Proposal of a Measurement Scale of Decision Quality in Infrastructure Projects in Oil and Gas Exploitation

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Abstract

The objective in this paper is to present a proposal of a scale to measure the decision quality in infrastructure projects in the exploitation of oil and gas, as well as its foundations. One of the most important distinctions of Decision Analysis is the differentiation between a good decision and a good outcome, which is the approach of the scale, which occurs when decision making faces uncertainty. Therefore, a good decision does not always produce a good outcome. From this distinction, a progressive scale was designed, using an adjustment of the pairwise comparisons based on the Saaty scale achieving a quantitative hierarchy, which shows whether the decision guarantees quality, does not guarantee quality or is not acceptable. For its application, other existing decision processes used in the petroleum industry were located, from their common components a standardized decision analysis process was created, the common components are appropriate frame, objectives, decision and alternatives, risk and uncertainty, possibilities and modelling, values and exchanges and implementation and each of them subdivided into key aspects that are object of the measurement and evaluation. The objective set in a first stage was the proposed model of the measurement scale of decision quality and is subject to future validation work to verify its applicability in real life in a second stage.

Keywords: Decision quality, Decision analysis, Decision quality scale, Oil & gas Decision Making

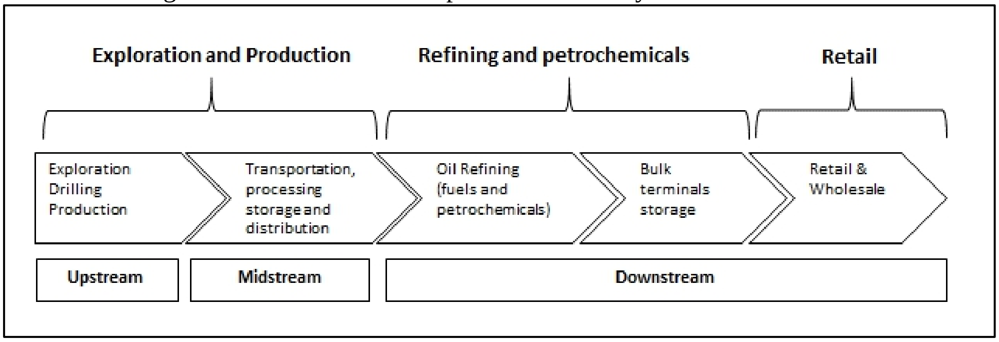
Introduction

One hundred percent of global commercial energy comes from a primary energy source. Oil & gas have a strategic role for the functioning of the world economy, since most of the energy consumed by the world comes from the so-called fossil fuels, which sustain more than 52% of the world's primary energy consumption (British Petroleum, 2016).

Within the fuels worldwide in 2016, oil is the most widely used in each of the different sectors with 32.9% of global energy consumption.

Exploration is the trigger in the value chain of the oil business, which comprises a series of studies, such as geological, gravimetric, reflection seismic and drilling of exploration wells, among others. This allows defining and evaluating the feasibility and profitability of hydrocarbon exploitation projects. Once a deposit is in the production stage, in the extraction site there is a pre-treated to remove salt, water and sulfur derivatives, if necessary, and transported to the refineries for processing, or to ports of shipment for export.

Figure 1. Value chain of the petroleum industry and its derivatives.



Source: Own elaboration, 2017.

The link in the chain that represents Exploration and Exploitation of the reservoir is the activity that requires the greatest amount of material, economic and human resources, becoming the most important activity and where most of the investments are established, being in this case the exploitation stage where this research project is developed.

Context of decision making in the oil industry

The "Society of Petroleum Engineers" -SPE- and the "Society of Decision Professionals" -SDP- (2015), mention that in recent years, there have been major projects in the oil and gas industry, with a performance lower than the 80%, according the expected in its approval. Approximately 30% had significant excesses in costs or phase-out in their programming, and 64% have experienced constant problems of production goals, after their start of production.

In their comparison of theoretical decision models and professional performance, Mackie, Begg, Smith and Welsh (2010), determined that there is a need to adapt processes to the types of decision, in order to decide optimally in the oil industry. Before Brashear, Becker and Gabriel (1999), highlight the low yields achieved in the projects, according to the rates of return achieved at the end of each of them, in another article, Mackie, Begg, Smith and Welsh (2007), argue that it is due to the failures of several decisions focused on the expected results.

Spetzler *et al* (2016), mention that there is a huge and documented gap between many business decisions and what the quality standards of a decision must meet, resulting in the loss of economic value.

