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LATIN AMERICAN
JOURNAL OF BUSINESS MANAGEMENT

V.16, N.2, **Jul - Dez** | 2025 Taubaté, SP, Brasil **ISSN: 2178-4833**

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Data de recebimento: 22/06/2025
Data de aceite: 18/11/2025

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ABSTRACT

Port work has changed due to economic globalization processes and technological innovations. Further changes are taking place in ports with the advent of the Fourth Revolution, new professional skills and, among them, the so-called generic competences. Research's objectives were to investigate generic competences (1) self-perceived by port workers, (2) required by representatives of port companies and institutions that take part in the training and education of such workers, and (3) valued by union representatives linked to the port. Data collection was performed online and in person among the participants, workers at the Port of Santos (SP). Statistical data analysis was performed using correspondence analysis. Results indicated that port operation workers, port companies, and institutions engaged in port education and unions understand differently the importance of generic professional competences for port work. This mismatch of views can be a negative element for a better performance of the sector.

Keywords: **Professional competence. Work. Human resources. Port of Santos.**

RESUMO

O trabalho portuário vem se transformando em decorrência dos processos de globalização econômica e das inovações tecnológicas. Novas transformações estão ocorrendo nos portos com o advento da Quarta Revolução, novas competências profissionais e, entre elas, as chamadas competências genéricas. Os objetivos da pesquisa foram investigar as competências genéricas (1) autopercebidas pelos trabalhadores portuários, (2) requeridas pelos representantes das empresas portuárias e instituições que atuam na formação e educação desses trabalhadores e (3) valorizadas pelos representantes sindicais vinculados ao porto. A coleta de dados foi realizada on-line e presencialmente entre os participantes, trabalhadores do Porto de Santos (SP). A análise estatística dos dados foi realizada por meio da análise de correspondência. Os resultados indicaram que os trabalhadores da operação portuária, as empresas portuárias, as instituições que atuam na educação portuária e os sindicatos entendem de forma diferente a importância das competências profissionais genéricas para o trabalho portuário. Esse desencontro de visões pode ser um elemento negativo para um melhor desempenho do setor.

Palavras-chave: Competência profissional. Trabalho. Recursos humanos. Porto de Santos.

INTRODUCTION

Between the 19th and 20th centuries, the industrial productivity increase highlighted the need of the working-class training, which began to be investigated both from the point of view of the work it could perform and of capital (what it was worth or, in other words, the so-called human capital). Areas such as Psychology, Anthropology and Sociology evolved also due to this interest (Melo, 2021). More recently, the International Labour Organization (ILO), an agency related to United Nations, started to contribute to the discussion around labour focusing on multiple issues, like opportunities for jobs, inclusion, digital labour and technological development and its impacts on work organization (Vaughan-Whitehead et al., 2021).

The creation and wide diffusion of disruptive technologies in terms of productivity have marked the Industrial Revolutions. The first had as its emblem the advent of the steam engine, which revolutionized the industry in the 18th century. The Second Industrial Revolution occurred from the utilization of electricity in the 19th century (Penprase, 2018). According to Penprase (2018), these changes were responsible for a significant and never-before-seen increase in industrial production that was possible at the time. The Third Industrial Revolution, which took place in the 1980s and 1990s, was marked by the systemic impact of data processing, computing, and network communication (internet) technologies. For Schwab (2016), the Fourth Industrial Revolution, visible in the first decades of the 21st century, results from the integration and composition of the effects of exponential technologies such as biotechnology, artificial intelligence and nanomaterials. With technological innovations, changes to teaching and work also followed (Krause,

2019; Penprase, 2018).

Knowledge and its sharing have long been considered an important asset for organizational development and competitiveness, and, as the Fourth Industry Revolution technologies require learning, knowledge sharing and enhanced absorptive capacity to reap their full benefits (Feng et al., 2017; Manesh et al., 2021). For Sony and Naik (2020) Industry 4.0 will be a socio-technical system that contain social (human-related) and technical (non-human) aspects which will interact to pursue a common goal.

In the specific case of port work, its structure in the Brazilian context has changed as a response to the economic globalization and technological innovations in the production processes, a remarkable phenomenon occurred in late 20th century and early 21st century (Bezerra et al., 2005). Through Convention No. 137 of 1973 (Brasil, 1995), the ILO already provided for a global change in the port work scenario, mentioning as the main reasons the adoption of cargo units, with great emphasis on containers, introduction of horizontal transshipment techniques (roll on and roll off) and increased mechanization and automation of port operations.

