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Importance–Performance Analysis of Human Capital Components in the Iranian Petroleum Industry: A Technology-Based Approach

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Highlights

- This study advocates transitioning from a resource-centric exploitation model to a technology-driven model in the oil industry, emphasizing its necessity for overcoming the resource curse and achieving sustainable economic growth within a resistance economy framework.
- The study provides a robust analytical framework for assessing capability importance and performance, offering valuable insights for resource-rich economies seeking to enhance competitive advantage and profitability through technology-driven strategies.

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Abstract

The resource-based model, centered on the extraction and sale of crude oil, has significantly contributed to the phenomenon of the natural resource curse, undermining sustainable economic growth. Consequently, this study advocates a paradigm shift in Iran's oil industry, moving from the current model of crude oil extraction and export toward a technology-driven approach. The technology-centric strategy is proposed as a means to mitigate this challenge and facilitate long-term development. In this context, critical questions arise: How prepared is a nation's oil industry across technical, human, structural, and other dimensions to adopt a technology-driven model? This research focuses on the human capability components within Iran's oil industry to implement such a model. To this end, 36 components across four key domains—organizational talent management, leadership, human resources, and organizational capabilities—were analyzed using the Importance–Performance Analysis method. The findings reveal that leadership-related components predominantly fall within Quadrant I of the Importance–Performance Analysis matrix, indicating high importance but weak performance, thus necessitating urgent strategic interventions. Conversely, most human resource components reside in Quadrant IV, reflecting the existing workforce's high readiness for adopting a technology-driven approach in Iran's oil industry. Components related to organizational capabilities and talent management are dispersed across multiple quadrants, underscoring the need for tailored policies and context-specific measures. Further results indicate that transitioning to a technology-driven model could yield significant competitive advantages and profitability for Iran's oil industry. However, this transformation requires a comprehensive evaluation of existing capabilities and the design of targeted strategies to address identified gaps. This research ultimately emphasizes the imperative of aligning Iran's oil industry with advanced technological paradigms to ensure sustainable growth and resilience against the resource curse.

Keywords: Human capability components, Importance–Performance Analysis (IPA), Iran, Organizational readiness, Petroleum industry, Resource curse, Technology-driven model

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1. Introduction

Economic development is widely regarded as a national and public ideal for all countries. Despite varying interpretations of the concept, its attainment has remained a fundamental goal of human life. This objective is reflected across various societal components, from industry to culture, prompting ongoing reflection and examination. In the Islamic Republic of Iran, the pursuit of progress and the realization of national goals have consistently captured the attention of policymakers, dedicated implementers, and the general public. Endowed with abundant natural resources such as oil and gas, Iran holds a strategically significant position globally. It ranks as the world's second-largest holder of natural gas reserves and the fourth-largest in oil reserves (Zibakalam & Tafti, 2023).

However, studies indicate that despite these advantages, the oil industry's contribution to the country's development has been suboptimal (Derakhshan, 2013; Noruzi, 2016). Compounding this issue are the growing competitiveness of rival nations and the volatile fluctuations in energy prices, both of which have hindered Iran's developmental progress. Moreover, the national economy's heavy reliance—both overt and covert—on oil and gas export revenues has exposed the country to external pressures, including sanctions imposed by adversarial entities (Ajili & Mobini Kesheh, 2013).

Development driven by natural resources has long been a focal point of economic discourse. While many economists argue that such development has largely failed—citing the superior economic performance of resource-poor nations compared to their resource-rich counterparts—others contend that success is attainable through the adoption of effective strategies, given the pivotal role of natural resources in production processes (Taherifard & Hoseini, 2011). Additionally, extensive research has explored the concept of natural resource governance, employing policy-oriented and prescriptive approaches to analyze the so-called resource curse phenomenon (Hosseini & Noruzi, 2016).

Many of the challenges faced by resource-rich countries, including Iran, stem from an exploitation-centric approach to natural resources such as oil and gas. Transitioning to a knowledge-based and technology-driven paradigm could not only mitigate economic vulnerabilities but also foster rapid growth.

The successful implementation of a technology-driven approach hinges on the availability of diverse structural, managerial, and human competencies. Identifying these prerequisites is essential for realizing this transition. This study, therefore, focuses on the human capabilities within Iran's oil industry that are critical for adopting a technology-driven approach. It seeks to clarify the concept of such an approach, outline the requisite human skills, and conduct an Importance–Performance analysis of these capabilities in the context of Iran's oil sector.

The primary innovation of this study lies in its development of a practical assessment tool to evaluate human capabilities necessary for adopting a technology-driven approach in Iran's petroleum industry. While the industry has traditionally relied on a resource-centric model, this research highlights the importance of shifting focus toward human capital readiness as a key enabler of technological transformation. By applying Importance–Performance Analysis, this study identifies critical gaps and strengths in four key areas of human capabilities. The proposed framework not only provides a clear roadmap for improving workforce readiness but also serves as a replicable model for assessing other dimensions of technological adoption, such as infrastructure and institutional adaptability.

2. Literature review and theoretical background

In this section, a comprehensive review of the literature and theoretical background is presented, highlighting key studies and foundational concepts relevant to the research topic. Furthermore, the principal terms and terminology employed throughout this study are briefly defined and contextualized to provide clarity and establish a common understanding for readers. This review serves as the conceptual foundation for the subsequent analysis and discussion in this research.

2.1. The resource-centered approach: understanding the origins of the resource curse phenomenon

In 1995, Sachs and Warner introduced the theory of the resource curse, arguing that resource-rich countries often experience slower economic growth compared to their resource-poor counterparts (Hosseini & Noruzi, 2016). Since then, extensive research across various economic and political disciplines has explored this phenomenon, identifying key frameworks and theories. Understanding these theories is crucial, as many challenges faced by resource-rich nations arise from their heavy reliance on resource extraction and export revenues. Adopting alternative strategies for natural resource utilization—such as those implemented in Norway—could lead to more favorable outcomes, as evidenced by the distinct development models of certain oil-rich countries.

Analyses reveal that governments typically respond to natural resource rents in two distinct ways. The first approach involves allocating resources to activities that bolster the government's political standing, often through patronage policies such as assigning public jobs to political allies or investing in politically favorable projects. Examples include vote-buying and the suppression of political opponents. The second approach is observed in governments constrained by efficient legal institutions, which employ economic tools to enhance political popularity. This strategy not only extends the political horizon of leaders but also encourages societal investment through increased savings.

