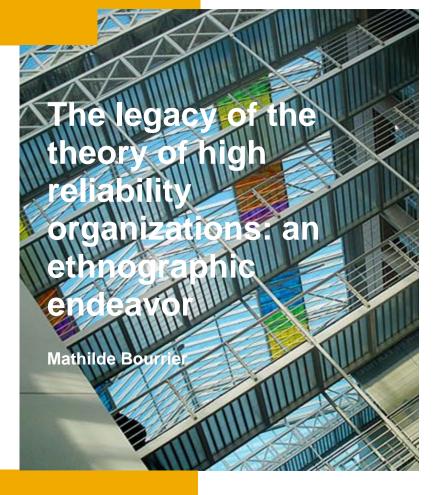This article looks back over two decades of work pioneered by Todd LaPorte and colleagues, under the banner of High Reliabiilty Theory (HRT). The article revisits the American roots of the Berkeley-based group and comments on its early and decisive fieldwork choices. It revisits some of the elements that emerged through the controversy around findings and implications of HRT.

It discusses the legacy of HRT and the ethographical twist given to "normal operations" studies. It further explains why the use of ethnographic and sociological methodologies gave new vitality to the study of high-risks organizations

The legacy of the theory of high reliability organizations: an ethnographic endeavor

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THE LEGACY OF THE THEORY OF HIGH RELIABILITY ORGANIZATIONS: AN ETHNOGRAPHIC ENDEAVOR

Mathilde Bourrier

Writing a piece reflecting on Todd La Porte's inspiration and work is a journey taking me back and forth between the United States and Europe. It is an exploration of the intellectual framing of the HRO group in Todd's own milieu in the United States and also a reflection upon the success of HRO ideas throughout the world and especially Europe. Writing these pages forced me to realize that one of the main contributions of the HRO founding father, Todd La Porte, has been to encourage numerous young researchers to confront the complex study of large socio-technical organizations and systems. In doing so, Todd La Porte (and his fellow scholars) envisioned this study as both empirical and theoretical in nature. What struck me in retrospect in his work is this implicit encouragement to engage in demanding fieldworks, in order to be in a position to genuinely understand and report on the functioning of these socio-technical systems, key to our societies.

Ever since the launch of the *High Reliability Organizations* Project at Berkeley in the mid-eighties, there has been on-going debate over the High Reliability Organization, or „HRO", category of organizations. In his classic handbook on Organizations, Scott (1992: 351) devoted a full page to this topic. The central importance of such organizations to modern society (they provide crucial services, such as electricity, transport, chemicals, health care…) provokes much scrutiny, and sustains a now ever growing body of research in Management, Sociology, Political Science, Anthropology, Psychology.

Today, there is hardly a chapter or an article on this topic that does not give deference to the „HRO model", devoting a few introductory paragraphs or a few slides to the phenomenon. Somehow it has come to replace Reason's famous „Swiss Cheese Model" (1990), which in the past was offered as a classic starter to numerous talks and *powerpoint* presentations.

The success of the „HRO" label has not been instant but rather has gained strength each year, up to the point where some of the research now labeled „HRO" has little relation to the early objectives of its founders. Todd La Porte, Gene Rochlin, Paul Schulman and Karlene Roberts have presented their research findings in numerous often cited publications[1]. The intent here is not to repeat what has already

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[1]   For example the special issue of the *Journal of Contingencies and Crisis Management*, called „New Directions in Reliable Organization Research", directed

been explained elsewhere. Rather, we would like to reflect upon the original objectives of the HRO project, in order to understand its reception and provide some feedback on the legacy of the HRO theory today.