However, the SPE and the SDP (2015), although they adapt a frame of reference regarding the quality assurance of decisions in the oil industry through a series of elements such as: establishing a useful framework, presenting clear values, visualize creative alternatives, present useful information, obtain logical reasoning and have commitment to perseverance. The measurement they propose are in qualitative aspects and subject to a judgment on each of the elements of quality in a decision, but do not specify a scale of accurate measurement of these elements, which would serve to measure the level of compliance or acceptability of the requirements to guarantee the quality in oil decisions in exploration and production.

Decision processes in the world oil industry

Allais (1956), cited in Suslick, Schiozer, and Rodríguez (2009), publishes what could be the formality of Decision Analysis (DA), in which he mixes economics with risk analysis in exploration, in a study on the economic feasibility of exploration in the Algerian Sahara (Allais, 1956). On the other hand, various authors in the 70's and 80's began their DA publications focused on the oil industry mainly in the area of exploration, as did Newendorp (1976), Hanciulescu and Pescaru (1968), Kaufman (1965) and Greyson (1962), among others.

Today there is a DA applications in the global oil industry throughout its entire value chain -Upstream, midstream and downstream-. Ley (2009), enunciates a series of DA applications in the Mexican oil industry and Suslick and Schiozer in Gamma and Teixeira, (2013), state that in the global oil industry, managers are increasing the use of analytical techniques to make decisions.

On the other hand, Schilling and Ley (2008) and Ley (2009), mention that there are several applications based on this process, mainly in the Mexican oil industry, among which Palacios (2004), Morales, Palacios y García (2005), García, Palacios y Morales (2005) and Morales (2008) stand out.

There is evidence of a varied application of the DA between the years 2007 and 2016, mainly in specific areas of exploration and well drilling, even some important companies adopted and implemented them as part of their strategy and organizational culture. Among which are ConocoPhillips, that is an integral part of its way of deciding how to invest and operate, basing the model on "The ConocoPhillips Way"; Chevron where the Society of Decision Professionals (SDP) awarded in 2015, the Raiffa-Howard Award to Chevron Corporation for achieving excellence in the application of the principles of Decisions Quality throughout the organization; Syncrude from the year 1995 transforms its strategic planning and organizational culture using the Dialogue of the Decision Process (Matheson & Matheson, 1998); Petrobras implemented a corporate-level protocol to assess the economic risks associated with potential investments.

Other companies that have also adopted decision-making systematically: Schlumberger, Halliburton, Amoco Norway Oil Co., Statoil, British Petroleum, Royal Dutch Shell, “Petróleos De Venezuela SA” (PDVSA) and ECOPETROL among others.

In the case of "Front End Laoding (FEL)" as a decision-making process, it is used in several oil companies, such as: MEDCO E&P Indonesia (Mishar, 2012), British Petroleum (Fryar & Looney, 2011), Conoco (Smith, Williamson & Seals, 1997), Chevron-Texaco (Sullivan, 2015), Royal Dutch-Shell (Weijde, 2008), ECOPETROL (Garcia, Naranjo, Salazar, & Linero, 2012), PEMEX (Arteaga *et al*, 2011) and (Czwienzek, *et al*., 2009), Kuwait Oil Company (Saputelli, Black, Passalacqua & Barry, 2013), Woodside Petroleum Ltd (Brennan, 2004), Petrobras (Asrilhant, 2005), PDVSA (Halliburton, 2006) and Exxon-Mobil among others.

There is also evidence of the use of the Decision Process Dialogue -DPD-, in which its implementation has been in different companies such as: General Motors (Luecke, 2008), Syncrude (Strategic Decision Group, 2015), in the field Duri in Sumatra, Indonesia (Neal, 1994) and the oil company Chevron, who lived a decisional process based on the Decision Process Dialogue (Spetzler, 2015) among others.

Decision Quality

With regard to decision quality, Yates (2003) raises decisions that are understood better as commitments with actions, that pretend to produce states of satisfaction for the beneficiaries of those decisions. In addition to the beneficiaries, the typical components of business decisions include decision-makers, stakeholders, and those responsible for decision-making analysis. It uses the term of effective decision, which involves five criteria: purpose, need, aggregate results, rival options and process costs.

To answer the question of what makes a good decision?, this is answered according to Howard and Abbas (2014) and Spetzler *et al* (2016), where they mention that having a shared understanding of the quality of a decision, means that all those involved in the decision process, are familiar with the fundamental elements of this.

It should be noted that in terms of desicion quality there are other similar approaches, one example is Skinner (1999), which mentions that it is possible to achieve quality in decisions, since the problem is thoroughly examined and the alternatives evaluated, through the analysis of decisions and mentions ten principles to follow and ninety activities.