A) Dutch disease theory

The term Dutch disease refers to the economic phenomenon in which the exploitation of natural resources leads to the decline of the industrial sector and other economic sectors. This occurs through two primary mechanisms: the spending effect and the resource movement effect (Ovald, 2024). According to this theory, a surge in natural resource revenues, coupled with an appreciation of the real exchange rate, can deindustrialize the economy and undermine the competitiveness of the tradable sector. First formulated by Corden and Neary in 1982, Dutch disease remains a significant factor in economic deindustrialization, though it is often overlooked in broader economic discourse. Interestingly, while deindustrialization can hinder economic diversification, it may also reduce environmental degradation (Ullah et al., 2020).

A useful first step in understanding Dutch disease is to outline its general mechanism. This can be illustrated using a simplified two-sector open economy model, where labor is fully employed and can move freely between the traded and non-traded sectors. The model emphasizes two key effects: cost-driven adjustments and resource reallocation. A resource boom boosts national income, increasing demand for both tradable and non-tradable goods. While the price of traded goods is determined by international markets, the relative price of non-traded goods must rise to balance the heightened demand (known as the expenditure effect). This price increase elevates real wages in the non-traded sector compared to the traded sector, prompting labor to shift from the latter to the former (the resource movement effect). Consequently, the traded sector contracts while the non-traded sector expands, leading to deindustrialization (Reisinezhad, 2023). For example, in countries experiencing an oil boom, the surge in resource revenues often results in labor moving from manufacturing to sectors such as construction or retail.

B) Rent-seeking patterns

Natural resource revenues, often classified as non-tax income, can diminish governments' accountability to their citizens. With fewer incentives for voters to monitor governmental actions, leaders may feel less compelled to address public demands, ultimately eroding public support. Additionally, the rise in rent-seeking and corruption associated with resource rents undermines the government's capacity to deliver essential public services (Guliyev, 2022). This dynamic increases the risk of internal conflicts (Musayev, 2016), highlighting the need to identify mechanisms that mitigate the adverse effects of resource rents on social and political stability (Mohamadian Mansour & Golkhandan, 2023).

Abundant resource wealth is often seen as a catalyst for the rise of authoritarian regimes, where leaders engage in rent-seeking and extractive practices (Ross, 2015). Numerous developing nations that are heavily reliant on natural resources function as rentier states—countries that depend predominantly on resource rents. These rents, derived from the exploitation of natural resources, shift the state's focus toward income allocation and rent distribution, often at the expense of broader economic development (Akinyetun et al., 2023). As Ross (2015) notes, "paradoxically, many of the poorest and most troubled countries in the developing world are endowed with significant natural resource wealth." This abundance of resources creates a powerful incentive for the establishment and perpetuation of authoritarian rule. For example, in some oil-rich nations, the concentration of wealth from resource exports has enabled leaders to consolidate power, often undermining democratic institutions in the process.

Autocratization often emerges when governmental accountability is weakened (Akinyetun et al., 2023). The paradox of abundant natural resources coexisting with economic stagnation stems from intense competition among enterprises and groups to access rents generated by resources such as gold, diamonds, oil, gas, and cotton. These actors frequently prioritize rent capture over contributing to broader economic growth. This narrow focus on resource extraction diverts attention from developing the state's productive capacity and potential investment opportunities, further exacerbating economic stagnation. In such environments, corruption thrives as government officials prioritize personal wealth accumulation over public welfare. The resulting competition for resource rents frequently escalates into conflict, rebellion, and even military intervention (Pütün, 2015). For example, in countries such as Sierra Leone and Angola, the struggle for control over diamond and oil revenues has fueled prolonged civil wars, illustrating the destructive consequences of rent-seeking behavior.

In conventional economies, where governments depend on tax revenues, establishing a structured relationship with the corporate sector is essential. In such systems, enhancing the capacity of economic enterprises fosters a mutually beneficial dynamic, aligning the interests of corporations with those of the state. For households, paying taxes not only funds public services but also empowers citizens to hold the government accountable for its actions and performance. However, in economies reliant on oil—or other natural resources following a similar model—this reciprocal relationship is significantly weakened. Resource revenues reduce the state's dependence on taxes, diminishing its accountability to both households and corporations (Mahdavian, 2009). For instance, in oil-dependent economies such as Venezuela, the government's reliance on resource revenues has eroded its responsiveness to citizens and businesses, undermining democratic accountability.

A comprehensive review of the theories and frameworks addressing Dutch disease reveals that the root causes of developmental failures in resource-rich countries lie in their reliance on a resource-centered approach. This model, exemplified by Iran’s dependence on oil revenues, is inherently ill-suited to foster sustainable development and cannot serve as a viable foundation for macro-level economic progress.

C) Other theories

Theories explaining the natural resource curse have expanded considerably, with most focusing on how overreliance on finite resources such as oil, gas, or minerals leads to underdevelopment. These theories—ranging from economic distortions, such as Dutch Disease, to political issues, such as weak institutions in rentier states—often overlap because they emphasize similar root causes tied to resource dependence. However, the proliferation of these overlapping frameworks can create confusion. To address this, the present study organizes these theories into a structured taxonomy (Table 1), summarizing their core ideas and relationships without engaging in detailed debates. This streamlined approach provides clarity, enabling readers to grasp the broader landscape of the resource curse while setting the stage for deeper analysis in subsequent sections of this research.