The port work automation has been growing every decade, with the use of cranes and grabs, and has intensified over such time, reaching its peak upon the introduction of the container (Green, 2000). Full terminal automation was first implemented in 1993: the ECT Delta SeaLand Terminal at Maasvlakte 1, in Rotterdam, became the first terminal in the world to use Automated Guided Vehicles and Automated Stacking Cranes. In early 2022, 62 fully or partially (semi) automated container terminals were operating worldwide (KNATZ et al., 2022).

The "Work for a brighter future" Report from the ILO's Global Commission on the Future of Work (2019) indicated that new jobs will be created with the increasing advancement of technological automation, robotics, and artificial intelligence across various sectors of the economy. The adoption of Industry 4.0 can positively impact work flexibility and autonomy, leading to improved job performance, creativity, and innovation (Cassia et al., 2020, Malik et al., 2021).

A study conducted by The World Bank (2023) to monitor the impact of the Fourth Industrial Revolution on the labor market and to identify the potential scale of occupational disruption and strategies to empower declining occupations, investigated 45 economies worldwide and their over 11 million jobs, represented by 803 companies and 27 different sectors. The report pointed out that the

functions experiencing the most growth are concentrated in the areas of technology, digitalization, and sustainability. For Peña Zarzuelo et al. (2020), the ports entered the fifth stage of evolution towards a global scale, in which they were, together with the terminals, fully integrated into the Global Supply Chain. Therefore, the impacts of Industry 4.0 were also observed there, giving rise to the term "Ports 4.0", which represents a new dimension in the sector and demands different knowledge and skills from professionals (Mendes et al., 2020). The biggest difference between this new phase and the arrival of the so-called Ports 4.0 is the incredible automation of processes through new technologies arising from the Fourth Industrial Revolution, which is directly related to the need for workforce training in new scenarios. Strategic work themes in ports, such as logistics, security, traceability, cargo control, are being revolutionized or will soon be transformed with new technical possibilities.

As a result, the number of workers in operation per team was reduced, some functions were excluded, and greater qualification was required (Machin et al., 2009). Equipment operators, for example, have to learn to use technologies applied to 4.0 environments (Rauch et al., 2020). However, work processes will need new approaches, as will the professional development of these workers (Kaasinen et al., 2019; Krause, 2019). Frey (2019) believes that artificial intelligence, one of the technologies of Industry 4.0, will benefit long-term job generation, but he raises concerns that effective management of this implementation is necessary to avoid a "repeat of the past" when workers vehemently expressed concerns about machines taking their jobs in the 19th century. According to The World Bank (2019), in order for societies to benefit from the potential offered by technology, a new social contract centered around greater investments in human capital will be required, gradually providing universal social protection.

According to Silva and Bittencourt (2021), an education centered around knowledge acquisition loses its significance and gives way to a formative approach aimed at cultivating professional skills. This approach enables individuals to bridge the gap between the classroom and the working world while still in an educational setting. Freire Seoane et al. (2013) considered that work competence is not a probability of success while carrying out the work but a real and evidenced ability to "know how to do" things. Labor competence would thus be a productive capacity of the individual that is defined and measured as soon as the task is carried out in a given work context and not only of knowledge, skills, and attitudes. Such a vision is directly linked to what has been

called generic competences. Some examples of generic competences are: ability to work in a team, manage information, use technologies, and manage and plan time and tasks (Dubey, 2019; Freire Seoane et al., 2013).

The study of competences permeates multiple approaches, with no conceptual and epistemological consensus regarding the topic (Brandão; Borges-Andrade, 2007). There are many meanings related to the word "competence" and they are being mobilized in different contexts. However, competences have been associated with education since the 1970s in the United States of America (Van Der Klink et al., 2007). Thus, the literature shows several classifications of professional competences, such as process, technical, organizational, service and social competences (Zarifian, 1999); transversal, technical or moral (Swiatkiewicz, 2014); generic or transversal (Freire Seoane; Salcines Cristal, 2010; Freire Seoane et al., 2011, 2013).

