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Stratification in academia as a status order: A Weberian proposition

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[\[French version: March 2016 - n°123\]](#)

Increasing stratification in higher education is analyzed by using the concept of a status order. In Max Weber's work, "status" refers to ranks in a social hierarchy based on prestige; and persons of like rank tend to assemble and form a status group. Recent research has redefined status as signaling a "quality" that organizes relations between people as they form groups. These two lines of research are crossed to identify the processes that divide academia into various status groups and thus produce, despite individuals' merits, structural inequality. This approach is grounded on an empirical study of *Organization*, a journal supported by a group of critical, "postmodern" academics, whose key members come from the same universities (mostly English and, to a lesser extent, Australian and Scandinavian).

Inequality in the academic world is glaring. In management studies,⁽¹⁾ the situation is evolving toward a "world championship of scholarship" with its winners and losers (MURPHY & ZHU 2012:916). According to Podsakoff *et al.* (2008), 5% of scholars accounted for 55% of citations and published more than a quarter of the articles in the most prestigious journals. With reference to Google Scholar, 5% of scholars produced a quarter of the research (articles, books, working papers); and with reference to the Scopus data base, 5% of researchers represented about 50% of the articles and 80% of citations (COURTAULT *et al.* 2010).

This inequality does not result from merit alone, as several studies would like to believe (PODSAKOFF *et al.* 2008). If it did, we would have to admit that an overwhelming proportion of the most meritorious come, "as if by chance", from English-speaking lands and from the same universities and doctoral schools (BEDEIAN

et al. 2010), or even the same social group (ÖZBILGIN 2009). As Murphy and Zhu (2012) have shown, 66% of the authors published in the twelve major (four-star) management journals and 86% of the members of these journals' editorial boards were Anglo-American (United States, Canada, United Kingdom). The French represented 2% of the authors and 2.1% of editorial board members — about as much as Germans.

Unless the conclusions are to be drawn that Anglo-Americans are massively "better" scholars than others and that, owing to their talents, they merit this concentrated representation, does this inequality not entail social processes that beg to be explained? I do not claim to provide herein an exhaustive or systematic explanation of how academia operates. My intent is, instead, to propose a grid for interpreting this inequality with the help of the concepts of "status" and "status order".

The concept of status order (PODOLNY 1993) postulates that the social recognition (status in Podolny's words) enjoyed by individuals leads to a relatively stable social stratification over time. This implies that forms of inequality stem from social structures instead of the qualities of individuals. The status order tends to reproduce itself though the processes whereby people form groups and choose to associate with each other as a function of their respective positions.

⁽¹⁾ Despite the focus herein on managerial studies, the situation clearly does not differ much in other disciplines. In the two systematically top-ranking journals of sociology (American Journal of Sociology and American Sociological Review), from 90% to 95% of the authors are American (GINGRAS & WARREN 2006). Once again, we must draw the conclusion either that American sociologists are extraordinarily talented or else that the social processes in operation have led to the overwhelming domination of sociology by a few scholars with similar profiles. This article has been translated from French by Noal Mellott (Omaha Beach, France).

To pursue this line of inquiry, this article draws on both Max Weber's legacy and recent discussions to examine how the concept of status can help us conceive of the social hierarchy and equality. The second part of this article shows how this concept sheds light on the organization of the academic world. In the last part, the example of the journal *Organization* serves to examine in detail the argument that the academic field of management studies is organized in relatively closed status groups through a control over the admission of new members. In the Weberian sense, we thus come face to face with the phenomenon of "closure".

The concept of status

The Weberian legacy

The concept of status has its origin in the work of Max Weber (1864-1920). Status and class underlie the Weberian analysis of social stratification. Much caution is needed when interpreting Weber's brief notes about this concept in the unfinished fourth chapter of the first volume of *Economy and Society* (Weber 1978, 1995) and the other scattered references to it. The Weberian concepts of status and class have prompted much of the thought devoted to social stratification (KURZMAN *et al.* 2007).

On the one hand, Weber's writings refer class — in line with Marx — to the economy, *i.e.*, to the inequality of revenues: *"a probability which derives from the relative control over goods and skills and from their income-producing uses within a given economic order"* (WEBER 1978, vol. I, p. 302). A class groups individuals who share the same economic situation, and thus the means of controlling and using goods. Weber did not think that a class makes for a community: *"the unity of social class is highly variable"* (p. 302).

On the other hand, status is grounded on prestige, esteem and "social honor" (COX 1950). This relational concept evaluates how individuals are distributed in the social hierarchy owing to the prestige they are recognized as having: *"an effective claim to social esteem in terms of positive or negative privileges"* (WEBER 1978, vol. I, p. 305). This hierarchy is a matter of consensus. As a type of inequality, it is double-sided (PIAZZA & CASTELLUCCI 2014:290): to be seen as a *"relationship between social groups"* (for instance, between members of two professions, such as doctors and nurses) and as a *"hierarchical relationship among individuals"* (a doctor and a nurse). In modern societies, prestige is based, in particular, on formal education and the diplomas that validate skills and know-how, or on a profession. The profession of lawyer endows all who exercise it with a degree of prestige in society, despite the wide disparity of incomes in this group (KARPIK 1995).

Status is visible through patterns of consumption, lifestyles and values. Individuals of equivalent status tend to adopt common consumption and behavior patterns, like the "leisure class", analyzed by Veblen,

on the East Coast of the United States at the end of the 19th century. Status confers the material or symbolic privileges attached to a respected social position, for example, the opportunity to keep company in a given social circle or to gain access to a certain profession. It bears an offer of resources. Unlike class, status makes for community, a point to which we shall return.

Revival of the concept

The concept of status has spurred several recent publications (PIAZZA & CASTELLUCCI 2014). For Podolny (1993:830), whose writings have contributed to this revival, *"a producer's status is defined as the degree to which market participants perceive the quality of its product to be superior to that of its competitors."* Status serves to signal quality in an uncertain situation, since there usually exists a stable and, in general, positive linkage between the producer's status and the quality of the proposed products.

Partnerships between firms (for example, of a company manufacturing a recognized brand of computer chips with a computer-maker) so clearly signal information about the expected quality of products that Podolny has advanced the argument that a firm's status changes as a function of its alliances. A firm grows stronger when it associates with a higher-status partner; or on the contrary, weaker when associating with a lower-status partner. According to Robert Merton, products will be evaluated better if they come from a high-status firm than products of like quality from a low-status firm. As a consequence, the high-status firm will, for a lower production cost, be able to propose its products at a higher price; and the low-status company will have trouble competing.

Status *"invokes the imagery of a hierarchy of positions — a pecking order — in which an individual's location within the hierarchy shapes others' expectations and actions toward the individual and thereby determines the opportunities and constraints that the individual confronts"* (PODOLNY 2005:11). A status order exists and, as Podolny has tried to show, tends to be stable over time.⁽²⁾ Competition pushes higher-status actors, since they are able to do so, to choose partners with a status at least equivalent to their own. For Menger (2009), this association of actors on the basis of their social recognition is "selective cooptation". As Podolny (2005:255) has pointed out, status is by nature a conservative, stabilizing force.

The concept of status can be applied to both firms and individuals. It has found applications in the sociology of culture (DUBOIS & FRANÇOIS 2013; MENER 2009) and of organizations (WASHINGTON & ZAJAC

⁽²⁾ For Podolny, "reputation" refers to an actor's past behaviors. Reducing status to a signal of quality risks confusing status with reputation. This confusion can be cleared up by taking the social dimension into account: reputation does not create a social structure. The space allotted for this article does not allow for discussing the relations between reputation and status. The key idea is that a status is, in fact, incorporated in the social structure, specifically a status order. Podolny's definition has been widely adopted (cf. WASHINGTON & ZAJAC 2005, PIAZZA & CASTELLUCCI 2014, BITEKTINE 2011).

2005) as well as economic sociology (ESPELAND & SAUDER 2007). It has even been suggested to apply it to academia (PODOLNY 1993:837).

Podolny's argument is economic; it aligns the concept of status on a signal of quality (PIAZZA & CASTELLUCCI 2014). However the economic and social definitions can be brought together by conceiving of status both as a signal of quality and, in accordance with the Weberian tradition, as a position in a social hierarchy. Both definitions hinge on the prestige an actor is recognized as having. Status is a subjective evaluation (of quality as inferred from the position in a hierarchy) as well as a structural reality (a relatively stable hierarchical structure).

Prestige directly signals quality. Buying a prestigious writer's book involves an expectation about the quality of what we are going to read. A book associating René Char and Picasso, for example, does not just reinforce the status of both artists, *i.e.*, their respective places in the hierarchies of poets and painters; it also sends a strong signal to readers about the book's quality.

The main criticism to be addressed to Podolny concerns his idea that status necessarily changes through the successive associations formed with partners, specifically: that the association with a partner of lesser status always lowers one's own status. This seems too categorical, as Dubois and François (2013) have shown in their study of associations between poets and publishers, where the alliance with a lower-status partner does not systematically lessen the status of the more prestigious one. Picasso might sign a book with an unknown poet without losing status; but the poet's status will, for sure, benefit from this association with a so prestigious painter.

Academia as a status order

To illustrate the idea of status, Weber proposed the example of Chinese scholars (WEBER 2000). They were made to compete for access to prestigious positions, had to pass difficult formal examinations and were then subject to lifelong evaluations of their intellectual aptitudes. This competition through selective examinations was based on criteria apparently related to a merit system. The recruits had, therefore, to continually improve their qualifications and skills. Under the control of the emperor for whom they were "consultants", they formed a "corps", a somewhat autonomous social group that devised its own rules of operation and, in particular, set the social rewards that the "best" among them could hope to receive. This corporate group of scholars was organized in a social hierarchy based on prestige.

We recognize in this description many similarities with the contemporary situation in higher education. Academia, too, is made up of highly qualified individuals who compete with each other for prestigious positions and are subject to ongoing evaluations of their intellectual, apparently "meritocratic", qualities. Academics, too, form a relatively autonomous social group that operates following rules it has mostly set

for itself. Academics, too, sometimes play the role of "consultant" for political and economic elites.

There are three main constitutive aspects of status in academia. The first is affiliation with specific universities. A professor from Harvard is better positioned on the social scale than a colleague from the University of North Dakota. This affiliation signals the quality of the "production" of each: more will be expected of the first than of the second. As Merton pointed out, the work of the first will, when of equivalent quality, be better evaluated than that of the second. Contrary to Valle and Schultz's (2011) assertion, this is not the only constitutive aspect of status in the academic world. A second factor is publications. Publication in an academic journal is a sort of tournament; the authors tourney each other when they submit articles to the same journal. Since it can publish but a few articles, the journal uses this as an argument when it vaunts its refusal rate as proof of its demanding intellectual standards (BEVERUNGEN *et al.* 2012). Victory in this tournament sends a positive signal about the quality of the published intellectual work. Under the current system, this victory is instantly evaluated in terms of the journal's ranking or "impact factor" (BERRY 2009). Likewise, expectations about a book's quality are related to the prestige of its publishing house. Thirdly, holding a position on a journal's editorial board — besides increasing the chances of being published and of playing a key role in academic affairs (ÖZBILGIN 2004) — is also a signal of the recognized qualifications of the person holding the position, all the more so if the journal has a high rank.

How the status order operates in academia

What I am suggesting is that academia is organized as a status order mainly through cooptation. Owing to this process, actors, each of equivalent status in their fields of qualification, associate with each other so that the prestige of the one reflects onto the other, thus amplifying differences with lower-status actors. This is the case on both the organizational and individual scales, among firms (PODOLNY 2005) as well as artists (DUBOIS & FRANÇOIS 2013; MENGER 2009).

In academia, scholars mostly work with colleagues of equivalent status. In a study of coauthored articles published in the major journals of managerial studies, Acedo *et al.* (2006) classified the authors in four categories as a function of their bibliographies: category 4 grouping the authors with the best reputations.⁽³⁾ This study found that 45.49% of the coauthored articles were written by authors from categories 3 and 4; but only 5.48%, by authors from categories 4 and 2. By the way, 19.9% were written by authors from categories 1 and 4 — usually an experienced scholar cosigning an article with a doctoral student or young PhD in his/her department. These patterns, brought to light through a network analysis, have been confirmed by other studies (EVANS *et al.* 2011, JONES *et al.* 2008). Although

⁽³⁾ Acedo *et al.* (2006) selected the major American and European academic journals of management, the latter like the former, in English: *Organization Studies*, *Journal of Management and Human Relations*.

the pattern of an experienced scholar coauthoring an article with a doctoral student or young PhD does occur, it is but another way that scholars consolidate their status while diffusing their ideas and sponsoring a promising young talent in the best networks. As already pointed out, this sort of association does not necessarily demean the higher-status partner.

The choice — so decisive — made by the editors of the mainstream journals involves similar processes (BURGESS & SHAW 2010, ÖZBILGIN 2004). Universities, too, each in its domain, are organized as a status order, which is “objectified” through repeated ranking procedures (ESPELAND & SAUDER 2007). The universities with the best reputations tend to recruit the “best” professors and researchers; they then furnish these recruits with the best resources so as to enable them to consolidate their status individually (D’AVENI 1996) — thus accelerating the Mertonian process of accumulating advantages while amplifying differences. In fact, these universities exchange young PhDs through narrow recruitment channels (BEDEIAN *et al.* 2010). These processes operate all the better insofar as citation indexes and classifications for ranking journals immediately provide the information to be used for cooptation strategies.

Status groups

Status groups and closure

For Max Weber, individuals of equivalent status tend to form a community, a status group. Like Chinese scholar bureaucrats, such a community’s members share values, lifestyles, work experiences, a group consciousness.... Communities of this sort are, however, informal. Given their similar social positions, the members share not only social but also economic interests. They are able, therefore, to coordinate their actions for the purpose of establishing norms.

Though differing depending on their level of prestige, status groups function via a “closure” based on the academic degrees that validate qualifications. This criterion, in particular, will be used to establish distinctions between members and nonmembers, so as to control the group’s composition. Status groups can thus become “castes”, *i.e.*, groups that recruit their members using their own criteria (COX 1950). According to Bendix (1974:154), who draws on Weber, “*whether formally free or institutionalized, modern intellectual life tends to form cliques and schools of thought or style. And on that basis, distinctions of class and status are formed among intellectuals*”.

In scientific circles, the validation process involves the academic degree (PhD and the place where it was obtained), affiliations and, of course, publications. A publication seems to function like a security: it is evaluated as a function of the journal where it is published, of the latter’s rank and impact factor. It becomes a sort of currency on the academic marketplace. Recall that three main means establish an academic’s status: affiliations, publications and

prestigious positions (in particular on the editorial boards of academic journals or through participation on committees or in roundtables at academic congresses). All three are directly or indirectly linked to the person’s productivity in research.

An appointment to an editorial board very much hinges on this productivity (ÖZBILGIN 2004). As for affiliations, the chances for entering a prestigious university (and thus benefitting from its status) mainly depend on the individual’s results in research, given the tenure system (BEDEIAN *et al.* 2010), which has now been implanted in French universities (MENGER *et al.* 2015).

What are the reasons for this emphasis on research? The latter is definitely not the only criterion that could be used for evaluations and promotions. It is, however, a more discriminating one than the individual’s “performance” in teaching or administration. Productivity in research is very concentrated — a Pareto curve: 5% of researchers account for about 50% of articles and 80% of citations. In contrast, “teaching performance” is more evenly distributed among academics, in a bell curve (MENGER *et al.* 2015).

Research and teaching, the two main academic tasks, have different underpinnings. For one thing, 5% of professors cannot attract 80% of students.... In contrast, research is a scarcer resource, so contested that an individual’s high productivity in research sends a stronger signal about his/her reputation than would be the case for teaching. Furthermore, academics seem more sensitive to performance in research: “*researchers proudly display their stars, like army medals*” (CHEVRIER 2014:21). Besides, research claims to offer a promising, innovative learning experience — in par with the latest scientific trends — in flagship programs (MBAs, for example), unlike teaching standardized, routine introductory courses. In addition to the obvious variability of the quality of courses, teaching is a “locally” evaluated “performance”. Unlike research, it is hard to compare teaching across establishments or among individuals since there is no agreed-upon means of measurement (like bibliometrics in research). Research emits a signal about the person’s reputation that is conveyed fast at no extra cost, whereas teaching, intended for a broader public, requires logistics and costs the professor’s salary.⁽⁴⁾

The reputation of establishments of higher education depends, first of all, on research, where competition, easy to measure, facilitates international comparisons and classifications. To be persuaded of this, we need but consult the brochures or websites of French universities, which systematically list scholars’ individual results in terms of research (publications) but do not describe their “educational skills”. As French business schools undergo a process of “academization”, their results in research are the discriminating criterion for ranking them (MENGER *et al.* 2014, 2015). The variable of research allows for the widest dispersion among

⁽⁴⁾ Might the situation not change owing to the creation of a global market for teaching through massive open online courses (MOOCs)? Might the possibility of diffusing such courses on a large scale at small cost... but is this to be hoped for?

schools and for quite strong correlations with a school's rank, budget and degree of internationalization. The result is blatant. Two academic labor markets are organized in a hierarchy: the one for top-level research professors (based on their publications) and the other for teaching professors. This holds for English-speaking lands (HENKEL 2005) as well as French business schools.⁽⁵⁾ Besides, the number of positions for "research only" or "teaching only" is on the rise, thus dividing academic labor, the faculty, into two unequal groups.

The stratification characteristic of academia should, therefore, be interpreted as a hierarchy of status groups with varying degrees of prestige based on the variables of research and affiliations. These groups rely on two major institutional factors, which are the driving force in status formation: academic institutions (universities, business schools, departments, doctoral degrees) and academic journals (in particular, the editorial boards of the "best" journals). These two factors are tightly correlated. Academics affiliated with the same universities sit on the editorial boards of the best journals, as the diagram from Burgess and Shaw (2010:636) depicts.

This network diagram has been drawn using data about the editorial board members of the 36 top-ranking journals of the well-known *Financial Times* classification. On this diagram, the only university not in the United States is French: the Institut Européen

⁽⁵⁾ In this system, teaching is the variable for making adjustments: business schools set the number of hours of courses a professor must dispense as a function of his/her results in research. As a director at EDHEC clearly put it, "If a professor does not fill his contract of publications, he can be dismissed. However, if he is a good teacher, we might keep him. In this case however, he will have a lot of hours of courses to teach" ("Les coulisses du mercato des profs-stars", L'Expansion, p. 52, 4 May 2011).

d'Administration des Affaires (INSEAD). Doing a few simple calculations using Burgess and Shaw's data, we notice that 76% of editorial board members are based in the United States. For these 36 journals, the average ratio between, on the one hand, the number of editorial positions that board members held in other journals in the *Financial Times* group and, on the other hand, the total number of editorial board positions is 42.11%. This is evidence of the concentration of these key positions in the hands of a small interconnected elite.

To examine the collaboration (the cosigning of articles along with less formal actions) between members of the teaching staff in managerial studies in the United Kingdom, another study (EVANS *et al.* 2011:394), adopting a statistical method, drew the conclusion that cooptation, a powerful means for organizing academic life, leads to the formation of "rich clubs".

Academic institutions recruit, as shown, from the doctoral degree programs of institutions with equivalent prestige. These doctoral programs are the cradle for the socialization of status groups. The major variable is not just the country of origin but, even more, the specific institution where research professors teach or have pursued their PhD (ALTMAN & LAGUECIR 2012). From this perspective, the admission of persons from other countries into doctoral degree programs in universities in English-speaking lands does not upset the status order. It merely reinforces its ramifications. This does not stem just from institutional strategies. In effect, faculty members themselves choose, in priority, young colleagues who share their values and have graduated from institutions like their own in terms not of just prestige but also culture. Academics working in a prestigious university where research reigns tend to choose young colleagues from establishments like their own (D'AVENI 1996).

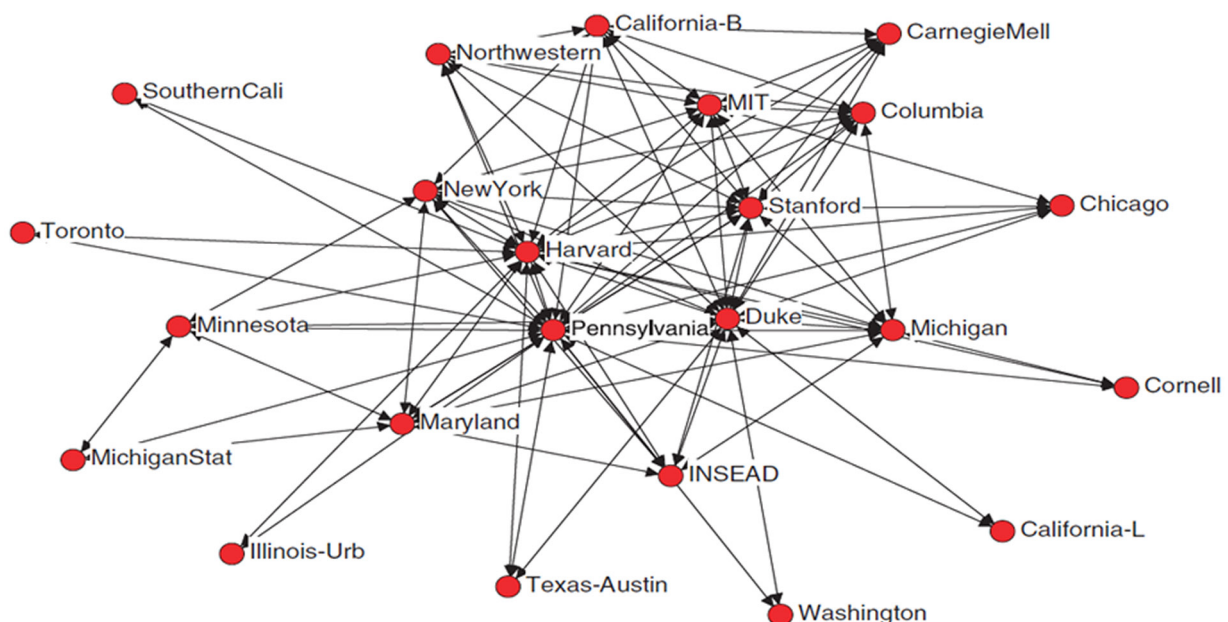


Figure 1: Network of universities with members on the editorial boards of the 36 top-ranking journals of the well-known classification made by *Financial Times* (Burgess & Shaw 2010:636)..

A critique of *Organization*, a critical academic journal

To illustrate my remarks, I have chosen *Organization*, one of the few European journals ranked with four stars by the French National Center of Scientific Research (CNRS). Specialized in the sociology of organizations, it would offhand seem to be more open, especially since it is a “critical” journal in organization studies. Its editorial line is to contest the dominant North American models, in particular positivism and quantitative methods, and to direct attention to critical thinkers from other disciplines, such as Bourdieu, Foucault or Deleuze (PARKER & THOMAS 2011).

I examined the tables of contents of the issues from the last five years: in all, 220 articles by 352 authors from 175 universities and 28 countries, including Romania and Brazil. Given its location in Europe and its editorial line, the network around *Organization* would, we assume, be less “hegemonic” and less concentrated than what Burgess and Shaw described in the “mainstream” journals of the *Financial Times* group, dominant in major North American universities. However the social relations formed around this European journal are very hierarchical, thus revealing the overlapping between academic journals and universities, the two main places for making the status of researcher.

Five universities account for 21% of *Organization*'s authors. The situation has changed a little since a previous study (JONES *et al.* 2006), which found 25% for the period from 1994 to 2001.

The key universities in this journal's network are clearly identifiable: those in the United Kingdom (Leicester, Manchester, Cardiff, Essex) plus a few foreign establishments, such as Copenhagen Business School or the universities in Lund (Sweden) and Sidney (Australia).

In all, 60% of the articles have been signed by more than one author. Furthermore, 49% of these coauthored articles involve at least one author from the most represented universities; and 35%, more than one author from these universities. Furthermore, 45% of the authors are English.

Italians make up but 0.005% of the authors; and Germans, 2.8%. The French authors, 1.9%, come from four establishments of higher education (University of Paris-Dauphine and three *grandes écoles*). All but one of them (who had a PhD from a major American university) coauthored articles with high-status foreign colleagues. Among the “exotic” scholars (to the exclusion of English-speaking lands and Scandinavia), 44% coauthored articles with a colleague from one of the ten most represented universities.

If we eliminate the special issues that *Organization*, to its credit, devoted to “management from the South” or post-colonialism, we discover but two authors from countries in the planet's South. Each of them had a PhD, the one from an Ivy League university in the United States and the other from an English university centrally positioned in the journal's network.

Of the twenty authors who signed 21% of the articles, 60% are English, all of them from the aforementioned universities. In fact, four or five of them have published at least one article per year. Out of the twenty most published authors in the journal, 85% have been current or former members of the editorial board. Among the three others, two have sat on the editorial board of *Organization Studies*, the other major European journal of organization studies, which has as its mainstay the annual colloquium organized by EGOS, the foremost social event in this discipline. The editorial boards of *Organization* and *Organization Studies* overlap: 29 persons sit on both boards.

We thus come to see the interconnections between the elites of the European academic journals specialized in organization studies.⁽⁶⁾ These authors (some of them also editorial board members) are in a position for exercising broad control over publication in the journal's pages and partial control over access to the field of critical management, of which *Organization* is a flagship. The most published authors share the same academic (and social) activities. These social patterns are, we might imagine, even clearer in the dominant mainstream journals than in this European journal, given the latter's critical, multidisciplinary stance: we search in vain for a single article by, for instance, a Brazilian or Romanian author in *Administrative Science Quarterly* during the same period.

These data throw light on stratification in academia. According to the Weberian interpretation proposed herein, these groups tend to reproduce themselves by coopting members through complex procedures, such as integrating researchers from dominated countries. These phenomena, leading to closure, are sometimes hidden. According to Özbilgin (2004), Turkish colleagues who were admitted to a journal's editorial board, probably as a token of the board's plurality, did not have any communication from the board over a two-year period! In the words of this former editor-in-chief of *British Journal of Management*, himself of Turkish origin: “White masculine hegemony continues to reproduce itself, as graduates, who are trained in elite research institutions with entrenched forms of inequality, are blessed from the beginning through the system of patronage with privileged access to prized posts in the academic labor market. In the same way, journal editors want high impact factors and seek well-known people to sit on their boards and to publish in their journals. This process keeps well-known persons well-known. The glass elevator effect is hard to break into unless you are in the friendship circle of the ‘well-known’, which is more likely if you are from the upper class, the product of an elite institution, especially in the United States or Britain” (ÖZBILGIN 2009:114).

This remark points to the existence of a status order, where the dominant groups — expecting a quality of work produced using criteria they have to a large

⁽⁶⁾ The big American universities are nearly completely missing in this picture. *Organization* is not part of the dominant American networks: I have turned up only one author from one of the top ten American universities (according to the *Financial Times* classification).

degree defined and incorporated in the hierarchical logic of self-reproduction — have definite social profiles. As a driving force, status tends to establish hierarchical groups that might be relatively separate from each other (PODOLNY 2005). An example is the domination of English-language journals, which mainly publish English-speaking authors or foreigners who have undertaken a doctoral degree program in English-speaking lands (ALTMAN & LAGUECIR 2012). This is the case of *Organization*, a journal articulated around a dominant group — the critical, postmodern current of thought — whose core is made up of English researchers and, to a lesser degree, of Australians and Scandinavians. The major authors belong to the same English-speaking culture, come from the same universities and often enough work together to coauthor articles or sit on editorial boards in the same journals. Dominant status groups are in the position of exercising broad control over the recruitment of new members. Not only do they hold positions of power in universities and on the editorial boards of journals, as we have seen; but also, as Weber suggested, they decree the highly standardized norms (and enforce them) that tightly govern academia's intellectual production (GREY & SINCLAIR 2006). As Özbilgin (2009) has stated, they are hardly inclined to give up key positions or to yield on the norms governing academic production, since these norms serve their interests.

Conclusion

This interpretation of inequality in higher education suggests that the current system of scientific evaluation, centered on publication in journals that are ranked and claim to have high “impact factors”, favors and consolidates the organization in terms of status groups with unequal degrees of prestige. To its advantage, this interpretation avoids falling into the trap of oversimplifying social reality by positing a binary contrast between “dominant” and “dominated”. It lets us see academia as a series of hierarchical, specialized status groups, which vary depending on the country, discipline or current of thought, in the likeness of the group formed around the journal *Organization* and English universities — a social network still separate from the major North American journals.

This interpretation has tried to explain academia's fragmentation and its convergence toward an “elite of the elites” with shared characteristics. It would, of course, come as a surprise were the relentless race in research for the obtainment of academic recognition (CHEVRIER 2004:18) not to have consequences on how higher education is organized. For sure, inequality existed prior to the incredible acceleration of the race toward a top rank or classification of establishments, journals, scholars, etc. However, forms of inequality have undoubtedly deepened. They tend to rigidify through processes that are not just (or at least not mainly) meritocratic.

In structural terms, this is a consequence of using rankings, as Espeland and Sauder (2009) have shown in American law schools. These ranking systems

rigidify and artificially deepen status differences by organizing competition like a tournament, by defining and making data available via bibliometrics — data that are simplified and sometimes erroneous (BERRY 2009) — and, too, by setting special rules for organizing this competition so as to artificially increase the differences between rivals from schools in the top tier and those from schools just below that level, or between articles published in three-star and two-star journals, etc. From this point of view, systematically using lists that ranks journals (as Section 37 of the CNRS does), especially in French schools of management, reinforces the processes described herein — to the point that some deans have now been won over to strategies, in particular for faculty management, that exclusively pursue the number of stars (GLESS 2014).

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The internationalization strategies of French and German firms: Two different models

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Macroeconomic statistics and data on big firms are used to compare the internationalization strategies adopted by French and German firms. The German and French models of internationalization differ with respect to: exportation; the volume and type of foreign direct investments; and the mode of market entry. Several possible explanations of these noticeable differences in strategies are proposed, among them: costs, the firms' strategic choices and the institutional and cultural environment.