Table 1

Taxonomy of theoretical frameworks on the natural resource curse: definitions, key concepts, and references

Theory	Definition	Key concepts	References
Dutch disease	Describes a macroeconomic phenomenon in which a surge in revenue from natural resource exports, such as oil, leads to currency appreciation, rendering non-resource sectors, including manufacturing, less competitive. This effect fosters over-reliance on finite resources, stifling diversification and long-term growth.	Currency appreciation, sectoral imbalance	Ovald (2024); Ullah et al. (2020)
Rentier state theory	Posits that governments reliant on resource rents rather than taxation lack accountability to citizens. This dynamic fosters corruption, weakens institutions, and prioritizes patronage over public welfare, thereby perpetuating underdevelopment.	Resource rents, weak institutions	Al-Sarihi & A. Chern (2022); Montambault Trudell (2024)
Price volatility	Highlights how dependence on commodities exposes economies to global price shocks, resulting in fiscal instability, debt crises, and underfunded public services. Price volatility discourages long-term planning and deters foreign investment.	Commodity shocks, fiscal instability	Aktürk et al. (2022)
Conflict theories	Links natural resources to armed conflict, as competing groups seek control over lucrative resources, such as “blood diamonds.” Resource wealth can finance rebellions, prolong wars, and destabilize post-conflict recovery.	Resource wars, conflict financing	Vongel (2022)

Theory	Definition	Key concepts	References
Paradox of plenty	Explains that abundant natural resources often correlate with poor economic performance and political instability. Contributing mechanisms include price volatility, underinvestment in human capital, and rent-seeking behaviors that distort governance.	Resource abundance, governance failure	Lapinskas (2023); Okorie et al. (2023)
Institutional theories	Emphasizes that resource-rich countries frequently develop extractive institutions that prioritize elite enrichment over inclusive growth. Weak property rights, corruption, and limited innovation reinforce dependency on natural resources.	Extractive institutions, governance	Sharma & Reddy Paramati (2022)
Social capital	Argues that resource dependence erodes trust and civic engagement by centralizing power in rentier elites. Communities become disenfranchised, reducing collective action and institutional legitimacy.	Trust deficit, civic disengagement	Al-Aloosy (2024)
Neoclassical growth models	Asserts that resource windfalls crowd out investments in human capital and technology. Without innovation, economies stagnate, failing to transition to higher-value sectors.	Crowding-out effect, human capital	Kleinman et al. (2024); Valentine Okolo et al. 2023

D) Sustainable development

The transition toward a technology-driven oil industry aligns closely with the principles of sustainable development, which emphasize the integration of economic efficiency, environmental responsibility, and social equity. Unlike the extractive resource-based model—which often contributes to environmental degradation, economic volatility, and social disparity—the proposed model seeks to enhance long-term competitiveness while fostering human capital and institutional innovation. By strengthening the knowledge and technological base of the oil sector, this approach supports the creation of a resilient industrial ecosystem capable of adapting to global energy transitions. In this context, the research contributes to the broader agenda of sustainable development by highlighting the strategic importance of human capabilities in achieving a more inclusive and future-oriented oil economy. The figure below presents one of the most widely recognized diagrams related to sustainable development, illustrating its components and their interrelationships. While more detailed aspects of these models could be explored, they are beyond the scope of this article.

2.2. The Pitfalls of the resource-centered approach: a case for technology-driven development

The global oil industry is shaped by two distinct development paradigms. The first is the resource-centered model, which prioritizes the exploitation of oil and gas reserves. The second, the technology-driven approach, emphasizes building technological capabilities and infrastructure to optimize resource extraction while generating added value through engineering, equipment manufacturing, and technical operations. Unlike the resource-centered model, the technology-driven approach can function independently of direct resource exploitation, fostering innovation and economic diversification. For instance, Norway's oil industry exemplifies this model, where investments in technology and infrastructure have created a resilient and diversified economy, reducing reliance on raw resource exports.

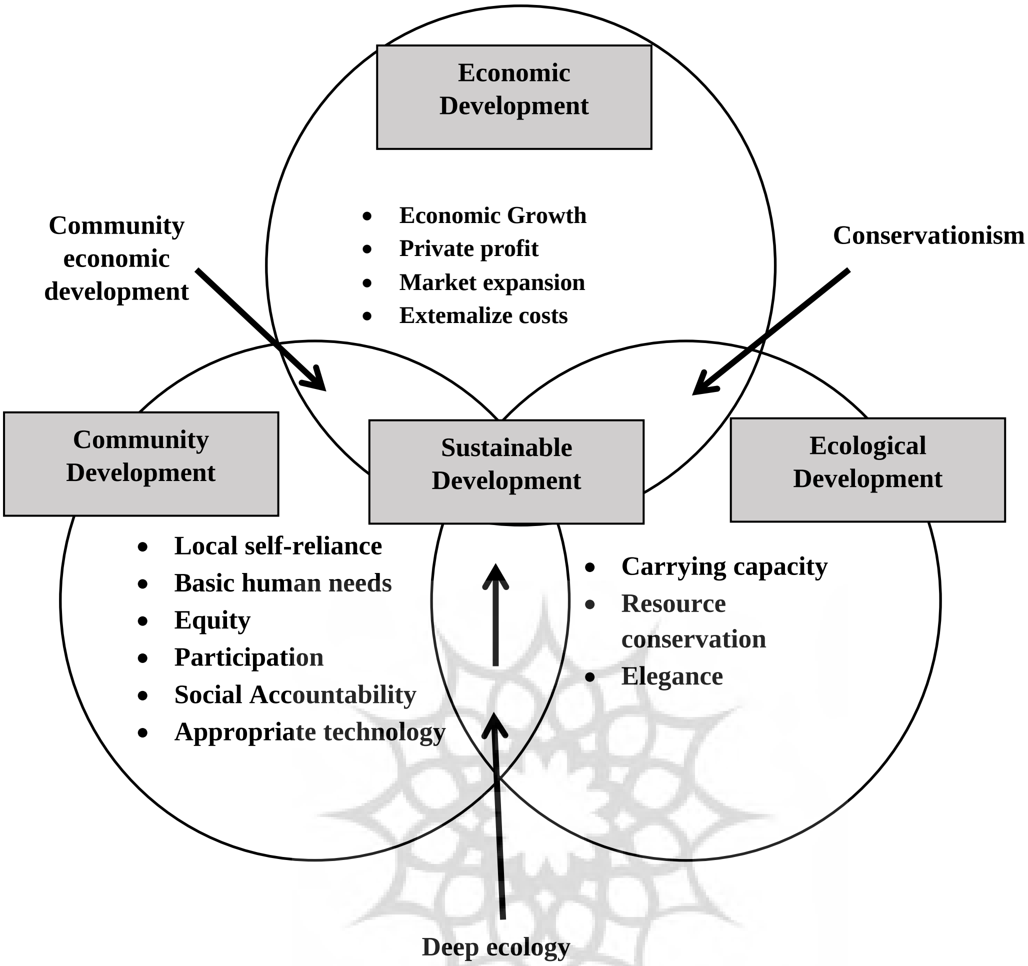

Figure 1

Theoretical model of sustainable development (Paris & Kates. 2003)

Under the resource-centric approach, oil and gas extraction relies heavily on foreign investment and imported technology, with the primary aim of generating revenue through the sale of crude oil and natural gas. Countries adopting this model focus on maintaining their share of global oil production and ensuring a stable energy supply for international markets, often relegating technological advancement to a secondary priority. However, this reliance on external resources has stunted the endogenous growth of local industries, leaving them poorly aligned with domestic cultural and managerial contexts. Consequently, these nations frequently grapple with administrative inefficiencies, state monopolies, and diminished productivity (Qayumi-Abraqoui et al., 2004). For example, in countries such as Venezuela, dependence on foreign technology and investment has stifled the development of local expertise, perpetuating economic vulnerabilities.