According to Freire Seoane et al. (2013), it is not easy to define the concept of competences. Many efforts have been dedicated to this task, as well as ups and downs in the carrying it out from different perspectives (pedagogical, psychological, labor, and economic). The classification of Freire Seoane et al. (2011) was followed in this study, built from work carried out in the Tuning Project (2008), which emerged to mark the educational structures, curricula, and training in different higher education institutions in Europe. As a result of the creation of the European Higher Education Area and in the context of the so-called Bologna Process, Tuning systematized an approach on competences to modernize higher education and facilitate academic standardization and exchanges and meet the dynamics of the global labor market (Tuning Project, 2008).

The Tuning Project (2008) classified generic competencies into instrumental, interpersonal, and systemic. Instrumental competences are cognitive, methodological, technical, and linguistic skills. According to Freire Seoane et al. (2011), these competences are deemed necessary for understanding, construction, handling, and critical use in different professional practices. Interpersonal competences are related to social relationship skills and integration in different groups, as well as the ability to develop specific and multidisciplinary teamwork. Finally, systemic competencies are skills related to all systems, whether they are a combination of understanding, sensitivity, and knowledge. In general, these competencies refer to individual qualities and motivation at work.

In Brazil, the changes arising from the new technologies applied to ports were driven by Law No. 8,630 of 1993, known as the Port Modernization Law, which created a new exploration and port regulation model internationally knowns as landlord (Brasil, 1993). In recent decades, especially since the late 1990s, the Port of Santos, one of the largest in Latin America, has seen significant expansions and modernization, with the entry into operation of several private use terminals, specialized terminals for containers, fertilizers, solid bulk, sugar, and liquid bulk, in addition to new rail connections (Autoridade Portuária de Santos, 2020).

According to Law No. 12,815 of 2013, the functions considered as port work are the stowage, foremanship, block, conference, repair, and surveillance of vessels (Brasil, 2013). In 2021, according to the *Portos do Paraná* (2023) based on the Annual Report of Social Information of the Brazilian government, there were 43,205 port workers in Terminal Operations and Port Infrastructure Management in Brazil. If, before the modernization of ports in Brazil, workers were marked by kinship or friendship relationships, in which the work depended more on personalized information, favors or, even, the political condition (union), nowadays work recruitment for the port has changed, and now it is more based on the market dynamics and carried out by companies specialized in labor hiring (Maciel et al., 2015).

According to the Port Modernization Law (Brasil, 1993), revoked by Law No. 12,815 (Brasil, 2013), a regulation was in force with the attribution to the *Órgão de Gestão de Mão de Obra* (Ogmo) to promote training and qualification of the independent port workers, including for multifunctional actions. The law also established the obligation to implement Training Centers upon the initiative of the respective Port Authority Councils (CAPs; Brasil, 1993). However, it kept the resources that would finance such a training system under the management of the Management of Ports and Coasts. Some Training Centers were implemented in Brazilian ports, either by CAPs or by port administrations.

Many of these centers could give special courses funded by federal state or municipal government programs, as well as through partnerships negotiated with port companies. In this sense, it can be very positive to know the view of the various segments involved in the port sector on the importance of developing generic skills. Courses and training can be planned based on this diagnosis with the aim of harmonizing the actions of the different participants in the sector. This study aimed to investigate the valuations of generic professional competences made by the own workers, companies, unions, and

institutions that are engaged in port education, considering the Port of Santos (SP), and build importance profiles in the evaluation of each of these groups.

METHOD

The research had an observational character with a quantitative design and use of statistics for data interpretation. The locus was the Port of Santos, located in the cities of Santos and Guarujá (right and left bank, respectively), was responsible for 28% of Brazil's trade balance in 2019, handling more than 130 million tons a year and growing by 5% a year since 2009. As already mentioned, it is one of the largest ports in Latin America. The berths are spread over 16 km of quays with more than 100 km of rail network, 20 km of road access and 55 km of pipelines. It is just 70 km from Brazil's largest economic, financial and consumer center, São Paulo (Autoridade Portuária de Santos, 2020).