1. ROOTS (1987-1993)

1.1. The original team: Founding fathers and Mother

Todd La Porte, Professor of Political Science had long been interested in the issues concerning technology, organizations and society (La Porte, 1975). Earlier in his career he had served as an infantry officer then attack pilot for the US Marine Corps, which enabled him to develop an acute knowledge and sensitivity on what it takes for men, crews and organizations to achieve top performances in stressful and uncertain circumstances. Following the HRO fieldworks, La Porte conducted research at Los Alamos National Laboratory (1998-2003) examining the institutional challenges of multi-generation nuclear missions. His recent work includes HRO considerations of the dynamics of NASA's manned flight space programs (La Porte, 2006b) and the challenges of terrorism (Frederickson & La Porte 2002)

Gene Rochlin, originally a scholar in Physics, with a strong interest in international security, evident in his book on the politics of plutonium (Rochlin, 1979), had moved at that time to a newly founded interdisciplinary group called the Energy and Resource Group at Berkeley. Rochlin, was not only a fine connoisseur of the intricacies of technology (Rochlin, 1997), but was also sensitive to the anthropological aspects that fieldwork demands in complex technological environments.

Karlene Roberts is a Professor of Organization Behavior at the Haas Business School. She is still active in the field of HRO literature, with recurrent assignments and new developments in the medical field

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by Gene Rochlin in 1996, together with an earlier article co-authored by La Porte and Consolini (1991), the book edited by Roberts (1993) and later Rochlin (2001) and La Porte (2001).

(Roberts & Grabowski 2008; Roberts, Desai, Madsen & Von Stralen 2005; Roberts, Desai & Madsen 2006).

Paul Schulman is a Professor of Public Administration at Mills College, with great interest in technology, public and private organizations and policy making. He is also still quite active with a recently published monograph with Emery Roe, on the intricate operations of the California Independent System Operator, manager of a very expensive electricity power grid (Roe & Schulman, 2008) and great interest for critical infrastructures (Schulman, Roe, Van Eeten & de Bruijne, 2004; Schulman & Roe, 2007).

In the early nineties the group was already partially dismantled, but regular discussions still took place. In fact, most of the fieldwork that led to the characterization of the HRO literature was behind them[2].

1.2. The original paradox

As suggested „The Research Challenge" (La Porte, Roberts, Rochlin, 1987), the group encountered a number of both theoretical and empirical surprises. Mirroring Perrow's analysis, and reasoning as organizational scholars, they concluded from the array of literature on the subject that these highly demanding organizations were operating under such challenging conditions that sooner or later they were bound to fail. It should be noted here that the Berkeley group began its work 2 or 3 years after the publication of Perrow's *Normal Accidents,* in 1984. Both Perrow and La Porte had been members of the special commission convened at the request of U.S. President Jimmy Carter after Three Mile Island (Sills, Wolf and Shelanski, 1981).

Yet – as it is well known now –, despite major disasters (Bhopal, Chernobyl…) and despite the convincing *Normal Accident* theory, the Berkeley group noticed that some high hazard organizations were doing far better than expected. Struck by this paradox, they embarked on a new theoretical and empirical journey. They found absent from the literature any discussion on the idea that some organizations could not fail at all and that the lessons learned from making an error would be so damaging that it would kill the industry altogether. They were reluctant to follow Wildavsky's analysis in *Searching for Safety* (1988), namely trial and error is not and cannot be the only way to manage the potential risks. It should be remembered that at the time, most of the literature tended to focus on failures, accidents and

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[2]   A few other people have been associated with the group, not only graduate students, but also associated researchers, like Karl Weick (Weick & Roberts, 1993).

disasters, which in retrospect are always easier to explain. Against Perrow's *Normal Accidents* they pushed for *Normal Operations Studies.*

1.3. The original cases: a deliberate choice

1.1.1 Ex-ante and deductive choices

The group first identified three organizations that to their knowledge continuously met and often surpassed the criteria set by society for reliable performance: i) The Air Traffic Control System (Federal Aviation Administration); ii) Electric Operations and Power Generation Departments (Pacific Gas and Electric Company) iii) The peacetime flight operations of the U.S Navy's Carrier Group 3 and its two nuclear aircraft carriers U.S.S. *Enterprise* (CVN 65) and U.S.S. *Carl Vinson* (CVN 70). Later the nuclear production at PGE's Diablo Canyon plant (Pacific Gas and Electric Company) was included.

