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Article

The impact of the soft skills approach to human resources on building job competencies: Evidence from the petroleum sector

Ali Abdullah Alhijris[1], Mohamed Mostafa Albaz[2,*]

[1] Unit of Scientific Research, Applied College, Qassim University, Qassim 51425, Saudi Arabia
[2] Department of Business Administration, Faculty of Commerce, Suez Canal University, Ismailia 41522, Egypt
*** Corresponding author:** Mohamed Mostafa Albaz, dr.mohamedalbaz@hotmail.com

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Abstract: The business environment in the modern era is witnessing numerous Intellectual Changes, Technological developments, and increasingly Complex Situations, which has led to a need for effective Leadership in the Business Sectors. This leadership plays a role in transforming companies into giant corporations that serve as a true foundation for enhancing and improving Job Competencies (JC)., The study aimed to analyze the impact of the Soft Skills approach in Human Resources (analytical and critical thinking, decision-making and problem-solving, planning and organization, teamwork) on developing Job Competencies (productivity, technical, managerial) in Petroleum Sector Companies in Egypt. The researchers employed the descriptive-analytical method to study the phenomenon, conducting the study on stratified random samples consisting of 379 managers and a sample of 382 employees from Petroleum Sector Companies. The study utilized the SPSS and AMOS Software Programs. The study found statistically significant differences at the (0.01) level between the average scores of managers and employees regarding soft skills in human resources and job competencies, with managers scoring higher. Additionally, the study revealed a statistically significant direct causal effect at the (0.01) level of Human Resources Soft Skills on Job Competencies in Petroleum Sector Companies., Finally, a proposal was developed for enhancing Job Competencies in Petroleum Companies in Egypt based on the application of human resources Soft Skills, alongside future research directions and practical implications.

Keywords: the soft skills approach to human resources; job competencies; petroleum sector companies

1. Introduction

In recent years, the emergence of globalization, IT, and communication technology has led to changes in the administrative, economic, political, and cultural structures of companies worldwide (Singh and Tiwari, 2020). The changes in business, new technologies, increased competitiveness, and dynamism have led to the need for new skills (Dolce et al., 2020). Additionally, the fourth industrial revolution has significantly altered the job market, prompting many companies to seek employees with practical skills rather than cognitive skills (Qizi, 2020). Businesses have shifted their focus towards promoting the use of soft skills. These skills encompass analytical and critical thinking, teamwork, planning and organizing, communication, decision-making and problem-solving, interpersonal, and risk management. These competencies are essential for developing the behavioral skills in human resources that are vital for the success of any company. (Zainal et al., 2022).

Modern management in business companies has increasingly focused on adopting the competency-based approach, which relies on a comprehensive scientific

framework. This approach utilizes tools that support decisions related to productive, technical, managerial, and digital performance. The competency-based approach is one of the contemporary methods focused on enhancing the performance levels of human resources to address the challenges faced by companies, which may include a decline in the performance levels of production staff, weak digital management systems, and a deterioration in technical standards. In addition to the ability to envision forecasts that contribute to business execution, the industrial sector today requires changes in the labor market, necessitating human resources with creative competence and the strategic thinking necessary to manage complex manufacturing systems for continuous development and improvement in the industry.

The petroleum sector is a crucial strategic industry that creates significant added value from natural resources. This contributes to the increased growth rates of the national economy. The sector includes various activities such as the exploration, production, and refining of oil and natural gas, as well as the transportation, distribution, and marketing of petroleum products. These activities serve as a major and attractive source of foreign investments. In recent years, the petroleum sector has faced numerous challenges, including the ability to meet the local market's energy supply demands, maintaining environmental standards, developing and enhancing the efficiency of human resources to build job competencies within the sector, gradually reducing subsidies on petroleum products, modernizing and updating the sector to keep pace with contemporary requirements (Official website of the Ministry of Petroleum and Mineral Resources,(www.petroleum.gov.eg). Consequently, it has become evident to decision-makers in petroleum sector companies that building the job competencies of human resources is essential due to its strategic impact, which enhances the required level in production, management, technical, and financial performance.

The significance of this study is underscored by the fact that, although there are research and studies that have addressed the topics of the soft skills approach in human resources and job competencies, there is a scarcity of studies that have explored the relationship between them. Moreover, there are no studies that have specifically examined this relationship within the petroleum sector companies in Egypt, In addition, the study aims to apply the research topic within petroleum sector companies, which is a strategic sector in the Egyptian economy. The study seeks to understand all areas of the sector, including exploration, production, and manufacturing, which maximize the added value across all economic sectors. The study also aims to examine the impact of the soft skills approach in human resources on developing job competencies within the petroleum sector companies under study. It seeks to provide a set of results and recommendations for building job competencies (productive/technical/managerial) in these companies based on the influence of soft skills. Additionally, the study aims to propose a framework for leveraging soft skills to develop job competencies in the petroleum sector companies being analyzed. It has been found that the level of interest among petroleum sector companies in applying soft skills in human resources is low, which negatively impacts the development of job competencies within these companies. Consequently, the research problem can be formulated as follows: What is the impact of the soft skills approach in human resources on developing job competencies in the petroleum sector companies under study?

2. Theoretical framework and literature review

2.1. Soft skills for human resources

The soft skills approach in human resources emerged in the early 2000s, following environmental developments related to expertise and the ability to execute strategic tasks for businesses. Due to the interest of those involved in administrative and economic affairs in the concept of soft skills, it has been identified as a crucial approach that aids in achieving success and prosperity in any company. On the other hand, the lack of these skills among human resources leads to increased operational costs, reduced quality levels, and poor technical performance. Therefore, soft skills are those abilities that distinguish an individual from others and are related to one's personality and behavior to achieve professional success in the workplace (Parlamis and Monnot, 2019).

The study by Lamri and Lubart (2023) explored concepts related to the soft skills approach and its characteristics, identifying the dimensions of soft skills, which include teamwork, analytical and critical thinking, decision-making and problem-solving, communication, and lifelong learning. The statistical analysis revealed a statistically significant positive impact of these dimensions of soft skills on the human resources under study. The study by Zainal et al. (2022) highlighted the Malaysian government's focus on supporting the use of essential soft skills for employment, which include teamwork, decision-making and problem-solving, analytical and critical thinking, entrepreneurship, and communication skills. Data and information were collected through questionnaires distributed to respondents, with descriptive statistical analysis conducted using the Statistical Package for the Social Sciences (SPSS). The study concluded that analytical and critical thinking is one of the primary educational objectives in Malaysia. Additionally, soft skills enhance the capabilities of human capital to meet the employment needs required in the workplace.

The study by Chin (2021) highlighted that the dynamic business environment has increased pressure on management to achieve the highest levels of efficiency for human resources. The study aimed to determine the strength of soft skills as part of the competitive advantage framework in industrial companies and to examine the dimensions of soft skills, which include team building, decision-making and problem-solving, creativity, interpersonal skills, and analytical skills. The study was conducted on 110 executives and 1000 employees in three Malaysian states within a plastics manufacturing company. It found that soft skills play a positive role in enhancing the company's competitive advantage and achieving high performance amidst the impact of the COVID-19 pandemic. In contrast, the study by Fadhil et al. (2021) highlighted the impact of essential soft skills on the employment process of graduates in the Malaysian technology sector. This was achieved by distributing a questionnaire to employees in two technology companies and performing regression analysis to validate the conceptual model. The study found that soft skills (teamwork, analytical and critical thinking, lifelong learning, and communication) are crucial factors for employability in Malaysian technology firms and that these skills positively impact the performance of human resources, contributing to business success.

The study by Putra et al. (2020) also explored the impact of hard and soft skills on teachers' innovation capabilities, mediated by organizational learning. The study was conducted on a simple random sample of 251 participants across five Indonesian schools. The findings revealed that soft skills have a significant positive impact on teachers' innovation capabilities, both directly and indirectly, through the mediation of organizational learning. A proposed model was developed to enhance innovation capabilities in Indonesia by strengthening soft skills, with organizational learning as a mediator, to improve teachers' readiness to face the demands of modern education. The study by Sancho-Cantus et al. (2023) highlighted, within the context of the COVID-19 crisis, the extent to which soft skills are a crucial issue in human relations, focusing on the future professional performance in the healthcare sector. It emphasized the importance of developing soft skills (teamwork, communication, problem-solving, and analysis) through university education. The study concluded that it is essential to enhance soft skills amidst the changes brought about by the COVID-19 crisis and proposed a training model based on soft skills for healthcare workers.

