

Viability, Sustainability and Non-Requisite Variety

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Abstract

In his work, Ashby demonstrated the importance of a certain quantitative relationship called the law of requisite variety. After finding this relationship, Ashby related it to Shannon's theorem on the amount of noise or error that could be eliminated through a correction channel. The native limitation in the law of requisite variety, like the Shannon equation, applied in thermodynamics, is that the relational nature of the organization is not considered. Thus, he formulated that only the variety can absorb variety. However, the previous statement is only valid when it is formulated in the domain of interactions, but it is not possible to sustain it when dealing with relationships; as is the case of human organizations. This work introduces the concept of non-requisite variety (NRV) of Viability defined within the model of Relational. Therefore, a methodology is introduced to "measure" the degree of waste that occurs within a network which deviates from its organizational identity due to poor communication. The history of Science allows us to see that we are talking about the "history" of the reduction of non-requisite variety because, in the process of generating value, this phenomenon not only produces value equal to 0 but also generates values less than 0. Consequently, non-requisite variety destroys variety.

Keywords: Variety, Non-Requisite Variety, Viable Relational System.

1. Introduction

The organization of a human organization emerges as a network of relationships that allow it to be defined as a complex unit. In the observation of this network of relationships, these ensure solidarity and resilience relative to these ties, which enable us to understand it as a unit. Organization, with its emergent character, transforms, produces, congregates and preserves the quality of relationships that resemble itself. Faced with this fact, it is not easy to dismantle hierarchical decision-making structures and replace them with shared decision-making dynamic, whether through structures in collaborative networks, heterarchical or horizontal.

However much these theoretically allow or facilitate the best possible solutions. The very possibility of evaluating the possibilities of this change is extremely difficult since the change in the relationship network is not

quantified, and because the expectations are set on observing and assimilating the change only in technique and technology, instead of internalizing and driving change in the ways of thinking and acting of the agents involved who, ultimately, are what determine the nature of the administrative and organizational culture. Thus, the general process is affected from beginning to end, generating high variability to carry it out. This variability, product of communication processes in "silos", ignores the global optimization of the process of organizational identity, which is reflected in the overuse of the parts, added to the generation of greater variety than required in the processes of taking of decisions throughout the entire organizational structure. Faced with this, the challenge that a management process must face is to achieve the design of a strategy that allows it, through knowledge of the relational structure, to reduce non-requisite variety, or waste, product of those relationships that generate dissociation, loss of complexity and consequently of organization, delaying or hindering the decision process.

This work introduces, as we have said, the concept of non-requisite variety (NRV) based on viability defined within the model of relational viability, (Lavanderos & Massey, 2015). Thus, a methodology is brought forward which allows us to "measure" the degree of waste that occurs within a network as it deviates from its organizational identity due to poor communication.

We have organized the writing as follows: The first thing has been to establish the field of science-art as the basis upon which we are generating the proposal, this corresponding to organizational cybernetics; the second, has been to generate a brief description of the viable relational model and the definition of viability, and within the latter, the variables that allow us to calculate it and bring it into view through the calculation of the non-requisite variety (NRV).

2. Organizational Cybernetics and Strategic Intelligence

An essential tool for the design of organizational structures turns out to be organizational cybernetics (OC). We understand by organizational cybernetics, the generation of knowledge that allows us to understand and study organizations from their structure or network of relationships, to assess their viability and how they show up in management. Part of the underlying methods includes strategic process intelligence (SPI) which makes it possible to identify, neutralize, degrade and/or rebuild the relational information network. This is so because the information network could generate singularities that result in the loss of coordination and cohesion, affecting communication and generating waste in the management, that is, "non-requisite variety".

The correction, anticipation and/or elimination of disruptive events, allows the value that is advocated to propagate in the organizational network since it can be visualized as a "fluid" that carries the semiotic sense of the political vision constituted in management, to achieve the strategic objective. If we visualize this complex of fluids (semiotics), we can locate those "downed" bridges slow down a stop or stop their dynamics of shared meanings. In other words, those relationships that prioritize other types of flows to the detriment of the relational configuration that shares the political vision. It is to these threats

that we design the strategic process intelligence process (SPI) as a method of correcting the relational structures that retard the propagation and reproduction of the decisional strategy of the organization (Lavanderos & Massey, 2015).