The choice was deliberate and deductive: for HRO scholars some organizations display the conditions to be or to become true HROs, while others do not. There is no doubt that they chose to study organizations having properties they believed HROs should display. They never intended to take a large sample and verify whether this or that particular organization was an HRO or not. The HRO nature of an organization was decided upfront and had to match a first set of characteristics defined by the group at the beginning of the research.

The current widely accepted definition of an HRO, namely any organization that entails some risk to the population and the environment, is a corruption of the original meaning. For example, not all organizations operating high-risk activities do so under the „no failure" strict requirement, such as a classic HRO is bound to[3].

1.1.2 Early questions

They identified six areas of interest, which largely framed their intellectual choices:

1. *The evolution of High Reliability Organizations*: How does an HRO come into existence? How to describe the logic that lead to attempting to achieve extraordinary operational reliability?

2. *Structural Patterns and the Management of Interdependence*: Identify the formal patterns and rules that such organizations set up to address the massive coordination issues at every level of the organization.

3. *Decision Dynamics in High Reliability Conditions*: How such organization balance between routine operations and abnormal conditions or unpredicted contingencies and how the attention to both conditions is sustained throughout the organization.

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[3]   For example, they never considered NASA as an HRO.

4. *The Organizational Culture of High Reliability*: Elucidate group norms that are key to the achievements required at the individual and also at the group level.

5. *Promotion of New Technologies in High Risk Systems:* Reporting on the growing importance of embarked information technologies (which exploded during the nineties) and their impact on activities. The underlying question here was: Is the adoption of new technologies always to the benefit of safety or is there any danger that their implementation might unnecessarily disturb working practices, which are at the core of sustainable reliability and safety?

6. *The Design of Consequential Organizational Systems* is the ultimate point of interest and it summarizes all the above. Would it be possible to deduce a number of principles which target not only the organizational design but also and in a bolder manner the technological design itself? Would it be possible to design better systems that could be easily audited and inspected by regulators for example? Is there a way to reduce the intricacies of the technology and help achieve what appears to have a high social, technological and human cost? This reveals one of Todd La Porte's research obsession, namely to engage resolutely with the question of design, refusing to be confined to „soft" issues as social scientists are often obliged to.

1.1.3 Modus operandi of the group

At the same time, despite these provoking questions, they were not interested in giving recommendations, or advising on subsequent prescriptions. Rather, what they had envisioned was that their discussion of design issues could be taken up later by managers, operators and regulators if they wanted to:

> „Making things work better was not the reason for our being there, nor the purpose of our work." (Rochlin, 1996: 56)

Confronted with today's fame of the HRO concept, widely used in the industry to coin efforts towards reducing and managing risks and dangers, encompassing all aspects of organizational life (or so it is said), there is some irony to report on this "no recommendations policy". Todd La Porte has always said that he was open to discuss any issues that managers, employees or regulators wanted to take up, but that he believed that the role of an academic was to develop and foster knowledge on these complex socio-technical systems, not to design any specific organization or procedure. He likes adopting the "stewardee"'s point of view. Yet, he encouraged open discussions and the establishment of genuine interest and mutual respect between managers and academics. Fieldwork in these types of organizations requires that a reflexive perspective both by researchers and members of the organization had to be adopted and reinforced

throughout the study to ensure trust and confidence.

I am not sure if he would call his posture "embedded sociology" (Bourrier, 2010), but clearly, the close-perspective the group gained, meant that access to these organizations had been though through carefully (see Rochlin's article in this issue). Yet, as the following selections will show, there has never been a clear definition of the modus operandi of the group. The methodological aspects derived from the kind of access HRO researchers pursued, have never been quite explicit. However, the Normal Operations Studies perspective changed the way scholars now envision their research in High-Hazards Industries[4].

The group had developed contacts, trust and confidence within the three (later four) organizations listed above. These had remarkable performances and also outstanding capabilities to systematically review their processes and day-to-day activities. It is clearly this latter property, namely a keen interest to always doubt whether the existing policies and practices will ever be sufficient, which the Berkeley scholars found out of the ordinary and worthy of the HRO label.

