

When Plans Meet Reality: the Tangle of Improvisation and Planning in Crisis Situations

Yasmine Rannene^{a*}, Nelly Olivier-Maget^b, Samantha Lim^c, Isabelle Bouty^a, Anouck Adrot^a

^aUniversité Paris-Dauphine, Université PSL, CNRS, DRM, M-LAB, 75016 PARIS

^bLaboratoire de Génie Chimique, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

^cINERIS, France

yasmine.rannene@dauphine.eu

Planning is crucial in crisis preparedness. Yet well-prepared plans often fail to provide an adequate response due to the unpredictability of crises. Consequently, responses often require improvisation, shaped by contingencies and time constraints. However, research on risks frequently puts planning and improvisation at odds. In this paper, we overcome the seemingly contradictory nature of planning and improvisation and explore how they intertwine in complex technological emergencies.

Although organizations develop a wide range of plans, complete prediction of crises is out of reach. That's why we propose that improvisation and planning are complementary to strengthen the resilience of organizations in crisis management. To better understand improvisation, researchers have studied it at individual, group and organizational levels, focusing on its characteristics and dimensions. However, gaps remain in our understanding of the full impact of improvisation, how it interacts with existing crisis plans, and how it unfolds during crises. This article aims to fill these gaps by exploring the influence of improvised actions on the execution of existing crisis management plans.

1. Introduction

In contemporary society, the propensity of failures in critical infrastructure, technological accidents, and pandemics has increased (Boin & McConnell, 2007). Furthermore, as critical infrastructures grow increasingly complex, compounded crises are emerging, which challenge existing procedures and plans designed to address these situations. While, examining the research, it becomes apparent that most studies addressing the interplay between "improvisation" and "plan implementation" has centred on fields like new product development (Moorman & Miner, 1998a), fire management (Weick, 2024), and responses to natural disasters. However, there is a significant gap in studies focusing on technological accidents at high-threshold Seveso sites. Investigating improvisation in chemical plants is particularly important, especially in the light of the risk of a "domino effect," where a major industrial incident could trigger a chain reaction of damages. Such accidents could endanger not only adjacent industrial facilities but also nearby residential communities, resulting in severe environmental consequences, such as soil and marine contamination. These scenarios would require the collaboration of various organizations, each needing to improvise to manage an unexpected and unlikely event. Rapid and effective coordination would be crucial to mitigate risks and minimize harm. Despite the complexity and potentially extensive ramifications of these situations, they remain insufficiently addressed in existing literature. To address this gap, this research is conducted within the ANR RESCUE project, which unites academic institutions, industry stakeholders, and crisis management partners to strengthen territorial and business resilience through the development of effective operational tools for crisis management.

2. Planning

Planning is a crucial element of crisis management, involving the definition of roles and allocation of resources. The next section discusses its role in crisis preparedness and the challenges posed by the unpredictability of crises.

2.1 Planning : a key to crisis preparedness

Organizations recognized planning as a fundamental aspect of crisis preparedness, allowing them to effectively tackle unforeseen challenges. In their planning processes, they rely on projections and predictions to create multiple scenarios that aim to prevent or reduce the likelihood of disastrous occurrences (Cordova-Pozo & Rouwette, 2023). They analyze the occurrence rates of events, generate possible scenarios, and explore human behaviour to understand how socio-physical systems respond to perturbations (Cook & Lourdes Melo Zurita, 2016). Through this planning process, organizations create detailed plans that outline specific actions and strategies to effectively deal with potential crises (Kendra & Wachtendorf, 2003). These plans may take the form of community plans, contingency plans, and household emergency plans (Cook & Lourdes Melo Zurita, 2016). Whether from a theoretical or practical standpoint, it is evident that planning is crucial; the absence of planning opens the door to chaos, confusion, uncertainty, and ineffective crisis handling.