Structurally, two types of subnetworks can be distinguished; command-control, dedicated to the reproduction of political vision, coordination, and dissemination of strategy among management functions, and the data subnet; that which is dedicated to the flow of information obtained by the operations centers to the analysis or command-control centers. Strictly speaking, the organization is a constant process of construction of relational viability that demands a strategy for the minimization of the non-requisite variety. For this reason, it is the domain of viability that will determine what is possible or how willing is the organization to reduce waste to increase profitability. This is what confronts “command”, and its solution passes down by obligation, spreading a political vision associated with a type of relational structure.

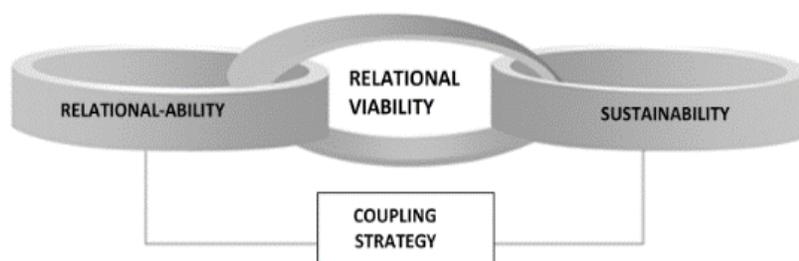


Fig. 1. Model of Relational Viability built on the coupling between Relational-ability and Sustainability.

An organization is relationally viable if its relationships make it viable. This affirmation is fundamental when it comes to establishing the form that constitutes the relationality of an organization. Under this vision any process is productive, it is not possible to separate them into primary and support (Lavanderos & Massey, 2015). The identity of the organization is not the result of what it produces, be it this product or service, but the strategy to produce it. From this perspective, an organization can be explained as a semiotic fluid, in which analogically with the irrigation channels, it must be organized in such a way that the greatest effective extension and the best quality of meaning are obtained. For this reason, the organization of the 21st century must say goodbye to the Taylor model if it wishes to incorporate the cognitive domain as the value of the company.

3. Evaluation of Sustainability

As we pointed out in previous paragraphs, the robustness of viability is the result of the form and degree in which the viable and the sustainable fit together. For this reason, the process model is the appropriate field to evaluate

this correspondence, since this will unveil the coupling strategy. On this basis, it is essential to evaluate the state of the relationship network (Sustainability) and the structure of the energy-material heritage (sustainability).

We have defined viability as the relational state of the command network. Its evaluation depends on two variables, namely:

- The relationship of the command with the manager, defined as coherence
- The relationship of the command as a whole (including the manager), defined as congruence

3.1 The Concept of Organizational Coherence

We define coherence as the correspondence between decisions taken and actions carried out concerning management. Organizational coherence unifies the declarations of the leader (manager) to the strategies, goals, objectives, and priorities to pursue, and how these declarations are understood and assimilated by subordinates throughout the chain of command. Organizational coherence, when it is weak or non-existent, is one of the main factors in the failure to implement the strategic plan and the effective execution of the business model. The lack of organizational coherence is the greatest source of invisible expenses, waste that directly impacts organizational effectiveness, reducing both the effectiveness and efficiency of the organization.

3.2 The Concept of Organizational Congruence

The correspondence between the decisions made and the actions taken is defined as congruence, this includes management. This means that the general manager is incorporated as another person within the network, so the evaluation is of all against all. The congruence evaluation allows us to classify the network within certain typologies, for example; a simple addition of people; as an operational team; or simply as a set or bunch of people. All of which directly impacts the generation of value. The measurement of congruence assumes values between 0 to 1.

For both consistency and congruence, the following variables are measured:

- **UNDERSTANDING:** Evaluated as the proximity between what is declared, and the actions expected concerning the declaration.
- **KNOWLEDGE:** Evaluated as the closeness (similarity) in the logic used to solve problems.
- **CONFIDENCE:** Evaluated based on the interactivity existing within the network, detecting levels of trust/distrust

Once the diagnosis is complete, this entire process allows for an assessment of the degree of congruence and strategic coherence existing within the executive team. This will allow us to determine where are the main gaps in understanding, knowledge, and trust that limit the implementation of the declared strategy or what needs to be done.

