01$) between all dimensions of the instrument, with coefficients ranging from 0.452 to 0.839. This pattern of intercorrelations suggests that the five behavioral competencies assessed do not operate as independent constructs, but rather maintain interdependent relationships that reflect the systemic nature of soft skills in the organizational context. From a theoretical perspective, these findings are consistent with multidimensional models of psychosocial competencies, which postulate the existence of significant relationships between different behavioral dimensions, particularly those related to social interaction and work performance.

The highest correlation is observed between teamwork and communication ($r = 0.839$), which indicates that both dimensions share approximately 70.4% of their common variance. This strong partnership is conceptually coherent, since the effectiveness of collaborative work depends fundamentally on the ability of team members to exchange information clearly, express opinions in a timely manner, and understand each other's needs and emotional states. In the context of the Ecuadorian aquaculture sector, where productive operations require constant coordination between different areas and hierarchical levels, this interdependence between communication and teamwork acquires particular relevance, suggesting that training interventions aimed at strengthening one of these competencies could have positive effects on the other.

Similarly, the correlation between leadership and communication reaches a value of 0.752, reflecting that the ability to lead teams is closely linked to communication skills, particularly those related to the clear expression of ideas, the transmission of confidence and the facilitation of participation. This finding is consistent with the specialized

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literature that identifies effective communication as one of the fundamental pillars of transformational and situational leadership. From the perspective of organizational engineering, this relationship suggests that leadership development processes in the aquaculture sector should incorporate intensive training components in communication skills, recognizing that the ability to influence work teams is mediated by the ability to establish effective communication channels.

The association between teamwork and leadership (r = 0.736) reinforces the notion that both competencies feed off each other in organizational contexts, where effective leaders are those capable of fostering collaboration and group cohesion, while cohesive work teams facilitate the exercise of leadership by generating environments of trust and participation. The aquaculture sector, characterized by operations that require coordination between multidisciplinary teams, could benefit from management strategies that simultaneously promote leadership development and teamwork, recognizing their interdependent nature.

The correlations between integrity and the other dimensions, although significant, present the lowest values in the matrix, ranging from 0.452 with problem solving to 0.531 with leadership and communication. This pattern suggests that integrity, understood as coherence between values and actions, transparency and acceptance of mistakes, maintains a more moderate relationship with the other behavioral competencies. From an ethical and organizational perspective, this finding could indicate that integrity constitutes a relatively independent construct within the set of soft skills, possibly because it refers to dimensions of a moral and normative nature that operate at a different level than the competencies more oriented to social interaction and the resolution of operational problems.

The correlation between integrity and problem solving (r = 0.452) is the lowest in the entire matrix, suggesting that the self-perception of ethical and transparent behaviors is limited to the perception of ability to identify causes of problems, generate alternative solutions, and evaluate results. This finding is particularly relevant from the point of view of human talent management, since it suggests that competencies linked to the ethical dimension and those associated with analytical-operational capacity could be developed through differential trajectories, requiring specific training strategies for each domain.

From a methodological perspective, the correlations obtained in all cases exceed the threshold of 0.30 considered as indicative of a practically significant association, and most of them are in the range of strong correlations (r > 0.70) or moderate correlations (r between 0.40 and 0.70). This pattern suggests that, although the dimensions maintain significant relationships that justify their inclusion in a common instrument, they present sufficient specificity to be considered differentiated constructs. The statistical significance of all correlations ($p < 0.01$) provides a solid basis for affirming that the observed relationships are not attributable to chance, reinforcing the validity of the instrument and supporting the relevance of the analysis of soft skills as a system of interrelated competencies in the context of the Ecuadorian aquaculture sector.

SECTION 5: RESULTS – Group comparisons

Table 6.- Correlations by Age Group

Correlation	21-30 years (n=72)	>30 years (n=16)
Integrity - Leadership	0.530**	0.516*
Integrity - Teamwork	0.516**	0.489*
Leadership - Communication	0.748**	0.781**
Team Work - Communication	0.835**	0.852**

The correlation analysis segmented by age groups, presented in Table 6, reveals patterns of association between the dimensions of soft skills that remain consistent in both the group of participants aged 21 to 30 years and in the group of participants over 30 years of age, with all correlations reaching statistical significance. This finding suggests that the relational structure among the behavioral competencies evaluated remains stable throughout the age ranges considered, indicating that the interdependence between the dimensions of the instrument is not substantially modified by the age of the participants.

The correlations observed in the group of young participants (21 to 30 years old) show coefficients ranging from 0.516 to 0.835, all of them significant with $p < 0.01$. On the other hand, the oldest group (over 30 years old) shows coefficients ranging from 0.489 to 0.852, with levels of significance that include both $p < 0.01$ and $p < 0.05$. This pattern of results suggests that, although the magnitudes of the associations show slight variations between both groups, the direction and nature of the relationships between the dimensions evaluated remain fundamentally invariant, which supports the stability of the measurement instrument in different age segments.

The highest correlation in both groups is observed between teamwork and communication, reaching 0.835 in the 21 to 30 age group and 0.852 in the over 30 age group. This consistency in the magnitude of the association suggests that the relationship between the ability to collaborate in teams and communication skills remains equally strong regardless of the age of the participants. From an organizational engineering perspective, this finding is relevant insofar as it indicates that the interdependence between these two competencies constitutes a stable phenomenon, suggesting that organizational development strategies aimed at strengthening teamwork could be implemented in a similar way in work populations of

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different ages, taking advantage of the synergistic relationship with communicative competencies.

The correlation between leadership and communication also shows high and comparable values in both groups, with coefficients of 0.748 for the young group and 0.781 for the older group. This similarity suggests that the association between the ability to lead teams and communication skills remains robust across age ranges, supporting the notion that effective communication constitutes a cross-cutting component of leadership regardless of experience or career path. This result is particularly relevant for the design of leadership skills training programs for the aquaculture sector, since it suggests that interventions aimed at developing communication skills could have positive effects on leadership skills in both young professionals and those with more experience.

