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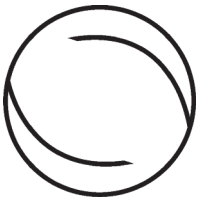

Towards a Foundation of Bricolage in Organization and Management Theory

Raffi Duymedjian and Charles-Clemens Rüling

Abstract

This article provides a conceptual underpinning for the study of bricolage in organizations. Based on a review of Claude Lévi-Strauss's original writing, we propose that bricolage involves an ideal-typical configuration of acting (practice), knowing (epistemology) and an underlying world view (metaphysics) and develop the opposed ideal-types of the bricoleur and the engineer. We then explore and propose to distinguish two forms of *collective* bricolage—familiar and convention-based—depending on the type of interaction and the nature of the conventions employed. Finally, we highlight the tension between ideal-typical bricolage and general organizational norms and standards, and discuss both the bricoleur's legitimacy and how a bricolage-based arrangement might be embedded into an organizational context.

Keywords: bricolage, epistemology, investments of form, Lévi-Strauss, metaphysics, practice

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Claude Lévi-Strauss's seminal 1962 book, *La pensée sauvage* (published in English as 'The Savage Mind' in 1966), introduces the notion of 'bricolage' as an analogy to describe a particular mode in which human actors relate to their environments, and this notion has enjoyed growing popularity in the social sciences over the last two decades. It has traveled from anthropology to cognitive sciences, information technology, entrepreneurship, innovation research, and organization theory. The main organization and management contributions relate bricolage to organizational resilience, improvisation and sensemaking, entrepreneurship, and the utilization of technical systems and artifacts, which share the reference to some of the ideas at the heart of Lévi-Strauss's writings on bricolage, notably the famous characterization of a particular way of acting as 'doing things with whatever is at hand' (Levi-Strauss 1966: 17).

In this article, we intend to build on and move beyond existing work to provide a more complete conceptual underpinning for the study of bricolage in organizations. For Lévi-Strauss, the notions of bricolage and the bricoleur serve as analogies for describing, in a holistic way, a particular kind of relationship human beings entertain with the world. To make these notions fruitful for organizational analysis, we suggest extending the dominant view of bricolage as a way of acting towards understanding it as an ideal-typical configuration of metaphysics, epistemology, and practice. Consistent with this stance, we argue that bricolage cannot occur periodically but extends over time, as it implies the constitution of a 'stock' of resources and developing intimacy with 'what is at hand'.

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We explore the conditions of collective bricolage conceptually in the light of the highly idiosyncratic character of an individual bricoleur's resources, worldview, knowledge, and practices, and distinguish two forms of collective bricolage—familiar and convention-based—depending on the type of interaction and the nature of the conventions employed. We also highlight the tension between ideal-typical bricolage and general organizational norms and standards, and discuss both the bricoleur's legitimacy and how a bricolage-based arrangement might be introduced or embedded into organizational contexts.

The article is structured in five main sections. The first reviews recent references to bricolage in organization and management theory. In the second section, we turn back to characteristics of bricolage initially suggested by Lévi-Strauss to develop, in the third section, our view of bricolage and the bricoleur as ideal-type. Section four extends the discussion to forms and conditions which might make collective bricolage possible, while section five draws attention to issues related to bricolage in organizations. The conclusion discusses the implications of our work for managerial practice and suggests issues for future research.

Bricolage in the Organization and Management Literature

Over the last two decades, different areas within organizational research have started to refer to the notion of bricolage. The main areas where bricolage is discussed (with reference Lévi-Strauss's work) include improvisation and sensemaking, entrepreneurship, and work on technical systems.

Bricolage, Improvisation, and Sensemaking

Bricolage has been used to characterize organizational practices related to innovation, and several authors relate bricolage to improvisation (e.g. Weick 1998; Moorman and Miner 1998; Cunha et al. 2000). Improvisation consists of assembling elements based on simple rules in order to yield an original composition. This mode of action is characterized by a coincidence of conception and realization that makes it difficult to clearly distinguish moments of reflection from instances of action. This integration of thought and action allows for a rapid degree of adaptation, which equips organizations to relate better to a turbulent environment. Some authors see the notion of bricolage as extending towards organizations, understanding them as improvising systems characterized by a 'mixture of the precomposed and the spontaneous, just as organizational action mixes together some proportion of ... exploitation with exploration, routine with nonroutine, automatic with controlled' (Weick 1998: 551). Actors in such environments can be characterized as bricoleurs, in the sense that they use whatever resources and repertoires they have at hand.

Organizational symbolism describes bricolage as a process by which organizational members 'make sense of and order the world ... against a background of material and social constraint' (Linstead and Grafton-Small 1990: 291). As sensemaking, bricolage promotes a capacity for adaptation in destabilizing

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situations. Weick (1993) links bricolage to the resilience which enables an individual or organization to overcome a crisis situation by maintaining both a coherence of identity and the capacity to act. One of the paradoxical mechanisms at work in bricolage is the idea of 'ritualized ingenuity' (Coutu 2002) based on the bricoleur's familiarity with the elements that make up his environment and an ongoing practice of diversion and permutation of elements in the bricolage process. In a crisis situation, the encounter with familiar objects and the capacity to perform simple actions can allow actors to retain their orientation, but also to immediately engage in a process of trial and error, so that the ability to act does not become paralyzed.

