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► To cite this version:

Constance Guers, Christophe Martin, Jean-Luc Wybo. The impact of the use of subcontracting on organizational reliability and safety. 24th European Safety and Reliability Conference - ESREL 2014, Sep 2014, Wroclaw, Poland. pp.1027-1035 - ISBN 9781138026810. hal-01063681

HAL Id: hal-01063681

<https://minesparis-psl.hal.science/hal-01063681>

Submitted on 22 Oct 2014

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The impact of the use of subcontracting on organizational reliability and safety

C. Guers, C. Martin & J.L. Wybo

Centre for research on risks and crises (CRC), Mines ParisTech, Sophia Antipolis, France

SUMMARY: Subcontracting has become very widespread in contemporary socio-technical systems. It takes many forms and leads us to think again about the nature of the workforce. This article takes a new look at organizational boundaries in terms of the concept of businesses that are extended through subcontracting and its implications for safety culture. First we present a comprehensive, state of the art typology of the current forms of subcontracting, which have been developed to meet the needs of productive organizations. Then we focus on the effects of this type of indirect management on the effectiveness and reliability of organizations and more specifically, the workforce.

1 INTRODUCTION

Since the beginning of the twentieth century, we have seen a change in the way businesses are organized. Until the end of the 1970s an integrative model dominated. Under this model companies themselves were responsible for most of the manufacturing of the final product and all production functions were integrated. In the early 1970s, companies became large corporate networks (a multi- or poly-cellular model). The contracting company headed the network; it was only responsible for a very limited part of production/manufacturing and was surrounded by a network of suppliers/ partners.

This new model can be seen as offering the best prospects in an increasingly unstable economic context. Nowadays it takes many forms: the extended organization (Benchimol 1993; Capraro & Baglin 2002; Perez 2007; Defelix & Picq 2013), the fragmented organization (Hatzfeld 2000; Berger 2005), the network organization (Veltz 2000; Roy & Audet 2002; Rorive 2005; Morley 2005; Mazaud 2006; Pesqueux 2008), the shared organization (Abdul-Nour, Jacob, Julien & Raymond 2003), the enhanced organization (Moreau 2003) or the agile organization (Barrand, Gumb, Badot, Benameur, Blum *et al.* 2010). These new forms are all examples

of not only a more flexible and efficient organization, but also new organizational boundaries, a new way of occupying space and new governance mechanisms. They consist of a national and international exterior space and an internal space that is fragmented due to the diversity of actors and skills. In this kind of organization, production is distributed in an orderly manner between partner companies.

These changes in the way businesses operate are fundamentally changing the organization. They are likely to accentuate certain types of organizational risks related to the management of a fragmented workforce distributed across a network, and extended by a constellation of actors (subcontractors, co-contractors or partners). It is important to understand these new organizational forms in order to be able to better predict these changes and anticipate the risks associated with them. The internal organization of a company can become a source of threat. Organizational reliability is based on the strategies of actors who shape production on a daily basis given the organizational constraints they face. In this context, this article examines how the constraints faced by the extended organization can be a source of reliability or risk. The aim is to help organizations that have decided to use subcontractors to improve reliability, and control

safety- and security-related risks in the context of relevant research, particularly management systems.

Specifically, we ask how the strategies implemented by individuals shape the efficiency, reliability or risk of extended productive organizations. In the first part of the article we define subcontracting, its different forms and motivations. In the second part we define the extended organization, its characteristics and the risks that are associated with it. Finally, we show the impact of this ambivalent mode of organization on the effectiveness and reliability of the workforce.

2 SUBCONTRACTING

There is no question that subcontracting is one of the key characteristics of the operation of these new productive organizations and the subcontractor can be thought of as a fully-fledged actor in the system. While the phenomenon of subcontracting is not new, its popularisation is. This phenomenon means two things: On the one hand it has become both widespread and commonplace; the subcontractor cascade has become common practice in many companies. On the other hand it has been extended into a growing number of business operations. In the 1970s it concerned simple tasks such as cleaning and security; since the 1980s it has extended in some companies to the entire production process (the hollow firm). The internal organization and working conditions of companies in many sectors have thus completely changed.