The correlations between integrity and the other dimensions show more moderate values in both age groups, with coefficients ranging from 0.489 to 0.530. Integrity, when assessed by items that inquire about the acceptance of errors, the coherence between values and actions, and transparency, maintains a systematically lower relationship with the dimensions oriented to social interaction and problem solving, a pattern that is consistently observed in both age groups. This finding reinforces the notion that integrity, understood as a competence linked to ethical and normative principles, could operate as a relatively independent construct within the soft skills ecosystem, maintaining more moderate relationships with the behavioral dimensions oriented to interaction and operation.

It is important to note that the correlations between integrity and leadership (0.530 in young people vs. 0.516 in older people) and integrity and teamwork (0.516 in young people vs. 0.489 in older people) show marginal differences between both groups, with slightly higher values in the younger age group. These differences, although minimal, could suggest that in younger populations the relationship between ethical and behavioral dimensions tends to be slightly closer, possibly due to organizational socialization processes that are still in early stages of consolidation. From the point of view of human talent management, this finding suggests that the integration between the ethical dimension and interpersonal competencies could be strengthened through early training interventions, particularly in young work populations where these associations show a tendency to be more pronounced.

The consistency of the correlation patterns between the two age groups is a methodologically relevant finding, since it supports the validity of the measurement instrument by demonstrating that the relationships between the dimensions evaluated do not present substantial variations attributable to the age of the participants. This stability is particularly significant for the application of the questionnaire in diverse organizational contexts, since it suggests that the factorial structure of the instrument remains invariant in different age segments, which facilitates its use as a diagnostic tool in heterogeneous work populations. The magnitude of the observed correlations, consistently moderate to strong in both groups, supports the notion that the soft skills assessed constitute a system of interrelated competencies whose structure remains stable throughout the working life cycle.

Table 7.- Correlations by group by sex

Correlation	Female (n=51)	Male (n=37)
Integrity - Leadership	0.547**	0.502**
Integrity - Teamwork	0.528**	0.491**
Leadership - Communication	0.758**	0.739**
Team Work - Communication	0.841**	0.832**

The sex-segmented correlation analysis, presented in Table 7, reveals patterns of association between the dimensions of soft skills that remain consistent in both the group of female participants and the group of male participants, with all correlations reaching statistical significance ($p < 0.01$). This finding suggests that the relational structure between the behavioral competencies evaluated does not present substantial differences attributable to the sex of the participants, indicating that the interdependence between the dimensions of the instrument constitutes a phenomenon that transcends gender differences in the context of the Ecuadorian aquaculture sector.

The correlations observed in the female group have coefficients ranging from 0.528 to 0.841, while in the male group the values range from 0.491 to 0.832. This range of coefficients, as well as the order of magnitude of the associations, is practically equivalent between both groups, which suggests that the structure of relationships between the competencies evaluated remains unchanged regardless of the sex of the participants. From a psychometric perspective, this consistency supports the validity of the instrument by demonstrating that the dimensions of the questionnaire maintain stable intercorrelation patterns in different population subgroups, which constitutes a relevant indicator of the robustness of the measure.

The highest correlation in both groups is observed between teamwork and communication, reaching 0.841 in the female group and 0.832 in the male group. This slight difference in favor of women, although minimal, could suggest a slightly closer integration between collaborative capacity and communication skills in the female population. However, the magnitude of the difference is so small that it does not allow conclusive statements to be made in this regard, and the similarity of the coefficients suggests that the relationship between these two competencies constitutes a transversal characteristic, present in an equivalent way in both sexes. From an organizational engineering perspective,

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this finding is relevant insofar as it indicates that teamwork development programs in the aquaculture sector could be structured in a similar way for female and male populations, taking advantage of the synergistic relationship with communication skills that is consistently manifested in both groups.

The correlation between leadership and communication also shows very similar values between both sexes, with coefficients of 0.758 for the female group and 0.739 for the male group. This proximity in magnitudes suggests that the association between the ability to lead teams and communication skills remains robust and equivalent in women and men, supporting the notion that effective communication constitutes a fundamental component of leadership regardless of the gender of those who exercise management roles. From the perspective of gender equity in the workplace, this finding is particularly relevant, since it suggests that the mechanisms that link communication and leadership competencies operate in a similar way in both sexes, which could contribute to demystifying stereotypical conceptions about gender differences in leadership skills.

The correlations between integrity and leadership show values of 0.547 for the female group and 0.502 for the male group, while the associations between integrity and teamwork reach 0.528 in women and 0.491 in men. In both cases, the coefficients obtained in the female group are slightly higher than those observed in the male group, which could suggest a marginally closer relationship between the ethical dimension and interpersonal competences in the female population. These differences, however, are small enough to be interpreted with caution, and the statistical significance of both correlations in both groups supports the existence of positive relationships between integrity and the other dimensions regardless of sex.

It is important to note that, in general terms, women have slightly higher correlation coefficients than men in all the associations evaluated. This trend, although systematic, is of a small magnitude and does not allow conclusive differences to be established between the two groups. The homogeneity in the correlation patterns is a methodologically relevant finding, since it suggests that the factor structure of the instrument remains invariant in different sex groups, which supports the cross-cultural and gender validity of the questionnaire. From an organizational management perspective, this consistency suggests that the soft skills diagnoses made with this instrument can be interpreted in an equivalent way for female and male populations, without the need to establish differential scales according to the sex of the participants.

The coincidence in the patterns of correlation between men and women is particularly significant for the analysis of soft skills in the Ecuadorian aquaculture sector, since it suggests that the interdependence between the behavioral competencies evaluated constitutes a relatively stable phenomenon, which is not substantially affected by gender differences in socialization processes. professional development or work experiences. This stability of the relationships between dimensions regardless of sex, consistently observed in all the associations evaluated, reinforces the validity of the measurement instrument and provides a solid empirical basis to affirm that the structure of soft skills, at least in the context of the Ecuadorian aquaculture sector, presents a similar behavior in men and women. which facilitates the interpretation and comparison of results in diverse work populations and contributes to the understanding of behavioral competencies as universal constructs in the organizational field.

SECTION 6: RESULTS – Analysis by sex

Table 8.- Descriptive statistics by sex and test of homogeneity of variances.

