

Capital Intelectual, relación con Liderazgo y Personalidad Gerencial en petroleras Upstream mexicanas

Intellectual Capital, Relationship with Leadership and Management Personality in Mexican Upstream Oil Companies

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Resumen

La investigación tiene como objetivo estimar la relación del capital intelectual con el liderazgo y la personalidad gerencial en empresas de exploración y producción (Upstream) petroleras de México. Se presenta un avance del estudio hasta el marco teórico con base en revisión bibliográfica de las variables de investigación: Capital Intelectual como variable dependiente, Liderazgo y Personalidad como variables independientes. El beneficio que se plantea es comprobar que la relación del liderazgo y la personalidad gerencial con el capital intelectual, documentado en varias arenas organizacionales, cumple también en el ámbito de empresas mexicanas del sector petrolero y, se justifica ante los grandes retos que enfrenta este sector económico primario de frente a una demanda creciente de energías limpias en un contexto mundial que clama por una reducción general de emisiones de carbono.

Palabras claves: Capital intelectual, Conocimiento, Liderazgo, Personalidad.

Abstract

The objective of this research is to estimate the relationship between intellectual capital and leadership and Management Personality in oil exploration and production (upstream) companies in Mexico. An advance of the study is presented up to the theoretical framework based on a literature review of the research variables: Intellectual Capital as the dependent variable and leadership and Personality as independent variables. The benefit proposed is to prove that the relationship between leadership and managerial personality and intellectual capital, documented in several organizational arenas, also applies to Mexican companies in the oil sector and is justified by the great challenges faced by this primary economic sector in the face of a growing demand for clean energy in a global context that calls for a general reduction of carbon emissions.

Key words: Intellectual capital, Knowledge, Leadership, Personality.



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1. Introduction

In the current era of knowledge, organizations such as the World Bank recognize Intellectual Capital (IC) as one of the intangible factors that determine the value of an organization and have even committed to include in their annual reports one of the fundamental dimensions of Intellectual Capital: Human Capital (World Bank [WB], 2021). However, leadership and personality are related to Intellectual Capital in the performance of organizations, as studied and demonstrated by several authors and global organizations (Condori, 2019; Delgado and Rodriguez, 2010; Ensari and Theil, 2020; Lord et al., 1986; Manosalvas, 2017; Neira and Balseca, 2018; Pellegrini et al. 2020).

Companies in the oil exploration and production sector (known as upstream) have been facing technological, economic, and environmental challenges to maintain profitability and sustainability in recent years, given the clamor for greater participation in clean energy sources (Beck et al., 2021), a situation that has increased with the pandemic and recession caused by Covid-19 (Beck et al., 2021) (Rempel and Gupta, 2021). However, studies in leading companies in the sector show that IC has been a source of growth and competitive advantage (Almutirat, 2020; Dženopoljac and Muhammed, 2017; Dženopoljac Muhammed, 2018; Ocheni, 2018; Saremi et al. 2016).

Not only in Mexico but worldwide, the upstream oil sector faces enormous challenges to achieve resilience, profitability, and sustainability in the hydrocarbon industry, in a world that demands low carbon emissions (Beck et al. 2021); furthermore, the explicit goal in 2015 Paris Agreement on the progressive reduction in the use of fossil fuels

has possibly been accelerated, as a result of what they call the "pancession (pandemic + recession) of COVID-19" (Rempel and Gupta, 2021, p. 1), a speed that is also recognized by the Organization of the Petroleum Exporting Countries, but adds that despite the expected growth of renewable and other clean energy sources, the world energy matrix projected to 2045 will still depend on just over 50% of fossil fuels from oil and gas (Organization of the Petroleum Exporting Countries [OPEC], 2021).

In Mexico, since 2015, energy production has been surpassed by consumption (Secretaría de Energía, 2021; Secretaría de Energía, 2020); a situation that is related to the decrease in oil and gas production of 40% and 31% respectively from 2008 to 2021 (Comisión Nacional de Hidrocarburos, 2021).

In this context, the research problem focuses on estimating the relationship between Intellectual Capital and Leadership and Management Personality in Upstream oil companies in Mexico, to contribute to the understanding of the critical factors of the construct and to support the results of the companies.

