

FUNCTIONAL REQUIREMENTS FOR DIGITAL TRANSFORMATION IN OIL & GAS ORGANIZATIONS

REQUERIMIENTOS FUNCIONALES PARA LA TRANSFORMACIÓN DIGITAL EN ORGANIZACIONES DE OIL & GAS

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Abstract

The functional requirements of the digital transformation in companies in the oil & gas sector were determined. I work with a quantitative approach, explanatory type, it is considered field with a non-experimental, transactional design. The intentional sample was 16 managers from different Petrochemical companies who were involved with the organizational processes of administrative areas. The observation technique was used through a survey, the questionnaire applied has items with multiple response options for five (5) alternatives, as follows: Always; Almost always; Sometimes, Almost never, and Never. In companies in the oil & gas sector, they lack a modern technical, rational and modern tool to respond to current demands that allow the administration and management of the network. The institutional need to propose digital transformation is considered viable; it was concluded that the infrastructure must have the required designs, as well as the operation of the hardware and software components that are used for instrumentation in its architecture.

Keywords: Organizational communication, Gas, Oil, Information systems, Digital transformation.

Resumen

Se determinaron los requisitos funcionales de la transformación digital en las empresas del sector oil & gas. Trabajo con un enfoque cuantitativo, de tipo explicativo, se considera de campo con un diseño no experimental, transaccional. La muestra intencional fue de 16 directivos de diferentes empresas Petroquímicas que estuvieron involucrados con los procesos organizacionales de las áreas administrativas. Se utilizó la técnica de observación a través de una encuesta, el cuestionario aplicado tiene ítems con múltiples opciones de respuesta para cinco (5) alternativas, así: Siempre; Casi siempre; A veces, Casi nunca y Nunca. En las empresas del sector oil & gas carecen de una herramienta técnica moderna, racional y moderna para responder a las demandas actuales que permitan la administración y gestión de la red. Se

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considera viable la necesidad institucional de proponer la transformación digital. Se concluyó que la infraestructura debe contar con los diseños requeridos, así como el funcionamiento de los componentes hardware y software que se utilizan para la instrumentación en su arquitectura.

Palabras clave: Comunicación organizacional, Gas, Petróleo, Sistemas de información, Transformación digital.

Introduction

The necessary requirements for digital transformation seek the reinvention of an organization or business using digital or technological means as an enabler, considering the organization horizontally with the clear objective of giving more value to customers, improving services, and generating a competitive advantage, inside out (Haouel & Nemeslaki, 2024). Likewise, the requirements of digital transformation focus on knowledge of the business, where the company is and where it wants to be and where it wants to go using technology as an enabler, so it depends on the strategy you want to follow (Fernandez et al., 2022).

One of the requirements focuses on business architecture, which is a critical element for any digital transformation project, because it is alive like any organization and changes during business life (Al-Hajri et al., 2024). Strategy, business, information systems and technology are interrelated (Indrajaya & Zulaikha, 2024). Additionally, it is a discipline to guide the business response to disruptive forces in a proactive and holistic manner, analyzing the execution of the change towards the business vision and the desired results (Borodin et al., 2021). It is important to note that it is always guided by the objectives and strategy that the business has outlined (Mohamed & Saad, 2022). If there is no intention to change anything within the business, the result of the architecture will most likely be a digital optimization rather than a digital transformation (Ogbu et al., 2024).

On the other hand, another requirement is the means of communication, given that they increasingly personalize the content they deliver to each user (Martins et al., 2023). The adjustments made should improve the operation of the company (Gao et al., 2022). Digital transformation is a cultural change within an organization and can often pose different challenges at the beginning (Sergeevna, 2024). For a digital transformation project to be successful, every stakeholder within the company must be on board (Billett, 2023). Brands can offer tailored content to their specific target audience based on their audience profile through programmatic advertising (Beisekenov et al., 2022). Thanks to programmatic advertising and the digital transformation of communication companies, they can deliver the right content to the right people at the right time (Zakharkina et al., 2022).

Finally, innovation technology in Digital Transformation can be listed according to four types that come together to be more efficient (Erbay & Yıldırım, 2022). These are Big Data, the cloud, social business and mobility (Rueckel et al., 2020). Likewise, it refers to the process of completely replacing manual, traditional and legacy methods of doing business with the latest digital alternatives (Samylovskaya et al., 2022). This type of reinvention touches all aspects of a business, not just the technology (Laplane et al., 2023). Also, innovation technology in digital transformation is accelerating digital transformation and giving CEOs the opportunity to reinvent business models by creating new products and services in order to stay updated with the market and thus offer a better service. quality (Froehlich et al., 2023).