Spetzler *et al* (2016), mention six requirements that must be fulfilled to achieve the quality of a decision: 1) Appropriate framework, 2) Creative and feasible alternatives, 3) Reliable and useful information, 4) Clear values and compensations, 5) Logical and correct reasoning and 6) Commitment to action. When all six requirements are met, the decision quality reached (Neal, 1994), (Keelin, Schoemaker & Spetzler, 2008), (Howard and Abbas, 2014), (Spetzler *et al*, 2016), (Spetzler, 2015) and (McNamee & Celona, 2008).

This approach was introduced by the "Strategic Decision Group (SDG)", at the beginning of the 1980s, It has been shown since then, that the application of its approach is a good practice, to achieve clarity and alignment in the significant decisions-making of the organization (Edwards, Miles and Winterfeldt, 2007).

Regarding the concept of quality in the decisions McNamee and Celona (2008), they point out that the concepts of quality of content and the quality of people should be part of its definition.

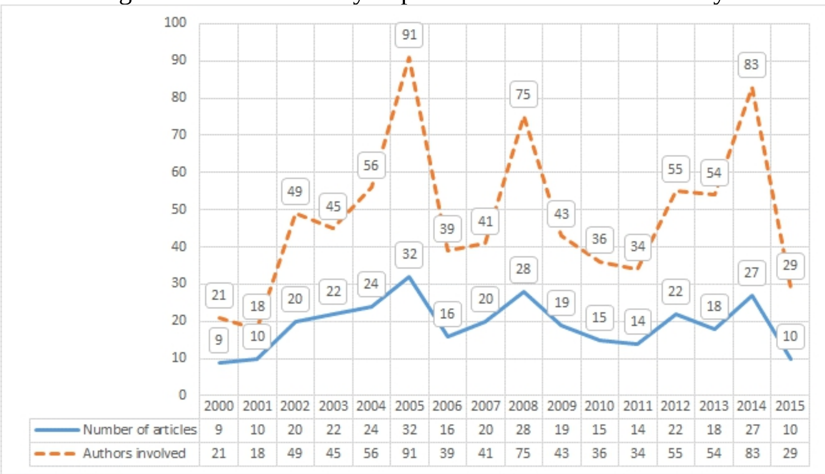
Ley (2009), mentions that one can infer about the quality of decisions without waiting for the results, through the auditability of the process of analysis and decision making.

Evidence of Decisions Analysis in the oil industry

Today there is a wide range of DA applications in the global oil industry throughout its entire value chain. In addition there are several articles that show the literature reviews, in terms of the matter in decision analysis such as Keefer, Kirkwood and Corner (2004), Keeney (1982), Partnell and Bresnick (2013). On the other hand, Ley (2009) states that there is a series of DA applications in the Mexican oil industry.

Over time, there have been various publications generated that link the DA in the oil industry. The Figure 2 show the relationship between articles and authors/co-authors involved. There is an upward trend in the publication of related articles of DA with the oil industry, due to the dissemination of the discipline worldwide.

Figure 2. Decision Analysis publications in the oil industry.



Source: Own elaboration, 2017.

The focus of this work is mainly on the oil & gas exploration and production, specifically in the exploitation projects.

The Table 1 shows the review of DA publications related to Exploration and Production to year 2000 to the year 2015, where Bratvold and Begg are who have published the most and directed to each of the links of the value chain, in the case of Schiozer, his publications are focused mostly on the exploration process, as well as Bickel.

Table 1. Decision Analysis articles by process in oil & gas industry (year 2000 to the year 2015).

	Value Chain (109 Articles)	Exploration (76 Articles)	Development (66 Articles)	Drill (15 Articles)	Production (29 Articles)	Transportation (8 Articles)	
Bratvold, R. B.	19	3	4	3	5	1	35
Begg, S. H.	18	4			2		24
Schiozer, D. J.	2	10			2		14
Welsh, M. B.	9	2					11
Bickel, J. E.	3	2	2	2	2		11
Willigers, B. J. A.	3	1			1	1	6
Mackie, S. I.	6						6
McVay, D. A.	2	2	2				6
Saputelli, L. A.		1	4				5
Morales, R. G.	1		2		2		5
Jafarizadeh, B.	2		1		1	1	5
Costa, A. P. A.		5					5
Cullick, A. S.		2	3				5
Cunha, J. C. S.	2	1		2			5
Jablonowski, C. J.	2		2	1			5
Laughton, D.	4						4
Suslick, S. B.	2		1		1		4
Smith, C.	4						4
Ligero, E. L.		4					4
Virine, L.	4						4
Rajaieyamchee, M. A.			1	3			4
Campbell, J. M.	3				1		4
COOPERSMITH, E. M.	3		1				4
Palacios, L. G.			1		2		3
Lee, M. D.	3						3
Lake, L. W.	1		2				3
Narayanan, K.		2	1				3
Bailey, W. J.	2		1				3
Godi, A.		3					3
Couët, B.	2		1				3
Cunningham, P. C.	2		1				3
Denney, D.		1	2				3
Others..	10	76	66	15	29	8	0

Source: Own elaboration, 2017.