2.1 *Subcontracting and outsourcing*

Subcontracting is one form of outsourcing. A report by the French Social and Economic Council distinguishes between subcontracting and outsourcing in terms of the length of the relationship and the transfer of ownership (activity substitution), “It could therefore be said that subcontracting, unlike outsourcing, partially concerns the provision of a service in a given time and not necessarily over many years and – most importantly – does not imply that the activity was previously undertaken internally. Outsourcing is further distinguished from subcontracting in that it tends to lead to long-term change (by subtraction from the original company to an economic third party) in the boundaries of the company and the structural configuration of its resources. It could be called a ‘contractualised’ and ‘monetised’ handover of a function or activity

previously included in the internal mode of governance.”¹

The concept of semi-integrated subcontracting (Houssiaux 1957) is based on the principle of substitution and the transfer of ownership of a specific piece of work; however it implies that there are ongoing and stable links. According to Barthélemy (2007, p. 12), the difference between subcontracting and outsourcing is based on the obligations of the service provider. Outsourcing is based on an obligation to provide results; the service provider takes entire responsibility for the management of the outsourced activity. In the case of subcontracting, the client is responsible for the management of the outsourced activity and the service provider merely provides production resources. Nevertheless, subcontractors are also obliged to produce results, and can be seen as the intervention of an external agent on at least three levels: the definition of work, its resources and the procedures put in place to achieve a specified outcome. In some cases, highly-qualified subcontractors may participate in drawing up specifications (Chaillou 1977).

Nevertheless, the difference between outsourcing and subcontracting remains ambiguous. Inter-company links are varied and in many cases go beyond official definitions, which give an incomplete picture of labour relations, “a little like concrete can mask the girders it supports” (Jounin 2006). In a very general and basic way, we define subcontracting² as an operation that consists, for a company A, of the delegation to a company B of a task or a function that Company A does not want to or cannot undertake itself.

2.2 *The various forms of subcontracting*

In order to understand the different forms that subcontracting can take within organizations, Chaillou (1977) proposed a typology, in which time is a fundamental characteristic for understanding the relationship between businesses. He distinguishes short-term subcontracting (comparable to occasional, cyclical troubleshooting) and long-term

¹ Social and Economic Council (*Conseil économique et social*), *Conséquences sur l'emploi et le travail des stratégies d'externalisation des activités*, The Official Journal (*Les éditions des journaux officiels*), 2005, p.92

² The French law of 31 December 1975 defines subcontracting as “the operation by which a business entrusts, through a subcontract and under their responsibility, to another person called a subcontractor, all or part of the execution of a business contract or a public tender concluded with the client.”

activities that can be compared to permanent, structural or semi-integrated subcontracting that is more akin to outsourcing (Houssiaux in Baudry 2013). The contract frames the length of the relationship between the client and the subcontractor.

At the same time, it is vital to identify areas where subcontracting can be used: on-site, internally or externally. External subcontracting may be local or abroad, known as offshore or delocalized outsourcing (Niang 2013). This practice runs the risks found in both outsourcing and offshoring (Geyer 2007) – loss of control and ownership of one or more delegated activities. In this case, it is up to the organization to decide whether it is in its interests to expand its borders. Ponnet (2011) also distinguishes between the activities carried out on the contractor's premises and those performed externally. She noted that maintenance work is semi-integrated and carried out at the contractor's production facilities.

In cases where subcontracting is carried out in the organization's country of residence, it is more like classical subcontracting or nearshore outsourcing (Quelin 2007).

When the work is carried out onsite by a foreign contractor, and the subcontractor's company is located in a different country to that of the client, the term onshore outsourcing is used (Samaganova 2008). *In situ* subcontracting is also subject to risk. Jounin (2006) gives examples of field observations where employees of various local companies coexist and work together to achieve the same production objectives. This is an illustration of a constellation of actors where the new interactions fundamentally change the organization's reliability, the division of work and teamwork modalities.