Bricolage and Entrepreneurship

Baker et al.'s (2003) analysis of bricolage in an entrepreneurial setting marks an important step in the development of the concept. Entrepreneurial firms recombine and make creative use of existing resources, and share a capacity to mobilize practical knowledge in a way that challenges general theoretical approaches that specify *a priori* how resources should be utilized. These companies are able to find responses to the environmental constraints and dependencies they face, because they enjoy great latitude in their processes of collecting and utilizing resources which they cannot always acquire or employ via rational or standard procedures (Baker and Aldrich 2000).

As a process of continuous creation and utilization of practical knowledge, and as an exploitation of varied types of resources, bricolage depends on the existence of organizational memory. This memory allows an organization to maintain an inductively generated knowledge base founded on experiences. Large organizations, which share a tendency towards fragmentation along professional or occupational boundaries, tend to be disadvantaged compared to those built on multidisciplinarity and a practice of exchange across boundaries. 'Network bricolage' describes a process in which pre-existing contact networks are considered as resources at hand for the entrepreneur-bricoleur (Baker et al. 2003). In resource-constrained firms entrepreneurial activity relies on bricolage in the social construction of resource environments, and in the rejection of institutional constraints (Baker and Nelson 2005).

With an emphasis on distributed agency in the emergence of technological paths, bricolage refers to a particular process of engaging multiple actors characterized as 'moving ahead on the basis of inputs of actors who possess local knowledge, but through their interactions, are able to gradually transform emerging paths to higher degrees of functionality' (Garud and Karnøe 2003: 296).

Bricolage and Technical Systems

Bricolage characterizes a particular strategy of information technology appropriation in which an information system is seen by a user as a set of means that can be (re-)assembled at will according to their actual informational needs (Ciborra 1992, 1996, 2002). Despite their technological rigidity, information systems are characterized by a high degree of flexibility in use, which allows

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users to act as bricoleurs. Information systems are rarely used in the ways for which they were originally conceived—diversion of functions, breaking up and recombination of systems in use are signs of bricolage.

Orlikowski (2000) distinguishes between technologies-as-artefacts—i.e. technologies defined by a predetermined set of technical functions—and technologies-in-use—i.e. in a practice situation. The flexibility and handiness of digital objects greatly facilitates bricolage in information systems by transforming all kind of signs into a common format, allowing for infinite collage. The diffusion of integrated information systems and the development of interconnectivity between physical arrangements are an additional facilitator for bricolage, which then concerns not only the manipulation of signs, but also the recombination of tangible infrastructures.

Research on bricolage in organizations can be summarized from four different angles. In terms of *variety*, bricolage has been investigated in several theoretical fields such as innovation studies (e.g. Garud and Karnøe 2003), social psychology (e.g. Weick 1993), entrepreneurship (e.g. Baker and Nelson 2005) and information technology (e.g. Ciborra 1992). In terms of *levels of analysis*, bricolage has been considered as an individual activity (e.g. Weick 1998), as an organizational process (e.g. Ciborra 2002) and as a form of inter-organizational dynamics (e.g. Garud and Karnøe 2003). In terms of *stance*, bricolage has mainly been used descriptively as a comprehensive notion to describe ways of doing things, but it has also been given some normative aspects when referred to as a source of resilience (e.g. Weick 1993) or as a way to 'bolster incremental innovation' (Ciborra 2002: 51). Finally, in terms of *conceptual complexity*, bricolage has moved on from its simplest definition of 'making do', and the relatively frequent assimilations with improvisation, towards the assertion that 'bricolage does not imply improvisation' (Baker et al. 2003: 265) and a much richer definition that emphasizes the nature of the resources at hand and the process of recombining resources for new purposes (Baker and Nelson 2005). The existing literature thus provides an important first step for introducing bricolage to the realm of organization and management theory, but it also suffers from a lack of systematic exploration and development based on Lévi-Strauss's original writings. Our working hypothesis for this article is that reconstructing and solidifying our understanding of bricolage and the bricoleur will be beneficial for organizational analysis.

Lévi-Strauss's Analogy of Bricolage

For the French anthropologist Claude Lévi-Strauss, bricolage designates as much a particular relation to time, to space, to objects and to knowledge as a particular way of practical reasoning. In the first chapter of 'The Savage Mind', programmatically entitled *La science du concret*, Lévi-Strauss argues that much reasoning in indigenous populations is neither 'pre-logic' nor opposed to scientific rationality, but should be understood as a 'science of the concrete', characterized by a concern for exhaustive observation, systematic inventorying of all elements in the surrounding environment and relying on a highly developed mode of understanding based on an intimacy with the concrete.

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To illustrate the mode of operation of this 'science', Lévi-Strauss uses bricolage as an *analogy* to shed light on the processes underlying mythical thought ('an activity which on the technical plane gives ... quite a good understanding of what a science we prefer to call "prior" rather than "primitive" could have been on the plane of speculation' [1966: 16]). He characterizes the bricoleur as someone who uses 'whatever is at hand' (1966:17), rather than searching for resources that are specifically adapted to his project. The bricoleur acts on what Lévi-Strauss calls his 'stock'—his repertoire of resource elements—sometimes odd and heterogeneous—that have been collected according to the overarching principle that they might come in useful at some point.