2.2 Confronting uncertainty: the planning dilemma

The planning dilemma in crisis management highlights an inherent contradiction: “planning is such an important activity that plans must be written for situations in which the event will almost certainly differ from what is anticipated” (Kendra & Wachtendorf, 2003). This contradiction becomes particularly evident when we reflect on the question posed by Boin and McConnell (2007): How can we plan for a phenomenon that, by its very nature, defies the predictable patterns that planners usually depend on? (Boin & McConnell, 2007). Many crises such as natural crises, technological failures, and public health emergencies, manifest unpredictably, challenging the efficacy of traditional planning approaches. As a result, even a well-thought-out plan can falter when faced with a quickly unfolding crisis that presents uncertain implications (Eriksson & McConnell, 2011). In situations of high uncertainty, plans and planning are often viewed as rhetorical and symbolic (Cook & Lourdes Melo Zurita, 2016). They serve only as navigational instruments in these contexts, contributing to the process of dealing with uncontrollable events (Cook & Lourdes Melo Zurita, 2016). Consequently, significant aspects of crisis responses need to be improvised, based on immediate circumstances and time constraints (McConnell & Drennan, 2006).

3. From planning to action: the role of improvisation in crisis response

This section examines improvisation in crisis response by defining the concept, analyzing its relationship with planning, exploring its contribution to resilience, and considering its integration into plan-driven sectors.

3.1 Improvisation: what it means

From firefighting and crisis management to studies on error prevention in Oil, Gas, and Petrochemical Operations (Cowley et al., 2021), accidents such as Fukushima Disaster (Guarnieri, 2017), sociology, and anthropology, improvisation is considered as an essential practice across disciplines (Moorman & Miner, 1998a). Each field offers its own perspective on improvisation, yet they collectively emphasize that it is “the deliberate fusion of the design and execution of a novel production” (Miner et al., 2001). In other words, this form of action happens when organizations design activity patterns during their execution rather than beforehand (Cunha et al., 2022). According to Moorman and Miner (1998a), improvisation is defined by the degree of overlap between planning and execution, implying that as these two elements occur closer in time, the activity becomes increasingly improvisational. . Researchers identify both effective and ineffective instances of improvisation in critical contexts (Adrot, 2023). Illustrative cases such as the Mann Gulch disaster (Weick, 2024) highlight the value of adaptive and creative responses, whereas events like the Pedrógão Grande fire (Cunha et al., 2022) expose inherent limitations. These contrasting perspectives point to the need for a more nuanced analysis of the relationship between improvisation and formal planning.

3.2 The interplay of improvisation and planning

Improvisation has been explored through two primary and distinct research streams (Cunha et al., 2022). The first research stream examines the crucial role of improvisation in crisis situations, where strictly adhering to predefined plans can be impractical, counterproductive, and even dangerous for individuals (Crossan, 1998). In these scenarios, defined by uncertainty, complexity, and time pressure, improvisation plays a critical role in tackling unforeseen challenges, where an immediate response is imperative. Nevertheless, this does not negate the importance of planning. In fact, research has shown that improvisation resulting from poor planning and

insufficient crisis preparedness introduces significant risks (Cunha et al., 2022). The idea here is to consider improvisation not as a deviation from plans but as a valuable solution particularly in unpredictable and rapidly evolving environments. In other terms, while effective planning provides a necessary framework for operations, the importance of improvisation lies in its ability to offer flexibility and responsiveness, essential for tackling unexpected situations that may arise (Moorman & Miner, 1998b). The second stream of research approaches improvisation as a phenomenon that does not strictly manifest in critical settings, but that is inherent to organizational life. This perspective argues that organizations constantly deal with some level of uncertainty, even with established plans (Cunha et al., 2022).

3.3 Improvisation as a key to resilience

In the context of crisis management, improvisation refers to the ability to respond to unexpected events without prior preparation (Wiedner et al., 2020). This requires the integration of concurrent thought, planning, and action, allowing individuals to respond dynamically while utilizing available resources. This process enables organizations to effectively address singular events and enhances their resilience in the face of unforeseen challenges (Kendra & Wachtendorf, 2003). Considering resilience as the ability to quickly understand what is happening, both operationally and relationally, and to formulate effective responses that can be adapted as conditions evolve (Barton et al., 2020), it becomes clear that improvisation is a fundamental engine of resilience (Grøtan et al., 2008). For example, in large-scale emergencies, frontline operators rely on improvisation by dynamically solving problems and rearranging available resources. Their capacity to improvise and showcase creativity can be decisive and potentially avert disaster (Meshkati & Khashe, 2015). Scholars have demonstrated that systems can enhance their resilience through the creativity and initiative of their actors (Cunha et al., 2022). Furthermore, anticipation, attention, and response are crucial principles for resilience (Grøtan et al., 2008). Improvisation aligns with these principles when understood as a means of confronting uncertainty, integrating doubt into on-the-spot attempts to create order. Consequently, this leads to a continuous process of balancing confidence with caution, knowledge with doubt, and wariness with understanding (Weick, 2024). This process of balancing is basically applied wisdom (Weick, 2024).

