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Understanding Cindynics

While the methods, studies or standardization commonly used to manage risks have been quite effective, it is undeniable that through the history of accidents and disasters, their effectiveness is still not entirely satisfactory.

In order to fully understand cindynics, it seems useful to examine what its concepts can add to postponing the occurrence of feared events.

Indeed, any risk study currently conducted starts with the knowledge of the dangers existing within the situation under examination. This phase, which is the keystone of a risk study approach, is called the "hazard study".

Let us recall that the method most often used for risk studies is the one called MADS–MOSAR which involves:

– a model called "Methodology of Systems Dysfunctioning (MADS)" also called Universe of Danger [PÉR 00];

– a method called MOSAR, "organized method of systemic risk analysis" that allows the identification of major risk scenarios using methods and tools for operational safety.

The use of the MADS model makes clear the priority given to the search for hazards[1]: it uses "systemic modeling by breaking down the installation into sub-systems and systematically searching for the hazards presented by each of them".

This model is used to establish a hazard qualification grid.

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1 The MADS–MOSAR method (Methodology for System Dysfunction Analysis – Organized Method of Systemic Risk Analysis) is a risk analysis method developed by [PÉR 00]. By referring to the words "system" and "subsystem", the approach is deemed systemic.

Concepts linked to cindynics are therefore perfectly aligned with the **principle of thinking about danger before paying attention to the risks and the initiating event**. However, the hazard research carried out by MADS is limited to the exploration of a table of hazards of technical origin[2]. And while these have been brought to our attention, it is because they have been described and catalogued, because they are perceptible. It is therefore on this level that cindynics concepts differ and bring about very great originality, because the dangers or sources of risks are certainly of technical origin, but they are also organizational, cultural or managerial (see section 1.1).

Cindynics therefore meets the need for in-depth research into complementary sources of risk, either difficult to identify or coming from pathogenic elements which, if they do not attract attention, can unknowingly weaken an organization's ability to resist hazards (see the term "organization" in the Glossary)[3]. Recalling the importance of focusing on sources of risk that are difficult to perceive, [DEL 20] notes: "**the two-week fall in the Dow Jones and the CAC 40 gives credence to the famous black swan theory, developed by the statistician Nassim Nicholas Taleb, according to which the greatest financial catastrophes are triggered by seemingly minor events whose rarity is such that it makes them unpredictable for market operators**"**.**

The ISO 31000:2018 standard states that the success of risk management depends on the effectiveness of an organization's management framework integrating the understanding of the organization and its context, the establishment of risk management policy, responsibilities and so on, in order to lead to a risk management process.

It further states that:

– managing risk is part of governance and leadership and how the organization is managed;

– managing risk includes interaction with stakeholders as an integral part of all activities of the organization;

– managing risk considers the internal and external context of the organization, including human behavior and cultural factors.

However, while the cindynics approach is completely in line with the prescriptions of the ISO 31000:2018 standard, it obligatorily precedes the risk

2 See the box on page 8 of [PÉR 00].

3 The examples of accident and disaster studies, detailed in Chapter 8, illustrate the capabilities of cindynics to explore these complementary risk factors.

assessment phase by the study of an assessment phase of all types of hazards (or sources of risk).

A "risk mapping" tool is commonly used in risk management in order to create and share a risk frame of reference.

Cindynics tools also use a frame of reference which concerns sharing through a process that is in line with the recommendations of the ISO 31000:2018 standard but whose purpose is to highlight the **hazards** through matrices of deficits and dissonances.

NOTE.– In the remainder of this book and to comply with the ISO 31000:2018 standard, **the term "risk source" will be used instead of "hazard".**

Then, to become fully aware of the originality of cindynics involves discovering that its concepts incorporate a method, tools and processes that are adapted to the complexity of systems, as well as an approach to the study of risk sources adapted to the complexity of systems.

1.1. The approach

During its life, any organization receives many internal or external requests (desired development, opportunities, imposed constraints, changes in objectives, realization of new projects, reactivation of a process, changes in regulatory markets, staff turnover, sociological changes, etc). As a result, any organization modifies itself voluntarily or not with time **through these solicitations called transformation operators**.

