Organizational Culture Assessment Using Paraconsistent Logic Method of Evaluation

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Abstract – **The present study aims to present a tool to analyze the organizational climate adherence through the integration of success codes and the Paraconsistent Decision Method. In this way, contributing to a previous scenario analysis that can return more precise feedback of the organizational culture conditions of the organization. The Paraconsistent Decision Method has the axillary function of the decision-making process, so when integrated into a corporate climate analysis survey the result is a more precise survey, where contradictions are treated in a different way, extracted to the maximum the information collected.**

Keywords – **Organizational culture; Paraconsistent Annotated Evidential Logic Eτ; Paraconsistent Decision-Making Method.**

I. INTRODUCTION

The consideration of a new quality management system will have, always, to a greater or lesser degree, rivals that will strive to hinder or even prevent the change, attitudes that can characterize ill will or even sabotage. Part of the literature relates to interpersonal trust many organizational variables such as citizenship behavior, cooperation, communication quality, performance, and troubleshooting. The trust involves expectations of benevolence and dependence on another party involved, where the actions of who trust are utterly related to their perceptions and attitudes of the target of trust [1].

Even the trust and organizational culture are distinct levels

variables, micro, and macro; respectively, there are several indications of this relationship. Studies that analyze the relationship between trust and organizational culture, organizational culture as an antecedent of confidence, while considering the faith as a variable to facilitate processes of change in the culture of organizations [1].

Considering the organizational culture mainly as what is in the Organization, the confidence that employees have in the organization can contribute to anyone change. If it is appropriate to consider that the trust stimulates beneficial behaviors in the context of the work, it is possible to say that one's absence can encourage helpful little or nothing response [1].

Based on these notes it is possible to identify the relationship between reliability and organizational culture. Therefore, it is necessary to use a tool that can measure the success factors of the corporate culture to improve the security of the actors of the organization.

After this explanation, this study presents itself divided into five chapters. The theoretical framework is set out in Chapter 2; Emphasized the methodology in Chapter 3. Section 4 shows a discussion of the results, followed by their respective analyses. Moreover, finally, is given in Chapter 5 the final considerations of the present research.

II. THEORETICAL BACKGROUNDS

In this paragraph is presented all the contents that were used as the basis for this research, after vast bibliographical research on Paraconsistent logic and Organizational Culture was unable to collect the necessary material to develop a reliable path for the present work.

A. Organizational Culture

In the social sciences, culture can be understood as that which holds individuals of the same group in specific patterns of behavior, are their conscious elements or not of existence and culture. Manifestations, represented in some ways either by attitudes, gestures, habits, that is, the various actions expressed by members of a group, that make these individuals part of the Group [1].

Many authors narrow the relationship between organizational culture and organizational climate as is the case with Coda [2] [3], Souza and Schneider [4]. There are also authors that deal with environment and culture as synonymous, i.e., there's no way to talk about climate or culture separately.

According to Oliveira [5], talking about organizational

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climate refers almost necessarily speaking also to corporate culture as if they were conceptually inseparable.

Some of the authors who are organizational climate and organizational culture as synonyms are Katz and Khan [6] and [7] Milioni Toledo. Katz and Kahn conceptualize that environment, or corporate culture reflects the norms and values of the formal and informal system of the Organization, namely, the concept becomes vital to be outlined the formal and informal structure of the organization.

Organizational culture involves a complex range of assumptions and values. Such issues are discovered or invented by a particular group of people during attempts to adapt to external conditions or internal. Eventually, they become strong enough to be passed on to other members of the Organization, whether they are new members or not, the correct way to perceive, think, and feel in respects to such situations [8].

The intellectual development of people is a factor impacting on organizational culture because it is nothing more than a set of ideas, knowledge, behavior patterns and techniques learned in the group set [8].

The noticeable side of organizational culture is formal and can be compared to the tip of the iceberg, that is readily identifiable because it is equipped with technologies, artifacts, and creations. The other side, the imperceptible, is not easily recognizable because it consists of values, customs, and assumptions that are deeply rooted and implicit within the Organization [9].

To define culture as a set of values, norms and beliefs that standardize and guide the behavior of the particular group, note that the concept of culture is more vast and broad definition of organizational climate [9].

Motta and Caldas [10] denote the organizational culture is a set of beliefs, expectations, and values that are shared between its participants and left as a legacy for future generations, and these rules of conduct apply since high even the most simple operator manages.