The study by Molek-Winiarska and Kawka (2024) focused on developing training programs based on soft skills requirements (communication, teamwork, decision-making, problem-solving, and team dynamics) and their impact on improving work performance in the mining industry. A MANOVA, along with effect size measures, was conducted in mining companies. The study found that specialized training programs for soft skills are crucial for enhancing the work environment in these companies. It also revealed a positive impact of soft skills on reducing organizational stress, leading to increased safety and health within the companies studied.

The study by Qizi (2020) emphasized that knowledge is a key driver of productivity and economic growth, with information technology playing a significant role in the labor market. In this context, the study highlighted the MODES project, which focuses on enhancing a joint European program on personal skills through various academic curricula (aimed at equipping students with new employability-focused skills). Data was collected from employees in 246 companies across different sectors in five countries. The study aims to explore the relationship between soft skills, employability, and the global labor market, as well as the strategic role of soft skills in professional development for achieving career success across various sectors. It also highlights the role of higher education in developing soft skills necessary for the global labor market. The questionnaire results revealed that soft skills are most in demand in modern workplaces amidst current economic changes.

The study by Bednárová and Serpeninova (2023) ensured the importance of the soft skills approach for human resources in businesses. It highlighted that the increasing complexities of companies and rising global competition have shifted the focus of various managers and researchers towards the significance of soft skills for human resources. The study was conducted using a quantitative approach and meta-analysis method, covering all relevant scholarly articles published from 2010 to 2019 on soft skills. The results revealed that a total of 34 soft skills variables were investigated, showing high but varying effect size. Lifelong learning, planning and organization, and critical thinking were identified as the most significant dimensions affecting soft skills for human resources compared to other variables, as predicted by

theories at managerial levels. While Hendriani et al. (2023) study addressed the importance of adopting soft skills for human resources in the 21st century through distinctive training strategies, it highlighted that technological skills alone are insufficient for competing in a highly competitive global work environment without the incorporation of soft skills. This was evident from data collected through interviews and questionnaires with senior management and employees in the logistics industry, revealing the importance of soft skills dimensions (communication, teamwork, critical thinking, problem-solving, and decision-making) in the hiring process.

In today's complex and interconnected world, the importance of soft skills for human resources in the hiring process cannot be overlooked, as they positively impact the success of modern companies, many studies (Juhász et al., 2023; Marin-Zapata et al., 2022; Singh et al., 2022) have highlighted the significance of developing essential soft skills in the current century. These skills include critical thinking and analysis, decision-making and problem-solving, planning and organization, teamwork, communication, creativity and innovation, self-reliance, time management, and other diverse skills. These capabilities help in effectively gathering and analyzing information for making informed decisions, working effectively within a team, enhancing cultural awareness, increasing competitiveness, exploring new development opportunities, building strong relationships among employees, and communicating effectively to solve problems. Additionally, the development of technological skills contributes to career success and the ability to turn challenges into opportunities for success.

The researchers identified the dimensions of soft skills for human resources as follows: Analytical and critical thinking skills involve generating ideas and developing creative solutions. Decision-making and problem-solving skills encompass analyzing solutions, forecasting outcomes, and preparing accordingly. Planning and organizing skills are centered on prioritizing tasks, managing time, and specifying required actions. Additionally, teamwork skills refer to an individual's ability to collaborate effectively within a group to achieve shared goals, necessitating strong cooperation and communication among all team members.

The researchers conducted a questionnaire on the soft skills approach for human resources among two groups (managers and employees) in petroleum sector companies in Egypt to identify differences in their opinions. This led the researchers to formulate the following hypothesis: "There are statistically significant differences between the mean scores of managers and employees regarding soft skills for human resources in petroleum sector companies".

2.2. Job competencies

There is increasing research interest in job competencies within the industrial sector, which represent a source of competitive advantage for companies globally, by viewing productivity competency as a function of alignment between business strategy and manufacturing structure (Shet and Pereira, 2021). Additionally, there is a focus on the integration of efforts between companies, governments, and universities to address issues related to preparing professionals for the industry to stay current with the

demands of the new industrial revolution (Kipper et al., 2021). Job competencies also represent a fundamental framework within organizational structures because they play a strategic role in aligning the capabilities of human resources with strategic objectives. Job competencies encompass various dimensions, including productivity, technical, managerial, and digital competencies, among others. They are a crucial tool across different industries.

A study by Wong (2020) highlighted that there is a substantial body of research discussing the crucial role of the competency-based approach in Human Resource Management (HRM) practices across various companies. The study also emphasized the importance of practically developing competencies for specific roles. The study concluded that companies must continuously enhance their human resources' capabilities by investing more heavily in development strategies. Additionally, competencies are an effective tool for managing and developing human resources to maintain competitive advantage and organizational performance in the workplace. In this context, today's industry needs to rapidly respond to changes in the external environment, which requires supporting human resource competencies in line with work conditions to adapt to industrial changes. This fundamentally necessitates focusing on developing comprehensive competency models (productive, technical, managerial) at various levels, along with establishing a strategic vision to enhance the industry.

The study by Enke et al. (2018) agreed with Bianco et al. (2023) on the necessity for the industry to adopt high-efficiency production systems through a philosophy of improvement and development, which includes qualifying and training human resources to work in modern digital environments amidst the industrial revolution of modern productive competencies. In this regard, Shet and Pereira (2021) proposed a framework for adopting effective job competencies that bring about a qualitative shift towards the productivity levels required for industrial processes considering recent scientific and technological advancements.

Based on human capital theory, the study by Kashive and Khanna (2023) established a systematic model for HR analysts' competencies within the companies under study amidst global developments. This was achieved by relying on evidence from models conducted with HR analysis specialists from Canada and Ireland, analyzing job functions across five countries: Australia, Canada, Ireland, the United Kingdom, and the United States. The study found that job competencies enhance performance levels amidst the increasing digitization in companies. Meanwhile, the study by Sabuhari et al. (2020) revealed a positive impact of job competencies on company performance through an analysis conducted on 105 human resources in an Indonesian company.

In addressing the needs of the electronics manufacturing industry in Malaysia, the study by Kannan and Garad (2021) examined how changing technological trends impact the future role of quality in the electronics industry, as well as how to bridge gaps to tackle quality challenges. Additionally, the study presented several global models on the impact of quality on industrial technology development in the Netherlands, China, and Singapore. Data were collected through personal interviews with 64 quality specialists, including executives and engineers. The study concluded that empowering human resources to achieve the required capabilities for value-added

tasks, along with adhering to a scheduled timeline, is crucial for maintaining competitiveness.

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Human resources are a fundamental element in modern companies, with the level of tasks performed dependent on their competencies, which are tangibly reflected in the achievement of the company's goals. Mikła (2025) focused on managerial competencies, identifying competency gaps across various managerial levels within the company, and highlighted the essence and objectives of managerial competence and its crucial role in achieving the company's goals. The study's conclusions were formulated from experimental studies, an analytical review of collected research data, and recommendations provided to the company being analyzed. It was found that measures and programs must be implemented to enhance managerial competencies for positions. Identifying these competencies for human resources helps pinpoint various managerial gaps and ensures that activities related to managerial competence have a tangible impact on the company's results and success. Additionally, Hassan (2020) through exploratory research based on previous literature, highlighted the importance of the managerial competencies required for current managers to achieve sustainable development projects. The study proposed a model for the necessary managerial competencies aimed at enhancing managers' performance to achieve outstanding results in both current and future projects. The study concluded that there is a direct positive relationship between the dimensions of managerial competencies and the economic, environmental, and social pillars of sustainability. Additionally, effective managerial competencies enhance the achievement of business projects.

The researchers conducted a questionnaire on job competencies among two groups within the study (managers and employees) in petroleum sector companies in Egypt to explore differences in opinions. This led the researchers to formulate the following hypothesis: "There are statistically significant differences between the average scores of managers and employees on job competencies in petroleum sector companies".

2.3. The relationship between soft skills for human resources and job competencies

The new paradigm shift resulting from the human and industrial revolution in the modern era has led many industrial companies to focus on the soft skills approach, which includes skills such as (analysis and critical thinking, decision-making and problem-solving, planning and organizing, communication, teamwork, and creativity).

This focus aims to build job competencies (productive, technical, managerial, and technological) in industrial companies. The new industrial dynamics are centered on various directions in production processes, manufacturing automation, and designing strategies to implement new practices (Chaka, 2020).

Jerman et al. (2020) conducted an analysis of data and personal interviews with experts in the automotive sector in Slovenia. The study highlighted that transitioning from traditional to smart production systems in the industry requires exceptional human resources. Soft skills, including analytical and critical thinking, decision-making and problem-solving, teamwork, and creativity, are crucial factors that positively influence the enhancement of job competencies in human resource activities. The study proposed strategies for maximizing job competencies in the industrial sector by integrating soft skills into human resource practices.