In the case of written articles, it is observed that 34% of these are of applicability throughout the value chain, 25% are related to the exploration process, 21% are related to the development of fields, 5% are related to drilling, 9% to production and 3% to transportation.

Scales of quality measurement in decisions

According to the documentary search carried out, there are only some ways to measure the quality of decisions in a very subjective and qualitative way. Such is the case of Skinner (1999), who mentions that the quality of the decision can be measured qualitatively and as it progresses from one phase to the other, it establishes ten aspects to qualify and uses a scale from 1 to 5, where 1 = low, 2 = average and 5 = high;. He mentions that from experience, a result of less than 30 points means that it is an unsuccessful decision.

Blenko, Mankins and Rogers (2010), state that a decision will have good results in financial terms, if it meets the highest scores in terms of Quality in decision-making, speed in making decisions with respect to competitors, performance, given by the percentage of effective execution and the lowest of the scores for the decision making effort in terms of percentage, highlighting the scale of low, medium and high, in the surveys conducted.

Lately Spetzler et al (2016), propose scales of measurement in each of the quality requirements of a decision between 0 and 100, and stipulate that where there is a lower score is where the weakness of the chain and where the practice of the requirement for decision quality should be reinforced.

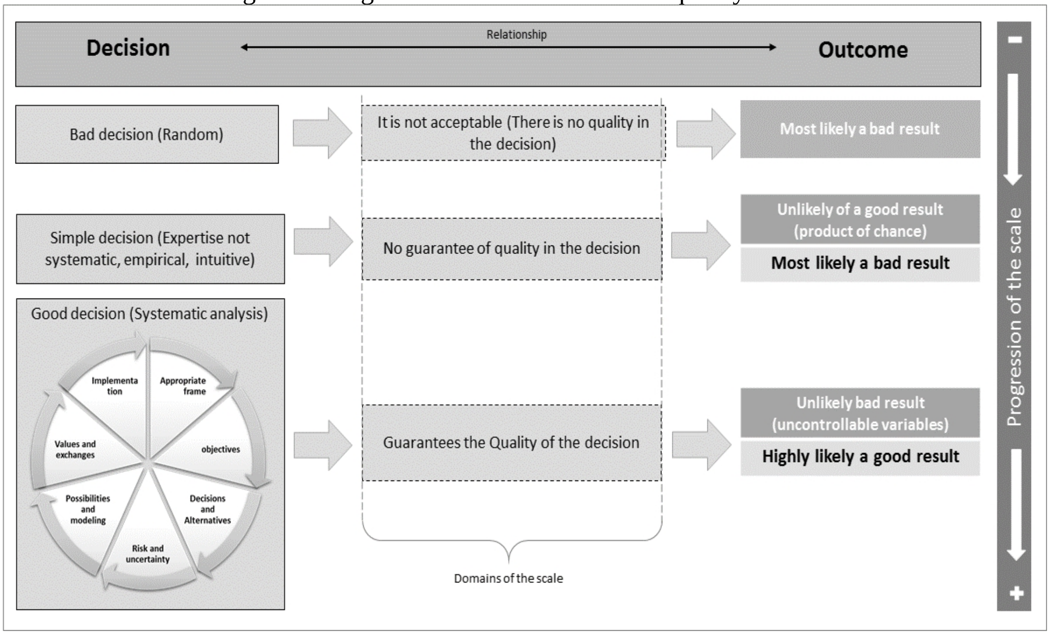
In general it follows that there are very few proposals for scales to measure the quality of decisions, which motivates this research work.

Proposed research model

The research model conceived is according to the normative characteristic of the decisions analysis, where the necessary elements for the construction of a quality measurement scale in the decision-making in the oil industry are exposed. These elements are part of the structures and variables of the different decision models, with the purpose of establishing the basis for the scale.

There is a fundamental distinction in Decisions Analysis (Howard & Abbas, 2014), the difference between decision and outcome -which is the approach of the scale of decision quality measurement in this research-. Which gives rise to the domains of a progressive scale (Figure 3), which helps to establish the measurement of the decision quality, through the assurance of the a priori quality of the decision-making, thus ensuring a good outcome. This distinction is the most important in the Analysis of Decisions.

Figure 3. Progression model of a decision quality.



Source: Own elaboration, 2017.