Every organization, even if informally, create one's own culture that for his time reflects the standards and formal values. The concept of motivation leads us to the idea of organizational climate, people are always in search of satisfaction of their needs and keep their emotional balance.

The organization can be compared to a social system that has different types of participants, which are represented by all the elements that receive incentives and bring contributions to the Organization's existence.

There are four types of participants, employees, investors, suppliers, and customers. Each participant assumes his role at any given time in the Organization, not necessarily needing to be inside her to act, but all relate to the Organization of the reciprocal form [8].

TABLE I
BUSINESS PARTNERS (CHIAVENATO, 2002)

Participants (Partners)	Contributions(Personal Investments)	Incentives (Expected Return)
Employees	Contribute to work, dedication, personal effort, performance, loyalty, attendance.	Motivated by salary, benefits, awards, praise, and recognition opportunities.
Investors	Contribute to money in the form of shares, loans, financing.	Driven by profitability, liquidity, dividends, the return on investment.
Suppliers	Contribute materials, raw materials, technologies, specialized services.	Motivated by prices, terms of payment, billing, warranty of new business.
Customers	Contribute money to the purchase of products/services and one's consumption or use.	Motivated by price, quality, terms of payment and satisfaction of needs.

A process of change, to be successful, must be well planned, well publicised, well justified and well executed. It is of paramount to consider the climate and culture of the organization. Need to count on the commitment of top management, without which inexorably fail. The responsibility is the desire for real and evidenced by visible evidence. The team responsible for the change must have a delegation of authority to senior management. The difference must start with the points that have a higher probability of success so that one can produce the effect demonstration, which will facilitate the most problematic aspects [11].

Six determinations of change should be considered:

Understanding: understanding the importance of change on the part of senior management;

Commitment: decision to make the transition by the persuasion of its significance;

Competence: the ability to perform the technical and administrative change;

Correction: the absence of errors in the process of change;

Communication: information and justification to all involved about the need and importance of change;

Continuity: ensuring that there will be no setback after implementation.

The changes for the better comes from new concepts and not the adoption of new methodologies. These methodologies help only in organizations that understand their real problems and can change their paradigms in favor of progress [11].

The teams involved in the process of the six determinations of change can come across incomplete, ambiguous, vague and often contradictory to a greater or lesser degree, making data analysis for decision making. A non-Classical Logic can present more reliable results for this scenario. The following will be given to Paraconsistent logic as a helper tool for analysis of these scenarios.

B. Paraconsistent Logic Annotated Evidential Eτ

This topic introduces as purpose to introduce the Paraconsistent Logic Annotated and Evidential, that will be the basis for subsequent studies.

Approximately, paraconsistent logic allows contradictions in theories based on them without trivialization. It is possible to note that Nikolai Vasiliev and Jan Łukasiewicz discovered Paraconsistent logician 1907 at Aristotelian level while Stanisław Jaśkowski in 1948 and Newton da Costa in 1958 independently introduced propositional level and higher-order logic, respectively [12].

da Costa has developed a family of Paraconsistent Logic, propositional and predicate calculus of first-order set theory, that is, all the standard logic levels [13].

The process of decision making is a rational process, in which a plan of action is chosen based on various. Every decision-making process produces a choice. The decision refers to the process of selecting a coherent way in certain situations [14]

All decision-making, in a company, affects the general condition. The path to be chosen must be parsed; one should support the decision-making process by setting ways that must be traversed and think about what is affected by that decision [14]

By analyzing the real world, uncertain and inconsistent situations, we notice that in most of them we have partial knowledge of the facts. However, it does not prevent the development of human reasoning, that is beyond binary relation of truth and falsehood. The need to demonstrate and handle situations of contradiction raised an underlying logic to formal systems, called Paraconsistent Logic [15]

The decision-making process is an excellent response. Some people have an ease with the decision-making process. However, others attach to the problem a disproportionate value to their reality that wrong choices are made. [14]

The Annotated Evidential And Paraconsistent Logic Et is a class of Paraconsistent Logic whose language contains propositions of type $p(\mu, \lambda)$, where p is a proposition and (μ, λ) is an annotation constant. μ indicates the favorable degree of evidence and λ the contrary evidence expressed by the proposition p. The evidence degrees of μ and λ range between the real numbers 0 and 1 [16].

The processing of input data by application of minimizing and maximizing connectives between the Atomic Formulas A and B, that define the resulting state of the output.