The group was diverse in its background and interests. This diversity certainly enabled participants to combine their different approaches and methodologies. Roberts recalls that:

> „The team members represented different social science disciplines and assigned themselves around the ships to ensure different perspectives, in order to reduce individual bias. Thus, one team member might „work the deck" while another observed bridge activities and the third learned how to launch and recover aircrafts from the ship's tower". (Roberts, 1988: 20).

Paradoxically, we do not find a very accurate description of the group's fieldwork methods. Yet, some articles do offer some information. As Rochlin explained:

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[4]   As many fieldworkers know from experience, negotiating access is almost 50% of the job. I am inclined to believe that the conditions under which researchers can operate, and gain access to high risk facilities is not any easier now than then. On the contrary, the guarantees that researchers, and especially social scientists, must provide, have discouraged scholars from engaging in such fieldwork. The often painful bureaucratization and close monitoring of their intervention by ad-hoc "surveillance committees" on site, seems to produce new norms of interaction, at the expense of the genuine trust that such endeavour requires from both parts (Bourrier, 2010).

„Analytically, [the study] evolved from straightforward interview and survey work to a more complex blend of organizational analysis, studies of organizational culture and ethnographic observation at all levels of the organization" (1996, 55).

Earlier Roberts wrote (1988) about the USS *Enterprise* and *Carl Vinson* experience:

„Over a three-year period a team of three senior researchers followed two West Coast based ships…Team members went to sea intermittently for periods of five to ten days, making observations and learning jobs on the ships from different vantage points. Field notes were entered into computers every few hours when the pace of the ship's activities permitted" (p.20).

This quote is a rare example. In general, little is known about the group's arrangements for their four fieldworks. Rochlin's piece in this special issue is filling an important gap. This untold story of the practical details of their research may have contributed marginally, to the misinterpretations that their work elicited later.

2. IN THE MIDST OF A CONTROVERSY (1993-2000)

2.1. Early misunderstandings

Early in the development of the program, members of the group perceived the possible misunderstandings that certain formulations or words might create. Rochlin was perhaps the most concerned about this issue. Upfront he repeatedly tried to address the potential lack of proper understanding of the exact nature of what they were describing. The label was one of his constant worries:

„In retrospect, this choice [the label High Reliability Organizations] of compact, acronymic terminology was both necessary and unfortunate. Necessary because some label is needed to identify organizations which, as is argued below, are indeed clearly distinguishable from those that have been the subject of most historical study and analysis in the organizational literature. Unfortunate because the term implies that our evaluation is based on some absolute, and static, standard of performance rather than on a relative evaluation of the dynamic management of a difficult and demanding technology in a critical and unforgiving social and political environment". (Rochlin, 1993: 12).

He wrote repeatedly that „reliability-seeking" organizations (from the point of view of the organizations themselves), or „reliability-enhancing" organizations (from the point of view of the public) might

have been a better choice. Furthermore, he observed that:

„Any three-letter acronym, however eloquently descriptive, is only a label. Properly used, such a label invokes a set of generally accepted, relatively invariant, static descriptors. In our case, however, the lack of any widespread consensus as to the meaning of reliable or effective makes it unusually dangerous to assume a commonality of meaning among our colleagues or across varying literatures" (Rochlin, 1993: 28).

2.2. By-products of a controversy
Did Scott Sagan invent the controversy?

The HRO project would probably have been less visible and renowned, without the publication of Scott Sagan's book, *The Limits of Safety* (1993) on nuclear weapons safety. Sagan can certainly be credited with the launch of the controversy, now referred to as the „Normal Accident Theory/HRO debate". It was Sagan who first suggested that the work of the HRO theorists and that of Perrow were competing and opposite on crucial points. He is the one who coined the notion of HRO as an „optimistic" theory, and Perrow's, as „pessimistic".

Throughout the world, in many conferences, workshops and seminars the major features of both theories have been commented on. There is no escaping this and indeed it is not our intention to return to these characteristics, but rather to summarize some effects of this well orchestrated scientific controversy.