The progression model of a decision quality (Figure 3), show the direct relationship between the decision and the outcome. Where a good decision or decision with quality -those that are analyzed and carried out in a systematic and coherent manner with the objectives that are proposed, focused on the assurance of quality in the decision- guarantee a good result and it is unlikely that it will produce a bad outcome as a consequence of a fortuitous event.

In a simple decision -one that is not systematic, intuitive or based on experience, there is a decision trigger, oriented to results- it is likely to produce bad results and very unlikely but ultimately possible, I could throw a good result, but this will be a product of chance. Phillips, Klein and Sieck (2004) write that although decision making seems to favor the experienced person, the experience must often be put in context to make sense, on the other hand the expert understands the problem more thoroughly and more effectively. They define that intuitions can be specific as judgments related to a particular task with a certain domain. And as a general intuition to knowledge and experience with a domain.

In the case of a bad decision -which is completely random, based on emotional aspects, without any effort and impulsive- taken in a not so reasonable way, there is the possibility of a bad result and with a minimum probability of a good result.

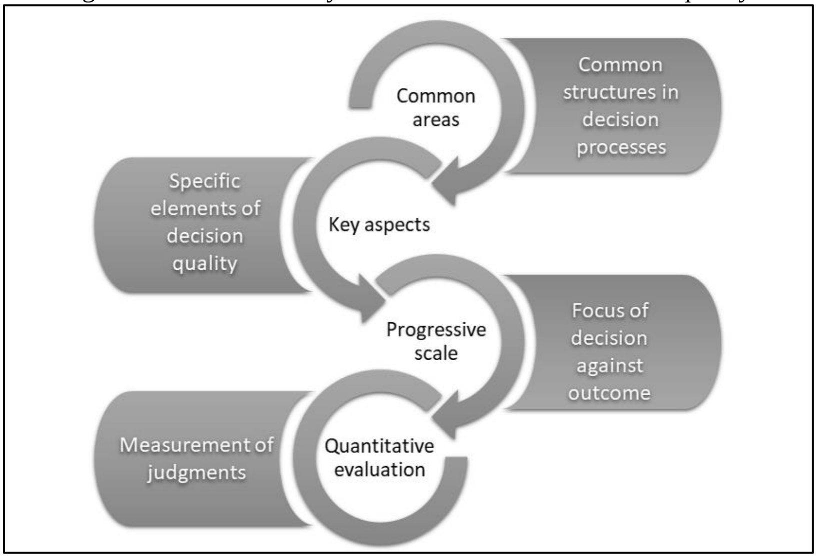
Some aspects to take into account to verify decisions quality, is through the assurance of quality in the decision making process, establishing an evaluation process, which involves the following approach:

1. To achieve quality in oil decisions in each of the stages of the analysis or process of the decision, through the assurance or verification of the application of the elements and tools of decision analysis in a correct and systematic way.
2. In the structures or common components of the decisional processes used in the oil industry.
3. In specific aspects or elements, which are involved in each of the structures or components of decision-making processes and the analysis of a decision in the oil industry.
4. Progressive scale, based on the concept of the basic distinction in decision making between decision and result.
5. In the quantitative measurement of judgments using the adjusted Saaty scale and paired tests.

The intention is to apply in a systematic way the group of structures and criteria, to lead to quality decision-making, and make possible the measurement the applicability of the requirements of a decision quality in the presented situations and quantitatively express the level of quality of a decision in the oil industry.

In Figure 4, there are four components of the model for the systematic evaluation of the decision quality: the common areas, the key aspects, the scale of progressive measurement and the quantitative evaluation of value judgments expressed.

Figure 4. Model for the systematic evaluation of decision quality.