From a global industrial perspective, characterized by increasing globalization and competitive changes in the workplace, Blanco et al. (2020) emphasized the need for universities, companies, and governments to support the knowledge and skills of human resources. This support is crucial to overcome economic and social challenges and to influence the development and enhancement of future job competencies, thereby improving performance levels in the U.S. industry. Ramadhan et al. (2021) confirmed that human resources are a critical factor for both private and public companies, as they drive every activity to be executed. The study found a positive impact of soft skills on company performance, noting that soft skills had a direct and positive effect on job satisfaction. Ejsmont (2021) explored the impact of industrial and technological advancements on human resources. The study highlighted that recent changes in Australia's industrial sector necessitate robust skills and capabilities in human resources to enhance both current and future employment performance and effectively overcome any challenges.

The petroleum sector currently faces significant gaps, including a shortage of technical experts, weak human resource capabilities, a lack of distinguished training programs, and the emigration of skilled human resources abroad, leading to decreased performance. Howes and Taylor (2020) studied the current state of human resources in the petroleum sector, highlighting the need to adopt soft skills in human resources to effectively enhance efficiency levels and support technical roles amid rapidly changing dynamics in the work environment.

2.3.1. The relationship between soft skills for human resources and production competencies

In the context of reviewing the literature on manufacturing strategy and production efficiency, the study by Szász et al. (2015) aimed to activate the development of production competencies and measure their impact on business performance in industrial companies. Data were collected from a subsample of 465 manufacturing companies across 21 countries. The study concluded that productive competencies positively impact business performance and emphasized the need to prioritize the improvement of human resource skills to enhance manufacturing strategy. Meanwhile, the study by Gudanowska et al. (2018) focused on the productive competencies required for industrial excellence and identified the human skills (teamwork, analytical and critical thinking, communication, decision-making, and

problem-solving) necessary for job competencies that influence the industrial production process. The study also explored innovative methods, process improvements, and continuous performance enhancement as foundations for the competitiveness of various industries.

The study by Jerman et al. (2020) revealed the necessity of adopting innovation and continuous development processes in the industry and advancing the conceptual model of competence in production processes. The study was conducted through personal interviews with a sample of industry experts, university professors, and government officials. It concluded that educational experts should design curricula that incorporate various soft skills to ensure the achievement of productive competencies in the industry. It also found a positive impact of human resource soft skills on the functional performance of industrial production processes, particularly in the automotive industry. The researchers argues that productive competencies constitute an integrated system of personal attributes and processes that enable the completion of tasks and the achievement of benchmark performance and quality in production processes within companies.

2.3.2. The relationship between soft skills for human resources and technical competencies

Over the past decade, the importance of soft skills for human resources has gained prominence in research articles across various fields. Marin-Zapata et al. (2022) emphasized the role of soft skills in business literature and their impact on developing technical competencies for human resources in companies. Global advancements in technology have enabled companies to convert vast amounts of data into valuable information for strategic decision-making. Coelho da Silveira et al. (2020) explored and analyzed soft skills (analytical and critical thinking, decision-making and problem-solving, teamwork) and their role in enhancing the technological technical competencies of employees in organizations, using a descriptive approach.

Dogara et al. (2020) explored the importance of soft skills for human resources across various industries and examined the relationship between soft skills and technical competencies in companies. The study, conducted on a stratified random sample of 268 individuals from 22 public technical colleges, utilized AMOS model analysis. The study concluded that soft skills positively impact the enhancement of technical competencies in the employment sector and highlighted the need for educational curricula focused on strengthening job competencies for future roles in business organizations. The researchers argued that technical competencies encompass the knowledge and attitudes required to perform a specific job effectively and distinguishably, according to established standards.

2.3.3. The relationship between soft skills and managerial competencies

In the context of managerial challenges and recent transformational changes in the global environment, Bondarenko et al. (2021) provided a methodological perspective on theoretical frameworks and modern models related to managerial competencies according to international standards. The study concluded that developing an effective modern manager requires acquiring soft skills for human resources. Global professional challenges necessitate radical transformations to enhance managerial competencies within organizational structures in businesses.

Meanwhile, Mitrofanova et al. (2023) emphasized the need to reconsider modern approaches to managerial competencies considering current challenges. In addition to developing theoretical and methodological foundations and establishing a model for future managerial competencies to improve performance levels in businesses under modern economic conditions, Szczepańska-Woszczyna and Dacko-Pikiewicz (2014) demonstrated that the key factors for successful innovation implementation in Polish companies are human capital and managerial competencies related to both managers and employees. These include skills, knowledge, and behaviors, which enable individuals to achieve work flexibility and adapt to various changes in contemporary social and economic conditions.

Managerial competencies in businesses are core attributes of individuals that rely on tools to assist in selection, development, training, career planning, performance management, and compensation in a scientifically integrated manner to achieve outstanding job performance (Alazmi et al., 2023). To assess the performance levels of human resources (managers) in the petroleum and gas companies under study as an applied field, a questionnaire was conducted to gather opinions from project managers regarding the soft skills necessary for project success. This questionnaire was distributed electronically to 33 participants and analyzed using statistical methods in SPSS software. Al-Hinai et al. (2020) explored the soft skills needed by managers to achieve managerial competence and developed an innovative framework linking the core soft skills of project managers to the success rate of specific projects. The study found relationships between the soft skills of project managers and project success. The proposed framework is used to identify managers' strengths and weaknesses, thereby pinpointing areas that require further development and improvement, as well as approaches for promotion and career advancement within companies.

The researchers validated the main objective of the study, which focused on the impact of the human resources soft skills approach on building job competencies, using the AMOS software. This validation was based on the following hypothesis: "There is a direct causal effect of human resources soft skills as an independent variable on job competencies and their dimensions as dependent variables in the petroleum sector companies.

After reviewing the previous literature and the theoretical framework related to the research topic, the researchers found that there is a scarcity of studies addressing the relationship between the research variables. Most studies agreed on the importance of examining the approach of soft skills in human resources across various sectors; however, they have not been effectively utilized in the petroleum sector companies. Additionally, job competencies are a crucial factor in achieving success in the petroleum sector. Despite being a relatively recent topic with a direct connection to human resource management, there remains a significant gap in understanding the impact of soft skills in human resources on the development of job competencies. The current study focused on the impact of the human resources soft skills approach (analytical and critical thinking, decision-making and problem-solving, planning and organizing, teamwork) on building job competencies (productive competencies, technical competencies, managerial competencies) in petroleum sector companies.

Based on the above, the researchers can identify the key scientific contributions that aid in building job competencies in petroleum sector companies as follows:

1) The researchers identified several dimensions of the soft skills approach for human resources, including analytical and critical thinking, decision-making and problem-solving, planning and organizing, and teamwork. These dimensions are crucial for enhancing job competencies within companies through mechanisms and programs that focus on developing the necessary human resource skills and capabilities, particularly in the petroleum sector.
2) The researchers focused on addressing one of the most critical contemporary management issues, which is building job competencies. This issue has a direct impact on improving performance levels by developing productive competencies, supporting technical competencies, and enhancing managerial competencies. This involves implementing reforms within the organizational structure, creating substantial opportunities for the private sector, improving the performance of production processes, and optimizing the distribution of petroleum, natural gas, and petrochemical operations, as well as attracting investment in petroleum products by expanding oil and gas exploration activities in Egypt.
3) The researchers addressed, tested, and expanded the research scope. However, this study particularly highlighted the importance of the soft skills approach for human resources in building job competencies within Egypt's petroleum sector. The sector aims to develop highly competent national human resources, maintain environmental standards, expand exploration activities while diversifying resources, achieve the highest added value from natural resources, meet domestic market needs for petroleum and petrochemical products, and achieve the targeted growth rates for the national economy.
4) The role of the petroleum sector in Egypt's energy strategy is to diversify and expand energy sources. Additionally, it plays a pivotal role in international energy markets through the operation of the Suez Canal and the Suez-Mediterranean pipeline. Additionally, this sector plays a key role in regional and international energy markets due to its strategic position in global trade routes for various energy sources, such as natural gas and oil. It is one of the largest oil producers in Africa, the second-largest natural gas producer globally, the fifth-largest oil producer worldwide, and has the largest crude oil refining capacity in Africa.
5) The researchers proposed a framework for building job competencies based on the application of soft skills for human resources within Egypt's petroleum sector companies.

3. Methodology

3.1. Statistical methods used in the study

Data from the field study were analyzed using SPSS (Ver. 26) to test the validity of the first and second hypotheses through Independent-Samples T-Test. Additionally, AMOS was used to test the validity of the third hypothesis using Structural Equation Modeling (SEM).