In the resource-centered model, exploitation is typically achieved through the utilization of imported technology and foreign capital. The primary competitive advantage of resource-rich countries stems from their access to natural resources, such as oil, gas, or other raw materials, and the relatively low cost of extraction compared to other nations. An intriguing aspect of this approach is that some countries with minimal natural resource endowments have acquired advanced international technologies for resource extraction. These countries then offer technological services to resource-rich nations, securing a significant position in the global natural resource market. In some cases, they even extend their involvement to other stages of the value chain by processing raw natural resources, such as oil and gas, into higher-value products. These processed goods are subsequently sold at prices several times higher than the raw materials to resource-rich countries.

In the technology-driven development model, the emphasis is placed on advancing technological capabilities, specifically the scientific and technical expertise required for the exploration, production, and processing of oil. In these countries, the necessary institutional and human infrastructure for engineering activities, resource exploitation, and development is established. This enables them not only to extract their own resources but also to actively participate in projects within oil-rich nations. The oil industry in such countries becomes an integral component of a developed society, serving not only as a reliable source of income but also as a means to achieve broader strategic objectives (Qayumi-Abraqoui et al., 2004).

When examining the fundamental differences between these two perspectives, it is crucial to emphasize that the profitability of the resource-centered model depends heavily on rising prices of natural resources, such as oil. When resource prices increase, and given the significant gap between production costs and selling prices, resource-rich countries benefit from higher revenues. However, if resource prices decline, resources are depleted, or global consumption patterns shift, these countries may face severe economic and structural challenges due to reduced revenue from resource sales. In contrast, the technology-driven approach, which relies on a knowledge chain and an extensive network for the production and utilization of technological knowledge, can generate substantial profits from natural resource extraction while being less vulnerable to fluctuations in resource prices. In the event of reduced production of one resource, the knowledge-driven model can adapt by shifting focus to other resources, leveraging its technological expertise to extract and process them. Another significant advantage of this approach is the establishment of a robust human network, spanning universities to production and industrial centers, which supports continuous innovation and development.

In the exploitation-oriented perspective on technology development, proponents of the first group adopt a narrower view of technology, perceiving it primarily as tools, equipment, and machinery used for oil extraction, which can be easily bought and sold in the market. In contrast, the second group defines technology as an integrated system comprising human and organizational software alongside hardware. This system collectively facilitates the production and exploitation of oil resources. From this perspective, technology cannot be readily acquired through market transactions; instead, it requires time, consistent and targeted investment, and endogenous development to achieve progress. Table 2 provides a detailed comparison of these two approaches.

As illustrated in Table 2, the fundamental differences between the resource-centered and technology-driven models underscore the necessity and urgency of transitioning from a resource-centered approach to a technology-driven one. Moreover, the previous section highlighted the critical role of technology in conventional development models, further reinforcing its indispensable position in achieving sustainable and effective development. A key conclusion drawn from this analysis is that without leveraging technology, development—even if attainable—will lack sustainability.

Table 2

Comparison of two approaches: resource-oriented and technology-oriented development models in the oil industry

Axis of difference	Technology-driven model	Resource-centric model
Competitive advantage	Possession of technological knowledge for international development.	Possession of abundant oil and gas resources with low extraction costs.
Fixed capital	Human resources and organizational knowledge.	Reliance on oil and gas resources.
Profit conditions	Applicable when advanced knowledge is possessed.	Gains occur in the event of an increase in oil prices.
Failure conditions	Limitation arises when confined to technologies of a single type of energy, such as oil, without updating technological knowledge.	Vulnerable in the event of a decrease in oil prices, depletion of oil resources, or shifts in global energy sources.
Profitability rate	Dependence on contractual conditions, ranging from acceptable to very high.	Profits depend on the difference between oil prices and extraction costs.
Technology approach	Encompasses all components—hardware, software, brainware, humanware, and organizationware—and requires endogenous development.	Technology is limited to hardware, which can be purchased and transferred.
Impact on the country's macroeconomics	Establishes a platform for lateral growth in other technological fields, completing the full chain of activities.	The country's economic dependence on oil revenues.

2.3. Importance–performance analysis

The four quadrants of the Importance–Performance Analysis (IPA) diagram represent distinct strategic implications, each guiding specific managerial actions based on varying levels of importance and performance.

Quadrant 1 (Concentrate Here): Projects in this quadrant exhibit high importance but low performance. These represent critical areas that demand immediate attention and improvement. To support the firm's future growth and development, it is imperative to allocate additional resources and implement targeted strategies to enhance the performance of these projects.

Quadrant 2 (Keep Up the Good Work): This quadrant represents projects with both high importance and high performance. These projects should be maintained and sustained, as they significantly contribute to the firm's competitive advantage. Consistent focus on these areas is essential to ensure the firm remains competitive in the long term.

Quadrant 3 (Low Priority): Projects in this quadrant are characterized by both low importance and low performance. These projects do not warrant significant attention or resource allocation and can be deprioritized, particularly when resources are limited.

Quadrant 4 (Possible Overkill): Projects in this quadrant are characterized by low importance but high performance. Considering the limited availability of resources, the firm should avoid further investments in these projects. Instead, resources should be reallocated to areas with greater strategic significance.

Q1: Concentrate here	Q2: Keep up the good work
Q3: Low priority	Q4: Possible overkill

Figure 1

Quadrant definition (Martilla & James, 1977)

2.4. Human capability

Human refers to talent and individual competence; organization refers to collaboration within teams, with a focus on building organizational capabilities such as agility, culture, and strategic clarity; leadership and leaders bridge talent and organization; and the human resources (HR) function provides the necessary infrastructure (Ulrich, 2024).