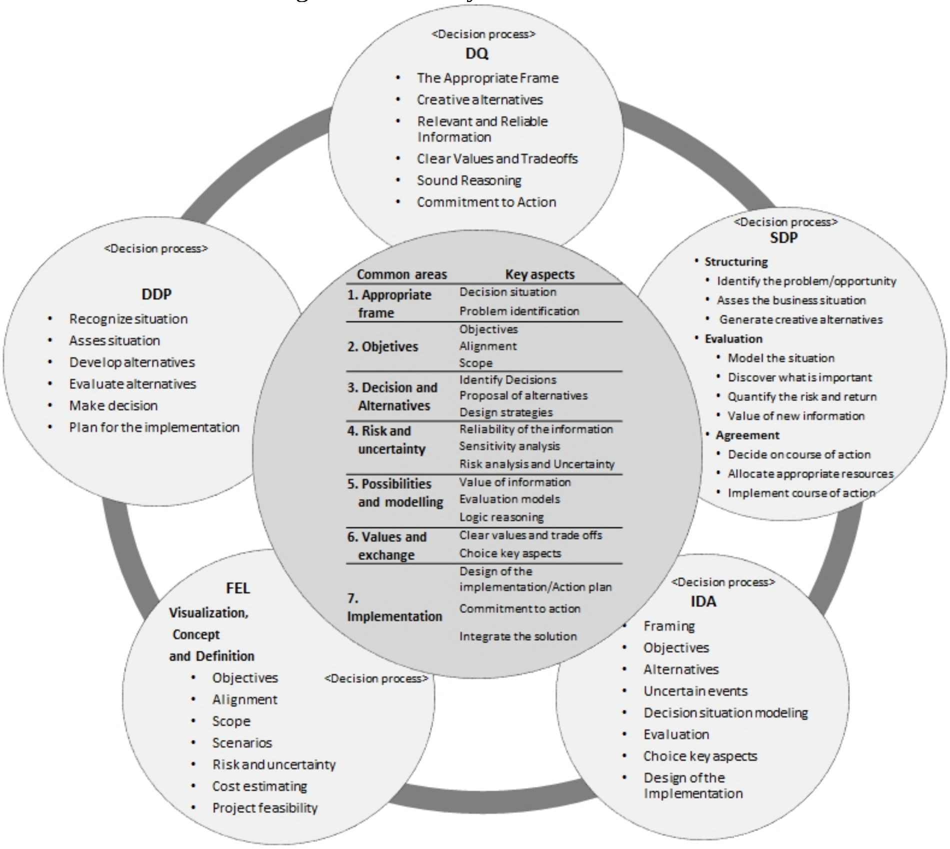


Source: Own elaboration, 2017.

Each of these components are part of evaluation of the decision quality. Which specifically, logically and sequentially, all aspects involved to achieve the measurement of the level of the quality of the decision.

After grouping and classifying the universe of the components of the different existing decision processes, a single complemented model is integrated. According to documentary research, the models used in the oil industry (Figure 4) Integral Decision Analysis (IDA), Front End Loading (FEL), the Decision Quality Model (DQ), the Dialogue Decision Process (DDP) and Scalable Decision Process (SDP).

Figure 5. Summary of common areas.



Source: Own elaboration with information of Ley, Speltzer, Howard, Skinner and Pasaalacua, 2017.

Each of the models found, has in essence the same dynamics and thought, some differences are observed, however, they are not critical, so no specific one was used, since the scale is intended to be used universally to anyone of existing models.

There are seven areas according to the processes and analysis of decisions, which contain certain key aspects or common components, which must be carried out in an orderly and systematic manner, in order to achieve a quality decision process, what gives rise to the name of common areas, are structured according to figure 5. Each of the Common areas includes all the key aspects of a good decision in the form of a requirement.

For the achievement of quality in the decision, the idea of focusing on verifying the systematic application of the different aspects or components of a decision must prevail. However, such verification should be treated not only in terms of the qualitative expression of judgments about its application, but also in a quantitative way to remove subjectivity and provide clarity.

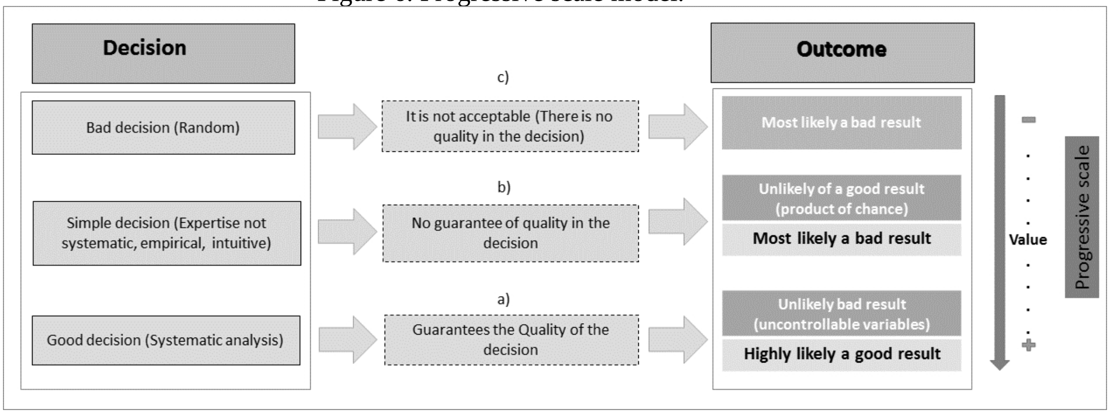
Therefore, it is necessary to design a scale focused on this objective. The scale should be based on the systematic thinking of a decision with quality and its associated approaches.

The common areas and the key aspects that make up the structure of a process or a decision are the vital part, in order to establish the quality condition of a decision; however, the process is not completed until the measurement to all the elements of the decision is made.