3.4 Improvisation: can it fit into sectors that embrace plans and procedures?

Improvisation represents a contentious issue in sectors that emphasize strict rule adherence, such as in the context of process safety incidents (Cowley et al., 2021). These sectors stress the importance of planning, arguing that improvisation can lead to chaos due to a lack of structure and loss of control (Flach, 2014). In these fields, the dominant belief that better planning leads to more effective crisis management might explain why 'improvisation' is not a term commonly found in the literature. However, recent studies, such as those by Ghasemi et al. (2024), show that developing an effective Incident Action Plan (IAP) has become more challenging, as emergencies are increasingly unique and unpredictable. They highlight the role of improvisation in managing crises, asserting that organizations should work to enhance their improvisational capacities. On industrial sites, an uncontrolled fire, chemical leak, or technical failure can lead to dangerous situations and even crises that cause serious damage, not only to the site's infrastructure but also to the environment and nearby populations. In such scenarios, responses must be immediate. Improvisation can take the form of a decision made at the managerial level, but its details need to be worked out by the operational staff (Rankin et al., 2013). Another form of improvisation occurs when coordination between multiple organizations is required, and all actors must improvise together to navigate the extreme complexities of an emergency (Roud, 2021). In these complex environments, improvisation emerges as a crucial tool for handling emergencies and situations requiring immediate response. Therefore, it seems increasingly relevant to integrate improvisational actions into formal emergency training programs or emergency operations plans to help bridge the gap between emergency operating procedures and their real-world implementation (Ghasemi et al., 2024).

4. Practice a relevant lens to explore improvisation and planning complementarities

Given the difficulty in fully capturing the interaction between planning and improvisation, this section advocates for the use of a practice lens to better examine their complementary roles in industrial environments.

4.1 What is practice ?

Dissatisfaction with traditional management and organizational theories has contributed to a growing interest in practice-based approaches, which offer a more refined perspective for examining organizational phenomena and addressing existing theoretical gaps. At the core of this approach is the assertion that practices, rather than individual practitioners, are the primary unit of analysis (Nicolini, 2013). This shift transcends a reductionist view of practices as mere descriptions of actions; instead, practices are understood as dynamic, mediated forms of conduct, encompassing sayings and doings that both shape and are shaped by their context (Nicolini, 2009). Far

from being isolated actions, practices serve as meaning-making, order-creating, and reality-shaping activities, which provide the foundation for new ways of exploring, understanding, and explaining social and organizational phenomena (Nicolini & Monteiro, 2016).

4.2 Exploring practices in critical settings

Critical infrastructures in sectors such as the chemical industry are marked by considerable complexity, sensitivity and interconnectivity, making them more prone to operational failure (Boin & McConnell, 2007). These failures can trigger serious emergency situations, requiring intervention at both internal and external levels of the organization. The study of these situations requires a more dynamic approach, focusing on the people involved, the materiality and the interconnections between these elements. This is where the practice-based approach comes into its own. Practice theorists argue that understanding and re-presenting practice requires an appreciation of the interconnectedness of practices, recognizing that activities never occur in isolation and are always embedded in a dense network of interconnections (Nicolini, 2009). According to this perspective, practices are always materially mediated and take place through and in the midst of a variety of artifacts and objects (Nicolini, 2007). This approach, which sees practices as inseparable from materiality, offers a new, dynamic analytical framework for understanding complex, dynamic situations.

