Chapter 2
Contracting and Safety: Lessons from Observing an Outsourcing Process "in the Making"

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Abstract Drawing from an inductive study at a nuclear plant, this chapter provides insights about an outsourcing situation that is barely studied in the literature, i.e. an outsourcing process (1) "in the making" of (2) a production activity. We highlight how practical, professional and contractual arrangements are elaborated throughout the progressive transfer of the activity. We discuss, from a situated perspective, the positive and negative effects of outsourcing in the short term and draw attention to key lessons for ensuring safe industrial performance in the long term.

Keywords Outsourcing process · Production activity · Nuclear · Practice-based approach

2.1 Introduction

In a practice-based approach, safety is defined as "*a collective knowledgeable doing*" [10]. Far from being a state established once and for all, it is built through a dynamic process and "*performed in, by and through safety practices*" [9] realised by workers with different occupations, skills and responsibilities. Work in contemporary organisations is more and more distributed, not only within organisational boundaries, but beyond them, as a result of increased outsourcing and a greater use of contracting out [22]. In this context, and following the practice-based approach, ensuring safety or maintaining safe practices is a collective endeavour in which actors, who belong not only to different communities of practices but to different organisations, are involved.

Looking at the literature on outsourcing and safety, we find that the vast majority of studies identify a negative link between safety (either occupational or process) and contracting. In the oil and gas sector, Hayes and McDermott [13] have shown the potential adverse safety outcomes of subcontracting, due to trade-offs on safe work practices, in order to increase some aspect of industrial performance (project deadlines and profit). Similar findings, which emphasise the tensions and vulnerabilities

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arising from the use of contracting out, have been observed in the nuclear industry [23]. In aviation also, Bağan and Gerede [1] highlight the hazards associated with outsourcing due to cost and time pressures on contractors. Contracting has also been highlighted as a possible cause of incidents [20] and even accidents, e.g. Deepwater Horizon [12]; Challenger [24]. Among the activities that are contracted out, maintenance is one of the most common, which is often justified by the fact that it falls outside of the core competencies of firms. Paradoxically, it is also an activity known for being directly linked to safety.

Yet, most of the research undertaken has not examined the way in which work is actually performed when part or all of an organisation's activities are contracted out. In fact, existing research generally examines the organisational configurations in which activities are contracted out over a period of time, meaning that the activities therein have stabilised and routines put into place. Developing an understanding of the process in which activities are contracted out per se, i.e. the way in which outsourcing is established in the first instance, appears to be a blind spot in the literature.

The researchers of the present chapter are well placed to address this gap, having the opportunity to observe the contracting out of a production activity within a high-risk organisation. Drawing from an inductive study of one production workshop in a nuclear plant, the objectives of this research are to answer the following questions:

- How is the outsourcing of a production activity performed?
- How does outsourcing affect safe industrial performance?
- What pitfalls or good practices may be revealed through the observation of an outsourcing process in the making?

2.2 Outsourcing, Contracting Out and Safe Industrial Performance

The 1970s were characterised by an upward trend in outsourcing, which was consistent with the strategy of organisations to focus on their core businesses. With the decision to "make or buy", contracting out became the adjustment factor: adjusting the production capacity or adjusting the type of activity that should be done internally or externally. In the 1980s, this strategic movement became more prevalent with the development of labour flexibility (part-time jobs, short contracts, etc.) and the development of inter-organisational relationship models [16]. The increased use of contracting in almost every industry raises the question of the relationship between outsourcing and industrial performance.

The performance induced by a decision to contract out activities is correlated with an organisation's capacity to protect its strategic resources and competencies to sustain a competitive advantage [2, 26]. According to the resource-based view, the impact of outsourcing on organisational performance depends on how organisations are able to outsource efficiently. According to Barthélemy [3], organisations should

avoid the "deadly sins" of outsourcing such as contracting out activities that should not be, selecting the wrong (sub)contractor, establishing a poor contract, overlooking personnel issues, losing control over the outsourced activity, overlooking hidden costs and failing to plan an exit strategy.

The relationship between outsourcing and industrial performance is thus complex, and contracting out is not necessarily synonymous with increased performance [14]. It may improve performance depending on whether there are contractual difficulties related to the appropriation of a proprietary technology, the cost measurement, and the interdependencies between outsourced and internal activities. In summary, there is no direct relationship between performance and outsourcing. This depends on firms' ability to develop competitive advantages by adapting to market conditions [6]. In high-hazard settings such as the nuclear industry, the ambiguous relationship between outsourcing and industrial performance cannot be considered separately from safety requirements.