As internationalization advances, firms are often unable to defend a strong position on the domestic market without also being present on other national markets. The motivation for this is not just the quest for new prospects in targeted foreign markets that are to be conquered. It also has to do with the shares and roles assigned to various foreign markets in the production chain through the investments made there, whether of a horizontal or vertical type (LEMAIRE 2013).

Researchers have adopted various theories to tackle this problem, such as the product-cycle theory (VERNON 1966), the Uppsala model of phases in commitment decisions (JOHANSON & VAHLNE 1977), the eclectic paradigm (DUNNING 1988), the theory of transaction costs (WILLIAMSON 1975) or the new economic geography (KRUGMAN 1991). These theories refer to a firm's characteristics, products and markets in the effort to explain its reasons for developing abroad, the regions where it sets up operations and its decision about how to enter the foreign market (COLOVIC & MAYRHOFER 2008). Except for the Uppsala model however, they concentrate on but a single aspect of the process (MEIER & MESCHI 2011). Nonetheless, they have considerably contributed to strategic management and help us better understand differences in the choices made by firms. In addition, these theories have underlaid empirical research.

Some of these empirical studies have focused on how the context in a firm's country of origin influences its internationalization strategy, in particular: the degree of

international diversification (LI & YUE 2008); the mode and timing of market entry (STEVENS & DYKES 2013); or even the relation between internationalization and performance (WAN & HOSKISSON 2003, ELANGO & SETHI 2007). However most empirical studies on international diversification, by focusing on a specific country of origin, have failed to take into account how the firm's nationality affects its strategic choices (LI & YUE 2008). National characteristics (comparative advantages, the institutional and cultural environment, etc.) weigh on the resources at a firm's disposal, its organizational routines and its competitive advantages, all of these being factors affecting the firm's strategic choices (BARMAYER & MAYRHOFER 2007).

For this reason, it is necessary to conduct new studies for identifying and better understanding differences in corporate internationalization strategies, in particular with respect to the mode of foreign market entry that a firm adopts as a function of its country of origin. Several studies have concentrated on the mode of entry, a critical component in a firm's international strategy; but no consensus has emerged (MORSCHETT *et al.* 2010). In particular, very few studies have compared the internationalization strategies of firms from different countries in Europe — a promising perspective for research (MAYRHOFER 2004). Several questions arise about these differences in international strategies. What specific advantages of a firm and which national, institutional or cultural characteristics of its homeland affect its choice of an international strategy?

The research presented herein, by concentrating on the internationalization strategies of firms from two European countries, helps make up for this lack in comparative studies. For this purpose, it has used global, macroeconomic data as well as data from the UNCTAD sample of multinational firms. Three alternatives for internationalization strategies are taken under consideration: exportation or foreign direct investment; foreign investments of a horizontal or vertical type; and investments made by setting up a foreign subsidiary from scratch (greenfield investments) or by purchasing foreign companies (acquisitions). We have left out of account foreign market entry modes based on more cooperative practices, since data about them are not available at the country level.

Since studies have already described the effects of size, the quality of production factors, local institutions (what has been dubbed the country's "munificence") and the legal system, we thought it worthwhile to compare rather similar countries in order to neutralize the effects of these three dimensions. France and Germany are of a comparable scale, and each has a high degree of munificence (WAN and HOSKISSON 2003). Both figure among countries with a legal system of a civil law type (LA PORTA *et al.* 1998). Furthermore, they use the same currency, the euro, and have, through the European Union, the same economic environment. We can then set the differences observed in our findings down to other characteristics of these two lands.

This article⁽¹⁾ starts by comparing the choices that French and German firms have made between exportation and direct foreign investment, and then between foreign investments of a horizontal or vertical type. It then turns to the choice between greenfield investments or acquisitions. Several possible explanations will be presented to account for the differences observed between the internationalization strategies of France and German firms: the positioning of products, investments in R&D, the cost competitiveness of production sites, and the institutional or cultural environment of the country of origin. Nevertheless, our research cannot yet establish a clear causal connection between these explanatory factors and the observed differences in internationalization strategies.

Which strategy: Exportation or foreign direct investment?

Exportation and foreign direct investments (henceforth, FDIs) are different, but not mutually exclusive, ways for firms to stake out a presence on foreign markets. Multinational corporations, in particular, do not usually adopt the one to the detriment of the other. Nonetheless, the benefits and costs of these two strategies are different in nature (LEMAIRE 2013).

⁽¹⁾ This article has been translated from French by Noal Mellott (Omaha Beach, France).

One advantage a firm gains from an exportation strategy is flexibility: it is easier to pull out of the market than in the case of an FDI, and the volume of exports targeting foreign markets can be adjusted as a function of demand on one of them. Moreover, an exportation strategy allows for faster access to foreign markets, since the firm uses its existing production capacity in the homeland. A last point: a growing volume of exports enables production plants located in the country of origin to improve their performance thanks to economies of scale (GRANT *et al.* 1988). Given these advantages, exportation is the most widespread form of internationalization. When turning toward international markets, small and medium-sized firms usually start by exporting. But even firms with foreign subsidiaries continue using exportation as a vector in their internationalization strategy.

In contrast, foreign direct investment bears advantages for a firm compared with a strategy based on exportation alone. First of all, setting up operations directly in the targeted country facilitates market entry there by reducing transportation costs of merchandise and sidestepping barriers to transactions, whether custom duties or other impediments (UNCTAD 2012). Next, host country governments often direct investments, which create jobs locally. Finally, FDI makes available to the firm the comparative advantages specific to the foreign market and enables it to benefit from its physical presence there: access to scientific or technological resources, as well as the low costs of labor or natural resources (KOGUT & ZANDER 1993, ZAHRA *et al.* 2000).

Comparing France and Germany provides a contrasting picture of the relative weights of exportation and FDI strategies for companies from these two countries. Quite clearly: whereas French firms have preferred FDI at the cost of their own exports, German firms have preferred exports from the homeland and have made fewer direct investments abroad than their French counterparts. Measuring the exportation of merchandise and services in 2010 as a percentage of GDP, the percentage point difference between the two lands was 22.1 in Germany's favor, whereas the difference between the two with respect to the total stock of FDIs was 15.8 in France's favor (*cf.* Table 1). Furthermore, these relative discrepancies in internationalization strategies have been accentuated during the first decade of the 21st century. German firms increasingly prefer exportation strategies more than French firms, whereas the latter increasingly prefer FDI strategies more than German firms.

How to explain these differences in internationalization strategies with respect to exportation?

The first explanation of the low level of exports by French firms is simply that France has fewer exporting firms: 11% of German firms do so as compared with only 4% of French firms (Direction Générale du Trésor 2009a). The dearth of exporters in France — approximately 100,000 here as compared with 350,000 in Germany — is closely related to the lack of "large" small and medium-sized firms in France. Size has a positive effect on both the propensity to export and

	<i>Exports 2010</i>	<i>Exports 2000</i>	<i>Total FDI outward stock 2010</i>	<i>Average FDI outward stock 1995-2004</i>
French firms	25.5%	28.8%	59.1%	13.0%
German firms	47.6%	33.4%	43.3%	10.6%
Percentage point difference (France-Germany)	-22.1	-4.6	15.8	2.4
<i>Sources:</i> Authors' calculations using data from the European Commission (2014) on exports and from UNCTAD (2012) on FDIs.				

Table 1: Exports of goods and services and the total stock of foreign direct investments as a percent of GDP.

the volume of exports, as several studies have shown (MITTELSTAEDT *et al.* 2003, LU & BEAMISH 2001). In 2007, France counted 4,900 middle-tiers firms as compared with 8,800 in Germany; and the gross sales of its middle-tier businesses were twofold less than their German equivalents (DANIEL & PICO 2012). Furthermore, fewer small and medium-sized firms are exporters in France than in Germany: 42% of firms with from 100 to 249 wage-earners do not export, compared with only 17% of German business of the same size (DIRECTION GÉNÉRALE DU TRÉSOR 2009b).

This explanation seems insufficient however, since France and Germany continued diverging with respect to exportation from 2000 to 2010, even though the structural characteristics of industry in the two lands had not fundamentally changed. By placing data on exports alongside data on FDIs, we notice that the latter are much higher for French than for German firms.

Might French firms have simply deserted their homeland because, in their opinion, it is no longer competitive? The annual increase in wages between 2000 and 2010 was 2.7% in France compared with a moderate 1.1% in Germany (COHEN & BUIGUES 2014). Might France's low level of exports not be explained, above all, by the decision of big French multinationals to manufacture abroad and to scale back production at French locations because the costs there are less competitive? This explanation is convincing given the increase in the stock of French FDIs compared with German FDIs during the period when the relative weight of French exports was decreasing.

Foreign direct investments, more than exports, are mostly a matter for big corporations; and France has more multinationals than Germany. Out of the hundred biggest nonfinancial multinationals (classified by foreign assets) in the world in 2012, fourteen had

their headquarters in France as compared with ten in Germany (UNCTAD 2013).⁽²⁾ Whereas France lacks middle-tiers firms compared with Germany, it has more big multinationals.

As a proportion of total jobs (domestic and foreign), the share of jobs in the foreign affiliates of the French multinationals retained in UNCTAD's ranking was, in 2012, higher than for the German multinationals: 63% vs. 58% (UNCTAD 2013). In that year, total employment in the German economy amounted to 41.5 million persons as compared with only 28.2 million in France; but the big French multinationals had more employees outside the country than did the German ones: 1.36 million vs. 1.29 million (respectively, 5.6% vs. 3.1%).

We obtain a different perspective on the internationalization of these big French and German multinationals by turning from the share of jobs in foreign affiliates to sales outside the domestic market (both exports from the homeland and the sales made by foreign affiliates) in relation to total sales. In 2012, sales outside the homeland by German multinationals amounted to 72% compared with 68% for French multinationals (*cf.* Table 2).

We thus observe major differences in the internationalization strategies of big French and German multinationals. The French ones have preferred FDI, thus limiting exports from plants in France. In contrast, German multinationals are less inclined to set up operations outside the country; and as a consequence, a larger share of their exports comes from plants in Germany.

⁽²⁾ In France: Renault, Édf, Engie, Veolia, Total, France Télécom, Vivendi, Schneider, Sanofi, Pernod-Ricard, Saint-Gobain, Lafarge, EADS and Carrefour. In Germany: VW, Mercedes, BMW, E.ON, RWE, Deutsche Post, Deutsche Telecom, Siemens, BASF and Linde.

	<i>Ratio of employment in foreign subsidiaries to total employment</i>	<i>Ratio of sales outside the homeland to total sales</i>
French multinationals	63%	68%
German multinationals	58%	72%
Percentage point difference (France-Germany)	5	-4
<i>Source:</i> Authors' calculations using data from UNCTAD (2013) about the top 100 multinationals.		

Table 2: Jobs and sales outside the country of origin in the biggest French and German multinationals (2012).

These findings about the biggest multinational firms corroborate macroeconomic data on the weight of exportation strategies in Germany and of FDIs in France (Table 1). French multinationals, unlike their German counterparts, have definitely preferred setting up operations outside the country, to the detriment of production in, and exports from, the homeland. The probable explanation for this is the decreasing cost competitiveness of production sites in France, as compared with Germany.

To illustrate these differences between French and German firms, it is worthwhile analyzing a firm from each land in the same branch of the economy. Table 3 presents data on two automakers. When foreign sales are used to measure internationalization, Volkswagen outstrips Renault. When shifting the focus to jobs in foreign affiliates however, Renault turns out to be more internationalized than Volkswagen. For a lower proportion of sales abroad, Renault produces more outside the country. This is clear evidence that the French automaker counts less on domestic production and, therefore, on exports than its German counterpart.

A question is still standing. As for operations set up outside the country of origin, do these French and German multinationals differ with respect to the choice of a type of FDI, horizontal or vertical? Let us now turn to this question.

Which FDI strategy: Horizontal, or vertical?

Markusen & Venables (1998), who introduced a typology of FDIs based on the strategies underlying decisions for setting up foreign subsidiaries, have distinguished between horizontal FDIs, which create subsidiaries that produce goods identical to those manufactured by the multinational in its country of origin, and vertical FDIs, which set up operations abroad that are complementary to the parent company's activities.

Horizontal multinationals set up abroad production processes similar to the parent company's in the homeland. Markusen and Venables (1998) have emphasized that FDIs of a horizontal type reduce trade flows. When a multinational sets up a subsidiary, local production replaces exports. Accordingly, multinationals choose to make horizontal FDIs when exportation costs are higher than the costs of setting up operations abroad. They prefer this strategy for entering the

markets of larger countries in order, on the one hand, to reduce fixed installation costs and, on the other, to reap economies of scale. The relative production cost at foreign plants in the case of a horizontal FDI compared with the cost of importing products from the multinational's country of origin apparently depends on: sales costs, transportation costs, trade barriers (such as custom duties) and the economies of scale to be made thanks to plants in the foreign land.

Vertical multinationals seek to take advantage of international differences in the cost or quality of various factors during each phase of the value chain. They thus specialize their plants in each country on a given stage of the production process. Optimally locating various business activities is a key issue for the multinationals that increasingly segment the value chain (COLOVIC & MAYRHOFER 2011). Opting for this strategy is not new. In the late 1990s, Ford located operations as a function of characteristics in the host country (MUCCHIELLI 1998). The most technology-intensive activities (motor parts) were located in Leamington (England) and Cologne (Germany); and the least technology-intensive ones (final assembly, upholstery), in Valencia (Spain). A good example of this vertical model comes from the German automakers who moved the production of certain parts to eastern Europe while keeping much of the value chain in Germany.

Vertical FDIs stimulate international transactions, unlike horizontal ones. Trade and FDIs are much more compatible when foreign investments are of a vertical type. The parent company's productivity is a factor in the decision to make a vertical FDI (HEAD & RIES 2001). In this case, the main determinants of the location of production units abroad are: unit labor costs in the host country, the characteristics of its labor market and the level of qualifications and skills there.

The multinational firms that prefer FDIs of a vertical type will, therefore, tend to import intermediate goods for assembly at their factories in the homeland. On the contrary, those that prefer FDIs of a horizontal type import fewer intermediate goods but more finished products. As Table 4 shows, the share of intermediate goods in total imports was, in 2011, lower in France than in Germany. During the period 1994-2011, this share increased considerably in Germany while tending to be stable in France. This comparatively low degree of externalization to low-cost countries of the supply of intermediate goods might, for France, be the factor that

	Ratio of employment in foreign subsidiaries to total employment	Ratio of sales outside the homeland to total sales
Renault	58%	74%
Volkswagen	55%	81%
Percentage point difference (Renault-Volkswagen)	+3	-7

Source: Authors' calculations using data from UNCTAD (2014) on the top 100 multinationals.

Table 3: The internationalization of Renault and Volkswagen (2013).

accounts for the difference in the competitiveness of its exports with Germany's.

	1994	2011
France	46%	44%
Germany	47%	51%
Percentage point difference (France-Germany)	-1	-7

Source: Ministère de l'Économie et des Finances, 2012.

Table 4: Share of intermediate goods in imported manufactured products (France and Germany, 1994 and 2011).

Whereas French firms prefer setting up, in foreign markets, operations covering the whole value-added chain up to and including the finished product, German firms still export from Germany while importing intermediate products. They have, as a consequence, moved abroad operations involving labor-intensive phases in the value chain (KINKEL & MALOCA 2010) while keeping inside the country the core activities for adding value to the manufacturing process, namely: R&D, engineering, assembly and marketing (SINN 2006).

What about the strategies of the biggest French and German multinationals? Do these firms prefer horizontal or vertical FDIs? Do their profiles differ? The automobile industry illustrates, once again, the general differences between France and Germany with respect to the role assigned to homeland operations in the value chain.

French automakers are strongly inclined to import vehicles and export auto parts, whereas their German counterparts tend much more to import auto parts and export vehicles. As Table 5 shows, the importation of auto parts in 2011 represented a smaller percentage of total imports in France than in Germany. In turn, the exportation of vehicles represented a smaller percentage of total exports from French than from German automakers.

Differences in strategy clearly come into play. French automakers tend to offshore production more than assembly. The factories moved abroad make vehicles for foreign markets and, too, target the domestic market in France. During the first decade of the 21st century, Renault became a net importer of vehicles in France (BUIGUES *et al.* 2015). German automakers use foreign countries, in particular the new EU member states, to make parts that are then imported back into Germany

for final assembly, an activity retained more often in Germany than in France.

French automakers tend to make horizontal FDIs. Foreign factories produce vehicles in full, a percentage of them then being imported back in France. In contrast, German automakers import auto parts more than their French counterparts; and German factories are still more oriented toward the final assembly of vehicles for exportation. German FDIs tend, therefore, to be vertical.

German firms take advantage of international differences derived from the cost or quality of labor during each phase of the value chain for producing intermediate goods and parts. Each foreign market where operations are set up is specialized in a specific type of intermediate product, and the German multinational tries to optimize cost competitiveness and product quality.

These internationalization strategies, whether horizontal or vertical, are not independent of the strategy adopted for entering foreign markets. We suppose that horizontal FDI strategies are better adapted for penetrating foreign markets through acquisitions whereas vertical FDI strategies are better adapted to market entry through what has been called greenfield investments. Acquisitions seem less suited for producing abroad a single segment of the value-added chain. Can these suppositions be corroborated?

Which market entry strategy: Greenfield investments or acquisitions?

When a firm makes a direct investment to set up operations in a foreign country, it has to choose between two possible investment strategies, greenfields or acquisitions.

Greenfield investments, which create a new production unit from scratch, are a good way to expand into foreign markets. This strategy's principal advantage is that the parent company maintains full control over operations. However a rather long time is required before the strategy becomes fully operational.

Mergers and acquisitions hold certain advantages compared with the foregoing strategy, in particular a fast, easy access to new production capacities. Firms tend to make acquisitions in sectors where there are several targets that can be bought out. Furthermore,

	Exports		Imports	
	France	Germany	France	Germany
Auto parts	37%	25%	27%	41%
Vehicles	63%	75%	73%	59%
Total	100%	100%	100%	100%

Source: Direction Générale des Douanes et des Droits Indigents (2012).

Table 5: Horizontal vs. vertical FDIs: French and German multinationals in the automobile industry (2011).

this strategy allows a firm to immediately expand its market share and reinforce its position on the market.

Hennart (1982) was one of the first scholars to have analyzed the factors that weigh on the choice between these two modes of foreign market entry. Among the Japanese multinationals trying to enter the American market, those with a slight competitive advantage relied on acquisitions, whereas those with a strong competitive advantage preferred greenfields (HENNART & PARK 1993). Consonant with these findings, a relation has been shown to exist between R&D and the mode of market entry (CHANG & ROSENZWEIG 2001). A firm's commitment to R&D is an important factor in the choice between these two market entry modes. In technology-intensive sectors, firms with a competitive advantage generally prefer greenfields, since they have what it takes to develop in house the requisite capacities. On the other hand, firms that are not R&D-intensive might want to acquire technological skills through acquisitions.

Acquisitions usually cost more than internal development, owing to the financial premiums as well as the costs of transactions and integration (LEE & LIEBERMAN 2010). They also seem riskier than greenfields. An acquisition requires more funds up front, whereas a greenfield can be gradual. During implementation, acquisitions often run up against cultural differences; and expected economies of scale are not easy to achieve.

Finally, a firm's in-house "culture" is an important factor. Some firms have a culture favorable to greenfields; others, to acquisitions. Whether the firm adheres to an "Anglo-American" or a "continental" culture weighs on this choice (BUIGUES & LACOSTE 2011). In the former, the approach adopted by stockholders is more financial than industrial, and such firms tend toward mergers and acquisitions rather than greenfields, which require a long-term strategy. French multinationals where Anglo-American shareholders carry weight tend to adopt merger-and-acquisition strategies.

Indeed, firms and their executives are "imbued by a cultural socialization that has shaped their way of perceiving reality, and of thinking and acting according to this perception" (BARMEYER & MAYHOFER 2007:15). German firms, for example, value joint management; and wage-earners must be won over to strategic objectives. This form of management pushes for a high level of standardization of work processes. These characteristics of Rhenish capitalism, of its mode

of governance and management, might work in favor of greenfields instead of mergers and acquisitions. In the case of an acquisition, the cultural shock between the German firm and the thus acquired foreign company might jeopardize the Rhenish model.

Comparisons between the foreign market entry strategies of German and French firms are telling. Between 2011 and 2013, German firms heavily made greenfield investments: more than €56 billion per year compared with but €36 billion for French firms. The reverse can be observed for mergers and acquisitions. French multinationals invested more in acquisitions than did the Germans: €12.1 billion per year vs. only €9.4 billion (See Table 6).

The competitive advantage of German firms — in particular their high level of differentiation, their position on the high end of their markets and their high level of spending on R&D — provide, in our opinion, a possible explanation of their preference for greenfield investments over mergers and acquisitions. This confirms the findings of previously cited studies (HENNART & PARK 1993, CHANG & ROSENZWEIG 2001).

In contrast, French firms launch bigger operations than their German counterparts. The average amount for an acquisition was \$26.5 million compared with \$20.3 million for German firms. For greenfields, the respective averages were \$44.5 million and \$41.2 million. This difference might be set down to the French firms' propensity to pursue horizontal operations, which, by nature, cover a larger span of the value chain than the vertical operations preferred by German firms.

Conclusion

In the effort to contribute to the literature on corporate strategies for penetrating foreign markets, this article has compared the practices of firms from two European lands (France and Germany) and tried to explain the differences thus observed. Since most earlier studies have treated Europe like a single unit (MAYRHOFER 2004), it is worthwhile assessing how the characteristics of specific European countries weigh on the choices made by their firms. This France/Germany comparison, globally but also among big firms, has brought to light considerable differences in strategic choices.

Besides setting in a clear light two disparate models

	<i>Value of reenfield investments outside the country</i>	<i>Value of mergers and acquisitions outside the country</i>
French firms	\$35.9 billion	\$12.1 billion
German firms	\$56.3 billion	\$9.4 billion
Difference France-Germany	-\$20.4 billion	+\$2.7 billion
<i>Source: Authors' calculations using data from UNCTAD (2014).</i>		
<i>NB: A three-year period (2011-2013) has been used to limit possible distortions due to any given year.</i>		

Table 6: Foreign investments of French and German firms: Greenfields vs. mergers & acquisitions (Average value, 2011-2013).

of internationalization strategies, this comparative analysis of the international strategies of firms from Germany and France has mentioned explanatory factors. However the suggested explanations are, at this point, but hypotheses for further research. They await corroboration: the strong cost competitiveness of production sites in Germany compared with plants in France; the position of German multinationals at the high end of their markets; their high level of spending on R&D in comparison with French multinationals; and cultural and institutional factors. Let us review the major aspects that set these two models apart.

First of all, French firms prefer FDIs more than German firms, which tend toward exportation. France has more big multinationals than Germany, and its multinationals have gradually moved production plants outside the country. In contrast, the big German groups still give a strategic place to plants in Germany and still export massively from the homeland. Had French multinationals adopted internationalization strategies similar to the German ones, France would have improved its balance of trade. How to account for this difference in strategies? It has, we suppose, to do with the conditions of production in the homeland (the unfavorable trend in total labor costs in France compared with Germany) and, too, with the positioning of products on the market (French firms at the lower or middle range of the market compared with the upscale products of German firms). The erosion of France's balance of trade might, therefore, be mainly due to a lack of competitiveness of plants inside France, even though the performance of big French multinationals is comparable with that of their German counterparts.

Secondly, when they move operations outside the homeland, German firms rely, more than French firms, on a vertical segmentation of the value chain. They keep creative activities (e.g., their massive investments in R&D) and, above all, final assembly in the homeland. That is what the big German automobile firms have done. On the contrary, French multinationals prefer FDIs of a horizontal type, evidence of this being the importation into France (to satisfy domestic demand) of the vehicles made by Renault in Romania, Turkey or Spain. These differences in international strategies fit into global strategies that also differ. Made-in-Germany is still a reference mark, both qualitatively (brand imagery, objective quality) and quantitatively (the volume of exports stimulated by the location of plants in Germany). This accounts for the German firms' determination to not choose horizontal FDIs but to take advantage of international differences in the cost or quality of labor so as to produce intermediate parts and products abroad.

Finally, German multinationals, much more than their French counterparts, make foreign investments through internal growth (greenfields). This enables them to control production abroad better than in the case of FDIs made through external growth (acquisitions). In contrast, French multinationals are, more than their German counterparts, tempted by acquisitions when they want to enter a foreign market. Once again, a possible explanation is the strategic advantage held

by German multinationals in spending on R&D and innovation.

Consequently, French and German firms pursue different models of internationalization. This article does not claim to present an exhaustive list of the explanatory factors, nor to establish a direct relation between these two models of internationalization strategies and economic performance. It is yet to be proven whether these differences stem from domestic conditions (the costs of labor or capital, the institutional and cultural environments) or from the general strategic position. Although average profitability is lower for French than German firms, this is not so for the French and German multinationals in the UNCTAD sample. In 2012, the margin in relation to sales was 5.6% for these French multinationals vs. 3.9% for the German ones.

Beyond its input to theory-building in the academic literature, this article shows that managers must, when analyzing competition or drafting a strategy, better understand how a competitor's decisions are rooted in the context of his country of origin if they want to anticipate his strategic movements.

This research has limitations that should be pointed out. First of all, it focuses on exports and foreign investments, and thus overlooks more cooperative forms of development (franchises, alliances, etc.). In effect, data on these entry modes are not available at the country level. Secondly, the use of global data does not enable us to eliminate the hypothesis that specialization by sector in the two countries under study has affected the choices made — even though the sectoral distribution of the French and German multinationals ranked among the top 100 by UNCTAD is comparable. All the German firms and 60% of the French firms come from five branches of the economy: the automobile industry; energy and utilities; telecommunications; electric and electronic products; and the chemical and pharmaceutical industry. Finally, although possibilities for explaining national characteristics have been suggested herein, they do not take into account all dimensions of each nation's context. Nor do they allow us to build a model of how these dimensions are related to the choices made. It would be worthwhile bringing national, cultural factors into the proposed model; model-building, though complicated, is an important line of inquiry for further research.

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The Gribeauval system, or the issue of standardization in the 18th century

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From the Revolution to the Napoleonic Empire, French armies had the upper hand in Europe — mainly owing to the standardization of the artillery at the end of the 18th century by Jean-Baptiste Vaquette de Gribeauval (1715-1789), an officer and engineer. This standardization of the caliber of canons and the design of carriages (wheels and axles) presupposed techniques of production and measurement, and implied training artillery officers in the basic and applied sciences. Everything had to change at once: military doctrine, industry and techniques. Like the *Querelle des Bouffons* in opera, this highly controversial shift sparked a major controversy during the last years of the monarchy: the so-called Quarrel of the Reds and Blues, with reference to the color of gunners' uniforms before and after the reorganization of the artillery. Initially backed by the king, Gribeauval fell out of favor but was then reinstated and conducted his reform successfully. A presentation of this first big battle of industrial standardization in its historical context...

Between 20 September 1792, the date of the Battle of Valmy (which amounted to an artillery duel that ended with the Prussian army beating a retreat) and 18 June 1815, the date of the Battle of Waterloo (which put an end to the First Empire), the Revolutionary and then Napoleonic French armies dominated the European military stage.⁽¹⁾ This supremacy came from their mobility, which astounded enemies. The most spectacular instance was the swing toward Germany in August 1805 of the Grande Armée, which, stationed in Boulogne, had initially been instructed to embark for England. Advances took place so swiftly that the general commanding the Russian army, Kutuzov, on whose support his Austrian allies were counting, thought that the French were still along the English Channel while they had just hemmed in the Austrian army in Ulm. The French army owed this mobility and its considerable firepower to its artillery.

The French artillery had been designed and standardized in the waning years of the monarchy under what has been called the Gribeauval system. This system is probably the archetype of all the big battles

for standardization in contemporary industry. This is not a matter of coincidence. The artillery is required to have sometimes contradictory and often incompatible characteristics: to be robust, powerful, precise, stable, simple for use and upkeep, light and fast — all of this, of course, at a low cost. The army resignedly accepted for a long time a “*more or less felicitous compromise*” between these contradictory requirements — a compromise resulting from a “*roughhewn price quote that depends on the moral, social, intellectual, technical and economic conditions at any given moment*” (CHALMIN 1968:466). How was this approach overhauled? How did the Gribeauval system develop? How was it put into application? The major quarrels about standardization are not merely technical and industrial but also, as we shall see, political and social owing to their implications.

⁽¹⁾ The authors would like to thank the participants of the AEGIS writing workshop of 8 April 2016, who helped them improve this text, which has been translated from French by Noal Mellott (Omaha Beach, France).

The military controversy

Invented in the 14th century, artillery had the function of demolishing the ramparts around medieval towns or defending them during a siege. Problems of standardization arose from the start. Each foundry felt it fully mastered the best techniques and tried to make innovations without giving thought, apart from the ambition to outstrip them, to what its competitors were doing. Consequently, the cannon parts were not comparable with each other: carriages, bores, the caissons containing cannonballs and gunpowder, etc. — everything depended on the mill that had made them. Each cannon (or nearly) had its own projectiles. This was an especially acute problem for the armies of Charles V, their equipment reflecting the diversity of the Holy Roman Empire. The cannons from Austrian, Spanish or Flemish foundries were not at all compatible with each other. The first attempt at standardization was to codify calibers so as to reduce the number of them.

The purpose of artillery changed during the reign of Gustavus Adolphus (Gustav II, 1594-1632) of Sweden. Depending on current tactics, this king was the first to use light, mobile guns grouped in batteries. Cavalry could thus be sheltered from attacks by the enemy infantry and held in reserve for launching a potentially decisive offensive. French generals (such as Gassion, assistant to the young Condé) managed to gradually introduce the Swedish king's ideas in the French armies.

