

EFFECT OF ORGANIZATIONAL DNA ON INNOVATION PERFORMANCE IN THE EGYPTIAN OIL AND GAS COMPANIES

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المستخلص :

الغرض من هو دراسة تأثير البصمه الوراثيه التنظيميه على الأداء الابتكارى للمؤسسه في قطاع البترول في مصر. ولتحقيق الهدف من الدراسة قام الباحث بتطوير استبيان شمل (32) فقرة لجمع البيانات الأولية من عينه الدراسة والمكونه من (384) موظف في قطاع البترول المصري تم اختيارهم عشوائيا من العاملين بشركات مختلفه بقطاع البترول المصري لتسهيل تجميع البيانات المطلوبه، وفي ضوء ذلك تم تجميع البيانات وتحليلها واختبار الفرضيات، حيث تم استخدام العديد من الأساليب الإحصائية لتحقيق اهداف الدراسة.النتائج اسفرت الدراسة الي وجود أثر ذو دلالة إحصائية بين الجينات التنظيميه للمؤسسات داخل قطاع البترول المصري و الاداء الابتكارى عند مستوي ($P \leq 0.01$). تضمنت نتائج البحث عدة توصيات من اهمها ضروره توفير المؤسسات المناخ المناسب الذى يساعد العاملين فى مختلف المستويات داخل المؤسسه على الابتكار و استغلال افكار العاملين الابتكاريه فى تحقيق و تطوير اداء مؤسسات قطاع البترول المصري الابتكاريه و

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يوصى الباحث بعمل المزيد من الأبحاث في العلاقة ما بين البصمه الوراثيه التنظيميه و الأداء الابتكارى فى قطاعات اخرى بجمهوريه مصر العربيه مع الاخذ فى الاعتبار دراسه تاثير متغيرات اخرى مثل المرونه التنظيميه و ثقافه المؤسسه وعوامل اخرى .

Abstract

The purpose of this paper is to investigate the impact of organizational DNA on innovation performance in Oil and Gas Industry in Egypt. Data were collected through a survey questionnaire of (32) statements, from a sample of 384 employees selected randomly from different companies in the oil and gas industry in Egypt to facilitate the collection of required data. Different statistical techniques were adopted to examine the data and the hypotheses.

The findings revealed that organizational DNA is significantly related to Organizational innovation performance at significant level of ($P \leq 0.01$).

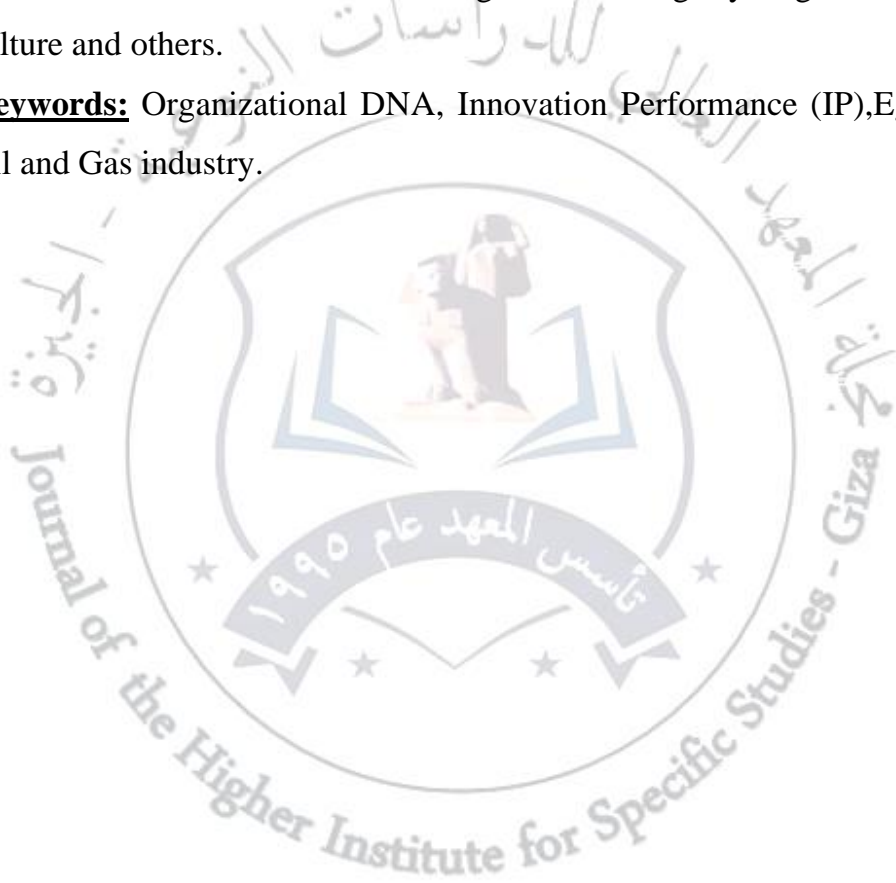
Considering the findings of the research, the researcher suggests several recommendations such that, organizations have to provide the climate that allows creativity and innovation for all employee levels through trying the innovative ideas and solutions provided by employees in the Egyptian oil and gas companies and developing them

