

# THE FUTURE OF SAFETY

The “FonCSI 3” research agenda

2020  
2024



# THE FOUNDATION FOR AN INDUSTRIAL SAFETY CULTURE

The Foundation for an Industrial Security Culture (FonCSI) is a non-profit organization created following the AZF accident in Toulouse, France. Initially, the Foundation was equally funded by industry and the French government; over time, industrial donors have breathed new life into the Foundation's activities.

FonCSI's mission is to support and fund interdisciplinary research into risk, and the human and organizational factors (HOF) of safety, and ensure its transfer to industrial safety stakeholders.



Its reputation for excellence is based on four strengths :

- A small team that collaborates with the Institute for Industrial Safety Culture (Icsi), by sharing their in-depth knowledge of industrial practices, actors, directions and networks at European level, and an academic insight into HOF that is unique in France. FonCSI manages research projects, organizes working groups and prepares academic and operational publications in French, English and Spanish.
- An international research network in the domain of HOF and the industry that has

few equivalents in France or even in Europe, which connects it to leading experts worldwide.

- An approach that goes beyond classical research instruments such as calls for proposals. In practice, the Foundation functions as an international think tank, able to address the most difficult topics.
- A genuine commitment — it could be said its *raison d'être* — to forge links between basic research, industrial research, implementing concepts in the field, and funding industrial pilot programs.

The Foundation operates on a five-year cycle. It is in the process of developing the third research agenda of its young existence, for the years 2020-2024.



## FONCSI 3 | Why join us?

Human and organizational factors (HOF), or human factors engineering, will play a key role in the industries of the future. This vast domain encompasses not only safety and production, but also corporate commitment to the company's values. The challenges are becoming increasingly strategic and no less difficult for industry to understand – while they are closely linked to technology, they go beyond a purely technological and rational approach. It is a field that combines academic knowledge from sociology, ergonomics, psychology, engineering, economics, not to mention medicine.

Many themes are relevant to the industry of the future, and require further investigation.

The Foundation's first program ("FonCSI 1", 2008-2015) explored the themes of operational experience feedback, the dynamics of negotiation and compromise, citizen involvement, decision-making under uncertainty, and trade-offs in cases where safety competes with other priorities.

The second program ("FonCSI 2", 2015-2019) tackled the issue of the professionalization of workers in the domain of safety, models of safety and safety culture and how they are used in industry, HOF organizational models and their results, sharing safety models between contractors and subcontractors, and the theme of the relations between regulatory bodies and industry.

### Choice of themes

Ten, new, very topical themes have been identified for the Foundation's third research agenda: "FonCSI 3", 2020-2024.

You can choose up to 4 themes from the 10 that are on offer.

You are welcome to adapt the content to your needs, or even propose new themes, as we progressively put together the final agenda that will be agreed with the program's industrial sponsors.



# THE “FONCSI 3” RESEARCH AGENDA

## COMPONENTS AND DONATIONS

### FONCSI 3 | How does it work?

#### Components

Each proposed theme is divided into three components:

- A working group
- A strategic analysis
- An industrial pilot

#### Strategic analyses: the heart of the program

“Fonsci 2” demonstrated the effectiveness of strategic analyses, which will be an important instrument in “FonCSI 3”. **All of the themes will be the subject of an analysis**, even if the other components are not developed.

A strategic analysis brings together a panel of international experts over a period of 18 months. A group is selected to launch the initial analysis that runs over a period of nine months. This group then selects internationally-renowned experts to participate in a residential seminar. The last six months are devoted to the analysis of industrial practices in the light of the academic knowledge acquired during the analysis. The analysis ends with a second seminar, outreach activities and strategic orientations, designed specifically for FonCSI sponsors. Strategic analyses can be compared to the work of a think tank. They end with the publication (in English) of an open access book by Springer, and the publication of Cahiers that summarize the work and provide practical guidance. The Cahiers can be freely downloaded from the Foundation’s website, [www.foncsi.org](http://www.foncsi.org).

#### Complementary and optional components

For topics where the scope is not immediately clear, a **working group** comprised of industrial actors is established. This group shares their experience and their needs, before the strategic analysis begins. Over a period of 6 months to 1 year (4 to 10 sessions), the group’s discussions help to set out the scope of the topic and the best framework for the subsequent strategic analysis.

Once the results of the strategic analysis are finalized, the Foundation funds one or two research projects, in the form of **industrial pilot programs**, for up to 2 years. These programs focus on the implementation and transfer of the concepts that have emerged from the academic research.

FonCSI also funds an annual seminar, organized by the international risk network NeTWork. Based on a prospective approach, these seminars are designed to identify the research challenges of tomorrow.

FonCSI is a leader in the community. The Foundation manages a wide range of dissemination tools: its website, social networks, open access publications, research/industry seminars, free conferences, etc.



# FONCSI 3 | How can you participate?

The “FonCSI 3” program runs over 5 years, and is organized:

- around **4 working themes** selected from the 10 on offer, with at least a strategic analysis;
- and **4 or 5 prospective seminars** that will start work on the identification of potential “FonCSI 4” themes. These seminars may take a brief look at some of the 10 themes proposed.