Nevertheless, wars at the end of the 17th century, in particular those conducted by Louis XIV, remained traditional. Armies moved slowly over routes, which could not be used all winter long and could barely be used in the summer during bad weather, before reaching a city to besiege and then moving on to the next. This sort of warfare was still being waged at the start of the 18th century. A distinction was made between “battery guns” (the heavy cannons used for sieges) and “field guns for a Swedish-type campaign”. Technically, these two types of cannons were quite different and were not at all handled alike. On the battlefield, the Swedish-type of artillery had to be positioned with regard to the infantry and cavalry, whereas the heavy cannons served only during sieges. It should be pointed out that the heavy cannons were 16- or even 20-pounders, the numbers indicating the projectile's weight in French pounds.⁽²⁾

The actions of one of the greatest generals, the Marshal of Saxony, illustrated this hesitation. Count Maurice's brilliant campaign in 1745 started with the capture of Tournai with the help of siege artillery. A little more than a month later, the Battle of Fontenoy was won because batteries (Swedish-type artillery) were quickly redeployed to curb an English attack that

was threatening to split the French army in two. Nonetheless, in his posthumous *Mes rêveries* (1757: book I, chapter 7), Maurice de Saxe stated his preference for an army exclusively equipped with 16-pounder cannons drawn by oxen. These beasts of burden, he wrote, could be put out to pasture more easily than horses and, when food was scarce, could be slaughtered so that famished soldiers would have something to eat. We might at least conclude that he apparently did not set store on the speed for moving troops!

Meanwhile, Frederick II, who did not like siege warfare and had little talent for it, was clearly orienting the Prussian army toward maneuver warfare. Prompted by this example, some pundits in France also called for a “*light and manageable*” artillery “*always in movement*” (CHALMIN 1968:487).

In the mid-18th century, two schools of thought stood at odds. This standoff — technical, political and industrial — sparked a quarrel. This controversy, violent in words, foreshadowed the battles of standardization in modern industry (CORBEL 2005).

Before Gribeauval

On 7 October 1732, Louis XV signed a royal order for a much needed reorganization of the artillery. It instituted, under the influence of one of the best artillery officers at the time, Jean-Florent de Vallière, what has been called the “Vallière system”. To put an end to the anarchy in calibers, only guns firing projectiles of 24, 16, 12, 8 and 4 pounds would be made in France.

This step was important but not decisive, since no account was taken of the choice between destructive firepower and mobility. All artillery guns, even those of lighter weight, were still long and, as a consequence, heavy. They were made for sieges, for attrition rather than maneuver warfare. For a 4-pounder Vallière cannon, the barrel's length equaled 26 times the caliber, in comparison with a ratio of 17 for a Swedish-type cannon. The weights were 1,150 pounds for the first and 600 pounds for the second. The variance for artillery of a Vallière type was much too large for regular windage (*i.e.*, the difference between the diameters of the cannonball and of the bore). Therefore, the firing range and precision were not optimal. Furthermore, only the sizes of calibers had been fixed. Everything else, in particular the carriages, still varied from province to province. In fact, Vallière refused to have any changes made to the carriages.

In late 1754, the minister of Warfare, Marc-Pierre de Voyer de Paulmy, Count of Argenson, learned that Frederick II had decided to adopt a light cannon for the Prussian army — barely one hundred times the weight of its projectile. Although Franco-Prussian relations were not all that cordial, Frederick II accepted, probably as a token of goodwill, for France to send an envoy. He said he would place at the French officer's disposal all requested information. The officer that the crown chose to send was Jean-Baptiste Vaquette de Gribeauval. Coming from the minor nobility and having a humble financial situation, Gribeauval had been oriented

⁽²⁾ Since the French pound, 489.5 g, weighed more than the English pound, 453.6 g., an English cannonball of 16 pounds was not compatible with a 16-pounder French cannon; and vice-versa.

toward the artillery, since he had neither the means nor the contacts that would have opened the way toward joining the infantry or cavalry. Gribeauval arrived in Berlin on 20 May 1755. Upon returning to Paris, he submitted to the king a report critical of the Prussian equipment. The king asked for proof. Gribeauval, the only person capable of giving it, was thus introduced to Louis XV.

The Seven Years' War (1756-1763) broke out a year later. Aware of her army's weak points, Maria Theresa of Austria, allied with France, asked Louis XV to send engineers trained in siege warfare. Since the time of Vauban, French engineers were known to be the best in this field.

Appointed *Oberstfeldwachtmeister* of the imperial armies, Gribeauval, 43 years old, conducted his first siege, the town of Neisse/Nysa (now on the German-Polish border). Within a few months, he became the specialist of this type of combat in the Austrian army and won fame at Schweidnitz/Swidnica, which he had been assigned to defend. The Prussian king would spend months taking back this town, which the Austrians had captured in a few days. Frederick II was piqued, as he stated in a letter: *"A certain Griboval [sic], who is full of himself, and ten thousand Austrians have stopped us up till now"* (quoted in NARDIN 1982:83). He was so vexed that he refused, at first, to meet Austrian officers after the town fell, but he then changed his mind and even invited them to his table. This battle created a considerable stir in Europe: a French officer had stood up for several months to the Prussian king personally in command of the siege. Following this event, this officer found himself in a sensitive position. The Empress wanted to keep him in her army and awarded him the Maria Theresa Order, a very rare distinction for a foreigner; but Louis XV definitely wanted him to return to his homeland. Gribeauval finally decided to go back to France.

Drawing lessons from the war, Count Étienne-François de Choiseul, secretary of state for War (but, in fact, quasi prime minister) proposed a reform of the army to Louis XV. His diagnosis was clear: France thought it had the best artillery in Europe. This fixed idea might still be true for siege artillery, he told the king, but it no longer held for field artillery. Modernizing the army was imperative. To do so, Choiseul proposed appointing Gribeauval while keeping Vallière as the nominal officeholder.

This would be a sound decision, since the prince of Liechtenstein had already reformed the Austrian artillery, which had proved to be the best in Europe during the war. Gribeauval knew the ins and outs of the reform adopted by Austria. Having analyzed its weak points, he thought he could fix them by making a system even better than the Austrian one: *"This artillery has a big effect in battles owing to the large number [of pieces]. It has advantages over France's artillery, which has its own advantages over it. An enlightened man, without passion, familiar with the details and creditworthy enough to go straight to the good solution, would take from these two artilleries what could be used to make one artillery that would be decisive in nearly all*

field warfare actions. But ignorance, pride or jealousy always interferes — the devil himself. We cannot change that like changing clothes. It costs too much, and there's too much danger if we are not sure of success" (quoted in HENNEBERT 1896:36).

The Gribeauval reform

Gribeauval decided to take on the devil's own job: he launched a sweeping reform. His starting point was to differentiate between siege and garrison artillery, coastal, naval and field artillery. For field artillery, a system was to be designed allowing for mobility and heavy firepower — which, at the time, seemed contradictory. To make a lighter cannon without reducing its projectile's weight, the simplest solution was to shorten the barrel. So the decision was made that the barrel's length would equal 18 calibers, *i.e.*, 18 times the cannonball's diameter. The Prussians had settled on a ratio of 15, but Gribeauval held firm: 18 was better for the gun's solidity. Time would tell that he was right: some of the cannons made during the reign of Louis XV would still be part of the Grande Armée's equipment.

With a shortened barrel however, a cannon could not shoot as accurately nor as far. It was agreed to maintain a range of *500 toises* (about one kilometer, one *toise* being approximately six feet). To avoid fire dispersion, cannonballs had to be perfectly spherical, and the variance between the diameters of the ball and of the bore had to be kept small. A major industrial and technical problem cropped up.

Gribeauval turned to Johann Maritz from Berne. This founder of Swiss origin proposed a revolutionary method. Till then, cannons had been cast in a mold with a core inserted to create the hollow area corresponding to the bore. Once the cannon was cast, the core was taken out; and the hollowed out space was reamed so that the bore would be as even as possible inside. In contrast with this core casting, Maritz — and this was his strong point — cast a cannon as a solid piece and then bored a hole in it afterwards. He even claimed to have made a perfectly even bore down to a millimeter. He invented a brand-new machine for this feat.

The problem still hanging was to improve the roundness of projectiles so that shorter (and therefore lighter) cannons could be made with a firing range and a precision equal to traditional ones, which were longer and, therefore, heavier. The first guns made under this new system seemed satisfactory.

In late April 1764, Choiseul ordered Gribeauval to test and compare the new and old cannons in Strasbourg. As he full well knew, many in the artillery corps firmly opposed the new system. Everything was to be very carefully organized. In particular, several opponents of Gribeauval would sit on the committee in charge of writing the report. All the officers at the garrison were asked to attend the demonstration. The test was tightly designed. Two rows were erected of wooden posts spaced approximately sixty feet apart. Each cannon's

firing range would be measured accurately along with fire dispersion.

A report was forwarded in August to the minister. There was little difference in the firing range between the light and heavy pieces: from 5% to 10% depending on conditions. By elevating the angle half a degree for the lighter cannons, they had a range equivalent to the heavier pieces. Fire dispersion did not amount to much. An extreme test was ten run on the cannons: firing nine hundred shots in a row, conditions resembling actual warfare. Might the lighter cannons not overheat much faster than the heavier ones? The test proved that this did not happen.

Gribeauval thus demonstrated that the new cannons were as efficient as those from the Vallière system of 1732, but they were much lighter and easier to maneuver. He reckoned that only the 12-, 8- and 4-pounders should be retained,⁽³⁾ the 3-pounder being too inefficient. The 16-pounder cannons, too heavy, would be kept in reserve for eventual use against fortifications that withstood attack. But they would not accompany the army during campaigns, since the 12-pounders were more than adequate to breach the usual fortifications.

Gribeauval did not hold still at this point. For the lighter cannons to yield a decisive advantage on the battlefield, the whole system had to be redesigned (ROSEN 1975).

When a cannon was in firing position while being transported, its weight was unevenly distributed. The Austrian solution for the carriages was adopted: the barrel had a different position for transportation and for firing. However many technical improvements went far beyond what the Austrians had imagined. Wooden axles on cannons were replaced with iron ones. A screw replaced the wood peg that, pushed in at variable lengths, regulated the angular height. A compartment was added to the carriage for balls and powder; once positioned, a cannon could thus be fired without having to wait for the caisson carrying munitions. Besides, the caissons were lighter, and all vehicles now had much sturdier steel axles. Two standardized sizes were set for the wheels of carriages, caissons, forges, etc. Since axles might break, the decision was made to equip artillery units in the field with forges. The equipment was designed so that a cannon could be released from the team drawing it without having to unharness the horses; this considerably saved time when setting up a battery.

Besides his excellent work in the foundry, Maritz was a remarkable mechanic. He advised Gribeauval on all points in the new system. Although the report by Gribeauval to Choiseul was improved with additions till 1789, it was not substantially altered. The whole Gribeauval system was ready in 1764. Once implemented, it would stay pat till the French Revolution (NAULET 2002).

⁽³⁾ Demonstration of the firing of an 8-pounder cannon of the Gribeauval system on <https://www.youtube.com/watch?v=kx2lQViUmkc>.

Oddly enough, the royal order for reforming the artillery was never published. This was rare but not exceptional. Expecting lively opposition from the army, political authorities tried to avoid rocking the boat while retaining the possibility of reversing course if need be.

The new system also implied reforming how the armies operated. Till then, gunners formed a separate corps. In the field, they slept in the artillery camp with their equipment. During combat, they were on temporary assignment with the infantry. There was no specialization: a detachment might operate a 4-pounder one day and a 16-pounder the next. Now, each detachment was specialized in a type of artillery and made responsible for the cannon and its maintenance. The detachment could stay with the infantry unit where it was assigned. Knowing that it would (logically) be necessary to have the gunners mount horses, Gribeauval expected an outcry. He settled on proposing that they ride in carriages, a solution adopted in Germany. But Choiseul put this decision on hold. To signal that the reform marked a turning point, gunners would now wear blue instead of red uniforms.

From an industrial perspective, the new system could work only if standardization were complete. Previously, each province used its own system of measurement, whence variances in calibers. Gribeauval imposed on everyone the so-called *Châtelet toise*. Standardized copper measuring rods were distributed in all arsenals. No one had ever before worked under conditions sharing this degree of precision. Controls upon delivery were now systematic. They were facilitated by ongoing improvements in the instruments invented for the task, such as the callipers that, by measuring the bore with unprecedented precision, would help reduce windage (PEAUCELLE 2005:60). "*Now — something not imaginable previously — a rim made in Auxonne could be fully adjusted to a hub made in Strasbourg or Metz*", exclaimed du Coudray, a captain who appreciated the interchangeability of parts (NARDIN 1982).

Costs were expected to explode. But nothing of the sort happened. On the contrary and to everyone's surprise, standardization with such a high level of precision came at a relatively moderate price — owing to economies of scale and the learning curve.

A technical controversy and political about-face

Vallière was succeeded by his son as director-general of the artillery. The son had a book by his father, who had died a few years earlier, published in 1768. He added an appendix of his own to it: "Reflections on the principles of artillery". Therein, he reiterated the usual criticisms: light artillery pieces had a shorter range, and their fire was less accurate. Besides, they overheated too fast; and the reduced windage prevented firing red-hot projectiles. This was true: a cannonball dilated by heat could no longer be loaded in a barrel more precisely calibrated to the ball's diameter (whence the

invention of the howitzer). In conclusion, the system from 1732 should be preserved, since it had proven itself, especially with respect to mobility.

This first criticism of the reform of the artillery under Choiseul and Gribeauval opened a floodgate for what would appear in several memoirs — usually published in London or Amsterdam to elude censorship. Doubt was cast on the Strasbourg test, which Saint-Auban, one of Gribeauval's most vehement opponents, described as a set of “mysterious operations covered in a darkness inscrutable to any human eye that was not thought to be timid or accommodating” (quoted in NARDIN 1982:168). Recall that Choiseul had taken the precaution of putting opponents of Gribeauval on the committee and that the tests were performed in the presence of all officers at the garrison, who were mustered for the demonstration. In these memoirs, any old claim could be made: the new guns were less sturdy and less accurate than the older ones; the carriages were too fragile; gunners' specialization in given types of cannon was a regression compared with their former versatility, which had proven useful on the battlefield; the screw for adjusting the angular height became clogged with soot and wore out; promoting noncommissioned officers to the rank of officer of artillery made them arrogant and incompetent; and so forth. Above all, the cost of Gribeauval's full reform alarmed financial services, which would urge decision-makers to review their position.

The debate flared, and authorities felt it necessary to organize a new demonstration. The test conducted in Douai on 12 July 1771 showed that heavy cannons had a range 15% longer than light ones but that fire dispersion was the same for both. The lighter cannons also had twice the recoil of heavier ones. The test was made to add more gunpowder in an effort to increase the range of the light pieces, but to no avail. In some cases, the range was even shorter. This finding should have come as no surprise, since Bernard Forest de Belidor, professor of mathematics and artillery, had proven a few years earlier that the optimum range was attained using a dose of gunpowder equal to a third of the cannonball's weight. Following the Douai demonstration, Louis XV began having doubts. He decided to fall back on the former system. The symbol of this reversal: gunners would keep their old uniforms.

The only voice speaking up for the new system came from Philippe Tronson du Coudray, the scanty 32-year-old captain of the work crew. Coudray, whom Gribeauval had appointed, circulated several pamphlets in favor of his mentor's system and against the about-face. Besides, what to do with the equipment acquired over the previous seven years? The stock of projectiles and new guns would have to be modified for the sake of compatibility with the old equipment that would be redeployed. The circumference could be reduced, it was imagined... but Coudray explained how dangerous this was, given the friability of the cannonballs.

The Academy of Sciences joined the fray. Buffon, who liked to claim to be expert in metallurgy, emitted an opinion. Coudray refuted him. The fray involved

name-calling between “Reds” and “Blues”, the “fashionable” and “old whigs”! To make the quarrel resound, Saint-Auban started publishing articles in the *Journal militaire et politique*. According to the editor, “*There is more than the presumption that, had (as is the custom) he asked the ministers for permission to make public his remarks against adopting the new system, the examination of the manuscript would have been sent to his opponents and he would thus have been forbidden to express his opinion freely. Instead, the editors and censors of the learned journals of physics, encyclopedists and others have found nothing in M. de Saint-Auban's writings that could prevent the printing thereof*” (quoted in NARDIN 1982:286-287).

This dispute impassioned public opinion, even though it understood next to nothing about the topic. Meanwhile, since 1752 and the performance in Paris of *La Serva Padrona* [*The Servant Turned Mistress*], the country was shaken by the quarrel between supporters of French opera, descended from Lully and Rameau, and of Italian opera, revolutionized by Pergolesi (FABIANO 2005, KINTZLER 2011). These quarrels extended beyond a narrow circle of experts and drew enthusiastic attention of all strata of the population. Given that explicitly political debates were forbidden under the monarchy in the mid-18th century, they instituted what Jürgen Habermas (1988) has called the public sphere, in preparations for free, open debate, as would happen during the French Revolution.

A complication: while reforming the artillery, Gribeauval had tried, in addition, to have the guns used by the infantry replaced (PEAUCELLE 2005). Once again, the new muskets (Model 1777) would give an advantage to French armies during the Revolutionary and Napoleonic wars. However Gribeauval's opponents used a shady affair concerning the previous generation of muskets to stain his reputation. Gribeauval fell into disgrace.

Gribeauval's comeback: The peak of his career

The eclipse did not last long. Emmanuel-Armand de Vignerot du Plessis-Richelieu, Duke of Aiguillon, was appointed minister. Though favorable to Gribeauval, he knew he would have to play it tight. How to reverse, once again, the king's opinion? He cleverly put together a committee of four Marshals of France who had commanded an army in Germany: Richelieu, Contades, Soubise and Broglie. The selection was unquestionable: these men had gained the most experience in recent wars, during which they had won fame and used the equipment in question. But the selection was not neutral: Aiguillon knew that these officers had experience with lighter pieces of artillery and preferred them. Vallière (the son) and Gribeauval expounded their ideas before this prestigious group. As Aiguillon expected, the Marshals unanimously sided with Gribeauval.

After a stroke of hard luck — Louis XV died on 10 May 1774, and Aiguillon was dismissed — Louis XVI chose as replacement de Mouy, who was in

favor of Gribeauval. The royal order of 3 October 1774 adopting the Gribeauval system even foresaw that promotions for gunners would be made on the basis of their qualifications (through a vote by those in the rank above them). This provision — utterly contrary to what existed in the infantry or cavalry, which nobles dominated — vouchsafed the artillery corps's technical competence. When, in July 1789, noble officers emigrated, thus disorganizing the army, they were usually replaced with artillery officers selected for their qualifications alone. Among them would be a young Corsican from the minor nobility...

The quarrel smouldered in memoirs and pamphlets, until it burned out for want of combatants: Vallière died; and authorities forced Saint-Auban, the staunchest opponent of the Gribeauval system, to hold his peace. Du Coudray had to leave the country. Above all, the new system's 4-pounder cannons proved effective during the difficult campaign in Corsica in 1769, when Noël Jourda, the Count of Vaux, heavily relied on them.

Gribeauval could now try to fully deploy his system, in spite of the financial situation, which would deteriorate due to the support that France was lending to the American insurgents. It is worth mentioning Philippe Henri de Ségur, minister of War, who made a decision that would play a part in triggering the French Revolution: a royal order of 22 May 1781 required that nobles have proof of four quarters of nobility in order to become military officers. This decision eliminated the sons of the bourgeoisie and of Nobles of the Robe from the king's service. The discontent it sparked would burn on. All the same, this minister let the artillery to Gribeauval, since it had, it was believed, attained a degree of efficiency such that no major reform was required. A royal order of 3 November 1776, written under Gribeauval's supervision, enabled him to deploy his system. By the 1780s, it was in place. A last step was to finalize the new Gomer mortars, which would be used during all the Revolutionary and Napoleonic wars.

Gribeauval then devoted all his energy to training officers and gunners.⁽⁴⁾ Engineering theory was to be taught: mathematics, the physics of metal and wood, metallurgy, mechanics, smelting, draftsmanship, topography and lessons about military campaigns. The practical part of course work (three days a week) involved learning how to form batteries, maneuver, manipulate munitions and artillery pieces, and fire cannons.

As for industry, Gribeauval helped Ignace de Wendel and William Wilkinson set up in Le Creusot an ironworks with a forge for casting cannons using coke as fuel. He engaged in a last battle for a reform: Frederick II had created mounted artillery units a few years earlier. The cavalry was capable of capturing a position, such as a hilltop, but unable to keep it long enough for the infantry to arrive. Setting up an artillery battery in such a position would be a tactic useful for withstanding a counterattack. Austria had adopted this tactic, and it was impossible to imagine that France should not do so. But the situation

⁽⁴⁾ École Polytechnique is the Revolutionary heir of the Gribeauval artillery schools.

was blocked because transportation was in the hands of private operators instead of the army. The risk of a dispute was too high, and the ministry of War under Ségur (as under Choiseul previously) backed down. The French Revolution would make this additional step forward in 1791.

For twenty years, Gribeauval introduced the first major system of industrial standardization in history, even though we cannot explain exactly how, with no previous experience, he achieved such a colossal task: *“the realization and use of construction tables required a constant effort that continued till into 1789. They had to be made for all parts and materials: cannons, munitions, caissons, carts, field forges, carriages, axle units, drays, etc., as well as the tools and devices used for all sorts of control and verification (lunettes, callipers, etc.). There were, too, the drawings of the special machines for boring, reaming or cutting bolts. Related regulations, just as useful, set the sizes of the semifinished products to be used, such as pieces of iron (flat or square), sheet metal, bars (round or rectangular), wooden parts, ... the tools for artillery: drill bits, screw taps, tappers, etc. Each of these tools bore a standardized mark, a crowned ‘A’ (Royal Artillery Corps) followed by two letters indicating the origin (MA for Maubeuge, SE for Saint-Étienne, etc.)”* (NARDIN 1982:340). To improve on these parts and materials and foster ongoing innovations, Gribeauval supported setting up a special shop for designing prototypes in Saint-Étienne.

Epilogue

We expect that Gribeauval would have been promoted Marshal, but he did not meet the requirement of four quarters of nobility set by Ségur. He was not among the eleven Marshals of France appointed in June 1783. He died on 9 May 1789, as the Estates-General was meeting. He did not, therefore, witness his system's triumph on Europe's battlefields.

Taking stock of the Gribeauval system

It is worthwhile reviewing several points in this system.

The first, not all that important, has to do with the controversy about what Gribeauval himself actually contributed to his system. From the start of the quarrel, Saint-Auban accused him of not having invented his system, of having borrowed nearly all his ideas from the Austrians and Prussians. After all, Gribeauval had probably come upon the forecarriages with big wheels, the long shafts (which made it possible to pull the cannons while trotting or even galloping, and not just at a walking pace), the iron axles, the copper pads for the hubs, etc. in a publication dating from 1722, a book he did not mention by a certain Camus: *Des forces mouvantes*. Oddly enough, English-speaking historians have rekindled this controversy by claiming that the famous Gribeauval system was but the Liechtenstein (*i.e.*, Austrian) system (MACLENNAN 2003). The question seems insignificant. After all, the superiority

of the French artillery and, therefore, of the Gribeauval system was repeatedly demonstrated on battlefields during the French Revolution and under Napoleon.

Two more important points have to do with standardization itself.

First of all, the originality and strength of Gribeauval's approach was, unmistakably, that it was systemic. Gribeauval introduced, for the first time in history, a standardized industrial system. This required inventing more accurate measuring instruments, setting up workshops capable of designing prototypes, devising methods of production capable of achieving the requisite level of quality, and instituting systems of control to make sure that all production sites had the same level of quality and produced exactly the components required. Given this systemic approach, everything had to change at the same time in the political, industrial, military, scientific and social spheres.

As for industry, this precise, detailed standardization boosted the integrated manufactories that implemented serial production with tight quality controls. Complaining about this, manufacturers called for higher prices.

As for education, schools had to be founded or reformed to provide the best possible scientific and technical training to the persons who would be using the new equipment on the battlefield.

As for the army, warfare had changed. Till then, it mainly consisted of laying siege to fortifications; but now it required mobility and firepower, with, as a consequence, the carnage under the Revolution and the Empire, the first slaughtering fields of modern times. This trend entailed an organizational change: the artillery, an autonomous corps during siege warfare, was now integrated with other army corps for maneuvers, even though its differences, owing to the skills and qualifications required, persisted.

As for science, prototypes were tested, and the science behind the working of metals came under discussion.

As for the political and social spheres, the need for expertise cast doubt on the monarchy, precisely: on the very foundation of an aristocratic society, namely the principle that the nobility was the only group capable of assuming military offices. Although the emigration of noble officers as of July 1789 disorganized the French army in the short run, it ultimately made room for deserving talents. Young officers who were not nobles but had been trained in artillery schools soon took the places left vacant by the *émigrés*. They would form the brilliant staff of French armies during the Revolutionary and Napoleonic periods.

Secondly, another lesson to draw from the Gribeauval reform is that battles of standardization are both technical and political, the two dimensions overlapping. Given the uncertainty that prevails when they are pitched, these battles are not purely technical. This falls in line with science studies of scientific controversies (LATOUR 1989, CALLON *et al.* 2001). The three tests run for settling the quarrel make this point.

The Strasbourg test had a rigorous methodology. Measurements were accurate, owing to the posts staked sixty feet apart. Furthermore, the cannons were tested under an extreme condition: continuous firing, which raised the temperature of the barrels. Choiseul fully understood that this technical demonstration had a political dimension. For one thing, he made sure to appoint to the official committee avowed opponents of the new system. For another, he tried to reach out, at least indirectly, to a broader public by authorizing all the officers at the garrison to attend.

The second test at Douai, though intended to be purely technical, was — as everyone knew — political. It induced Louis XV to make an about-face, in a return to the Vallière system. But the demonstration proved unsatisfactory for technical reasons. Either the persons who conducted it were not familiar with the technical and scientific discoveries made by Belidor; or else they willfully ignored them. Although the decision to be made fit into a political context, it had to be as rigorous as possible scientifically.

The third test, organized by Aiguillon, was highly political. The final users — the Marshals of France who had taken part in the last major war (with Prussia) — were entrusted with conducting it. They heard both parties, Vallière's son and Gribeauval; and then expressed an opinion. Politically, it was hard to challenge their expertise, even though, from the start, everyone knew they supported a Swedish-type of artillery.

Let us bear in mind that this quarrel concerned military equipment. The level of technical uncertainty is very high, since military equipment is actually tested only in a real-life situation — on the battlefield. For this reason, military officers usually prefer limited conflicts, which allow them to form a clear idea about the performance of the material at their disposal. The occasion for testing the Gribeauval system arose during the limited war conducted in Corsica, when the Count of Vaux made heavy use of the new 4-pounder cannons. This settled the quarrel in the most convincing of ways.

Conclusion

Beyond the history of industry during the 19th century, on the far side of the history of politics, much of what would occur between 1792 and 1815 — the establishment of democracy against the aristocracy and the growing power of expertise in democratic society — was played out during the often overlooked battle for the standardization of artillery. This battle was conducted by a man who imagined a system, who took interest in any inventions that could be incorporated in it, who set off “bunches” (to borrow from Schumpeter) of innovations, who managed to install the system over a twenty-year period, during the reigns of two kings, and who did all this in spite of political setbacks and the repeated appointment of new ministers.

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When innovation implied corporate reform: A historical perspective through the writings of Walther Rathenau

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The work of Walther Rathenau (1867-1922), the head of Allgemeine Elektrizitäts-Gesellschaft (AEG) and a minister in the early days of the Weimar Republic, casts a historical light on the ideas that intellectuals and corporate executives in the 1910s had about the modern firm and its social responsibilities. For Rathenau, the modern firm stands out owing not to its size but to its capacity for collective innovation. Seeing this capacity as the grounds for new responsibilities, he proposed institutionalizing a form of governance that would articulate the firm's private status with its finality as a community of interest. Now that corporate social responsibility is being discussed in terms ranging from voluntary ethics to a utilitarian approach, reading Rathenau leads us to understand that history could have carried this concept in a different direction: perspectives open for the future...

Talk about corporate social responsibility is becoming more earnest as firms grow and have a global reach. Given the ecological disequilibrium caused by corporate activities, some pundits have denied that business can voluntarily take account of social and environmental preoccupations (CRANE *et al.* 2014, FLEMING & JONES 2013, KARNAN 2011). As a private party pursuing its own interests, a firm might, of course, pay heed to stakeholders when doing so stimulates its growth. But is it able to actually take into account social preoccupations that do not serve its interests or might even disserve them?

These questions are not new, as history shows (ACQUIER & AGGERI 2009, MARENS 2008). The paternity of the concept of corporate social responsibility is usually attributed to Howard Bowen's book published in 1953. (ACQUIER & GOND 2007). Questions about social responsibility arose, it has been attested, from the birth of big firms and modern management at the start of the 20th century. Modern managers did not just "rationalize" operations; they purposed to be progressist. Corporate leaders frequently drew attention to their responsibilities and the services of public interest rendered by their firms

(ACQUIER & GOND 2007, BOWEN 1953). Referring to corporate leaders as "*quasi-public servants*", George Walbridge Perkins, a director at US Steel Corporation and then Harvester International, wrote in 1908 (p. 393): "*Many of our corporations, being of comparatively recent origin, have, at the outset, been managed by men who were previously in business, in some form or another, for themselves; and it has been very difficult for such men to change their point of view, to cease from looking at questions from the sole standpoint of personal gain and personal advantage, and to take the broader view of looking at them from the standpoint of the community-of-interest principle.*" Such talk has often been interpreted as a legitimation of firms (HEALD 1957 & 1961), an interpretation that is partially reductionist.

Let us, herein, look back on the origins of corporate social responsibility by setting our sights on Walther Rathenau (1867-1922), one of the few corporate directors at the time who put his conception of the firm and of its social responsibilities in writing. The thoughts of this author, who was both a captain of industry and a minister during the Weimar Republic, had a resounding echo during his lifetime. In Germany, more

than 65,000 copies of his book, *Von kommenden Dingen*, were sold during the year of publication in 1918; and an English translation came out in 1921. Rathenau was “the most read and passionately discussed German author” at the time (KESSLER 1933:179). Berle and Means quoted from this book in the conclusion of their well-known *The Modern Corporation and Private Property*, published in 1932, in order to suggest that a firm might serve not only its owners or shareholders but also society as a whole. Nevertheless, Rathenau has had few disciples. Given the current “crisis” of corporate social responsibility, it is worthwhile looking back on his contribution, since it opens toward another understanding of the firm’s social responsibility.