Dimension	Female (n=51)	Male (n=37)	Levene (F)	p
	Medium (SD)	Medium (SD)		
Integrity	4.08 (0.68)	3.97 (0.70)	0.148	0.701
Leadership	4.35 (0.78)	4.11 (0.95)	1.875	0.174
Teamwork	4.36 (0.89)	4.12 (1.00)	0.861	0.356
Communication	4.32 (0.88)	4.12 (0.99)	0.443	0.507
Problem Solving	4.36 (0.93)	4.19 (0.98)	0.048	0.827

The analysis of descriptive statistics segmented by sex, complemented by the Levene test for the homogeneity of variances, presented in Table 8, reveals systematic but moderate differences in the means of self-perception of soft skills between women and men, accompanied by variances that do not present statistically significant differences between both groups. Women obtain higher average scores in all the dimensions evaluated, with differences ranging from 0.11 points in integrity to 0.24 points in leadership and teamwork, on a scale of 1 to 5 points. This consistent pattern suggests a trend towards a slightly higher self-perception of behavioral competencies in the female population of the Ecuadorian aquaculture sector, although the magnitude of these differences is small and will require statistical significance analysis to determine their relevance.

In the integrity dimension, women have a mean of 4.08 (SD = 0.68) compared to 3.97 (SD = 0.70) in men, which represents a difference of 0.11 points. This difference, while modest, suggests that women tend to perceive themselves as having slightly higher levels of ethical consistency, transparency, and acceptance of mistakes compared to their male peers. The similarity in the standard deviations (0.68 vs. 0.70) indicates comparable variability in both groups, which is confirmed by the Levene test ($F = 0.148$, $p = 0.701$), which shows that the variances do not show significant differences. From a psychometric perspective, the homogeneity of variances is a fundamental requirement

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for the application of parametric tests for the comparison of means, and in this case it is satisfactorily fulfilled for all the dimensions evaluated.

The leadership dimension presents the most pronounced difference between the two groups, with a mean of 4.35 (SD = 0.78) for women and 4.11 (SD = 0.95) for men, which represents an advantage of 0.24 points in favor of the female sex. This difference, although moderate, is particularly relevant in the context of the aquaculture sector, where leadership roles have traditionally been occupied mostly by men. The higher standard deviation observed in the male group (0.95 vs. 0.78) suggests greater heterogeneity in leadership self-perceptions among men, with some participants reporting very low levels and others very high, while women present more concentrated responses around the mean. Levene's test confirms that this difference in variances does not reach statistical significance ($F = 1.875$, $p = 0.174$), although it is close to the conventional threshold, suggesting a trend towards greater variability in male responses.

In the teamwork dimension, women obtained an average of 4.36 (SD = 0.89) compared to 4.12 (SD = 1.00) in men, with a difference of 0.24 points, also favorable to the female sex. This disparity suggests that women perceive themselves to have greater competencies for group collaboration, the promotion of unity in the work environment and the acceptance of agreements established in teams. The higher standard deviation in the male group (1.00 vs. 0.89) again indicates slightly higher variability in men's responses, although Levene's test ($F = 0.861$, $p = 0.356$) confirms that this difference is not statistically significant.

Communication, a dimension that measures skills linked to expressive clarity, active listening and perception of the emotional state of others, has an average of 4.32 (SD = 0.88) in women and 4.12 (SD = 0.99) in men, with a difference of 0.20 points in favor of women. This result is consistent with the literature suggesting that women tend to develop stronger communicative competencies in relational contexts, possibly due to differential socialization patterns that emphasize emotional expression and empathy. The Levene test ($F = 0.443$, $p = 0.507$) confirms the homogeneity of variances between both groups, validating the use of parametric tests to evaluate the significance of this difference.

Problem solving presents the smallest difference between the two groups, with a mean of 4.36 (SD = 0.93) for women and 4.19 (SD = 0.98) for men, which represents an advantage of 0.17 points for women. This dimension, which assesses competencies linked to the identification of causes of problems, the generation of alternative solutions and the evaluation of results, shows the smallest difference between the sexes, which could suggest that analytical and decision-making skills are more equally distributed between men and women in the context of the aquaculture sector. Levene's test ($F = 0.048$, $p = 0.827$) confirms that the variances are practically equivalent in both groups, which constitutes the most robust result of homogeneity in the entire table.

The analysis of homogeneity of variances, evaluated by Levene's test, shows that in none of the dimensions is the null hypothesis of equality of variances rejected, with probability values ranging from 0.174 in leadership to 0.827 in problem solving. This finding is methodologically relevant, since the homogeneity of variances is a fundamental assumption for the application of Student's t-tests for independent samples, as well as for analyses of variance (ANOVA). The fulfillment of this assumption in all the dimensions evaluated supports the validity of the statistical comparisons made between both groups, providing a solid empirical basis to determine whether the differences observed in the means reach statistical significance.

From an organizational engineering and human talent management perspective, the pattern of observed results suggests that, although women tend to report slightly higher levels of soft skills in all dimensions, the magnitude of these differences is moderate and the homogeneity of variances indicates that the variability in responses is comparable between both sexes. This finding invites reflection on the factors that could be contributing to the observed differences, as well as on the need to implement gender equity policies that promote the equitable development of behavioral competencies in the aquaculture sector, recognizing both the strengths and the areas of opportunity presented by each of the groups. The consistency of the homogeneity of variances in all dimensions also suggests that the measurement instrument behaves stably in different sex groups, which constitutes an additional indicator of its validity and usefulness for organizational diagnostic purposes.

Table 9. Comparison of means between men and women (t-test)

Dimension	t	gl	p	Cohen's d
Integrity	0.726	86	0.470	0.16
Leadership	1.318	86	0.191	0.28
Teamwork	1.175	86	0.243	0.25
Communication	1.000	86	0.320	0.21
Problem Solving	0.847	86	0.399	0.18

Note: Cohen's d = effect size (0.2 = small, 0.5 = medium, 0.8 = large)

The analysis of the comparison of means using the t-test for independent samples, presented in Table 9, reveals that the differences observed in the self-perception scores of soft skills between women and men do not reach statistical significance in any of the five dimensions evaluated. The

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probability values associated with t-statistics range from 0.191 for leadership to 0.470 for completeness, all of them well above the conventional threshold of 0.05 that would allow the null hypothesis of equality of means to be rejected. This finding suggests that, although women have consistently higher mean scores than men in all dimensions, these differences are not large enough to be considered statistically significant in the context of the sample analyzed.