Donations cover the full, 5-year program and are tax-deductible in France, where the FonCSI is a public-interest research foundation.

Donations can be distributed over the 5 years of the program but, for obvious management reasons, the first year must be a minimum of 40% of the total.

## Options

### A SPONSOR HAS SEVERAL OPTIONS.

Three options are available for “FonCSI 3”:

- **1 theme: 200k€, equivalent to 40k€/year**
- **2 themes: 350k€, equivalent to 70k€/year**
- **4 themes (the whole program): 500k€, equivalent to 100k€/year**

Membership of the entire program entitles the sponsor to a seat of the Foundation’s Board of Directors and the Research Management Committee. The Board of Directors makes the final decision on which themes will be addressed, in what order, and how, over the 5-year term.

In each case, a donation, whether for one or more themes, entitles the donor to full access to the results of the chosen theme and the Foundation’s general activities, notably those aimed at the scientific community, the network, prospective seminars, etc.



# PROPOSED THEMES

The “FonCSI 3” research agenda is being developed iteratively. Discussions are held with potential sponsors with the aim of tailoring the agenda to the needs of industrial partners.

Ten themes are proposed, based on contacts that are already in place and the state-of-the-art in the HOF domain, but new topics may emerge from the discussion with potential sponsors.

THEME

## 1 2030–2040: A new generation of workers

**Anticipate impact on industrial organizations and use of technology.**

Anticipating ‘the factory of the future’, new technologies, and how they are used is a priority for the industry. But it is also necessary to think about the new production methods, new organizations and new occupational profiles that will be required by a changing workforce. The impact of ‘generation Z’ and ‘ZZ’, on the workplace is still poorly understood, notably given the speed at which society is changing. The digital revolution, the globalization of work and businesses, and educational processes have evolved rapidly over the past decade, particularly in developing countries, which could be a major source of employees for international companies.

This forward-looking strategic analysis focuses on the impact of generation Z (born since 2000), and ZZ (still to be born), who will form the core of the workforce in the years 2030-2040. It addresses 4 key questions:

THE ISSUES

- What is the relationship to the commitment to the company and its consequences on corporate values?
- What is the impact on how new technologies are used?
- Which implications for safety?
- What impacts on supervisory control systems and their regulation?

THEME

## 2 How to construct and measure industrial safety in the future

**In a distributed and changing world, how can we anticipate changes that impact safety?**

How industrial safety is designed, and the indicators that are selected to measure it, are the reflection of a historical process based on a society’s memory of past disasters. This process shapes what citizens are ready to accept, regulatory monitoring policies, and how industry thinks about safety and production.

Globalization, the digital revolution, the decompartmentalization of industries as they continue to expand, the break-up of sectors and branches, subcontracting ... and especially the numerous rapid changes experienced by organizations all influence the historical situation, with unpredictable impacts on safety as we know it.

THE ISSUES

- How can we revisit the current philosophy and the (already difficult) debate about zero incidents/defects, based on continuous optimization, which requires a high level of stability over time?
- What models and philosophies could replace it? Are there any existing models that are more agile, better targeted at the local level, and which are clearly able to manage risk?
- What changes should be introduced into the calculation of risk and the demonstration of risk control?
- How do we communicate with regulators and the public about this new way of managing risks?



## 3 Organizational aspects of cybersecurity

**Improve our understanding of the human and organizational aspects of cybersecurity.**

Managing potential vulnerabilities in software and telecoms equipment is a growing concern among managers who are responsible for high-risk industrial systems and critical infrastructure managers. Although the technical and technological dimension of cybersecurity attracts the most attention, the organizational dimension is equally problematic and increasingly overlaps with industrial safety challenges.

### THE ISSUES

- The ISO 27000 family of cybersecurity standards deals with a number of topics that overlap with safety management: risk analysis (including the identification of relevant metrics), business continuity, incident response, and risk governance.
- What role do insurers and regulators play in the management of cybersecurity, and what are the implications for accountability?
- What are the skills needed to protect classical information systems? The existing skill shortage concerning cybersecurity is much more acute concerning high-risk systems, which use specific equipment with long product lifetimes.
- What should procurement and maintenance policies for IT and communication equipment look like? What partnerships are needed to ensure safety in the long term; what are the associated commitments and responsibilities?

## 4 Safety and security

**What is the link between industrial safety and security linked to malicious acts?**

Historically, science has separated and almost completely compartmentalized two communities working in related safety domains: the risk of industrial accidents and work (safety), and the risk of malicious acts and terrorism (security). The increase in the second risk (security) makes this division more difficult, or even impossible in the future. At a minimum, bridges must be built – one option is the construction of a global, shared model. However, these two worlds differ in almost every aspect: approach, culture, method, system of proof, etc.

This research theme focuses on drawing up an inventory of these differences and complementarities, and providing an insight into a unified approach to global security that can be applied to the various forms of industry in the future.

### THE ISSUES

- How to manage differences in beliefs, professional practices and cultures between these two worlds?
- How to overcome differences in ways of thinking about availability and protection?
- What new practices can be implemented that foster discussion and cooperation?