Did Sagan invent the controversy? Probably not. Already in the group's papers we find discussion of Perrow's arguments and a determination to build a different framework away from his theory. As mentioned above, team members were interested in organizations, which have fewer „normal accidents" than predicted by theory. In Roberts' review of Perrow's main contentions (complexity and tight-coupling), she concluded rather provokingly that Perrow had an engineering point of view on these organizations (Roberts, 1988: 10)

It is worth considering this assertion, because in retrospect it is relevant to this field of research: There is no doubt that Perrow's specific arguments directed the discussion towards design issues, which is unusual for a social scientist. However, one could also praise the fact that for the first time such a discussion could be led (and legitimized) by a sociologist. From then on, the question of the design

of high-risk technology also became an issue for social scientists, even though it was marginalized and often contested.

The HRO project contributed also greatly to this shift in interest, asking tough questions such as: how should a high-hazard organization be designed if one would want to enhance its ability to be easily regulated by safety authorities? La Porte especially has been an advocate for this type of far-reaching question. Other researchers like Heimann (1997) or more recently Etienne (2007) have followed up on this agenda, albeit from a different theoretical perspective.

Our own work based on ethnographic studies conducted at four (then 5) civil nuclear power plants, including Diablo Canyon from the HRO sample (Bourrier, 1999a and b) led to a reconsideration of the conditions under which adjustments and informalities — that sociologists tend to see everywhere — were induced by the organizational design itself. At some plants informal adjustments were frequent, at others they were kept minimal. Some organizational designs are more transgression prone than others.

1.1.4   Bits of controversy

A long list of the early debates has already been published in the *Journal of Contingencies and Crisis Management*, which over the years has become the „natural habitat" for the deployment of this controversy. The special issue in 1994, has fuelled many articles, aimed at either reinforcing or diminishing the usefulness of the controversy, supporting one theory against the other, or trying to reunite the rivals[5]. The long list of articles shows that the controversy

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[5]   Some of the article titles are very evocative. In 1997, Pidgeon published "The Limits to Safety? Culture, Politics, Learning and Man-Made Disasters". In the same volume, Rijpma published "Complexity, Tight-Coupling and Reliability: Connecting Normal Accidents Theory and High Reliability Theory" (1997). He continued with a Book Review Essay called "From Deadlock to Dead End: The Normal Accidents-High Reliability Debate Revisited" (2003). Mascini in "Risky Information: Social Limits to Risk Management" (1998) chooses NAT over HRO. Bain in "Application of Theory of Action to Safety Management: Recasting the NAT/HRT Debate" (1999) challenges Sagan's view and joins Rijpma, finding that both theories are complementary, not competing perspectives. Hopkins has also been a careful analyst of the controversy, in two articles "The Limits of Normal Accident Theory" (1999) and " Was Three Mile Island a "Normal Accident?" (2001). He concluded that Three Mile Island was not a Normal Accident, and he doubted that any accident could actually be a Normal accident, leaving readers quite lost,

has been kept alive and well throughout the years, providing a firing angle for scholars wishing to take aim at safety and reliability issues. It has become a *passage obligé*. However, La Porte in his „A Strawman Speaks Up: Comments on *The Limits of Safety*" (1994 : 209) dismissed the idea that the work of HRO theorists might be competing with Perrow's own attempt. He also insisted on the fact that the HRO research agenda could be regarded as a follow-up to Perrow's work. Perrow, who was invited to engage in the same kind of exercise by the journal, did not take the same line, which could have led him to agree with La Porte, perhaps confirming that HRO theory could be an offspring of his own theory (Perrow, 1994 p. 212).

1.1.5   Going native…or doing ethnography?

One of the main contentious issue deals with a suspected "going native" bias from the HRO scholars' part. Perrow questioned the ability of HRO researchers to have maintained the objectivity to their fieldwork, accusing them of excessive proximity, which might have altered their judgment on the organizations they worked in.

Attention to methodology has been one of the great by-products of this polarization of theories. Perrow and Sagan (or Clarke) have used secondary documents, „after the fact", „after the event" type of memos, from which they have managed to derive deductively a theory of accident causation. The HRO group also used documents. However, much of their work is ethnographic in nature (a combination of face to face and group interviews with field observations). Unintentionally probably, this controversy has enabled the development of ethnographic approaches to the study of high risk organizations.