Although subcontracting practices vary from one organization to another, there are two main scenarios that are widely used. In the first scenario the company does not have sufficient production resources and therefore delegates certain functions that cannot be undertaken internally. This is known as 'speciality' subcontracting, where the contractor calls upon a specialist who has the equipment, materials and expertise that meets the needs of the purchaser, because the latter does not have or may not wish to acquire them, for their own strategic reasons³. Specialty subcontractors or specialised

suppliers (Houssiaux in Baudry 2013) carry out specific operations using their own methods. Their activity is complementary to that of the organization. In the same vein, Barthélemy and Donada (2007) argue that companies are motivated by rapid access to resources and skills that are not available internally. It allows the organization to focus on its main activity (Mazaud & Lagasse 2009) and to delegate ancillary activities. Specialization is subjective and varies depending on the organization as, "their point of reference is their own technical ability" (Chaillou 1977). A specialist is someone who is as (or more) capable than the company itself, while others are seen as 'capacity' subcontractors (see below). Chaillou differentiates specialty subcontracting from 'supply' subcontracting which concerns, "the definition and study of methods to be used to perform a given piece of work." This type of subcontracting involves a high degree of specialization that makes it possible to define functions on the basis of specifications that target a specific need of the client company. This enables the client company to optimize its internal resources.

In the second scenario, the company is able to produce the good or service itself, but instead it delegates the work. This is called 'capacity' subcontracting. In this case, the contracting company, which can produce the product itself, employs another company (either occasionally due to a temporary spike in production or technical problem or on a more or less ongoing basis) because it wants to maintain its own capacity through the use of external production capacity⁴. These capacity subcontractors can also be called consignment manufacturers (Houssiaux in Baudry 2013); they perform simple tasks as directed by the contracting company or client and very often their activities compete with that of the organization.

Although in theory there are several types of subcontracting, in practice it is difficult to identify them. According to Jounin (2007), in the public construction sector, the boundary between capacity subcontracting and specialty subcontracting is blurred. For example, subcontracting in building industry activities is mainly based on workers and intermediate consumption, "some of the girders are supplied by the contractor, while their main tools are

the application of the *Nomenclature d'Activités Françaises* on 1 January 2008 (second revision), in the manufacturing sector primary contractors *sensu stricto* are only those who provide raw materials. Conversely, subcontractors *sensu stricto* are only those who receive raw materials.

⁴ INSEE definition (op. cit.)

³ The French National Institute for Statistics and Economic Studies (INSEE) definition is as follows: Following

supplied by the general business” (such as the crane). In this case, Houssiaux talks about ‘community’ subcontracting, in which the activity, the execution of work or the finished product are collective.

Variable	Weight		
	Short	Moderate	Long
Duration of the activity of the subcontractor	Short	Moderate	Long
Place where the subcontractor carries out work	External	Intermediate	Internal
Share of the activity in the organization	Small	Average	Significant
Nature of the subcontracting activity	Simple and substitutable	Average	Complex, non-substitutable
Place of the subcontractor in the production process	Supply – intermediate production – final production		

Table 1: The various forms of subcontracting

2.4 Motivations for the use of subcontracting

We have highlighted the different forms of subcontracting, which correspond to the different needs and strategies of organizations. According to Houssiaux (in Baudry 2013) capacity subcontracting is mainly used to reduce or limit production costs. Business owners can create competition between different service providers to get better rates. This idea is not new; Williamson in 1975 looked at corporate collaboration through market relations from an economic point of view. Transaction costs theory (Ghertman 2003) argues that the organization chooses between doing things themselves, or having them done, depending on the cost of acquiring a product or service on the market compared to the cost of internal production. Barthélemy and Donada (2007) noted that the use of subcontracting allowed organizations to be more flexible by transforming fixed costs into variable costs, which made it easier for them to cope with market fluctuations. According to Quélin and Duhamel (2002) the economic factor is closely related to the quality function. A company delegates not only for reasons of quality and efficiency, but also cost. For some companies in some cases, subcontracting is primarily explained by performance issues in the workplace. Finally, subcontracting can be a way to

transfer risks and responsibilities associated with production to a third party. Statistics show that accidents occur more often among the employees of subcontractors (Algava & Amiras 2011) compared to the employees of contractors, but it must not be forgotten that some companies outsource their riskier activities, particularly in the industrial sector (Thébaud-Mony 2000).

Other organizations transfer social risks through subcontracting (Puech 2004; Barthélemy 2007, p. 67). In this case, it is a way to avoid excessively high social costs; the imposition of new constraints, loss of benefits, lower wages and lack of resources can result in disenchantment with the organization. Subcontracting can enable the company, in deteriorating market conditions, to take measures that have a negative impact on the subcontractor without having to deal with the consequences. This is not an intentional process, but an adjustment mechanism in response to market fluctuations.