4.3 Exploring improvisation and planning through practices

Understanding the interplay between plan implementation and improvisation remains a challenge, as the current state of knowledge does not fully capture this interaction. To remedy this, the practice-based approach proposes rethinking organizational concepts as part of a complex network of socio-material activities and their effects (Nicolini, 2009). Theorists of this approach argue that organizational phenomena, such as improvisation and planning, emerge from and are shaped by a network of interconnected practices (Nicolini, 2009), where organizational boundaries become blurred and everything depends on the sequence of daily practices (Nicolini, 2013). By adopting this approach, we can better understand the complexity of the interaction between these two concepts, which encourages us to look beyond the moment when the organization improvises and consider the upstream phases as well. The aim is to build a representation of the relationship between the improvised and planned components of responses, while determining when improvisation begins and ends.

5. A research agenda to explore the practical side of planning and improvisation

The previous section introduced the practice-based approach as a valuable framework for exploring the relationship between improvisation and planning, though it remains underutilized in current literature. Significant gaps persist regarding the practical aspects of improvisation and its connection to planning. This article proposes three research avenues to advance the practical understanding of their interaction.

5.1 The need for extended scope of investigation: going beyond response to preparation

In contexts of high uncertainty and imminent threats, the literature consistently highlights the complementary nature of improvisation and planning. Planning provides a structured framework, while improvisation enables rapid, creative adaptation to formulate an appropriate response and build resilience. This complementarity has been widely studied in the response phase. For example, (Milagres et al., 2024) point out that organizational actors demonstrate a great capacity to improvise and make sense of their actions in the moment. However, the resources and practices do organizations cultivate prior to a crisis can influence the integration of improvisation and planning during the emergency. Studying their interaction through integrative mapping could provide a better understanding of how these seemingly opposing elements interact to foster organizational resilience in industrial crises.

5.2 The need for a more in-depth investigation: exploring the integration of improvisation in plans

Several studies highlight different approaches to designing flexible plans and procedures, emphasizing the integration of both planning and improvisation. Additionally, research has explored how improvisation can be incorporated into plan development (Nesse et al., 2024), advocating for less top-down and bureaucratic structures. However, how improvisation is actually integrated into crisis response plans remains poorly understood. This gap leads us to ask the following questions: What is the formal integration of improvisation into industrial crisis response plans? To what extent can improvisation be explicitly mentioned in crisis preparedness? And what is the level of acceptance of improvisation within organizations and among their members? Furthermore, from a practical perspective, the limited understanding of how individuals responsible for planning systematically integrate improvisational practices into their processes highlights the need for further research in this area.

5.3 The need to go beyond complementarity: Discovering the boundaries of improvisation

Recent research suggests that prior knowledge of tasks and objectives enables managers and staff to engage in improvisation (Oscarsson & Danielsson, 2018). This underlines the importance of plans as tools that guide individuals in improvisation. However, the literature lacks clarity regarding the distinction between planned and improvised actions. Determining when improvisation begins and ends remains ambiguous, and understanding how actors operate beyond predefined plans while maintaining alignment with organizational goals presents an ongoing challenge. To address this gap, we pose the following questions: What are the boundaries of improvisation? How can limits be established to ensure that organizational members remain attentive to predefined plans? Investigating these questions will contribute to a deeper understanding of improvisation in crisis management, demonstrating how it can not only complement but also enhance the overall effectiveness of response efforts and strengthen organizational resilience.

5.4 Contributions

The contribution of this research is twofold, encompassing both theoretical and practical dimensions. From a theoretical point of view, it improves our understanding of the interconnection between improvisation and planning in the context of industrial risk management. It offers new insights into how these two elements, often seen as opposites, can complement each other to strengthen organizational resilience, while shedding light on the mechanisms by which organizations adapt to unforeseen events. From a practical point of view, this research contributes to the development of new training programs that highlight the central role of improvisation in crisis management. These programs will enable organizations to prepare more effectively for emergencies by integrating improvisation into their response strategies, giving them the tools to react more flexibly and efficiently when pre-established plans become unworkable.