For this purpose, a progressive scale of ordinal type is designed, which serves as a reference, to establish the relevant value judgments.

The distinction between a decision and a result is the basis of the proposed progressive scale and it is shown in Figure 6. It is called progressive because the intrinsic value of the quality of the decision is a function of the quality assurance reached in a decision.

Figure 6. Progressive scale model.



Source: Own elaboration, 2017.

The scale used to make judgments about the status of each of the components of the decision process. The judgments are based on the structure of the elements of the progressive scale (Figure 6). According to three options in each decisional process component, the option of item c) which is the one that has less value. According to the components, there could be a wrong or incomplete option and it would have a status of not being acceptable for the achievement of quality in the component, which would result in a bad decision.

On the other hand, option b), although it is not the ideal one, has a certain degree of validity since experience and intuition prevail, so that its practice in the analyzed decision component could bring a good result closer, but it does not guarantee it.

Finally, option a) is the most valid, since according to the theoretical-practical standards of decision analysis, is ideal and would guarantee the quality of the decision, raising the probability of a good result.

Table 2. Structure of the elements of the progressive scale

+ Value -	$\#_i$ Element of the decision $_j$
	a) Option that guarantees the quality in the element of the decision
	b) Option that does not guarantee quality in the element of the decision
	c) Option that is not acceptable for quality in the decision element

Source: Own elaboration, 2017.

According to the structure of quality in a decisional process, a migration from the qualitative to the quantitative is considered, achieving a quantitative hierarchy through an over classification method, where the three options compete.

Taking as reference the common areas and the key aspects, a construct is designed, based on the key aspects (Figure 5), with the idea of representing the judgments aimed at establishing the degree of quality of a decision. This construct is structured according to the seven common areas, and in turn each area contains the evaluation of each of the key elements, through the design of items (Table 3), which will be assessed through the progressive scale that bases the respective value judgment.

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Table 3. Structure of an item.

Common area
Question that verifies the application of the key aspect or component of the decision
Option that guarantees the quality in the element of the decision.
Option that does not guarantee quality in the element of the decision
Option that is not acceptable for quality in the element of the decision

Source: Own elaboration, 2017.

Table 3 shows the design of the structure of an Item, when the value judgments on the systematic applicability of each of the key aspects in the oil exploitation projects are issued, there is a valid reference. The judgment will be direct towards the appropriate option, and with the help of the Saaty´s method, the quantitative standardized hierarchy is achieved, adding a score that is going to accumulate and this way knowing the final score and the status of the project regarding the quality achieved.

The approach of the scale is oriented to compare the current decision-making, with respect to an ideal reference, according to the three options of the progressive scale presented, in each of the items of the construct.

For the application of the progressive scale, it is proposed that the Saaty scale be adjusted in the numerical allocation spectrum, only three grades or assignments for each evaluation. The above with the idea of using the progressive scale based on only three options A, B and C, and thus define which option is being decided on without being listed as a preference.

It is proposed that when choosing the option of the current state –TO BE state through three options-, adjust the Saaty scale (Table 4) to the values of 7, 5, 1 as appropriate, achieving with this complement the paired test (Saaty, 1990), (Saaty and Vargas, 1994) and simplify the application of the scale in practice, measuring in a single dimension and not in two as required by the traditional paired test method and obtaining the same results.

Table 4. Values in the combinations of a paired test, if option A is chosen.

Option A, for combinations:		Saaty Scale (a_{ij} value)	verbal Scale (When the criterion *i*, compared with *j*)	Explanation of the scale
A	B	7	Very strong preference	Element A is much more favored than B, the next in hierarchy.
A	C	5	Strongly preferred	Although it is still A, it is visualized as the strongly favored element over C, although B is more favored than C, that is why it has a lower value than the AB combination.
B	C	1	Equally important	Equivalence of indifferent

Source: Own elaboration, 2017.

Table 4 explains part of the proposal, if A is selected out of the three options A, B and C -which guarantees the quality of the decision and therefore has more value- of the three combinations in which faces A against B, A against C and B against C. The values of 7, 5 and 1 are assigned respectively for each combination. This means that the combination in which A appears has greater value, specifically due to the progressiveness of the scale, AB has a higher value than AC - component B has a higher value than component C-, being the value of 1 or indifferent for the BC combination, because none is of the preference.

In the same way, it is determined for the cases in which B or C is selected. In Table 5, the summary and result of the paired test for each of the combinations of options is observed, where a 1.3 of consistency index is obtained in each one, which is considered acceptable (Saaty and Vargas, 1994). Therefore, these values are the basis of the scale and depending on the option chosen, is applied.