Considering two groups of experts A = (E1, E2) and B = (E3, E4), it can be shown the connective OR application, represented by the disjunction A v B:
E1 $(\mu1, \lambda1)$ OR E2 $(\mu2, \lambda2)$ = (max $\{\mu1, \mu2\}$, min $\{\lambda1, \lambda2\}$) = air $(\mu1, \lambda1)$
E3 $(\mu1, \lambda1)$ OR E4 $(\mu2, \lambda2)$ = (max $\{\mu1, \mu2\}$, min $\{\lambda1, \lambda2\}$) = $(\mu2, \lambda2)$

Then, the application of connective AND, among the signs noted in air and BR, representing the conjunction ∧ AIR BR:
R = $(\mu1, \lambda1)$ AND BR $(\mu2, \lambda2)$ = (min $\{\mu1, \mu2\}$, Max $\{\lambda1, \lambda2\}$) = R $(\mu1, \lambda1)$

After applying the maximization and minimization, the degrees of certainty and uncertainty are obtained by Degree of certainty: $Gce(\mu, \lambda) = \mu - \lambda$; Degree of Uncertainty: $Gun(\mu, \lambda) = \mu + \lambda - 1$. With the values of Gce and Gun obtained, identifies

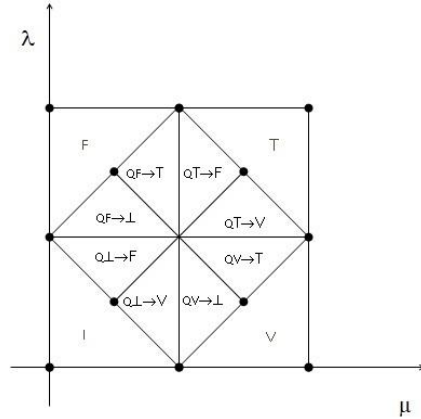the logical State arising through the analysis of τ in lattice Fig. 2.

Fig. 2 – Extreme and non-extreme States Source: [15]

TABLE II - EXTREMES STATES SOURCE: [15]

Extreme State	Symbol
True	V
False	F
Inconsistent	T
Paracomplete	⊥

TABLE III NON-EXTREMES STATES - SOURCE: [15]

Non-extreme State	Symbol
Quasi-true tending to the Inconsistent	QV→T
Quasi-true tending to Paracomplete	QV→⊥
Quasi-false tending to the Inconsistent	QF→T
Quasi-false tending to Paracomplete	QF→⊥
Quasi-inconsistent tending to the True	QT→V
Quasi-inconsistent tending to False	QT→F
Quasi-paracomplete tending to True	Q⊥→V
Quasi-paracomplete tending to False	Q⊥→F

C. Paraconsistent Method of Decision

Based on studies of [20], you can synthesize Paraconsistent method definition of decision (MPD), which is a method that assists decision-making using Paraconsistent Logic.

Paraconsistent method of Decision was developed by [21], which sought to identify factors that influence the success or failure of a project, namely, that end up affecting the decision to carry out a plan or not. The analysis made it possible to identify what attributes can in some cases indicate favorable conditions in other unfavorable and other circumstances indifferent. These factors may be of different orders: economic, social, legal, environmental, political, technical, among others [21].

MPD uses as "input" (in) the experience of the participants in the decision-making process that are called experts as an

essential tool of assessment of the particular issue, enabling or precludes a situation any [17].

Starting a problem, question or note, which gets its name from the proposition, the method determines the need to finish the so-called factors, which as the name implies are the factors that impact on the viability or infeasibility of this proposition [18].

The factors can be severed to increase the accuracy of the analysis of a particular factor, sections created can extract more from the knowledge of the experts who are evaluating the [17].

Paraconsistent decision method consists of basically eight steps [20]:

1. Define the degree of demand that is parameterized on the decision-making process.

2. Define the factors that impact the proposition that will be parsed.

3. Set the sections that constitute the factors, to explain better the factor limits; there is no limit of sections to give the factor or a pattern to be followed.

4. Form the database, which can be formed by the weights also assigned factors and by evidence favorable factors and evidence to the contrary, that are deposited to each factor and its sections; such weights and opinions are taken from people who are considered experts in the field of knowledge that the proposition is inserted.

5. Carry out field research to establish, in which condition each of the factors.

6. Get the of the favorable evidence degree (a_i, R) and the contrary evidence degree (b_i, R) ($1 \leq i \leq n$) for each of the factors (F_i) and the sections (S_{pj}) considered.

For that consider applications of the techniques of maximizing (MAX operator) and minimizing (MIN operator) of logic andτ.

7. Obtain the degree of favorable evidence (a_w) and the degree of evidence to the contrary (b_w) of the global analysis representing the chosen factors in the lattice t.