3.3 From Requisite Variety Required to Non-Requisite Variety

A key concept in organizational cybernetics has been variety, understood as the number of possible states of a system. Ashby's Requisite Variety Law (Ashby W. , 1956, 1958), states that only variety can absorb variety. Ashby related it to Shannon's theorem on the amount of noise or error (Shannon & Weaver, 1949). The native limitation in the law of the variety of requirements, like the Shannon equation, applied in thermodynamics, was formulated in the context of the interactions, but it is not possible to sustain it when dealing with relationships; as is the case of human organizations. Thus, it is important to establish the difference between interaction and relationship. The following example allows us to imagine the distinction of our proposal, for example: In a game of chess, what you observe are schemes of action through the movement of pieces and surely also, expressions of different types between the two players. However, you do not have access to the relationship that both establish. This means that what we can observe and denote are schemes of action and not the relationships that support those actions. Logically, these actions arise from the distinctions that in the relationship feed the decision making of each of the players. The actions put on the board can vary from attraction to repulsion, however; the content and meaning that sustains these actions are not accessible to the observer, therefore, what we can propose is diverse systematics and classifications of everything we could call behavior. If we follow the above arguments, the variety of a relational system cannot be reduced to a number of states (actions), given that; if we did, we would ignore all the complexity of the relationship of the actors involved and in turn our relationship as observers of these, in other words, we would be cheating.

The difference that arises from what is manifest, which is the scheme of action and the support of the same, is the cognitive relationship, this is fundamental and allows establishing the difference between the concept of autopoiesis and ecopoiesis (Lavanderos & Malpartida, 2005),(Lavanderos & Massey, 2015), (Malpartida & Lavanderos, 2000), (Maturana & Varela, 1992), (Varela, 1991,1998).

The first notion constitutes an important vision but one that is ultimately reductive, since to be coherent it operates in the molecular sphere, that is, in the field of interactions, of causality, of the manifest. The second notion, unlike the first, operates in the field of relationships, the links, of what is underlying. The autopoiesis closes to bring closure, it divides what is internal from what is external; in ecopoiesis, this is not necessary because the network of relations operates conserving those relations that reproduce their organization spontaneously. In other words, what we have defined as relational viability to differentiate it from Beer's definition (Beer S. , 1974,1985).

Relational viability operates from the strategy of coupling between the relational plane and that of energy-material resources, (Lavanderos & Massey, 2015). Along the same line, the loss of resources in an organization depends on the introduction of "non-requisite variety", that is; of those relationships that generate dissociation and loss of complexity, which interrupts decision-making, generating a loss of organization. In this way, we could define non-requisite variety as follows: "For a relational system, all forms of generation of non-requisite variety are produced by destroying requisite variety." This is a

fundamental difference with Ashby, (Ashby, 1958). This is so because a great problem has been generated by confusing and associating the meanings of communication, entropy, and information as homologs. Although it is possible to establish some correspondence, the domain of application and knowledge of these formulations have nothing to do with the relationship in the informational and semiotic sense. Therefore, although a mathematical isomorphism can be established, it does not homologate the conceptual, Callaos and Callaos, (Callaos & Callaos, 2002).

In the domain of human organizations, non-requisite variety assumes the form of a law, which can be exemplified as follows: Located within an organization, connective diversity, which is what allows the exchange of variety, is weakened or destroyed in efficiency through the introduction of delays, preventing or generating resistance to the flow of data necessary to the decision and production process. We could add, from systems theory, that it would be introducing summative properties of the elements of the system, which spoil the emergence of the constitutive properties of the organization and, therefore; decision making related to the business. This happens, every time a unit exchanges non-requisite variety, thus determining loss of control and output variability.

So then, as we do not have access to the relational configuration, we are obliged to calculate non-requisite variety based on the action schemes that occur in the network, isolating those configurations that are organized as subnets of repulsion and that are responsible for generating the increase of non-requisite variety and, consequently, costs in all ways, shapes and forms including the costs of lost opportunity.