For one thing, Rathenau, writing while radical changes were taking place in German industry, based corporate responsibilities on an analysis of the firm as such. Once it had caught up with England, Germany experienced a period of unprecedented growth during the second half of the 19th century. In particular, the iron and steel, chemical and machine tool industries transformed, within a few decades, a country achieving unification. In the early days of the 20th century, much thought was being devoted to big firms. Recent studies have shed light on both the influence of Taylorists and the drive toward rationalization in Germany (NYLAND *et al.* 2014), in particular the acceptance of rationalization, including by labor unions, who saw this process as a way to make their factories more competitive (REHFELDT 1988). Rathenau showed, however, that the modern firm is not to be reduced to this process. For him, what characterized manufacturing firms at the start of the 20th century was their exceptional capacity for making collective innovations: precisely because of their power to undertake social and economic transformations, firms had new responsibilities to assume.

For another, Rathenau stands out owing to his proposals. He did not expect firms to spontaneously place their power for making transformations at the service of society; yet he did not propose assigning them new obligations. The scope of transformations implied, in his opinion, redefining the corporation and changing the principles underlying corporate government. In the world they have created, firms should, according to Rathenau, no longer be classified as private persons. Nor should the economy be interpreted as a set of players interacting via the markets. These models needed to be overhauled along with the corporation’s legal status and statutes.

Our rereading of Rathenau will enlighten us about how intellectuals and corporate leaders conceived of the modern firm at its birth and of its social responsibilities.⁽¹⁾ Questions will be raised about the history, as usually recounted, of corporate social responsibility. This article opens with a quick presentation of Walther

Rathenau’s life and dazzling career and of the lukewarm reception given to his ideas. A reinterpretation of his writings will then be proposed that insists on innovation. It will be shown how his analysis led to a critique of economic theories and to proposals for reforms that would link corporate autonomy to the aforementioned community-of-interest principle.

Walther Rathenau (1867-1922), “A man with his contrary”

Walther Rathenau’s life was hardly ordinary. We might say it was threefold: he was an industrialist, politician and essayist — the links among the three not always being evident.

From childhood to chairman of AEG

Walther Rathenau was the son of Emil Rathenau, AEG’s well-known founder. Emil started his education as an apprentice in a farm machinery factory inherited by his grandfather. He then worked in building, and even more designing, machinery for the purpose of systematizing mass production at the lowest cost. After having bought Edison’s patent, he founded *Deutsche Edison Gesellschaft*, which would become *Allgemeine Elektrizitäts-Gesellschaft* (AEG). Faced with the mighty Siemens, AEG cleverly staked out its position in electricity, a state-of-the-art science at the time, by inventing techniques for systematically designing machines. By playing a part in the country’s rapid electrification, AEG soon became the biggest electricity company in Germany (RIEDLER 1916).

Emil’s son, Walther, had a formal education in electrochemical engineering, the only field of electricity in which AEG was wanting. In 1889, Walter defended, in Berlin, a dissertation in physics on the absorption of light by metals. This marks the start of his career in this field of engineering. He soon filed several patents on the electrolysis of alkanes. His discoveries were apparently significant enough for him to be asked to present them to Emperor Wilhelm II. He founded *Electrochemische Werke*, an AEG subsidiary, where he was broken in as a young top executive, before joining AEG’s board in 1899. He proved his mettle by piloting several projects, such as having the group’s factories rebuilt with the help of R. Behrens, a well-known Bauhaus architect. Walther Rathenau successfully headed electrochemical plants in Austria and Germany, including the one in Bitterfeld. After his father withdrew from business, he was in charge of AEG. However he quickly moved into the chairmanship of the supervisory board and busied himself with public relations. He devoted efforts to several other companies. On the eve of World War I, he was sitting on the boards of 86 companies in Germany, and of 21 outside the country!

Walther Rathenau is better known for his other careers as essayist and politician. Put in charge of the Raw Materials Department during WW I, he organized and coordinated supply chains. He also headed a company that produced substitutes for raw materials in many

⁽¹⁾ This article has come out of a research program on the theory of the firm, which was supported by the Collège des Bernardins in Paris. It has been translated from French by Noal Mellott (Omaha Beach, France).

fields. After the war, he sided with the Weimar Republic, and became minister of Reconstruction in 1921, then minister of Foreign Affairs in 1922. He adopted certain positions, in particular his support for reaching an agreement with Russia, that were strongly criticized. A Jew, he was assassinated by the far right in 1922.

A thinker pondering industrial transformations

Rathenau's principal legacy is his analysis of the transformations wrought by industrialization. The concepts he molded in his writings have been frequently borrowed in various fields. Keynes, the economist, referred to Rathenau's concept of the "autonomy of firms" in a lecture in Berlin in 1926 (GELTER 2010). He also mentioned Rathenau when discussing the difference in corporate management between Germany and the United States: the power of managers tended to be feared in the United States given the dispersion of shareholders, whereas the power of controlling shareholders in Germany led Rathenau to criticize their eventual interference in management. Berle and Means (1932) also cited Rathenau in their conclusion.

Jurists have seen in Rathenau the harbinger of a conception of the firm that came under earnest discussion in Germany during the 1920s and 1930s. His idea of the "*enterprise as such* [*Unternehmen an sich*]" presents the firm not as a node of contracts but as a given entity pursuing its own finalities.

Rathenau has also been seen as a promoter of economic planning or "organized capitalism" (SVENSON 1961, REHFELDT 1990).

A controversial essayist

The various elaborations made in the course of the 20th century on Rathenau's writings in law, economics and management have had difficulty grasping this author's thoughts. There are several explanations of this.

First of all, Rathenau's essays were very controversial. For instance, in an opuscle on business and corporate law (RATHENAU 1917), he decried shareholders' inability to take part in managing modern firms and pointed out the contradictions between their legal empowerment and their usual incompetence. He also criticized the lawyers, courts and journalists who, failing to understand the watershed in economics, too often exhorted corporate executives to follow or even anticipate what the general assemblies of shareholders decided without any regard for the consequences on the firm. In other writings, he was less on the offensive, but leaves the impression that he was a utopian or even a mystic.

When he wrote *Von kommenden Dingen* in 1917, Europe was at war; and Rathenau was striving to build the future. Critics thus thought they saw enormous contradictions between, on the one hand, his position as a partisan of industry and rationalization and, on the other hand, his social views and political commitments. Contemporaries described him as a very paradoxical figure. His biographer, Count Kessler, said he was like a

"man with his contrary": "*At first, he was ignored. Then, when he went on, in the 'Critique of the Present Time' and 'Mechanics of the Spirit', murmurs were heard, voicing the annoyance of seeing the member of eighty boards of directors still busy writing books. This businessman preaching about the birth of the soul was considered ridiculous; this rich man attacking luxury was an embarrassment*" (KESSLER 1933:116).

But were Rathenau's careers as an industrialist and essayist all that contradictory? After all, his position as a corporate leader in a world in the throes of change induced him, I would like to show, to propose an original interpretation of industrialization. Mechanization and rationalization were not, in and of themselves, vectors of servitude, impoverishment or social violence. Instead, Rathenau saw them as bearing an unparalleled potential for progress and a source of promises of social advancement. Consequently, a new system of thought and a new type of organization were required.

This formed the core of his writings, which were, as we understand, not well received, even less so given that the translations of them (when they exist) are often problem-ridden. His landmark, *Von kommenden Dingen*, on which I have relied, was soon translated and widely commented. Although the German title means "the things to come" or, even better, "things still unknown" or "things to imagine", the title of the English translation is *In Days to Come*, which evokes a prediction. As for the title in French, *Où va le monde?* [Where is the world going/headed?], it suggests another, perhaps more critical or polemical, connotation.

Before presenting Rathenau's ideas, a few points of methodology and a few precautions are worth mentioning.

I have not consulted Rathenau's complete writings, mainly because they are not, to the best of my knowledge, all available in translation. In particular, I have not consulted the earlier *Zur Mechanik des Geistes* (1913) to which Rathenau made many a reference. It seems to have given rise to a *quid pro quo* since "mechanics of the mind" refers to the creative spirit/genius, but the full title continues with *Vom Reich der Seele*, "the realm of the soul". However several other texts are available (KESSLER 1933, RATHENAU 1913, 1917, 1918, 1921a & 1921b), and Létourneau (1995) has provided an exhaustive bibliography. In French, *La Triple Révolution* (RATHENAU 1921b) brings together three essays that, to my knowledge, make no mention of the word "revolution": *Die neue Wirtschaft* (1918), *Die neue Gesellschaft* (1919) and *Der neue Staat* (1919). Thanks to colleagues,⁽²⁾ access was obtained to Rathenau's untranslated *Vom Aktienwesen. Eine geschäftliche Betrachtung* (1917), which might be rendered as "On the role of joint stock companies: Commercial considerations". I have also relied on several studies (BUENSTORF & MURMANN

⁽²⁾ I cannot thank enough Regina Bornfeld, Guillemette de Courtivon and Pascal Le Masson for their patient, qualified help in deciphering Rathenau's original 1917 text.

2005, GELTER 2011, KESSLER 1933; LÉTOURNEAU 1995, McGAUGHEY 2015 & TEUBNER 1985).

Insofar as possible, I have compared different versions of Rathenau's texts and tried, if need be, to resort to the meaning of the original terms in German. References are made to the (unpaginated) translations in French or English available on line, but page numbers refer to the original in German.

“Mechanization”, the defining feature of the modern world

Management, or the “art of creating”?

A key concept in Rathenau's essays is *mekanisierung*, translated as “mechanization” in the English version or “machinism” in Kessler (1933). It is ambivalent. In Kessler's words, mankind is imprisoned in a world “*mechanized from top to bottom and amalgamated in an iron organization by material interests*”. Accordingly, Rathenau was seeking to augment freedom in the business world. My interpretation is quite different.

Owing to his experiences as an entrepreneur and executive in firms, Rathenau saw the 20th century as marked by technological changes. Considerable progress had been made in science and technology, and in the power to control things in nature and establish new infrastructures. All this was changing the face of the world. For management, this implied the capacity to imagine the future, to make things till then unknown happen. Rathenau conceived, therefore, of the firm's function in terms of creativity. The word “create” in its various forms (creation, creative, creator, creating, etc., in German: *schöpfung*, *schaffen*, etc.) crops up 179 times in the 360 pages of *Von kommenden Dingen*. Rathenau made recurrent analogies with the world of art. This means that, although scientific and technological progress was indispensable, since it was the source of development, today's knowledge did not suffice for creating tomorrow's world: “*Nowadays, science itself is starting to realize that its most perfected material is for the human will what a good map is for a traveler [...]. But a map cannot tell me which road is prescribed for me, the one toward which my heart and sense of duty attract me*” (RATHENAU: 1918:14). Science and knowledge were not, therefore, sufficient.

The firm was society's organ for adventuring into the unknown, exploring new possibilities and pushing back the bounds of what was known; and the managerial function was fundamentally creative. Significantly, Rathenau came to the conclusion that the German language lacked a word for this; so he proposed a derivative of the word “creation”: “*What is specific to all these men [those capable of governing: politicians and, too, organizers and entrepreneurs] is the faculty of envisioning what does not yet exist, of feeling that they are in communication with the organic world and of undergoing [its] deep influence, of intuitively grasping and comparing incommensurable effects and motives, of making the future emerge in their own minds. What characterizes their forms of action is the*

realistic imagination, the force of decision [...]. It is not surprising that the German language does not have a word to refer to this synthesis, this set of forces. I have chosen the phrase ‘art of affairs’ based on the former meaning of the word ‘affair’ [Geschäft], which comes from ‘create’ [Schaffen]” (RATHENAU 1919:327-328).

Mechanization, its potential and risks

Mechanization thus had special significance. It was the defining feature of the modern era, but did not refer just to a mechanized, routinized or rationalized world. Quite to the contrary, Rathenau (1918:29) wrote about the “*creative frontier where we are [auf der Schöpfungsgrenze, auf der wir stehen]*” since the era of mechanization was, in fact, a period when collective action became able to change the face of the world. It is, we might say, the era of what is man-made, as we enter a universe “created” by man.

Several writers at the time thought that policies of innovation were a source of new responsibilities for leaders (HATCHUEL 2016, SEGRESTIN 2016). According to Fayol (1917), leaders, facing the unknown, had to foresee contingencies and provide for the cohesion of society. For Perkins (1908:394) too, the responsibility of corporate executives was future-oriented: “*The foresight, the planning ahead, the putting the house in order for the storms of the future, are the true measure of the best and highest stewardship, as well as of the highest order of managerial ability.*”

Rathenau dwelled on the responsibility of leaders less than on the overall organization of the economy. Liberal economics had made mechanization possible but, too, had left it up to the game of competing interests. Instead of reducing poverty, mechanization tended to worsen inequality. What was to be reformed was not so much the process of mechanization as the framework in which it fit.

Toward a revamping of economic theory

Rathenau was not an economist and did not stake out a position as such in economics. As a manager however, he seemed to have measured the distance between corporations and economic theories. A theory of modern firms as agents independent of each other and a conception of production or consumption as functions of the choices made by individuals seemed to him thoroughly out of step with the issues. For this reason, he inveighed against classical liberal theories: “*An economic and social science is but applied ethics [...]; a state, an economy, a society deserve to vanish when they mean only a state of equilibrium of interests held in check, when they are only associations for production and consumption, armed or unarmed*” (Rathenau 1918:167).

Take note that he also rejected socialism. For him, abolishing property or profits was nonsense. To explain his conception of profit-making, he asked: what if the state has a certain amount of money to invest in the general interest? If it has to choose between several

development programs for different groups, what choice should it make? For Rathenau, it was not necessary to want to make a choice. Instead, ask each program to replenish the resources it consumes — to make a profit — so that the program is carried out while allowing for the realization of other programs. This is the true function of profits: the firm needs to make a profit to replenish its resources and pursue its — useful — work.

This leads to the idea that property entails responsibility: *“the owner’s arbitrariness [must be] replaced with responsibility.”* As Acquier and Gond (2007) have pointed out, this idea was widespread at the turn of the century, even among businessmen. It was highly tinted with religion (BOWEN 1953). According to Rathenau (1918:167), *“the world is [...] an association of creators [Schaffender]; whoever wastes work, worktime or the means of work steals from the group. Consumption is not a private matter: it is a matter for the group, for the state, for morals, for humanity.”* However the intent was not to orient the individual’s behavior through ethics or religion.

The deeper purpose was to revamp the theoretical grounds on which the modern firm had been built. The economy was not seen as a network of individual, individualistic actors. Rathenau seems to beckon us to give thought to concepts such as “communal economy”, where actors create a world in common and where the responsibility for things to come (*Von kommenden Dingen*) is assumed.

Toward new statutes for firms

The issue of the firm’s autonomy

According to Rathenau, firms are hemmed in by a set of institutional arrangements that no longer fit them. The legal framework, in particular shareholder corporations, was set up to organize trade but is still in use. What this framework regulates — collective actions — no longer has anything to do with its reason for being. Rathenau wrote about a *“substitution of contents [Substitution des Grundes]”*: corporations are no longer associations of merchants involved in a joint venture. These shareholders no longer manage the firm and are very often not even familiar with it. Their “shares” are, at best, a bet they have made on the state of health of a given branch of the economy.

Rathenau (1918:141) called, therefore, for a thoroughgoing reform of corporate governance, for *“breaking away from the convenience of liberal theories and imagining institutions adapted to creation”*. He set off a debate that the current of thought *Unternehmen an sich* (“The firm as such”) would amplify during the 1920s (GELTER 2011).

But what were the guidelines for this reform? Coherent with his view of profit-making, Rathenau formulated two main proposals. First of all, the firm should become “autonomous” by acquiring its own shares in equity. The need for capital was not so pressing that a firm could not rely on banks or foundations, or even, if need be, emit bonds. Secondly,

the firm, thus “depersonalized”, should be devoted to a creativity useful for society. While retaining a private status, it should pursue a specifically public finality.

Shareholder foundations: A community of interests

These proposals were not all that unrealistic; for Rathenau mentioned shareholder foundations. By ceding their shares to a foundation, the partners in a business would be effectively “depersonalizing” the firm. They could assign the foundation its mission through its statutes. Rathenau probably had in mind certain pioneering experiences in Germany, where shareholders had ceded their shares to a foundation for the purpose of ensuring through “impersonal property” (the only means of doing so) an orientation and stability (ABBE 1896). The Carl Zeiss Foundation was exemplary in this respect (See the boxed insert), but it was not the only example.

For managers, setting up a foundation is a way to

The Carl Zeiss Foundation

Since the end of the 19th century, the firm Carl Zeiss, an international leader in optics and optoelectronics, has experimented with a quite original form of governance: the shareholder foundation, of which there are several examples in Germany and Scandinavia (GOYDER 1951).

In 1846, Carl Zeiss set up a workshop of optical instruments. He soon recruited a physicist, Ernst Abbe, to help understand the distortion of images and produce microscopes. This was one of the first companies to have installed a system of management “by science” (BUENSTORF & MURMANN 2005). After Zeiss died in 1888, Abbe was the senior partner in the company. In 1896, he set up a foundation and endowed it with all shares in the firm. As the single shareholder, the Carl Zeiss Foundation is bound by the very precise principles that Abbe set down in a long constitution of 122 paragraphs.

Under this constitution, the firm has an innovative assignment with respect to a community of interests:

- *“Cultivate the branches of precise technical industry, which have been introduced into Jena by the Optical Works and the Glass Works” and thus guarantee the economic security of wage-earners and serve “the scientific and practical interest”;*
- *“Promote the general interests of the branches of precise technical industry [...] and] take part in organizations and measures designed for the public good of the working population of Jena and its immediate neighborhood”;*
- *“Promote study in natural and mathematical sciences both as regards research and teaching”.*

This assignment carries implications for all levels of management. For example, investments should not be made as a function of profitability alone. Instead, they should contribute to the firm’s learning and long-term viability by taking into account all dimensions, including the interest that wage-earners take in their work. The Foundation’s Council, which includes representatives of Saxe-Weimar and of the university, has the task of overseeing corporate management and seeing to it that management fulfills its assignment.

actually provide for the firm's autonomy so that it leads its life — like an artwork, which, once created, pursues its own existence independently of its maker (RATHENAU 1918:124). Rathenau thus considered the firm to be a new type of institution. As private organizations pursuing a public purpose, firms had to be endowed with new structures so that mechanization's full potential could be realized.

A question remained to be settled for this “autonomous” firm, this private organization with a public interest: who would head the firm? How to understand the function of leadership when shareholders are no longer in control?

Creative government: The capacity for discussion

For Rathenau, the “orientation of the world” should not be left to the course of things, in particular the clash of individual interests. He argued against a government by the people or by experts or even by the educated, whose knowledge might turn out to be an impediment to action. Leadership implies a creativity for forming a conception of the world to come, a capacity for shaping and federating individuals' actions into a productive collective action. Those who govern are in charge of making a projection of the world and defining its strategic orientations.

Rathenau cited as example the political organization of the state. Parliament's role in the political system should not, in any case, be the same as the government's. Its function is not to make decisions but rather to serve as an “agency of consultation”. A parliament parleys [*“Das Parlament redet”*]. It is a place for debate; it is not an organ of representation. A parliament does not draw up political or strategic orientations; instead, it debates them and makes them public, disputes them and subjects them to sound, open criticism.

Rathenau thus suggested: a) setting an assignment related to the firm's community of interests; b) naming directors capable of envisioning and organizing innovative collective actions; and c) submitting these plans for action to discussion in a council or “agency of consultation”. The firm's leaders would be subject to a form of democratic oversight, instead of a board of directors. Their responsibility would no longer be a matter for a code of professional conduct; nor would it be a strategic necessity for the firm's development. It would be related, on the one hand, to the firm's assignment of general interest and, on the other, to the requirement to refer matters related to this interest to a multiparty organ of supervision and discussion.

Conclusion and perspectives

Rathenau's writings were read and discussed in Germany in the early 1920s. His views weighed on discussions for drafting the Weimar Constitution (1919) and for adopting the principles of wage-earner participation (“codetermination”) on supervisory boards (McGAUGHEY 2015). Nonetheless, his direct influence has been limited. Although some authors, such as Berle

and Means (1932), clearly understood the theoretical and institutional revolution suggested by Rathenau, his ideas, in general, did not lead to concrete results; and the concept of corporate social responsibility ended up taking another road. Nevertheless, Rathenau pointed out a major element in the way that managers in the early 20th century conceived of their firms. He also suggested an alternative way of understanding the firm's social responsibility.

Rathenau clearly thought that a new social and industrial order was arising at the start of the 20th century. It was emerging neither out of a balance of power nor owing to the growing size of corporations, even though this growth would entail a program of rationalization. For Rathenau, the modern world could not be understood, nor oriented, without realizing the full import of “mechanization”, *i.e.*, the capacity for collective actions to shape the world to the point of creating a man-made universe. The modern era signaled, above all, the advent of an unparalleled capacity for innovation and collective creation. As a consequence, leaders had a very strong responsibility for the world they were helping to create.

Like other contemporaries, Rathenau did not think that firms should be likened to private parties pursuing their own interests. The classical economic theory about actors independent from each other was outdated. The firm's power to act should not be left to the free play of the market, nor to the contingency of the composition of general assemblies of shareholders. Rathenau deemed it indispensable to reform the institutions of corporate government. He considered the firm to be a private institution, obviously, but one endowed with a finality related to a community of interests. Consequently, he proposed drawing on concrete experiences to adapt corporate governance. In particular, he suggested that the directors should guide the firm in line with the objectives related to this community of interests and under a set of supervisory arrangements aligned with these objectives.

Given their power of innovation and their potential impact on society, firms must be committed to programs related to a “collective” interest. This reinterpretation of the grounds underlying the concept of corporate social responsibility is worthy of our full attention during this 21st century.

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The incompatibility of worlds within a multinational corporation: The experience of a French expat in a Mexican factory

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This ethnographic account of a managerial situation is a contribution to the new institutionalist studies of MNC based on the testimony of an expatriated French engineer in a Mexican factory. We try to make an in-depth analysis of the gap between what needed to be done in the Mexican context to make the factory profitable, and the good practices prescribed by the financial, technical, and legal services of corporate headquarters. Our analysis supports the theory of incompatible worlds (*Lebenswelt*) that multinational corporations often bring together. We highlight the translation-betrayals and deceptions that an expat has to accomplish, including whilst presenting the accounts, in order to avoid any obstacle caused by the incompatibilities that could jeopardize the factory's smooth operations. We emphasize the arrangements the engineer had to negotiate to avoid, for example, the well-intentioned paternalism of a powerful potentate or the "tax" paid to local police in the name of an exogenous conception of law and ethics.

Introduction

This ethnographic account of a managerial situation is a contribution to the new institutionalist studies of MNC based on the testimony of an expatriated French engineer in a Mexican factory. We try to make an in-depth analysis of the gap between what needed to be done in the Mexican context to make the factory profitable, and the good practices prescribed by the financial, technical, and legal services of corporate headquarters. Our analysis supports the theory of incompatible worlds (*Lebenswelt*) that multinational corporations often bring together. We highlight the translation-betrayals and deceptions that an expat has to accomplish, including whilst presenting the accounts, in order to avoid any obstacle caused by the incompatibilities that could jeopardize the factory's smooth operations.

Theorizing from a sociological perspective, this ethnographic account permits the comprehension of certain difficulties at the heart of the management of transnational corporations.

First important theoretical fact: the "censorship" that F.F. experienced for more than 20 years. As a managing director in a multinational corporation, it was inconceivable that he testifies publicly about what he lived through in order to draw useful lessons. Too many details were scandalously inconsistent with the accepted ideas of management. Too many details went against the laws, norms and rules for a company like CostKillers Company and an upper level manager could risk their reputation, for the truth.

Later, when F. F. quit in order to undertake a PhD in management and recycle himself in academia, he was advised to commit himself to less onerous tasks. The analysis of his experience was thus perpetually put off and almost never came about.

Yet, all of the aspects of the business world do not concord with the management logos. In other words, what managers cannot conceive, what is unmanageable is essential for theorizing management.

The second fact that fosters interrogations: the flaws of the intellectual tools used by corporate headquarters in order to govern at a distance. These tools, these “management mechanisms” (BERRY, 1983) are supposed to “train”, then “supervise” the expatriates sent to far-off countries. François Fourcade shows that this viaticum can be an epistemological obstacle and impediment to adapting on the ground. He also demonstrates the unrealistic nature of most of the financial accounting tools used by headquarters in order to evaluate the situation. It is a question of convenient narratives, simple “conventions” that provide a rational aspect to processes that are neither known nor understood nor mastered, but simply certified as conforming to standards by a “management bubble” that names them without truly grasping them.

Third theoretical element: the political dimension of the experience. We discover that the factory does not only belong to long-distance managers and stockholders, but also, informally, to those who take on local political responsibilities, the leaders of local mafias, and union bosses with whom they must negotiate if they want the factory to work.

The orthodox remedies spelled out by the Parisian headquarters jeopardize the factory’s profitability and precipitate its closing, while the local elites, both formal and informal, legal or illegal are very attached to their factory. They need it; they have a direct interest in its prosperity. They contribute to it through uncommon channels, but it is necessary to withhold judgement in light of the mental categories used in the power centers of globalized capitalism.

In sum, it can be said that Mexican bigwigs, allied with a few adventurous expats, do what they do locally and in their own way, to save “their” factory from the absurdity of the management dictates of a distant and absent owner that does not understand what is happening on the ground and probably does not want to know too much about it.

The question is, how to connect the study of this case with the academic literature on multinational corporations (MNC) and particularly with the new Institutional studies on multinational companies?

Subsidiary management responses to local and headquarters pressures

A long-standing research tradition on MNC has focused on the headquarters/subsidiaries relations (ZEIRA, 1975; BELANGER, 2009; BARTLETT and GHOSNAL, 1992-2011; BECKER-RITTERSPACH and DÖRRENBÄCHER, 2011; BLAZEJEWSKI and BECKER-RITTERSPACH, 2011) or, more specifically on subsidiaries’ behaviour (GUPTA and GOVINDARAJAN, 1999; KOSTOVA and ROTH, 2002; OLIVIER, 1991). Expatriates’ behaviour was also a topic of study (MENDEHLAKK and ODDOU, 1985; NAUMANN 1992, 1993; BIRDESEYE and HILL, 1995), as well as intercultural management (TROMPENAARS and HAMPDEN-TURNER, 1998; D’IRIBARNE *et*

al., 1998, 2009). In a psychological perspective, some researchers have focused on expatriates’ adaptation to the host country (NEWMAN, BHAL BHATT and GUTTERIDGE, 1978; JUN, GENTRY and HYUN, 2001; HASLBERGER, 2005). More recently, a new trend in economic sociology following Granovetter’s tradition endeavoured to get a better understanding of the social embeddedness of multinational companies (HEIDENREICH, 2014). In sociology of law, another trend studied how a MNC manages to conform to the diversity of national rights in its multiple subsidiaries (corporate compliance, PARKER and NIELSEN, 2011; VILLETTE, 2014b), whilst other sociologists investigate on management transgressions on the workplace (BABEAU and CHANLAT, 2008 ; COURPASSON and THOENIG, 2008).

This paper is in line with the new institutional studies of multinational companies which tell us that subsidiaries are faced with institutional duality and are pressured to conform to parent company practices as well as to the local institutional environment in which they are based. Oliver (1991:162) argues that where organizations face incompatible and competing demands from different constituents, conformity may be impossible because the satisfaction of one constituent often requires to ignore or defy the demands of another“. Acquiescence to parent company pressures can mean the avoidance of local institutions. Compromises with local institutions can mean the defiance of parent company practices. Kostova and Roth (2002) argue that the multinational subsidiary is in a situation of institutional duality. On the one hand, it is pressurized by the headquarters to adopt a particular set of the firm’s “traditional” practices as used at “home“; on the other hand, the subsidiary is pressurized by its host context to follow the local practices. Ferner (2000); Geppert *et al.* (2006) and others, identify subsidiary management knowledge of the local institutional environment as an important resource. They argue that subsidiary managers can derive resources from their role as interpreters of the local environment for a parent company management who may have difficulties understanding it. Kristensen and Zeitlin (2005) show that dependence on the local environment may also stem from the close relationship between subsidiary management and local stakeholders such as governments, trade unions or work councils which have the power to constrain subsidiary management action.

Using a qualitative and case studies methodology, Tempel, Edwards *et al.* (2006), concentrated their study on how HRM outcomes emerge in subsidiaries as a result of an interaction between the subsidiary management and the internal and external pressurizing constituents. “Such interaction is not a one-off event, but a continuous process“. Consequently, they conclude that “the complexity and dynamics of the processes by which institutional pressures and interdependence with pressuring constituents shape human resources management outcomes in subsidiaries cannot be captured with quantitative methods alone, yet such methods continue to dominate in new institutional studies” (TEMPEL, EDWARDS *et al.* 2006, p. 1565).

Similarly, Birkinshaw, Yoko Brannen and Tung (2011, p. 575) argue that "Research on knowledge in MNCs has typically failed to distinguish between simple (codified, explicit, binary, universal, unambiguous) knowledge that can be researched using traditional quantitative methods and complex knowledge (tacit, implicit, systemic, endemic, context dependent) that requires more 'up-close and grounded' qualitative types of methodologies".

Methodology

Researchers in social sciences do not pay sufficient attention to the empirical situations they use to justify their arguments. An article published in 1988 by Erving Goffman suggests these situations are too often "neglected". Howard Becker wrote in 1966 that "sociologists love to talk about the function of processes, but their methods do not allow them, in general, to concretely appropriate the processes of which they so abundantly speak." (See also VAN MAANEN, 1979). These affirmations remain true today, in sociology as in management sciences.

The case presented in this paper, is one of a series of investigations currently run about subsidiaries management of European MCN based in eight different countries (Mexico, Brasil, UAE, Morocco, China, Poland, and Russia). We deliberately chose to present one unique case so as to explore it in depth. It was also a methodological choice to make F. F., our main informer, co-author of this article. 17 years have passed since these events took place and we reckoned that, after a successful career change, F. F. was no longer a management practitioner but rather someone able to put his experience into perspective. Since he proved to be fit for an intellectual analyze in retrospect, he therefore deserves to be fully considered as a research partner.