8. Finally, decide with the aid of the data obtained.

The theoretical basis for the MPD (Paraconsistent Method of the decision) is based on the rules of maximizing and minimizing of the Paraconsistent Annotated Evidential Logic Eτ.

Such rules are applied to favorable evidence degrees (μ) and contrary evidence degrees (λ).

The application of the rules of maximization and minimization can be performed as follows:

1. Making the maximization of degrees of evidence to a set of notes, to get:
The best evidence that is favorable (The highest value of favorable evidence μ)
The worst evidence that would be contrary (The highest value of contrary evidence λ)

2. Also, we consider the degree of certainty:

Gce = μ - λ, which in a way, reflects how much the information contained in this set allow to infer the truth or the falsity of the premise. (This form is more intuitive and leads to more predictable and consistent results).

Maximizing the degree of certainty (Gce) is seeking:
The best evidence that is favorable (The highest value of favorable evidence μ)
The best evidence would be contrary (The lowest value of favorable evidence λ)

Moreover, consequently, minimizing search:
The worst evidence that is favorable (The lowest value of favorable evidence μ)
The worst evidence that would be contrary (The highest value of favorable evidence λ)
The MPD, as a tool to aid decision making based on paraconsistent logic plays a vital role in the treatment of the views of its members, taking into account its contradictions and that in some instances it is significant for decision-making more accurate, therefore, has much to contribute to human relations within the Six Sigma. Six Sigma has tools contribute to the improvement of quality, but these tools are subject to human intervention, which can change the results and create a false impression of success, however, which does not hold in the long run.

III. APPLICATION

A. The Survey

The survey presented in this chapter is an adaptation of the work of Liza f. de Carvalho [23], which adapted your work, translating and improving the tool (OCAI ®). We consider now a well-known tool for the diagnosis of an organization's organizational culture Organizational Culture Assessment Instrument (OCAI) and consists of four sections composed of questions are assigned scores of 0 to 100. These scores are then calculated and will serve as a diagnosis of the current culture and preferred. The process used in the diagnosis is simple: first answered the questions knowing the current conditions of the Organization, then responds again, but now having in mind the situation, Quinn and Cameron [24] stress that was necessary during the distribution of some variables coming up so the two dimensions. The first dimension differentiates on the one hand effectiveness criteria focused on flexibility, discretion, and dynamism, of principles which emphasize the stability, order, and control. Some organizations are seen as active as remain in constant movement, adaptable and organic. Others are considered adequate if they remain stable and static [23]. The second dimension differentiates effectiveness criteria which emphasize internal guidance, integration, and unity, of external guidance criteria, differentiation, and rivalry. Some organizations work harmoniously focusing on interior features while others know the success and are recognized for work with other organizations external to itself [23]. So, if form four quadrants and born around these dimensions. These quadrants represent forces or opposing dynamics, typeset by Quinn. Each quadrant represents basic assumptions, guidelines, and values, the same elements that make up an organizational culture. The OCAI ®, as well, is an instrument that allows the diagnosis of the dominant orientation of the organization based on the types of nuclear culture [24]. The goal of the OCAI ® is to evaluate six dimensions of organization: Dominant Characteristics, organizational leadership, people management, Organizational, Strategic emphasis on Uniqueness and Success criteria, sorting into four types of dominant corporate culture: Team, Innovation,

processes and results and their respective foci, represented by the matrix below:
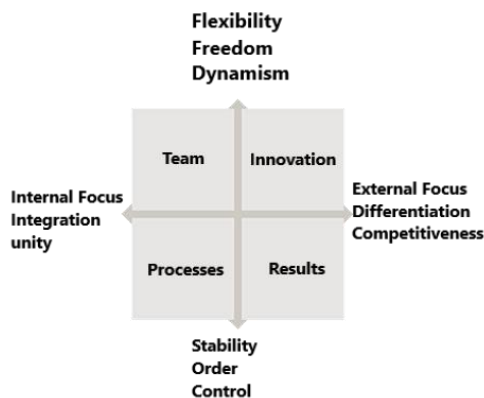

Fig. 3 – OCAI Array Source: (Cameron and Quinn, 2006)