Table 5. Summary of paired test results for all combinations

	$\#_i$ Element of the decision $_j$	Saaty scale value in the combination	Paired test result (Logical consistency index= 1.31%)
+	**A.** Option that guarantees the quality in the element of the decision.	AB=7 AC=5 BC=1	A=74.71% B=11.94% C=13.36%
Decision Quality	**B.** Option that does not guarantee quality in the element of the decision.	AB=7 AC=1 BC=5	A=11.94% B=74.71% C=13.36%
−	**C.** Option that is not acceptable for quality in the decision element.	AB=1 AC=7 BC=5	A=11.94% B=13.36% C=74.71%

Source: Own elaboration, 2017.

The application of the scale is limited to the question and three options, which makes it easier, simpler and practical in its application in the diagnostic questionnaire and the corresponding measurement.

Framework of work

For the visualization of the state of the art, in relation to the fundamental idea of this research, a search was made of the articles published in the different journals of scientific validity, through the different means of search such as Copernic, Publish or Perish , Google academic, databases such as One Petro, ABI/Global INFORM, EBSCO, Petroleum Abstracts Tulsa® Database, Scopus, Scifinder, EI-VILLAGE-COMPENDEX, EI-VILLAGE-ENCOMPASS LIT and EI-VILLAGE-ENCOMPASS PAT and some others. The search was carried out through keywords related to decision analysis, decision-making, decision processes, quality decisions, gas, oil, "Upstream", Exploration and production and others.

Hypothesis Formulation

With the premises of a decision with quality, where the relationships between the decision making and the possible results are made, it is evident that the systematic practice of a decision will guarantee a good outcome. According the research questions, the respective hypothesis is presented, with the purpose of establishing the hypothesis that lead to establish the position of the progressive scale model created. Being the main hypothesis as follows:

When making decisions in a systematic way, a good outcome will be presented, such as to guarantee the quality of the decision with a score greater than 74%, according to the progressive scale.

Which systematic way, means that if the common areas and key factors are applied in correct way, there will definitely be a guarantee of making a good decision, which will increase the probability of obtaining a good result. Quantitatively using the progressive scale and based on the results of the its application, which establishes as a minimum acceptable score of 74%, product of the adjustment to the scale and a paired test between options a), b) and c) of the questionnaire (Table 3), in each of the key aspects of a decision as explained above lines (Table 5). It should be noted that the present hypothesis is subject to subsequent validation since it is part of a second stage of the present work.

Discussion of results

In the search of the scientific basis of the Decisions Analysis, many publications were found and made reference to the application of the DA in the petroleum industry in general but mainly in the University of Stavenger in Norway, Adelaide University in Australia, State University of Campinas in Brazil, the University of Texas at Austin, which gather 31% of the publications found. However, only two articles refer to a systematic measurement of the quality of the decisions, but none of them go deeper into the measurement scale.

It is important to mention that the scale and the model of measurement of the decision quality, should comply with the characteristic of simplicity in its application, since this can be a determining factor in its implementation.

On the other hand, there could be more precise, complex and sophisticated mathematical models to perform a measurement scale but its application would be impractical, so a balance is sought. The adjustment in the paired tests that is proposed, fulfills this requirement since it simplifies the self-evaluation to the selection of three options only and not necessarily to perform the exercise of the paired test in each of the items that make up the total of the evaluation questionnaire .

According to the review in articles between the years 2000 and 2015, it is visualized that there are 3 maximum scales to measure the quality of the decisions and they are only based on certain percentages assigned directly by a judgment and do not have the depth of evaluation and analysis required.

The progressive scale proposed in the present work, starts from a principle of self-management, in which the evaluated person captures his current status about the standards required to comply with a decision-making process with quality.

Conclusion

The proposed model and its foundations obey some precepts and ideas established in terms of experience and knowledge about Decision Analysis. It is also highlighted that the absence and theoretical sufficiency in scales of measurement of quality in decisions, is deficient and shallow.

According to the documentary research, five decisional processes were located, from which it was decided instead of using a specific one, because in general the five outline the same idea and only show some differences, so it was decided to integrate a process complemented with common components.

One aspect of value in the present investigation is the model of common areas and key aspects, since there are several models of decision applied in the oil industry and all have in essence the same components or structure, in the present work a structure was assembled to be completely collective, in order that the measurement is applied to any process.

For the design of the measurement scale, at least three elements are necessary, which are the basis and reference for quantification, being feasible in this case the approach of an intermediate base between a bad and a good decision, which we called as simple decision, that weights decisions based on experience and although it does not guarantee a good result, it will increase the probability of obtaining it.

According to the frameworks established in this research and the proposal of the model, there is an advance such that, it is necessary to check the hypothesis of work and thus be conclusive about the utility of the scale of measurement of quality in decisions proposal.

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