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to achieve organizational innovation performance.it is also important doing more research on organizational DNA and their impact on organizational innovation performance in other sectors as well as related to other variables such as organizational agility, organizational culture and others.

Keywords: Organizational DNA, Innovation Performance (IP),Egypt, Oil and Gas industry.



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Introduction

Each organization has its own unique characteristics that make it different from the rest of the organizations, even those with which it works in the same field, Which prompted some writers and researchers to try to find out those characteristics that represent Organizational DNA (Al-Masadi, 2009, Lepda, 2015), which could be limited to four dimensions specific to the are the decision rights , information, structure and Motivators, and looking at these four variables, we find that they are the essential pillars to the effectiveness of the performance of any organization (khorasgani et al, 2015) and if any organization wants to recognize and identify themselves and know their strengths and weaknesses, they should take care of the four organizational DNA variables (Nefi,2015), putting a special care to the four organizational DNA dimensions will support organizations in building a competitive advantage for its products and services, helping it to survive, innovate and face organizations competitors,(Thomas 2013 & Izzet dos, 2013)

Innovation performance is one of the most important successful organizations characteristics that show. The role of innovation performance is one of the important factors that create a positive results in organizations performance as it provides the organizations different types of solutions in the external dynamic environment and its challenges. It also produce as many ideas as possible to improve the working environment and enhance the organizational performance. In addition to allow to break down the barriers of the employees and encourage them to raise new ideas. (Khasawneh,2011).This study aimed to investigate and identify the role of the organizational DNA in

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the organizational innovation performance. Furthermore, the findings may help the decision makers in the oil and gas industry in Egypt in reaching to enhance the innovation performance inside the organizations .That is done based on relevant literature review which led to develop research questions, hypotheses, and a and a conceptual model, a quantitative study using 5 Likert scales questionnaires were conducted. SPSS and MS Excel were used for data analysis which included mean, SD, correlation analysis, regression analysis.

1. Theoretical Framework

1.1 Organizational DNA

The term "corporate DNA" or "regulatory DNA" is derived from the biological term "DNA," which refers to the molecule in living organisms that contains the genetic instructions. The fundamental organizational and cultural design factors that define an organization's personality and determine whether it is strong or weak in implementing strategy can be metaphorically represented by the term "organizational DNA." (Fistonic, 2021).One of the recent metaphors that have been considered in the fields of organization and management to describe organizations using a genetic approach is organizational DNA.Examination, revelation, arrangement, and outlining the behaviors inherited are viewed as significant objectives in organization's genes (Soroush,et al 2013). The term "organizational DNA" refers to the fundamental elements that determine an organization's identity and explain its performance (David, et al.,2006).