It is important to keep in mind that, despite the precision of his writing, Lévi-Strauss does not provide a clear definition of bricolage. He expresses and illustrates his ideas through frequent changes in perspectives, addressing as much the process of bricolage as the role of the bricoleur, and drawing on multiple comparisons of bricolage, craft, myth, play, and art. The figure of the bricoleur is developed through comparison with an opposite figure, the '*ingénieur*', a term (not easily translated into English) rooted in the historical time and process of the Enlightenment, which conveys an array of notions (including a specific belief in the superiority of rationality and scientific reasoning) related to the French engineering tradition. From our reading, three elements are paramount to understanding bricolage according to Lévi-Strauss: *stock* or *repertoire*—his view of the resources used; *dialogue*—the process of bricolage; and *outcome*—the nature of its results. These key elements are discussed further below.

Repertoire

The notion of 'repertoire' is at the center of Lévi-Strauss's idea of bricolage, and consists of material and immaterial resources that are collected independently of any particular project or utilization. Bricolage starts with the constitution of a repertoire and finishes with the return of resources to the repertoire. For the bricoleur, elements belonging to the repertoire are perceived as independent entities, and derive their characteristics from their potential for association: 'they each represent a set of actual and possible relations; they are "operators" but they can be used for any operation of the same type' (Lévi-Strauss 1966: 18).

The bricoleur's repertoire comprises elements that are heterogeneous by their nature and their individual history ('remains of previous constructions or destructions' [1966: 17]). Despite its potentially large size, the bricoleur's repertoire is finite, and is held in an equilibrium through a continuous flow of objects, means, ends and significances, where 'it is always earlier ends which are called upon to play the part of means: the signified changes into the signifying and vice versa' (1966: 21).

Dialogue

The process of bricolage—the activity of assembling objects—can be understood as a form of dialogue which starts from the moment when the bricoleur is confronted with an objective or a practical function to be fulfilled. According to Lévi-Strauss it always begins with an inventory of the repertoire in which the

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bricoleur 'turns back to an already existent set made up of tools and materials, to consider or reconsider', thus engaging in a dialogue with the repertoire's elements. This examination allows him 'to index the possible answers which the whole set can offer to his problem', discovering the significance and the contribution of each of them 'to the definition of a set which has yet to materialize, but which will ultimately differ from the instrumental set only in the internal disposition of its parts' (1966: 18).

This dialogue is directed at the capacity of elements contained in the repertoire to be associated within a functionally performing structure, and occurs throughout the assembly process. Even if the objects in the repertoire undergo certain transformations, the bricoleur's principal operation remains the *arrangement* of objects, not their transformation. If the bricoleur realizes that a given object does not 'fit' into the structure, he has the 'possibility of putting a different element there instead' (1966: 19). In other words, assembling proceeds through a continual process of testing, permutation, and substitution of pre-existing objects.

Outcome

The particular nature of the outcome of a bricolage process is the third element characterizing Lévi-Strauss's view of bricolage. In Lévi-Strauss's analogical use of bricolage, the ambivalence of the term bricolage referring to both the process and its result is not a problem: on the contrary, the word's double meaning highlights the circular dynamic which relates the bricoleur's repertoire to its outcome. Lévi-Strauss argues that the outcome of bricolage can be seen as 'a new arrangement of elements, the nature of which is unaffected by whether they figure in the instrumental set or in the final arrangement (these being the same, apart from the internal disposition of their parts)' (1966: 21).

The outcome of bricolage reflects the underlying process: it is an assembly of different objects that remain visible as such. Another characteristic is its remoteness from the initial idea. It 'will never be the same as one vaguely imagined nor as some other which might have been preferred to it' (Lévi-Strauss 1966: 16). The outcome differs from the original elements in the repertoire only by the way in which the parts are assembled (1966: 18), which ensures that the outcome of bricolage can easily be disassembled and re-integrated into the repertoire.

The correspondence between the process and its outcome is reinforced by the idea that the dynamics of dialogue make the bricoleur part of his oeuvre. For Lévi-Strauss, the bricoleur '"speaks" not only with things ... but also through the medium of things: giving an account of his personality and life through the choice he makes between the limited possibilities. The "bricoleur" may not ever complete his purpose but he always puts something of himself into it' (1966: 21).