6. Conclusions

This study addresses the importance of improvisation in crisis management, particularly when real-time responses are required. It aims to examine the impact of improvised actions on the execution of existing crisis management plans. The literature review reveals a dichotomy: while many scholars contend that improvisation and planning are at odds, others argue that improvisation plays a significant role in bridging the gap between pre-established plans and the realities of a crisis. In this paper, we propose that planning and improvisation are two complementary activities that cannot be studied separately. Furthermore, we argue that by combining improvisation and planning, organizations can enhance their resilience. In other words, the integration of these two activities can be considered a catalyst for improving organizational resilience and effectiveness. Finally, we propose three potential avenues of research aimed at deepening our understanding of the interplay between planning and improvisation. By exploring these research directions, we seek to provide new insights into how organizations can effectively integrate both elements to navigate crises more efficiently.

Acknowledgments

I would like to express my gratitude to everyone who contributed to this research. This thesis is part of the RESCUE project, which is funded by the Agence Nationale de la Recherche (ANR).

References

- Adrot, A. (2023). 'Not Too Good to be True': A Proposal to Further Benefit from Emergence in Management Research. *M@n@gement*, 85-94. <https://doi.org/10.37725/mgmt.2023.9390>
- Barton, M. A., Christianson, M., Myers, C. G., & Sutcliffe, K. (2020). Resilience in action : Leading for resilience in response to COVID-19. *BMJ Leader*, 4(3), 117-119. <https://doi.org/10.1136/leader-2020-00026>
- Boin, A., & McConnell, A. (2007). Preparing for Critical Infrastructure Breakdowns : The Limits of Crisis Management and the Need for Resilience. *Journal of Contingencies and Crisis Management*, 15, 50-59. <https://doi.org/10.1111/j.1468-5973.2007.00504.x>
- Cook, B. R., & Lourdes Melo Zurita, M. D. (2016). Planning to learn : An insurgency for disaster risk reduction (DRR). *International Journal of Disaster Risk Reduction*, 19, 265-272. <https://doi.org/10.1016/j.ijdrr.2016.08.022>
- Cordova-Pozo, K., & Rouwette, E. A. J. A. (2023). Types of scenario planning and their effectiveness : A review of reviews. *Futures*, 149, 103153. <https://doi.org/10.1016/j.futures.2023.103153>
- Cowley, C., Denyer, D., Kutsch, E., & Turnbull James, K. (2021). Constructing Safety : Reconciling Error Prevention and Error Management in Oil and Gas and Petrochemical Operations. *Academy of Management Discoveries*, 7(4), 554-580. <https://doi.org/10.5465/amd.2019.0190>