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Decision rights, information, motivators, and structure are the four main components of organizational

DNA that define and unite the nature of an organization

(Neilson,2006). Organizational DNA can express organizational performance according to four definitions of structure, decisions rights, motives, and information (Neilson et al., 2005).

A-Decision Rights

Decision rights refers to the fundamental process through which decisions are really made (Hamilton,2005). Making decision is a making power and responsibilities as clear as possible is the first step. The second is to designate "process owners," or business unit or functional managers, who will spearhead the revitalization of business processes and be responsible for their success (Bordia et al.,2005) and this definition of a choice right is employed in the study because it combines that right with an organization's success, which is the key topic that organization s look into.

B-Information

Information improves main business operations (Wheelen et al,2004). Information clarifies the performance measurement metrics. How are tasks coordinated, and how is information shared? How are goals and development reported? Who can say? What must be known by whom? This definition of information is employed in the research because it encompasses a wide range of information relevance and links information to performance, which is the goal of any business (Neilson et al., 2005).

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C- Organizational Structure

Structure should follow logically from the options related to the other three points, decision rights, information, and motivators, rather than serving as the beginning point. It is the finale rather than the cornerstone of organizations reform attempts (Govindarajan & Trimble,2006). To assess good communication, coordination, and integration of work across divisions, structure is the total of how an organization distributes its labor into distinct jobs (Daft,2001). The structure, numerous organizational layers, and constrained range of control usually lead to excessive bureaucracy and decision-making bottlenecks. Executions have to consider the following two remedies. The first step in enhancing organizational performance is to identify, remove, eliminate or redistribute shadow staff members who are executing tasks that are already being completed by other members of the organization's resources are a key to improve organizational performance. Second, managing the career path and ensuring rotations in different geographic, functions, and roles is important to the development (Bordia et al. 2005).The definition that is used in the research refers to organizational performance, which is one of the primary KPIs in any organization , as well as pinpoints redeploying shadow staff members performing tasks, which is also crucial in any organization .

D- Motivation

The Latin word "movere," which means "to move," is where the word "motivation" comes from (Sunitha,2016). The process of encouraging others to carry out and complete a desired task can be considered a motivation. Knowing what factors can encourage and motivates workers can help managers to set corporate tasks and to concentrate and increase those motivation factors.

As a result, corporations can employ motivation as a managerial tool (Sulaiman et al., 2014). This definition is one of the most thoroughgoing ones available for motivation. Motivations have a role in determining behaviour and impacting organizational effectiveness and performance . In addition to money, other nonfinancial factors including objectives, preferences, and accomplishment can also serve as motivators (Ivancevich et al,2002).One of the key difficulties that managers must address is striking a balance between positive (financial and nonfinancial) and negative (punishment) motivational consideration (Thoompson et al, 2003).Hamilton, 2006 summarize the four building blocks of the organizational DNA as shown in figure 1.

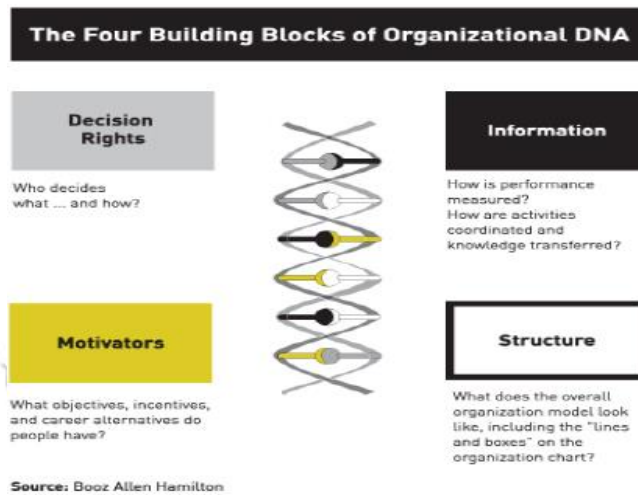


Figure 1: The four building blocks of organizational DNA, Booz Allen Hamilton; Neilson, 2006