In the integrity dimension, the t-statistic reaches a value of 0.726 with 86 degrees of freedom and an associated probability of 0.470, indicating that the 0.11-point difference observed between women (M = 4.08) and men (M = 3.97) could be due to chance in approximately 47% of the possible samples. This result suggests that, from a statistical point of view, there is insufficient evidence to affirm that men and women differ in their self-perception of integrity in the context of the Ecuadorian aquaculture sector. The leadership dimension has the highest t-value (t = 1.318, p = 0.191), which indicates that the difference of 0.24 points in favour of women, although the most pronounced of all the dimensions, does not reach statistical significance either, with a probability of type I error of 19.1%.

The dimensions teamwork (t = 1.175, p = 0.243) and communication (t = 1.000, p = 0.320) present similar patterns, with differences of 0.24 and 0.20 points respectively that do not reach statistical significance. Problem-solving shows the lowest t-value (t = 0.847, p = 0.399), consistent with the smallest difference observed between both groups (0.17 points), which reinforces the conclusion that analytical and decision-making skills are perceived similarly between men and women in the Ecuadorian aquaculture sector.

The effect size analysis, calculated using Cohen's d, provides complementary information on the practical magnitude of the observed differences, beyond their statistical significance. The coefficients obtained range from 0.16 for integrity to 0.28 for leadership, all of them in the range considered as small effect size according to conventional criteria (0.2 = small, 0.5 = medium, 0.8 = large). The leadership dimension has the highest effect size (d = 0.28), followed by teamwork (d = 0.25), communication (d = 0.21), problem solving (d = 0.18) and integrity (d = 0.16). These values indicate that, even in the case of the most pronounced difference, the magnitude of the association between sex and soft skills is small, explaining less than 2% of the total variance in leadership scores.

From an organizational engineering and human talent management perspective, the absence of significant differences between men and women in the soft skills evaluated is a relevant finding that suggests that gender does not operate as a determining factor in the self-perception of behavioral competencies in the context of the Ecuadorian aquaculture sector. This result is particularly significant from the point of view of gender equity in the workplace, since it suggests that the competencies associated with leadership, teamwork, communication, integrity and problem-solving are relatively equally distributed between men and women, at least in terms of the self-perception of these skills.

The findings obtained invite reflection on the nature of gender differences in the organizational sphere, suggesting that, in the specific context of the Ecuadorian aquaculture sector, perceptions of soft skills do not present significant biases associated with the sex of the participants. This conclusion, however, must be qualified by the inherent limitations of self-perception measurements, which could be influenced by factors such as social desirability, internalized gender stereotypes or organizational expectations, which could modulate participants' responses according to their sex.

The size of the small effect observed in all dimensions suggests that, even in those cases where the differences are close to statistical significance (such as in leadership, with p = 0.191 and d = 0.28), the practical magnitude of these differences is modest. This finding acquires relevance from an organizational policy perspective, since it indicates that strategies aimed at promoting the development of soft skills in the aquaculture sector do not necessarily require gender-differentiated approaches, at least in terms of self-perception of competencies. The homogeneity in response patterns between men and women suggests that training interventions could be designed with a universal approach, without the need to establish differentiated programs according to the sex of the participants, although always considering that gender equity in professional development requires comprehensive policies that transcend the field of behavioral competencies.

4.- Discussion

4.1. Interpretation of the results

The findings obtained in this research allow us to characterize the soft skills profile of the administrative staff of the Ecuadorian aquaculture sector, revealing high levels of self-perception in all the dimensions evaluated, with means ranging from 4.03 for integrity to 4.29 for problem solving. This pattern of results suggests that participants perceive a solid development of behavioral competencies, particularly in those related to analytical skills, group collaboration, and effective communication. The elevation of scores above 4.0 on a scale of 1 to 5 points could be interpreted as an indicator that administrative staff in the aquaculture sector value their interpersonal skills positively, although it could also reflect the influence of social desirability bias, a frequent phenomenon in self-perception studies where participants tend to overestimate their abilities in dimensions valued by the organization and society. From an organizational engineering perspective, this finding suggests that companies in the sector have a

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favorable competency base on which to build talent development strategies, although it is recommended to complement self-perception measurements with behavioral performance evaluations or with third-party observations to obtain a more objective approach to the real development of these competencies.

The identification of problem solving as the dimension with the highest average is consistent with the demands of the aquaculture production context, characterized by permanent operational and health contingencies that require rapid adaptive responses and decision-making under uncertainty. This finding suggests that administrative personnel in the sector have developed analytical and decision-making skills that allow them to effectively face the challenges inherent to productive activity. In addition, the integrity dimension has the lowest mean, which could reflect the complexity of measuring constructs linked to ethical behavior in work environments where implicit norms and organizational incentives can influence participants' responses. This observation is particularly relevant from an ethical and organizational perspective, since it suggests that competencies linked to transparency, coherence between values and actions, and the acceptance of errors constitute an area of opportunity for the strengthening of the organizational culture in the aquaculture sector.

The correlation matrix reveals positive and significant associations between all the dimensions evaluated, with coefficients ranging from 0.452 to 0.839, indicating that soft skills do not operate as independent constructs, but as a system of interrelated competencies that influence each other. The highest correlation between teamwork and communication ($r = 0.839$) is conceptually coherent, since the effectiveness of group collaboration depends fundamentally on the ability of team members to exchange information clearly, express opinions in a timely manner, and understand the needs and emotional states of others. This interdependence is particularly relevant in the aquaculture sector, where production operations require constant coordination between different areas and hierarchical levels, and suggests that training interventions aimed at strengthening one of these competencies could have positive effects on the other, thus optimizing the resources allocated to talent development.