Following Tempel, Edwards *et al.*'s suggestion to use a qualitative approach to study the interactions between the subsidiary management, the local institutions and the headquarters, this article is based on the narrative of a management situation as defined by Girin (1990), who says that a situation becomes a management situation when "the participants are brought together and must accomplish, in a set time, a collective action leading to a result that is subject to external judgment" (GIRIN, 1990, p. 142). It is exactly in this framework of constrained action that the expatriate finds himself. We shall try to understand how he manages to deal with an emerging, dynamic and indeterminate situation, which always tends to escape the manager's control.

In this testimony, the given situation is simultaneously whole and singular. Following Dewey (1993, p. 128-129), we can say that it is an experience in which there are neither isolated objects nor events. An object or event is always a portion, a phase or a specific aspect, a surrounding world of experiences, "a diffused whole". The qualifier of "diffused" is used by Dewey to link constitutive elements of a whole between themselves. Each situation is a unique and indivisible case in

which a narrative can be only told in a both incomplete and partial way, no matter the degree of sincerity of the witness and the efforts made by researchers to elucidate the situation.

The radical methodology used in this paper was inspired by both *l'approche ethnographique des entreprises* (VILLETTE 2014b) and the *microstoria* traditions illustrated in particular by Carlo Ginzburg (see REVEL, 2010, for an overview). It allows to challenge a singular case with the multiples concepts of academic literature and to focus on the very concepts that can be invoked to explain the situation.

Referring to the works of the new institutionalist studies of MNC allows us to identify some of the specificities of this case:

- The worldwide headquarters are located in a developed European country whereas the subsidiary is located in a developing country, which means that "the institutional distance between home and host country institution is large". (KOSTOVA 1999);
- The plant is considered to be unprofitable and non-strategic by the HQ and is therefore exposed to shutting down or reselling. The power ratio between HQ and subsidiary is thus highly unbalanced and unfavorable to the latter.
- On the day of his arrival in the foreign country, the expat had neither experience nor training in management and was totally uneducated in academic literature on the subject. However, his training as an engineer who graduated from a French *Grande École* predisposed him to self-confidence and a "subversive strategist"'s behaviour instead of that of a "boy scout" (DELANY, 1998).
- The multinational managers and the local stakeholder's demands are incompatible (OLIVER, 1991), yet "the local stakeholders have the power to constrain subsidiary management action" (KRISTENSEN and ZEITLIN, 2005).
- Relations between expat, HQ, and local stakeholders could be analyzed "in terms of 'micro-politics' in which the drive from the MNC headquarters towards isomorphism is undermined by the capability of local actors to pursue different interests." (DORRENBACHER and GEPPERT, GEPPERT and MAYER, 2006).
- In addition to this list of specificities, two other characteristics of the case have not been theorized by new institutionalist studies of MNC but by both corporate compliance literature (PARKER and NIELSEN, 2011) and management transgression literature (BABEAU and CHANLAT, 2008; COURPASSON and THONIG, 2008) :
- The local actor's demands are illegitimate and even sometimes illegal according to both home and host countries regulations. However, they are tolerated and unspoken of since there is a tacit agreement between subsidiary and HQ management as long as it contributes to the economic success of the subsidiary.
- The decisions made by the subsidiary management to save the plant are incompatible with the current multinational policy but are tolerated and unspoken of.

By telling the story of an expat who forms an alliance with the local political forces, thereby transgressing many HQ prescriptions in order to save a factory, we aim at focusing the academic research on the experience on the ground. We base this approach on the phenomenological tradition (SCHULZ, 1945) and on the fact that scientism in social sciences has been the object of numerous critics (HAYEK, 1952). In doing so, we take into account Jack, Callas *et al.*'s remark (2008) which reads: "The international management field seems to have engaged in a continuous disavowal of epistemic reflexivity and a critical trajectory for theory development."

Ethnographic account of the management situation by François Fourcade

Following a master's in business administration, I was 26 years old when this story began in 1991 after a Telecommunications Engineering Degree; I answered an ad: "Urgent: CostKillers Company is looking for a VSN volunteer for Mexico to occupy the job of deputy to the management controller in a factory."

I was interested in Mexico because I love surfing, and there are beaches with fantastic waves. I pretended to know everything an industrial management controller should know. I insinuated that I spoke Spanish and it worked. Without a doubt, I was the least terrible of the willing candidates for such an adventure, and even the only engineer willing to live in the middle of a semi-desert.

The contract signed, I was inevitably going to show up in a factory producing car radiators for the American market. It is a product that is not very sexy in the eyes of automobile specialists, not very innovative, unsophisticated and produced at a low cost in a country in which labour is cheap. There, I immediately found a position with some responsibility, without experience in industry, in management control, in expatriation or in Mexico.

I will first present what I was taught in the 3 months I spent at corporate headquarters in the 17th arrondissement of Paris, in order to prepare my departure. Then, we shall see what I discovered once I arrived, and how I confronted the situation.

One might get the impression that I paint a dark picture of the corporate world, thus I must note that my story is a *success story*, both from a human point of view and from the strictly industrial and financial point of view. The factory was suffering heavy losses when I arrived. Headquarters was considering an imminent closing. When I left, thanks to the entire team, it had become profitable and still functions today. After this first experience, I remained for more than 10 years with the CostKillers Company group. I also made a lot of friends in Mexico with whom I am still in contact.

Despite this success, it has always been difficult for me to tell this story in a credible fashion. In spite of my

efforts, the audience thinks that it is bad police fiction rather than a serious business school case study. The difficulty is to take what happened to me seriously, rather than regarding it as an atypical and pleasant adventure.

Preparing for departure: the inculcation of management norms

CostKillers Company is an automobile equipment producer, more internationalized than the automobile makers that are its clients. A radiator can be sold to any automobile maker in the world, so long as it is competitive in terms of price, conception and quality. In comparison to automobile makers, equipment builders are directly exposed to international competition.

CostKillers Company's headquarters are responsible for coordinating worldwide operations and work on defining the standard processes for the conception, production and delivery of competitive equipment at competitive prices to automobile makers around the world. These processes are then supposed to be implemented in all factories throughout the globe.

During my training period, I learned to respond to these two main questions:

- What does headquarters require of the local factory?
- What kind of information does a factory send to headquarters?

We teach young managers hired by CostKillers Company that corporate culture is very strong, and that there are norms to respect: "total quality", "customer service", "constant innovation", "personal implication", "lean management", "management control", "supplier integration", etc.

Becoming a member of corporate management depends on integrating those values and norms and promoting them.

In order to verify the implementation of the rules in all of CostKillers Company's establishments around the world, commandos of auditors intervene regularly. They show up in teams of five in a factory, staying a week, verifying everything they can, in order to insure that the factory is "in line" with the principles and values of the house.

Those norms that must be respected in terms of management control are defined in a "bible" translated into 18 languages and called the *Administrative and Financial Manual* (AFM). The management controllers of each factory are supposed to be the gatekeepers. They are asked to oversee that the factory strictly respects the AFM.

It is also expected that management controllers exercise a counter power to manufacturers and salespeople. They oversee the factory director and keep him from getting out of control, such as for example, consenting to overly significant discounts to clients, salary increases to employees, or even succumbing to corruption, writing fake bills, selling to insolvent clients, etc.

Most of the information exchanged between headquarters and subsidiaries goes through the management controller. For this reason, very early on in its history, CostKillers Company developed excellent software, now integrated into its SAP system.

The corporation is well known for its capacity to reduce costs and obtain an acceptable profitability regardless of the circumstances. The norm is the amortization of any investment in less than 4 years: the average life span of a car. Additionally, it is accepted that costs on sold products should diminish by 30% every 4 years.

A beginner quickly needs to learn the corporate jargon. At headquarters, people speak in coded language. A typical hallway conversation goes something like « Have you done your IAP? », which should be understood as « Have you finished writing your request for investments? » otherwise known as the *Investment Authorization Proposal*.

CostKillers Company requires a strict respect of the financial *reporting* calendar from management controllers. Whatever happens, it is imperative that the information be sent within the deadlines, and it should always demonstrate that the budget has been respected. This is what guarantees to stockholders that the semester results will correspond to analysts' expectations.

In order to always reassure the CFO of the group, (and, above and beyond him, the stockholders) the management controller acts as a "model student", always showing good results for his factory, no matter what the circumstances. On September 11, 2001, the sales of cars in the United States collapsed. CostKillers Company still managed to publish bi-annual results that corresponded with previsions. In other words, all of the factories' management controllers invented expedients in order to minimize the visibility of incidents in the quarterly accounting. That is how they showed investors that CostKillers Company is a safe investment, a resilient corporation that sticks to its promises no matter what the hazards of the external environment. In addition, that is how share prices remain stable.

In the case of low revenues, costs are reduced by all means necessary, even if it means paying suppliers late (and even if they end up going bankrupt). As well, it means reducing the number of employees, despite possible adverse consequences on technical knowledge, stress and the morale of the personnel.

In order to deal with the unhappy surprises, the management controller also has to know how to dissimulate the good ones. They constitute safety nets that allow expenses and/or revenues to be carried over from one semester to another.

Having spent 3 months at headquarters and thanks to discussions in hallways and the advice of more experienced colleagues, I had learned that in this kind of group, when one is a management controller, one should not confine oneself to the theoretical principals of accounting. He who reports disappointing numbers

is a bad management controller. The factory that he controls will suffer the consequences and his career in the group risks being brief.

In a factory with numerous problems, such as in Mexico, with unreliable data, numerous disruptions and infringements of the rules, I would quickly learn that a lot of imagination was needed to always supply coherent data in accordance with the rules: the only data the software accepts to save. One very quickly learns the reflexes necessary to survive in a system that requires that the numbers always be correct right down to the decimal point, and moreover, they always have to be positive.

Aware of the fact that the factory regularly reported numbers well below global norms, I expected major problems. The Corporate Human Resources Director risked concluding that I was a terrible management controller.

Adaptation in a Mexican Factory

I still needed to learn Spanish, which happened during a one-month stay in Saragossa, Spain. My arrival in Mexico occurred on December 12th, 1991.

My first job as a trainee in the management control department, under the direction of the financial controller allowed me to discover some of the main problems faced by the 3 French expatriates in charge of the 500 Mexican factory workers.

Fridays, the workers are paid in cash. Under the protection of 6 guards armed with machine-guns, an armoured car conveys the money. One quickly wonders who are these armed men, who trained them and for whom they work.

Monday, absenteeism is at its pinnacle: those workers who were paid Friday got drunk. The factory functions at barely a 10% return and runs the risk of work-related injuries.

In the automobile sector, equipment makers are supposed to deliver their clients right on time, with a minimum amount of stock held by the assembly chains. The problem for the equipment manufacturers is delivering on time in order to avoid the enormous penalties detailed in the contract in case of delays (\$20,000 per minute the client's assembly line is shutdown).

At the factory of *San Luis Potisi*, any excuse was feasible to stop working, no matter the urgency. If, for example, there was no space left to store the radiators being manufactured, the workers stopped working and played baseball in the courtyard while the foreman found a storage solution.

The factory invested in workers training. Unfortunately, as soon as they were trained, the Bosch plant nearby, which offered more attractive salaries, hired them. Consequently, the factory served as a local technical college, without anything in return.

Preventive maintenance is an unheard concept in Mexico where they prefer to fix machines after they break down. As a result, the factory lost a million euros following the breakdown of a machine. The personnel in

charge of its maintenance considered that when 6 of the 8 oil jets were stopped up, there were still two to insure lubrication. The costly machine was finally out of order. The workers had thought they were doing the right thing by deactivating alarms so that the machine could continue to function despite the progressive deterioration of its lubrication system.

Right on time delivery also supposed resolving logistical problems including 1200 km of roads sometimes impracticable in winter, or chaotic Mexican railroads. Sometimes, the local mafia held up an entire train, or a delivery destined for Japan *via* the port of Acapulco on the Pacific Coast, ended up on Veracruz on the Atlantic.

In Mexico, as everyone knows, there is a strong tradition of corruption. Certain employees received propositions for large sums of money in exchange for blank invoices with the CostKillers Company logo that would have been used to buy supplies at the company's expense.

In France at the time, a good CostKillers Company factory generated a million Francs in income per employee. At my arrival in San Luis Potisi, the factory was at barely half of that. A trained operator could be replaced by his cousin, or even two of his cousins the next day; one that knew how to read, the other that knew how to pilot the machine. No factory could respect the criteria of a million in revenues per employee in such conditions. Consequently, the group threatened to close the factory down and refused all investments even vital ones, invoking our low productivity.

How could the factory be defended against the wrath of headquarters?

The idea came to me to adjust the numbers of employees declared in the country. The number of workers necessary to insure the running of the factory would no longer be paid directly by CostKillers Company, but by the company in charge of cleaning the factory.

Thanks to this accounting trick, our ratio of revenues per capita increased abruptly, while an increasing percentage of personnel costs fell into the accounting category of general costs. The corporate financial department quickly congratulated me for our spectacular gains in productivity, and the image of the factory improved slightly in the eyes of the corporate managers.

The factory used a copper supplier, which –we discovered later– belonged to the governor of the province who demanded exclusivity. On my arrival, reinforced by the teachings of corporate headquarters, I tried to apply the principals prescribed by the AFM, particularly the principle of the diversification of suppliers. I tried to have at least 3 suppliers for each type of supply. What a bad idea! The governor called me and gave me an appointment in the middle of nowhere. The helicopter arrived and took me to a hacienda. The governor welcomed me politely and took me on a tour of his car collection as well as his tiger menagerie. He offered me a sumptuous lunch before explaining to me that CostKillers Company should procure its copper supplies exclusively through him, without diversifying

suppliers, given that he controls the country's copper market. Effectively, no other copper supplier would risk supplying us.

A few months later, I was told that one of our drivers, exasperated, had refused a bribe, during a routine control by the highway police (*Fédéral de Caminos*). As a reprisal, the police alerted their colleagues by radio, and all of CostKillers Company's trucks were immobilized at police barrages. In order to grasp the importance of this event, we have to remember the penalty of \$20 000 per minute any time the client's automobile assembly is stopped. It should also be kept in mind that the automobile factories in Detroit, some 4000 miles away, could get sick of working with a supplier that doesn't deliver on time.

What to do?

I went to see the governor and asked for his help. He offered me tea and launched into a long, friendly conversation while I became increasingly stressed by the minute.

He proposed a tailor-made solution designed to pay the bribes suitable for the police. It was a sort of "provision for transportation risks", an anti-blockade insurance of his own invention. I accepted, having no other choice, and within the half hour that followed, all of our trucks were moving again.

From that point on, I learned to consider the police as another supplier, which was difficult to explain to corporate auditors, come to verify the accounting. However, the result was evident. Once the system was in place, the police became very cooperative. They even brought assistance to a truck that broke down.

How could this local arrangement be implemented with the prescription of the AFM and global, corporate requirements? It was my turn to be imaginative. I invented a new, discrete "provision for transportation hazards".

Of course, my arrangement with my friend, the governor, could not be communicated to CostKillers Company corporate headquarters nor to the auditors and certainly not to the French Embassy in Mexico.

I integrated into Mexican life. At the same time, my French expat colleagues left the factory one by one and I became director in 1995.

Having decided to save the factory that was still threatened with closing, I continued my attempts to create new gains in productivity. One day the governor told me "You know, François, when you go across the Rio Grande from the US to Mexico, with your famous trucks, you pay 44% in import taxes. You should know that according to Mexican law, if you put two guys on the Mexican side of the border, and that they open the doors of the truck and then close them just as fast, the merchandise can be considered Mexican, because they bring an added value to Mexican territory given that the men open and close a door to insure that the product is there. You create two new jobs and you only pay 5% in taxes".

The fiscal gain realized was enormous.

World corporate headquarters considered that the factory had two years to show its profitability. If we did not reach this, CostKillers Company would close it and 500 employees and at least 2000 families would be unemployed. The provincial government was perfectly aware of the danger. We shared a common interest in making the factory work. It was thus better to participate in the forms of exchange in effect in the local economy and culture rather than remain fixated on the French conception of how to do business.

The *Administrative and Financial Manual* imagined by Parisian headquarters and translated into English, which became the global bible, contained around 400 words. The lexical poverty perfectly reflected the degree of simplification of reality in which this type of document resulted. Endowed with a very feeble description of reality, the text conveyed an overall thought supposedly comprehensive and applicable in 25 countries, but which is familiar only to business school graduates, other consultants, accountants and corporate lawyers. When it comes to negotiating with those who held another conception of the world, it was of little use. Too rigidly interpreted, it could even be an obstacle to any understanding, any negotiation and any efficiency in common action.

Having followed the Americans, CostKillers Company proved that the French were more concerned with the factory than its former owners. The Mexicans noticed that, little by little, CostKillers Company invested in the factory and really wanted it to work. Thus, they contributed to saving it, in their own way, assuring incidentally the defence of their own interests.

If in legal language, certain of those practices of which I spoke would be qualified as corruption, up to what point can we say that the advantages drawn by the local police, the governor or the director of the cleaning company are more illegitimate or more immoral than those advantages of faraway stockholders who do nothing more than buy and sell their property rights in one click? Could not we also say that customary rights of those people who contributed to the proper running of the factory should be taken into account in the same way as those of absent and distant owners, defended by lawyers and professional accountants, protected by a large amount of laws and norms designed for them?

I left on a 14-month contract and I stayed in Mexico for 7 years. The factory developed, modernized and became one of the most profitable factories for CostKillers Company. I had the immense satisfaction of developing the factory and I remained good friend with the Mexicans who had welcomed me.

How can the testimony of François Fourcade be interpreted?

The notions of law, accounting and management used by decision-making centers of global capitalism had little force in the Mexican province of Western Sierra Madre in the 1990s. An expat that would have wanted

to apply them in spite of it all, adopting an ethnocentric posture (PERLMUTTER and HEEMAN, 1974; ZEIRA, 1979) would have almost certainly failed. The testimony of François Fourcade proves that the efficiency imperative, so dear to engineers and financiers, can not be obtained by classical means, applying managerial prescriptions determined by headquarters or even by a translation or *loose coupling* of these same prescriptions (ORDON and WEICK, 1990). It requires a methodical work of separating these worlds, through translation-treason and disinformation, including accounting and legal information. This type of behaviour falls under a form of transgression (BABEAU and CHANLAT, 2008) that we call "functional transgression", given that in the end, it contributes to realizing the goals expected by financial markets.

Managing the incompatibility between multiple realities

While not the first to discuss the subject, William James is, without a doubt, one of those who most clearly formulated the way in which our sense of reality is constituted. For him, is *real* what awakens and stimulates our interest. Reality is thus not a state of fact, but a relationship. Saying that something is *real* signifies that it is in relationship to us. Our first impulse is to immediately affirm that all that we perceive is real, as long as it is not contradicted. It follows that infinite realities probably exist. Everyone tends to consider the universe in which they find themselves an evidence and to doubt the reality of experiences foreign to them.

The incompatibility between distinct *Lebenswelt* (SCHUTZ, 1945) should not be taken lightly and should be considered as an epiphenomena of a psychological nature. It is a fundamental social phenomenon with serious consequences. Robert Jackall (1988) sums it up when he writes that in organizations, "details are pushed down and credit is pulled up", a formula which perfectly resumes the processes by which the world experienced by the leaders always tends to differ from the one experienced by the managers responsible for executing the details.

The head of a large multinational corporation can thus chose to ignore the statements transmitted by subsidiaries over which he avoids making any judgements, even if it is because he does not have the time (MINTZBERG, 1973 ; DELPEUCH and LAUVERGEON 1988 ; RIVELINE, 1991).

A leader can intellectually admit the diversity of points of view and the way in which to do business. However, given his position, he cannot allow himself to develop symmetrical and egalitarian relationships with those he is supposed to manage. The boss must be protected from his juniors since he is supposed to be the guarantor of the integration of individual behaviours in the perspective of pursuing the superior interest of the stockholders and the respect of the law.

As a result, the relationship between parent company-subsidiaries will tend sometimes towards transparency, other times towards opacity in order to

avoid compromising the politically correct reality of corporate headquarters with the daily experience of the subsidiaries' employees.

Decoupling between corporate reality and reality in the factory in managing the incompatibilities

Managerial literature acknowledges that the role of headquarters, considered in relationship to operational units, is to insure coordination, control and cohesion. It is also seen as obvious that communication between the different levels of the organization must be as fluid and transparent as possible. The ideal, both for managers and a large majority of researchers in management, is to insure an optimal coupling between the strategy, conceived of by directors and experts at headquarters, and the running of operations in industrial and commercial establishments.

What the Anglo-Saxons call *alignment* is obtained through many different means: computer systems, planning, management control, reporting, audits, executive committees and transversal projects.

The management tradition affirms that no one should be left to act in accordance with his free will, in order to avoid running the risk of multiplying pockets of inefficiency. The behavioural alignment with good practices, modelled by consultants and experts, appears necessary to achieve significant performances. In theory, company employees are agents in the service of the principal (stockholders), suspected of lacking both loyalty and hard work. These control systems express mistrust. The incentive salary formulas (bonuses, stock options...) are supposed to motivate agents through the lure of gain.

In reaction to this normative managerial tradition, critical authors contribute corrections to the notion of *loose-coupling* (ORDON and WEICK, 1990), elasticity in the rules of the game (RAYNAUD, 1989 ; PARKS and GALLAGHER, 2010) or the concept of *organizational slack*, which finds its application in multinationals in the article of Nitin Nohria and Ranjay Gulati (1997). These authors, like others who possess a double competency in management sciences and sociology, believe that corporate governance must avoid excess control and allow base units sufficient autonomy.

Specialists of diverse management subjects have often criticized the centralization of decisions and controls, as well as the abuse of procedures. Computer systems specialists denounced the abuse of transparency in the exchange of data between units and the general direction (PAVÉ, 1989). Researchers in Sociology of work and Human resources management insisted on the positive role of autonomy left to the teams on the ground for workplace motivation (EMERY and TRIST, 1960; VELTZ, 2008; GETZ, 2012). Researchers in management control insisted on the necessity to avoid overly frequent and too detailed reporting in order to leave managers the necessary time to correct the differences in relation to previsions (DRUCKER, 1954; ANTHONY, 1988; SIMONS, 1995)

The testimony of François Fourcade highlights the

pertinence of all these warnings. It echoes the well-known work of Goldratt (1984) and allows the formulation of an even more radical thesis according to which an incompatibility exists between the reality of the world in headquarters and in the factory. Thus, the person responsible for the interface must, at his own risk and peril, organize a disconnection, a complete decoupling. He must attempt to implement hermetic walls in order to avoid a crisis.

This is what F.F. remarks during a conversation regarding his experience:

"Headquarters knew. At least certain people knew what was happening at the factory, but the rule of the game was blinkers to allow things to happen. If the affair became public, it was the local manager that would have been accused, obviously."

Or:

"The expat is a translator. He shouldn't throw out information about what he understands in the host country without taking precautions. That would do damage. Reciprocally, the application of procedures and values from headquarters doesn't work in country without considerable efforts to translate, and in this translation, there is a good portion of treason."

If it was not only known, but recognized, this incompatibility would cause a crisis in the organization and would arouse concern, which would have disastrous effects on the company's reputation. It would appear as incoherent, unserious and immoral, because it would deem them incapable of respecting the rules and principles that the most developed societies require. More fundamentally, the corporation would no longer be able to satisfy the rationality requirement that Nils Brunsson (1985) showed was both indispensable to the legitimation of organization in our contemporary societies, and practically impossible to maintain in numerous circumstances.

Prescribed work, real work and transgression at work

The idea that the work undertaken by workers goes above and beyond what is prescribed dates. Roy (1954) described how workers in a factory fought to save time with the benevolent complicity of foremen. If the gap between prescribed work, real work and the transgression of official norms was first theorized regarding workers, it equally applies to management and engineers, even if academic literature was late to realize it. Babeau and Chanlat (2008) remind us that transgression could be a forgotten dimension of organizations. Girin and Grosjean (whom they do not quote) already treated the issue (1996). Courpasson and Thoenig (2008) write that a "hegemonic management confronts its subordinates with impossible challenges. Nonetheless, the tie-wearing dissenters are constructive". Thus, rebellion can be a creative process, bringing new methods of production (SINGHAL, 2009).

In the Mexican factory, faced with a given problem –

the impromptu replacement of a work by his cousin—a number of rules confront each other, each claiming possibly legitimacy. We observe the classic opposition between formal and informal rules, or the conceptual distinction proposed by Jean Daniel Reynaud (1989) between rules made by management that seek to reduce moral hazards and “autonomous normative” rules born of efforts by members of a work group in order to live together and insure production.

Faced with the complexity of the situation, F.F. explains his behaviour:

“If a worker is replaced by his cousin, what can be done? Should his behaviour be sanctioned? The answer is no. This local practice needs to be accepted and accompanied. First, tolerate it, and then try to encourage mutual training between workers, so that the tenured worker trains his replacement. Medium term and little by little, we manage to modify behaviour but only if we start by admitting it.”

Different ways of following a rule exist, according to the activity in which one is involved and the local circumstances. At the Mexican factory, the attitude of the engineer is entirely guided by the concern for efficiency. He has a consequentialist approach to the application of the rules and also a pedagogical view that we understand only if we take into account the length (seven years) of the “indeterminate, emergent and dynamic (DEWEY, 1993)” situation in which he is involved.

We could also see in his behaviour a realistic adaptation to a local balance of power. Caught between a corporate rule whose respect is required by some faraway headquarters, and an arrangement approved by the provincial government, we can consider that human resources fall more under the jurisdiction of the local mob boss than an abstract rule written in English by far off technocrats.

Should any gap between the actions taken and the text of the rules be treated as a transgression or worse, as a breach or trickery?

Following a procedure is conforming actions with texts, schemas and software. Yet, it is unnecessary to invoke Freud or Lacan to remember that the relationship between action and its representation is often problematic. An action is unique, circumstanced, situated (SUCHMANN, 1993). The text is either too general to know what to do, or illegible, or inapplicable if he tries to envision all imaginable cases. It is thus logical that people at work showcase their quality as intelligent human beings when faced with anonymous rules. This improvised intelligence is not only at the service of egocentric interests as noted by Crozier and Friedberg (1980); its “positive deviance” (SINGHAL, STERNIN and DURA, 2009). It can also be at the service of “technical solidarity” to use the expression proposed by Nicolas Dodier (1995).

Technical solidarity to make the factory function

Considering what was happening in the factory, Dodier (1995) shows how the operators (engineers, technicians, HR, maintenance workers, production agents) comprise a group that devotes itself to making the socio-technical system in which they are involved and over which they want influence, work. They are all more or less stricken with the “Bridge Over the River Kwai syndrome” and finish in one way or another by doing everything to make sure that “it works” despite it all, and whatever happens.

The testimony of F.F. offers a good example of this technical solidarity concerning the factory of *San Luis Potosi*. The need to reconcile all of the allies needed to make the factory function is a perfect illustration of James March’s theory (1962) according to which a corporation is above all a “political coalition”.

Without judging who is wrong and who is right, what is ethical and unethical, without weighing himself down with technical, legal and moral concepts of some faraway Parisian headquarters, the expatriate is forced to build a coalition necessary to improve productivity. These allies are conscious of the necessity of avoiding the factory’s closing, in light of its utility. They contribute to the smooth running of the factory according to their own means and methods, which have little to do with management models.

Sociotechnical networks do exist and sustain themselves if “innovators” manage to align human and non-human behaviour mobilized to insure their smooth operation (CALLON and LATOUR, 2006). The governor—who is also a businessman and the head of a mafia organization—behaves in a number of instances as an innovator and his inventions contribute to making the factory productive. Workers who share the same job with their brothers or cousins can also be put in the same category of innovators once factory management was capable of developing their invention instead of reprimanding it.

Publishing these facts is also an opportunity to examine the contradictions of globalized capitalism, and the legitimacy of the condemnations regularly made of local arrangements. Certainly, an audit could have been undertaken in the factory, denouncing the corruption, blackmail, misuse of corporate assets, agreements between clients and suppliers and black-market labour. These judgements would have branded these local behaviours and customs as disgraceful.

Management sciences have difficulties integrating local arrangements into the analyses of the success and failure of enterprises. However, it is not by ignoring these phenomena that we can learn to properly interpret them. It is not with abstract conceptions of law and ethics that one can learn about the difficulties of practice, but rather in taking into account the diffuse, indeterminate and dynamic nature of management situations in a precise manner.

Conclusion

The new institutionalist theory of MNC has clearly established the duality of institutional pressures exerted on subsidiaries, and the impossibility for subsidiary management to comply to local and global demands. Should we conclude that this implies a lack of MNC legitimacy, as argued by Morgan and Kristensen (2006)? The F.F. testimony and other testimonies of expat middle managers suggest that MNC have developed efficient ways to maintain a sufficient amount of organizational hypocrisy (BRUNSON, 1991) to deal with the contradictions of the external environment worldwide.

In the end, F.F. appears to be the paragon of the expat who does "whatever is necessary for it to work". He is a functionalist acting towards one single goal, insuring sufficient productivity in the San Luis Potisi factory so that the bosses back at headquarters consider it a good factory. To do so, he does not hesitate to cut or sidestep all methods of communication that link the factory to headquarters, in such a way so that the heteroclitic and incompatible realities that separate the Mexican province from the Parisian headquarters do not block what is most important to him: the emergence of a technical solidarity between those people who contribute to its operation, including the governor of the province, local police, railroad workers and truckers.

I suggest defining this expatriate ideal type not only as a "subversive strategist" according to the terminology of Delany (1998), but more precisely as an "arranger of incompatible realities in a management situation". The arranger should not be confused with the assembler, as he consecrates a good portion of his efforts on dissociating those whose meeting must be avoided at all costs. In order to better serve headquarters, he organizes it so that headquarters does not intervene in local business. He transgresses, but his objective is to better serve those whose rules he does not respect.

