SHAPING A CONSTRUCTIVIST VIEW OF ORGANIZATIONAL DESIGN SCIENCE

M.-J. Avenier

Centre d'Etudes et de Recherches
Appliquées à la Gestion C.N.R.S UMR 5820

CAHIER DE RECHERCHE n°2010-01 E4

SHAPING A CONSTRUCTIVIST VIEW OF ORGANIZATIONAL DESIGN SCIENCE

Version révisée du Cahier CERAG n° 2009-20

AVENIER Marie-José

Unité Mixte de Recherche CNRS / Université Pierre Mendès France Grenoble 2
150 rue de la Chimie – BP 47 – 38040 GRENOBLE cedex 9
Tél. : 04 76 63 53 81 Fax : 04 76 54 60 68

SERIE RECHERCHE

SHAPING A CONSTRUCTIVIST VIEW OF ORGANIZATIONAL DESIGN SCIENCE[1]

AVENIER Marie-José *

CAHIER DE RECHERCHE n ° 2010- 01

CERAG

UMR 5820 CNRS – Université Pierre Mendès-France Grenoble

Version révisée du Cahier CERAG n° 2009-20

JANVIER 2010

A paraître dans *Organization Studies,* 2010, - Special Issue 'Organization Studies as Applied Science: The Generation and Use of Academic Knowledge about Organizations'

* Directeur de Recherche CNRS au CERAG - marie-jose.avenier@upmf-grenoble.fr

[1] I would like to thank Paula Jarzabkowski, Sue Mohrman and Andreas Scherer, guest editors of this *Organization Studies* Special Issue on 'Organization Studies as Applied Science: The Generation and Use of Academic Knowledge about Organizations' for their particularly helpful feedback and encouragement to keep clarifying the argument, as well as the anonymous reviewers—with a special mention to one of them—for their insightful and constructive suggestions. I also thank Jean-Louis Le Moigne, William McKinley, Catherine Thomas, Jean Bartunek, Catherine Glée, Luciano Barin Cruz, Laurence Gialdini, Bernard Augier, and Georges Goyet for their support during the revision of the paper as well as Sarah Setton for her precious help in the final editing of this paper in the English language

Abstract

The so-called rigor–relevance gap appears unbridgeable in the classical view of organization science, which is based on the physical sciences' model. Constructivist scholars have also pointed out a certain inadequacy of this model of science for organization research, but they have not offered an explicit, alternative model of science.

Responding to this lack, this paper brings together the two separate paradigmatic perspectives of constructivist epistemologies and of organizational design science, and shows how they could jointly constitute the ingredients of a constructivism-founded scientific paradigm for organization research. Further, the paper highlights that, in this constructivist view of organizational design science, knowledge can be generated and used in ways that are mutually enriching for academia and practice.

Keywords: constructivist epistemological paradigms, sciences of the artificial, design sciences, interpretive methods, rigor

Table des matières

> "The object of all science, whether natural science or psychology, is to co-ordinate our experiences and to bring them into a logical order."
>
> Einstein, 1955, p.1

This contribution to the on-going discussions about organization science paradigms (Pfeffer 1993; Cannella and Paetzold 1994; McKelvey 1997; Weick 1999) aims at setting forth the basic ingredients of a constructivism-founded *scientific paradigm*[2]. This paradigm has the advantage of providing a framework in which the rigor – relevance gap, which has been argued to be unbridgeable in the classical view of organization science (Kieser and Leiner 2009), can be overcome.

Constructivist perspectives have played an important role in what is sometimes referred to as the organization science paradigm war (McKelvey 1997). Despite the abundance of research done within these perspectives, nowadays, constructivist research about organization is faced with a number of issues that impede further progress. The proliferation of different varieties of constructivist perspectives (Berger and Luckmann 1966; Piaget 1967; Glasersfeld 1984, 2001, 2005; Astley 1985; Guba and Lincoln 1989, 1998; Cannella and Paetzold 1994; Le Moigne 1995, 2001, 2002; Mir and Watson 2000; Charmaz 2003, 2006) which have different scopes and which rest on potentially different foundational assumptions generate enormous confusion which is not favorable to knowledge development in constructivist epistemologies. More fundamentally, while constructivist scholars have regularly pointed out the inadequacy of the physical sciences as a model for organization research (Cannella and Paetzold 1994), they have not offered an explicit, alternative model of science consistent with constructivist epistemologies. This is most probably because of the widespread, implicit belief among scholars that science has to be founded on positivist or realist epistemologies. Indeed, any conception of science, when it is viewed as a continuing effort to develop an organized body of knowledge (through disciplined research) about the world in which humans are embedded, needs to be associated with an epistemology. However, this epistemology does not necessarily need to be a positivist or a realist one (Glasersfeld 2001).