In addition to these quantitative, qualitative and social advantages of subcontracting, we can add a further strategic and opportunistic motivation. These concern situations where the company is faced with uncertainty concerning the market or its products and wishes to test a company or its staff before integrating them or buying the company. In practice, although the extended, outsourced organization has become a dominant trend, other organizations are moving in the opposite direction and are seeking to strengthen their classical “hierarchical and pyramidal centralization” through internalisation policies (Veltz 2000). This raises the question of the acquisition of certain subcontractors. The motivations for the use of subcontracting are not always rational, and are likely to be the result of poor strategic choices. Subcontracting is by nature ambivalent. While it offers various benefits to the organizations and can form part of an extension strategy, this extension can sometimes be a disadvantage and pose a risk to production.

3 ORGANIZATIONS EXTENDED BY THE SUBCONTRACTOR NETWORK

Rorive (2005) provides a typology of six types of corporate network. Of these six, five are driven by the use of partners, suppliers, joint contractors, subcontractors or distributors. It could therefore be said that many organizations extend themselves through outsourcing, and more specifically subcontracting.

For Veltz (2000, pp. 174–175) the term corporate network is both overly polysemic and restrictive. He defines this new form of organization as “a network of cellular models” made up of “a relatively compact and traditional central core surrounded by a periphery of suppliers and distributors structured in successive layers.” Three elements characterize this type of organization and mark a break with the integrated organizational model: market-oriented decentralization, the contract and multi-functionality.

3.1 Market-oriented decentralization

Market-oriented decentralization concerns the distribution of activities across relatively autonomous units. These subsets are subject to strict targets coupled with the systematic evaluation of their results (rather than a precise definition of procedures). According to Veltz (2000) this management mode is a consequence of Taylorism where goals become more important than the means: “specialization according to goals and products impacts on specialization according to processes, resources and technical knowledge”. This phenomenon can be observed in many organizations and has spread to many industries. This market-oriented decentralization can be a risk for organizations. If goals are too general and vague, they must be broken down into operational and individualisable sub-goals (Simon 1983). Otherwise, individuals may take decisions that have an adverse impact on the organization and it becomes difficult to control the consequences. Herbert Simon (1983) points out that the goals and objectives of an organization can be perceived differently by different members of the organization and these different perceptions are likely to harm the overall coherence of these new organizations.

3.2 The contract

The increasing use of the contract is a fundamental element of the relationships between the different units in the cellular network organization. For Veltz (2000) the contract leads to “very diverse relationships, legal forms, styles and constraints”. He stresses that “‘hierarchy’ and ‘contracts’ are in no way antithetical” and takes the example of Japanese supplier chains. In these chains, the ability to mobilize networks of relationships is based on a clearly defined, prescribed hierarchy that forms the basis for the organization (Magaud & Sugita 1993).

An extension of the commercial function is found in new organizations through contracts that mobilise remote resources. The characteristic feature of this type of organization is that it is able to extend its scope for action while reducing its legal exposure. Many economists have highlighted the trend towards “vertical disintegration” (i.e. a reduction in direct production units legally owned by the company). This makes it possible to indirectly extend and share production by mobilising a network of actors and skills. This market-driven vertical disintegration usually involves a reduction of the salaried workforce and non-strategic or ancillary activities (such as administration, cleaning or security) for the lead company.

Demmou (2011) noted that there has been a significant decrease in manufacturing jobs since the 1980s. The partial outsourcing of industrial activities to the service sector explains 20–25% of the decrease in the salaried workforce⁵. On the other hand, market orientation and the use of contracts have encouraged the creation of “complex mini-businesses rather than divisions created along the lines of traditional functional departments” in organizations (Veltz 2000, p. 178). Contractual relationships become one of the keys to the expansion of the organization. Coase (1937, p.23) highlighted this point in other terms when he wrote, “a firm becomes larger as additional transactions (which could be exchange transactions co-ordinated through the price mechanism) are organized by the entrepreneur and becomes smaller as the abandons the organization of such transactions”. The contract, whether between two individuals or two companies, allows the organization to expand both on a spatial and skills level. However, it cannot alone organize collective action, contrary to what the transactional approach (also known as agency theory) suggests⁶.