3.2. Sample of the research

The researchers applied the study to (10) petroleum sector companies in Egypt: (Nasr Petroleum Company/Cairo Refinery Company/Tanta Refinery Company/Asyut Refinery Company/Suez Petroleum Processing Company/Al-Jam'eya for Petroleum Cooperation/Egypt Petroleum Company/Nile Petroleum Company/Petrotrade Company/Egyptian Gas Transmission and Delivery Company "Butagasco"). The study relied on primary data collection through questionnaires, observations, and personal interviews with managers and employees of the companies. Secondary sources included books, international scientific research, relevant global case studies, and various company records and websites.

The study was conducted on a stratified random sample of managers in the petroleum sector, with the total population of approximately (24,668) managers. Based on sample size tables for a research population of (25,000), the sample size was determined to be (379). A total of (390) questionnaires were distributed to managers in petroleum sector companies, with (379) valid questionnaires returned, representing a response rate of (97.1%). The study also relied on a stratified random sample of employees in the petroleum sector, with a total population of approximately (66,523) employees. According to sample size tables for a research population of (70,000), the sample size was determined to be (382). A total of (390) questionnaires were distributed to employees in petroleum sector companies, with (379) valid questionnaires returned, representing a response rate of (97.9%). This was done to gather their opinions and suggestions regarding the dimensions of the variables under study.

Table 1. Description of the demographic variables for the sample.

Variable demographic	Category	Number	Percentage
Gender	Male	564	%74.1
	Female	197	%25.9
	Total	761	%100
Age	Below 30–40	174	%22.9
	From 30 to 40	276	%36.3
	From 41 to 50	208	%27.3
	Above 50	103	%13.5
	Total	761	%100
Position	Managers	379	%49.8
	Employees	382	%50.2
	Total	761	%100
Years of experience	Below 5	231	%30.3
	From 5 to 10	245	%32.2
	From 10 to 15	156	%20.5
	Above 15	129	%16.9
	Total	761	%100

Source: Prepared by the researchers based on statistical analysis results.

The sample was described using demographic variables (personal characteristics), including gender, age, position, and years of experience, according to category, number, and percentage. The following **Table 1** provides a description of the demographic variables for the sample as above.

The previous table shows that the total sample size is 761 individuals. Regarding gender, there are 564 males (74.1%) and 197 females (25.9%). For the age variable, 174 individuals are under 30 years old (22.9%), 276 are between 30 and 40 years old (36.3%), 208 are between 40 and 50 years old (27.3%), and 103 are over 50 years old (13.5%). Concerning job position, there are 379 managers (49.8%) and 382 employees (50.2%). For years of experience, 231 individuals have less than 5 years of experience (30.3%), 245 have 5 to 10 years of experience (32.2%), 156 have 10 to 15 years of experience (20.5%), and 129 have more than 15 years of experience (16.9%).

3.3. The psychometric properties of the research tools

3.3.1. Managerial questionnaire

A. Validity of the Questionnaire: The validity of the questionnaire was assessed by calculating the internal consistency between each item's score and the dimension to which the item belongs, as illustrated in the following **Table 2**:

Table 2. The correlation coefficients between each item and the dimension it belongs to in the managers' questionnaire.

Variables	Dimensions	NO.	Correlation coefficient	NO.	Correlation coefficient	NO.	Correlation coefficient	NO.	Correlation coefficient
Soft skills of human resources	Analysis and critical thinking skills	1	**0.884	2	**0.894	3	**0.852	4	**0.859
	Decision making and problem-solving skills	1	**0.805	2	**0.902	3	**0.905	4	**0.883
	Planning and organizing skill	1	**0.734	2	**0.822	3	**0.776	4	**0.879
	Teamwork skill	1	**0.738	2	**0.731	3	**0.811	4	**0.786
Job competencies	Production competencies	1	**0.834	2	**0.836	3	**0.834	4	**0.827
	Technical competencies	1	**0.802	2	**0.752	3	**0.680	4	**0.651
	Managerial competencies	1	**0.886	2	**0.917	3	**0.889	4	**0.637

Source: Prepared by the researchers based on statistical analysis results **Significant at the (0.01) level.

The previous table shows that the correlation coefficient values level (statistically significant at 0.01) between each item's score and its corresponding dimension ranged from (0.637, to 0.917). All the correlation coefficients were positive, indicating the internal consistency validity of the questionnaire. Thus, the internal consistency validity of the managers' questionnaire was confirmed. The internal consistency validity was also calculated between each dimension's score and the overall score of the managers' questionnaire, as shown in the following **Table 3**:

Table 3. Internal consistency validity of managerial questionnaire dimensions.

NO.	Dimensions	Correlation coefficient
1	Analysis and critical thinking skills	**0.862
2	Decision making and problem-solving skills	**0.912
3	Planning and organizing skill	**0.889
4	Teamwork skill	**0.788
5	Production competencies	**0.602
6	Technical competencies	**0.730
7	Technical competencies	**0.855

Source: Prepared by the researchers based on statistical analysis results **Significant at the (0.01) level.

The previous table shows that the correlation coefficients ranged between (0.602, 0.912), with all values being positive and statistically acceptable. This indicates the internal consistency of the dimensions of the manager's questionnaire, thus confirming the internal consistency of the dimensions of the manager's questionnaire.

B. Reliability of the questionnaire: To estimate the reliability of the questionnaire, the researchers used both the Cronbach's alpha and split-half methods for the manager's questionnaire, as shown in the following **Table 4**:

Table 4. Values of Cronbach's Alpha and split-half reliability coefficients for each dimension of the managers' questionnaire.

Variables	Dimensions	Cronbach's Alpha Coefficients	Split-Half Reliability Coefficients	
			Guttman's Equation	Spearman-Brown
Soft skills of human resources	Analysis and critical thinking skills	0.894	0.883	0.883
	Decision making and problem solving skills	0.897	0.899	0.904
	Planning and organizing skill	0.813	0.804	0.804
	Team work skill	0.762	0.732	0.734
Job competencies	Production competencies	0.845	0.857	0.857
	Technical competencies	0.733	0.828	0.828
	Managerial competencies	0.860	0.879	0.906

Source: Prepared by the researchers based on the results of statistical analysis.

The previous table shows that the values of Cronbach's alpha reliability ranged from 0.733 to 0.897. The split-half reliability values, before correction using the Guttman equation, ranged from (0.732, 0.899), and after correction using the Spearman-Brown formula, they ranged from (0.734, 0.904). All these values are statistically high, confirming the reliability and suitability of the questionnaire for the purposes of the study.

3.3.2. Employee questionnaire

A. Validity of the Questionnaire: The internal consistency validity was calculated between each item score and the dimension to which the item belongs for the employee questionnaire, as shown in the following **Table 5**:

Table 5. Correlation coefficients between each item and the dimension to which it belongs for the employee questionnaire.

Variables	Dimensions	NO.	Correlation coefficient	NO.	Correlation coefficient	NO.	Correlation coefficient	NO.	Correlation coefficient
Soft skills of human resources	Analysis and critical thinking skills	1	**0.768	2	**0.827	3	**0.772	4	**0.869
	Decision making and problem solving skills	1	**0.816	2	**0.750	3	**0.680	4	**0.804
	Planning and organizing skill	1	**0.785	2	**0.857	3	**0.842	4	**0.821
	Team work skill	1	**0.914	2	**0.858	3	**0.908	4	**0.845
Job competencies	Production competencies	1	**0.803	2	**0.735	3	**0.600	4	**0.721
	Technical competencies	1	**0.826	2	**0.745	3	**0.714	4	**0.761
	Managerial competencies	1	**0.578	2	**0.797	3	**0.729	4	**0.763

Source: Prepared by the researchers based on statistical analysis results **Significant at the (0.01) level.

The previous table shows that the correlation coefficients between each item and the dimension to which it belongs ranged from (0.600, 0.914). All correlation coefficients (at 0.01 significance level) were positive and statistically acceptable, indicating internal consistency validity of the questionnaire. Thus, the internal consistency validity of the employees' questionnaire was confirmed.

The internal consistency validity was also calculated between each dimension of the questionnaire and the overall score of the employees' questionnaire, as shown in the following **Table 6**:

Table 6. Internal consistency validity of the dimensions of the employees' questionnaire.

NO.	Dimensions	Correlation coefficients
1	Analysis and critical thinking skills	**0.862
2	Decision making and problem solving skills	**0.875
3	Planning and organizing skill	**0.925
4	Team work skill	**0.918
5	Production competencies	**0.731
6	Technical competencies	**0.705
7	Managerial competencies	**0.698

Source: Prepared by the researchers based on the results of statistical analysis ** Significant at the 0.01 level.

