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Workplace Engagement Networks in The Energy Sector Around Nearshoring

Abstract:

Nearshoring presents a market of opportunities characterized by relationships built on trust that imply varying degrees of commitment. However, within the energy sector, this progression is not entirely apparent. Therefore, this study aims to establish a learning network focused on work commitment in nearshoring. An exploratory, transversal, and correlational analysis was conducted with 100 students. The results indicate that the process is centered around opinions, beginning with proposals and culminating in emotions. While existing literature suggests a cognitive framework for work commitment, this study instead identifies a perceptual, decisional, and situational framework where opinions take precedence.

Key Words: labor commitment; nearshoring; neural networks; energy sector

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Introduction:

Nearshoring in the oil and gas industry involves moving or outsourcing business operations to nearby countries to take advantage of strategic advantages (Guedes et al., 2021). Integrating operations in new territories may require reorganizing teams, hierarchical adjustments, and establishing new decision-making processes. Incorporation of nearby subsidiaries with central operations, ensuring efficient communication. Operations in nearby countries may need a certain degree of autonomy to adapt to local markets. Technical and cultural training for local employees, ensuring alignment with industry standards. Since the oil and gas sector requires advanced technical skills, nearshoring can seek specialized talent in nearby countries. Provide incentives to retain staff who may be essential in the transition and execution of nearshoring strategies. Incorporation of values and work practices of the host country, avoiding cultural clashes.

Nearshore operations must align with the core organizational culture (Slepniov et al., 2013). Leveraging the cultural diversity of nearshore staff to foster innovation. Implementing technological platforms that allow coordination of operations between main and nearshore headquarters—improving supply chains to integrate activities across regions efficiently. Ensuring cybersecurity and physical security standards at new operating sites. Ensuring operations comply with local and global environmental protection regulations. Nearshoring can facilitate diversification into clean energy in countries with greater regulatory flexibility. Adapting practices to minimize environmental impact in new operations.

Reducing operating costs through more competitive wages or tax incentives in nearby countries (Espaillat, 2022). Assessing the impact of currency fluctuations, taxes, and potential relocation costs. Initial construction costs, technology, or facilities needed for oil and gas operations. Establishing links with local authorities to obtain permits, incentives, and support for nearshoring and building trust in local communities through social and economic projects and integrating local suppliers and partners into the value chain. Nearshoring can be an opportunity to incorporate solutions such as IoT, AI, and predictive analytics into operations. Possibility of quickly adapting to regional or global demand and establishing innovation centers close to new operations to accelerate technological developments.

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In the context of nearshoring, work engagement in the oil and gas energy sector takes on relevance due to the challenges and opportunities that this strategy poses (Guedes & Pereira, 2015). Adopting nearshoring involves organizational restructuring that can generate uncertainty and affect the perception of job stability. Workers may feel more engaged if they are included in the transition to this new strategy. Nearshoring in this sector requires specific technical skills (e.g., operation of advanced machinery, knowledge of renewable energy). Continuous training programs increase engagement by offering opportunities for professional growth. Implementing economic incentive policies and professional recognition can increase employee motivation and loyalty, especially in key roles. Incorporating diverse work cultures and promoting a collaborative environment in nearshore operations fosters engagement and a sense of belonging. Since the oil and gas sector can be risky, ensuring safe working conditions and emotional well-being is essential to maintaining high levels of engagement.

Nearshoring often involves collaborating with local communities. Involving workers in corporate social responsibility projects increases their pride in the company (Foukolaei et al., 2024). The possibility of working in different locations or flexible shifts, characteristic of nearshoring, can improve job satisfaction. Introducing advanced technological tools and digital systems that facilitate daily work promotes efficiency and increases engagement by reducing repetitive tasks. Highlighting the energy sector's contribution to sustainable development and the energy transition can inspire greater employee engagement.