Bricoleur and Ingénieur as Ideal-Types: Practice, Epistemology and Metaphysics

We propose that bricolage and the bricoleur be considered as ideal-types (Weber 1997). As we have discussed above, Lévi-Strauss refers to bricolage not as a

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Table 1. Comparison of the Bricoleur and the Ingénieur

	Bricoleur	Ingénieur
Metaphysics	Everything matters	A-priori hierarchical order
	Complex, interconnected system	Reduction/decomposition
	Closed universe	Openness, transcending boundaries
	Cyclical time	Linear time
Epistemology	Intimate knowledge, familiarity	Distant knowledge, representation
	Knowledge about relationships implying a low functional fixedness bias	Knowledge about structural characteristics entities
	Versatility implying resilience	Specialization
Practice	Collection through unplanned encounters	Search for adequate, project-oriented means
	Unclear outcomes	Project and design
	Dialogue with elements in stock, diversion of resources	Respect of prior specifications Seamless integrated system
	Assemblage, substitution 'it's working'	Evaluation through expected level of performance/quality
	Creation and use cannot be dissociated	Separation of creation and use
	Outcomes look unlike anything else	Outcomes respond to field norms

concept but as an analogy. While a concept implies necessary and sufficient conditions that define its extension and allow for unequivocal identification ('this *is* bricolage'), an ideal-typical approach considers bricolage as an analytical construct 'formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena' (Weber 1997: 88; for the use of ideal-types in the study of occupations see Barley 1996).

Recent work on bricolage in the organization and management literature has moved our understanding forward, but does not yet fully exploit the potential of Lévi-Strauss's ideas. Our proposition is to consider the two notions of the bricoleur and the ingénieur as they are juxtaposed by Lévi-Strauss. We consider them as designating two opposed but complementary ideal-typical regimes of action, which can each be understood through a particular combination of acting (practice), knowing (epistemology) and an underlying world view (metaphysics) (see Table 1). However, at the same time regarding the bricoleur and the ingénieur as ideal-types also acknowledges the truth that, in fact, all 'real world' actions are situated somewhere in between the two—in concrete, empirical terms, there is no such thing as 'pure' bricolage.

Our emphasis on relatively stable regimes of action is informed by recent work by the cognitive psychologist Richard Nisbett (e.g. Nisbett 2003; Nisbett et al. 2001). Based on empirical observation of significant differences in the cognitive processes between Easterners and Westerners, Nisbett (2003) develops the idea of a self-reinforcing homeostatic relationship between metaphysics, epistemology and practice: 'The social practices promote the worldviews; the worldviews dictate the appropriate thought processes; and the thought processes both justify the worldviews and support the social practices' (2003: xx). Nisbett's approach considers cognition in relation to the material and symbolic context in which the action unfolds, and thus resonates with the general 'practice turn' in the social sciences (Schatzki et al. 2001), and the advancement of knowledge on 'situated cognition' (Smith 1999).

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Practice

As outlined above, a necessary condition for bricolage is the creation, over time, of a repertoire of heterogeneous resources, collected during unplanned encounters and built up with no clear intention and purpose. Whenever the bricoleur engages in action, he conducts a 'dialogue' with the elements in his repertoire and/or any additional resources in his immediate environment, a mode of acting that resonates with Schön and Wiggins's (1992) 'reflexive conversation' and with notions from the practice tradition describing a space composed of heterogeneous resources (objects, space, symbols, ideas, documents, etc.) allowing the emergence of effective action like, for example, 'ba' (Nonaka and Konno 1998), 'platform' (Ciborra 1996), and 'site' (Schatzki 2002).

Dialogue is intertwined with assembly, creating connections between resources, and in a process of permutation, resources are substituted for one another until the emergent arrangement 'holds'. Elements at hand are diverted from their initial purpose in order to find a role in the new arrangement. The bricoleur acts in a 'satisficing' mode (Simon 1997), where assembling stops as soon as the arrangement works. The resulting arrangement resembles a 'curious hybrid' (Lanzara and Patriotta 2001: 959) that does not hide how resources are assembled and adjusted to one another: it is the result of what 'the surrealists have felicitously called "objective hazard"' (Lévi-Strauss 1966: 21). The practice of bricolage translates the bricoleur's identity: he 'always puts something of himself into it' (Lévi-Strauss 1966: 21), and reciprocally, the bricoleur often himself becomes an essential element for operating the bricolage and maintaining its outcome.

In contrast, the ideal-typical ingénieur searches for resources that correspond to exact design requirements. He relies on predefined inputs—tools, machines, raw materials, etc.—which he uses according to prior specifications to produce a seamless, integrated whole that perfectly corresponds with his initial plans. The outcome is evaluated against predefined levels of quality, performance, and cost. It is free standing; once finalized it can be operated independently from its designer and producer: creation and utilization/consumption are separated.

Several aspects constrain the practice of bricolage. The first relates to the boundaries of the repertoire: their physical limitation forces the bricoleur to rely on a limited set of combinations instead of playing with an infinite number of objects. The second relates to the fact that a bricoleur (unlike the scientist) rarely exceeds the class of actions and significances he is accustomed to, and 'by inclination or necessity always remains within [the constraints imposed by a particular state of civilization]' (1966: 19). Further constraints (mentioned only briefly by Lévi-Strauss) are the overall time frame and any performance imperatives (to repair, to heal, etc.) in a given problem context.

Epistemology

Following the claim that 'knowledge is less about truth and reason and more about the practice of intervening knowledgeably and purposefully in the world' (Spender 1996: 64), epistemology defines what is known, as well as the nature and validity of knowledge used and produced.