Managing does not simply consist of controlling, coordinating and integrating operations, but it also comprises making viable the contradictions between heterogeneous realities that coexist only at the cost of serious work to hide the incompatibilities. A large multinational corporation is an organization in which the contradictions of globalization are internalized. Searching for allies, leaders promise things to everyone. Given the heterogeneous nature of world cultures and the disparity in standards of living within each country, these promises are incompatible. Simultaneously satisfying the expectations of a billionaire stakeholder and those of a worker or poor peasant in a country of the South is not easy. Taking into account the demands of diverse politicians, union leaders, heads of NGO's, plus the engineers and scientists looking for technical achievements, legal experts who desire rules and bankers looking for money-making deals, is a challenge. Internalizing all of these contradictory demands, without putting the organization in a situation of crisis, requires implementing strategies of avoidance, screens, short-circuits that organizational theory has not studied closely enough.

It is at the interface between the headquarters –where image is managed– and the subsidiaries –where operations take place– that the contradiction appears most intensely.

When the work-related stress of managers and leaders (DEJOURS, 1993) is evoked, we also refer to, without a doubt, the difficulty they have in separating the representation of the world in which they work, their *Lebenswelt* as referred to by Alfred Schutz (1945), and the representations produced given their functions in order to satisfy the different demands of their interlocutors. Giving the corporation an ideal image (VILLETTE, 1988, p.142-143; VILLETTE and D'INGUIMBERT, 2014a) adapted to each audience and appropriate in every circumstance requires constant vigilance. Hiding the proof of contradictions by subtle communication strategies is an anxiety laden task, and all the more difficult when management doctrines almost always present the corporation as a unitary actor, that is simultaneously rational, coherent, legalist and morally responsible.

It is thus understandable that François Fourcade, after having consecrated so many years to insuring that corporation's function at all costs, and despite the managerial doxa, decided in the middle of his career to become an academic.

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Regulating molecules “without data”: The REACH of “prohibition through authorization”

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How to control high-risk substances despite the absence, lack or confidentiality of the data available (but unequally so) to authorities and companies? Starting with the US Toxic Substances Control Act of 1976, the difficulties are pointed out that public authorities have encountered while trying to control the thousands of chemicals on the market. For a long time in both the United States and European Union, a stalemate arose out of the asymmetry of information between regulatory authorities and firms. The EU's REACH regulation, adopted in 2006, has lifted this blockage. Its authorization procedure enables authorities to regulate dangerous molecules without new data by placing on firms the burden of proving that they control health risks and that the chemicals deemed essential to their business have socioeconomic benefits. REACH thus deploys a new form of regulation for high-risk chemicals owing, in particular, to its “prohibition through authorization”, which prefers a gradual withdrawal of toxic substances from the marketplace to outright prohibition.

Thirty years after the passage of the Toxic Substances Control Act (henceforth TSCA) in the United States, the European Union adopted in December 2006 a set of far-reaching controls over substances produced by the chemical industry. Like the TSCA, this regulation on the “*registration, evaluation, authorization and restriction of chemicals (REACH)*” is intended to regulate several thousands of chemical substances.⁽¹⁾ REACH and the TSCA are frequently likened to each other, in particular with regard to their scope. However REACH differs significantly because it places on firms the task of producing information on molecules and their risks (JOUZEL & LASCOUMES 2011).

The TSCA is one of the most ambitious laws ever imagined for controlling toxic substances. Signed by President Gerald Ford in October 1976, it was the first regulatory instrument with the intent of controlling

several thousands of chemicals through its procedures of registration, assessment and prohibition. To apply this law, the Environmental Protection Agency (henceforth EPA) has been assigned the task of identifying, for control by federal authorities, the chemicals present on the market. The TSCA authorizes the EPA to collect information on the production, uses and harmful effects of chemicals already on the market. It also enables the EPA to propose requirements for companies to conduct additional studies and tests, in certain cases, when the information provided to the agency is insufficient. This act also has a procedure for handling requests for placing new chemicals on the market. If the EPA manages to determine that a chemical has “unreasonable” risks for health or the environment, its duty is to take the necessary steps to reduce these risks.

Although REACH and the TSCA are frequently likened to each other, the American act has been a regulatory failure in the opinion of several analysts (O'REILLY 2010; VOGEL & ROBERTS 2011). The EPA has

(1) Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency.

prohibited only five chemical agents under this act since its adoption: PCBs, chlorofluorocarbons, dioxin, asbestos and hexavalent chromium. Furthermore, the courts overturned the ban on asbestos less than two years after it was issued. The EPA has not prohibited more substances because it lacks the authority for requiring manufacturers to carry out additional scientific studies or for making the concept of “unreasonable risk” operational. Whether referring to information management (KOCH & ASHFORD 2006), the precautionary principle (KARLSSON 2010, VOGEL 2012) or a systematic comparison of the TSCA and REACH (APPLEGATE 2008), critics have tended to be unanimous: the TSCA has failed, whereas REACH is said to be both an opportunity for innovation and a “new paradigm” for managing chemicals (FUCHS 2009), even though attention has also been drawn to its negative economic effects (CATOIRE *et al.* 2012).

How has the EU regulation been able to control dangerous chemicals while the TSCA has failed? The hypothesis explored herein is that new “ways of regulating drugs” (GAUDILLIÈRE & HESS 2012; GAUDILLIÈRE & JOLY 2006) are part of a shift from an administrative to an industrial regulation. For a long time, administrative authorities were in charge of controlling toxic substances through government agencies that had to do most of the work of expertise and decision-making. In contrast, firms play a key role in regulatory procedures of an industrial type. Herein, I would like to explain how this shift in EU policy-making, thanks to a new control procedure (authorization), has reconfigured the relations between public authorities and firms.

This article⁽²⁾ relies on research conducted between 2011 and 2014 for a doctoral dissertation (BOULLIER 2016a). Data were collected using three classical methods of research in the social sciences: semidirective interviews, observation (participant as well as nonparticipant) and the analysis of documents from the archives (in particular the working papers during the drafting of REACH). My remarks on the TSCA are based on interviews with former EPA employees and on the archives of the National Service Center for Environmental Publications, which manages EPA publications and reports. As for the filiation between REACH and the TSCA, I have drawn on the findings of two case studies wherein I traced the regulatory circuits of several molecules in the process of being

(2) This article has been translated from French by Noal Mellott (Omaha Beach, France), who would like to quote from recital 72 of REACH, which is highly relevant to the reading of this article: “To support the aim of eventual replacement of substances of very high concern by suitable alternative substances or technologies, all applicants for authorization should provide an analysis of alternatives considering their risks and the technical and economic feasibility of substitution, including information on any research and development the applicant is undertaking or intends to undertake. Furthermore, authorizations should be subject to time-limited review whose periods would be determined on a case-by-case basis and normally be subject to conditions, including monitoring.” The intent expressed in this recital is reformulated in article 60. Texts of European Union law are available at <http://eur-lex.europa.eu/legal-content/FR/TXT/?uri=CELEX%3A02006R1907-20140410>.

prohibited, in particular, the well-known plasticizer, bis(2-ethylhexyl) phthalate (DEHP).

Although the regulatory procedures of both the TSCA and REACH suggest a similarity, the way chemicals are regulated in the EU has deeply changed. After recalling how industrial chemicals are regulated in the United States, the filiation between the two sets of regulations will be described along with the innovations made under REACH, notably its “prohibition through authorization”. Firms play a key role in this new approach on the borderline between administrative and industrial forms of regulation.

The EPA, firms and the lack of data

In the 1960s, American authorities started using a multi-disciplinary (instead of a sectoral) approach to address the issue of dangerous chemicals. Till then, the only arrangements for controlling chemicals targeted their uses as pesticides (the Federal Insecticide, Fungicide, and Rodenticide Act of 1910) or drugs (the Federal Food, Drug, and Cosmetic Act of 1938). At the time, no government agency was responsible for managing environmental pollution as such, nor for handling the public health problems caused by pollution. Three major factors led to the TSCA: an increasing politicization of environmental issues, the priority given by President Nixon to rationalizing federal agencies and, coming out of all this, the creation of the EPA.

Managing toxic substances regardless of the source

Prior to the EPA, the federal government had very few programs on the environment. The existing programs were unevenly applied, owing to a lack of coordination among the federal agencies in charge. During the 1960s, more and more questions were being raised about toxic substances in the environment. Rachel Carson’s *Silent Spring* (1962) sounded the alarm and catalyzed concern. Meanwhile, several persons who would be involved in drafting the TSCA pointed out the reasons why the federal government was unable to manage pollution. The question of making a reform arose. J. Clarence “Terry” Davies, one of the first persons to imagine such a reform, would help draft the bill of law. His career, which had started by sharing time between Princeton University and various federal offices, is a guideline for tracing the evolution of the TSCA during its initial years.

It all started in the mid-1960s when Davies joined the Office of Management and Budget (OMB, part of the Executive Office of President of the United States), responsible for drafting the federal budget. The OMB also sees to it that other government services comply with the presidential policies; its employees examine how government agencies carry out federal programs. After two years devoted to assessing environmental programs, Davies wrote a book drawn from his experience in the OMB (DAVIES & DAVIES 1970). Focused on federal programs related to pollution and toxic substances, this book would soon bring him back to Washington. In the last chapter, he raised questions

about environmental programs. What objectives should they have? What sort of reform would enable the federal government to control the multitude of toxic substances present in the human body and environment?

Davies formulated two proposals for controlling chemicals on the American market. The first was to set up a federal agency in charge of managing pollution regardless of its source. No one had previously seen pollution as a problem to be handled across the board. The US Public Health Service was in charge of air pollution; and the Department of Interior, of water pollution, while several government services and agencies handled health problems related to radiation or workplace safety without any of them actually being in charge. Davies' second proposal was to institutionalize, through new regulations, a procedure for the marketing of new chemicals.

As an expert on environmental policy, Davies soon joined a group working on how to reduce the number of federal agencies responsible for environmental, agricultural and social policies. The group's first idea was to set up a Department of Natural Resources to include the departments of Agriculture and of the Interior and, too, the services in charge of Health, Education and Social Services. Davies was not convinced of this proposal's relevance or feasibility. Along with Douglas Costle, who would later become the EPA's first administrator, he drafted a counterproposal whereby the future agency was to be a commission with powers for handling environmental problems across the board: a sort of independent regulatory authority.

Meanwhile, President Nixon realized he did not have the advice he needed on pollution problems. He was not familiar with this topic, and it did not figure among his priorities. The opposition would badger him on this it during the 1972 election. Conditions were ripe in 1970 for massively reorganizing the federal government's environmental programs. In a special message to Congress, Nixon called for creating an agency to control pollution of all sorts. The EPA was set up in December 1970, and talks on what would become the TSCA started in 1971.

Setting up the EPA was a major event that vindicated the position, adopted by Davies and Costle, about a single federal body to be in charge of toxic substances, whether in water, air or soil — an agency for controlling chemicals across the board. The agency now existed but without the power to regulate chemicals. Negotiations started on what would become, six years later, the Toxic Substances Control Act.

Preserving the asymmetry of information

From the start, the bill of law on toxic substances was a sensitive issue. Negotiations were thorny, as were the relations between Davies and Charles Lettow, a legal expert with whom Davies would write the bill's first draft. Given their quite different careers (a political scientist from academia vs. a former employee of Dow Chemical Company), it was not evident that the two

would get along.⁽³⁾ Despite their variant approaches to, and perceptions of, chemicals, they drafted a bill of law based on two key principles in line with those for regulating drugs and pesticides: a procedure for requesting permission to place chemicals on the market and a division of labor that placed the burden of proof on manufacturers. However this second principle — at the core of REACH — would be left out of the act passed by Congress.

Strong opposition from the Department of Commerce to the bill led the OMB (in charge of arbitrating disagreements) to take a closer look at this first version. Taking cognizance of the objections raised by Commerce, the OMB required that the two authors renegotiate the text with James Lynn, chief attorney at Commerce. Despite the principle of placing the burden of proof on industry, Lynn obtained that the EPA would have to bring proof of the negative physiological effects of chemicals by establishing causality based on a dose-effect relationship. As a consequence of this compromise, the asymmetry of information between authorities and firms went untouched.

Apart from political obstruction on Capitol Hill, other legal issues further complicated the quest for a compromise. It would take Congress six years before adopting the TSCA in 1976 — nearly the same duration that negotiations on REACH, thirty years later, lasted in Europe. Before taking effect, the TSCA had a poor reputation in the EPA, which saw it as being so flawed that some pundits nicknamed it the "Toxic Substances Conversation Act".

The impossibility of prohibiting chemicals

The EPA office in charge of implementing the TSCA had a hard time during the first months following passage of the act. Under the law, the EPA was to compile, publish and update a list of all chemicals manufactured or used in the country. The first major difficulty was, therefore, to make this inventory, which would be used to identify and control new chemicals. At the time, the administrators described this inventory work as a nightmare — at present, there are nearly seventy thousand chemicals on the list. This first feat, added to the organizational difficulties of setting up a new office in a federal agency, was a challenge. But all this did not amount to much compared with what happened after Reagan (1981-1989) became president.

In a book on the controversies surrounding carcinogenic chemicals, John D. Graham has described the difficult times endured by the EPA during the Reagan administration, in particular when Anne Gorsuch (1981-1983) and William Ruckelshaus (1983-1985) headed the agency (GRAHAM *et al.* 1988). Using similar data (which, by the way, have not changed much since then), the agency reached opposite conclusions, under Gorsuch then under Ruckelshaus, about the risks of cancer related to formaldehyde. The Gorsuch team was accused of being pro-industry.

(3) J. Clarence Davies interviewed by Jody Roberts and Kavita Hardy on 20 October 2009.

These differences were partly at the origin of a Red Book on risk analysis published by the National Academy of Sciences. This publication led to deconstructing the hypothesis of a “pure” science owing to a shift, under risk analysis, from “*reliance on facts to reliance on process*” (JASANOFF 1992:202, JOLY 1999). The shift toward risk analysis covered up the key problem facing authorities: not enough data available were available on existing chemicals, and it was not possible to force firms to provide data.

The EPA's unfortunate attempt to regulate asbestos in 1989 relied on risk analysis tools. This setback was evidence that it was nearly impossible for the agency to prohibit toxic chemicals or restrict their introduction on the market. After ten years of research, public meetings and investigations on the best regulatory approach to adopt for controlling chemicals, the EPA opted, under section 6 of the TSCA, for a gradual but total prohibition on manufacturing, importing, processing or distributing asbestos. Challenged in the courts by a coalition of manufacturers, this decision was overturned (STADLER 1992). In 1991, the court concluded that the EPA had not clearly stated whether “*there is any other regulation that would achieve an acceptable level of risk as mandated by TSCA*”; and that “*the EPA, in its zeal to ban any and all asbestos products, basically ignored the cost side of the TSCA equation*”.⁽⁴⁾ The court's ruling put an end *de facto* to the EPA's recourse to section 6 of the TSCA. No other action for prohibiting a toxic substance would be taken after this ruling.

Unable, for want of data, to assess the precise “uses” of toxic molecules, the EPA tried to use the TSCA to prohibit such chemicals regardless of their uses. But the courts, deeming such a prohibition to be too radical, deprived the agency of the only option that allowed for making the ultimate decision, namely prohibition. Following a period of “adversarial procedures” involving toxic chemicals (JASANOFF 1992), the EPA more or less gave up on regulating chemicals already on the market.

This brief history of the TSCA provides a glimpse of how, in the management of risky materials, the relations between regulatory authorities and firms have been reconfigured. The arrangements foreseen under the TSCA are similar to those the EU gradually adopted after 1970. The EU regulation adopted in 2006 has similar pretensions to the TSCA's: REACH foresees, under a single regulation, procedures of registration, assessment and prohibition that apply to thousands of chemicals. But: the reversal of the burden of proof under REACH — from public authorities to manufacturers — has fundamentally altered the management of dangerous molecules.

(4) Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir. 1991). Available at <http://law.justia.com/cases/federal/appellate-courts/F2/947/1201/153685/> (consulted 17/6/17).

A new paradigm for managing toxic substances?

The idea of a far-reaching reform like REACH emerged in the late 1990s. Two major factors stimulated the process that would lead to the adoption of REACH in 2006. For one thing, the European Commission was pursuing a policy of rationalization, the “better law-making agreement”, which pushed toward assessing the effectiveness of EU directives and regulations and then decreasing the number thereof. For another, several member states were demanding reforms, through their ministers of the Environment to the Council of the Union. The reform of EU regulations targeting chemicals thus came to figure on the agenda.

REACH and the TSCA: Similar pretensions

According to a story on the origins of REACH, the process of reform was set in motion at a meeting of the ministers of the Environment of member states (specifically, of the Council of the Union in its configuration “ministers of the Environment”) in 1998. Accordingly, the Council played a major role by insisting on gaps in the existing regulatory framework (EWALD 1986). One of the most important loopholes was the “burden of the past”:⁽⁵⁾ firms were not under the obligation to systematically provide data on the toxicity of the tens of thousands of chemicals already on the market.

This meeting of ministers of the Environment led the European Commission to publish a report in 1998.⁽⁶⁾ Presented to the Council, this report evaluated the operation of existing EU regulations on chemicals and identified shortcomings in risk management. In particular, regulation 793/93 “*on the evaluation and control of the risks of existing substances*” (*i.e.*, substances placed on the market before 1981) was found to be wanting in matters of risk assessment. Out of the 110 substances listed as a priority in this regulation, only 19, according to the report, had been subjected to a full risk assessment; and recommendations for reducing risks had been formulated for 14 of them. Bear in mind that the European inventory listed more than 100,000 chemicals! Although the EU had not waited till the turn of the century to start controlling toxic substances, this concrete assessment of the application of the dozens of regulations and directives adopted since the end of the 1960s was overpowering.

Given this failure, the Commission decided to work on objectives for a future European strategy. The objectives set in REACH often enough remind us of the TSCA's. There was, as already pointed out, the pretension to control several tens of thousands of toxic substances

(5) European Commission, “Industrial chemicals: burden of the past, challenge for the future”, A stakeholder workshop on the development of a future “chemicals” strategy for the European Union, Brussel, 24-25 February 1999, DOC XI/6337/99, April 1999. Available at: www.chemicalspolicy.org/downloads/Brainstorming-WRCRecommendationscopy.pdf (consulted 17/6/17).

(6) European Commission, “Report on the operation of directive 67/548/EEC, directive 88/379/EEC, regulation 793/93 and directive 76/769/EEC, Brussels, 18 November 1998”.

regardless of their sources. Like the TSCA, REACH was to draw up an inventory of chemicals, and assess and prohibit the most dangerous substances when the risks related to them could not be controlled.

Prohibit chemicals while authorizing uses

Let us insist that the European regulation is very similar to its American counterpart: its three underlying principles have to do with the registration and assessment of the thousands of chemicals on the market and the prohibition of the most dangerous. Upon a closer look however, we notice that REACH foresees a new procedure, “authorization”, whereby authorities may prohibit dangerous chemicals — without any new data — on the grounds of their general properties. The chemicals thus declared “subject to authorization” are then prohibited, unless a temporary authorization to use them is granted, case by case, to a firm that files a request.

Before the adoption of REACH, it was hard to prohibit the most toxic molecules. Ten years after its adoption, 168 chemicals figured on the “candidate list subject to authorization” at the start of 2016; and 31 of them were on the “list subject to authorization”. No other procedure for controlling chemicals has achieved such a result, moreover, in such a short time.⁽⁷⁾ To understand how this procedure works, let us look at a concrete example.

The case of DEHP clearly illustrates how REACH prohibits chemicals that used to lie beyond the reach of regulatory authorities. Used as a plasticizer, bis(2-ethylhexyl) phthalate (more often known as DEHP) is omnipresent in everyday life. It was synthesized for the first time in the 1920s, and produced on a large commercial scale during the 1930s. Given its low production costs and many applications, it is one of the most widespread phthalates. Many manufactured products contain DEHP: shower curtains, electric cables, toys, vinyl floor coverings and, too, the bags used for blood and for dialysis and even sex toys.

Despite the risks related to its uses and the high risk of exposure, DEHP was subject to few controls till quite recently. Like many other products, it took a long time before this molecule was recognized as “toxic for reproduction” and classified in consequence. Although studies proving its toxicity date back to the 1980s (THOMAS *et al.* 1984), DEHP would not be classified as “probably” toxic till the turn of the century. According to the studies serving as the grounds for this decision, DEHP carries risks for human fertility (especially to children) owing to its properties as an endocrine disruptor. Given the large volumes produced, this phthalate was subjected to a risk assessment by EU authorities — an additional document to add onto the large number of previous studies. Despite all this evidence, this dangerous, extremely widespread chemical, omnipresent in many everyday products, was still beyond the reach of

the law. The situation changed following the adoption of REACH in 2006. Shortly after its enactment, Swedish authorities decided to submit DEHP to the authorization procedure.

The authorization procedure has two major steps. The first is for national authorities to declare a chemical to be of “very high concern”, mainly on the grounds of its classification and of the number of tonnes produced. After being placed on the “candidate list subject to authorization”, the most toxic of these molecules may be made “subject to authorization”. They are then prohibited from being placed on the market unless there is a precise authorization granted case by case. The second step is for the firms that would like to continue using one of these molecules to request an authorization from the European Chemicals Agency (ECHA), which is in charge of applying REACH. The firm filing a request can hope to be authorized to continue using the molecule but for a stated use and a limited time. This procedure was applied to DEHP.

Following the demand from Swedish authorities in June 2008, DEHP was declared a “substance of very high concern (SVHC)”. As of 2009, the committee of the member states of the ECHA placed it among the first chemicals to be “subject to authorization”. Since February 2015, this molecule may not be placed on the market without an authorization. Several big firms are affected by this listing of DEHP as a substance subject to authorization. Anticipating this decision, Arkema, a French chemical firm and one of the major European manufacturers of DEHP, filed in August 2013 two requests with the ECHA for authorizations to use DEHP to make articles in PVC.⁽⁸⁾ On the basis of socioeconomic data and information provided by the firm about its risk-management measures, Arkema obtained the authorization to use this chemical but only for the uses declared in the authorization and for a period limited to four years.

By setting conditions, the “regulatory horizon,” in particular a time limit beyond which a toxic substance may no longer be used, REACH has avoided the pitfall of the EPA’s asbestos ban. Whereas the TSCA foresees an outright prohibition on the most dangerous chemicals, without any possibility for a dispensation, REACH provides for an authorization procedure. A chemical subject to authorization may continue being placed on the market for a given use and time on condition that a firm files a request and manages to prove that it has implemented suitable risk-management measures or that the socioeconomic analysis submitted in its request contains adequate grounds for temporarily keeping the substance on the market.

(7) However the scope of this authorization is “moderate” in the words of one interviewee, a former European chemical industry representative who took part in preliminary negotiations on REACH. Approximately 1,500 chemicals could be targeted among the 100,000 in circulation (BOULLIER & LAURENT 2015).

(8) Arkema, Application for authorization for Bis (2-ethylhexyl) phthalate (DEHP) for industrial use in polymer processing by calendaring, spread coating, extrusion, injection moulding to produce PVC articles except erasers, sex toys, small household items (<10cm) that can be swallowed by children, clothing intended to be worn against the bare skin; also toys, cosmetics and food contact material (restricted under other EU regulations), 2013.

By focusing on the properties and uses of chemicals, this authorization procedure allows for numerous “special” cases. As a result, regulatory authorities are in a “hybrid” position that can be reduced neither to simply finding a solution to a purely regulatory requirement nor to fully delegating to private interests the power to organize the chemicals market (BOULLIER & LAURENT 2015).

Furthermore, REACH provides for many exemptions. The authorization procedure does not, for example, apply to imported goods, not even if they contain substances subject to authorization. This is very often the case for phthalates, which enter into the composition of many products manufactured outside the EU. Another exemption concerns European manufacturers who export their goods outside the EU. Since the authorization procedure requires the manufacturer to state a “use” for placing a chemical on the European market, exporting firms benefit from the fact that the substance in question has no use on the European market since all goods containing it are exported. As a consequence, a firm that makes phthalates and exports all its production outside the EU is not concerned by the authorization procedure. Despite these exemptions, the authorization procedure allows for prohibiting molecules — something that no previous regulatory policy had achieved.

Prohibition through authorization: A new form of regulation

Unlike previous regulatory procedures, despite their pretensions and the adoption of the TSCA in the 1970s, REACH manages to exercise control over chemicals. The deployment of its authorization procedure corresponds to a new “form of regulation” (GAUDILLIÈRE & JOLY 2006). Borrowing John Pickstone’s (2001) “ways of knowing”, Jean-Paul Gaudillière and Volker Hess (2012) have described five forms of regulation (professional, administrative, industrial, juridical and public) that were applied to therapeutic agents during the 20th century. For a long time, the control of substances produced by the chemical industry was an administrative type of regulation, which assigns most tasks of expertise and control to government agencies.

While clearly providing for interventions by regulatory authorities, REACH adds objectives related to profit-making and productivity to the requirement of protecting human health. It thus comes close to being a regulation of an industrial type, in which firms clearly play a key role. In the EU, this change can be observed at the level of the authorization procedure. To describe how this shift involves firms in the production of regulatory know-how during the decision-making process, Table 1 epitomizes the characteristics of procedures for controlling risky chemicals. To understand how the authorization procedure works, I would like to point out how the characteristics presented in this table follow on, and rectify, previous policies of prohibition, such as the one under the TSCA in the United States.

REACH differs in intent and scope from most previous regulatory policies, including the TSCA. In particular, it claims to make the protection of human health and the environment compatible with the improvement of the European chemical industry’s competitive advantage. The TSCA’s intent and scope are quite different. Lacking power over chemicals already on the market (such as asbestos), the US act focuses on controlling new chemicals. It is a coercive policy. Insofar as the EPA fails to obtain data on the uses of potentially dangerous chemicals already on the market, controls are limited to requests concerning new chemicals or new uses. Prior to 2006, the European regulatory framework was much the same: directives and regulations mainly concerned new chemicals. Under REACH’s authorization procedure, the decision to prohibit a chemical is easier to make since it does not take effect right away but at the end of the period during which the chemical is authorized for certain uses.

Whereas existing chemicals were, prior to its adoption, subject to few or no controls, REACH distinguishes between substances and their uses. This new approach, enshrined in the authorization procedure, alters the division of labor between regulatory authorities and firms. Authorities have the job of selecting the chemicals to be prohibited; they single them out (DODIER 1993) by declaring them to be of “very high concern” and destined for the list “subject to authorization”. The

	Earlier procedures (as under the TSCA)	REACH’s authorization procedure
<i>Intent and scope</i>	A coercive, restrictive policy. Narrowly defined prohibitions, irrevocable decisions.	Under a policy of “responsibility-making”, authorizations for temporary, specified uses.
<i>What to control</i>	New chemicals to be placed on the market. Chemicals already on the market are subject to few or no controls.	The prohibition of all toxic substances but with the possibility of temporary authorizations.
<i>Data</i>	A heavy burden on the administration: for want of toxicological data, few prohibitions are pronounced.	A chemical is listed as “subject to authorization” on the basis of its danger. When filing a request for an authorization, the firm must submit socioeconomic data and information on the uses of the chemical.
<i>Regulatory know-how</i>	The grounds for prohibiting a toxic substance are toxicological data. The creation of lists.	Various sorts of know-how arise out of a collaboration between public authorities and manufacturers.

Table 1: Regulating chemicals before and after REACH

firms that want to continue using these chemicals must file requests to explain why certain “uses” should be temporarily authorized.

Previous procedures required information on toxic substances that regulatory authorities themselves had to provide. This imposed so heavy a burden on the administration that few prohibitions could be pronounced. Under REACH, authorities use the general information available to pronounce a prohibition. It is now possible to prohibit a dangerous substance even “without data”, *i.e.*, without any detailed data on it.⁽⁹⁾ In effect, the data on the uses of toxic molecules and on their economic benefits are provided by a firm when it requests an authorization.

Previously, a decision to prohibit an existing chemical was based on a risk-assessment, but relevant toxicological data were not always available. Under REACH, such data are no longer the key evidence used to decide whether it is necessary to take dangerous chemicals off the market. Under the authorization procedure, attention is also given to both the chemical’s socioeconomic benefits and the time needed for R&D to invent a substitute. Knowledge is constructed by firms, along with authorities, during a process of collaboration for the purpose of gradually prohibiting dangerous chemicals (starting with those for which substitutes exist). In effect, most molecules classified “subject to authorization” are old chemicals that are now being replaced.

Conclusion

We have explored the hypothesis of a shift from an administrative type of control of high risk chemicals to an industrial form of regulation, wherein firms play a key role.

The history of the US Toxic Substances Control Act of 1976 — one of the most ambitious policies for controlling chemicals that has ever been imagined — has been reviewed. The thorny negotiations leading to its adoption stripped the TSCA of provisions for placing the burden of proof on manufacturers. Given the asymmetry of information that long prevailed in the regulation of chemical substances, the EPA was unable to prohibit toxic molecules. Its failure in prohibiting asbestos marked the end of any attempt by this federal agency to outlaw existing chemicals.

The intent of REACH’s authorization procedure is to settle problems by granting regulatory authorities the power to prohibit certain dangerous molecules in spite of this asymmetry of information. These substances are now made “subject to authorization” on the grounds of their general properties, but they may be temporarily authorized for certain uses, on condition that the request filed by a firm for an authorization be accepted.

(9) In the words of a representative of the Ministry of Ecology during an interview in September 2012. As this phrase implies, a chemical may be made subject to authorization without any new data, since chemicals are singled out on the basis of generic classificatory criteria.

Given that REACH assigns firms a strong position (BOULLIER 2016b), questions arise about this reconfiguration of the relationship between regulatory authorities and firms and of the “ways of knowing” under the authorization procedure. In any case, the authorization procedure signals a break with the past: managing dangerous chemicals no longer entails hurriedly making a data base with exhaustive information from relevant scientific studies and all tests on exposure levels (and related risks) and about all manufacturing processes so as to be able, at last, to decide, with full knowledge of the facts, whether to prohibit a substance. The chemicals listed as “subject to authorization” are well-known, everyday products. Our attitudes toward them are ambivalent. We know they are dangerous but they are part of everyday life. The framework of the authorization procedure is clearly defined: molecules with known dangers are to be withdrawn from the market gradually, as substitutes are introduced, so as not to upend industry or disrupt our way of life.