Indeed, one of the great merits of the HRO agenda has been to encourage ethnographic research in this kind of environment. A great number of studies have now adopted the „Normal Operations Studies" approach. Since, it seems to be more widely accepted that a zero-incident workday does not exist, this calls for methodologies which

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since there aren't that many Normal accidents anyway. Perrow himself refused to include Bhopal or Chernobyl in the list! Jarman in "Reliability Reconsidered: A critique of the HRO-NAT Debate" (2001), once again revived the controversy. Finally, Marais, Dulac and Leveson offer to go " Beyond Normal Accidents and High Reliability Organization" (2006), see also Leveson (2008).

can precisely describe how actors manage to adjust constantly to changing situations for the sake of safety (Bourrier, 2002; Woods & Hollnagel, 2006; Petterson, 2008; Runte, 2010). As Vaughan (1996), Perin (2005), Walker (2010) showed in their own ways, countercultures of safety are developing to compensate for unpractical and unworkable set of bureaucratic rules. The question remains, how to control adjustments made in the field. How it is possible to discriminate between "good ones" and "bad ones"?

1.1.6   Where does it leave us?

Both theories have prompted an interest in system design[6], organizational features, organizational culture, and a reflection on the impact of the environment (political, regulatory, social…) on safety performances. Even though, the influence of the institutional environment on accident prevention is analyzed differently in both theories.
Following this line of questioning, and especially in the context of the two NASA losses (*Challenger*, in 1986 and *Columbia*, in 2003), a very dynamic literature has offered some characterization of the harmful effects of constant budget constraints affecting the shuttle program and its security division from the beginning (Heimann, 1997, 2005; Vaughan, 1996; Starbuck & Farjoun, 2005). As Vaughan explained, this pressure (along with other factors) produced a culture within the organization, which permitted a „normalization of deviance". Performances of individual organizations, especially their safety performances, should also be assessed in a wider context, including the impact of regulation, the pressure of public opinion and political interference.
Finally both HRO and NAT gave legitimacy and weigh to an alternative perspective on high-risk systems from economists and engineers (Perrow, 1994: 220).
Unfortunately, much still remains to be done, as there is a wide gap

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[6]   We are leaving aside the issue of redundancy, and the place it occupies in both theories. We believe interesting readers can find accounts of both points of view in numerous published articles. Moreover, his debate is not yet resolved. For example, Marais, Dulac and Levenson (2006) propose going beyond this oversimplification of the redundancy debate, arguing, from an engineering point of view, that both the HRO and Normal Accident theory fall short of adequately addressing the issue of redundancy in highly complex systems.

between the level of knowledge published and debated in the academic circles on these issues and the level of knowledge transfer that has actually taken place from those circles to the industry or regulatory circles. Hopkins is right when he observes that: *„this is not just a theoretical debate. There are practical consequences for the way we go about accident prevention"* (2001: 72).
Designing or reinforcing organizational dynamics that favor social exchanges on unexpected events and surprises, and implementing voluntary error reporting systems are now considered as key risk mitigation strategies throughout the industry. It is un-doubtful that some of these initiatives owe their inspiration to the HRO theory.

CONCLUSION : THE HRO LEGACY (2000 ON…)

A New Label?

The HRO literature has continued to grow, evolving from a research topic, as described above, to a powerful marketing label: Organizations, concerned with their level of safety and/or with their public image, want to become HROs and maybe more importantly they want to be described as HROs. The HRO term has somehow become a label of excellence, even appearing in Wikipedia, the online encyclopedia. How can we account for this success?
It is probable that the restrictive list of characteristics given by HRO authors has operated differently to the way they had expected. Rather than providing a starting point, leaving researchers and experts free to enrich the categorization, it evolved over the years to become a set of minimal conditions to describe a successful high risk organization. It has even sometimes been presented as „a four-step process model of quality management" (Gaba, 2000, p.86). This was never the initial intention of the Berkeley researchers. Other times HRO theorists have been defined as „behavioural scientists" (Knox, Simpson and Garite, 1999). Therefore, one now finds more articles on other activities that might benefit from this perspective rather than an enlargement of the characterization itself, which could have led to the discovery of additional characteristics and may have prevented the initial work from being sometimes caricatured too easily.