With regards to Occupational Health and Safety (OHS), most studies highlight the negative impact of outsourcing on workers [19]. For example, an Australian study shows that contracted workers have a mortality rate over twice that of employee workers [17]. This rate can be explained by the fact that the most hazardous activities are often left to (sub)contractors. Moreover, outsourcing increases the complexity of work organisation—multiple stakeholders from different organisations, compartmentalisation of activities, co-activities, poor communication, etc.—and tends to lead to work intensification due to economic pressure and competition between subcontractors [17]. In addition, (sub)contractors are not necessarily qualified or well informed about risks [8]. In the French nuclear industry, contract workers absorb 80% of all radioactive doses received during maintenance activity [23]. The fragmentation of activity between the industrial operator and (sub)contractors hinders the measurement of work accidents [7].

Beyond OHS, establishing a causal link between the increasing use of subcontracting and a negative impact on safety is complex [20]. Maintenance in civil aviation and in the nuclear sector has been extensively studied. For example, Belobaba et al. [4] demonstrate the absence of statistical significance between contracting out and safety in civil aviation maintenance. However, outsourcing tends to generate "latent failures" [21]. Notably, increased cost pressures can lead to dangerous practices [1]: lack of training or skills, poor information about risks, co-activity, etc. By increasing work distribution, outsourcing exacerbates the problem of managing interdependencies and interfaces [11], which is crucial for safety since most risks lie at the interstices [5]. Both the principal organisation and (sub)contractors must manage these problems. In the French nuclear industry, the Environment Act prohibits delegating the responsibility for safety to a contractor. Industrial operators must monitor safety–critical activities when they are contracted out and ensure that contractors have the necessary technical skills to carry out these activities.

High-hazard organisations cannot favour performance at the expense of safety or vice versa. On the contrary, they have to simultaneously meet safety and industrial performance requirements, and outsourcing may impact both dimensions. Yet, as exhibited above, most studies focus on one dimension or the other. Our chapter goes

some way to addressing this gap by considering the link between outsourcing a core activity (in this case, production) and "safe industrial performance". As stated by Journé and Tillement [15], "[t]his concept aims to put emphasis on the articulation between the safety goal and the other industrial goals by focusing on the processes, actors and objects that make this articulation possible under good conditions."

With regard to the above, we aim to understand this articulation by studying a contracting out process in the making, through a practice-based lens [10]. This involves paying particular attention to collective working practices developed by all stakeholders engaged in the outsourcing process whether this is the principal or the contractors and to their interactions and arrangements. In the next section, we highlight some important findings drawn from a case study in a nuclear plant.

2.3 The Trajectory of an Outsourcing Process in a Nuclear Plant

Our findings are drawn from an inductive study conducted at NucCo (a pseudonym) in close collaboration with industry practitioners, an arrangement which provides a unique opportunity to gain long-term access to the field. NucCo is a nuclear plant that specialises in radioactive waste processing. This very large, complex and tightly coupled [18] organisation faces the challenge of managing safety–critical activities. Yet, its safety objectives cannot be achieved at the expense of industrial performance (and vice versa). Approximately half of the personnel working for NucCo are contractors. Work is distributed between several workshops, which are all interdependent with regard to the waste treatment chain.

Fieldwork is conducted in one of these workshops, hereinafter referred to as W', dedicated to the collection and conditioning of waste from the other workshops. More specifically, we focus on the production activity, which consists of managing the conditioning and storage of waste packages depending on their radiological properties. NucCo decided in 2016 to outsource production of W', and this activity was officially transferred to the contracting firm at the beginning of 2019.

The main objective of our case study is to analyse an outsourcing process in the making. Consequently, neither the work situations nor the formal and informal relationships and arrangements are well established or have stabilised. Observing this process is an excellent opportunity to understand good practices and pitfalls when outsourcing an activity. More importantly, the authors negotiated from the beginning to have similar levels of access and proximity to the workers of the principal and contracting companies in order to analyse both sides of this outsourcing project.

Through a dynamic and situated approach, we collected data through observation (work in the control room, planning meetings, operational meetings) and interviews with both the employees of the principal and of the contractor. This study enables us to examine, throughout the outsourcing process, the evolution in the nature and quality of interactions between the workers of both companies, how work is performed,

how contractual arrangements are negotiated and how this affects safe industrial performance.

2.3.1 The Issue of Defining Precisely the Outsourced Activity from the Beginning

Our study first reveals an incomplete characterisation of the activity to be outsourced from the very beginning. When top management decided to outsource this activity, it was based on the (partially flawed) assumption that this activity was simply about managing waste, similar to a nuclear clean-up. This definition led them to choose a contractor that had developed this area of expertise and was already working in other workshops of the plant. Yet, as the outsourcing process was unfolding, they realised that the activity was more about workflow management than clean-up, and thus about ongoing operations rather than one-off interventions. With the facilities being more and more monitored directly by the operators of the contractor, they found themselves confronted with volatile and unstable work, a situation far removed from the repetitive and routine job that was initially envisioned. They realised that the practices, associated knowledge and skills needed to manage the production activity safely and efficiently differed from those envisaged initially. This led to twofold tensions between the principal and the contractor: occupational and contractual. On a professional basis, the workers had to collectively engage in a process aimed at redefining the outsourced activity. This required rethinking the occupational roles of the operators and management staff of both the contractor and the principal, and to circumscribe their respective field of responsibilities. This had to be translated into contractual terms, leading to renegotiations of the initial contract to formalise the responsibilities and tasks of the external company to properly reflect the real activity.