It is evident from the previous table that the correlation coefficients ranged between (0.698, 0.925), with all values being positive and statistically acceptable. This indicates the internal consistency validity of the dimensions of the employee questionnaire, thus confirming the internal consistency validity of the employee questionnaire dimensions.

B. Reliability of the Questionnaire: To estimate the reliability of the questionnaire, both Cronbach's Alpha and Split-Half methods were used for the employees' questionnaire, as shown in the following **Table 7**:

Table 7. Cronbach's Alpha and split-half reliability coefficients for each dimension of the employees' questionnaire.

Variables	Dimensions	Cronbach's Alpha Coefficients	Split-Half Reliability Coefficients	
			Guttman's Equation	Spearman-Brown
Soft skills of human resources	Analysis and critical thinking skills	0.820	0.834	0.836
	Decision making and problem solving skills	0.752	0.715	0.722
	Planning and organizing skill	0.844	0.827	0.827
	Team work skill	0.902	0.906	0.907
Job competencies	Production competencies	0.787	0.753	0.762
	Technical competencies	0.750	0.833	0.833
	Managerial competencies	0.762	0.742	0.743

Source: Prepared by the researchers based on statistical analysis results.

The previous table shows that the Cronbach's alpha reliability coefficients ranged from (0.750, 0.902), while the split-half reliability coefficients before correction according to the Guttman formula ranged from (0.715, 0.906). After correction using the Spearman-Brown formula, the coefficients ranged from (0.722, 0.907). All these coefficients are statistically high, confirming the reliability and suitability of the questionnaire for the study's purposes.

3.4. Descriptive statistics for the dimensions of the field study

The means and standard deviations, as well as kurtosis and skewness, were calculated to verify the normality of the managers' data as shown in the following **Table 8**:

Table 8. Means, standard deviations, kurtosis, and skewness to verify the normality of the managers' data.

Variables	Dimensions	Mean		Standard Deviations	Kurtosis	Skewness
		Item	Dimension			
Soft skills of human resources	Analysis and critical thinking skills	3.80	15.23	3.07	0.697	0.124
	Decision making and problem solving skills	3.43	13.75	3.03	0.459	0.554
	Planning and organizing skill	3.55	14.23	2.33	0.143	0.519
	Team work skill	3.66	14.67	2.08	0.569	0.281
Job competencies	Production competencies	3.55	14.20	2.43	0.212	0.352
	Technical competencies	3.59	14.36	1.94	0.373	0.113
	Managerial competencies	3.51	14.05	2.80	0.564	0.246

Source: Prepared by the researchers based on statistical analysis results.

The previous table shows that the skewness and kurtosis values for all dimensions do not exceed one, indicating a high degree of normality. Additionally, the mean

values for all manager responses in the petroleum sector companies across the study's dimensions were significantly high.

Additionally, the means and standard deviations, as well as kurtosis and skewness, were calculated to verify the normality of employee data as shown in the following **Table 9**:

Table 9. Means, standard deviations, kurtosis, and skewness for verifying the normality of employee data.

Variables	Dimensions	Mean		Standard Deviations	Kurtosis	Skewness
		Item	Dimension			
Soft skills of human resources	Analysis and critical thinking skills	3.01	12.05	3.63	0.402	0.948
	Decision making and problem solving skills	3.13	12.52	3.32	0.141	0.909
	Planning and organizing skill	3.11	12.45	3.71	0.328	0.924
	Team work skill	3.25	13.01	3.92	0.038	0.157
Job competencies	Production competencies	3.30	13.21	2.88	0.295-	0.462
	Technical competencies	3.06	12.27	2.93	0.220	0.055
	Managerial competencies	2.95	11.83	3.10	0.066	0.560

Source: Prepared by the researchers based on statistical analysis results.

The previous table shows that the skewness and kurtosis values for all dimensions do not exceed one, indicating a high degree of normality. Additionally, the mean values for all employee responses in the petroleum sector companies on the study dimensions were found to be at a moderate level.

3.5. Tests of hypotheses and analysis of results

3.5.1. Results of testing the first hypothesis

The first hypothesis states: "There are statistically significant differences between the mean scores of managers and employees on the soft skills for human resources in petroleum sector companies".

To test this hypothesis, an Independent Samples *T*-Test was used to identify differences between managers and employees regarding soft skills for human resources in petroleum sector companies. The following **Table 10** illustrates the results:

Table 10. The *T* value and its statistical significance for the differences between the mean scores of the two study groups (managers and employees) regarding soft skills for human resources in petroleum sector companies.

NO.	The dimensions of the soft skills of human resources	Study groups	NO. of Individuals	Mean	Standard Deviations	Degrees of Freedom	*T*	Significance level
1	Analysis and critical thinking skills	Managers	379	15.23	3.073	759	13.035	0.01 Statistically significant
		Employees	382	12.05	3.635			
2	Decision making and problem solving skills	Managers	379	13.75	3.039	759	5.361	0.01 Statistically significant
		Employees	382	12.52	3.328			
3	Planning and organizing skill	Managers	379	14.23	2.331	759	7.929	0.01 Statistically significant
		Employees	382	12.45	3.715			

Table 10. (*Continued*).

NO.	The dimensions of the soft skills of human resources	Study groups	NO. of Individuals	Mean	Standard Deviations	Degrees of Freedom	*T*	Significance level
4	Team work skill	Managers	379	14.67	2.086	759	6.867	0.01
		Employees	382	13.01	3.929			Statistically significant
The total of the soft skills of human resources		Managers	379	57.89	9.140	759	9.491	0.01
		Employees	382	50.12	13.091			Statistically significant

Source: Prepared by the researchers based on statistical analysis results.

The previous table shows the following:

1) The mean score for critical thinking and analysis skill for managers was (15.23) with a standard deviation of (3.073), while for employees it was (12.05) with a standard deviation of (3.635). The calculated *t*-value was (13.035) at a significance level of (0.01). Thus, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences between the opinions of the two groups (managers and employees) regarding the critical thinking and analysis skill, in favor of the managers at the (0.01) level.
2) The mean score for decision-making and problem-solving skill for managers was (13.75) with a standard deviation of (3.039), while for employees it was (12.52) with a standard deviation of (3.328). The calculated *t*-value was (5.361) at a significance level of (0.01). Thus, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences between the opinions of the two groups (managers and employees) regarding decision-making and problem-solving skills, in favor of the managers at the (0.01) level.
3) The mean score for planning and organizing skills for managers was (14.23) with a standard deviation of (2.331), while for employees it was (12.45) with a standard deviation of (3.715). The calculated *t*-value was (7.929) at a significance level of (0.01). Thus, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences between the opinions of the two groups (managers and employees) regarding planning and organizing skills, in favor of the managers at the (0.01) level.
4) The mean score for teamwork skills for managers was (14.67) with a standard deviation of (2.086), while for employees it was (13.01) with a standard deviation of (3.929). The calculated *t*-value was (6.867) at a significance level of (0.01). Thus, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences at the (0.01) level between the opinions of the two groups (managers and employees) regarding teamwork skills, in favor of the managers.
5) The mean score for soft skills in human resources for managers was (57.89) with a standard deviation of (9.140), while for employees it was (50.12) with a standard deviation of (3.091). The calculated *t*-value was (9.491) at a significance level of (0.01). Thus, we reject the null hypothesis and accept the alternative

hypothesis, indicating that there are statistically significant differences at the (0.01) level between the opinions of the two groups (managers and employees) regarding soft skills in human resources, in favor of the managers.

3.5.2. Results for testing the second hypothesis

The second hypothesis states: "There are statistically significant differences between the mean scores of managers and employees regarding job competencies in the petroleum sector companies".

To test this hypothesis, an Independent Samples *T*-Test was used to identify differences between managers and employees regarding job competencies in the petroleum sector companies, as shown in the following **Table 11**:

Table 11. *T*-Value and its statistical significance for the differences between mean scores of the two study groups (managers and employees) on job competencies in the petroleum sector companies.

NO.	Dimensions of Job competencies	Study groups	NO. Of Individuals	Mean	Standard Deviations	Degrees of Freedom	*T*	Significance level
1	Production competencies	Managers	379	14.20	2.430	759	5.128	0.01 Statistically significant
		Employees	382	13.21	2.881			
2	Technical competencies	Managers	379	14.36	1.942	759	11.585	0.01 Statistically significant
		Employees	382	12.27	2.935			
3	Managerial competencies	Managers	379	14.05	2.805	759	10.327	0.01 Statistically significant
		Employees	382	11.83	3.104			
The total of the soft skills of human resources		Managers	379	57.89	9.140	759	9.491	0.01 Statistically significant
		Employees	382	50.12	13.091			

Source: Prepared by the researchers based on statistical analysis results.