This absence of an alternative model of science well suited to the study of organizational phenomena delays the possible emergence of an alternative *scientific paradigm* for organization research founded on a constructivist *epistemological paradigm*. This situation generates numerous unanswered questions about constructivism-founded research. What might the term *scientific* mean in constructivism-founded organization research? How to conceive of knowledge generalization and justification in a constructivism-founded organization *science* without an explicit model for this science? How would use of the knowledge be affected by its elaboration in this scientific paradigm?

A fairly separate stream of works concern the development of design sciences (Hatchuel 2001; Romme 2003; van Aken 2004, 2005, 2007; March and Storey 2008), also labeled sciences of design (Le Moigne 2002; Van Gigch 2002) and sciences for design (Jelinek et al. 2008). These notions of science are explicitly developed within the framework of Simon's (1969) sciences of the artificial, rather than within the sciences of nature framework. The conceptualization of these sciences is still nascent but has recently gained strong momentum in organization research. For instance, an *organizational design science*, also labeled

[2] The term paradigm is used in the sense of "the entire constellation of beliefs, values, techniques, and so on, shared by the members of a given community." (Kuhn 1970: 175) In this definition, "beliefs, techniques, and so on", can concern any kind of subject matter such as epistemology, science, or methodology. This paper deals mainly with scientific and epistemological paradigms.

organization design science (Mohrman 2007; Jelinek et al. 2008), is progressively taking shape. So far, contributions about organizational design science have concentrated more on methodological aspects (Hatchuel 2001; *JABS* 2007; *OS* 2008; *MISQ* 2008) than on the epistemological contexts in which it could fruitfully develop.

This paper's contribution is to bring together these two separate paradigmatic perspectives of constructivist epistemologies and of organizational design science, and to show how they could jointly constitute the ingredients of a constructivism-founded scientific paradigm for organization research. It is also to underscore that in this view of organization science the so-called rigor – relevance gap, which has been argued to be unbridgeable in conventional organization science (Kieser and Leiner 2009), can be overcome.

The paper is organized into two parts. The first part shows that Simon's (1969, 1996) conception of the sciences of the artificial is consistent with radical constructivism (Glasersfeld 1984, 2001, 2005; Riegler 2001) as further conceptualized by Le Moigne (1995, 2001) under the label *teleological constructivist epistemological paradigm*. It then argues that bringing together these two paradigmatic perspectives offers the beginnings of an alternative *scientific paradigm* for constructivist organization research. The second part examines issues of generation and use of academic knowledge in this alternative scientific paradigm, anchoring the discussion in the grounded theory approach (Glaser and Strauss 1967; Charmaz 2003, 2006) as well as in methods developed in the design sciences (Pawson and Tilley 1997; Van Aken 2004; *JABS* 2007; Denyer et al. 2008).

Core Ingredients of a Constructivism-Founded Scientific Paradigm

Mir and Watson's (2000) review of constructivist studies reveals the dynamism and the import of constructivist reflection in organization research over the last thirty years. This dynamism has been accompanied by the emergence of a wide variety of kinds of constructivism (Berger and Luckmann 1966; Piaget 1967; Glasersfeld 1984, 2001, 2005; Astley 1985; Guba and Lincoln 1989, 1998; Cannella and Paetzold 1994; Le Moigne 1995; Mir and Watson 2000; Charmaz 2003, 2006). Despite this variety Mir and Watson (2000) found that constructivist scholars share a number of beliefs. However, in order to constitute the basic ingredients of a constructivism-founded organization science these shared beliefs need to be further specified and supplemented. In particular, the underlying epistemological paradigm needs to be explicitly defined, and constructivists' shared beliefs need to be complemented by an explicit model of science that is well suited for the study of organizations and consistent with the specified epistemological paradigm.

The Teleological Constructivist Epistemological Paradigm: Foundations, Advantages, Outcome

Currently there are two different constructivist epistemological paradigms, namely Guba and Lincoln's (1989, 1998) *Constructivist Epistemological Paradigm*, and Glasersfeld's (1984, 2001, 2005) *Radical Constructivism*, which was further conceptualized by Le Moigne (1995, 2001, 2002) under the label *Teleological Constructivist Epistemological Paradigm*. Table 1 summarizes these two paradigms' main founding assumptions. Inspired by Guba and Lincoln (1998), it is arranged in three rows which, according to these authors, reflect the three basic questions of epistemology, namely:

1) The ontological question which asks: *"What is there to be known?"*
2) The epistemological question which asks: "*What is the relationship of the knower to the known (or the knowable)?"*
3) The methodological question which asks: "*What are the ways of finding out knowledge?"*