In short, requirements are statements that identify attributes, characteristics, capabilities, qualities that a deliverable needs to fulfill in order for it to have value and usefulness. Likewise, deliverables are the promises of the team, which is what makes expectations met. Based on everything stated up to now in this work, the functional requirements of the digital

transformation were determined to strengthen quality management in companies in the Oil & Gas sector.

Methodology

The work is framed under the positivist paradigm, with a quantitative approach, the research methodologically responds to an explanatory type study and according to the source that originates the information, it is considered a field study with a non-experimental, transactional or transversal design (Paternina et al., 2024). The universe of the study is made up of companies in the Petrochemical sector of the state of Zulia in Venezuela, such as: POLINTER, PEQUIVEN, PRALCA and PROPILVEN. However, it is noted that the analysis units to be considered for the study were the Managers of different areas of each of the companies mentioned, see Table 1.

Table 1. Characteristics of the population under study

Companies	Managements	Post	Total
POLINTER	· General Management · Manufacturing Management · Administration and Finance Management · AIT Management · SSGG Management · DDSS Management	Managers	10
PEQUIVEN	· General Management · Manufacturing Management · Administration and Finance Management · AIT Management · SSGG Management · DDSS Management	Managers	15
PRALCA	· General Management · Manufacturing Management · Administration and Finance Management	Managers	6
	· AIT Management · SSGG Management · DDSS Management		
PROPYLVEN	· General Management · Manufacturing Management · Administration and Finance Management · AIT Management · SSGG Management · DDSS Management	Managers	6
Total			37

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The analysis units of the study can be seen, from the different petrochemical companies considered for investigation, there are 37 Managers, but the intentional sample was 16, which were chosen based on pre-established criteria or judgments, such as:

- (a) The time available for the Managers to respond to the instrument was considered.

- (b) Managers who were involved in the day-to-day organizational processes of the Petrochemicals in administrative areas, directly linked to Quality Management, were assumed.
- (c) Managers who held permanent, non-contracted positions;
- (d) That they have in-depth administrative/managerial knowledge of petrochemical companies.
- (e) Managers who had further of two (2) years in office or professional practice.
- (f) Managers who are not on vacation or sick leave.

The observation technique was used through a survey, the applied questionnaire has items with multiple response options for five (5) alternatives, as follows: Always (S=5); Almost Always (CS=4); Sometimes (AV=3) Almost Never (CN=2) and Never (N=1). The statistical treatment of the same nature, similar to that of Severiche et al. (2023) and Severiche et al. (2021), characterized by obtaining a global view of the entire data set by estimating the frequency distribution, which resulted in the calculation of the absolute (fa) and relative (%) frequencies of the projected responses per sample addressed.

In Table 2, it is important to highlight that the scores obtained after calculating the arithmetic means of the items processed when applying the instrument, will determine the weighting of the value of the response alternatives that will allow the variables to be placed in the categories, Very high application (4.2-5.00); High application (3.2-4.00); Medium application (2.5-3.25); low application (1.76-2.50); Very low application (1.00-1.75).

Table 2. Scale for the arithmetic mean or average

Alternatives	Range	Categories
Always	4.20 – 5.00	Very High
Almost always	3.40 – 4.19	High
Sometimes	2.60 – 3.39	Average
Hardly ever	1.80 – 2.59	Low
Never	1.00 – 1.79	Very low

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Results And Discussions

Table 3 shows the questions that were applied to study the indicator, Architecture with the Item, the company has a technological architecture where digital transformation can be implemented.; It was found that 38% of the population stated that always, 56% almost always, 6% sometimes, 0% almost never and 0% never. The item the IT staff is trained in the management of technological infrastructure and equipment management, finding that 38% of the population stated that always, 50% almost always, 6% sometimes, 6% almost never and 0% never. And in relation to the item, the companies' IT staff will be able to take on the challenge of implementing a cutting-edge system for digital transformation. It was found that 19% of the population stated that always, 44% almost always, 31% sometimes, 4% almost never and 0% never.