1.2 Innovation Performance

Innovation is the method used by businesses to put knowledge into practice. As well as innovation is a new products or concepts, (Macmillan & Tampoe, 2000:248). Regarding the topic of innovation performance, there are numerous points of view. According to (Jones, S 1995), it is the process by which a company uses its resources to develop new products, procedures, or services. According to (McElroy et al, 2000), innovation is the process by which organizations put new knowledge into practise. According to (Macmillan & Tampoe, 2000:248) innovation is the new products or concepts, according to (Hitt et al., 2001), innovation is the process of turning an invention into a marketable product. On the other hand, a variety of metrics have been used to assess innovation performance. The three aspects

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are time to market, product quality, and creating a customer value (Hitt et al., 2001). (Robbins, 2003) identifies speed, quality improvement through time and continuously , and flexibility as performance measures for innovation. Three categories have been highlighted in (Hunger et al, 2004): new product, product quality, and faster distribution. According to a recent Hamilton study, innovation performance depends on several factors, including time to market, product quality, and the cost of development (Bordia et al., 2005:1). According to the most recent Hamilton experience working, Bordia et al. (2005) identify three areas, including accountability, transparency-exchange of information between functions, and speed of decision-making about new opportunities in the market.

1-Speed: To innovate more quickly than your rivals. Organizations that are able to make decisions fast are better able to seize fresh opportunities and gain an advantage over competitors by being the first to market with a product or service.

2- Transparency: The characteristics of a system that make organizational direction and action visible inside the organization. Transparency makes it possible to link between development priorities and efforts with the strategic priorities, which is essential for effective innovation.

3-Accountability: is the process that guarantees cross-functional promises are taken seriously and that individual responsibility for performance and results is established.

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1.3 The relationship between variables:

The previous studies that discussed the relationship between the research variables are supporting this research and considered the one of the main cores of this research since they are used in formulating the problem of this paper and determining the variables and the hypothesis and the study objective.

1.3.1 Organizational DNA and innovation performance.

(Amgad Bahaa EL Din et al, 2019) analysis of the link between organizational DNA and innovative performance the study highlighted that the level of innovative performance increases with the whole organizational DNA level increment. Entire organizational DNA (as an independent variable) accounts for 91.2% of the variation in innovative performance (as a dependent variable) in local organizations in Egypt.

In accordance to Nafei's , 2014, research that shed the light on the relationship between organizational DNA and organizational performance, Organizational DNA is a method or methods used to identify problems that an organization is having and that are impeding its performance, as well as solutions to these problems (Thomas, 2007). The organizational DNA aims to identify the organization by highlighting its strengths and weaknesses and outlining potential solutions (Gharmy, 2006) Industrial businesses can influence an organization's DNA, specifically the decision rights, motivators,

information, and organizational structure, to increase organizational performance.

Also Nafei's , 2014 study suggests that organizational performance can be improved in the industrial companies by affecting its organizational DNA, specifically, by improving the motivators ,organizational structure, information and decision rights, The research highlighted a set of recommendations including the importance of giving more attention to the four blocks of organizational DNA as of a key points for organizations to increase it's competitive edge and advantages which is of prime mover for Organizational Performance.

In accordance to Rashid's et al., 2007 research that referred to Hamilton's 2005 studies that were related to organizational DNA and innovation performance, his study tried to discover the ways that various types of organizations can have a competitive advantage and achieve their goals, this study replied on two questions one of them is related to our study research of to what extent is the organizational DNA dimension are affecting the innovation performance the study concluded that the organizational DNA dimensions had a positively significant relationship with innovation performance.