The comparative analysis by sex reveals that, although women obtain slightly higher mean scores in all dimensions, these differences do not reach statistical significance, as shown by the probability values obtained in the t-test ($p > 0.05$ in all cases). This finding is particularly relevant from the point of view of gender equity in the workplace, since it suggests that the competencies associated with leadership, teamwork, communication, integrity, and problem-solving are equally distributed between men and women in the context of the Ecuadorian aquaculture sector. The effect sizes, calculated using Cohen's d, are in the small range (0.16 to 0.28), confirming that even the most pronounced differences have a small practical magnitude. This result contributes to demystifying stereotypical conceptions about gender differences in leadership skills and other behavioral competencies, providing empirical evidence that supports the design of equitable professional development policies.

4.2. Comparison with previous studies

The findings obtained are in line with previous research that has documented high levels of self-perception of soft skills in working populations, although particularities linked to the sectoral context of the aquaculture industry are observed. Studies carried out in the field of manufacturing and services have reported similar patterns of favorable self-perception, with means that tend to exceed the midpoint of the scale, suggesting that the tendency to overestimate behavioral competencies is a widespread phenomenon in different organizational contexts. However, research on soft skills in the aquaculture sector specifically is limited, making it difficult to directly compare it with previous studies in the same production field. This knowledge gap highlights the original contribution of the present study, which provides systematic empirical evidence on the behavioral competencies of administrative personnel in an industry of high economic relevance for Ecuador.

In relation to sex differences in soft skills, the findings of the present study present partial coincidences with previous literature, which has reported inconsistent patterns in gender differences. Some research has documented that women tend to perceive themselves as having higher levels in dimensions related to communication and interpersonal skills, while others have not found significant differences, especially when controlling for contextual and occupational variables. The absence of significant differences by sex observed in the present study aligns with the most recent research suggesting that gender differences in soft skills tend to attenuate in professionalized work contexts, where organizational socialization processes and shared occupational roles modulate initial dispositions and promote adaptive behavior patterns based on the demands of the environment. This finding is consistent with theoretical perspectives that emphasize the situated and dynamic nature of soft skills, which are developed in interaction with organizational contexts and accumulated professional experiences.

In terms of age differences, previous research has suggested that soft skills develop and consolidate throughout the life cycle, influenced by work experience and professional maturity. Longitudinal studies have documented that dimensions such as leadership and problem-solving tend to increase with age and career path, reflecting experiential learning and the accumulation of social and psychological capital. In the present study, although no formal statistical comparisons were made by age due to the imbalance in group sizes, the observed correlation patterns between dimensions remained consistent in both age groups, suggesting that the relational structure of soft skills is stable in different population segments. This finding coincides

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with research that has reported stability in the factorial structure of soft skills measurement instruments in different age groups, supporting their usefulness for diagnostic purposes and organizational development.

The high reliability of the measurement instrument, with Cronbach's alpha coefficients exceeding 0.70 in all dimensions and reaching 0.944 for the total questionnaire, is above the values reported in similar studies in organizational contexts. This result can be attributed both to the robustness of the instrument and to the homogeneity of the sample evaluated, and constitutes a relevant methodological contribution by providing a validated instrument for the evaluation of soft skills in the Ecuadorian aquaculture sector. The comparison with previous studies carried out in Latin America reveals that the reliability coefficients obtained are in the upper range of what was reported, which suggests that the instrument has adequate psychometric properties for its application in similar organizational contexts.

4.3. Theoretical and practical implications

The findings of the present research present relevant theoretical implications for the field of study of soft skills in organizational contexts, particularly with regard to the understanding of the relational structure between competency dimensions. The consistency of the correlations observed between the five dimensions evaluated supports the conceptualization of soft skills as a system of interrelated competencies, where the development of one dimension is positively associated with the development of the others, suggesting the existence of competence transfer mechanisms that could be the subject of future research. This finding contributes to the theoretical debate on the nature of soft skills, supporting perspectives that emphasize their systemic character and integrated development, in contrast to approaches that conceive them as independent constructs. Likewise, the stability of correlation patterns in different population subgroups (by sex and age) provides evidence on the invariability of the structure of soft skills in different population segments, which constitutes a contribution to the knowledge about the universality of these constructs.

From a methodological perspective, the validation of the measurement instrument in the context of the Ecuadorian aquaculture sector constitutes a significant contribution, providing a reliable tool for future research in the sector and in similar production contexts. The reliability coefficients obtained, which far exceed the acceptable thresholds in all dimensions, support the usefulness of the questionnaire for organizational diagnosis purposes and evaluation of talent development programs. This methodological contribution is particularly relevant in the Latin American context, where the availability of validated instruments for the assessment of soft skills in specific productive sectors is limited, and where the adaptation of international instruments requires systematic validation processes that consider the cultural and contextual particularities of the population evaluated.

The practical implications of the findings are particularly relevant for the management of human talent in the Ecuadorian aquaculture sector. The results suggest that, although the administrative staff of the sector presents favorable levels of self-perception in all dimensions, there are areas of opportunity for the strengthening of specific competencies, particularly in integrity, which could be addressed through the design of ethical and behavioral development programs. The absence of significant differences by sex in the soft skills assessed provides evidence that supports the design of equitable professional development policies, which recognize the strengths of all employees regardless of their gender. Likewise, the positive and significant relationships between all dimensions suggest that training interventions aimed at strengthening a specific competence could have multiplier effects on other dimensions, thus optimizing investment in talent development and generating a broader impact on organizational performance.

From an industry perspective, the findings of the study provide valuable insights for aquaculture companies looking to strengthen their organizational capabilities through the development of their human capital. The identification of problem solving as the dimension with the highest level of development suggests that companies in the sector have trained personnel to face the operational and sanitary contingencies that characterize aquaculture activity. However, the relatively lower score in integrity invites reflection on the organizational factors that could be influencing the self-perception of ethical conduct, as well as on institutional policies aimed at strengthening ethical coherence and transparency in labor practices in the sector. The implementation of training programs aimed at strengthening soft skills could significantly contribute to improving the organizational climate, job satisfaction and talent retention, critical factors for the sustainability and competitiveness of the sector in an increasingly demanding global market.

4.4. Limitations and future projections

The present research presents methodological limitations that must be considered for an adequate interpretation and generalization of the findings. First, the cross-sectional design of the study, although appropriate for the objectives set, does not allow establishing causal relationships between the variables evaluated, limiting the ability to determine whether soft skills levels influence organizational performance or if, on the contrary, they are the result of work experiences and contexts. This limitation suggests the need to develop longitudinal studies that allow examining the evolution of soft skills over time and their relationship with objective indicators of organizational performance, thus providing more solid evidence on the underlying causal mechanisms.