Table 3. Architecture

The company has a technological architecture where digital transformation can be implemented										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	6	38 %	9	56 %	1	6%	0	0%	0	0 %
Subtotal	6	38 %	9	56 %	1	6%	0	0%	0	0 %
IT staff is trained in the management of technological infrastructure and equipment management										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	6	38 %	8	50 %	1	6%	1	6%	0	0 %
Subtotal	6	38 %	8	50 %	1	6%	1	6%	0	0 %
The IT staff of companies will be able to take on the challenge of implementing a cutting-edge system for digital transformation										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	3	19 %	7	44 %	5	31 %	1	6%	0	0 %
Subtotal	3	19 %	7	44 %	5	31 %	1	6%	0	0 %
Total	15	32 %	24	50 %	7	14 %	2	4%	0	0 %

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With the media, companies have a social media department where they can attract and retain users through digital strategies. It is found in Table 4 that 58% of the population stated Always, 25% almost always, 19% sometimes, 0% almost never and 0% never. To develop digital transformation, companies design action plans that specify how the formulated strategies will be executed. Where 26% of the population stated that always, 63% almost always, 6% sometimes, 8% almost never and 0% never and finally the item, it would be good for the organization to know how to share content in the cloud and on the networks any content in the cloud and on social networks in any format, through own or external software or apps, where 68% of the population stated that always, 31% almost always, 0% sometimes 6% almost never and 6% responded never.

Table 4. Media

Companies have a social media department where they can attract and retain users through digital strategies										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	9	56%	4	25%	3	19%	0	0%	0	0%
Subtotal	9	56%	4	25%	3	19%	0	0%	0	0%
Develop the digital transformation, the company designs action plans where it specifies how the formulated strategies will be executed										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	4	25%	1 0	63%	1	6%	1	6%	0	0%
Subtotal	4	25%	1 0	63%	1	6%	1	6%	0	0%
The organization knows how to share content in the cloud and on networks any content in the cloud and on social networks in any format, through its own or external software or apps										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	9	56%	5	31%	0	0%	1	6%	1	6%
Subtotal	9	56%	5	31%	0	0%	1	6%	1	6%
Total	2 2	46%	1 9	40%	4	8%	2	4%	1	2%

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When analyzing the responses related to the indicator: Media, it was observed that almost the entire population interviewed answered 56%, which according to the category in the designed scale represents a Medium category. However, when comparing the results obtained, they coincide with what raised, when describing the means for the design of a digital transformation, in which a detailed description of the products and services delivered must be included, through a communications network, as well as the detailed and structured billing rate in which services are compensated.

The third indicator, as shown in Table 5, denotes the questions applied to the study of the aforementioned indicator, found for the item, With the media, the company has a social media department where it can attract and retain users through digital strategies. . It was found that 13% of the population stated that always, 63% almost always, 19% sometimes, 0% almost never and 6% never.

Table 5. Innovation Technology

With the media, companies have a social media department where they can attract and retain users through digital strategies										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	2	13 %	10	63 %	3	19 %	0	0 %	1	6 %
Subtotal	2	13 %	10	63 %	3	19 %	0	0 %	1	6 %
In companies, users are empowered to accept the challenge of changes for digital transformation										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	2	13 %	9	56 %	4	25 %	1	6 %	0	0 %
Subtotal	2	13 %	9	56 %	4	25 %	1	6 %	0	0 %
Business users are prepared for manual to digital processes										
Location of the subjects surveyed	Responses obtained									
	S		CS		AV		CN		N	
	3	19 %	10	63 %	3	19 %	1	6 %	0	0 %
Subtotal	3	19 %	10	63 %	3	19 %	1	6 %	0	0 %
Total	7	15 %	29	60 %	10	20 %	2	4 %	1	6 %

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The item in business users are empowered to accept the challenge of changes for digital transformation. Where 13% of the population stated that always, 56% almost always, 25% sometimes, 6% almost never and 0% never. and finally item 15. Business users are prepared for manual to digital processes. where 19% of the population stated that always, 63% almost always, 19% sometimes, 0% almost never and 0% responded never.

From the statistical results presented, it was deduced that to fulfill the main purpose of this research, which sought to propose digital transformation to strengthen quality management in companies in the oil & gas sector, it was necessary to know a series of elements which helped the researcher to obtain the diagnosis, to later finally design the proposal.

This is why, when comparing the results obtained, it was necessary to remember what was stated in the research by Galloso et al. (2022) and Romero et al. (2022), where they concluded that digital transformation is the key factor of competition, which contributes to improving the quality of life of a community, its purpose is to guarantee the right of users to free communication and allow the interoperability of networks and the interworking of services. From this evidence it is deduced that there is no interconnection between the headquarters.

Conclusion

In companies in the oil & gas sector, they lack a modern technical, rational and modern tool to respond to current demands that allow the administration and management of the network. The institutional need to propose digital transformation is considered viable; it was concluded that the infrastructure must have the required designs, as well as the operation of the hardware and software components that are used for instrumentation in its architecture. Likewise, guarantee the protection of data using security devices, in order to avoid attacks against the network, taking into account that an intranet connected to the Internet is susceptible to external attacks that violate the security of the information.

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