Also in accordance to the Rashid's et al., 2007 research of, "The Impact of Organizational DNA on Innovation performance ": An Empirical Study on Sample of Industrial Organizations in Iraq", with the purpose of explaining the theoretical ideas and practical experiences of the organizational DNA and innovation performance in the research of

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Hamilton. . to answer the two key questions related to how well or poorly the orgDNA four dimensions are matching with the industrial organizations in Iraq (organizational stereotypes)? and to what extent the matching of orgDNA dimeniosn can influence the innovation performance.

The researchers concluded that the four dimensions of organizational DNA have a positive significant relationship with innovative performance. Good matching of the building blocks of an organization's DNA also results to faster innovation.

1.4 Outcome of literature review:

After exploring and presenting different literatures and scholars related to the most current trending organizational variables we can conclude that organizational DNA has a relationship with the innovation performance.

2. Research Model

As per the above outcome from the literature review, it is estimated that the Organizational DNA can affect in a significant positive effect the innovation performance.

In the research model, Organizational DNA is positioned as independent variables, while the innovation Performance shall be located as the dependent variable as illustrated below in the following figure.

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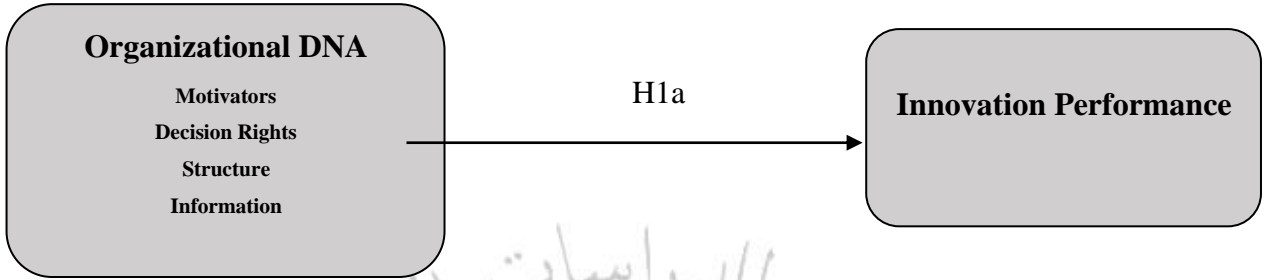


Figure 2: The research model

The above presented variables of organizational DNA (independent), and innovation performance (dependent) shall be studied to test the following Hypothesis to understand the relation between these variables as follows:

H1a: organizational DNA positively influences the innovation performance .

3. Research Methodology

A Quantitative method was chosen, with a deductive approach and positivist hypotheses, the data were collected and analysed using the descriptive approach to test the hypotheses.

3.1 Research Instrument

A questionnaire was used, build on previous studies, related to the study variables of Organizational DNA and Innovation Performance. The questionnaire was divided into two parts; Part one: to measure the dependent variable, the innovation performance, using Jiangtao Honga, et al, 2019 dimensions (product innovation, Process Innovation and Management

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Innovation), with a questionnaire consists of nine questions Part two: to measure the independent variable, the Organizational DNA, using (Dyan Abdelmuhdi, 2018) dimensions of (Decision Rights, Information, Motivators and organizational structure) with a questionnaire consists of twenty three questions. This study used the 5- point Likert scale as prior studies and to unify the scale among the variables. The 7-point Likert scale ranges from “strongly disagree” (=1) to “Strongly Agree” (=5).