PARTICIPANTS

Three distinct groups of agents engaged in port work in the region took part in the study: (1) port workers in the loading and unloading operations; (2) professionals working in companies of the port segment and professionals from workers' training institutions and; (3) leaders of labor unions linked to the loading and unloading operations. In a non-probabilistic sampling, the inclusion criteria of the participants in the research were:

1. Port workers engaged in loading and unloading operations (approximately 3,000 workers in 2021): adults with at least a two-year experience in the activity; included in any of the activities listed in Law No. 12,815 (Brasil, 2013) or similar; and/or working in Port Terminals or as Port Operators carrying loads at the Port of Santos, under an employment relationship or any relationship with no legal link;
2. Professionals from companies or training institutions (a range of 67 companies and institutions): the company professionals came were from the Human Resources, Workplace Safety, or Operations Management departments; professionals from institutions engaged in workers' institutions were teachers or coordinators (leaders);
3. Leaders of labor unions linked to the loading and unloading operations at the Port of Santos (sample range of seven labor unions): a minimum two-year experience in the role of union leader and a minimum of three-year experience working in the port operation at the port.

INSTRUMENT

The instrument used was the Scale of Generic Competencies (ECG) by Freire Seoane and Teijeiro Alvarez (2010), adapted for the groups of participants. In addition to the 19 competences included initially in the ECG, three other generic competences were added ("communicating in another language", "using technologies", and "committing to the environment preservation"). Based on the Tuning Project for Latin America (Beneitone et al., 2007), such increase took current characteristics of port work into account, given its relationship with foreign trade, process modernization and equipment, and the fact that port activity predominantly takes place in a coastal environment.

A statement was placed for each group of participants, with relevant indications for the assessment survey (self-assessment, in case of workers; assessment required by the company, in case of company professionals; assessment required in the profession, for training professionals and union leaders). The statement presented the text: "Considering the port works listed in Law 12,815/13 (stowage, foremanship, lookouts, conference, block, and repair), and related works, mark the importance of the following competences for these works" (Brasil, 2013). The respondent must indicate, on a seven-point semantic differential scale, whether the competence is not necessary/important to necessary/important. Additional information was also requested, such as age, type of work (on board or land), and period of time in the role.

DATA COLLECTION AND ETHICAL PROCEDURES

1. Sampling was non-probabilistic in the search for:
2. the largest possible sample of port workers at the Port of Santos (approximately 3,000 workers); the largest possible sample of professionals from port companies (micro, small, medium, and large) and from the port operators, transport and storage companies, and port terminals, and professionals from institutions engaged in the education, training, and qualification of port workers at the Port of Santos (a total of 67 companies and institutions); and
3. the largest possible sample of union leaders (a total of seven labor unions referenced to the Port of Santos).

The invitations to take part in the research, including an explanation of the goals, ethical procedures, and clarification on the instrument to be used, were prepared as follows:

1. port workers from the Port of Santos (registration or enrollment with Ogmo) and port workers engaged in loading and unloading operations linked to companies were invited in person and virtually;
2. professionals from port companies and institutions engaged in the education, training, and qualification of port workers at the Port of Santos were also invited in person and via e-mails and phone calls. The port companies were those with the qualification provided for in Law No. 12,815/2013 or a Transport and Warehousing company, classified "H"[1] The institutions engaged in the training of port workers are those provided for in the last two Port Laws (BRASIL, 1993; 2013) and institutions accredited by the Brazilian Navy to provide training and updating courses to port workers; and
3. union leaders were invited from the seven labor unions linked to the Port of Santos, via e-mails and/or phone calls. For unions with a leaner structure (few departments and employees), the invitations were made in person.

Data was collected from April 2020 to July 2021 in two formats: face-to-face and online. The invitation to face-to-face (in-person) data collection was for those workers who were undertaking a course/training at *Centro de Excelência Portuária de Santos* (Cenep), a public institution engaged in port workers' training. As to the face-to-face collection, the questionnaire and the informed consent were made available on a printed paper.

The online collection format was used to reach union leaders and, mainly, port workers in the loading and unloading operations of the Port of Santos. The virtual invitation was made to workers who were carrying out Cenep's virtual training, through which contacts were made. As regards the online collection, the questionnaire and the informed consent were made available in an electronic form.

The study followed ethical standards of research with human beings. The Research Ethics Committee of the Universidade Federal de São Paulo (Opinion No. 3853012) approved the project. Participants who answered the questionnaire in person agreed to participate by signing the Free and Informed Consent Term in two copies. As regards the online collection, the agreement was given by marking the "I accept" option after submitting the online informed consent.