Second, the sample size (n = 88), although adequate for the statistical analyses performed, limits the ability to perform

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more complex analyses, such as structural equation models or confirmatory factor analyses, and restricts the generalization of the findings to other populations in the Ecuadorian aquaculture sector or to other productive contexts. Likewise, the imbalance in the age distribution, with 81.8% of participants in the 21-30 age group, limits the ability to make robust age comparisons and to explore the interactions between sex and age in the configuration of soft skills. Future research could expand the sample size and seek a more balanced distribution by age groups, as well as include participants from different regions of the country or from different subsectors of the aquaculture industry, to assess the generalizability of the findings.

Thirdly, the exclusive use of self-perceptions as a method of assessing soft skills constitutes a significant limitation, given the potential social desirability bias and the tendency to overestimate socially valued skills. Future research could incorporate complementary assessment methods, such as hetero-assessments by supervisors or peers, as well as behavioural assessments based on the observation of specific behaviours in real or simulated situations, which allow self-perceptions to be contrasted with external perceptions and to obtain a more objective approach to the development of the assessed competencies. Triangulation of information sources would help mitigate the biases inherent in self-perception measurements and provide a more complete and accurate picture of the soft skills of the sector's administrative staff.

Finally, the need to deepen the analysis of the contextual and organizational factors that modulate the development of soft skills in the aquaculture sector is projected, including variables such as organizational climate, leadership style, talent management policies and professional development opportunities. Future research could address how these factors interact with individual characteristics to influence soft skills levels, as well as explore the relationship between assessed behavioral competencies and objective indicators of organizational performance, such as productivity, innovation, and talent retention. Likewise, it is suggested that studies be carried out to evaluate the effectiveness of specific training interventions for the development of soft skills in the sector, through experimental or quasi-experimental designs that allow determining the impact of structured training programs on the competencies evaluated, thus contributing to the design of evidence-based strategies for the strengthening of human talent in the Ecuadorian aquaculture industry.

5.- Conclusion.

5.1. Synthesis of findings

The objective of this research was to examine the soft skills present in the administrative staff of the Ecuadorian aquaculture sector and the professional development strategies implemented by the leading companies in the sector in the city of Guayaquil. The findings obtained allow us to conclude that the administrative staff of the sector presents high levels of self-perception in all the dimensions evaluated, with means ranging from 4.03 for integrity to 4.29 for problem solving, on a Likert scale of 1 to 5 points. This pattern of results suggests that participants perceive a solid development of behavioral competencies, particularly those related to analytical capacity, group collaboration and effective communication, competencies that are critical for performance in a sector characterized by the need for rapid response to operational and health contingencies, as occurs in the Ecuadorian aquaculture industry.

The reliability analysis of the measurement instrument confirmed its excellent internal consistency, with Cronbach's alpha coefficients exceeding 0.70 in all dimensions and reaching 0.944 for the total questionnaire. The problem-solving dimension had the highest reliability ($\alpha = 0.938$), followed by communication ($\alpha = 0.920$) and leadership ($\alpha = 0.913$), while integrity, although with a more moderate coefficient ($\alpha = 0.724$), exceeded the minimum threshold recommended for basic research purposes. The correlation matrix revealed positive and significant associations between all dimensions ($p < 0.01$), with coefficients ranging from 0.452 to 0.839, confirming that the soft skills assessed constitute a system of interrelated competencies, where the development of one dimension is positively associated with the development of the others.

Comparative analysis by sex revealed that, although women obtained slightly higher mean scores in all dimensions, these differences did not reach statistical significance ($p > 0.05$), with effect sizes in the small range (Cohen's d between 0.16 and 0.28). This finding suggests that gender is not a determining factor in the self-perception of soft skills in the context of the Ecuadorian aquaculture sector, which supports the design of equitable professional development policies. The correlation patterns between dimensions remained consistent in the different population subgroups (by sex and age), which indicates the stability of the soft skills structure in different population segments and supports the validity of the measurement instrument for its application in diverse labor populations.

5.2. Scientific and technical contributions

The present study makes significant contributions to scientific knowledge in the field of soft skills in organizational contexts, particularly in the Ecuadorian aquaculture sector, a productive area of high economic relevance for the country where empirical evidence on behavioral competencies was limited. The research provides a systematic characterization of the soft skills profile of administrative personnel in the sector, identifying the most developed dimensions (problem solving, teamwork and leadership) and those with relatively lower levels (integrity), information that contributes to understanding the configuration of behavioral competencies in a specific productive context and that can guide the design of strategies for the development of talent aligned with the needs of the sector.

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From a methodological perspective, the study provides the validation of an instrument for measuring soft skills in the context of the Ecuadorian aquaculture sector, providing evidence on its psychometric properties in this specific population. The reliability coefficients obtained, which far exceed the acceptable thresholds in all dimensions, support the usefulness of the questionnaire for future research in the sector and provide a methodological basis for its application in other similar production contexts. This contribution is particularly relevant in the Latin American context, where the availability of validated instruments for the assessment of soft skills in specific productive sectors is limited, and where the adaptation of international instruments requires systematic validation processes that consider the cultural and contextual particularities of the population evaluated.

The study also contributes to the knowledge about gender differences in soft skills, providing empirical evidence that suggests that, in the context of the Ecuadorian aquaculture sector, behavioral competencies are equally distributed between men and women. This finding contributes to demystifying stereotypical conceptions about gender differences in leadership skills and other behavioral competencies, providing evidence that supports the design of equitable professional development policies in the sector. Likewise, the consistency of correlation patterns between dimensions in different population subgroups is a finding that supports the universality of the soft skills structure and suggests that organizational socialization processes can modulate initial dispositions, promoting adaptive behavior patterns according to the demands of the work environment.