If not managed properly, the difference in salaries and working conditions between nearshore and headquarters employees can lead to dissatisfaction (Hunya & Jovanović, 2021). It is essential to design equitable structures to avoid conflicts. Integrating workers from different cultures and work practices can be challenging if an environment of respect and understanding is not fostered. Some employees may perceive nearshoring as threatening their job security or established organizational values. New structures resulting from nearshoring can confuse roles and responsibilities, affecting engagement if not communicate.

Employee engagement is critical to an organization's success and productivity. An employee engagement model can include several elements that create a positive and motivating work environment. Effective communication fosters open and transparent communication at all levels of the organization (Guedes & Pereira, 2017). This involves sharing relevant information about the company, its goals, challenges, and achievements. It is also important to actively listen to employees' concerns and suggestions. Informing employees about the benefits and goals of nearshoring creates transparency and trust. Offering physical and mental health programs, especially in a demanding sector, demonstrates the organization's commitment to its employees.

A strong organizational culture develops and promotes a company culture that values respect, collaboration, innovation, and employees' personal and professional growth (Zieris & Salinger, 2013). This can include training programs, team-building activities, and performance recognition. Leverage the cultural diversity inherent in nearshoring to enrich organizational culture and foster teamwork.

Inspirational leaders should be role models who inspire and motivate their teams (Merino et al., 2021). This involves setting clear goals, providing constructive feedback, recognizing achievements, and supporting employees' professional development. Empower local leaders to act as company ambassadors and promote values aligned with the strategic objectives of nearshoring.

Work-life balance promotes a healthy balance between employees' work and personal lives (Lieb & Lieb, 2015). Offer flexibility in work schedules, remote work options, and wellness programs promoting physical and mental health. Professional development opportunities for employees may include training programs, challenging project assignments, mentoring programs, and clear career paths. Recognizing and rewarding employees' exceptional effort and performance fairly and equitably may be through bonuses, promotions, awards, or simply words of thanks and appreciation.

A safe and healthy work environment ensures a safe and healthy work environment where employees feel protected and supported (Colamatteo et al., 2022). This involves complying with workplace safety regulations, providing adequate equipment and resources, and promoting workplace wellness. The involvement and participation of employees in decision-making and problem-solving related to their work and the organization's overall functioning.

By implementing this employee engagement model, organizations can create a positive and motivating work environment that increases employee commitment, satisfaction, and performance (Jakšič & Fransoo, 2018). It is important to adapt this model to the specific needs of each organization and maintain a constant focus on continuous improvement (Table 1).

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Dimension of work commitment	Positive impact of nearshoring	Challenges of nearshoring
Intrinsic motivation	- Increase in local professional development opportunities.	- Risk of demotivation due to possible cultural differences.
Employee-company relationship	- Creating jobs in the region strengthens the sense of belonging.	- Possible perception of dependence on foreign markets.
Recognition and rewards	- Improvement in salaries and benefits by attracting foreign investment.	- Difficulty balancing local vs. global salary expectations.
Autonomy and trust	- Increased responsibility and autonomy in technical and managerial roles.	- Possible breaches of trust due to changes in hierarchical structures.
Organizational culture	- Fusion of cultures can enrich work practices.	- Cultural adaptation and possible conflicts in working styles.
Development opportunities	- Access to training in global technologies and methodologies.	- Possible lack of alignment with specific local needs.
Job stability	- Job creation in industrial and technological sectors.	- Risk of temporary or outsourced employment.
Collaboration and teamwork	- Multicultural teams foster innovation.	- Language barriers or time differences can affect communication.

Table 1: *Comparison of the dimensions of work commitment*

In nearshoring, employee engagement in the energy sector depends on how organizations manage the organizational and cultural changes associated with this strategy (Stott & Murray, 2022). A well-planned implementation that prioritizes equity, professional development, and communication can turn nearshoring into a source of motivation and loyalty for employees. The ethical debate on energy security around nearshoring is crucial in a global context where sustainability, social justice, and economic interests come into play.