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Lévi-Strauss's bricoleur possesses intimate knowledge of the elements belonging to his repertoire, which is based not on an exhaustive and complete understanding of what things *are*, but of how they can be *related* to one another. This type of knowledge is based in the practice of dialogue outlined above. The bricoleur's intimacy with his repertoire, the versatility of his knowledge and his aptitude in doing more with less and dealing only with what is at hand, provide him with a strong sense of 'self-efficacy', i.e. a general belief in his ability to attain a high level of performance (Bandura 1977). Self-efficacy is one of the key elements in bricoleurs' resilience in crisis situations (Weick 1993; Coutu 2002).

The bricoleur's knowledge is broad and versatile, and he will draw on multiple fields of knowledge as long as these help him produce an effective arrangement from his repertoire. His main competence resides in his knowhow and ability to 'cobble things together'. The bricoleur's learning process is based on personal encounters with objects, ideas or spaces which develop his ability to sense potential uses and to overcome the biases of functional fixedness (German and Barrett 2005).

In contrast with the bricoleur, the ideal-typical ingénieur's knowledge derives from general and institutionally legitimized laws. The ingénieur and his knowledge are abstract—detached and distant from a concrete problem. He knows the structural characteristics of things to which general rules can be applied, as well as the predetermined ways of using his resources. The ingénieur has received expert education within a well-defined field of knowledge, and, when confronted with a task beyond his expert knowledge, either develops the needed skills through training, or hands the task over to another, better qualified expert.

Metaphysics

Metaphysics comprise the values structuring an individual's world, which are projected on the material as well as the symbolic world and shape our sense of space and time, as well as the interactions between humans and other entities in the world. The bricoleur sees the world as a complex, interconnected system in which every element may impact all other elements. Ideas, words, and living things, as well as inanimate objects, spaces, and places, are considered as belonging to the same world and as being related to each other. For the bricoleur, this implies that everything matters and deserves respect and recognition. The bricoleur's universe is closed, in the sense that he relies primarily on his repertoire when creating the assembly. He uses what he has (and knows) and does not venture beyond his stock and the concrete context of his action. His inquiry is geared towards experimenting with and exploiting what is at hand, rather than towards the exploration of new resources.

In contrast, the ingénieur's world is a decomposable system, in which complicated problems are solved by reduction. All entities composing the ingénieur's world are organized into task-specific hierarchies. From an ingénieur's perspective, some objects have no value and are insignificant in the context of a given project. On the other hand, the ingénieur lives in a world that is fundamentally open in the sense that it is characterized by a constant move towards transgressing existing boundaries to improve performance.

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The practice, epistemology, and metaphysics of bricolage complement and reinforce each other. Individuals can engage in bricolage practices when they hold a particular kind of knowledge developed through a learning process that resonates with a particular world view. Baker and Nelson (2005) thoughtfully characterize bricolage in three aspects: the resources at hand, the recombination of resources for new purposes, and 'making do'. We would argue that the knowledge underlying an individual or group's practices, as well as the concomitant view of the world, are also of high importance for analyzing an individual or group's ability to engage in bricolage practices. The literature indicates a lack of research on the development of the practices, epistemologies, and metaphysics of bricolage/bricoleurs over time. It should have become clear from our argument that bricolage is a deeply embedded regime of action that demands particular knowledge and a specific understanding of the world that need to be developed.

Collective Bricolage: Familiar vs. Convention-Based

Lévi-Strauss's bricoleur is a solitary figure, and most of the organization and management literature on bricolage eschews the discussion of collective bricolage (for exceptions, see Weick 1993; Garud and Karnøe 2003; Baker and Nelson 2005). In this section, we distinguish two forms of collective bricolage, 'familiar' and 'convention-based', based on the French political sociologist Laurent Thévenot's (2001) writing on pragmatic regimes.

Thévenot (2001) distinguishes the pragmatic regimes of familiarity, conventional utilization, and general conventions of qualification, which are characterized by increasing generalization of the conventions governing interaction. The more impersonal and distant the interaction, and the more there is at stake in a given interaction, the more important the conventions become. Conventions themselves can be negotiated locally or take the form of general, impersonal principles governing an area of social life. For example, a local convention could involve two colleagues using the same office and agreeing where to store their wet coats and umbrellas on rainy days, whereas a whole-building regulation defining the minimum volume of air to be renewed per workplace per hour would represent a more general convention.

Familar Bricolage

The ideal-type of bricolage as it has been outlined above is closely related to Thévenot's (2001) regime of familiarity, which refers to a situation in which an individual defines their particular uses of objects. Unconstrained individual bricoleurs freely constitute, develop, and enrich their personal stock and knowledge about the world. They individually enter into dialogue with their repertoires and create personal arrangements to solve the problems and challenges they encounter.

From the perspective of *collective* bricolage, the first question is, then, what happens when a bricoleur seeks to share his way of acting with someone else. In other words: how can familiarity be shared? (In the interest of the stepwise

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development of our argument, we start with the regime of familiarity and then move on to more 'loosely coupled' pragmatic regimes.) Collective bricolage that is more than the ex-post connection of separately constructed arrangements demands some degree of sharing between collaborating bricoleurs' repertoires. This involves physically merging or providing mutual access to the bricoleurs' individual repertoires. Access alone is not sufficient for appropriation, and it is difficult to imagine a process of joint bricolage without an extended time period of intense collaborative learning leading to the emergence of an at least partly shared repertoire on which the bricoleurs draw as if it was personally constituted by each of them.