These inescapable developments, whether desired or endured, generate as many potential **weaknesses as strengths (physical, organizational and psychological)**.

The cindynics approach therefore primarily monitors the fragility of collective activity situations, that is, the emergence of dangerous zones (see section 2.3.1) within an organization, thus weakening its capacity for resilience. These fragilities, due to the transformation operators, lead to deviations from a nominal or desired organization (state of the art, regulations, standards, charters, procedures, data and culture). The tensions generated by these gaps become risk sources that can lead to incidents, accidents or disasters.

This approach is therefore similar to that of physiopathology, a discipline that deals with disturbances in the normal mode of functioning of the constituent elements of a living organism.

All of the originality of cindynics lies in this ability to detect these sources of particular risks produced by these imbalances. And if, in doing so, potential forces are detected, it would be a pity not to take advantage of them.

When it comes to analyzing technical risks (which are **describable**), the methods and tools of dependability are perfectly suitable.

On the contrary, other categories of risk sources, more related to human, organizational, managerial, cultural and environmental aspects, being more difficult to identify, receive much less attention in order to be identified and described. As a result, cindynics, by placing the human and the organization at the heart of the complexity of organizations, focuses first on these categories of risk sources and then uses the MADS-MOSAR method to deal with technical risks.

Thus, the notion of an **activity situation** has become the **founding concept of cindynics** because it obliges us to define what is necessary to talk about when approaching a hazard study**.** The terms "situation" and "activity" still need to be defined:

– "situation" is to be understood etymologically as "the location of a structure". It is also, according to the Larousse definition, the set of events, circumstances and concrete relations in the midst of which someone or a group finds itself;

– the word "activity" is borrowed from the Latin "*activitas*" or "*vis agendis*", "the will to do". Later, the meaning of "activity" became "exercise of the power to act", then movement.

This is, indeed, the meaning given to the **activity situation which integrates notions of history, geographical space, actors and movement, and therefore dynamism and development**.

1.2. The method

Based on the fundamental concept, namely the activity situation, the resulting cindynics method is based on two notions as follows:

– **the characterization of this activity situation** by an objective approach of the internal and external contexts[4], complemented by other observable criteria (see section 1.3);

– **the qualification of hazardous areas** within it, whether directly observable or not. It is therefore imperative to **acquire the ability to describe** unobservable

4 See ISO 31000:2018.

elements. This ability was brought about by the scientific advances of the beginning of the 20th century. Indeed, since then, the reality of the world has evolved considerably thanks to two fundamental discoveries: **quantum theory**, which has brought to light the existence of invisible aspects of matter, and **complexity**[5].

Consequently, in order to succeed in describing the unobservable elements, cindynics adopts **a method of description** known as the "method of relativized conceptualization (MRC)" [MUG 77] proposed by Mioara Mugur Schätcher, a specialist in quantum physics. This method, born from the inability of physicists to observe – by means of measuring instruments, even very sophisticated ones – the invisible phenomena existing within matter, is based on a new process of constructing knowledge of the unobservable.

Through repeated observations, descriptions of the **impalpable or unobservable** are obtained by producing more or less objective images called "**aspects"** to ensure qualification.

The multiplication of qualifications carried out by observations in arbitrarily large quantities leads to a qualification grid used to establish a "**relativized description"** of the unobservable.

This method of describing risk sources that are not easily observable thus makes it possible to identify and evaluate the gaps or inconsistencies generated by the inevitable changes that organizations experience[6].

We have already noted that the original organization cannot be considered intangible. It must be adapted to this inescapability in order to prevent any possible dysfunction. This notion of **temporality** is all the more important since it is often slow, sometimes almost impalpable, evolutions that are at the origin of disasters. It is therefore a question of **integrating the notion of transformation operators** (see Chapter 2, section 2.1).