From its conception, IC is recognized as a variable that concentrates the knowledge acquired, created, and updated by all members of an organization, and that when applied enables greater growth, innovation, competitive advantages, and profitability, and, therefore, supports the maximization of sustainable business value towards the medium and long term (Cegarra and Martínez, 2018; Flores et al. 2020; González and Rodríguez, 2018). At the macroeconomic level, international organizations such as the Organization for Economic Cooperation and Development (OECD), the World Bank or the

European Commission (Pedro et al. 2018; World Bank [WB], 2020), agree that investment in IC management has improved labor productivity and innovation in developed countries over and above what their tangible assets could generate.

Consequently, in this knowledge era, a progressive change was generated in which companies needed to invest in the creation and constant updating of their IC to increase the productivity of their fixed or tangible assets (Danish Trade and Industry Development Council [DTIDC], 1997). Furthermore, Condori (2019), Delgado and Rodriguez, (2010), and Manosalvas (2017) documented that leadership at the managerial level is another variable that influences most organizational processes and can condition their results. Pellegrini et al. (2020), in their research considered novel on the systematic and relational analysis between knowledge management and leadership, express that leadership is a fundamental component "of the process of creation, acquisition, utilization and integration of knowledge" (p. 1445).

On the other hand, as expressed by Neira et al. (2018), leadership involves a close relationship with the analysis of the personality of individuals. Likewise, Bass (1990), Huffcutt, Roth, and McDaniel (1994), Judge, Bono, Ilies, et al. (2002), Makiney, Marchiro, and Hall (1999), and Martinsen (2000) cited in Bass and Bass (2009), have documented that leadership is correlated with personality factors.

Indeed, Lord et al. (1986) conclude, in a meta-analysis study on the relationship between personality and leadership in the late 20th century, that some personality traits can be considered relevant predictors of leadership development; while Ensari and

Theil (2020) argue that individuals possess innate personality characteristics that determine their leadership potential.

The value of this research study is to verify the impact that the variables of Leadership and Management Personality have on the Intellectual Capital (IC) variable in the Upstream sector of the oil industry in Mexico, a subject of study that is relevant for three main reasons:

1) Oil upstream is one of the tangible capital-intensive industrial sectors, both monetary and technological, which since the end of the 20th century has been part of the knowledge era business, with early evidence revealing a direct relationship between the level of IQ and the degree of performance in leading oil companies IQ has supported their growth and has fostered creativity, innovation and competitiveness (Almutirat, 2020; Dženopoljac and Muhammed, 2017; Dženopoljac and Muhammed, 2018; Ocheni, 2018; Saremi et al. 2016).

2) Studies on the relationship between Intellectual Capital and performance focused on the oil industry are considered few at present (Dženopoljac and Muhammed, 2018).

3) Mexico presents a national energy balance in which demand exceeds production since 2015 (Secretaría de Energía, 2021; Secretaría de Energía, 2020); as well as oil and gas production that has decreased by 40% and 31% respectively from 2008 to date (Comisión Nacional de Hidrocarburos, 2021).

2. Theoretical framework

The development of the theoretical framework, still in progress, has been carried

out through the review of various literary sources on the three variables of the construct under investigation, from its historical conception and development to its application, and four to five main theories have been selected to support the study of each variable.

2.1 Intellectual Capital

During the different eras of civilization, value creation in organizations has been explained using main factors that sustain the production of goods and services, making human survival and the development of society possible. The value creation model has gradually changed from being centered on factors of production with tangible assets such as land, machinery, and capital, towards the intangible assets of information and, more recently, knowledge (Cegarra and Martinez, 2018).

Because of this evolution, since the beginning of the 21st century, knowledge is recognized in the Oslo Manual of 2005 as an "indispensable factor for the economic growth, development and well-being of nations" (OECD and Eurostat, 2005, p. 5).

This does not mean that industrial capitalism disappeared, it has only evolved to what is called "cognitive capitalism" (Sztulwark et al. 2011, p. 2), because the processes developed during the industrial era do not disappear in the knowledge era, but evolve to enhance their results through information and intrinsic knowledge in organizations, similar to the stage in which the industrial era raised the productivity of the agricultural era (Hardt and Negri, n.d., as cited in Sztulwark et al. 2011), as cited in Sztulwark et al. 2011).