Nearshoring reduces dependence on distant or geopolitically unstable sources, improving energy resilience (Macias-Garza & Heeks, 2006). Installing energy infrastructure in nearby countries boosts the local economy and creates jobs. However, economic benefits can be concentrated in multinational companies, leaving few tangible benefits for local communities. Sometimes, energy projects in host countries prioritize energy exports rather than ensuring equitable access for local populations.

Producing energy closer to the consumer can reduce greenhouse gas emissions associated with fossil fuel transportation. Nearshore companies can implement more modern and less polluting technologies than in other countries (Akbari, 2024). Energy-intensive operations, such as hydrocarbon extraction, can cause environmental degradation in host countries. Communities near energy projects often bear the most remarkable environmental burden without receiving significant benefits. Nearshore projects create job opportunities for local communities, improving their quality of life (Ciabuschi et al., 2019). Technical training and investment in human talent are valuable opportunities for host countries. Without proper regulation, workers in nearshore operations can face low wages, unsafe conditions, and a lack of labor rights. The construction of energy infrastructure may involve the forced displacement of vulnerable populations.

Nearshoring promotes strategic alliances between countries to improve shared energy security (Ponce et al., 2024). Host countries can use nearshoring to strengthen their energy sector and economy. In many cases, foreign companies control energy resources instead of host countries. Excessive focus on nearshoring may limit countries' ability to develop independent energy policies.

Nearshoring can facilitate the adoption of cleaner energy solutions that benefit future generations. Energy access is protected for future generations by reducing dependence on specific resources. Intensive extraction can deplete natural resources and leave a legacy of pollution for future generations. Current generations may benefit at the expense of future generations, who will face environmental and social impacts.

The presence of multinational companies can raise standards in host countries (Narang, 2024). These collaborations can promote higher standards of transparency in energy management. The complexity of nearshore agreements can lead to corrupt practices that harm local communities. Many decisions related to nearshoring are made without consulting affected communities.

The ethical debate on energy security surrounding nearshoring raises fundamental tensions between economic development, social justice, environmental sustainability, and human rights (Ullah et al., 2021). Ethical implementation of nearshoring requires transparency and inclusive governance, commitment to labor and environmental rights, and International collaboration that prioritizes equity. If these tensions are not appropriately managed, nearshoring can exacerbate existing inequalities.

However, if managed with an ethical lens, it can catalyze a more just and sustainable energy future. Despite lacking a model reflecting work engagement dimensions in nearshoring, this paper will analyze experts' feelings and opinions.

Are there significant differences between the theoretical structure of work commitment reported in the literature and that observed in this work?

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Since nearshoring policies aim to acculturate the workforce, work engagement would be a sequential indicator of the new work culture. Therefore, significant differences are expected between the engagement structure reported in the literature and the observations made in this paper.

Method:

Design. A cross-sectional, exploratory, documentary study was conducted with 100 students and experts selected for their professional commitment to nearshoring.
Instrument. The Delphi Nearshoring Commitment Questionnaire was used (see Appendix A). It includes 1) Perceptions regarding Nearshoring, 2) Challenges of Nearshoring, and 3) Commitment Strategies. The instrument's reliability ranged between 0.723 and 0.782; the validity ranged between 0.327 and 0.523. The sphericity test was significant, and the adequacy test was more incredible than 0.600.
Procedure. Experts were selected based on their H index registered in Google Scholar. They were sent an invitation letter specifying the project's objectives and responsibilities and the participants' functions. They were informed that their participation would not be remunerated and that their responses to the instrument would not be disclosed or kept.
Analysis. The centrality, clustering, and structuring coefficients were estimated to contrast the hypothesis. Values close to unity were assumed as evidence of non-rejection.
The calculation of the average is:

$$\rho = \frac{\sum_{i=1}^{N} \omega i - \chi i}{\sum_{i=1}^{N} \omega i}$$

P: Weighted average of sentiment or opinion.
N: Total number of experts (in this case, N -30).
xi : Value of the response of expert i (score between 1 and 5).
wi : Weight assigned to an expert I (same for all, i.e., wi-=1).