5.3. Theoretical implications and practical applications

The findings of the present study present relevant theoretical implications for the field of study of soft skills in organizational contexts. The consistency of the correlations observed between the five dimensions evaluated supports the conceptualization of soft skills as a system of interrelated competencies, where the development of one dimension is positively associated with the development of the others, suggesting the existence of competence transfer mechanisms that could be the subject of future research. This finding contributes to the theoretical debate on the nature of soft skills, supporting perspectives that emphasize their systemic character and integrated development, in contrast to approaches that conceive them as independent constructs. Likewise, the stability of correlation patterns in different population subgroups provides evidence on the invariability of the structure of soft skills in different population segments, which constitutes a contribution to the knowledge about the universality of these constructs and their applicability in diverse organizational contexts.

The practical implications of the findings are particularly relevant for the management of human talent in the Ecuadorian aquaculture sector. The results suggest that, although the administrative staff of the sector presents favorable levels of self-perception in all dimensions, there are areas of opportunity for the strengthening of specific competencies, particularly in integrity, which could be addressed through the design of ethical and behavioral development programs. The implementation of training programs aimed at strengthening soft skills could significantly contribute to improving the organizational climate, job satisfaction and talent retention, critical factors for the sustainability and competitiveness of the sector in an increasingly demanding global market. The absence of significant differences by sex in the soft skills assessed provides evidence that supports the design of equitable professional development policies, which recognize the strengths of all employees regardless of their gender.

From an industry perspective, the findings of the study provide valuable insights for aquaculture companies looking to strengthen their organizational capabilities through the development of their human capital. The identification of problem solving as the dimension with the highest level of development suggests that companies in the sector have trained personnel to face the operational and sanitary contingencies that characterize aquaculture activity. The positive and significant relationships between all dimensions suggest that training interventions aimed at strengthening a specific competence could have multiplier effects on other dimensions, thus optimizing investment in talent development and generating a broader impact on organizational performance. In a context where automation and artificial intelligence are constantly transforming the labor landscape, the strengthening of human skills that cannot be replicated by machines acquires strategic relevance, positioning companies that invest in the development of these competencies as leaders in their respective markets and contributing to the positioning of the Ecuadorian aquaculture sector as a benchmark of excellence and sustainability in the region.

5.4. Projections and lines of future research

Based on the findings and limitations of this study, several lines of future research are projected that would allow deepening, validating or expanding the results obtained. First, it is suggested that longitudinal studies be carried out to examine the evolution of soft skills over time and their relationship with objective indicators of organizational performance, such as productivity, innovation and talent retention, providing more solid evidence on the underlying causal mechanisms and overcoming the limitations of cross-sectional design. The implementation of quasi-experimental designs that evaluate the impact of specific training interventions on the development of soft skills would allow to determine the effectiveness of structured training programs and would provide evidence for the design of strategies based on empirical data.

Secondly, it is recommended to expand the geographical and sectoral scope of the study, including participants from different regions of the country where aquaculture activity is carried out and from different subsectors of the industry, such as larval production, fattening, processing and marketing, as well as to include operational and technical

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personnel to evaluate the differences in competence profiles according to the hierarchical level and the function performed. Expanding the sample size would allow for more complex analyses, such as structural equation models or confirmatory factor analyses, which would contribute to a deeper understanding of the structure and dynamics of soft skills in the sector.

Thirdly, it is suggested that complementary assessment methods be incorporated to contrast self-perceptions with external perceptions and to obtain a more objective approach to the development of the competencies assessed. The integration of heteroassessments by supervisors and peers, as well as behavioural assessments based on the observation of specific behaviours in real or simulated situations, would help mitigate the biases inherent in self-perception measures and provide a more complete and accurate picture of the soft skills of administrative staff in the sector. Finally, the need to deepen the analysis of the contextual and organizational factors that modulate the development of soft skills, including variables such as organizational climate, leadership style, talent management policies and professional development opportunities, is projected, which allows us to understand how these factors interact with individual characteristics to influence soft skills levels. thus contributing to the design of comprehensive strategies to strengthen human talent in the Ecuadorian aquaculture industry.

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8.- Appendix (Only if they exist)

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9.- References.

[1] M. A. Baque Cantos and A. L. Román Choez, "PROFESSIONAL SKILLS AND LABOR PERFORMANCE IN THE SUINAV COMPANY OF THE CITY OF GUAYAQUIL," State University of the South of Manabí, 2025.

[2] L. O. Cujilema Estrella, J. M. Morocho Ordoñez, M. D. R. Carvajal Parra and P. Mesa Villavicencio, «Competencies for food productive development in the UEF UNE-Ecuador-2023,» *Multidisciplinary Scientific-Academic Journal*, vol. 9, no. 2, 2024.

[3] L. P. Sucari Gonzales and J. K. Fuster Gómez, "Soft Skills and Leadership Styles of the Administrative Staff of the Provincial Municipality of Pasco – 2024," Daniel Alcides Carrión National University, 2025.

[4] H. A. Hernández, L. V. Taquez Hoyos, and D. C. Cortez Mosquera, "Use of Artificial Intelligence in Project Management," *RHS*, vol. 13, no. 2, 2025.

[5] J. A. Asanza Choez and J. J. Abad Moreira, "EFFECTIVE LEADERSHIP AND ITS INFLUENCE ON THE FULFILLMENT OF GOALS IN LEADERSHIP SOLUTIONS UXPS S.A," Universidad Estatal del Sur de Manabí, 2026.

[6] B. R. Quispe Saenz and I. B. Pomalaza Buendia, "Transformative leadership and the development of managerial competencies in the District Municipality of Santa Ana de Tusi, Daniel A. Carrión Province, Pasco Region 2023," Daniel Alcides Carrión National University, 2024.

[7] R. García Rodríguez and K. V. Morán Nieto, "Basic professional skills in the handling of vegetative material and the training of agricultural technical high school students.," State University of the South of Manabí, 2026.

[8] H. S. Gómez León, K. C. Jiménez Huamali and J. A. Ricaldi Baldeón, "Soft skills and work performance of the collaborators of the regional directorate of housing, construction and sanitation - Pasco, 2021," Daniel Alcides Carrión National University, 2023.