As depicted in Figure 2, the management of people and organizations encompasses a range of initiatives that can be organized into four domains collectively referred to as human capability:

- **Talent:** Refers to people, employees, workforce, and individual competencies (Ulrich & Smallwood, 2011).
- **Organization:** Refers to teams, culture, workplace, and organizational capabilities (Ulrich & Yeung, 2019).
- **Leadership:** Refers to individual leaders who set direction and make decisions, as well as the distribution of leadership throughout an organization (Ulrich & Smallwood, 2012).
- **Human Resources (HR):** Refers to HR departments, practices (hiring, compensation, training, policy-setting), and personnel (Ulrich & Allen, 2014).

Transformation arises from targeted initiatives that impact each of the four domains—talent, organization, leadership, and HR—with a focus on creating value for others (Ulrich, 2020).

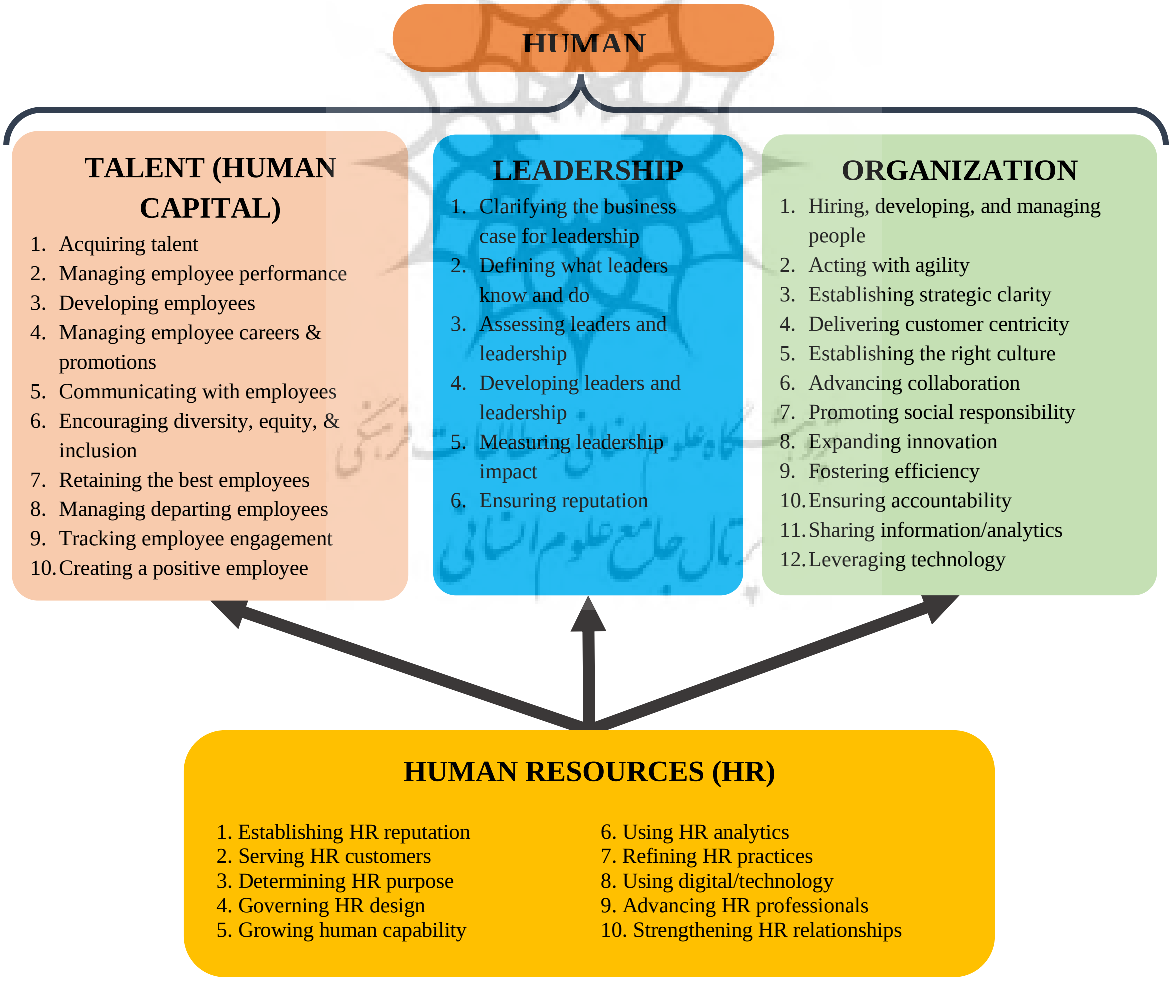

Figure 2
Human capability structure (Allen & Ulrich, 2023)

a) Human capability value for all stakeholders

Greater value for all stakeholders results when human capability initiatives begin with external stakeholders. Once stakeholder needs and expectations are understood and defined, business and HR leaders can envision human capability from a different perspective, ensuring that internal goals, values, and actions deliver stakeholder value. By adopting this outside-in focus, business and HR leaders ensure that internal human capability practices contribute to value creation for all stakeholders (see Figure 3) (Ulrich, 2024).

Organizational Talent Management: This category encompasses acquiring talent, managing employee performance, developing employees, managing careers and promotions, communicating with employees, encouraging diversity, equity, and inclusion, retaining top performers, managing departing employees, tracking employee engagement, and creating a positive employee experience. To elaborate, the guiding question is: *What should the company do to ensure it has the right competencies, workforce, or individual skills?*

Leadership: This category includes clarifying the business case for leadership, defining what leaders know and do, assessing leaders and leadership, developing leaders and leadership, measuring leadership impact, and ensuring reputation. The guiding question is: *What should the company do to ensure it has the right leaders and shared leadership at all levels?*

Organizational Capabilities: This category covers hiring, developing, and managing people; acting with agility; establishing strategic clarity; delivering customer centricity; fostering the right culture; promoting collaboration and social responsibility; expanding innovation; enhancing efficiency; ensuring accountability; sharing information and analytics; and leveraging technology. The guiding question is: *What should the company do to ensure it has the right organizational capabilities, workplace, or teams?*

Human Resources (HR): This category comprises establishing HR reputation, serving HR customers, determining HR purpose, governing HR design, growing human capability, using HR analytics, refining HR practices, applying digital technologies, advancing HR professionals, and strengthening HR relationships. The guiding question is: *What should the company do to ensure it has the right HR department, practices, metrics, and personnel?*