Encountering the Health System

The bulk of the literature now targets a new member of the exclusive club of High Reliability Organizations: the Health Care System (Shapiro & Jay, 2003; Wilson, Burke, Priest & Salas, 2005; Roberts, Madsen, Desai & Van Stralen, 2005; Carroll/Rudolph, 2006; Pronovost *et al.*, 2006; Dixon & Shofer, 2006).

The link between the medical field and the HRO agenda is undoubtedly a direct consequence of the famous alarm sparked by the report *To Err is Human: Building a Safer Health System* (1999), published by the American Institute of Medicine, which paved the way for a genuine reflection on a number of issues. It concludes that death at the hospital from preventable errors is the fifth cause of mortality throughout the western world.The main argument is that some of the deaths occurring in hospital are totally preventable. Bad communication, bad preparation, lack of feedback, great discrepancies between services, wards and experts are error inducing. These errors are embedded in the way the system is organized.

Following this brutal awakening, the health system is now engaged in a systematic comparison of its operation with other high risk industries (aviation, nuclear…). Individual health organizations now have a great will to reduce their level of error and are showing a keen interest in various approaches, such as voluntary error reporting systems (translated into „sentinel events" reporting in the medical setting). However, the analysis rests on the premise that health care is actually a system (Jensen, 2008). If we take the example of a hospital, this is certainly true at a certain level, but it is difficult to compare the functioning of a hospital to that of a civil nuclear power plant, or an airline. The comparison is far less simple than expected and might not even be very useful. The health system finally is probably not an HRO, and will never be.

What HRO has achieved?

The HRO literature brought to light a new territory for social scientists. It gave legitimacy to tackling issues of organizational design, substantiating the idea that safety and reliability are not only the result of great technology in combination with a great culture. They are also the result of organizational design: choices are made, allocations are

decided and these do greatly influence the potential to be simply safe and reliable. These decisions have to be questioned and reflected upon constantly.

The second point which is almost trivial is that variance across organizations exists. Industry and regulatory circles have always preferred to talk about „culture" when confronted with organizational variance, to the detriment of drawing on well-equipped organizational analysis. However, this work would allow social scientists, and notably organization theorists, to expose the strengths and weaknesses of various organizational regimes and actually contribute decisively to the safety debate.

Third, HRO literature gave an incredible boost to comparative research, across a number of countries, across industries, public and private, and this impetus needs to be further nurtured. Indeed, such „Normal Operations Studies" still need much encouragement, as the conditions under which researchers can independently embark on these topics, remain tenuous.

Forth, just as the „normal accident theory" is applicable to very few accidents — Perrow himself being very restrictive — similarly, the concept of HRO does not apply to a vast category of organizations. Over the years, stimulated by the success of the label, scholars and experts seem to have forgotten the first part of the model, commenting only on the second part. Originally, an HRO was primarily defined by its transactions within the institutional environment. To become or be defined as an HRO demands that society impose failure free operations, because failure is not an option. In the final analysis, the second part of the model, describing the various important features that High Reliability Organizations display, has acted as a set of excellence criteria, to be emulated. This has attracted most of the attention.

However, the strength of the HRO research agenda is probably to be found elsewhere. It has revealed the potential of interest in daily operations as opposed to *a posteriori* analyses of major accidents. Resorting to ethnographic and sociological methodologies gave new vitality to the study of such complex organizations. This must be considered a great tribute to the early developers of High Reliability.

As approaching the final point, *en homage à Todd La Porte*, there is something more to all of the above. One of the great points that I learned from him, is this idea that we know so little about the

functioning of decisive organizations. We are only looking at the tip of the iceberg. In fact, deep below in the water, complex work is done, people are toiling, and complex decisions are made everyday, with no-one paying attention to them. We depend on these secret webs of teams, decision, technology, infrastructures, and yet we know almost nothing about their daily operations. It is up to us to continue the investigation.

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