1.3. The tools

The set of tools used by cindynics identifies the devices used to characterize activity situations and to qualify areas considered dangerous:

– the characterization of situations is performed through criteria relating to five domains (spatial, geographical, chronological, contextual and networks of actors) (see Chapter 2, section 2.2);

5 The development of quantum theory will be briefly discussed in Appendix 4.

6 The use of the description method will be discussed at length in Chapter 8.

– the qualification of hazardous areas cannot be limited to the technical qualifier alone, it broadens its scope by selecting five others. For, in order to take the other risk sources into consideration, it appeared indispensable to report on the aims of the collective work, the methodological aspects, and the philosophical, ethical and deontological questions, specific to any organization and, by definition, complex.

Hence, in addition to the scientific "aspects" represented by **data** and **models**, cindynics has added complementary qualifiers relating to the humanities, integrating the **regulations** or **rules** undergone or imposed, the **values** that guide actions towards goals and **purposes** that are the aims of the organization. Thanks to these five **qualifying aspects**, risk sources that have not been identified so far become accessible to the description[7].

Laws are acts passed by Parliament. **Regulations** emanate from the Executive and are expressions of laws. Their applications are imposed. By extension, within an organization, rules are the expression of a decision from different levels of management. It is understandable that these notions also apply to the term procedure.

In contrast, standards are voluntary. Compliance is not mandatory.

With respect to **values**, this term refers to attributes and perceptions that a person shares with members of his or her social or cultural group. Types of sociological values include moral and ethical, ideological (political), spiritual (religion), beliefs, for example, ecological beliefs, or aesthetic, open, individual and collective beliefs.

As for the term **purpose**, it represents a set of statements, stemming from one or more ideas, which will come in the form of a goal to be reached. For an organization, the purpose is its raison d'être.

It is important not to confuse the term purpose (or goal) with the term objective, because the latter is a step, a means to an end, to arrive at the purpose.

In cindynics literature, this representation of qualification is called the hyperspace of danger [KER 95].

1.4. Processes

Cindynics processes (see Chapters 2 and 3) integrate for an activity situation:

7 The accessibility of the description is presented in Chapter 8.

– its characterization in order to fully understand all the dimensions of the context in which the history of the situation developed and the way in which the behaviors of the various stakeholders developed;

– the qualification of hazardous areas within it; to qualify hazardous areas (see Chapter 2, section 2.3.2) is to practice as many observations as necessary on the five qualifiers of the "hyperspace of danger". These observations are obtained through **interviews and desk research**, selected as the study progresses;

– interviews are conducted with stakeholders[8] identified as relevant to their role or function at the time of the study and/or before (whether internal or external to the observed situation); the documentary references cover all the horizons selected;

– the structured description of the sources of potential risks; this is carried out through an **analysis of the content** (see Chapter 2, section 2.3.2) of the documents collected (interviews, documentary research and observations). This analysis enables the information to be grouped together by dividing it, according to its nature, by type of qualifier so as to **reveal gaps between an organization taken as a reference and the one observed**;

– the identification, resulting from the analysis of these gaps, of the various deficits, whether systemic or individual, and of the dissonances, which are sources of tension between actors;

– the establishment of matrices of these deficits and dissonances; these matrices (equivalent to the design structure matrix (DSM)), for use by the sponsors, summarize these gaps (deficits and dissonances);

– the study of the relevance of the gaps observed; this is carried out with all the partners concerned in order to determine the extent to which these gaps constitute potential vulnerabilities or strengths.

In conclusion, while cindynics was conceived through feedback from numerous accidents and disasters, it has currently succeeded in structuring a scientific approach *a priori* of risk sources.

It now has the ability to **diagnose**, understand and **assess the potential vulnerabilities of an organization before an accident**. This diagnosis, informed by studies of relevance of the potentialities, then makes it possible to **imagine and define with the decision-makers measures for prevention if the risk is future-based and for treatment if the risk has already manifested itself.** These measures will consist of a **plan to reduce** or even eliminate the fragility of the organization.

This plan must **aim both to adapt the practices of the actors concerned and to adapt the organization that served as a hypothesis at the start of the study.**

8 As defined in the Glossary.