There are a variety of mechanisms to coordinate production activities, the contract is not the only incentive mechanism (Baudry 1992). The mobilization of remote productive resources may pose management and control problems within the extended organization.

⁵ See Sauvy A., 1980. *La machine et le chômage*, DUNOD. The spillover theory argues that technical progress that improves productivity leads to a transfer (spillover) of jobs from one sector to another.

⁶ The contract is seen as simply the act of giving consent and takes no account of authority and dependency relationships.

3.3 Multi-functionality

The organization distributes distinct functions across its network of partners, suppliers, joint contractors, subcontractors or distributors. This is the case at Airbus Toulouse (France), which divides tasks between Airbus and its network of suppliers. Production processes are distributed across the manufacturer's internal sites. Airbus is the prime example of the "lead network firm"; it delegates its non-strategic sub-functions in order to focus on its core activities.

However, the firm also uses strategic, lead subcontractors, who play an intermediate role and use their own subcontractors. Mazaud and Lagasse (2009) found "a high degree of segmentation" in Airbus suppliers. There is a division of labour between the company leading the network and its network of suppliers. Few authors have looked at its modalities. This multifunctional character of the organization means that it can carry out several simultaneous activities, improve performance and be more responsive to the needs of its customers. One example is the cooperation model that Airbus operates with its suppliers, which enables it to simultaneously develop several aircraft at different sites. However, while this multi-functionality enables organizations to focus on their specialty, it can also, in certain cases, lead to the loss of skills and control of overall production (Nogatchewsky & Donada 2005; Barthélemy 2007 p. 65).

These three features (market-oriented decentralisation, the contract, multi-functionality) make it possible to characterise and understand ambivalence in organizations that are extended by subcontracting. Such organizations grow around a base unit or an autonomous decision-making centre, which structures activities and their deployment, and ensures the overall coherence of peripheral activities.

The base unit forms the foundation for all other activities. This central core lies at the heart of direct and indirect cooperation with a constellation of partners, who undertake functions designed to achieve an ultimate goal. According to Capraro and Baglin (2002), the extended business "has to set the standard for all partners in design and production excellence, which must unite the efforts of numerous partners to achieve shared success in the extended company." The extended organization must therefore develop the capacity to re-think itself and

quickly recompose itself in response to its environment and these new links.

We argue that one of the characteristics of the extended organization is that every action centre or mini-business forming the network has the potential to further extend the boundaries of the initial contractor, and to initiate new cooperation. Its potential extension, in terms of both skills and geography, is unlimited and can present risks. The strategic nature of the subcontractor cascade (shared responsibilities through a multiplication of subcontractors and contractors, the supply chain, value chain or overall logistics), which includes all of the actors and activities that enable the production of a final product (Sofiane, 2009) is specifically designed to offer organizational flexibility and geographic reach that the integrated model does not provide. Finally, there are at least two ways in which an organization becomes extended. The first is through a reduction in its direct production units, via market-driven decentralisation. Secondly, it can create new commercial and contractual relationships, and manage its resources through a network of partners.

While communication is one of the keys in the extended organization it enables them to manage their resources and partners – it can also represent a risk. In practice, the multitude of internal actors can also lead to the risk of leaked information about industrial processes or organizational strategies. The communication of information has strategic value as it makes it possible to gain power (Crozier & Friedberg, 1977). Individuals always have a degree of autonomy and pursue their own objectives, which are not necessarily compatible with those of the organization – especially when it consists of a fragmented constellation of partners (Vaughan, 2009). As much as it may try, the organization can never completely limit the autonomy of subcontractors. The opening up of extended organizations through market-oriented subcontracting networks can create a significant risk of information leak about resources and strategies in a given market, and lead to a loss of control with respect to its partners and competitors. For example, subcontractors from emerging countries can monopolize technical and organizational knowledge by copying processes before themselves developing high-tech industries that compete with those of industrialized countries. Faced with such a risk, the organization can take a strategic approach to the market, i.e. by subcontracting auxiliary functions while continuing to carry out core functions

internally (Altersohn, 1997, p.22). Otherwise, only the quality and strength of the links between the contractor and the subcontractor can reduce the risks associated with an organization's loss of confidential information.