The previous table shows the following:

1) The mean score for the dimension of productive competencies for managers was (14.20) with a standard deviation of (2.430), while for employees, the mean was (13.21) with a standard deviation of (2.881). The calculated *T*-value was (5.128) at a statistical significance level of (0.01). Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences at the (0.01) level between the two study groups (managers and employees) regarding the dimension of productive competencies, favouring managers.
2) The mean score for the dimension of technical competencies for managers was (14.36) with a standard deviation of (1.942), while for employees, the mean was (12.27) with a standard deviation of *(2.935). The calculated *T*-value was (11.585) at a statistical significance level of (0.01). Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences at the (0.01) level between the two study groups (managers and employees) regarding the dimension of technical competencies, favouring managers.

3) The mean score for the dimension of managerial competencies for managers was (14.05) with a standard deviation of (2.805), while for employees, the mean was (11.83) with a standard deviation of (3.104). The calculated *T*-value was (10.327) at a statistical significance level of (0.01). Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences at the (0.01) level between the two study groups (managers and employees) regarding the dimension of managerial competencies, favouring managers.

4) The mean score for job competencies for managers was (57.89) with a standard deviation of (9.140), while for employees, the mean was (50.12) with a standard deviation of (13.091). The calculated *T*-value was (9.491) at a statistical significance level of (0.01). Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating that there are statistically significant differences at the (0.01) level between the two study groups (managers and employees) regarding job competencies, favouring managers.

3.5.3. Results of testing the third hypothesis

The third hypothesis states: "There is a direct causal effect of soft skills in human resources as an independent variable on job competencies and their dimensions as dependent variables in oil sector companies."

Based on this hypothesis, structural equation modeling was performed using AMOS software, as illustrated in (**Figure 1**) the following diagram:

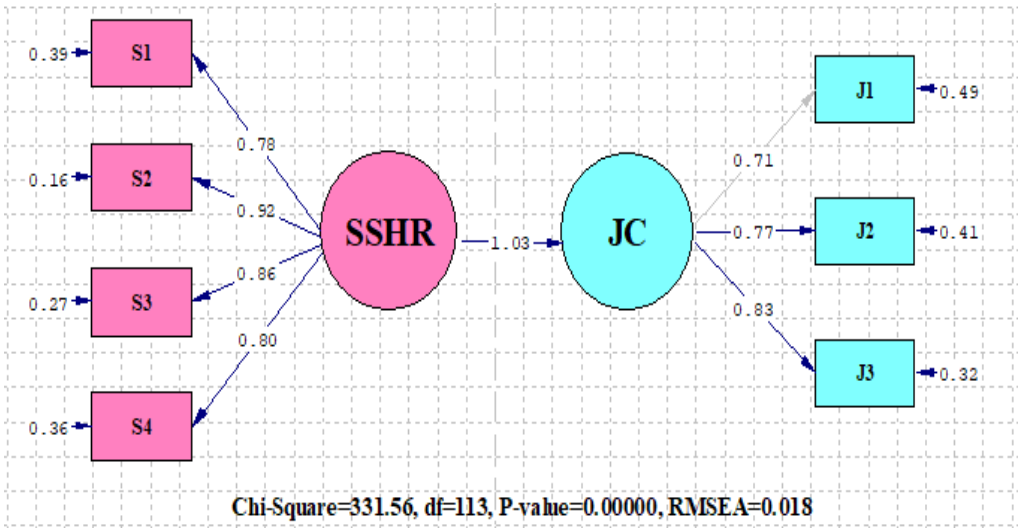

Figure 1. Structural model of the impact of soft skills in human resources as an independent variable on job competencies and their dimensions as dependent variables in petroleum sector companies.

Source: Prepared by the researchers.

SSHR = Soft skills for human resources, S1 = Analysis and critical thinking skill, S2 = Decision making and problem solving skill, S3 = Planning and organizing skill, S4 = Teamwork skill, JC = Job Competencies, J1=Productive Competencies, J2 = Technical Competencies, J3 = Administrative Competencies

The model achieved indices indicating a good fit to the data, and the following table presents the fit indices for the structural model as follows:

The **Table 12** shows that all model fit indices fall within the acceptable range, indicating a high degree of alignment between the proposed structural model and the primary data. This suggests a good fit between the proposed structural model and the study sample data, with respect to the structural relationships of soft skills as an independent variable and job competencies and their dimensions as dependent variables in the petroleum sector companies. The following **Table 13** presents the values for the effects of the latent independent variable on the latent and observed dependent variables:

Table 12. Fit indices for the structural model.

NO.	Fit Indices	Range of the fit indices	Recommended value	Index value	Decision
1	X2/df	From 1 to 5	Below 5	2.93	Acceptable
2	RMR	From 0 to 1	Close to 0	0.036	Acceptable
3	GFI	From 0 to 1	Close to 1	0.91	Acceptable
4	AGFI	From 0 to 1	Close to 1	0.92	Acceptable
5	NFI	From 0 to 1	Close to 1	0.96	Acceptable
6	NNFI	From 0 to 1	Close to 1	0.93	Acceptable
7	RFI	From 0 to 1	Close to 1	0.93	Acceptable
8	IFI	From 0 to 1	Close to 1	0.96	Acceptable
9	CFI	From 0 to 1	Close to 1	0.96	Acceptable
10	RMSEA	Close to 0	Below (0.08)	0.018	Acceptable

Source: Prepared by the researchers based on statistical analysis results.

Table 13. Evaluate the effects of the independent latent variable on the dependent latent and observed variables.

Latent Independent Variable	**Soft skills of human resources**		
Latent and Observed Dependent Variables	**Effect**	**Std. deviation**	***T***
Job competencies	1.03	0.045	**23.03
Production competencies	0.71	0.027	**18.50
Technical competencies	0.77	0.036	**21.20
Managerial competencies	0.83	0.036	**22.75

Source: Prepared by the researchers based on the results of statistical analysis. (**) The *T*-value is significant at a significance level of (0.01) ≥ 2.58.

The previous table reveals the following:

1) There is a statistically significant positive total causal effect at the 0.01 significance level of soft human resource skills on job competencies in petroleum sector companies.
2) There is a statistically significant positive total causal effect at the 0.01 significance level of soft human resource skills on productive competencies in petroleum sector companies.
3) There is a statistically significant positive total causal effect at the 0.01 significance level of soft human resource skills on technical competencies in petroleum sector companies.

4) There is a statistically significant positive total causal effect at the 0.01 significance level of soft human resource skills on managerial competencies in petroleum sector companies.

4. Results and recommendations

4.1. Results

The key findings of the field study, based on the statistical results of the study sample's responses, can be summarized as follows:

The study revealed statistically significant differences at the 0.01 significance level between the average scores of managers and employees in soft human resource skills (analytical and critical thinking, decision-making and problem-solving, planning and organizing, teamwork), as well as in the overall score for soft human resource skills in petroleum sector companies, favoring the managers. This indicates that managers possess greater experience and skills in job-related tasks, enabling them to analyze and think critically about work-related matters, which in turn allows them to make appropriate decisions that benefit all management levels within the company.

The study results indicated statistically significant differences at the 0.01 significance level between the average scores of managers and employees in job competencies (productive, technical, and administrative competencies), as well as in the overall score for job competencies in petroleum sector companies, favoring the managers. This suggests that managers outperform employees in job competencies, as they possess competencies (productive, technical, and administrative) that lack of employees, making them more effective in performing their work.

The study results revealed a statistically significant direct causal effect at the 0.01 significance level of soft human resources skills on job competencies in petroleum sector companies. This indicates that the development of job competencies across all management levels in petroleum sector companies is being conducted in an objective, realistic, and flexible manner, considering the influence of the soft human resources skills approach.

The study results revealed a statistically significant direct causal effect at the 0.01 significance level of soft human resources skills on productive competencies in petroleum sector companies. This means that the presence of soft human resources skills at management levels enhances the efficiency and quality of production processes in petroleum sector companies.

The study results demonstrated a statistically significant direct causal effect at the 0.01 significance level of soft human resources skills on technical competencies in petroleum sector companies. This indicates that the availability of soft human resources skills at management levels enhances their ability to efficiently perform technical tasks in petroleum sector companies.

The study results revealed a statistically significant direct causal effect at the 0.01 significance level of human resource soft skills on administrative competencies in petroleum sector companies. This indicates that the presence of human resource soft skills at the managerial levels enhances the efficiency and effectiveness of performance, ensuring the continued proper execution of tasks in petroleum sector companies.