1 Transport, Storage and Mail, Division "52" - Storage and Auxiliary Transport Activities, according to the National Classification of Economic Activities version 2.0 formulated by the Instituto Brasileiro de Geografia e Estatística (2018) and with a lease agreement for an area for handling containerized, solid bulk and general cargo at the Port of Santos Complex in the capacity of Port Terminal, installed in the Organized Port and Private Use Terminal.

DATA ANALYSIS PROCEDURES

The data from the face-to-face collection was digitized in a Microsoft Excel spreadsheet, and the data from the online collection, already available in spreadsheet format through the online form tool, was added to that and systematized all together. Participants were characterized according to age (by the group mean), type of work (on board or land) and time in the job (by the group mean).

Data was analyzed by descriptive statistics to obtain means and standard deviation for each of the groups evaluated. The statistical Correspondence Analysis (ANACOR) was performed to assess possible associations between competencies and groups of participants. For this analysis, competence ratings were categorized into "not necessary/important" (values from 1 to 5 on the semantic differential scale and blank values) and "necessary/important" (values 6 and 7 on the semantic differential scale). The statistical program SPSS 25.0 (IBM) was used.

RESULTS

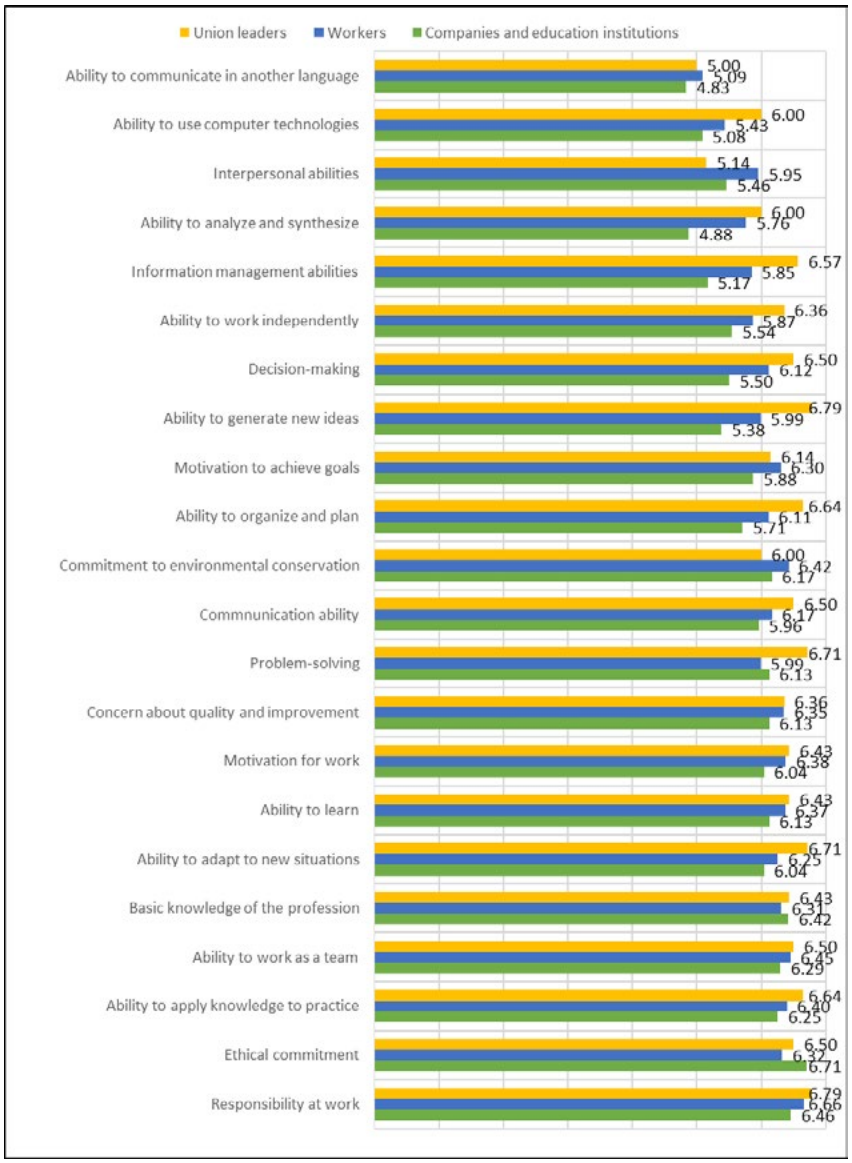
A total of 293 individuals participated in the research, 255 of which were eligible to compose the sample. Sample characteristics (number of participants, gender, type of work [for workers], average age, and average time working in the function) are shown in Table 1. Figure 1 shows the average valuation of generic competences for the three groups of participants. The segment of companies and institutions engaged in port education had the competence "ability to communicate in another language" with the lowest mean (4.83). The competences with the highest average ratings are in the segment of trade unionists, who presented the highest ratings for "capacity to work in a team" and "responsibility at work" (mean = 6.79).