Dispersion analysis assesses variability in opinions:

$$\sigma = \sqrt{\frac{\sum_{1-1}^{N} (\chi i - \chi)^2}{N}}$$

x : Average of the opinions.
xi : Individual opinion.

The decision tree analysis was calculated with the expected value:

$$VE = \sum_{i=1}^{n} Pi * Ui$$

Pi : Probability of occurrence of outcome i .
Ui : Utility or benefit associated with result i.
n: Total number of possible outcomes.

The decision node was set with the expected value and the optimal decision:

VE_1, VE_2, ..., VE_n

The model includes:
Strategies: Implement training programs, salary incentives, and improvement in labor infrastructure.
Technological training (E1)
Salary increase (E2)
Possible results: High job satisfaction, low turnover, demotivation, cultural conflicts.
Positive result (R+): Increase work commitment (+20 points on a scale).
Neutral result (R0): No notable impact (0 points).
Negative result (R-): Demotivation (-10 points).
Probabilities: Estimates based on data or assumptions (e.g., strategy success).
Utility: Impact on metrics such as productivity, level of engagement, or talent retention.

Results:

The centrality analysis consists of four parameters that indicate the degree of hegemony or prevalence of a node considered central concerning nodes assumed to be peripheral (Fig. 1). The results indicate that expectations are the axes on which the relationships between nodes are transferred.

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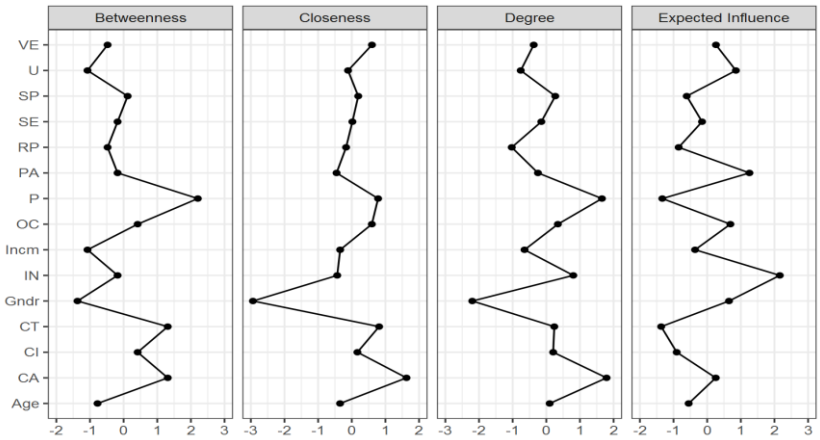

Figure 1: *Centrality of employee engagement in the energy sector and the context of nearshoring*

The clustering analysis includes four parameters that establish the configuration of the learning network around work engagement versus nearshoring (Fig. 2). The findings show that feelings are the axis around which the other nodes revolve.

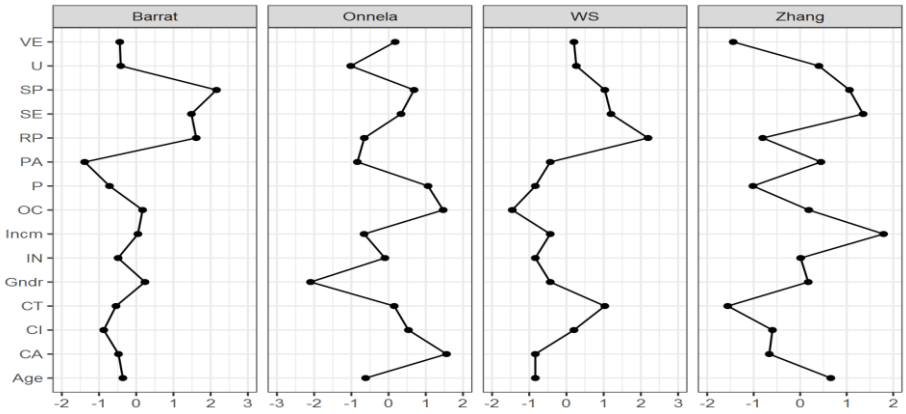

Figure 2: *Clustering of energy sector labor commitment in the context of nearshoring*