If we look at this from a controlled system, in cybernetics we must generate variety in such a way that its design allows regulation and feedback that achieves the minimum required variety. This implies understanding that the correspondence between the variety generated and the minimum required does not have to be exact, necessary or feasible, but rather, it requires a variety with a minimum complexity for the regulation of a system. The areas of diversity that interact and must be regulated correspond to a consistent diversity in the system; the attenuation of such variety must be intelligently designed.

On the other hand, even considering actions alone and to finish proposing our proposal with an image regarding cybernetic thinking, we say: "we are interested not only in the fish we catch but also in the ones we failed to catch". How do we map all those restrictions that elude us? - How many fish did we not catch? - This is non-requisite variety.

4. From the Construction of the Design to the Model of the Viable Relational System (Vrs)

Any organization or company, from our relational systemic viewpoint, rests in its conception upon a network of relationships, which are structured on processes relating to the production of products or services. The basic relational unit is built on the relationship between a network and the associated production process. All of which are expressed in the form of decision making. In this way, a network legitimizes the form of its task in relation to a process,

which allows access to 1) the variety or number of steps or signaled states; 2) to its variability or gap between observed and expected results; 3) to the connective diversity or relational structures established to carry out the process. In previous paragraphs, we have indicated what we understand by the VRS; a holored, which is co-formed from the coupling between the units of the fields of viability and sustainability, in which, the correction of variety is not generated in the autonomic dynamics, but a spontaneous process of selection of alternatives (epigenesis). The VRS has the condition of replicating itself, within a recursive process of recalibration (stochastic), depending on the strategic objective of the organization, in order to build network subsystems, which contribute to organization from its operations and/or processes

Faced with this, we can do without what we call "the external or environment", to achieve consistency between the operation and the administration we need to establish the relationships between the knowledge network (administration) and processes (operation), which is achieved through the art or culture of network tasks for these processes.

With these concepts, the relational network is designed by 3 elements that are generally not thought of as a whole, these are the processes, the network that carries them out and the culture or the "how they do it". In a second instance, it is necessary to consider how these 3 elements are related, which leads us to the definition of VRS, for this, we have used the following concepts:

1. Variety: Number of states or distinctions declared to carry out a process.
2. Variability: Gap observed between expected and observed.
3. Connective Diversity: Quality in communication with other areas or functions that are not directly involved in the process.

According to this, the VRS model is determined in the following way (Fig. 2).

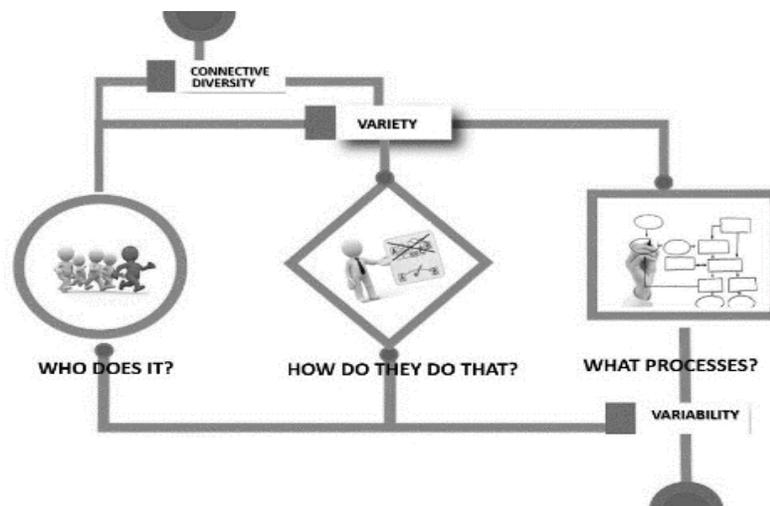


Fig. 2. Viable Relational Systems model; agents, decisions, and processes connected through connective diversity, variety and variability.

As indicated above, the model is generated from calibrations that, within the research process, ranging from design to formalization. Formally, we would obtain a model like the following (Fig. 3).

The construction of the VRS model, states that for the reduction of the variability of the processes involved in its management, the decision-making model of the knowledge network must be made explicit, to expose the behavior of the variables that account for of the output of their process.