Table 1 | Sample characteristics

		Workers (n = 251)	Companies and education institutions (n = 24)	Union leaders (n = 14)
Gender	Male	213	13	14
	Female	5	11	0
Type of work	On board	145	-	-
	On land	72	-	-
Mean age (years)		47.1 ± 10.3	40 ± 8.2	57.21 ± 10.10
Mean time in the job (years)		22.5 ± 10.4	8.8 ± 7.6	9.6 ± 8.7

Source: prepared by the authors (2025)

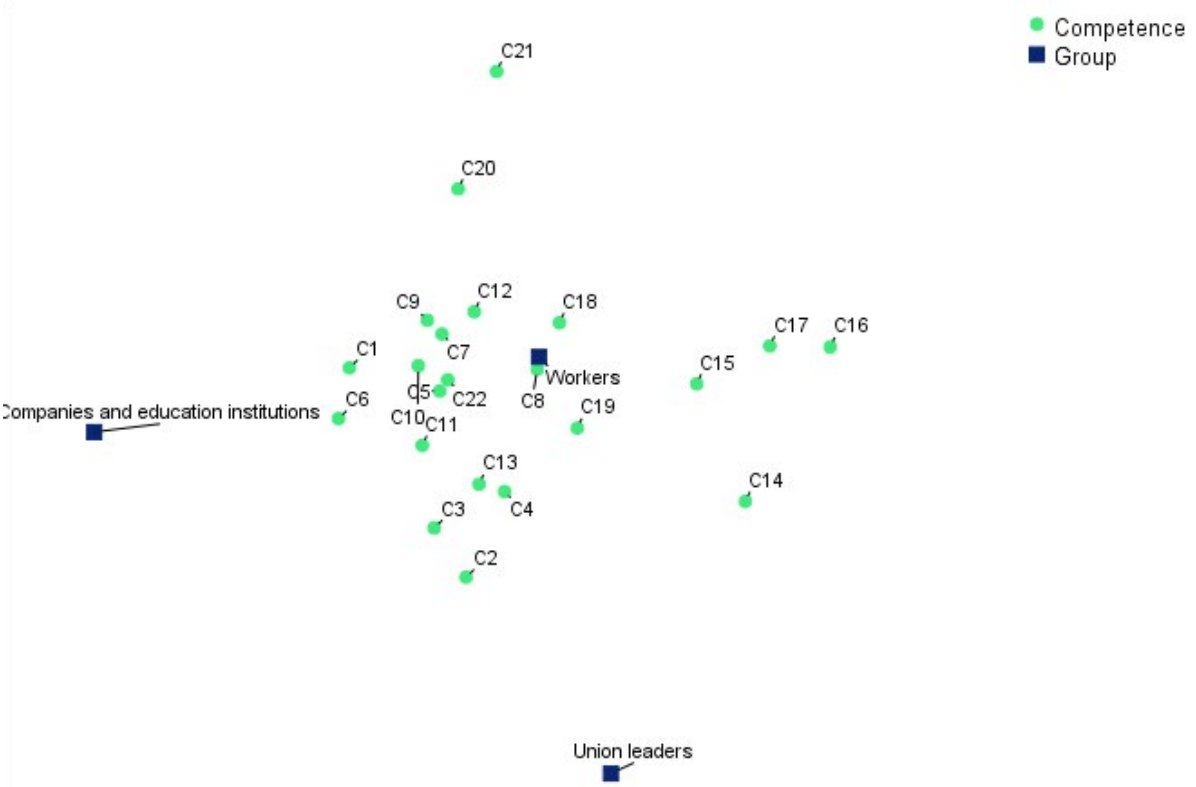
Figure 1 | Average valuation of generic competences for the three groups of participants



Source: prepared by the authors (2025)

The ANACOR test was conducted to verify possible associations between the importance of competences and the evaluated groups. The chi-square test indicated no association between these variables ($\chi^2 = 9.58$; $p = 1.000$). The inertia of the two dimensions explains 100% of the results. The joint distribution of competencies and the three groups evaluated (Figure 2) shows that each one has a different understanding regarding the importance of competencies. In the Figure 2, points that are close together are more associated; and points that are distant, little associated. It can be observed that all competences are more associated with the workers group (they are around it) than with the others.