The neural structure analysis suggests the beginning and end of the learning process of work engagement in the energy sector and the face of the challenge of nearshoring (Fig. 3). The results suggest that the beginning and end of learning of work engagement are established in the dimension of opinions.

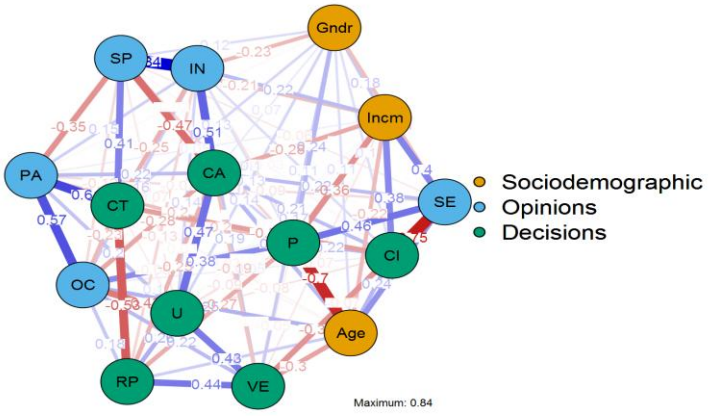

Figure 3: *Structure of work commitment around nearshoring*

The centrality, clustering, and structuring coefficients suggest that the hypothesis regarding significant differences between the theoretical and empirical structure of labor commitment in the energy sector versus nearshoring is not rejected.

Discussion:

This work's contribution to the state of the art lies in establishing a neural network model to reveal the surveyed sample's learning regarding work engagement versus nearshoring. The findings suggest that this learning process is reflected in opinions

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rather than decisions or sociodemographic conditions.
Emotional work engagement is based on employees' emotional connection with their work and organization (Fratocchi & Mayer, 2023). Emotionally engaged employees show enthusiasm, passion, and dedication toward their work tasks. They feel motivated, experience a sense of belonging, and have a strong emotional bond with the organization.
Cognitive work engagement refers to employees' conscious and rational attachment to their work and the organization (Rüssel & Ulmer, 2010). Cognitively engaged employees are convinced of the importance and value of their work, believe in the organization's goals and values, and clearly understand their job roles and responsibilities.
Behavioral work engagement manifests through employees' actions and behaviors (Canosa, 2024). Behaviorally engaged employees are actively involved in their work, show high effort, devote extra time and energy, and are willing to expend extra effort to achieve organizational goals.
Normative work commitment refers to employees' sense of obligation or responsibility toward their organization (Lieb & Lieb, 2016). This commitment relates more to social norms and external expectations than an emotional bond or strong identification with the organization. Normatively committed employees may remain with the organization due to a sense of loyalty, duty, or social pressure.
About the state of the art, where cognitive dimensions of work commitment prevail, this work suggests that this commitment is verbalized from the beginning to the end of the process. Thus, this work's area of opportunity lies in establishing the relationships between the predominant dimension of opinions concerning the decisional and situational dimensions.

Conclusion:

This study aims to develop a neural network focused on understanding work commitment within the surveyed sample. This process is reflected in the perspectives gathered throughout the research. However, the area for improvement lies in examining the cognitive, decisional, and situational sociodemographic dimensions. By incorporating these dimensions, the study anticipates scenarios of uncertainty, allowing the surveyed sample to reveal their perceptual degrees of incommensurability, uncontrollability, and unpredictability related to nearshoring.

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