It has been revealed that there is insufficient focus on developing the intellectual capabilities of human resources within companies, outdated financial systems concerning salaries, incentives, and bonuses, as well as deficiencies in the fundamental elements necessary for improving the quality of processes involved in discovering and extracting petroleum derivatives. Additionally, there is inflexibility in the laws, regulations, and rules governing the petroleum sector, along with inadequate investment activities in petroleum companies.

4.2. Recommendations

It is necessary to establish a forward-looking vision and flexible, evolving strategic plans in partnership with all relevant stakeholders to adapt to rapid transformations. This will enhance human resource skills, improve their capabilities, and provide them with the knowledge and expertise required. Additionally, setting standards that contribute to better performance in various job functions, along with encouraging scientific research and innovation to improve performance levels, is crucial. This should be done in light of the government's economic reform measures to address various needs within the petroleum sector companies.

Establishing, replacing, and renewing several petroleum product lines, and accelerating the development of new petrol and natural gas discoveries in Egypt to increase growth rates necessary for achieving self-sufficiency. This will also enable the export of surplus, provide foreign currency, and create job opportunities for youth. This process should rely on university professors, consultants from the Ministry of Higher Education, research centers, and specialized experts from relevant international organizations, and should be conducted regularly.

Attracting more local and foreign investment in the areas of research, exploration, and operation of petrol fields, as well as technical consulting, in light of the favorable investment climate, political stability in Egypt, and current economic reform policies.

It is necessary to develop modern training programs to prepare young leaders in petroleum sector companies. This aims to benefit from new ideas and opinions, provide multiple solutions to problems, improve occupational health and safety standards, and train technical staff to enhance performance levels in the petroleum industry. This is crucial for keeping pace with modern production, technical, and managerial developments.

The financial system is prepared and equipped for digital transformation to facilitate investors. This process is carried out regularly by the company's senior management, financial management, and the information systems unit.

Adopting technology and maximizing the local component to expand the company's activities and diversify its business areas. This aims to increase production opportunities from existing fields, identify necessary measures to reduce production costs, enhance the efficiency of production companies, and improve the quality and productivity of fields. Additionally, an electronic system should be launched to manage and monitor the trading and distribution of various energy sources to tighten control over the quantities transported.

Restructuring the Mineral Resources Authority by studying the optimal approach to increase the Authority's contribution to supporting the national economy. This

includes necessary legislative reforms to ensure legal compliance, carried out by legal advisors and top-tier specialized consulting firms to achieve the best possible benefit for Egypt from energy resources and the highest possible return.

4.3. A proposed framework for developing job competencies in petroleum sector companies in Egypt in light of the impact of soft skills on human resources

In light of the reviewed and analyzed previous studies, the field study conducted, and the dimensions of the problem outlined, the study has developed a proposed model consisting of four main phases as follows:

4.3.1. Phase One: identifying the elements of job competency dimensions to be addressed

It is necessary to develop innovative scientific curricula that use new methods and approaches to improve production processes, while focusing on providing the company with highly competent human resources, which will positively impact production competency.

Using tools and applications for technical analysis of human resources necessary to build technical competency, along with increasing the number of training courses to develop human resources skills at various management levels, which will positively impact the required job performance within the company.

Develop mechanisms to identify the current accumulated skills and available innovative practices, and build new competencies. Additionally, implement effective incentives and rewards to retain and sustain human resources, aiming to maximize the performance levels of managerial competencies.

4.3.2. Phase Two: Implementing the necessary procedures to build job competencies based on the impact of soft skills on human resource

There are several procedures, including: focusing on key human resource elements such as analytical skills, critical thinking, decision-making and problem-solving skills, planning and organization skills, and teamwork skills necessary for activating and building job competencies. Continuing to use the methods for financing soft skills development is essential, as it positively impacts job competencies and helps ensure retention and continuity.

4.3.3. Results of applying the proposed framework

The main objective of the framework is to build job competencies (productive competencies, technical competencies, and managerial competencies) by applying the soft skills approach to human resources in petroleum sector companies in Egypt. This involves developing productive competencies among managers and employees, enhancing technical competencies among managers and employees, and improving managerial competencies among managers and employees. Additionally, it aims to increase the human capital of the petroleum sector company through accumulated competencies.

4.3.4. Feedback

In this phase, the current situation is continuously evaluated at each stage. Then, new developments are studied to seize opportunities and avoid threats. The goal is to

minimize the impact of obstacles, challenges, and errors on the planned strategy in a timely manner.

4.4. Future directions and research

Based on the research results and the study's recommendations for building job competencies through the impact of the soft skills approach on human resources, the researchers propose several ideas for future research. These include: a proposed model for adopting human resource development strategies to enhance production quality, applied to Egyptian steel and iron companies; the role of research and development policies in building core capabilities, applied to the Egyptian chemicals sector; and the effects of digital transformation on the public business sector through a comparative field study.

5. Conclusion

Global administrative, human, and technological challenges have had a significant impact on public sector companies, particularly in the petroleum sector at all levels. These challenges have created new difficulties and job opportunities, leading to the recognition that the competency needs of company leaders are changing. The traditional standards for qualifying human resources are no longer effective, resulting in lower performance levels of human resources.

The researchers applied the study to 10 petroleum sector companies in Egypt and used a descriptive-analytical approach to study the phenomenon. Given the large size of the population, its geographical spread, and the difficulty of accessing all members due to the nature of the companies' operations, the researchers relied on sampling methods. The study employed a proportional distribution for the probability sample and was conducted on stratified random samples consisting of 379 managers and 382 employees from petroleum sector companies in Egypt. The study utilized SPSS and AMOS software for data analysis. Primary data was collected through surveys, observations, and personal interviews with managers and employees, while secondary data was sourced from books, foreign scientific research, global application models, records, databases, and various company websites.

The study provides a methodological perspective on building job competencies for human resources in petroleum sector companies in Egypt, with clear priorities set to enhance performance levels in light of recent global challenges. The research findings indicate significant statistical differences at the 0.01 level between the mean scores of managers and employees on soft skills (analytical thinking, critical thinking, decision-making and problem-solving, planning and organization, teamwork) and job competencies (productive competencies, technical competencies, and managerial competencies), favoring managers. Additionally, there is a statistically significant direct causal effect at the 0.01 level of soft skills on job competencies in petroleum sector companies.

Finally, the proposed framework for building job competencies in petroleum sector companies can be considered as the development of theory is an ongoing process. Future research could contribute to refining the framework and challenging traditional assumptions to reveal new and stimulating perspectives. This iterative

process may eventually lead to the development of a comprehensive theory for building job competencies for employees in petroleum sector companies in Egypt.

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Conflict of interest: The authors declare no conflict of interest.

References

Al-Hinai, N., Piya, S., & Al-Wardi, K. (2020). Analysis of Factors Affecting Motivation in Projects: A Case Study in Oil and Gas Industry in the Sultanate of Oman. Journal of Engineering Research, 17(2), 112-125. https://doi.org/10.24200/tjer.vol17iss2pp112-125

Bednárová, M., & Serpeninova, Y. (2023). Corporate digital responsibility: bibliometric landscape – chronological literature review. International Journal of Digital Accounting Research, 23. https://doi.org/10.4192/1577-8517-v23_1

Bianco, D., Godinho Filho, M., Osiro, L., & Ganga, G. (2023). Unlocking the Relationship Between Lean Leadership Competencies and Industry 4.0 Leadership Competencies: An ISM/Fuzzy MICMAC Approach. IEEE Transac-tions on Engineering Management, 70(6). https://doi.org/10.1109/TEM.2021.3069127

Blanco, F. S., David, C., Munevar, G., Felipe, D., & Romero, E. (2020). Job Competencies and Skills in Latin America: a Look from Industry 4.0. International Journal of Business Marketing and Management (IJBMM), 5.

Bondarenko, V., Diugowanets, O., & Kurei, O. (2021). Transformation of Managerial Competencies within the Context of Global Challenges. SHS Web of Conferences, 90. https://doi.org/10.1051/shsconf/20219002002

Chaka, C. (2020). Skills, competencies and literacies attributed to 4IR/Industry 4.0: Scoping review. IFLA Journal, 46(4). https://doi.org/10.1177/0340035219896376

Chin, S. T. S. (2021). SOFT SKILLS AS PART OF THE COMPETITIVE ADVANTAGE FRAMEWORK. Journal of Management Information and Decision Sciences, 24(Special Issue 1).