In order to make collective bricolage possible, bricoleurs will also need to engage in a joint dialogue with their resources. At the epistemological level, therefore, the question of collective bricolage is mainly related to modes and degrees of sharing of the intimate knowledge of repertoires' elements and of objects' relationships and their potential connections.

Shared and close exposure to a concrete material environment (as compared to apprehending the world through general, abstract rules and concepts) plays an important role in Weick's (1993) as well as in Garud and Karnøe's (2003) accounts of collective bricolage. Weick (1993) contrasts the formalization of fire fighting via specific and standardized procedures within the Forest Service with the emphasis on developing an intimate knowledge of the field and its specificities to enable a flexible and situational approach to fire fighting in the Park Service. In their comparative study of the innovation paths in the wind turbine industries in Denmark and the United States, Garud and Karnøe (2003) show that the Danish bricolage path had been made possible by the high proximity of a community of engineers, manufacturers, customers, and public administrators who were all involved in an incremental trial and error process. In contrast, the science-driven US innovation path relied heavily on the idea of producing a major breakthrough, and suffered from its emphasis on abstract and general knowledge and from the relative distance between scientists, manufacturers, public administrators, and owners.

Bricoleurs learn through personal encounters with the elements in their repertoires, so sharing them may be relatively easy when they belong to a close-knit community or have undergone similar kinds of socialization. An example is provided in the current authors' ongoing study of bricolage in movie special effects. Visual effects 3-D computer graphics experts integrate relatively rapidly within the bricolage environment of their workplace because they share a particular mode of action that is characterized by drawing on existing libraries of objects and effects and their creative modification for the purposes at hand. (We would also argue that the familiarity with industry-specific bricolage practices in particular professions might be an important factor in understanding career dynamics in external labor markets and across project organizations.)

Although we have characterized the bricoleur's stock as being closed at the point when bricolage occurs, the act itself relies upon a high degree of openness of mind, in particular towards new uses and views about the bricoleur's resources. The possibility of new ways of looking facilitates creative collective encounters between bricoleurs, who thrive on low functional fixedness of

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resources and the constant exploration of novel ways of acting. Collaborating bricoleurs are highly interactive, and their constant mutual adjustment and learning makes outcomes difficult to predict, whereas collaborations between ingénieurs are typically governed by general conventions that facilitate coordination by defining what are to be considered valid (or invalid) statements and actions in a given situation.

In a dynamic perspective, learning to interact with other bricoleurs in the familiarity mode demands an extended time period of mutual learning to access each others' repertoire and to develop the level of trust necessary to engage in a collective bricolage that is not governed by more general conventions. This strong interpersonal dimension also means that collaboration is probably restricted to individuals who 'get along well', and thus a key managerial challenge is the necessity of finding compatible actors. Collective bricolage in this mode clearly demands that the organization is focused on individuals rather than on tasks.

From Familiar to Convention-Based Bricolage

When a familiar space is shared between individuals who do normally not occupy the same time/space, collective familiarity cannot develop, and, in this case, collective bricolage must rely on a regime of collective action that Thévenot (2001) calls 'conventional utility'. In order to illustrate this regime, Thévenot uses the example of someone lending his apartment to a friend for a couple of days: in this case, local conventions will create the inter-subject order needed to regulate the use of the same space by actors who are not present at the same time, and who have not been able to develop similar familiarity with the objects in the common space. Local conventions developed in a regime of conventional utility help to coordinate action and prevent or settle conflicts.

Familiar and convention-based collective bricolage, while sharing the ideal-typical traits of bricolage with respect to the underlying practices, epistemology, and metaphysics, differ significantly in terms of the role played by the negotiations and conventions that are necessary for successful inter-action between bricoleurs (see Table 2). While familiar bricolage requires an extended period of time and the co-presence of bricoleurs in a common and dedicated space—conditions which allow the development of the closeness, resonance, and trust necessary for actors to interact without the need for conventions—convention-based bricolage relies on some degree of local conventions to enable bricoleurs to interact over more limited time periods and/or in more extended or less exclusive spaces.

Table 2. Familiar and Convention-Based Collective Bricolage in Organizations

	Familiar bricolage	Convention-based bricolage
Time frame	Extended period of time	Less co-presence, shorter period of time
Space	Co-presence, defined common space dedicated to the bricoleurs	More extended, non-exclusive space
Repertoire	Shared or mutually accessible	Separate repertoires, access regulated by conventions
Relationship	Closeness, resonance, trust	Negotiated, some conventions (which become part of a shared stock)
Conventions	None–informal	Informal–locally negotiated
Investments of form	Absent–low	Low–medium

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Bricoleurs engage in a process of continuous collection to constitute their repertoire; so, in collective bricolage situations, access to, use of, and contribution to the repertoires become salient issues. Can the bricoleurs use a joint repertoire—or do they rely on their individual repertoires from which they draw objects to be included in the collective arrangement? To what extent is it possible to access and to draw on other bricoleurs' stocks? Local conventions—mostly informal—can regulate the bricoleurs' interaction with each others' repertoire(s).