Thus, during the knowledge era, two key concepts for the management of

organizations were born: Knowledge Management and Intellectual Capital (Cegarra and Martínez, 2018; González and Rodríguez, 2018).

Knowledge Management (KM) is the discipline that, in a systemic way, manages the identification, codification, registration and updating of intellectual capital with the purpose of ensuring its transfer and application towards the entire organization to generate permanent and long-term competitive advantages; thus, KM can be conceived as an administrative tool to face, adapt and compete in the complex, globalized and sometimes volatile economic, social and environmental environment (Cegarra and Martinez, 2018; Gonzalez and Gonzalez, 2014). The Oslo Manual recognizes this discipline as "an important part of the innovation process" (OECD and Eurostat, 2005, p.32).

The concept of Intellectual Capital (IC) was first used in 1969, by economist Kenneth Galbraith, as a descriptor of intangible values associated with quality, prestige, and compliance of organizations that are not reflected in financial balance sheets (Gonzalez and Rodriguez, 2018; Pike and Ross, 2006). In 1993, Peter Drucker referred to Intellectual Capital as a descriptor of the post-capitalist society (Bontis, 2001).

However, it was in 1980 that the beginnings of several theories were developed to define and try to measure IC, under an approach of strategic and intangible resources (or assets) that organizations possess to achieve competitive advantages (Pike and Ross, 2006).

In the structure of the models of KM described by various authors, Intellectual Capital (IC) is the substantive and central

component that accumulates the knowledge held, created and applied by the members of the organization, from the basics of information, interpretation, learning, and experience to the documentation of methodologies, procedures or patents, to mention a few types, which can even become intellectual property assets; KM is the discipline in charge of adequately managing IC as an asset that generates added value in the company (Cegarra and Martínez, 2018; González and Rodríguez, 2018) and international organizations such as the OECD, the World Bank and the European Commission recognize IC as an indispensable factor for the creation of organizational and business value (Pedro and Alvez, 2018; World Bank [WB], 2020).

Five of the theoretical models that have been developed for Intellectual Capital have been analyzed for the construct, summarized in Table 1.

Table 1. *Theoretical Models of Intellectual Capital*

Models	Basic Notion	Author (year)
Skandia Intellectual Capital	IC map to support decision making. IC made up of intangible assets is not the same as financial capital.	Leif Edvinsson (1995)
University of Western Ontario Intellectual Capital	Cause-effect relationship between 3 dimensions of IQ and business performance.	Nick Bontis (1996)

Brooking Broker Technology	Classifies and measures the company's IC with methodology for auditing information on IC creation and management	Annie Brooking (1996)
Intangible asset monitor	Intangible assets represent the IC, a variable that concentrates the company's knowledge and supports investors' expectations.	Karl Erick Sveiby (1997)
Management of Bustelo and Amarilla information	QA implies the creation of ICs. The first step for IC creation is the implementation of Information Management (IM) systems.	Carlota Bustelo Ruesta and Raquel Amarilla Iglesias (2001)

Source: Own elaboration based on Avendaño and Flores, (2016); Bontis, (2001); Bustelo and Amarilla, (2001); Cegarra and Martínez, (2018); De Freitas and Yáber, (2014); González and Rodríguez, (2018); Lee and Wong, (2019); Vargas and León, (2016).

The Skandia Intellectual Capital model and the Intellectual Capital Model of the University of Western Ontario by Bontis have been chosen to analyze the possibility of application in the research. Both coincide in a practical approach to the management of IC for the creation of value or business results, describing IC from 3 interrelated components: Human Capital (HC) or employee competencies, Structural Capital (SC) or internal structure and Relational Capital (RC) or external structure, being the HC the basis for the creation of IC and without which it is not possible to generate the SC and RC components (Bontis, 2001;

Cegarra and Martínez, 2018; Lee and Wong, 2019; Vargas and León, 2016).

2.2 Leadership

Leadership has been a concept long expressed since ancient times, a phenomenon considered universal from mythology to social, political, and economic reality as a manifestation that makes a difference not only in guiding towards the achievement of a task or a project but also in influencing motivation and performance, both at a personal level as well as in groups and entire organizations (Bass and Bass, 2009).

According to Chiavenato (2019), the recognition on the relevance of leadership in human behavior within companies is recognized in the School of Management of Human Relations, unlike the Classical Schools of Management.