- Crossan, M. M. (1998). Improvisation in Action. *Organization Science*, 9(5), 593-599. <https://doi.org/10.1287/orsc.9.5.593>
- Cunha, M. P., Clegg, S., Rego, A., Giustiniano, L., Abrantes, A. C. M., Miner, A. S., & Simpson, A. V. (2022). Myopia during emergency improvisation : Lessons from a catastrophic wildfire. *Management Decision*, 60(7), 2019-2041. <https://doi.org/10.1108/MD-03-2021-0378>
- Cunha, M. P. E. (2005). Bricolage in Organizations. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.882784>
- Cunha, M. P. E., Gomes, E., Kamoche, K., Mair, J., Miner, A., & Tarba, S. (2022). Improvisation, strategy, and strategic improvisation in emerging markets. *European Management Review*, 19(3), 349-356. <https://doi.org/10.1111/emre.12543>
- Eriksson, K., & McConnell, A. (2011). Contingency planning for crisis management : Recipe for success or political fantasy? *Policy and Society*, 30(2), 89-99. <https://doi.org/10.1016/j.polsoc.2011.03.004>
- Flach, L. (2014). Use or Abuse of Improvisation in Organizations? *Creativity and Innovation Management*, 23(4), 374-385. <https://doi.org/10.1111/caim.12087>
- Ghasemi, F., Kalatpour, O., Salehi, V., & Omid, L. (2024). Why are emergency responses ineffective and inefficient? Lessons learnt from past events. *Journal of Loss Prevention in the Process Industries*, 90, 105335. <https://doi.org/10.1016/j.jlp.2024.105335>
- Grøtan, T. O., Størseth, F., Rø, M. H., & Skjerve, A. B. (2008). Resilience, Adaptation and Improvisation.
- Guarnieri, F. (2017). The Fukushima Daiichi Nuclear Accident : Entering into Resilience Faced with an Extreme Situation. In J. Ahn, F. Guarnieri, & K. Furuta (Éds.), *Resilience : A New Paradigm of Nuclear Safety* (p. 1-17). Springer International Publishing. https://doi.org/10.1007/978-3-319-58768-4_1
- Kendra, J., & Wachtendorf, T. (2003). Creativity in Emergency Response to the World Trade Center Disaster.
- McConnell, A., & Drennan, L. (2006). Mission Impossible? Planning and Preparing for Crisis1. *Journal of Contingencies and Crisis Management*, 14(2), 59-70. <https://doi.org/10.1111/j.1468-5973.2006.00482.x>
- Meshkati, N., & Khashe, Y. (2015). Operators' Improvisation in Complex Technological Systems : Successfully Tackling Ambiguity, Enhancing Resiliency and the Last Resort to Averting Disaster. *Journal of Contingencies and Crisis Management*, 23(2), 90-96. <https://doi.org/10.1111/1468-5973.12078>
- Milagres, R., Bernardes, M. E. B., & de Carvalho, R. B. (2024). Sense and Action : Organizational Reactions in Extreme Crisis: A Survey With Brazilian Executives. *Journal of Contingencies and Crisis Management*, 32(4), e70010. <https://doi.org/10.1111/1468-5973.70010>
- Miner, A. S., Bassof, P., & Moorman, C. (2001). Organizational Improvisation and Learning : A Field Study. *Administrative Science Quarterly*, 46(2), 304-337. <https://doi.org/10.2307/2667089>
- Moorman, C., & Miner, A. S. (1998a). Organizational Improvisation and Organizational Memory. *The Academy of Management Review*, 698-723.
- Moorman, C., & Miner, A. S. (1998b). The Convergence of Planning and Execution : Improvisation in New Product Development. *Journal of Marketing*, 62(3), 1-20. <https://doi.org/10.2307/1251740>
- Nesse, S., Schei, V., & Mitroff, I. (2024). Collective response capacity : Developing crisis leadership in organisations. *Journal of Contingencies and Crisis Management*, 32(3), e12612. <https://doi.org/10.1111/1468-5973.12612>
- Nicolini, D. (2007). Stretching out and expanding work practices in time and space : The case of telemedicine. *Human Relations*, 60(6), 889-920. <https://doi.org/10.1177/0018726707080080>
- Nicolini, D. (2009). Zooming In and Out : Studying Practices by Switching Theoretical Lenses and Trailing Connections. *Organization Studies*, 30(12), 1391-1418. <https://doi.org/10.1177/0170840609349875>
- Nicolini, D. (2013). *Practice Theory, Work, and Organization : An Introduction (First Edition)*. Oxford University Press.
- Nicolini, D., & Monteiro, P. (2016). The Practice Approach : For a Praxeology of Organisational and Management Studies. In A. Langley & H. Tsoukas, *The SAGE Handbook of Process Organization Studies* (p. 110-126). SAGE Publications Ltd. <https://doi.org/10.4135/9781473957954.n7>
- Oscarsson, O., & Danielsson, E. (2018). Unrecognized crisis management—Normalizing everyday work. *Journal of Contingencies and Crisis Management*, 26(2), 225-236. <https://doi.org/10.1111/1468-5973.12176>
- Rankin, A., Dahlbäck, N., & Lundberg, J. (2013). A case study of factor influencing role improvisation in crisis response teams. *Cognition, Technology & Work*, 15(1), 79-93. <https://doi.org/10.1007/s10111-011-0186>
- Roud, E. (2021). Collective improvisation in emergency response. *Safety Science*, 135, 105104.
- Weick, K. E. (2024). Mann Gulch Revisited : Improvisation as a Surface of Apprehension. *Academy of Management Discoveries*, 10(1), 7-10. <https://doi.org/10.5465/amd.2024.0006>
- Wiedner, R., Croft, C., & McGivern, G. (2020). Improvisation during a crisis : Hidden innovation in healthcare systems. *BMJ Leader*, 4(4), 185-188. <https://doi.org/10.1136/leader-2020-000259>