4 THE EFFECTS OF THIS AMBIVALENT MODE OF ORGANIZATION ON THE RELIABILITY AND EFFICIENCY OF THE WORKFORCE

The motivations, forms of subcontracting and relations between contractors and service providers vary from one organization to another. In order to understand them better, it is useful to think of the subcontracting relationship as a form of employment relationship. Baudry (1992) argues that the two types of relationship are comparable. In both cases there is "quality economy", i.e. there is uncertainty about the work of the subcontractor, like that of the employee, in terms of productivity and results. The author shows that there is a plurality of mechanisms that govern inter-firm relations. Production is based not only on the contract and authority but also (and above all) on trust. Jounin (2006) also sees working relationships as going beyond purely mechanical aspects. Contracts "provide the framework, but within this framework actors build trust and informal loyalties [...]. Personality comes back into the game, loyalty is re-injected, tacit alliances are established that go beyond employment contracts and compensate for their fragility."

However, unlike the employment relationship, subcontractors are in a different, intermediate position. Paid work is very often a subordinate position, although being this position does not necessarily mean oppression and servitude. It can be a situation where work-related skills are made available to a third party or a contractor. The particular characteristic of subcontracting is that the company is no longer in a direct employer-employee relationship, but in an indirect relationship (Tinel *et al.* 2007). In practice, the commercial contract replaces the employment contract. The company continues to mobilise its productive effort remotely through subcontractors.

4.1 Transformation of the workforce and risk management

Subcontracting may affect teamwork. As it becomes commonplace the workforce is restructured into those who are directly and those who are indirectly mobilised. Jounin (2007) used a case study of a building site to demonstrate the importance of

subcontracting in the construction industry. Out of 120 workers working on a large construction project, 80 were temporary workers employed by three subcontractors. Among the 40 who worked for the lead company, only 15 were direct hires. Therefore organizations need to create and cooperate with a fragmented workforce with different statuses, schedules and functions, united by a single goal. The SUMER 2003 survey (Hamont-Cholet & Sandret 2007) showed that the support of the workforce and the hierarchy protects against the risk of accident: the accident risk increases by 20% when workers cannot discuss with their bosses their concerns about how to do the job.

Similarly, Puech's analysis (2004) of a hotel's housekeeping staff identified two categories of workers, a fixed staff and subcontracted personnel, which highlighted the divided nature of the workforce. His case study showed that entire management of the workforce was tailored to meet the hotel's production requirements as closely as possible. The author noted significant differences in terms of employment conditions and wages in the two groups of staff (one employed by the hotel and the other employed by the subcontractor).

The first group worked full time, had a fixed number of rooms to clean and a fixed salary. The second group worked part time at a fixed pace: a certain number of rooms to be cleaned each hour. Their salaries were not fixed because their schedules varied between 20–30 hours per week. The author observed a significant difference in salary conditions within the same occupational group. According to Peuch, "the use of subcontracting allows the group to compensate for variations in activity levels, a particular feature of the hospitality industry. The subcontractor's employment contracts are therefore established in order to respond to the needs of the company as far as possible, i.e. almost exclusively part time." The consequence was that around thirty subcontractors members of the housekeeping staff took strike action as a result of a collective sense of injustice. While working hours were their main motivation, above all, the subcontractor's staff demanded equal status with the hotel's staff. This study shows that the use of subcontractors is not without consequences and that the internal organization of a company can be a source of threat. The organization itself contains the necessary elements for both its growth and its death.

According to a 2006–2007 survey on organizational change and computerization (Algava & Amira,

2011, cf. Table 1) subcontracting is widespread in the public construction and hospitality industries. However, most subcontractors are found in industry; both subcontractors who carry out the work themselves and those who in turn subcontract others (intermediate subcontractors).

4.2 Subcontracting at the origin of both vulnerability and reliability

In this section we focus on industrial organizations as a source of both risk (Perrow 1999) and reliability (La Porte & Consolini, 1991). These approaches are two sides of the same coin and we present them here as ways to understand the origins of reliability or risk within at-risk industrial organizations. Issues of reliability and unreliability are played out in the workforce (Bourrier 1999), and are particularly seen in strategies that locate actors depending on the constraints they are subject to. It is therefore important to understand the effect of the changes that organizations go through.