According to McFarland, Senn and Childress (1993) cited in Bass and Bass (2009), leadership should consider 6 aspects of relevance for the 21st century:

- 1) Leadership is no longer the exclusive domain of bosses,
- 2) It enables excellence in others,
- 3) Leading is not the same as managing,
- 4) Leadership has a sensitive and humanistic dimension,
- 5) Leaders need to exercise a holistic approach, applying a variety of qualities, skills, and abilities,
- 6) Leadership involves mastery in anticipating, initiating, and implementing change. (p. 58).

For this research construct, four theories developed by different authors were reviewed, which are described in Table 2.

Table 2. Theories of Leadership analyzed for the research construct.

Theories	Basic Notion	Authors consulted
Great Man Theory	In any society, there are men with the qualities of intelligence, energy, and moral strength who, in each context, can be leaders of the masses.	Dowd (1936), cited in Covey (2005)
White & Lippitt's three leadership styles	It focuses on the leader's actions and behavior. It is based on an analysis of the social climate of the leader and his group, where three styles of leadership are evident: authoritarian, democratic, and <i>laissez-faire</i> or liberal.	Chiavenato (2019), Scheidlinger (1994)
Hersey's situational leadership	The situational leadership model relates four different levels of follower readiness or maturity, each one related to four basic leadership styles to be applied according to the task to be performed, Hersey.	Hersey (1992), Santa-Bárbara and Rodríguez-Fernández (2010)
The Full Range Leadership theory of Burns and Bass	Explains leadership based on the relationship, form of action, and perception, between leader and subordinates, as well as the achievement of organizational goals in the context of daily work. Defines three types of leadership and a results variable: transformational leadership, transactional	Bass y Avolio (2004) cited in Bass y Bass (2009), Chaimongkonrojna and Steane (2015), Lapo y Jácome (2015), Passakonjaras and Hartijasti (2020)

leadership, laissez-faire leadership, and leader results.

Source: Own elaboration based on cited authors.

The Full Range Leadership (FRL) Theory has been chosen for its application in this research because of two main characteristics: it is the most recent one with the most analysis and application citations in the study of this variable for business, organizational, educational, and public contexts. According to Antonakis and House (2015), this is an integrative theory developed by Burns and Bass based on previous theories on leadership by authors such as Weber, Downtown, House, and Zleznik.

2.3 Personality

The word Personality comes from the Latin root *persona* which was the name given to the masks worn by actors in Greek theater in the 1st century BC and its definition implies a complex system of internal elements of the individual, interacting with the external system of sociocultural elements that surrounds him (Allport, 1961, cited in Bermúdez et al. 2017).

The evolution of the concept of personality can be analyzed from its historical background or the psychological perspective and the object of its study, and since ancient

times it has focused on deciphering and describing the behavior of everyone based mainly on biological, social, and environmental factors (Montaño et al. 2009).

For the purposes of this research, the analysis will focus on the theoretical bases developed under the perspective of 20th century psychology, which according to Davidoff (1998), the main theories were developed under four major currents: Psychoanalytic, Phenomenological or Humanistic, Cognitive and Behavioral; in addition to a perspective based mainly on the phenomenological current, but which combines some aspects of the cognitive and behavioral currents that, according to Montaño et al. (2009), is named as Integrating.

Table 3 summarizes these five main currents that gave rise to different personality theories.

Table 3. Summary of the Main Psychological Currents of Personality Theories

Currents	Main premises	Main theories - authors
Psychoanalytic	A relevant aspect of personality is the unconscious. Individuals develop their personality with three structures throughout their lives: <i>it, self, and superego</i> .	Freud's theory of psychoanalysis (Davidoff, 1998; Montaño et al. 2009).
Phenomenological or Humanistic	Individuals perceive the world from their unique perspective, developing their personality from conscious motivations	Phenomenological theory of Rogers and Allport (Montaño et al. 2009).