More importantly, our study reveals how the workers had to progressively adapt their practices, both formal and informal, when confronted with the reality of the required activity. These practices have direct effects on safe industrial performance. This is detailed in the next section.

2.3.2 The Trickle-Down Effects of Outsourcing on Safe Industrial Performance

Our study suggests a nuanced vision of the link between outsourcing, safety and industrial performance.

Throughout the outsourcing process, the necessary practices and skills (largely informal and tacit) for carrying out production are gradually transferred from former internal operators and managers to the new external ones. This is supported by formal practices (writing or update of operating procedures) and more informal ones,

notably inter-organisational forms of mentoring between experienced operators and newcomers. Paradoxically, this can be seen as a positive effect of outsourcing, as it precipitates a process whereby previous forms of normalised and often opaque or undiscussed "ways of doing" are revealed and questioned. The actors engage in collective discussions regarding these practices, with two possible outcomes. Firstly, the previous or inherited practices may be labelled as forbidden in the context of contracting out. Or, the practices may be authorised: in that case, they are formalised in operating procedures. In both cases, the contract is modified to formalise the agreement on the new scope of responsibilities of the contract workers.

Yet, as it is still not possible to anticipate and prescribe solutions for every possible event, vigilance in the management of "grey" areas should still be applied. Conducting work safely and efficiently requires the organisation to engage in an ongoing search to achieve a balance between control and autonomy. These tensions translate into two different, yet required, forms of commitment: contractual and professional. The second is linked to tacit knowledge and experience as acquired through confrontation with the materiality of installations. Acquiring autonomy is thus a long-term endeavour for contractors.

2.4 Conclusion: Lessons Learned

Our practice-based approach of studying an outsourcing process in the making enables a nuanced view of the link between outsourcing and safe industrial performance. It offers insights into the organisational and professional conditions that affect the positive or negative impact of outsourcing on safety and industrial performance. Finally, several lessons can be drawn from this case study with regard to enhancing safe industrial performance when outsourcing core and risky activities.

2.4.1 Lesson 1: A Correct Assessment of the Nature of an Activity Before Outsourcing Is Essential

As obvious as it may seem, it is of major importance to precisely assess the nature of the activity that a firm wants to outsource. In practice, this is not an easy task. As highlighted by Perrow [18] in his analysis of error-inducing systems, the "elites", in our case those who actually make the decision to contract out, are often far removed from the production or operating system and thus have incomplete knowledge of the actual work carried out by the actors in the field. Precisely assessing the nature of the activity (and the concrete practices and tacit knowledge that its execution requires) demands a full appreciation of relevant operations [25]. In a situation where the system is not fully in place, engaging with and seeking feedback from those who

monitor, on a daily basis, the current state of the system and the related operations and practices that occur, is essential.

2.4.2 *Lesson 2: Hidden Temporalities and Embracing Distant Past and Future Are Key in the Contracting-Out Process*

Our study highlights the importance, but also the difficulty, of taking into account the hidden temporalities during an outsourcing process. These hidden temporalities are directly correlated with the nature of the outsourced activity. They refer to the distant past (informal practices that have been normalised and have become largely invisible and tacit over time), to the uncertain future of the acquisition of skills and knowledge and to the discrete timeframe of the present activity, which, in large part, consist of managing for the unexpected which cannot be fully planned for. These hidden temporalities, although essential to the efficient and safe performance of the activity, are difficult to integrate into the contractual logic that dominates any outsourcing process.

2.4.3 *Lesson 3: Contracting Out Is a Dynamic Process, Which Requires Heedful Interactions Between Principal and Contractor in the Long Term*

An outsourcing process is fundamentally dynamic. Far from being a simple task of moving directly from state A to state B, it requires processes that enable the transmission of skills and the renegotiation of practices and professional roles, which are necessarily built collectively and over a long period of time. The quality of interactions between management and the operators, and between the employees of the principal and the contractor, is key to maintaining vigilance throughout the process and reaching an agreement on good practices and the jurisdiction of each actor.

The situation that we observed (i.e. when production was being outsourced) does not allow us to deduce what the future situation will be. Ensuring safe industrial performance in an outsourcing context is an enduring endeavour, and vigilance should be maintained in the long term. At the time when the activity is outsourced, the transfer of activity is vigilantly monitored and supported by mentoring practices and formal meetings and evaluation. They reveal and enable us to collectively discuss the validity of practices that may have been out of step and largely opaque until then. Yet, as Vaughan [24] has shown, it is maybe when things tend to stabilise that a process of normalisation of deviance can gradually take place. Heedful interactions and discussions between the principal and the contractor should be maintained in the

long term, else there will be a risk that forms of organisational blindness occur as a result of the long-term effects of organisational transformations.

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