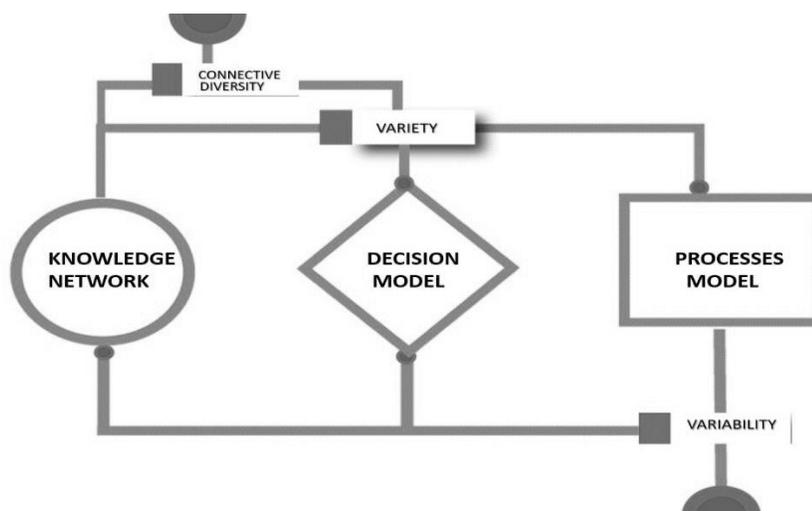


Fig. 3. Viable Relational Systems model

This allows not only the control of the same, but also shows the transparency of results for all actors involved in the value chain.

The VRS makes possible the integration of the entire scientific-technical area beginning with co-control of variety and variability. Likewise, connective quality or diversity makes it possible to establish the degree of collaboration with other areas, in order to control the variety of the process that generates value. As an example; if a productive unit needs support from the administrative areas, and this support is of low reciprocity, this diminishes the value of the productive process. This is a form of variety that assumes values equal to or less than zero and which we call a non-requisite variety. The generation of non-requisite variety or waste has a direct impact on the success or failure of management.

5. The Origin of Non-Requisite Variety

Conceptually, non-requisite variety refers to the relation involving the "cumulative distribution" of differences between calculated or theoretical flows (for example, the KPIs), seen from the systemic point of view, for an organization to function, versus the flows of fact or actual operation. This takes into account the people involved; the communications structure that sustains the tasks; the tasks developed; the inputs required for such purposes; the way planning takes place for all the assignments needed to be developed and all the processes that must be executed. In such a way that this cumulative distribution

allows us to evaluate the strength and direction of the totality of the systemic deviations that are actively distorting and structurally weakening the organization.

Non-requisite variety, therefore, has its origins in planning deficiencies, unbudgeted issues, supervening situations and improvisations that significantly affect the availability of resources, especially the use of time and the pace of operations and of course, rigidity that does not allow the adoption of other recursive, analytical and integrated forms, needed to lead an organization.

The systemic support where this phenomenon is detected is called a Holored. This construct is based on three integrated formal networks (organization, processes, and flows), where each occupies a level and is interconnected in an integrated way. Such a provision engenders a "spontaneous topology" that allows us to calculate all the relationships among its elements, privileging in every one of the elements involved the use of the VRS relational structure. This allows us to determine the level of non-requisite variety and obtain the systemic concepts necessary to interpret the levels of viability and complexity that arise from the coupling of the three networks. The VRS integrates the knowledge network that preserves the rules of art for organizational functioning, preserving its existence, and provides the elements of judgment necessary for the decision-making model, from which the processes are one way or another. The same knowledge network provides information to maintain control over the unit of connective diversity and, at the same time, lets us observe the variety needed so that both the decision-making model and the processes can generate the variability that creates sustainability and viability to this relational structure. This relational structure will be connected, on the one hand, with all the other relational units (VRS) and on the other, at the level of connective diversity, based on the related topology. The formal representation of all this corresponds to the idea of a rhizome, (Deleuze & Guattari, 1980).

6. Evaluation of Non-Requisite Variety

Let us suppose that n is the number of members of the organization and consider x the variable of interest in our studies, where said variable speaks of the relation of the ascending contribution of each member of the organization. This is the function of real distribution of non-requisite variety, from now on **NRV (x being, therefore, of ordinal nature)**.