3.2 Sample and Population

The oil and gas sector in Egypt was selected for this study due to its importance and contribution to Egyptian economy, and hence enhancing its innovation performance may positively affect the Egyptian economy and will positively affect the foreign investment in Egypt. Since according to the world bank Country Climate and Development Report Nov. 2022 the Egyptian petroleum sector attracted 74.3% of the total Foreign Direct Investment in Egypt, Moreover according to The Annual Economic Bulletin FY2020/21 issued by ministry of planning and economic development the petroleum products represents around 43% of the total Egyptian exports value with 8.6 B\$ in 20/21 .As the researcher works for one of the national petroleum companies in Egypt, this made the collection of data easy and with confident. So this study adopted the in this study is non-probability convenient sample from employees in the Egyptian Petroleum industry, since the study has a a limitation in terms of the time horizon, this study is a cross sectional study, where data were collected

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from employees in the period between March, April, and May 2023. According to (Uma Sakran et al 2010), the population that exceeds roughly 10,000 units (which is far less than actual number of the full-time employees in the oil and gas companies in Egypt), This research objective is to assess the hypothesis of this study and answering the research questions depending on the method of research. It consisted of (384) non-probability convenient employees in Egyptian oil and gas sector Companies. (Sakran et al., 2016) the response rates are generally low of the online surveys , So 280 forms were returned by respondents and thereby the return of forms ratio is 73 % , which proves the interest of respondents and their seriousness in the dimension of research, however, after excluding the incomplete responses , As a result of that, the sample size that is used in the analysis has the size of 241 individuals. Because it affected both modelling and reliability analysis severely in a negative way.

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4. Statistical Analysis and Discussion

4.1 Statistical Techniques

the Data were then processed using the Social Science Statistics Package (SPSS 25). Various statistical techniques were used to achieve the study objectives and analyze the collected data, including:

- i. **Arithmetic Mean:** to find out how high or low the study population responded to the study and their replies on the paragraphs of the questionnaire factors.
- ii. **Standard Deviation:** to know the extent of the deviation of the study sample responses on each paragraph of the questionnaire factors. It is noted that standard deviation shows the dispersion in the study sample responses on each adequacy, whenever its value becomes closer to zero, responses become concentrated, and their dispersion decrease in the scale.
- iii. **Cronbach Alpha Coefficient:** to determine the reliability of the questionnaire.
- iv. **Pearson Coefficient:** to measure the degree of association between the variables since the data is quantitative ratio scaled variables.
- v. **Coefficient of variation:** It is used to measure the relative dispersion according to the responses of the sample, and the extent of harmony of the answers.

- vi. **Multi regression coefficient:** to measure the correlation degree of independent, and moderating variables with the dependent variable.
- vii. **R²:** Used to find out how much changes occur in the dependent variable that can be explained by the independent variable.

4.2 Measurement Model Assessment

4.2.1 Validity and Reliability test

Is called also as “testing the goodness of measures” Sakran et al., 2016. testing the consistency and stability is the measure for the data reliability, Consistency is referring to what extent are the items measuring a concept are matching and associated together as a set. Cronbach’s alpha. Is representing the reliability coefficient that indicates how well the items in a set are positively correlated to one another. Cronbach’s alpha is measured in terms of the average intercorrelations among the items measuring the concept. The closer Cronbach’s alpha is to 1, the higher the internal consistency reliability. ,Sakran et al., 2016.

Table (1): Reliability Coefficients for the Studied Factors Using Cronbach's Alpha Coefficient Method.

Reliability Analysis

Variable	Dimension	Statements	Cronbach Alpha
Innovation Performance	Product innovation	3	0.803
	Process innovation	3	0.815
	Management innovation	3	0.755
IP – Overall		9	0.896
Organizational (DNA)	Decision rights	5	0.793
	Information	6	0.834
	Motivators	8	0.855
	Organizational structure	5	0.868
DNA – Overall		24	0.936
Overall		53	0.973

Based on the above table, for the included dimension(s) of dependent, independent and mediator variables of study, the reliability coefficients of Cronbach' alpha are higher than the acceptable value of 0.70 which reflects that there is a high level of inter-correlations among the dimensions of study. In addition, the Cronbach Alpha' coefficient for all statements included in the questionnaire is 0.973 which means that the responses of the individuals

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(sample size 241) included in the sample of study are indicative and closely related to each other. In addition, their answers are reliable and the results can be generalized.