Shifting from familiar to other regimes' for collective action requires 'investments of form' (Thévenot 1984, 2001); in other words, specific operations to raise the level of generality of actions, objects or ideas and objects' conventionality are necessary when collective action involves individuals who are unfamiliar with one another (Livet and Thévenot 2004). Typical examples include standards, norms, measures, and terminology. As long as an inter-subject order can be locally negotiated, and as long as no conflicts occur, such investments of form can remain relatively modest. The less familiar the actors involved in collective action, and the higher the stakes and the possibility of conflict between them, the more such investments of form will be required.

Conventional utility constitutes a middle ground between idiosyncratic individual action and generalized collective action. Local conventions depend on negotiation and agreement between the actors involved in a given situation: they rely on a high degree of tolerance concerning the utilization of objects, and their sphere of applicability does not extend beyond the concrete situation involved. This is consonant with Baker and Nelson's (2005) empirical observation of actors' embeddedness in communities of practice as a necessary condition for entrepreneurial bricolage.

Bricolage in Organizations

The fundamental problem of bricolage in organizations relates to the recognition and legitimacy of the bricoleur, and of his knowledge and mode of action, in environments that most often operate in a mode closer to the ideal type of the *ingénieur*.

Legitimating the Bricoleur

The mainstream management textbook view of legitimate action argues against the undecidability, trial and error, and locally emergent characteristics of bricolage. Bricolage questions specialization and crosses institutionally defined and separated disciplines and practices. Management knowledge is often related to particular disciplines—finance professionals are not supposed to use marketing professionals' tools and vice versa (at least in normal business situations). Stepping beyond one's professional boundaries is considered a waste of time or, at best, a pastime. Neither the bricoleur's mode of operation, nor the concept of assembly, nor the bricoleur's knowledge of dialogue, assemblage, diversion, substitution, and continuous testing can enjoy durable legitimacy and recognition in organizations characterized by high degrees of division of labor, the presence of strong professional identities, and the associated norms and modes of operation.

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The bricoleur's strength lies in his expertise and capacity to assemble heterogeneous resources by following a performance logic rather than the accepted general principles of any particular profession. The expertise of bricolage contradicts the legitimizing dynamics of a discipline in which constantly repeated and reproduced links between particular actions and specialized objects ensures professional coherence. Bricolage, in contrast, is difficult to assess before the completion of a specific concrete arrangement, and is therefore also difficult to generalize or foresee, or to plan for.

Organizational bricoleurs find themselves in situations that recall Michel de Certeau's (1990) analysis of tactics in everyday life. Tactics occur when an individual moves in a space that is not their own, or, more precisely, that is not marked by a fixed boundary within which they can determine the rules of action for themselves, and where they have no stable base to plan and capitalize on their moves. In this situation an actor's game becomes tactical, and involves playing with time and events in order to create opportunities. De Certeau shows, for example, how consumers, rather than using objects according to their designers' intentions, engage in 'poaching'. This notion positions the bricoleur within a system of power and constraints where they face performance imperatives, and where both the outcome and the process of acting and the use of organizational resources in the bricoleur's repertoire and arrangements are subject to monitoring and control. In essence, standard operating procedures and performance measures may be incompatible or opposed to bricolage.

Moreover, organizational bricoleurs are confronted with issues of ownership. Owners of resources not only have the capacity to use them in their actions, but can also authorize non-owners to utilize them within contractually and legally defined parameters. The generalized notion of ownership and property is opposed to the idea of open access to a variety of resources as part of a collection movement, which is (as outlined above) one of the characteristic and essential actions of the bricoleur. For the bricoleur, the value of an object is not determined by its intrinsic value, or by market structures, but in terms of a particular arrangement. So, in a bricolage context, its value cannot be identified in advance, and this leads to considerable problems in measuring a bricoleur's resource consumption or in determining adequate reimbursement to the owner of the (material or immaterial) resource used by the bricoleur.

Investments of Form, Formalization, and Transmission of the Arrangement

As we have highlighted above, the nature of the arrangement—the idiosyncratic use of resources and the innovative ways of makings arrangements work—makes it difficult for an organization to use a given arrangement independently of its creator: it may well be unusable when the bricoleur is absent without additional 'investments of form' (Thévenot 2001). As actions and their outcomes need to become more generally recognizable, investments of form are made in order to define an intersubjective space, and become particularly relevant when the outcome of bricolage is placed in an organizational environment. Typically, in organizational environments antagonistic to bricolage, investments of form may be necessary to hide the bricolage nature of an arrangement, and performing bricolage collectively may not be sufficient in order to ensure the organization readily accepts its outcome(s).

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Duymedjian and Ansart (2007) report the case of a French SME that used metal sheeting and second hand paint robots and ovens to build a €750,000 automated industrial paint line in bricolage mode. After having started the project with two enthusiastic co-bricoleurs (via a conventional utility regime), the entrepreneur-bricoleur had to gain acceptance from other collaborators, who were very skeptical about the performance of this home-made arrangement: in this case, the key was to make the arrangement look exactly and perform like a commercial paint line.