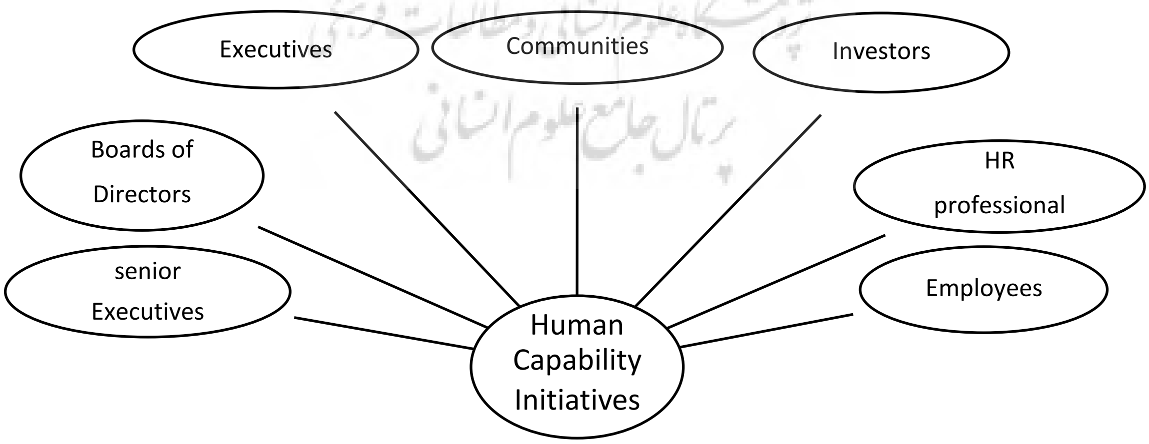

Figure 3

Human capability value for all stakeholders (Ulrich, 2024)

2.5. How do outside-in advances HR work?

An outside-in logic emphasizes how HR work delivers value to external—not just internal—stakeholders. This approach links internal organizational activities to external outcomes. Over time, organizations have connected the inside with the outside, often beginning with internal HR practices designed to create value for external stakeholders. For example:

- Build a skills-based organization so that customers receive products they value.
- Upgrade leadership so that the organization achieves a premium price-to-earnings ratio (intangibles) with investors.
- Enhance employee experience so that customer experience improves.

By applying this outside-in logic, human capability choices—encompassing talent, leadership, organization, and HR—can be aligned with the needs of all stakeholders. Effectively managed, these capabilities enable business and HR leaders to deliver value to both internal and external stakeholders (Ulrich, 2024).

3. Research methodology

This study also employs an Importance–Performance Analysis (IPA), which is a matrix-based approach generated through users' perceptions of an information system's performance (Putra & Bernarto, 2022). The resulting matrix maps attributes that require improvement, enabling enhanced system performance (Luthfi Hamzah et al., 2022).

This qualitative method allows for an in-depth examination of individuals' personal experiences. Rather than interpreting these experiences solely through existing literature or theoretical frameworks, it accounts for participants' real-life perspectives (Smith & Osborn, 2015). Additionally, this approach facilitates the phenomenological investigation of topics that are unresearched or understudied (Shinebourne, 2011).

The construction of the research methodology in this study is guided by the theoretical concept of the research onion, proposed by Saunders et al. (2016) (Figure 4). The research onion is a tool that assists in organizing the research process and developing the research design by progressing through its layered structure step by step. Methodological development begins with defining the research philosophy, selecting approaches, methods, and strategies, and determining the time horizon. These steps collectively guide the research logic toward the research design, encompassing the primary techniques and procedures for data collection and analysis (Melnikovas, 2018).

In light of the foregoing, the methodology of the present study can be summarized in several ways, as outlined in Table 3.

Table 3

Methodological dimensions of research (Source: Authors' own)

Dimensions	Answer
Research philosophy	**Pragmatism**
Approach to theory development	**Identification and prioritization**
Methodological choice	**Deductive-inductive**
Research approach	**Qualitative-quantitative**
Research strategy	**Survey**
Time horizon	**Cross-sectional**
Techniques and procedures	**Questionnaire**