When subcontractors are used there is a multiplication of dual-source employment statuses (CEE 2008 pp. 57–68, p. 60 Table 1, p. 61 Table 2). In the 1980s, 63% of businesses used short-term contracts and 59.8% used subcontractors. In 2000, 70% of companies used short-term contracts and 85.3% used subcontractors.

Triangular subordination situations have spatially and temporally reshaped organizations. This is particularly seen in the widespread use of temporary employment contracts, flexible working hours and polyvalent/ multi-skilled jobs. Alongside these changes in personnel management modes, power and the exercise of authority is changing. The need for results and constraints related to the pace, flexibility, objectives and the assessment of work are more visible in the subcontracting relationship.

According to a 2006–2007 survey on organizational change and computerization (Algava & Amira 2011), the employees of subcontractors were, on average, subject to greater constraints in terms of scheduling, pace, flexibility and objectives than those of prime contractors, and their working conditions were poorer. On the other hand employees of subcontractors had greater autonomy over their work than their colleagues with respect to initiatives taken to improve their workplace. The survey showed that non-intermediate subcontractors (those who carried out the work themselves and did not subcontract) received more direct instructions, but had fewer specific task-related targets to meet

than both intermediate subcontractors and employees of the contractor. However, this formalisation of working practices does not seem to have reduced the autonomy of subcontractor's employees.

The increase in work carried out under constraints and the scope for autonomy has at least two consequences. First, the widespread use of management practices where individuals are closely monitored means that staff are motivated by the fact that their results are regularly evaluated. Secondly, they know that if their results are unsatisfactory there will be negative consequences. The client may not renew the contract; a decision which would have negative consequence for many of the subcontractor's employees. Results-based performance means that employees are subject to significant constraints. The hierarchy requires increased professionalism in order to be the best. The situation is one in which the hierarchy issues objectives that must be met without fail.

In an at-risk organization (for example in the nuclear sector), working under such constraints can be beneficial in terms of both efficiency and reliability. The work of Bourrier (1999, pp. 205–251) highlights the benefits of subcontracting. Although it may be normal to expect that subcontracting reduces transparency and leads to an increase in incidents, the author noted total transparency regarding outsourced activities at the Nogent nuclear power. Subcontractors did not hesitate to declare the slightest production deviation in order to protect themselves against certain incidents. The author explained this behaviour in terms of the significant economic and qualitative constraints subcontractors are subject to. Consequently, in order to secure the renewal of their contract they seek to guard against any incidents that may occur at the client's site and demonstrate their usefulness.

However, if these constraints on objectives and the pace of work can lead to more effective organizations, they are also likely to increase the risk of accidents. An analysis by the French Department for Research, Clinical Trials and Statistical Analysis (*Direction de l'animation de la recherche, des études et des statistiques analysis*, Dares) (Hamont-Cholet & Sandret 2007) confirmed that employees who report "always having to rush" increase their risk of an accident by 26%. A high workrate may also limit its effectiveness and quality. According to Vaughan (2009) the space shuttle Challenger accident occurred following a sequence of

deviations from technical procedures in order to meet set deadlines. The technical culture of the aerospace industry is very sensitive to safety issues. According to the author, the politico-bureaucratic imperatives associated with a cost and time culture went against this technical culture.

5 CONCLUSION

This paper forms the first part of a sociological study. The different forms of subcontracting shown in these studies enable us to reflect on the impact of an increasingly widespread mode of governance that is having an effect on the workforce. The diversity of statuses present in productive organizations tends to change the organization of work. The use of subcontractors leads to both restructuring and tensions within the workforce. A better understanding of the composition of this workforce, and its reactions means that it becomes possible to anticipate events and shield productive organizations from certain risks associated with staff management. Sociological qualitative research methods are likely to provide us with a better insight into this scenario and help us to assess the associated risks.

ACKNOWLEDGEMENTS

We would particularly like to thank TOTAL, GDF SUEZ, SNCF and AFNOR, who are the partners of the Mines ParisTech Resilience Engineering Chair. These companies sponsored this research and thereby contributed to the creation of knowledge in the field of industrial risks.

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