Definition: The density function of the variety not required (DNRV), represents a succession of n positive real numbers $(DNRV[i])_{i=1}^n$ where for each i the value of the sequence is the sum of the fractional residuals of the differences between the corresponding values of row i of the matrices $M \in \mathbb{R}^n \times \mathbb{R}^n$ y $N \in \mathbb{N}^n \times \mathbb{N}^n$, should be it means $DNRRV[i] = \sum_{j=1}^n |m_{ij} - n_{ij}|$, where the matrix M contains the types of interactions obtained from the interviews and the matrix N contains the rounded values of the matrix M either by excess or defect.

Definition: The real non-requisite variety NRV: $= \sum_{i=1}^n DNRV[i]$, represents the totality of the "distortions" that the network structure of the

organization must assume and, therefore, the organization itself. Its distribution generates its network, through which it is possible to determine the necessary adaptations faced with critical conditions.

Definition: The position of each member of the organization = x is the position that each member of the organization will occupy with an ascending order of succession $(DNRV[i])_{i=1}^{i=n}$.

Luego: $1 \leq x \leq n$ y $x \in \mathbb{N}$ (1)

Definition: The distribution of non-requisite variety (dNRV), corresponds to the cumulative non-requisite variety generated by precedence, therefore, it is determined by the sum of the ascending contributions of each one of the members of the organization, with which, we will have

$$NRV(x) = \sum_{i_x=1}^x dNRV[i_x], 1 \leq x \leq n. (2)$$

Definition: The theoretical distribution of non-requisite variety (dtNRV), depends on the variable of interest x , a position given by the ascending order of the contributions of the members to NRV is:

$$\text{Eq N1 } F_{dtNRV}(x) = a_2x^2 + a_1x + a_0 (3)$$

Where $\{a_0, a_1, a_2\} \in \mathbb{R}$ are determined by the least squared method after the position x of each member of the organization is established.

Definition: The position x that determines the high point of the initial accumulated 25% of the distribution of the dtNRV, is the base domain of the theoretical distribution of the non-requisite variety and is obtained by solving: -

$$F_{dtNRV}(x) = 0,25 (4)$$

Definition: The position x that determines the initial accumulated 50% of the distribution of the NRV, is the domain of the mean structure of the theoretical distribution of the non-requisite variety and is obtained by solving:

$$F_{dtNRV}(x) = 0,4 (5)$$

Definition: The position x that determines the level of the initial accumulated 40% of the distribution of the NRV, allows us to point out the higher 60% of the distribution of the NRV, which is called the domain of critical structure of the theoretical distribution of non-requisite variety.

Therefore, it follows that:

$$0,001 < F_{dtNRV}(x) \leq 0,25 \Rightarrow x \in \text{Base Domain dtNRV}$$

$$0,250 < F_{dtNRV}(x) \leq 0,40 \Rightarrow x \in \text{Medium Structure Domain dtNRV}$$

$$0,400 < F_{dtNRV}(x) \leq 1,00 \Rightarrow x \in \text{Critical Structure Domain dtNRV}$$

This classification allows us to point out the relationship with the direct influence of the dtNRV, in the relational conception of the organization, namely: -

The Base Domain dtNRV, is made up of the members of the organization whose levels of contributions to the dtNRV empower them to assume duties of structural and non-structural modifications. The non-required variety that they generate does not gravitate in dissociative processes of the organization.

The dtNRV Medium Structure Domain is made up of the members of the organization whose levels of contributions to the dtNRV, place them in the region prior to the generation of dissociative processes and, as will be seen later, they are in the second section of the relocation or of outplacement or rotation, to facilitate the redistribution of the dtNRV load in the network that itself generates dtNRV.

The Domain of Critical Structure dtNRV, is made up of the members of the organization whose levels of contributions to the dtNRV, place them in the region that will generate the dissociative processes and serious dissociative processes and, therefore, make up the first section of change of position or outplacement or rotation, to facilitate the redistribution of the dtNRV load in the network generated by the dtNRVT itself.