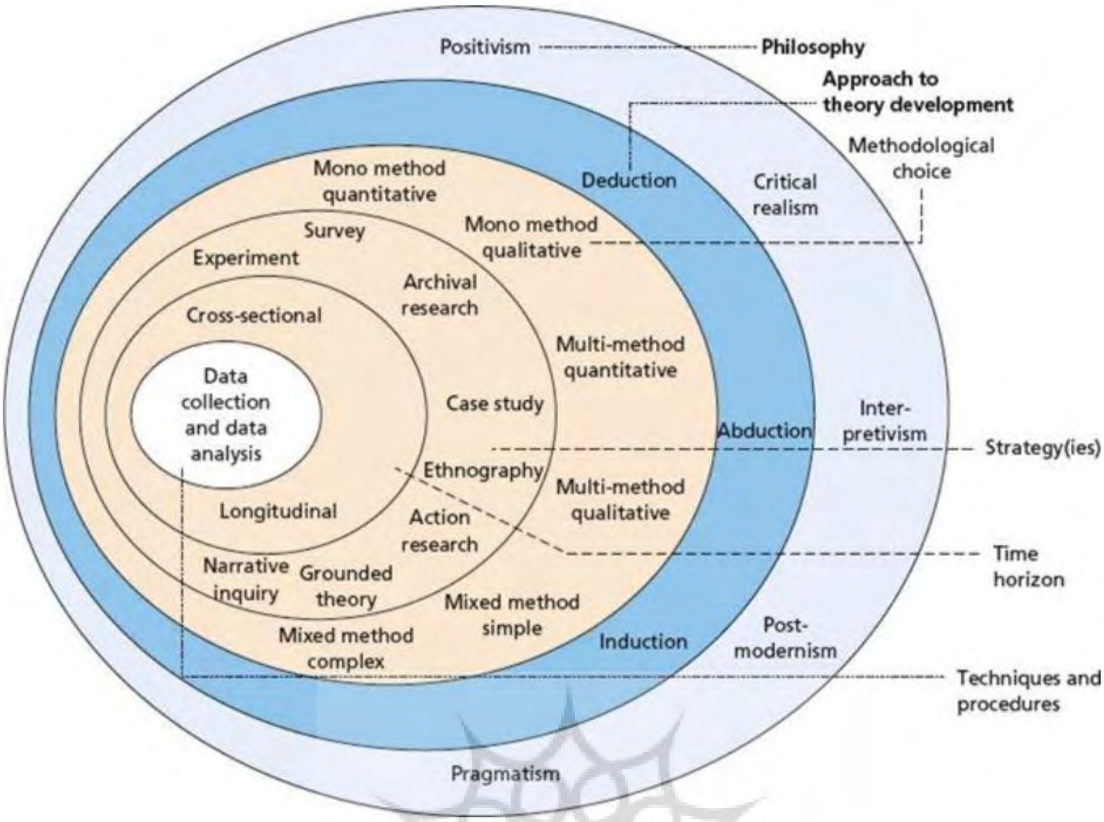

Figure 4

Saunders et al. 's Research Onion, 2016

As presented in Table 3, this study is classified as applied research in terms of its objective and is descriptive in nature. The research employed a survey-based approach, a widely accepted method for diagnosing strengths and weaknesses within complex systems by assessing performance and importance dimensions. Data collection was conducted using a structured questionnaire specifically designed for this study, comprising 36 items distributed across four key domains: organizational talent management, leadership, human resources, and organizational capabilities.

The questionnaire consisted of two main sections. The first measured the perceived importance of each component using a 5-point Likert scale (1 = least important, 5 = most important), while the second assessed the perceived performance of the Iranian oil industry in each component using the same scale (1 = very poor, 5 = very good). The target population included researchers, senior practitioners, and domain experts with proven experience in the Iranian oil industry. From this population, a purposive sample of 10 industry experts was selected based on their specialized knowledge and professional engagement with strategic and operational aspects of the sector. These individuals were primarily drawn from executives, engineers, and policy advisors actively involved in national oil-related institutions and development projects.

The data collected from the completed questionnaires were analyzed using the Importance–Performance Analysis (IPA) matrix, enabling the identification and prioritization of key human capability components necessary for transitioning toward a technology-driven model. The content validity of the questionnaire was confirmed by a panel of subject-matter experts, and the reliability of the instrument was assessed and deemed satisfactory.

4. Findings

The data derived from the mean scores of the 36 variables related to human capabilities are presented in Table 4.

Table 4

The gap between resource-based and technology-based approaches: importance and performance as IPA outcomes

Code	Variable	Mean importance	Mean performance	Result	Quadrants
C01	Acquiring talent	3/92	2/17	Concentrate here	1
C02	Managing employee performance	3/50	2/42	Possible overkill	4
C03	Developing employees	3/74	2/42	Possible overkill	4
C04	Managing employee careers and promotions	3/65	2/00	Low priority	3
C05	Communicate with employees	3/08	2/81	Possible overkill	4
C06	Ensuring diversity, equity and inclusion	4/50	2/32	Keep up the good work	2
C07	Retaining the best employees	2/88	1/96	Low priority	3
C08	Managing departing employees	3/85	2/88	Keep up the good work	2
C09	Improve and track employee engagement	3/21	2/38	Possible overkill	4
C10	Creating a positive employee experience	4/06	2/67	Keep up the good work	2
C11	Business case	3/86	2/59	Keep up the good work	2
C12	Know and do	3/95	2/11	Concentrate here	1
C13	Assess leaders	3/85	2/05	Concentrate here	1
C14	Invest in leaders	4/08	1/83	Concentrate here	1
C15	Measure impact	4/01	1/83	Concentrate here	1
C16	Ensure reputation	3/88	2/19	Concentrate here	1
C17	Talent	4/16	1/66	Concentrate here	1
C18	Agility	3/99	1/76	Concentrate here	1
C19	Strategic clarity	3/95	2/23	Concentrate here	1

Code	Variable	Mean importance	Mean performance	Result	Quadrants
C20	Customer centricity	3/92	2/29	Keep up the good work	2
C21	Right culture	3/27	2/63	Possible overkill	4
C22	Collaboration	3/22	2/42	Possible overkill	4
C23	Social responsibility	4/22	2/32	Keep up the good work	2
C24	Innovation	3/79	2/35	Possible overkill	4
C25	Efficiency	3/66	2/13	Low priority	3
C26	Accountability	4/15	2/11	Concentrate here	1
C27	Information	4/51	1/83	Concentrate here	1
C28	Leverage technology	3/73	2/35	Possible overkill	4
C29	Reputation	3/44	2/58	Possible overkill	4
C30	Customers	4/01	1/76	Concentrate here	1
C31	Purpose	4/13	2/19	Concentrate here	1
C32	Design	3/32	2/47	Possible overkill	4
C33	Capability	3/08	2/42	Possible overkill	4
C34	Analytics	3/12	2/35	Possible overkill	4
C35	Practices	3/56	2/38	Possible overkill	4
C36	Professionals	2/96	2/32	Possible overkill	4

The data on the mean scores of the 36 human capability variables influencing the implementation of the technology-driven approach are presented in Figure 5. These scores were subsequently mapped onto the Importance–Performance Analysis (IPA) grid and plotted across four quadrants based on the mean scores of both dimensions. In summary, 13 variables were positioned in the ‘Focus Here’ quadrant, 6 variables in the ‘Keep Up the Good Work’ quadrant, 3 variables in the ‘Low Priority’ quadrant, and 14 variables in the ‘More Than Possible’ quadrant (Figure 5).

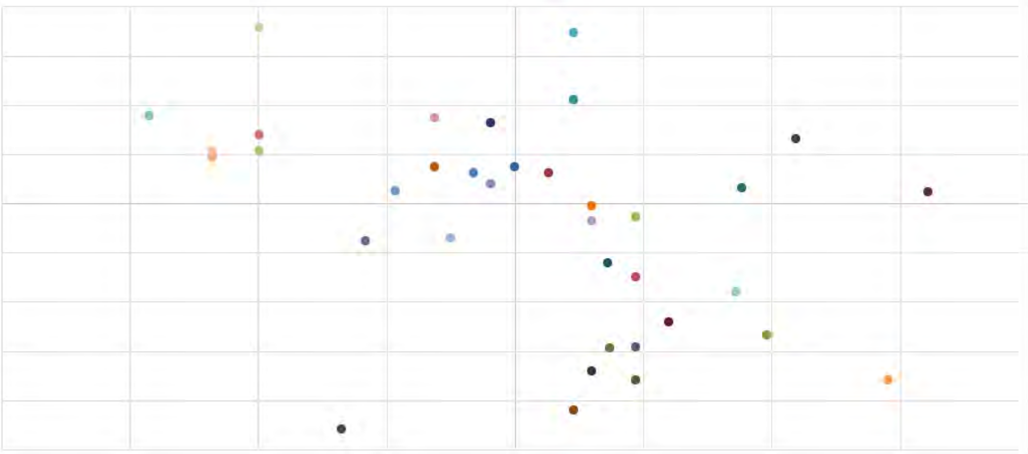

Figure 5

Mapping results on the importance–performance matrix

Figure 5 presents the Importance–Performance Analysis (IPA) network, illustrating the level of importance of each human capability component in implementing a technology-driven approach, along with the corresponding performance levels of the Iranian oil industry.