Fill in the fields "I believe" with the percentage of how much you believe in the affirmation and the field "I do not believe" with the percentage of how much you do not believe in the statement		
Dominant Features		
	I believe	I do not believe
The organization is very familiar. People tend to share enough of themselves.		
The organization is very dynamic and enterprising. People are willing to commit to taking risks.		
The organization is very results-oriented. One of the most significant concerns is implementing the work. People are competitive and results-oriented.		
The organization is very controlled and structured. Formal and established standards guide people.		
Organizational Leadership		
In an organization, leadership is usually supporting example, counseling, and training		
In an organization, leadership is usually an example of entrepreneurship, innovation and willingness to take risks.		
In an organization, leadership is usually an example of objectivity, combativeness and results orientation.		
In an organization, leadership is usually an example of coordination and continuous management of efficiency.		
Management of employees		
The employee management style is characterized by promoting teamwork, consensus, and participation.		
The employee management style is characterized by valuing the autonomy, the risk, and the creative spirit		

	I believe	I do not believe
The employee management style is characterized by developing the competitiveness, promote the results and achievement of goals.		
The management style is characterized by employees to ensure job security, compliance, and stability of relations		
Organizational Cohesion		
Loyalty and mutual trust are what keeps the organization cohesive. The commitment to the organization is high.		
What keeps the cohesive organization's commitment to innovation and growth. What's important is being on the cutting edge.		
What keeps the cohesive organization's commitment to achieving and exceeding goals. Win, be energetic and combative, are current themes.		
What keeps the cohesive organization are the formal rules and policies. Stability and balance are critical.		
Strategic Emphasis		
For the organization, it is essential to the development of people. Value trust, openness, and participation.		
For the organization, it is vital to the acquisition of new capabilities and the creation of new challenges. Value the new experiences and to prospect for new opportunities.		
For the organization, it is crucial to competitiveness and performance. The emphasis is on overcoming the ambitious goals and on market supremacy.		
For the organization, it is essential the permanence and stability. Focusing on the control, the efficiency and the fluidity of the operations.		
Success criterion		
The success of the organization is defined based on the development of human resources, the teamwork, the degree of involvement of its employees and concern for people.		
The success of the organization is defined based on the uniqueness and novelty of their products and services. It is a leading product and innovation.		
The success of the organization is defined based on conquest and supremacy of market. The posts are market leaders and competitive advantage.		
The success of the organization is defined based on efficiency. The crucial aspects are the satisfaction of commitments, planning and cost control.		

B. Collection of the data

After collecting the data obtained through the survey, there will be an array of knowledge compatible with a paraconsistent system, which works as follows:
• Step 1: receipt of the information.
The information is obtained using two independent variables, which are between 0 and 1, the first being the degree of favorable evidence and the second, the degree of evidence to the contrary.
• Step two: Data Processing.
The data are processed using the following equations:
a) GCT = (λ + μ)-1 to find the degree of contradiction.
b) GC = (μ-λ), to find the degree of certainty
• Step three: conclusion
To perform the completion, the following conditions:
a) and there is a high degree of contradiction, there is no certainty yet about the decision. Therefore, they must seek new evidence.
b) and there is a low degree of Contradiction, one can formulate the conclusion since it has a high degree of certainty.

IV. DISCUSSION OF RESULTS

This Work, with a broad view on the subjects discussed, invites the reader to reflect on the use of paraconsistent logic as a way to improve analysis and assessment of organizational culture. By studying the organizational culture, both in theory and in practice it was possible to analyze that even being a qualitative process based on reviews and human sensors, it is necessary that there are statistical techniques of high reliability to maintain organizational culture healthy.

A. Analysis of the results

The bibliographic survey was of importance to elucidate all the way by which the research would pass, many authors have dedicated much of their lives to consolidate the concepts employed in this research, denoting the importance of latent areas that have been addressed.
The resulting survey work analyses the organizational culture by assisting in paraconsistent, method such factors are of concern for the success of the survey presented because its perspective differs from common surveys.
Affirmations instead of questions were used to put the expert in the proposed scenario, and so he returns with the data of how that scenario is compatible with his reality.
Thus creating a context analysis more comfortable for the respondent, there are no wrong answers, including its contradictions will be used in the decision-making process.

V. FINAL CONSIDERATIONS

Times have changed, the way an organization behaves is not the same as years ago, where previously the Moldovan culture organization of employees, today the environment shapes the Organization's culture. Even when the focus of the organization is not directly related to improving the organizational culture, as in the implementation of Six Sigma, such factors nowadays are indispensable for the successful implementation of the quality improvement process, because the Organization is made by individuals who are entirely affected by organizational culture. However, in practice, there is no significant improvement. The Surveys can be reworked and customized according to each case study, keeping the main base and adding the desired score to each particular job.

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