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The conditions for a successful mentoring relationship: The followup on young graduates

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The mentoring program described herein follows up on young graduates of higher education who are looking for work. Its aim is to fight against discrimination and open access to the world of work for youth who are underprivileged (owing to their place of residency or social background). Conducted at the request of a nonprofit organization that brings young graduates into contact with white-collar workers in firms, an “action research” program has identified four major psychosocial effects of the mentoring relationship: 1) the “Wow!” effect; 2) the Pygmalion (expectations) effect; 3) the improvement of relational skills; and 4) the network effect. Taken together, they form the “magic square” of successful mentoring

Mentoring programs for entering, or returning to, the world of work, especially for “*accompanying, in their search for employment, young people without a personal network of relations to occupational environments*” are part of the toolkit proposed by public authorities in France to curb youth unemployment.⁽¹⁾ Under these “accompaniment programs”, the mentors often have a relatively high social status and are capable of identifying job opportunities for their wards (HOUDÉ 1996) and putting them in contact with corporate decision-makers (CHAUVAC 2011). Furthermore, they are examples and, thus, a positive source of motivation that ultimately affects the access, or return, to employment of those whom they are accompanying.

Our action research program, conducted at the request of a nonprofit organization, the association NQT (*Nos Quartiers ont des Talents*), has inquired into

the conditions for successful mentoring both in terms of the psychosocial interactions between mentors and wards and at the organization’s operational level. Founded in 2006, the NQT’s core activity is to bring young graduates from underprivileged neighborhoods (classified as “priority neighborhoods”) or disadvantaged social backgrounds into contact with experienced white-collar workers, the goal being to facilitate their integration in the world of work. Owing to its success, this mentoring program has been expanded on a large scale, and the NQT has grown fast.

(1) Circular of 8 November 1996 in application of an act of December 1993. For Maela Paul (2002:50), mentoring is based on an intergenerational bond with the mentor’s action at the “*articulation of the occupational and social fields*”.

The NQT establishes multiparty partnerships with private and public organizations, NGOs, etc. Such a partnership organizes mentoring, circulates job offers among young graduates looking for work, serves as a relay and facilitator at the local level or participates in the events organized by the association. By deploying an energy often described by its partners as “contagious”, the NQT tries to create and maintain mentoring relationships. Its special talent, in its work with partners, has been to successfully match mentors with wards and then to manage these mentorships over time, by supervising the frequency of meetings.⁽²⁾

We have chosen herein to explore the psychosocial aspects of interactions in the mentoring relationship, since the association’s mentorship model seemed to us to be evidence of its success. Our research has brought to light four psychosocial secrets for successful mentoring: a) the “Wow!” effect, b) the Pygmalion (expectations) effect, c) the accrual of interactional skills and d) the network effect. Taken together, they form the “magic square” of mentorship. In the case studied herein, they were the principal psychosocial factors that account for effective mentoring.

We shall start with a brief account of the studies that, made on mentoring programs for helping people gain access to the world of work, analyze the objectives and limits of mentoring. We shall then describe our fieldwork in the NQT, the latter’s request for research and the methodology adopted in response. Our findings will then be presented by using labeling theory (BECKER 1963) as a grid of interpretation. In conclusion, we shall discuss the advances made through our research and, too, its limits.⁽³⁾

Mentoring for opening access to the world of work

Integration in employment as an objective

Mentoring programs in France have mainly targeted youth with few or no qualifications. Programs have been set up locally for young people who are the farthest removed from the labor market (WAHBI 2002; CORVISART DE FLEJEURY & LANLO 2001). Other programs have been designed for young people under judicial control (by the services of *Protection judiciaire de la jeunesse*), the aim being to help them enter the world of work (CLÉMENT 2006). According to Dufour and Frimousse (2006), the young people targeted by mentoring programs need — given their low “educational capital” — to be sponsored by experienced adults, who will play a role in their socialization. Other mentoring programs have focused on underprivileged

secondary school students, the purpose being to help them finish high school and find a job.⁽⁴⁾

A few programs, run by nonprofit organizations, have targeted categories of young people with diplomas. Besides the NQT, the AFIP (Association pour Favoriser l’Intégration Professionnelle) runs a program for bringing into contact graduates from “visible minorities or lower-class neighborhoods” with mentors who work in firms that have pledged to “open their address books” (KROHMER *et al.* 2010).

All these programs rely on volunteers to provide counseling. These mentors use their address books to find job opportunities for their wards. This illustrates the “strength of weak ties” dear to Mark Granovetter (1973, 1974). By recommending his/her ward, the mentor makes the job application creditable to potential employers. This has been shown in studies on local networks for integration (BARON *et al.* 1995), which have proven effective “*partly because of a ‘contagion of value’, whereby the value attributed to the recommender is partly conferred on the person recommended*” (BUREAU & MARCHAL 2009:183). Philippe This phenomenon has been said to be a “transfer of fame” in the case of French jazz musicians: “*insofar as it has to do with beliefs, the transfer of fame achieved through sponsorship thus has, in a way, the sui generis effectiveness of ritual gestures, conveyed by belief in the magic virtues of the mentor’s renown*” (COULANGEON 1999:696). The ward is thus endowed with an otherwise unattainable “symbolic capital”.

The fight against discrimination as a purpose

One purpose of mentoring programs that help people enter, or return to, the world of work is to counter the effects of discrimination (BERENI 2009).

According to Rebzani (2000), mentoring, by obtaining a commitment from both the young wards and employers, is effective for three reasons. The first has to do with the “technique of taking the first step” (JOLE & BEAUVOIS 1987): to obtain a big favor from someone, start by requesting a smaller one. The employer’s first step is to sign the national charter on mentoring; he then has to prove his open-mindedness toward disadvantaged young people and open the company’s doors to them. According to Rebzani, the confidence placed in these young people motivates them to reconsider their perceptions of firms and double up on their efforts. Secondly, the “low-ball technique” of priming (CIALDINI *et al.* 1978) makes mentoring more effective when mentors see to it that employers keep their commitments. Rebzani’s third reason has to do with the “hypothesis of contact” (ALLPORT 1954), whereby increasing contacts between two social groups

(2) Readers who want more information about the NQT, its social work or business model, are referred to the minutes of its meeting of 3 February 2016 at École de Paris du Management (FOURNIER & RAULET-CROSET 2016) and to the research report in the NQT’s white book (RAULET-CROSET *et al.* 2015).

(3) This article has been translated from French by Noal Mellott (Omaha Beach, France).

(4) Examples are the programs of the foundation Un Avenir Ensemble (BANCEL-CHARENSOL 2015) and the association Actenses (BEHAGHEL *et al.* 2013). According to Behaghel *et al.*, the short- and medium-term effects of the latter program on the orientation of students were barely cogent. However the long-term effects on orientation after high school and integration in the world of work were not assessed.

will, under certain conditions, attenuate their prejudices about each other. Let us bear in mind that these three reasons are working hypotheses drawn from the literature in social psychology on obtaining compliance.

Other scholars have had reservations about mentoring or even criticized it. Mentoring lets employers off lightly, and this hardly motivates them to alter their recruitment practices (MASSON & VAN DE WALLE 2001, GARNER-MOYER 2003). Besides, it tends to push responsibility for fighting against discrimination onto young people, who are expected to modify their attitudes toward firms. The fight against discrimination is thus often pushed into the background in order to grant priority to jobs for youth. Furthermore, the public targeted by mentoring programs is often too broad; the objectives are sometimes poorly understood; and the mentor's role as a go-between is not clearly defined (MASSON & VAN DE WALLE 2001). According to Milena Doytcheva (2011:67), whose criticism goes even farther, mentoring heavily relies on *"an 'adaptive' approach to 'publics' that is specific to social programs for fighting against discrimination but that, in actual practice, deviates this struggle's objectives"*. The controversy on the cogency of mentoring programs is, as we see, keen.

Though opening paths for analyzing mentoring programs, the aforementioned studies have drawbacks. For one thing, some of the critical studies have adopted a macrosocial approach and mainly concentrated on discrimination in the labor market. For another, those studies that do take a look at the mentoring relationship itself are usually limited to theoretical remarks or a discussion about how to design experiments. This leads them to see the processes active in mentoring separately, one by one. Our inquiry, via an interactionist and pragmatic approach, has sought to discover the many factors accounting for successful mentoring in real-life situations.

Fieldwork and methodology

The art of mentoring on a large scale: The NQT

We have studied the mentoring actions conducted by *Nos Quartiers Ont des Talents*, a nonprofit organization created in 2006 on the initiative of Yazid Chir and Raynald Rimbault, two entrepreneurs with strong social commitments who, at the time, were, respectively, president and general delegate of MEDEF 93 Ouest, a local branch of the main employers' association in France. The NQT came out of a successful experiment carried out in 2005 in Seine-Saint-Denis, north of Paris, with 200 young graduates.

The NQT, which had approximately forty wage-earners in 2015, conducts throughout France a mentoring program for promoting the occupational integration of young graduates. Mentors, who are unpaid, are white-collar workers with at least eight years of on-the-job experience. This large-scale program relies on partnerships with public institutions (local authorities, universities, local unemployment offices, etc.) and firms. These partners support the association by providing funding and, too, "human resources", since mentors come from their personnel.

Since the start of this program, 7,800 mentors have accompanied young graduates in their search for jobs. Referring to its program as a pursuit of "equal opportunities", the NQT has followed up on approximately 30,000 young people over a 10-year period: 69% of them have found, on the average within six months, steady jobs (contracts of a duration of six months or more) on par with their qualifications.

Young people in the NQT's mentoring program

TARGET

Young people, less than thirty years old, with postsecondary diplomas (at least three years of higher education) are recruited as a function of their place of residence (in "priority" neighborhoods or zones of "rural revitalization") or social backgrounds (underprivileged groups).

PROFILE OF RECRUITS

In 2014, 64,4% of recruits were women. According to the NQT, the most frequent profile was: a 26-year-old woman with five years of postsecondary education in communications. In fact, 50% of the young people had an education in communications, business/marketing, human resources, the law, accountancy, management, finances or insurance. These young people, the majority with university degrees, have trouble finding a job on par with their qualifications. They are often demoralized when they contact the association.

THEIR DIFFICULTIES

According to Yazid Chir and Raynald Rimbault, the NQT's founders, three main reasons account for the difficulties encountered by these young people as they look for a job. First of all, they lack confidence in themselves and have no methodology for conducting the job search. Secondly, they lack knowledge of the labor market and of the world of business and its codes. Thirdly, they have no occupational network as a backing. The NQT's mentoring program tries to act on these three points.

The NQT's request and our methodology

In a ten-year period, the NQT evolved from an experimental setup to a “thriving start-up”, in its president’s words, with operations all over France. For its tenth anniversary, this association set as the goal of accompanying 100,000 young people toward employment. To make political office-holders aware of the importance of integrating young graduates from modest social backgrounds in the world of work, the association’s founders had the idea, in 2015, of writing a white book and delivering it personally to President François Hollande at the Élysée Palace. After the President’s Office responded positively to the request for a meeting, it was time to start thinking about the contents of this white book on the “activation of social mobility”. This was the NQT’s outlook when it contacted us in February 2015.

Following a first meeting with staff members, a lead emerged for our research: describe and analyze the association’s foundations and business model while verging on the issue of the mentoring relationship. An *ad hoc* research team formulated an 8-month long action research program that combined several methods: participation in meetings with the NQT’s staff, observations in the association (mainly during the events it organized) and interviews (a dozen with NQT members, more than twenty with young graduates and seven with mentors). We also used the findings of a survey by questionnaire of mentors, which the NQT had asked Adrien Constant, one of its members, to conduct.

Underlying this research is “grounded theory” (GLASER & STRAUSS 1967), an empirical, inductive method whereby: “A researcher does not begin a project with a preconceived theory in mind [...] Rather, the researcher begins with an area of study and allows the theory to emerge from the data” (STRAUSS & CORBIN 1998:12). Accordingly, the purpose is not to prove or disprove an existing theory but to propose a theory or concept that is grounded on examining the collected data, that emerges from the analysis of the phenomenon — in our case, a study of the conditions for successful mentoring in the NQT’s program for accompanying young people toward the world of work.

Findings

By shifting back and forth between data and theory, we have been able to identify several effects that, usually present in the mentoring situations observed, facilitate the access of young people to employment. The “magic square” of mentorship combines these four main psychosocial effects.

A theoretical framework was necessary to avoid being lost in the data: “It is a matter not of theoretical hypotheses but of frameworks for orienting one’s self in the data, frameworks loose enough not to shape the material and, as a consequence, the findings” (AYACHE & DUMEZ 2011:30). For this orientation, we relied on labeling theory (BECKER 1963). This current of symbolic interactionism (BLUMER 1969) focuses on social phenomena from the angles of social interactions and cognitive representations. It clearly corresponds to

what happens in the mentoring relationship. We shall present the four psychosocial effects identified in our research from the viewpoint of labeling theory and then show how they are interdependent.

The “Wow!” effect

In marketing, “Wow!” “refers to the fact that a product, service or advertizing campaign arouses among consumers an effect of surprise, admiration or appreciation translated by the interjection ‘Wow!’”⁽⁵⁾ Though theorized by Peters (1994), it is a practical concept rather than an academic construct.

In our research, this effect was triggered when the young graduate looking for a job met for the first time his/her mentor in the firm where the mentor works (a rule set by the NQT). The status and image of mentors (experienced white-collars, thus often a role model for the youth in question), the company where they work (often a big firm with an exceptional force of attraction), the layout of the workplace, or the experience of the mentor listening... these elements helped unleash the Wow! effect. As a consequence, these young people fastened a positive label on their mentors. One young graduate recalled:

“I called. He was director of logistics at Coca-Cola. It was really a stroke of luck to have someone in such a position! He’s not paid for it [for mentoring]. His job is to help run Coca-Cola. I remember: it was on the fourth floor, a table football was next to the elevator. It was very modern, a little like Google, offices of an American sort. People were cool at work, relaxed; they felt good.”

The Wow! effect had a positive psychological spin-off: a motivation, hope, feeling of recognition or even the belief that mentorship was enhancing the chances of landing a job. All this had a positive impact on the young graduate’s self-image — through a process of positive self-labeling.

The Pygmalion effect

In the educational sphere, this effect refers to what psychosociologists have usually called the “expectations effect” (TROUILLAUD & SARRAZIN 2003). As Rosenthal and Jacobson (1968) showed, the mere fact of a teacher believing in the success of a pupil improves the latter’s scholastic performance. A harbinger of this idea was Howard Becker (1952), who pointed to teachers’ low expectations as a reason why pupils are less successful.

This effect came into full play in mentorships. Mentors were deeply convinced that the young people whom they were accompanying had potential, had aptitudes, and were deserving — a process whereby they attached a positive label to their wards. In one mentor’s words:

(5) From the website: <http://www.definitions-marketing.com/definition/> [consulted on 2 June 2017].

"It supports my idea that there are gems everywhere, not only in privileged neighborhoods or in schools with a good reputation."

And as another had this to say while talking about the young people:

"They are amazed by our attention to them and our tenacity, and are sometimes surprised that we are more convinced of their aptitudes than they themselves!"

This evinces NQT's outstandingly performative slogan (and name) about the "talents in our neighborhoods" (*Nos quartiers ont des talents*).

This belief positively affected the young graduates' attitudes and helped modify their perception of their own experiences — a process of positive self-labeling. As a young graduate declared,

"A small personal example: I did theater for ten years, and so I put that under 'miscellany' at the end of my résumé. He [his mentor] told me, 'That's amazing. It's fantastic! It means a lot: the aptitude for improvising, working on a team', etc. And me, I was telling myself, 'Oh yea, but even so...'"

Improved relational skills

According to Emmanuelle Marchal (1999:45-46), "an applicant's flawed relational skills might overwhelm the recruiter's ability to make a judgment [insofar as this judgment] varies depending not on abstractly defined qualities but on the applicant's ability to show them and, as a consequence, on the relations that form between the persons in interaction." This is a reason why mentoring is important: it helps prepare young people for job interviews.

Improving relational skills meant learning the "codes" inherent in the interview setting: the ward's ability to adjust his remarks to what the employer was saying and to draw attention to his/her strong points on a job application. Beyond that, it meant making a lasting impression on the recruiter. According to a mentor:

"It was necessary to make Melanie progress, because she was too shy. So, I organized a simulation with two other colleagues, and I was there just as an observer. There were twenty minutes of interactions, and it was really terrific. She did not lose her concentration [...] We picked everything in her presentation apart, we went over everything! Then, after the debriefing, we redid the interview right away; and that changed everything! So I told her it was outstanding. But I admit it was rough. I think it triggered something for Melanie. She suddenly got it; and now, two weeks today, she's head of a project in marketing-communication."

This example clearly shows how feedback on the young graduate's comportment (the mentor's positive labeling of the ward) affected the latter's attitude and led her (through a process of positive self-labeling) to adopt an attitude conducive to the job search.

The network effect

The mentors who volunteer for the NQT program have an extended network of relations they can share with the young graduates whom they accompany. Jean Khiat, an icon in the association, has been so successful mentoring because he opened his network of relations to his wards. With thirty years of professional experience and more than nine hundred contacts via LinkedIn, he proposes to each of his wards to choose five persons in his LinkedIn network whom they would like to meet. He then serves as go-between, a practice that ultimately pays off. In his words, the persons who accept to receive a young graduate

"soon realize they're dealing with someone who's really worth it. They see a young person who has worked, is striving, who wants so hard. And so, they tell themselves, 'It would be stupid not to do something! I got to find a way...' And they tell the young person, 'I think such-and-such is looking for someone. So, I'm going to see if you can put in your application.' Being able to apply is already enormous! And then, if the young person manages to have an interview, because these are talented youth, they can make the difference during the interview, even more so since they've been prepared, they're supple... When they have a real job interview, they're usually hired."

As this example shows, the road to a job was opened through the processes whereby the mentor and, too, the contact label the young person.

However this road was not always so simple or straight, as we saw in the case of Aude. After graduating in architecture, Aude went from job to job just to pay the rent before she went to the unemployment office and then to APEC (an association specialized in employment opportunities for white-collars: Association pour l'Emploi des Cadres). When this association's six-month program did not lead to success, APEC oriented Aude toward the NQT, which quickly found her a mentor: a jurist working at Allianz. The mentor decided to take her along to a conference organized by Palladio Foundation. Set up in 2008, this Foundation works on a major 21st-century issue: urbanization and urban spaces. During the cocktail after the conference, Aude's mentor brought her into contact with persons in his network. One contact turned out to be decisive, as Aude put it:

"I had an interview with, in particular, an important person in the architecture network [at Allianz] who told me at the end of the interview, 'Go see such-and-such, you never know.' He sent me to a consultancy office and an agency, and gave me other names. My mentor had advised me to never leave an interview without having obtained references for other contacts, for fortifying my network. Some day, potentially, that would lead to a real job interview. That's more or less what happened. One thing leads to another. I had, I think, five network interviews with people who recommended other people. After an interview, I wrote e-mails [to contacts] with the words 'recommended by'. One

thing leading to another, I managed to land a real job interview. Following an interview I had a year and a half ago, I have a position in a firm: I'm an architect in an agency in the southwest of Paris."

This clearly illustrates the mentor's key role in opening the way toward employment by tapping his/her network, a key resource, and drawing on "the strength of weak ties" (Granovetter 1973, 1974).

The magic square

The four psychosocial effects, which we have analyzed through the prism of labeling theory, form the magic square of mentorship. Owing to the positive labeling of mentors by their wards (the Wow! effect) in combination with the mentor's high expectations and positive beliefs in the graduates they are accompanying, these young people regained confidence in themselves. They came to perceive their past in a positive light — the process of self-labeling through the Pygmalion effect. Relational skills then improved thanks to mentoring; the mentor's positive feedback to wards is an act of positive labeling. Combined with the opening of the mentor's network of contacts, this improvement of relational skills often proved decisive for integration in the world of work, even more so when the young graduates met (thanks to their mentors) people who fastened a positive label on them and recommended them to potential recruiters (the network effect).

It is not each of the four effects taken separately that accounts for the effectiveness of mentoring. Instead, the magic square refers to the chaining of the four. This metaphor emphasizes that successful mentoring involves a combination of all four effects. We can imagine, given the reputation of certain mentors, a virtuous circle, whereby the fourth effect chains back onto the first. Accordingly, the improved image of the young person who has found a job would reflect back onto the mentor, whose own image would be enhanced within his/her network, thus making the aforementioned labeling processes more effective in future mentorships. However our findings do not enable us to prove this hypothesis.

Discussion

This article helps us better understand what the mentoring relationship implies in psychosocial terms. Not many studies have been made of this, apart from Rebzani's (2000) purely theoretical approach to commitments and the more empirical studies on the "strength of weak ties" and a "contagion of value" in local networks for social integration (BARON *et al.* 1995, BUREAU & MARCHAL 2009). Our empirical findings are in line with these results since mentorship, in the NQT program, created both a commitment and a "contagion of value" (through the network effect). However they go farther by identifying other effects (the Wow! and Pygmalion effects as well as the improvement of relational skills) that give rise to positive interactions and are decisive for explaining the success of this mentoring program. The four psychosocial effects observed in our research

set off a group dynamics that facilitated integration in the world of work.

This article also contributes to the literature on mentoring by approaching this topic through labeling theory. Although this theory has concentrated on the processes producing social deviance, it can, in our opinion, be put to wider use. It can serve to explain how the processes of labeling and self-labeling come into play in most social interactions and affect behavior. Alongside negative labeling (studied by Becker in *Outsiders*), there are positive labeling processes that lead, not to stigmatization and discrimination, but to social integration and inclusion. In the repeated interactions between mentors and young graduates, a process of positive labeling leads, as we have shown, to modifying the young person's position in the labor market.

We cannot generalize our findings however. The magic square of mentorship mainly applies to the accompaniment of certain young people (graduates) by mentors of certain sorts (experienced white-collars). Let us point out what might be a finding in and of itself: the wide differential (which we observed) in the "value" on the labor market of the parties to a mentorship could be taken to be a reason why positive labeling is effective: it works in proportion to the distance between the young person and mentor.

Our research has another limitation. Although the magic square has been useful for the NQT's staff, it fails to shed light on other phenomena that might come into play in specific mentorships. For example, what turns out to be crucial for integrating a given young person in the world of work might be something else: his/her career plans or résumé instead of improved relational skills or restored self-confidence. In this case, the mentor's art is to adapt to the occupational situation of each young graduate whom they accompany.

Conclusion

In conclusion, we would like to propose two leads for further studies on mentoring.

The first lead brings us to a critique of the aim of mentoring and, more broadly, of the entrepreneurial philosophy underlying programs such as the NQT's. These programs are not intended to modify corporate recruitment practices and thus attack discrimination at its source and ultimately change the rules of the game. Instead, they prepare young graduates for the current situation and adapt them to it. Working on one's self, acquiring self-confidence, learning corporate codes, knowing how to seize recruitment opportunities and draw attention to one's assets and "sell" them during a job interview... these are both the prerequisites and finalities of mentoring. Such programs have the normalizing goal of adaptation, even more so when most of the program's "clients" are firms that volunteer, and provide financial and human resources.

Despite these reservations, mentoring for helping people enter, or return to, the world of work seems to be an appropriate solution for underprivileged young

people who have diplomas but lack a network and, very often, self-confidence as well. Mentoring enables them to acquire what they lack in order to find a job on par with their qualifications. To their credit, the firms providing volunteer mentors for the NQT's program are also committed to programs of corporate social responsibility. This has meaning for their personnel, and brings concrete, measurable benefits in house. Finally, the mentoring we observed was a "mending" action for creating the actual conditions for equal opportunities. It targeted young people who, objectively, were underprivileged — due to their very low endowment in economic and social capital (BOURDIEU 1980) — but who were "deserving" thanks to the educational capital they had built up through schooling.

The second lead for further study has to do with the way mentoring is organized. Our research deliberately focused on interactions within the mentoring relationship, a focus that has brought into view issues extending beyond mentorship itself. It would be worthwhile inquiring into these issues in order to understand how the association's managerial practices capitalize on successful cases of mentoring. How are the "right" practices shared, discussed and incorporated in the organization's regular practices? How does the organization take advantage of the four psychosocial effects? Is the association fully aware of the virtuous circle that can add to its reputation and to the value of its "stock" of mentors?

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High-reliability organization seen through interstitial activities

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Empirical studies of high-reliability organizations have usually focused on the most visible activities directly related to reliability: flight decks on aircraft carriers, the operation and maintenance of nuclear power stations, hospital emergency services and operating rooms, etc. The findings of fieldwork on heavy handling operations in two firms in the nuclear industry have been used to analyze “interstitial” activities along the boundary with visible “noble tasks”. Based on pragmatic theories and communication studies on organizations, this approach proposes an original definition of interstitial activities on four dimensions: organizational, temporal, spatial and symbolic. Owing to their effects on the vigilance of operatives and supervisors and on the decompartmentalization of activities at the plants, these boundary activities in bulk handling reinforce high-reliability organization overall. The concept of “interstitial activity” could prove useful for research on “distributed organizations”, where questions of coordination and cooperation are of utmost importance.

An increasing number of studies since the 1990s have focused on the conditions for attaining a high level of reliability in industries that conduct operations with potentially catastrophic effects. According to them, reliability stems from a “collective mindfulness” (WEICK & ROBERTS 1993, WEICK *et al.* 2008) that develops out of interactions between persons during routine activities or in unforeseen problematic situations (JOURNÉ & RAULET-CROSET 2008, TILLEMENT *et al.* 2009). Most empirical studies on high-reliability organizations have concentrated on high-risk installations with activities that are visible and directly related to reliability: flight decks on aircraft carriers (WEICK & ROBERTS 1993), the operation and maintenance of nuclear power stations (ROBERTS 1990, BOURRIER 1999, JOURNÉ 1999) and hospital emergency services and operating rooms (WEICK & SUTCLIFFE 2001, GENTIL 2013). These studies have, however, paid little heed to activities that, though closely related to “noble tasks” (HUGHES 1996), are not a full-fledged part thereof, thus remaining on the boundary, in the interstices of the organization. We shall, therefore, refer to them as “interstitial activities”.

To understand the relation between interstitial activities and an organization’s reliability, we have analyzed operations for handling and positioning heavy, bulky objects (several tons and several cubic meters) in two companies that produce critical parts (reactor pressure vessels, steam generators, pressurizers) for nuclear power stations and nuclear submarines. With serious industrial, economic and human consequences, these operations correspond to what Bourrier (2009) has described as “organizational risks”.

This article⁽¹⁾ intends to show that interstitial activities, though missing in formal texts and discourses about the organization, are crucial to production activities: they compel recognition from the persons working in production. We shall shed light on the processes

(1) This research was undertaken under the auspices of RESOH (École des Mines de Nantes/LEMNA) and its partners in industry: Areva, DCNS and IRSN. We would like to thank all persons in the field (crane-operators, packers, shippers, etc.) who shared their time and accepted our presence as observers doing fieldwork. This article has been translated from French by Noal Mellott (Omaha Beach, France).

whereby handling and portage activities played a part in high-reliability organization at the plants where we conducted fieldwork. In effect, they aroused “vigilance” with regard to critical risks, which the organization had previously neglected. Furthermore, by generating coordination among persons in workshops, they — and they alone — managed to effect a spatial and functional “decompartmentalization” of the organization.

From a theoretical viewpoint, our definition of interstitial, or boundary, activities is less related to the organization as such than to actual activities. How do such activities fit into a theory of high reliability organization? By proposing a definition grounded on both John Dewey’s pragmatic approach to valuation and communication studies of organizations (TAYLOR & VAN EVERY 2009), we raise points for building a theory of interstitial/boundary activities and concretely describe interstitial activities from four key dimensions: organizational, temporal, spatial and symbolic.

Interstitiality as a research topic: The theoretical framework of boundary activities

Research on the reliability of high-risk organizations has usually focused on the most visible and valued activities (even when the intent was to analyze errors and shortcomings) performed by recognized professionals (operatives in control rooms, maintenance technicians, firefighters, airplane pilots, doctors and nurses) (SCHULMAN 1993, ROCHLIN *et al.* 1987, WEICK & SUTCLIFFE 2001, BOURRIER 2009). High-reliability organization refers to “*studying the organizational conditions that enable a complex organized system to maintain a level of reliability compatible with both safety requirements and economic exigencies*” (BOURRIER 2003:200). Reliability involves several aspects, such as efficiency, safety, security, readiness and profit-making (TILLEMENT 2011, LLORY *et al.* 2001).

To study the interstitial activities on the boundary of the “nobler” tasks performed by higher-status occupational groups, we grounded our research on an interactionist approach for three reasons. First of all, this research entailed observing, in symmetry and at the same time, the so-called “noble tasks” and the “dirty work” (HUGHES 1971), since we could not understand the one separately from the other. Secondly, for interactionists (HUGUES 1971, BECKER 1982, STRAUSS 1988), the division of labor is a dynamic process that emerges out of interactions and arrangements between occupational groups with shifting bounds (TILLEMENT 2011). Thirdly, the division of labor is not just a technical matter; it is also a moral question. Zones of competence (BECHKY 2003) and task assignments are continuously (re) negotiated during interactions as a function of the “value” each occupational group assigns to its tasks as a “work well done” or a “real job” (BIDET 2015).

More recent studies (BORZEIX & COCHOY 2008), following up on these classics, share the concern for a detailed analysis of interactions within “communities of practices” and for forms of coordination in real-life situa-

tions. They are an extension of pragmatism, in particular of John Dewey’s work. In line with them, we have sought to pay special attention to everyday, routine actions that are partly invisible. How do persons at the workplace coordinate “distributed” tasks (LORINO 2014)?

Dewey’s (1939) theory of valuation provides an interesting grid for interpreting interstitial activities, since it helps us see how the persons involved determine what is, in their opinion, important. We propose describing interstitial activities as a function of the forms of communication whereby such activities become subject to valuation. For the pragmatist philosophers, thought processes are a form of action; and conversely, forms of action are thought processes. Attention, like any component of an action, involves “beliefs”, for instance the belief in safety rules and regulations. For the rules to work, those who make them have to believe that they will be applied as designed; and those who apply them will have to do so in the firm belief that the rules will help avoid risks that they do not even perceive (WILDAVSKY 1979). Dewey studied how beliefs turn “true” by being socially justified. His theory of valuation explains how value is set. Valuation can be formally defined as the making of a value judgement about a past action and the setting of a rule for a future action.