The first quadrant represents components with high importance but low performance, indicating areas that require focused attention. The findings show that, of the six leadership-related components, five are positioned in this quadrant. Thus, from the perspective of assessing human capabilities for implementing a technology-driven approach, organizational leadership demands particular emphasis. Additionally, four organizational capability components—related to strategy clarity, organizational responsiveness, organizational agility, and the availability of current and sufficient information—are also situated in this quadrant. Furthermore, two components from organizational talent management and human resources are positioned here.

In terms of prioritization for performance enhancement, 'Being up to date and availability of sufficient information' is ranked first with a score of 12.09, followed by 'Recognition of talented employees' with a score of 10.35.

The second quadrant, representing high importance and high performance, includes three components from organizational talent management. These components pertain to fostering a diverse workforce with equity, creating a positive employee experience, and effectively managing the exit process for departing employees.

The fourth quadrant, representing low importance but high performance, is often considered a potential area of resource overinvestment. A considerable number of human resources–related components fall within this quadrant, suggesting that significant investments in HR have resulted in a workforce of higher quality than currently required for implementing a technology-driven approach.

Regarding organizational capabilities and organizational talent management, a unified assessment cannot be provided, as the components of these categories are distributed across all four quadrants. This dispersion indicates that a uniform evaluation of sub-components is not appropriate. Relevant authorities should make decisions based on the specific quadrant placement of each sub-component. For example, while 'Recognition of talented employees' in organizational talent management is positioned in the first quadrant with a score of 10.35, indicating a need for special focus, 'Diverse workforce and equity' is placed in the second quadrant, 'Management of employees' career progression' is in the third quadrant, and 'Employee commitment and engagement' is in the fourth quadrant. From the perspective of IPA, each component requires a distinct management approach. A similar distribution pattern is observed for components in the category of organizational capabilities.

5. Conclusions

This study adopts an analytical approach to examine two development models in the oil industry: the resource-centered (exploitation-based) model and the technology-driven model. It emphasizes that the macroeconomic policies of the resistance economy necessitate replacing the prevailing resource-centered approach—focused on crude oil extraction and direct sales—with a technology-driven development model. In this context, after reviewing key theories related to the 'resource curse,' the study concludes that the root cause of this phenomenon lies in the resource-centered approach. Consequently, the distinctions between the resource-centered and technology-driven models were analyzed, and the role of technology within conventional development frameworks was examined to refine its position within these paradigms.

While understanding and implementing development models is a challenging, time-consuming, and multifaceted task, adopting appropriate approaches to support national progress is of utmost importance. An unsuitable approach could not only fail to achieve fundamental development goals but also hinder the realization of indigenous, value-based frameworks, such as the Islamic-Iranian Model of Progress. Moreover, many development approaches are based on incomplete or flawed conceptual frameworks, which require thorough revision before operationalization. Addressing these deficiencies is essential for establishing sustainable and meaningful development aligned with the nation's cultural and value-driven foundations.

Given that the implementation of technologies and systems requires specific capabilities, competencies, and skills, this study examines key components of the Iranian oil industry relevant to technological mechanisms for implementation. These components were analyzed using the Importance–Performance Analysis (IPA) method. Four categories—organizational talent management, leadership, organizational capabilities, and human resources—comprising 36 components in total, were identified.

The results indicate that most leadership-related components for implementing a technology-driven approach in the Iranian oil industry fall within the first quadrant of the IPA matrix, signifying high importance but low performance and, therefore, requiring urgent attention. In contrast, most human resources–related components are positioned in the fourth quadrant, reflecting high performance but lower strategic importance; in other words, the existing human resources possess a higher quality than currently necessary for implementing a technology-driven approach. Components in the categories of organizational capabilities and talent management are distributed across multiple quadrants, precluding a unified assessment of these categories. Consequently, policymakers and executives must evaluate each component individually to inform targeted strategic interventions.

In conclusion, the adoption of a technology-driven approach has the potential to generate substantial competitive advantages and profitability for the Iranian oil industry. Achieving this, however, requires a comprehensive assessment of all necessary capabilities. The findings of this research may also serve as a model for analyzing the Importance–Performance of capabilities in comparable contexts.

This study is subject to several limitations that should be acknowledged. First, the concept of transitioning from a resource-based model to a technology-driven paradigm in the oil industry involves substantial conceptual complexity, which may have influenced participants' interpretations and responses. Second, the limited availability of experts with deep, specialized knowledge in this domain constrained both the depth and diversity of insights gathered. Third, the prevalence of a traditional resource-oriented mindset within the oil sector posed challenges in engaging stakeholders with the future-oriented, technology-centered perspective proposed in this research. These limitations highlight the need for broader engagement, interdisciplinary collaboration, and continued empirical investigation in future studies.

Building on the findings of this study, several avenues for future research are recommended. First, subsequent studies could expand the analytical scope beyond human capabilities to include technical, financial, and institutional readiness for transitioning to a technology-driven oil industry. Second, future research could benefit from employing mixed-method designs, combining surveys with in-depth interviews or focus groups to capture nuanced perspectives and enhance contextual validity. Third, comparative studies involving other oil-dependent economies undergoing similar transitions—such as those in the Persian Gulf, Latin America, or North Africa—could provide broader insights and foster international learning. Fourth, longitudinal research could examine how capability development evolves over time in response to policy interventions or technological advancements. Finally, further studies might investigate how organizational culture, policy incentives, and regulatory frameworks interact with human capability development to either facilitate or hinder systemic transformation in the energy sector.

Nomenclature

HR	Human resources
IPA	Importance–performance analysis

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