4.2.2 Correlation Analysis

The correlational analysis to determine the relationship between the studied variables, The correlation coefficient that indicates the strength and direction of the relationship, we have used Pearson correlation Coefficient to measure the degree of association between the variables are quantitative and they are continuous ratio scaled variables .

	Innovative performance	Organizational DNA
Innovative performance	1	--
Organizational DNA	0.814*** (0.000)	1

Table (2): correlation coefficient for the Studied Factors .

*** refer to 1% level of significance respectively. P-values are in ()

Based on the above table, the correlation coefficient between the variables can be analyzed as follows:

The correlation coefficient between both independent variable of organizational DNA and dependent variable of Innovative performance is

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0.814 which indicates that there is strong positive (direct) linear relationship. In addition, this linear relationship is statistically significant and indicative at the level of significance of 1%.

4.3 Structural Model Assessment

The relationship between the organizational DNA and organizational Innovation performance .

4.3.1 Hypothesis Testing

The main objective of this study is to test the relationship between Organizational DNA and Organizational Innovation performance. To test these hypotheses linear and multi regression tests were done, using the structural equation modeling (SPSS) with results represented in table 3

Table 3 : Regression Analysis and Mediation Effect

No.	Model	Coeff.	P-value	99% Confidence Interval		R-Squared
				Lower bound	Upper bound	
1	DNA(X) → IP(Y)	0.9450***	0.0000	0.8590	1.0320	0.6626

*** 1% level of significance respectively

DNA refers to → Organizational DNA

IP refers to → Organizational innovation performance

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Effect of DNA(X) on Innovative Performance(Y)

When DNA increases by one unit, IP is expected to increase by 0.9450 on average. And since the p-value (0.000) is less than level of significance of 1%, therefore this coefficient is statistically significance and DNA has a real positive impact on Innovation performance. In addition, since the confidence interval lower and upper bounds (0.8590 and 1.0320 respectively) don't include value of zero, therefore this coefficient is statistically significant. R-squared is 0.6626 which means that DNA is able to explain 66.26% of the variation in IP and the rest is due to error. H1a is satisfied

H1a: organizational DNA positively influences the innovation performance.

5. Conclusion and Recommendations:

This study analysed the relationship between the Organizational DNA and Innovation Performance. The study concluded that there is a significant positive relationship between the Organizational DNA and Innovation Performance

Reference to the study results , All organizations should encourage their interest in organizational DNA four blocks as part of the organization's culture (organizational structure - information – decision rights - Motivation) And clarify the importance of all these dimensions for all employees because it helps to identify strengths and weaknesses and has a direct positive impact on organizational innovation performance. So organizations have to

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concentrate on increasing the decision making decentralization and allowing employees to act freely and independently away from restrictions.

Organizations have to encourage their employee to work in a team spirit and empower them through their participation in the decision making process and make them adopt and defend the adopted decisions, also organizations have to give the enough trust to their employees by giving employees the opportunity to show their creativity through making their decisions through the delegation of each employee to take the suitable decision within his job responsibility this is will increase the employee self confidence and it will make the employee feel his value in the company , which will reflect on the job performance .

Paying a special attention to increasing wages and incentives for workers Egyptian oil and gas companies, whether financially or symbolically, with the aim of increase their motivation towards work, which leads to an increase in their sense of enthusiasm at work, which is reflected strongly generally on their performance and specifically on their innovation capabilities? In addition, linking the incentives to the actual level of performance so that employees are evaluated according to their level of performance, which encourages all employees, regardless of their job title to exert maximum effort to improve their performance, Moreover establishing the principle of justice and fairness in granting incentives and rewards by eliminating favoritism And nepotism and mediation in rewarding.

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For the information dimension, it is important to conduct a frequent meetings between the staff and the management of the company surveyed for the purpose of coordinating efforts and facilitating communications in all directions and to ensure the smooth information flow.