Investments of form also ensure that the arrangement can be operated without the direct involvement of the bricoleur. Manuals, training, standardized user interfaces and other elements allowing the integration of the arrangement into the working environment of the non-bricoleurs can help secure acceptance—paradoxically not by increasing acceptance of the concept of bricolage in itself, but by *hiding* both the bricolage origin of the arrangement and the bricoleur, and using discourse to show that the arrangement is 'as good' as one created conventionally. However, this type of argument does not enhance the perception of bricolage—it actually only reproduces and reinforces the belief in the supremacy of non-bricolage solutions.

Another key issue of bricolage in organizations that the current authors highlight in a recent study is the transmission over time of repertoires, processes, and arrangements. In the words of one recently interviewed manager: 'One of the strong points with bricolage is to be able to keep the control over what we do. We can modify and repair everything without external help. The only problem is that only those who have participated in the creation [of an arrangement] know how to operate it'. Organizations seek relative durability and sustainability of arrangements, and fear the economies incurred during the realization and the exploitation of the arrangement will disappear—often together with the arrangement itself—when the bricoleurs leave. Interestingly, firms seem mainly interested in ensuring the transmission of the arrangement itself, and only rarely the bricoleur's capabilities.

Increased formalization of the arrangement and how it is used appears to offer a solution. In many organizations, documenting an arrangement's functioning (through users' manuals) and structure (for maintenance reasons) is seen as the principal way to ensure the sustainability of its exploitation beyond the point when the initial bricoleurs disengage. From a knowledge perspective, formalization is based upon reification and postulates that knowledge can exist as a delimited entity that can be stated formally. Thus the arrangement created through bricolage collapses into standardized industrial production means, losing the particularity that characterized its realization process. We hypothesize that the utilization and the maintenance of a bricolage outcome arrangement will always, at some point, demand interventions based on the bricolage mode, and that whenever bricolage is involved, an approach towards organizational knowledge as emerging from a network of social relations, experiences, and personalized memory will remain essential (as in Orr's [1996] analysis of the importance of sharing stories in the context of photocopier repair).

Since organizations tend towards formalization, we would argue that there is an additional need to preserve their bricolage capability, which means identifying individual's knowledge and experience, ensuring their organizational legitimacy and visibility, and providing opportunities for learning from trial and error. Providing conditions that nurture, develop, encourage, and orient bricolage

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provides organizations with an interesting alternative to formalization and making knowledge explicit.

Conclusion and Implications

This article has explored the notion of bricolage as a challenging path for analyzing everyday action in organizations. The contribution of our article is threefold. Firstly, we posit the bricoleur as an ideal-type marked by a particular configuration of practice, epistemology, and metaphysics, which depend on and shape each other. In doing so, we extend the existing literature on bricolage in organizations which has mainly concentrated on practice. Secondly, we supplement the existing organization and management literature by outlining the practice, epistemology, and metaphysics of the bricoleur in more detail. Bricolage as an observable organizational practice does not occur in a vacuum, and we stress particularly the importance of the bricoleur's repertoire and how it has been constituted over time and is thus closely tied to the bricoleur's knowledge and worldview. Our third contribution positions the bricoleur within a collective organizational process, where we have distinguished the forms of familiar and convention-based bricolage, the latter relying on local conventions regulating the interaction between bricoleurs. We have further discussed the necessity for bricoleurs to make investments of form in order to gain legitimacy and thereby position the outcome of bricolage in a wider organizational context.

While the available space and the more conceptual focus of this article do not allow us to develop a full discussion of implications for managerial practice, we would like to open up such a discussion in two areas: the legitimacy of bricolage as a form of action in organizations and the potential of reconsidering managerial action from a bricolage perspective. Firstly, we believe that the growing research on bricolage in organizations will contribute to rehabilitating this practice in organizations. Organizations may eventually seek to manage bricolage: however, (as argued above) bricolage depends on a particular worldview, nature and organization of knowledge, and on the existence of repertoires that have been built up over time, and therefore constitutes a capability that is deeply embedded in the organization. In this sense, bricolage cannot be improvised. A second promising avenue is to think about managerial practice itself as bricolage. The manager-bricoleur holds intimate knowledge of the human, material, and symbolic resources of their organization, and their thinking is based on proximity, rather than on the abstraction induced by many contemporary management methods, and on their ability to understand and to make use of the potential for association of resources of all kinds. The distinctive competences of the manager-bricoleur include their capacity to sense (latent) connections, their ability to get close to the reality of organized work, rather than to abstract representations of it, and their dexterity in manipulating resources and making arrangements 'hold' (Duymedjian and Rüling 2005).

The study of bricolage in organizations opens a wide field for future research. Key issues for further development include the dynamics of bricolage over time, notably the making of organizational bricoleurs, i.e. how their knowledge, worldviews, and practices are formed, the constitution and evolution of their repertoire,

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and the particular competencies involved in acting in the bricolage mode. Further empirical research is needed to understand the specificities of collective bricolage and its relationship to the organization, and the legitimization of bricolage and the transfer of bricolage-related knowledge appear to be the central questions in this respect. Last (but not least) we see a need to develop research on the psychological facets of the bricoleur, notably on their resilience, self-efficacy, and capacity to overcome the biases involved in functional fixedness.

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