[9] E. Sarmiento Leon, R. Sarmiento Huacho and M. A. Ventura Janampa, "Gamification and the

Vol. 08 / Nº 02
e – ISSN: 3028-8533
ISSN – L: 3028-8533

development of Soft Skills in students of the fourth grade of secondary school of the Daniel Alcides Carrión Educational Institution of Chipipata, Yanahuanca – 2024," Daniel Alcides Carrión National University, 2025.

[10] M. Domínguez Vargas and C. P. Méndez Cruz, "Impact of Digitalization on the Efficiency of Cooperatives," *Transcend, accounting and management*, vol. 9, no. 27, 2024.

[11] G. A. Falcon Justiniano and L. D. C. Muñoz Cornejo, "Soft skills and the labor efficiency of servers in the District Municipality of Tinyahuarco Foundry, 2022," Daniel Alcides Carrión National University, 2024.

[12] V. Badenes-Plá and J. Molares-Cardoso, «Artificial intelligence in the face of the challenges of the fashion industry. Benefits and applications in the commercialization and marketing phase," *Razón y Palabra*, vol. 27, no. 118, 2023.

[13] A. Santamaría Barraza, "The Influence of the Use of Strategic Planning of Operational Capacity on the Operations Management of Logistics Companies in Panama," *Research and Critical Thinking*, vol. 12, no. 3, 2024.

[14] K. Mansilla-Obando and G. R. Llanos, "Adoption of Micromobility Applications in Chile: TAM and Collaborative Consumption," *RETOS.*, vol. 16, no. 31, 2026.

[15] P. Valle Venegas and A. E. Yancan Camahuali, "Soft skills of the teacher and the development of scientific literacy in students of the Educational Institutions of the secondary level of the district of Yanacancha - Pasco," Daniel Alcides Carrión National University, 2025.

[16] J. D. Villanes Casimiro, F. Sánchez Cárdenas and L. Rojas Victorio, "Soft skills and labor performance of the workers of the ECOSERM Rancas Company, 2024," Daniel Alcides Carrión National University, 2025.

[17] E. Haymacaña Moreno, L. A. Zapata Aspiazu, F. J. Duque-Aldaz, G. F. Cabezas García y R. A. Sánchez Ancajima, Time series modeling of secondary school enrollment in Ecuador: a Box–Jenkins analysis (1971–2023), Inquide, 2026.

[18] F. J. Duque-Aldaz, E. R. Haymacaña Moreno, L. A. Zapata Aspiazu y F. Carrasco Choque, «Prediction of moisture content in the cocoa drying process by simple linear regression.,» *Inquide*, vol. 6, nº 2, 2024.

[19] A. K. Lopez Marcelo, A. Huacho Cornelio and R. Cuevas Cipriano, "Management leadership program for the development of soft skills in teachers of the Integrated Educational Institution No. 31756 Ricardo Palma, Pasco – 2023," Daniel Alcides Carrión National University, 2024.

[20] A. D. Carhuachin Yapias, J. A. Vargas Lopez and Y. A. Paita Panez, "Soft skills and business competitiveness in the Mining Construction Company Environmental Affairs and Transport Huayllay S.A. – 2023," Daniel Alcides Carrión National University, 2024.

[21] D. K. Peña Ponce and D. J. Pozo Cacao, "SOFT SKILLS IN THE DEVELOPMENT OF COMMUNITY PROJECTS OF THE PARISH DECENTRALIZED AUTONOMOUS GOVERNMENT OF CASCOL," State University of the South of Manabí, 2026.

[22] G. E. Castro Rosales, A. D. Torres Alvarado, L. S. Zalamea Cedeño, F. J. Duque-Aldaz y F. R. Rodríguez-Flores, «Comprehensive Ergonomic Proposal for the Reduction of Musculoskeletal Risks in Soap Production: An Approach Based on Statistical Analysis and Postural Evaluation,» *Inquide*, vol. 7, nº 2, 2025.

[23] L. A. Zapata Aspiazu, E. Haymacaña Moreno, F. J. Duque-Aldaz, F. G. Cabezas García y R. A. Sánchez Ancajima, «ARIMA vs. Hybrid Models with Machine Learning for Forecasting Ecuador's GDP.,» 2026.

[24] V. E. García Casas and F. J. Duque-Aldaz, "Improvement of capacities in the management of handling, hygiene and biosecurity protocols for the cabins-restaurants of the Playas canton in times of Covid-19," *Journal of Science and Research, vol* . 8, no. 3, 2022.

[25] G. J. Morocho Choca, L. Á. Bucheli Carpio y F. J. Duque-Aldaz, «Fuel oil fuel dispatch optimization through multivariate regression using local storage indicators.,» *Inquide*, vol. 6, nº 2, 2024.

[26] F. Duque-Aldaz, E. Pazán Gómez, W. Villamagua Castillo and A. López Vargas, «Occupational health and safety management system according to ISO:45001 in cosmetic and natural laboratory,» *Scientific Journal Science and Technology*, vol. 24, no. 41, 2024.

[27] V. E. García Casas, F. J. Duque-Aldaz and M. Cárdenas Calle, «Design of a plan of good manufacturing practices for restaurant cabins in

Vol. 08 / Nº 02
e – ISSN: 3028-8533
ISSN – L: 3028-8533

the canton General Villamil Playas,» *Magazine De Las Ciencias: Revista De Investigación e Innovación*, vol. 8, nº 4, 2023.

[28] F. J. Duque-Aldaz, F. R. Rodríguez-Flores and J. Carmona Tapia, «Identification of parameters in ordinary differential equation systems through the use of artificial neural networks,» *Revista San Gregorio*, vol. 1, nº 2, 2025.

[29] F. J. Duque-Aldaz, J. P. Fierro Aguilar, H. A. Pérez Benítez and G. W. Tobar Farías, «Affectation of environmental noise to Educational Institutions; set of actions from Citizen Participation and Educational Centers," *Journal of Science and Research*, vol. 8, no. 2, 2023.

[30] J. E. Estiven Pincay Moran, J. F. Ramírez Salcan, A. F. López Vargas, F. J. Duque-Aldaz, W. Villamagua Castillo y R. Sánchez Casanova, «Evaluation and Proposal for an Environmental Management System in a Mango Plantation,» *Inquide*, vol. 7, nº 1, 2025.