Definition: - The distribution of the efficiency potential, depending on the position x of the members, is defined by: -

$$P(x) = 1 - F_{dtNRV}(x) = -a_2x^2 - a_1x + (1 - a_0))$$

Definition: -The theoretical non-required variety of the organization is given by: -

$$NRVT = a_2n^2 + a_1n + a_0 \quad (7)$$

Definition: The supreme of theoretical non-requisite variety SNRVT, is the maximum sum of all residues of all possible interactions within the organization, i.e. it is the upper level of NRVT.

Definition: - $I_{VNR} = \frac{NRV(x)}{SNRVT(x)}$ (8)

is the index of non-requisite variety and indicates the proportion of a no-requisite variety of the organization, reached through the interactions of its members. According to the values of I_{NRV} , we have the following classification (Table N° 1):

RANKS	CLASSIFICATION
$0,001 \leq I_{NRV} \leq 0,1$	NRV, Justified by slack
$0,1 < I_{NRV} \leq 0,25$	NRV, Justified by development
$0,25 < I_{NRV} \leq 0,4$	NRV, transition
$0,4 < I_{NRV} \leq 0,6$	NRV, dissociation
$0,6 < I_{NRV} \leq 1,0$	NRV, Severe dissociation

Table N° 1. Classification and Ranks for no-requisite variety of the organization.

Where the classifications represent the following situations, namely:

Non-requisite variation justified by slack indicates that the non-requisite variety will provide "the necessary slack to be able to assume non-structural adjustments".

Non-requisite variety justified by development indicates that the will provide "the availability for members of the organization to assume adjustments and structural changes."

Non-requisite variety for transition, states that the non-requisite variety will provide "the elements that will eventually lead to dissociative processes".

Non-requisite variety for dissociation indicates that non-requisite variety will contribute "to the development of dissociative processes in the organization".

Non-requisite variety for serious dissociation indicates that non-requisite variety will be "a significant contribution to the development of dissociative processes throughout the organization".

The first two classifications of the non-requisite variety index (justified by slack and justified by development), constitute early warnings to be able to explore structural and non-structural adjustments and changes, always subject to evaluation and/or observation. While, the last three of the classification (transition, dissociation and serious dissociation), call upon us to assume responsibility and leadership, to be able to provide changes of greater scope and depth, taking into account the serious nature of the diagnosis, which demands reviewing suitability and any number of skills and competencies regarding members of the organization.

Definition: - The typical error $ET_{(NRV)}$, points to a relationship with the squared mean difference adjusted with two degrees of freedom between the theoretical distribution $dtNRV$ and the achieved (observed) distribution of NRV and is determined by:

$$ET(NRV) = \sqrt{\frac{\sum_x (F_{dtNRV}(x) - NRV(x))^2}{n-2}} \quad (9)$$

Where $NRV(x)$ is the (observed) contribution of the NRV through the member of the organization in position x and n is the number of members of the organization.

Percentage-wise, this value expresses the discrepancy between the value achieved (observed) for the NRV and that expected by the NRV .

7. Conclusions

The limitations imposed by the law of conservation of energy to be recognized as such were transformed into principles, design criteria and calculation, being of great value to engineers and physicists.

The limitation to the law of requisite variety, as in the Shannon equation, applied to thermodynamics, is that it does not take into account the relational nature of the organization.

This means that by sticking to the tangible or reality principle, it is necessary to absorb variety, which means that the distinctions around what we call the external (the thing in itself), tend to infinity and necessarily have a correlation with the current paradigm. However, more than a problem to be solved from tangible or material interactions, its solution is fundamentally epistemological. The history of science allows seeing what is "the history" of the decrease in non-requisite variety because, in the process of generating value, it not only produces value equal to 0 but also generates values less than 0. To sum it up, non-requisite variety destroys variety. Beliefs derived from the use of energy and the production of entropy, point to distributions that do not speak of a relationship with the human relational nature in particular and what is alive in general. This means that they cannot reduce the processes of communication, information, or the semiotic fluid that generates different levels of meaning in communication. What could explain the decrease in entropy, is the decrease in non-requisite variety as it occurs in the field of communication, meaning and human decision making.

The condition of complexity as a relationship is that it cannot be reduced or analyzed, which has allowed us to develop what we understand as the law of non-requisite variety.

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