Communication studies see the organization in terms of the interrelation between “texts” and “conversations” (TAYLOR & VAN EVERY 2009). From this perspective, texts — annual reports, evaluation procedures, etc. — constitute the organization and endow it with agency, *i.e.*, the capacity for undertaking action (DETCHESSAHAR & JOURNÉ 2007, KUHN 2008, PHILLIPS *et al.* 2004). Studies have also shown the decisive part played by conversations, whether verbal exchanges between directors (COOREN 2004) or operatives at the workplace (MURPHY 2001), in developing the “collective intelligence” that produces high-reliability organization.

Within this theoretical framework, we propose an initial definition of interstitial activities as activities subject to valuation only in conversations, never in texts. In other words, the organization’s texts do not refer to them. In this sense, they are invisible. Nevertheless, everyone admits in conversations that they are indispensable.

Methodology

Fieldwork

To empirically describe interstitial activities, we observed handling and portage activities in two firms that make state-of-the-art heavy equipment for the nuclear energy and weapons industries. The shop described hereafter had a workforce of 450.

The production process in the workshops where fieldwork was conducted involved highly skilled, tightly controlled operations of machining, welding, soldering, boilermaking and assembly. At one of the plants, the time devoted to controlling what was made amounted to a quarter of total production time; at the other plant,

Box 1: Heavy handling operations

The production process observed during fieldwork was organized by project. Each heavy, bulky object to be made was loaded and moved so that workers have access to it. Such bulk handling operations were frequently needed to move the objects being made as well as bins and tools.

These handling operations carry risks. Safety at the plants where these objects will be installed requires that they be manipulated without damage. However the objects might be scratched or bumped while being hoisted. If an object drops, it might not only damage machines in the shop but also injure or kill workers. Another mortal danger for workers is to be hit by an object while it is being moved.

During maintenance work on one of the reactors at the nuclear power station in Paluel (Eure Department, France) on 31 March 2016, a steam generator was dropped. This accident served as a reminder to everyone of the potential economic and human catastrophes related to handling operations. The worst event witnessed during fieldwork occurred when a machinist forgot to unclench a machine's jaw and marks were left on the object being moved. The most frequent mistake made by operatives is to leave slack in the tackle, which causes the hoisted object to be unsteady.

In the workshop where we did fieldwork, the group of handling operatives was made up of ten persons from the principal contractor (who are assigned to five teams) and of five persons from a subcontractor. The technical and material exigencies of heavy handling operations weigh on how they are planned and organized: handling operatives's know-how and skills (CRU and DEJOURS 1983, DODIER 1995), the shapes and characteristics of the object to be moved, the equipment available for performing the operations, etc.

the half. The operations to be performed are well documented. To take soldering as an example, there are detailed designs indicating what to solder and how long the soldered materials should be left to cool.

Despite the quite visible risks, the handling of heavy objects is not the subject of detailed "texts" in these companies. Besides, this activity must adapt to fluctuating demands, a source of pressure. Each workshop has irregular, unexpected needs for bulky, heavy objects to be moved; and the weekly schedule is frequently readjusted to the priorities and contingencies related to these demands. Handling and moving operations are tightly coupled with major production processes (PERROW 1999). For the reliability of bulk handling operations, like the organization's reliability in general, the interactions with other occupational groups have to be made more reliable.

The operations of handling and portorage are planned using demand-management software. In addition, discussions take place on several occasions to schedule operations, those to do right away and those to be done in the coming days (DETCHESSAHAR 2013, LAROCHE 1995).

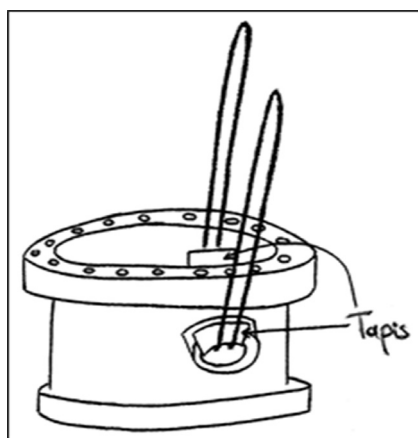


Figure 1: Placing slings on a cylinder pipe section to hoist it (drawing made during fieldwork).

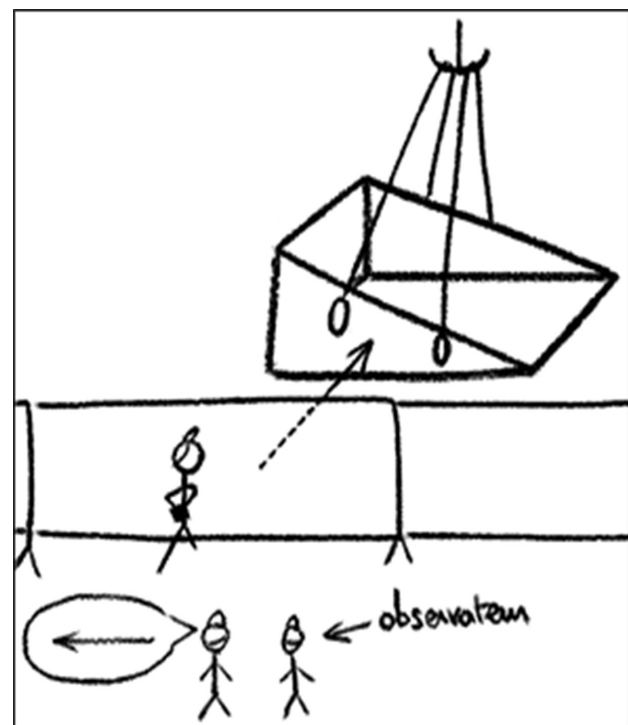


Figure 2: Hoisting a bin located behind a partition in relation to the observer (drawing made during fieldwork).

Data collection and analysis

Observations were conducted during fifteen weeks of immersion in fieldwork (FOURNIER 2012, JOURNÉ 2012). We took notes to describe both what workers were actually doing and what they said to each other before, during and after handling operations (VAN MAANEN 1979). Through these observations, we caught sight of the arrangements that handling operatives make to plan and organize their activities. These direct observations along with data collected in other forms enabled us to “gain access to conversations and texts” (ARNAUD 2007).

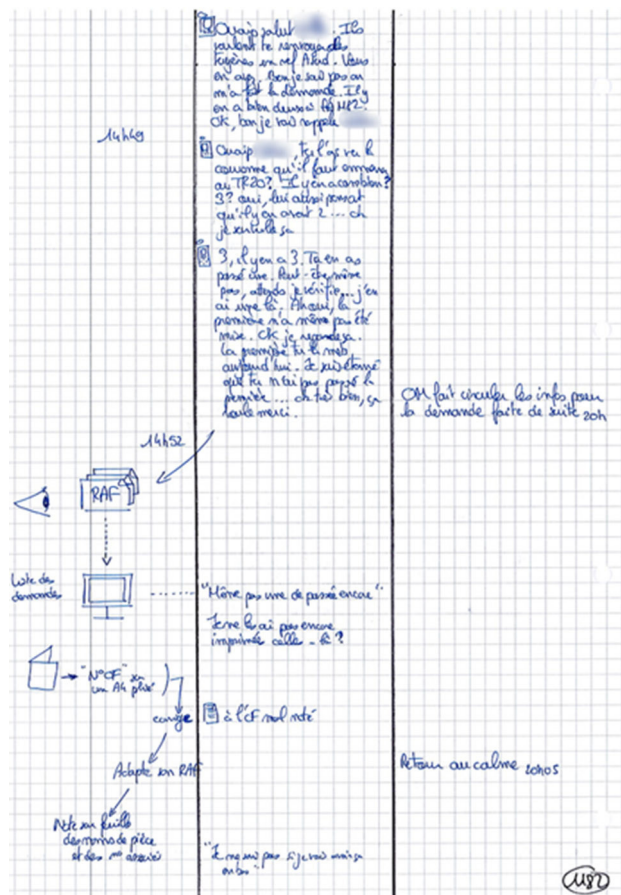


Figure 3: Page from a notebook.

Informal interviews at the workplace helped us understand the meaning these persons assigned to the situations we were observing. We also conducted interviews to detect the subjective experiences of persons working in production, whom we observed during our immersion in the group assigned to heavy handling (BEAUD 1996). Furthermore, we collected copies of documents used for communication purposes.

All this material has undergone a content analysis so as to make visible, for us and for employees, both the contents of the work done by heavy handling operatives and the working conditions (whether routine, disruptive, etc.). To see how handling operations contribute to high-reliability organization, we analyzed both the concrete, material aspects of the work done (tools, gestures, the positioning of operatives in relation both to the object being manipulated and to other workers, etc.) and oral exchanges during operations. We mainly

wanted to understand how the social and material aspects of the work environment were reflected in the language of actors; and vice versa.

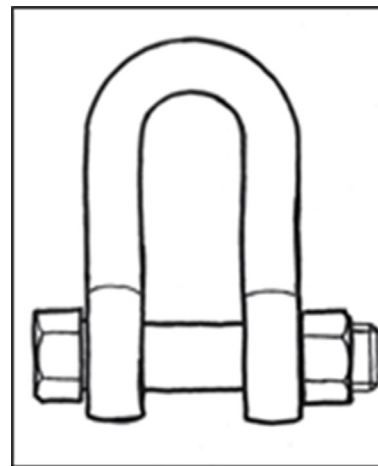


Figure 4: Coupling link used, for instance, to join a sling to an object's handle (drawing made in the field and from a sling operator's notes).

This analysis has brought to light two functions of interstitial activities with respect to high-reliability organization: a) they arouse vigilance and b) they decompartmentalize activities.

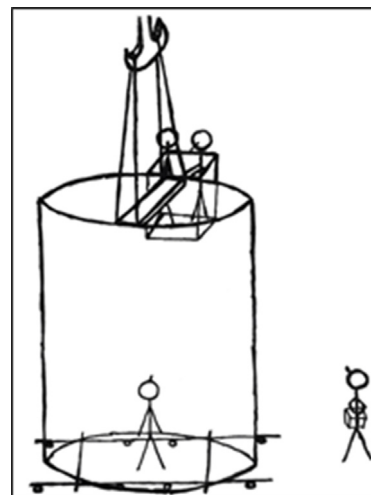


Figure 5: Positioning a lifting beam on a cylinder (drawing made during fieldwork).

Findings

Four dimensions of interstitial activities

With focus set on heavy handling operations and organizational reliability, our research enabled us to refine the initial definition of boundary activities as being invisible and indispensable by taking into account four dimensions: organizational, temporal, spatial and symbolic. The table presents our findings about heavy handling operations. We shall use them to describe interstitial activities and gauge their impact on reliability.

Dimensions	Characteristics of interstitiality		Impact on reliability
	Invisible	Indispensable	
Organizational	<ul style="list-style-type: none"> — Absence of formal procedures describing the activity. — Absence of quality control and of indicators for measuring performance. 	<ul style="list-style-type: none"> — Impact on production. — Impact on the global performance of workshops at the plant. 	<ul style="list-style-type: none"> — Difficulties of coordination with production. — Difficulties in evaluating and recognizing the work accomplished.
Temporal	<ul style="list-style-type: none"> — No planning for the time spent on heavy handling operations: the time needed is informally assessed. — The time devoted to such operations is split up as a function of needs in production. 	<ul style="list-style-type: none"> — Dead time is turned into productive time. — When done fast, such operations reduce waiting periods in production. 	<ul style="list-style-type: none"> — Heavy handling operations are seen by the rest of the organization as a waste of time, as a factor disturbing production schedules.
Spatial	<ul style="list-style-type: none"> — No place reserved for these operations; the place for tools is unused. — These operations are spread out in the workshop as a function of the needs of production. 	<ul style="list-style-type: none"> — The space used for these operations is dangerous. — Space on the shop floor is changed from unproductive into productive. 	<ul style="list-style-type: none"> — An activity at the interstices of the workshop and the organization. — Planning the spatial distribution of handling operations is seen as a waste of time.
Symbolic	<ul style="list-style-type: none"> — An activity considered to be “dirty work”. 	<ul style="list-style-type: none"> — An activity used to promote the organization’s products and image (in communication campaigns). 	<ul style="list-style-type: none"> — An activity “looking for its place” in the organization, in time and space.

Table: Interstitial (boundary) activities: Heavy handling operations

The first dimension of interstitiality is organizational. There are no formal procedures describing heavy handling operations as such. The “texts” (guidelines) for conducting or managing such operations, whether at the level of the supervisor or of the workers, are (when they exist) not at all precise or even fail to describe the requirements. There are no indicators for measuring performance, which, as a consequence, cannot be assigned a numerical value. Nor are there specific quality controls for heavy handling operations, unlike for other activities in production. Nonetheless, everyone in the shop said that heavy handling plays a part in production and contributes to reliability and performance. Furthermore, the handling supervisors consider that their activities affect the workshop’s global performance. This admission that heavy handling operations contribute to the work process is at odds with their organizational invisibility. The absence of formal texts causes difficulties during interactions with persons in production, problems that might impair the reliability of the organization as a whole. Given that indicators do not exist, it is hard to evaluate the work accomplished during heavy handling operations and, consequently, hard to obtain official recognition for them in the shop.

The second dimension has to do with time. There is no schedule specifying the time to set aside for heavy handling operations. Furthermore, the time needed is seriously underestimated (as compared with the time

scheduled for production activities), as both the handling and production managers emphasized. The time to be spent on heavy handling is split up, splintered, as the needs of production evolve. Nonetheless, production supervisors, during interviews, stated that heavy handling operations are, by their very nature, capable of turning dead time into productive time by, for example, reducing waiting periods. This is an argument used by a shop when it insists on having its handling operations done as soon as possible. When done fast, these operations reduce the time that workers in production spend waiting. Given the “temporal invisibility” of heavy handling operations however, this sort of talk is completely disconnected from the actual realization of them. Since handling operations often take much more time than what is allotted, production supervisors ultimately see them as disturbing production schedules. Heavy handling is said to be a preparatory or “lost phase”, and thus seen as a waste of time.

The third dimension is spatial. There is no specific place devoted to heavy handling. The places for arranging the tools and material (self-service) are very often ignored. Owing to the very nature of their job, handling operatives temporarily occupy a space normally devoted to production. Even when they are assigned a given place, their job forces them to move about; they are continually scattered and then brought back together. Everyone agrees, once again, that heavy handling

operations are indispensable for organizing space in the shop. Given the large dimensions of the objects to be manipulated, such operations inevitably take up space. In the words of a production supervisor, the space devoted to such operations *“becomes dangerous when maneuvers are executed; this is the reason production workers are not allowed into certain areas.”* Just as heavy handling operations turn dead time into productive time, they can make an unproductive space productive, by helping the production supervisor *“gain room”*. Since handling operations might be scattered all over the workshop, this spatial distribution is a strong reason why production supervisors exert pressure so that *“their”* request for heavy handling be a priority. This pressure negatively affects the shop’s reliability since it tends to compartmentalize handling operations in the shop, disconnecting them from activities in the plant as a whole.

The fourth dimension of boundary activities is symbolic. White- and blue-collar in production consider heavy handling to be *“dirty work”* (HUGHES-1971). According to a handling operative, this work is seen as *“next to the last job in the shop, just before maintenance”*. Workers are reluctant to help with handling, and supervisors declare that they *“don’t have the time to think about handling operations”*. Though little store is set on the job of handling heavy, bulky objects in the shop, this work, paradoxically, draws attention because it is spectacular. Communication campaigns use it to enhance the image of the firm’s products and vaunt its *“technicity”*: a classic photograph features a cylinder hoisted by a traveling crane. Heavy handling operations are symbolically invisible but yet spectacular. They are thus continually trying to find *“their place”*.

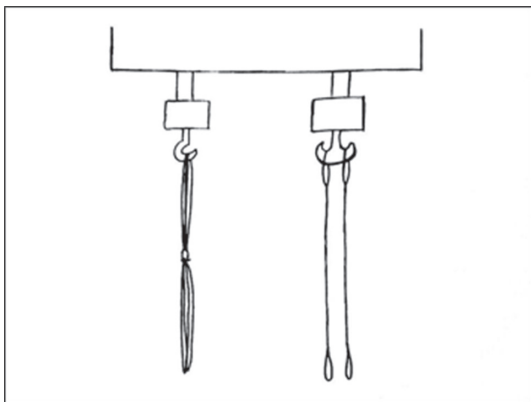


Figure 6: Traveling crane prepared for hoisting (drawing made during fieldwork).

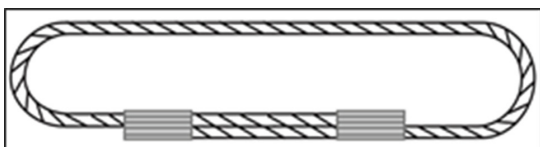


Figure 7: Tackle used for hoisting objects, for example, to be attached to a traveling crane (from a sling operator’s notes).

The analysis of interstitial activities along these four dimensions sheds light on the tension between their formal invisibility (which leads to heavy handling being seen as of *“little value”*) and their indispensability (as implicitly recognized in conversations). These boundary activities, which are indispensable for the workshop but more or less invisible, affect the organization’s reliability.

High-reliability organization

Heavy handling operations become visible to all whenever an incident affects worker safety, whence the impression that these operations do more harm than good to the organization’s reliability. However our research brings to light the positive contribution made by this boundary activity to high-reliability organization. What is said in conversations about handling operations modifies the beliefs and actions of the parties involved and thus contributes to the organization’s reliability in two ways: a decompartmentalization of both handling and production that arouses the vigilance of employees in production about heavy handling operations; and a decompartmentalization of jobs in production that also arouses the vigilance of employees there about the workshop as a dynamic whole.

Heavy handling, a factor for increasing vigilance

The work of making heavy handling operations reliable depends on several persons. The handling supervisor, as he coordinates requests coming from all shops in the plant, has to look for information and formulate it for the operations to be performed: date and time, the starting and ending position of the object to be moved, its size and weight, the layout, etc. The production supervisors, who request heavy handling, have access to texts about the operations that are more detailed than those in the hands of the handling supervisor. But when they formulate their request to the handling supervisor, they do not yet have the pertinent information to communicate; and they are not aware, before the handling operations start, of the part that they themselves have in making the operations reliable. When the handling operatives come to the shop to start work, the production supervisors finally realize their part in the reliability of the planned operations. The handling operatives need to fill in the information from their supervisor with information from the production supervisors. Box 2 describes a situation where the handling supervisor helped arouse the vigilance of his colleagues in production.

To plan interventions, the handling supervisor needs to keep his *“clients”* — the production supervisors — aware of the stakes. In the example reported in Box 2, the handling supervisor frequently reminded his colleagues in production that they had to gather information and pass it on to the handling operatives — information about the precautions to be taken and with technical details about the operations to be performed. The handling supervisor also needs to allay the pressure exerted by production supervisors, lest his operatives be pushed to take risks. In the example cited, the handling supervisor suggested that the production supervisor recheck his information on the handling operations he

Box 2: Arousing a production supervisor's vigilance

Needing to have two objects moved, a production supervisor telephoned the supervisor of heavy handling operations. He had already collected all the information on hand and talked to his workers. The requested operations would not, he thought, take too long. While talking to the handling supervisor, he insisted on the job being done fast. The handling supervisor mentally reviewed the requested operations. He did not tell the production supervisor; but production workers had to prepare the objects to be moved (an activity taking time), and a lifting bar had to be installed (more time...). Taking account of the information from the production supervisor, the handling supervisor thought that going too fast was risky.

Rather than starting an operation that might be risky and cause time to be uselessly wasted, the handling supervisor told his colleague that all his operatives were already busy on other jobs of equal priority that would take time. This was true. He asked him to recheck his information. The production supervisor said he would do so and call back later. Three quarters of an hour later, he called back to say that the two requested operations were not all that urgent. One of the objects was to be shipped the following week, and he gave him the exact date. The other was for much later, but no formal schedule had yet been set.

By advising the production supervisor to recheck his information, the handling supervisor drew on his own expertise, which the shop unanimously recognized. He was asking his colleague to look beyond the information drawn from reading the "texts" and from his "conversations" with his workers; the production supervisor would thus better understand the ins and outs of the requested operations. When the time came, the production supervisor was well enough informed that he could, with his workers, adequately prepare for the operations and satisfactorily coordinate them with the operatives of the handling and lifting equipment. The production workshop thus duly prepared the two operations requested, which were then performed without any rush.

was requesting. In cases when production supervisors are facing an emergency or when they feel that the requested operations cause no difficulty, the handling supervisor tries to arouse their vigilance so as to draw their attention to their part in the handling operations.

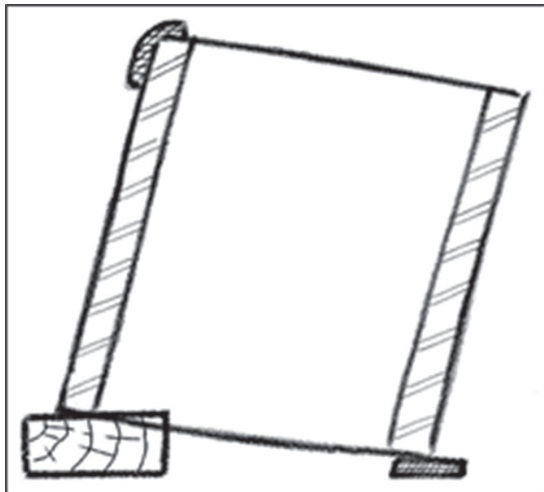


Figure 8: Cylinder prepared for hoisting by a traveling crane (drawing made during fieldwork).

Heavy handling, a factor of decompartmentalization

In the workshop where we conducted fieldwork, there are several specialized job categories (boilermaking, assembly work and tooling), each of them compartmentalized. Given the stakes of their jobs, these occupational groups are organized to attain their own high level of reliability. Each group focuses on its

own problems, which are so complicated that, in the words of production supervisors, its members are blind to the "specificities" of the other occupational groups. Given the relative scarcity of resources for bulk handling operations, these "specificities" can spark conflicts between skilled workers in different job categories. For example, welders, who work on very hot materials, might need an object to be moved fast before cooling. This demand is hard to meet when handling operatives are already busy satisfying requests from another job category.

Since production supervisors — unlike the handling supervisor — do not have an overall view of the plant, they are unaware of the general situation. As we noticed, much of the work done by the handling supervisor consisted of telephone contacts with production supervisors to discuss their requests. Production supervisors set store on direct verbal exchanges so as to adjust as fast as possible the schedule of handling operations to their own, local needs. Each production supervisor called the handling supervisor as soon as he wanted a heavy handling operation to be done and negotiated for it to be planned for as soon as possible. Production supervisors expected handling operatives to "function when the whistle blows", in a supervisor's words. These operatives intervened like "firefighters". At the scale of the plant, there were too many requests for handling operations, too much pressure and a "dispersion" of assignments (DATCHARY 2012). The issue was to limit this overbooking through planning.

However this work of planning and thus better preparing heavy handling operations ran up against the aforementioned compartmentalization of occupational

Box 3: Decompartmentalizing a production supervisor's approach

The supervisor of heavy handling operations called a production supervisor to confirm whether a given operation still had to be done in his workshop (for the second object in a pair to be moved during the current shift). The production supervisor said that everything needed had been left nearby. The handling supervisor informed him that there would be a lot of movement in his shop in the coming days. The production supervisor did not know about that. What the handling supervisor did not tell his colleague, however, was that the order of priority assigned to handling operations would very likely keep him from doing the one being requested. After asking the production supervisor to quickly file a request, he suggested that he plan a meeting the next day for their work teams, at the very start of the shift. The production supervisor agreed and assigned him a worker for six o'clock the next day.

The timing made sense: six o'clock is the usual time when the production supervisor meets his workers to discuss the work done during the previous week and to do during the coming week. The handling supervisor's suggestion was clever, since the heavy handling operation would not impede the loading work that the production supervisor had planned for the assigned worker. At the appointed time, this worker and a handling operative performed the operation together without taking any risks.

Afterwards, the other handling operations escalated, as foreseen. The operation that had just been accomplished reduced the pressure that other production supervisors would inevitably try to exert on handling operatives.

By opening a conversation with the production supervisor about the risk of an incident during operations, the handling supervisor managed to win him over by making him aware of the other already planned operations. By accomplishing this operation in advance, conditions were improved for the other operations planned in the shop with leeway for anything unexpected that might crop up.

groups. This impediment could be lifted only if several production supervisors collaborated. Box 3 recounts a series of conversations that sheds light on how the handling supervisor managed to skirt around this compartmentalization, his aim being to pass messages to production supervisors in different shops.

Since handling has the same hierarchical rank as the other occupational groups in the workshop, the handling supervisor was in no position to limit the requests coming from production supervisors. Vulnerable in dealings with these "colleagues", he tried to make them aware of the situation by explaining drawbacks and arousing an awareness of the global situation in the plant, with its interdependencies and incompatibilities. In the case described in Box 3, he managed to construct with the production supervisor a global, less compartmentalized, view and thus bring the latter to an awareness that reached beyond his own shop's problems. In this way, the handling supervisor obtained the cooperation of production supervisors; this, in turn, helped him plan his own work. His "interactional cleverness" during informal exchanges led him to propose adjustments that, as best possible, took account of each party's needs and conditions but without losing sight of the global situation.

Conclusion

Reliability and the organization seen through interstitial activities

We have pointed out how boundary activities play, owing to their very interstitiality, an ambiguous but major role in the reliable performance of an organization, a role of which employees are not fully aware. Contrary to studies of accidents and of high-reliability organizations, this research on everyday work processes has shown that operations such as heavy handling, though insignificant in appearance, play a key part in planning for risks and contingencies.

Through interactions of explanation, translation and negotiation (KELLOG *et al.* 2006), handling operations were performed while arousing the vigilance of production workshops and making them aware of the larger environment, in particular of other job categories and of the plant as a whole — thus moving employees beyond a narrow focus on the shop itself. By doing so, the risks associated with organizational/occupational compartmentalization were reduced; and a global vision of constraints and issues and thus a "collective intelligence" emerged. The planning for heavy handling

operations also led to a cognitive decompartmentalization that stimulated the “requisite variety” (WEICK & SUTCLIFFE 2001) and “slack” (SCHULMAN 1993), both of them necessary for coping with complex, unforeseeable, fluctuating situations.

However the reliability produced through interstitial activities, such as heavy handling operations, is very fragile. This system of reliability is vulnerable owing to what Bourrier (1999) has called “opaque autonomy”. It relies on the strong but unrecognized commitments made by first-line operatives and, therefore, depends on their willingness (and acceptance) to commit themselves despite the lack of any recompense, whether financial or symbolic. After all, this very opacity can block the “reflexivity” for which formal procedures allow, such as feedback from experience and the diffusion of learning experiences. Without the backing of the “texts” of safety regulations (DANIELLOU *et al.* 2011), boundary activities are, in this respect, more vulnerable than the “noble” activity described by Bourrier.

A pragmatic, communication-based approach enables us to understand how interstitial activities (herein heavy handling operations) are evaluated through conversations but not in formal texts. Such activities are caught in a permanent state of tension between, on the one hand, this textual invisibility (which keeps them from being assigned a measurable numerical value) and, on the other hand, their usefulness (which is admitted during conversations but is always verbal and more or less informal and contextualized). We have described this interstitiality and the tension accompanying it with reference to four interrelated dimensions: organizational, temporal, spatial and symbolic. An interstitial activity exists in between the activities with boundaries and contents that are clearly set through the organization’s practices, occupational groups, territories and formal texts.

Questions of coordination and cooperation in “distributed” organizations” have attracted the attention of researchers and practitioners. They imply investigating interactions along the boundaries, whether organizational, temporal, spatial or occupational. The concepts of “trading zones” (GALISON 1999, KELLOG *et al.* 2006), “boundary-spanning individuals” (TUSHMAN & SCANLAN 1981), or “boundary objects” (STAR 2010, CARLILE 2004) have been formulated to describe boundary activities and the “work of articulation” (STRAUSS 1992), by showing how they depend on an organizational arrangement, an individual or an object.

The originality of our research is that it shows how an interstitial activity — seen in relation to both an occupational group (herein handling operatives) and their practices — serves as the grounds for the emergence of coordination and decompartmentalization. Further research should focus on interstitiality less as a boundary activity of the organization than as a property of the activity itself. In line with studies on the work environment’s social and material aspects, it would be worthwhile thoroughly examining how problems of interstitiality crop up on each of the four dimensions (organizational, temporal, spatial and symbolic) and, too, in combinations thereof.

Implications for management

The interstitial activities observed and defined herein raise at least two problems for management. First of all, they are mostly invisible and can, therefore, be easily dismissed as “dead” time in the production process. Secondly, located along the margins, along the boundaries of “real jobs”, they are “looking for their place”, whence questions about how to define occupations and skills and delimit managerial authority.

A response (observed in both firms where we did fieldwork) to the first problem is to formalize interstitial activities through indicators or other visible, “textual” procedures. In our opinion, this misses the mark, since formal procedures might not find any takers (as we noticed in both firms) and, consequently, might vanish from “conversations” at the workplace. Besides, this response amounts to abolishing the interstitiality of these activities — the very characteristic that allows for their recognition (at least in conversations) and that enables them to be a source of vigilance and decompartmentalization at the workplace. This response by management confuses an activity’s “value” with its “visibility”.

To handle these two managerial problems, what is necessary is not so much to formalize work processes as to organize a dialog on interstitial activities. By taking account of how such activities reach across boundaries, management can either “dissolve” them in production (by placing them under a single authority with production) or else assert their independence (by bolstering the boundaries with other occupational groups). But either of these solutions risks depriving the interstitial activity of its capacity for stimulating a global vision (COUTAREL *et al.* 2015).

A global vision of the organization depends on an inter-comprehension between handling operations and the so-called “noble” occupations so that the two dialog about their practices and constraints. This necessitates an active management of “spaces” for discussions (DETCHESSAHAR 2001, ROCHA *et al.* 2015) so that the personnel in heavy handling relinquish certain zones of control to oversight by the organization and, too, that the principal activities in the organization attribute more value to these interstitial activities.

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