Figure 2 | Joint distribution of competencies and the three groups evaluated



Note. C1 = Basic knowledge of the profession; C2 = Communication ability; C3 = Problem-solving; C4 = Ability to organize and plan; C5 = Ability to work as a team; C5 = Ethical commitment; C7 = Responsibility at work; C8 = Ability to learn; C9 = Motivation for work; C10 = Concern about quality and improvement; C11 = Ability to apply knowledge to practice; C12 = Motivation to achieve goals; C13 = Ability to adapt to new situations; C14 = Decision-making; C15 = Information management abilities; C16 = Ability to analyze and synthesize; C17 = Interpersonal abilities; C18 = Ability to work independently; C19 = Ability to generate new ideas; C20 = Ability to communicate in another language; C21 = Ability to use computer technologies; C22 = Commiment to the environmental conservation.

DISCUSSION

The purpose of this study was to know the evaluations of generic professional competences made by the workers themselves, companies, unions and institutions engaged in port training, limited to the activities of the Port of Santos (SP) and also to build profiles of importance while evaluating each of these groups. A total of 255 individuals took part in the research, being 217 port workers, 24 professionals from companies or linked to port training, and 14 union representatives. The vast majority of participants were men. The time of work in the port environment of these

participants ranged between 8 and 22 years.

Starting the discussion with the results obtained with the port workers, their self-assessments pointed to the competences “responsibility at work” and “ability to work in a team” as the most frequent and most important in the different analyzes carried out. Although port work has been widely researched historically, the diversity of objectives, methods, and contexts makes it difficult to establish comparisons. No self-assessment studies were found with port workers based on a model similar to that used here regarding generic competences. Considering this same model, Freire Seoane and Teijeiro Alvarez (2010) and Freire Seoane et al. (2013) discovered that “ability to learn” and “ability to work in a team”, above all, were the most mentioned competences in investigations carried out in Spain, although, the research focuses did not specifically consider certain sector of the economy like our research.

Still using the same competence scale, a recent study by Carvalho et al. (2021) with third-year undergraduate students from two private universities in Baixada Santista, the metropolitan region of the State of São Paulo where the Port of Santos is located, discovered that “responsibility at work” and “ethical commitment” were at the top of the answers, showing that, despite the very heterogeneous audiences and contexts of the studies, four of the 19 competencies of the scale were highlighted. Focusing on port workers, the book organized by Queiróz and Diégues (2020) discusses the changes and technological impacts in the sector, including the Port of Santos, from a critical perspective, attributing to the competences a sense of rupture and disaggregation of the historical ties of formation of the port working class. This does not favor comparisons either.

For companies and institutions engaged in port training, the competencies “ethical commitment” and “responsibility at work” obtained the highest scores and, as well as for the segment of workers, it is possible to say that further studies are required to establish parallels. However, it is possible to notice a certain recurrence of some of the competences, despite the diversity of samples and contexts. As regards the study by Freire Seoane et al. (2013), companies were consulted. Therefore, not necessarily dealing with companies in the port sector, the Spanish study pointed out “responsibility at work” and “ability to learn” as the competences most required by company representatives in that region, in this case, the province of Coruña. Thus, among the 19 competences

assessed, there was a coincidence in the highest value given to “responsibility at work”.

The work by Beneitone and Bartolomé (2014), based on data obtained by the Tuning Project across continents, is likely the most robust in terms of comparison data, as Tuning consulted graduates, students, employers, and academics in order to discuss the topic of global employability. Focusing on similarities and differences across continents, the authors realized that at least 16 competencies are global trends, while others appear more localized. Perhaps it is not by chance that “ethical commitment” appeared in this Brazilian study, as it is a competence that is included in evaluations in Latin America and not in other continents as something to be remembered.