	based on temperament, character, and response to their environment.	Cattell's Trait Theory of Personality (Bermúdez et al., 2017; Revelle, 2009). Eysenck's Three-Dimensional Theory of Personality (Bermúdez et al. 2017; Montaña et al. 2009).
Cognitive	The study of individuals must include mental processes, structures, and functions. Personality develops based on the interaction of cognition, learning, and environment.	Bandura's Cognitive Theory (Davindoff, 1998; Montaña et al. 2009). Mischel's Cognitive Learning Theory (Davindoff, 1998; Montaña et al. 2009).
Behaviorist	When an individual is born, he/she comes as a "blank" and his/her environment determines the development of his/her personality, associated with a Stimulus-Response model. Personality should be studied from a broad perspective that integrates the contributions of several theories: aspects of temperament, character, and intelligence, as well as cognitive and Learning-Response processes with the environment.	Watson's Theory of Behaviorism (Davindoff, 1998; Montaña et al. 2009). Hull's Structural Theory (Davindoff, 1998; Montaña et al. 2009).
Integrator		Big Five Theory of Personality Traits of Caprara, Barbaranelli, Borgogni and Perugini (Bermudez et al. 2017; Caprara and Perugini, 1994; John et al. 2008; Simkin and Azzollini, 2015). Seven Factor Theory (Montaña et al. 2009).

Source: Own development based on Davindoff (1998), Montaña et al. (2009), (Bermúdez et al., 2017; Revelle, 2009), (Caprara and Perugini, 1994; John et al. 2008; Simkin and Azzollini, 2015).

3. Methodology

A quantitative, cross-sectional, and correlational-causal research is proposed.

Upstream oil companies, operators, and service companies, located in the Mexican oil provinces, are considered as the subject of study.

The program is programmed to reach a confirmatory level by applying inferential statistical analysis with the Statistical Package for the Social Sciences (SPSS).

3.1 Research Question

How to estimate the relationship between Intellectual Capital and Leadership and Management Personality in Mexican Upstream Oil Companies?

3.2 Theoretical research model

Based on the literature review, the theoretical model is presented in Figure 1: Intellectual Capital is a dependent variable; Leadership and Personality are independent variables. In turn, Leadership is a dependent variable of the variable Personality.

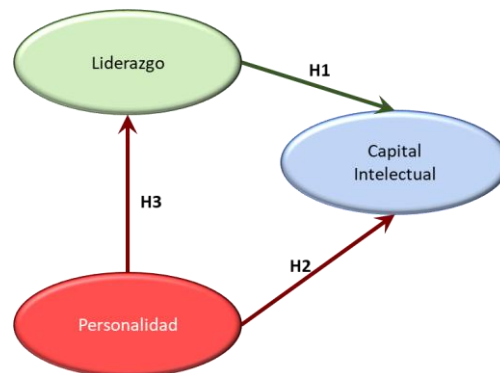


Figure 1. Theoretical Research Model. Source: Own elaboration based on Almutirat (2020), Bass and Bass (2009) Ocheni (2018), Neira and Balseca (2018), Pellegrini et al (2020).

3.3 Specific Objectives

1. To estimate the relationship of managerial Leadership with Intellectual Capital to identify the Leadership factors that have the greatest effect on Intellectual Capital.

2. To estimate the relationship between management Personality and Intellectual Capital, to highlight the dimensions of Personality with the highest impact on Intellectual Capital.

3. To estimate the relationship between Personality and Managerial Leadership to identify the Personality traits that are linked to each type of Leadership.

3.4 Specific questions

1. How to estimate the relationship between Managerial Leadership and Intellectual Capital, identifying the factors with the greatest impact?

2. How to estimate the relationship between Management Personality and Intellectual Capital?

3. How to estimate the relationship between Personality and Management Leadership?

3.5 Hypothesis

H1: Managerial Leadership is related to Intellectual Capital.

H2: Management Personality presents a relationship with Intellectual Capital.

H3: There is a relationship between management Personality and Leadership.

5. Conclusions

According to OECD, WB, EC, and authors of the O&G sector, the relevance of studying the relationship between Intellectual Capital as a source of business value creation is confirmed.

Taking into consideration the literature review on the main theories related to Intellectual Capital, Leadership, and Personality, analyzed to date, a theoretical research model has been proposed with the corresponding objectives, research questions, and hypotheses.

As the next actions, it is required to deepen in the State of the Art and establish the methodological matrices of the research model to continue towards the integration of the research instrument and subsequent pilot test, as support for the final application of the instrument and to achieve a confirmatory factor analysis.

At the end of the research, testing and measuring the impact that leadership and management personality have on the creation of Intellectual Capital will be a contribution to support the performance of upstream oil companies in Mexico.

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