## Regulators and the regulated

**A closer working relationship between regulators and regulated industries.**

The relationship between regulators (supervisory authorities, internal control bodies, third party inspectors) and those who are regulated (operators of hazardous industrial installations, product or facility designers) is important for both safety, and how at-risk industrial activities are perceived by society. While we already know that certain characteristics are desirable, regulatory practices and the nature of this relationship differ across industries.

- How to manage the tension between maintaining regulatory expertise and independence?
- What should the balance be between advice and sanctions?
- How does the regulator-regulated relationship unfold in the long term, and can it survive a crisis?
- What are the impacts of the trend towards criminalization of accidents and incidents?
- How to meet civil society's demand for transparency?
- How should regulatory bodies be financed, and what influence does the financing model have on their independence?
- What aspects of internal controls, and product safety (certification) need to be considered?

## Contractors and subcontractors

**Make safety a key element of contracts with subcontractors.**

Interventions by subcontractors create multiple safety challenges, and are the subject of numerous provisions that are found at all stages of the contracting process: from the selection of contractors, through to the execution and assessment of the work. Provisions generally concern both occupational and industrial safety, and are part of the 'quality' component of tender documents. As they are intended to address both safety performance and provide a legal defence in the event of an accident, a sub-contractor can find itself confronted by disparate requirements, both in terms of form and substance, which creates a heavy administrative burden for both partners. Is it possible to identify examples of current good practices, in the context of an agile partnership that ensures safe working conditions?

- How can safety models be harmonized when the sub-contractor's safety model is more rigorous than that of the client?
- Who is responsible for what, when different safety models are used on the same site?
- Should efforts be made to increase loyalty or mobility between contractors and subcontractors who are familiar with each other, in order to maintain optimal safety in the long term?
- What are the consequences for safety culture and the corporate values of each of the contracting parties?



## Acceptability of at-risk industrial activities

Societal changes in risk governance.

In a context where greater attention is paid to health and the environment, the public is less inclined to accept certain industrial risks. Civic participation is one of the pillars of environmental law, and given the constantly-evolving modes of communication, citizens are increasingly likely to be involved in major decisions regarding industrial development, and national and international technologies.

This strategic analysis summarizes academic knowledge on how to, from a sustainable development perspective, maintain or foster profitable, competitive, innovative and safe industrial activities that respect the environment, the region and neighbouring communities.

### THE ISSUES

- What impact do the cultural determinants of risk sensitivity have on regulation, industrial and energy policies, and citizen participation?
- What are the returns on investment from voluntary CSR commitments? How can they be measured? What methods and tools are available to implement a local CSR policy?
- What changes can be made in the day-to-day dialogue, and in crisis situations, in at-risk industries? What are the potential modes of participation, and what is the impact of digital democracy?
- Security: to what extent should the risk of terrorism be considered in a decision to open up facilities and their safety documentation to the public?



## Global harmonization of the regulatory environment

Does the anticipation of potential sanctions affect safety management?

The rapid globalization of industry makes it tempting for a company to use national differences in legislation, practices and the tolerance of local citizens to manage their industrial risk. However, although there are some general principles, the details of these differences are not particularly well understood, nor how they operate at the local level. The proposed strategic analysis addresses these questions.

### THE ISSUES

- What are the national differences between different sectors?
- What are the national differences in the same sector?
- At the organizational and application levels, what are the differences between industrial groups in the same sector?
- At the organizational and application levels, what are the differences between sectors in the same industry?
- At the organizational and application levels, what are the differences between subsidiaries in different countries belonging to the same group?
- To what extent do these differences compromise safety or other dimensions of business performance?



## THEME | 9 <sup>✓</sup> Industrial safety and employee participation

Integrating operator experience during system design.

The participation of employees in the design of facilities (including their maintainability), in the way in which information is presented, and in establishing operating procedures has repeatedly been shown to be a key way to improve industrial safety.

In practice, many companies limit this participation to modifications to localized operating rules and procedures, whereas digital technologies allow (in particular for new generations of employees) for operator input during the design phase (new units, revamping). Analysis of success factors and obstacles to user participation in high-risk systems would allow improvement in different industry sectors.

### THE ISSUES

- How can end-users/customers contribute to the design phase. Does the literature show that it has actual benefits?
- How, and what form should this participation take? What are the lessons to be learned from practice in different industries?
- What is the relationship between employee participation and the social dialogue with their representatives?

## THEME | 10 The impact of extra-financial reporting on safety performance and risk management

Evaluate the impact of extra-financial reporting and CSR provisions on safety.

Following a European Union Directive in 2014, major European enterprises are required to publish information on their environmental and social policies, their risks and performance. This obligation can be interpreted as an opportunity to improve CSR reporting communication practices, which are sometimes perceived as a marketing tool rather than as a source of information for shareholders and other risk governance stakeholders .

### THE ISSUES

- What metrics can be used to measure the 'industrial risks' component of extra-financial reporting?
- How can they be explained to stakeholders?
- How is this linked to CSR reporting practices that are often already in place?
- How can the system be audited, to ensure credibility?





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