Sharing the information between different disciplines inside the organization clearly, with easy access and in an appropriate manner that enables it to be processed in a way that makes it usable efficiently.

It is also important to reconsider the distribution of employees inside the organization, to make the organization structure more efficient based on the real need of each function inside the organization, in addition adopting the developing and simplifying organizational structures so that they can keep pace with the problems and difficulties the organization face a high degree of flexibility. Moreover creating a balance between centralization and decentralization through the adoption of a policy of delegation of authority that compatible with their jobs and to help them accomplish their task.

Building a clear vision and creating conviction among employees and those who are dealing with the company of that vision and focus for what the organization want to be like in the future, with a focus on the intangible image in front of stakeholders including customers and improve its reputation in front of the community.

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Appendix (1): The questionnaire of the study

<p>Section 2 : Organizational (DNA)</p> <p>Reference: Dyan Abdelmuhi, 2018</p> <p>According to your company's current situation, select the appropriate number in the right column (1-Strongly Disagree ; 2-Disagree ; 3-Neutral ; 4-Agree ; 5-Strongly Agree)</p>	
Measures Attributes	Questions
Decision rights	<p>1- The decision maker obtains data and information from reliable sources.</p> <p>2- Organization Adopts a team work approach.</p> <p>3- Organization Grants its workers the necessary power to carry out the different task.</p> <p>4- Organization Permits individual decisions for certain circumstances and contingencies</p> <p>5- Organization Works on developing different decision alternatives</p>
Information	<p>1- Organization relies on modern methods for data collection and processing and communicating</p> <p>2- Organization Provides and has its own database.</p> <p>3- Organization adopts the method of integrating the</p>

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	<p>new employees</p> <p>and experienced workers to enhance information sharing</p> <p>4- Organization is keen to streamline information among employees.</p> <p>5- Organization has distinct competencies in data collection.</p> <p>6- Organization is keen to continuously provide information to beneficiaries.</p>
Motivators	<p>1- Organization provides the amenities and well-being of employees.</p> <p>2- Organization is keen to identify training needs continuously .</p> <p>3- Organization management encourages personnel to carry out the work required from them .</p> <p>4- The higher management of Organization is keen to provide excellent services to the working personnel .</p> <p>5- The higher management of Organization encourages competition among creative personnel.</p> <p>6- The higher management of Organization is concerned with the ideas proposed by the workers to address problems and exploit opportunities.</p> <p>7- The higher management of Organization is actively</p>

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	<p>involved with its employees' special occasions and activities.</p> <p>8-The higher management of Organization allows the promotion of its employees according to a clear policy.</p>
Organizational structure	<p>1- Corporate provides a clear organizational structure.</p> <p>2- The organizational structure of company covers all the tasks and Functions.</p> <p>3- Company constantly develops its organizational structure.</p> <p>4- Changes in the organizational structure of company are congruent with the changes of its strategy.</p> <p>5- The organizational structure of Company is easily accessible and Communicated.</p>

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Section 1 :Innovation Performance	
Reference: Jiangtao Honga, Yi Liaob, Yibin Zhangc, Zhefu Yua, 2019	
According to your company's current situation, select the appropriate number in the right column (1-Strongly Disagree ; 2-Disagree ; 3-Neutral ; 4-Agree ; 5-Strongly Agree)	
Measures Attributes	Questions
Product innovation	1-The innovation outcome of the enterprise's products has improved 2-The number of new products or new ideas that the enterprise has introduced has increased 3-New products are competitive in the market
Process innovation	1-The enterprise can use value innovation to promote the quality of new product development (NPD) process 2-The enterprise can use the new production processes in order to improve efficiency 3-The enterprise can purchase new tools or equipment to enhance work efficiency
Management innovation	1-The enterprise implements new or improves existing computer-based administrative applications 2-The enterprise implements new or improves existing employee reward/training schemes 3-The enterprise implements new or improves existing structures such as project team or departmental structures

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