For the union participants, the most important competences were, in order, “ability to work in a team,” and “responsibility at work”, reinforcing the impression of recurrence. Some of the results obtained in this group drew a lot of attention if analyzed more closely in comparison to the companies. The competence “ability to generate new ideas” ended up being valued higher among unions than among companies. For the former, this aspiration for more creative and autonomous workers makes sense.

However, for companies, in the context of the digital economy and all the technological transformations arising from these first decades of the 21st century, even accelerated by the COVID-19 pandemic (Savic, 2020), a greater appreciation of innovation as a driver of its development and competitiveness was expected (United Nations, 2015). It was also expected that they would demand competences more linked to worker autonomy. However, the result attributed to this competence was lower on the scale of scores, which motivates further investigation.

Another finding that drew our attention involves the competence “conservation of the environment”. Both companies and unions surveyed valued the item less than workers, which seems to suggest that the environmental issue may be incipient among unionists and managers in the port sector when compared to other topics, notably those more linked to work efficiency and ethics. Despite the strong discourse globally, the environmental issue paradoxically seems to be little remembered, and the study by Beneitone and Bartolomé (2014) shows that its position was among the lowest in the various continents, occupying the last place in Russia.

According to Peng et al. (2020), the concept of green ports seeks to increasingly bring sustainable development to port development in terms of port facilities and the mooring of ships that can use renewable energy sources. The authors refer to the energy consumption of ships in port as an inherent uncertainty, which is influenced by the arrival pattern of ships and the actual auxiliary power. Ports need to reduce operating time to prevent the ship from being docked for many days at specific points made available for this purpose, known as berths, close to cities. Likewise, they need to provide clean energy to ships. The external characteristics of the port also impact the energy consumption of ships. For example, the allocation of berths and the scheduling of quayside cranes greatly affect the duration of berthed ships and, consequently, the energy consumption of ships (PENG et al., 2020). In this sense, technological innovation in port operations is aligned with the need not to impact cities and the local environment with the emission of gases from equipment and ships that pollute the atmosphere, leaks that affect the marine and estuarine ecosystem, particulates originating from in the loading, unloading and storage of cargo, sometimes dangerous cargo.

While analyzing the results of ANACOR, the competences investigated in this research associated with each other, as it was possible to see in the distribution of competences, except for “communicating in another language” and “using technologies”, which were far from the more general set of competences (although it does not seem logical if one considers that the port system is part of the global supply chain). With huge participation in the country’s international trade, this result was also indicated in the study by Beneitone et al. (2007), and suggests that, in case of the Port of Santos, it is possible that the stakeholders evaluated here are not ready to act in the context of Ports 4.0.

While looking at the joint distribution of competences and groups evaluated, and not exclusively the most valued (since there was good convergence between the segments), it is clear that these are not in tune with the competences that would be important for the port work. “Tune” here is used in the same sense brought by the Tuning Project. The result is reflected in the performance of unions as representatives of the collective interests of workers, as well as regards to educational institutions that are not aligned with their real training needs. In short, the data showed that port operation workers, port companies, institutions engaged in port training and unions,

roughly speaking, differently understand the importance of generic professional competences for these operational workers, specifically converging on the low score of “communicating in another language”. The mismatch of views on competences between the different segments surveyed, labor, union, and training, and which are related with the activities of the Port of Santos, can be a negative element for a better performance of the sector. At this point, new studies are desirable and even possible interventions with different segments that can promote better integration.

Focusing in its limits, the study presented many difficulties in terms of data collection. As regards the port workers, collection was impaired by the COVID-19 pandemic restrictions imposed on work during the research period and, consequently, on the training and updating courses that would favor contacts with potential participants of the study. As to union representatives, some signs of resistance to participation were observed, not always explicit, despite the explanations given relating research ethical norms. On the other hand, the segment of port companies and institutions engaged in port worker training was not very permeable to participation, opposite to what is suggested by the research of Freire Seoane et al. (2013), it was little permeable to participation. In addition to it, different understandings of the meanings of generic competencies can be a factor that negatively impacts the use of ECG.

The low accessibility to the research interface and the small integration between port-sector companies and universities led to study limitations regarding the scope and reach of a larger and more representative sample. Despite these limits, this study is expected to encourage and serve as a comparison so that other researches emerge to shed some light on generic professional competences in the context of Brazilian port work.

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