Coelho da Silveira, C., Marcolin, C. B., Da Silva, M., & Domingos, J. C. (2020). What is a Data Scientist? Analysis of core soft and technical competencies in job postings. Revista Inovação, Projetos e Tecnologias, 8(1). https://doi.org/10.5585/iptec.v8i1.17263

Dogara, G., Saud, M. S. Bin, & Kamin, Y. Bin. (2020). Work-Based Learning Conceptual Framework for Effective Incorporation of Soft Skills among Students of Vocational and Technical Institutions. IEEE Access, 8. https://doi.org/10.1109/ACCESS.2020.3040043

Dolce, V., Emanuel, F., Cisi, M., & Ghislieri, C. (2020). The soft skills of accounting graduates: perceptions versus expectations. Accounting Education, 29(1). https://doi.org/10.1080/09639284.2019.1697937

Ejsmont, K. (2021). The impact of industry 4.0 on employees—insights from Australia. Sustainability (Switzerland), 13(6). https://doi.org/10.3390/su13063095

Enke, J., Glass, R., Kreß, A., Hambach, J., Tisch, M., & Metternich, J. (2018). Industrie 4.0 – Competencies for a modern production system. Procedia Manufacturing, 23. https://doi.org/10.1016/j.promfg.2018.04.028

Fadhil, S. S., Ismail, R., & Alnoor, A. (2021). The influence of soft skills on employability: A case study on technology industry sector in malaysia. Interdisciplinary Journal of Information, Knowledge, and Management, 16. https://doi.org/10.28945/4807

Gudanowska, A. E., Alonso, J. P., & Törmänen, A. (2018). What competencies are needed in the production industry? The case of the Podlaskie Region. Engineering Management in Production and Services, 10(1). https://doi.org/10.1515/emj-2018-0006

Hassan, A. (2020). Managerial Competencies Required to Achieve Sustainable Development Projects: A Proposed Model for Managers. Environmental Management and Sustainable Development, 9(3). https://doi.org/10.5296/emsd.v9i3.17603

Hendriani, S., Sukri, A., Islam Riau, U., & Riau, U. (2023). Communication Soft Skills In Empowering Human Resources Soft Skill Komunikasi Pada Pemberdayaan Sumber Daya Manusia. Management Studies and Entre-preneurship Journal, 4(3).

Howes, C. S., & Taylor, R. W. (2020). Building technical, commercial and soft skills in evolving organizations. International Petroleum Technology Conference 2020, IPTC 2020. https://doi.org/10.2523/iptc-20078-abstract

Jerman, A., Bertoncelj, A., Dominici, G., Pejić Bach, M., & Trnavčević, A. (2020). Conceptual Key Competency Model for Smart Factories in Production Processes. Organizacija, 53(1). https://doi.org/10.2478/orga-2020-0005

Jerman, A., Pejić Bach, M., & Aleksić, A. (2020). Transformation towards smart factory system: Examining new job profiles and competencies. Systems Research and Behavioral Science, 37(2). https://doi.org/10.1002/sres.2657

Juhász, T., Horváth-Csikós, G., & Gáspár, T. (2023). Gap analysis of future employee and employer on soft skills. Human Systems Management, 42(5). https://doi.org/10.3233/HSM-220161

K. Alazmi, H., Z. Metwaly, A., & M. Albaz, M. (2023). The Impact of Russia-Ukraine War on The Egyptian Stock Market. International Journal of Accounting and Management Sciences, 2(4). https://doi.org/10.56830/ijams10202302

Kannan, K. S. P. N., & Garad, A. (2021). Competencies of quality professionals in the era of industry 4.0: a case study of electronics manufacturer from Malaysia. International Journal of Quality and Reliability Management, 38(3). https://doi.org/10.1108/IJQRM-04-2019-0124

Kashive, N., & Khanna, V. T. (2023). Emerging HR analytics role in a crisis: an analysis of LinkedIn data. Competi-tiveness Review, 33(6). https://doi.org/10.1108/CR-03-2022-0029

Kipper, L. M., Iepsen, S., Dal Forno, A. J., Frozza, R., Furstenau, L., Agnes, J., & Cossul, D. (2021). Scientific mapping to identify competencies required by industry 4.0. Technology in Society, 64. https://doi.org/10.1016/j.techsoc.2020.101454

Lamri, J., & Lubart, T. (2023). Reconciling Hard Skills and Soft Skills in a Common Framework: The Generic Skills Component Approach. In Journal of Intelligence (Vol. 11, Issue 6). https://doi.org/10.3390/jintelligence11060107

Marin-Zapata, S. I., Román-Calderón, J. P., Robledo-Ardila, C., & Jaramillo-Serna, M. A. (2022). Soft skills, do we know what we are talking about? In Review of Managerial Science (Vol. 16, Issue 4). https://doi.org/10.1007/s11846-021-00474-9

Mikła, A. (2025). Managerial Competencies Manage ment–A Practical Approach. Education Excellence and Innovation Management: A.

Mitrofanova, E., Mitrofanova, A., & Margarov, G. (2023). Impact of global challenges on managerial competencies. AIP Conference Proceedings, 2757. https://doi.org/10.1063/5.0135787

Molek-Winiarska, D., & Kawka, T. (2024). Reducing Work-Related Stress Through Soft-Skills Training Intervention in the Mining Industry. Human Factors, 66(5). https://doi.org/10.1177/00187208221139020

Parlamis, J., & Monnot, M. J. (2019). Getting to the CORE: Putting an End to the Term "Soft Skills." Journal of Management Inquiry, 28(2). https://doi.org/10.1177/1056492618818023

Putra, A. S., Novitasari, D., Asbari, M., Purwanto, A., Iskandar, J., Hutagalung, D., o, S., & Cahyono, Y. (2020). Examine Relationship of Soft Skills, Hard Skills, Innovation and Performance: the Mediation Effect of Organ-izational Learning. International Journal of Science and Management Studies (IJSMS). https://doi.org/10.51386/25815946/ijsms-v3i3p104

Qizi, K. N. U. (2020). Soft Skills Development in Higher Education. Universal Journal of Educational Research, 8(5).

Ramadhan, H., Lumbanraja, P., & Sinulingga, S. (2021). Analysis of the Effect of Competence and Soft Skill on Employee Performance with Job Satisfaction as Intervening Variable at the Regional Social Services of South Tapanuli Regency. International Journal of Research and Review, 8(8). https://doi.org/10.52403/ijrr.20210840

Sabuhari, R., Sudiro, A., Irawanto, D. W., & Rahayu, M. (2020). The effects of human resource flexibility, employee competency, organizational culture adaptation and job satisfaction on employee performance. Management Science Letters, 10(8). https://doi.org/10.5267/j.msl.2020.1.001

Sancho-Cantus, D., Cubero-Plazas, L., Botella Navas, M., Castellano-Rioja, E., & Cañabate Ros, M. (2023). Importance of Soft Skills in Health Sciences Students and Their Repercussion after the COVID-19 Epidemic: Scoping Review. In International journal of environmental research and public health (Vol. 20, Issue 6). https://doi.org/10.3390/ijerph20064901

Shet, S. V., & Pereira, V. (2021). Proposed managerial competencies for Industry 4.0 – Implications for social sustainability. Technological Forecasting and Social Change, 173. https://doi.org/10.1016/j.techfore.2021.121080

Singh Dubey, R., Paul, J., & Tewari, V. (2022). The soft skills gap: a bottleneck in the talent supply in emerging economies. International Journal of Human Resource Management, 33(13). https://doi.org/10.1080/09585192.2020.1871399

Singh Dubey, R., & Tiwari, V. (2020). Operationalisation of soft skill attributes and determining the existing gap in novice ICT professionals. International Journal of Information Management, 50. https://doi.org/10.1016/j.ijinfomgt.2019.09.006

Szász, L., Demeter, K., & Boer, H. (2015). Production competence revisited - A critique of the literature and a new measurement approach. Journal of Manufacturing Technology Management, 26(4). https://doi.org/10.1108/JMTM-09-2013-0120

Szczepańska-Woszczyna, K., & Dacko-Pikiewicz, Z. (2014). MANAGERIAL COMPETENCIES AND INNOVA-TIONS IN THE COMPANY – THE CASE OF ENTERPRISES IN POLAND. Business, Management and Edu-cation, 12(2). https://doi.org/10.3846/bme.2014.240

Wong, S.-C. (2020). Competency Definitions, Development and Assessment: A Brief Review. International Journal of Academic Research in Progressive Education and Development, 9(3). https://doi.org/10.6007/ijarped/v9-i3/8223

Zainal Shah, N. binti, Ab Aziz, N. S. binti, & Marie Balraj, B. (2022). Soft Skills for Employability from Academics Perspectives. Journal of Advances in Humanities Research, 1(3). https://doi.org/10.56868/jadhur.v1i3.36