------ Insert Table 1 about here ------

This table reveals that the two constructivist epistemological paradigms strictly agree on only one founding assumption, that which postulates that, even though the inquirer and the phenomenon under inquiry are distinguishable from one another, in the knowledge elaboration process they cannot be separated in the following sense: the inquirer cannot rationally know such a thing as an independent, objective world that stands apart from his/her experience of that world. This assumption, which is precisely the basic founding assumption of phenomenology, has important consequences. It implies that the usual separation between ontology and epistemology disappears in constructivist paradigms, a phenomenon that the dashed line between the ontological and epistemological levels in Table 1 is meant to reflect (Guba and Lincoln 1998). This unfeasibility of separating ontology and epistemology induced radical —and teleological —constructivists to take an agnostic stance about ontology (Riegler 2001). Although they do not deny the existence of a real world, they do not make any pronouncements on it either. In particular, they do not postulate any founding assumption on the possible nature of reality. This endows the teleological constructivist epistemological paradigm with a crucial property: for the sake of framing a particular research project, teleological constructivist scholars have the possibility of taking any beliefs concerning the possible nature of the world (that are consistent with their experience of that world) as working assumptions[3]. The only condition is that these working assumptions be explicitly stated and consistent with the paradigm's founding assumptions. As a consequence, the teleological constructivist epistemological paradigm includes as special cases any phenomenology-based epistemological paradigm which posits ontological founding assumptions.

In particular, researchers can take as a working ontological assumption, one that is frequently made in interpretive research which considers that human activity is patterned (Yanow 2006). As a matter of fact, since interpretive methods are grounded in phenomenology and hermeneutics, research conducted with these methods can rightfully be epistemologically anchored in the teleological constructivist epistemological paradigm.

As another example of ontological working assumptions, researchers can also take Guba and Lincoln's position which states that: "The ontological question is answered by adherents of the constructivist paradigm by asserting that there exist multiple socially constructed realities not governed by any natural laws, causal or otherwise: a *relativist* ontology. These constructions are devised by individuals as they attempt to make sense of their experiences, which it should be recalled, are always *interactive* in nature." (Guba and Lincoln 1989: 86) Incidentally, this quote reveals a weakness in Guba and Lincoln's discourse: they mingle what pertains to the epistemological realm—the constructions evoked in the last sentence—and what pertains to the ontological realm—the socially constructed realities evoked in the first sentence.

The teleological constructivist epistemological paradigm also permits more methodological possibilities than that according to Guba and Lincoln. Indeed, in the latter, only hermeneutical dialectical methods of inquiry are eligible. In the former, any method, provided it is used in an interpretive perspective (i.e. in search of understanding and meaning rather than solely causal explanations) is eligible to generate knowledge. Hence the teleological constructivist epistemological paradigm appears more open than that according to Guba and Lincoln both at the ontological and at the methodological level.

Because of the greater openness of the teleological constructivist epistemological paradigm over that according to Guba and Lincoln, the reflection and the discussion of this

[3] A working assumption is an assumption made in a research project, which will be accepted as stated rather than tested during the project.

paper will henceforth be anchored in the teleological constructivist epistemological paradigm. In this epistemological paradigm, knowledge is explicitly accepted as provisional. It has the status of *plausible hypothesis which fits experience* (Le Moigne 1995; Glasersfeld 2001). This epistemological paradigm's agnosticism together with the status of knowledge in this paradigm endow the elaboration of knowledge within this paradigm with a remarkable feature, namely the capability of thoughtfully incorporating knowledge that has been developed in other epistemological paradigms.

The converse appears problematic because of knowledge's explicit status in the epistemological paradigm—that of plausible hypothesis that fits experience—and because knowledge, in this epistemological paradigm, needs not be expressed in the form of falsifiable statements. As will be further detailed in the second part of the paper, the status bestowed upon knowledge in this paradigm also has consequences on the way knowledge about organization developed in this paradigm can be put to use.

Constructivist Scholars' Shared Beliefs and the Teleological Constructivist Epistemological Paradigm (TECP)

In their review of constructivist works Mir and Watson (2000) found that constructivist scholars share six fundamental beliefs (see Table 2), among which is the founding assumption common to the teleological constructivist epistemological paradigm (TCEP henceforth) and that according to Guba and Lincoln.

------ Insert Table 2 about here ------

A close look at these shared beliefs reveals that they are consistent with the TCEP, except for the way in which the last one is formulated. It states that: "Constructivism has been conceptualized as a methodology." (Mir and Watson 2000: 944) This shows that, unlike teleological constructivists (Le Moigne 1995; Glasersfeld 2001), Mir and Watson do not distinguish between epistemology and methodology. Such an attitude, which is frequent in organization research, reduces epistemological reflection to a methodological one. Yet epistemology is concerned with the origin, nature and limits of human knowledge (Guba and Lincoln 1989), while methodology specifically deals with methods, techniques and rules for developing knowledge. Hence methodology is just one aspect of epistemology. Piaget's (1967) concise definitions clarify their differences. Indeed, he defines methodology as the study of the constitution of knowledge, and epistemology as the study of the constitution of *valuable* knowledge. By not limiting *valuable* knowledge to mean knowledge validated according to the so-called scientific method, Piaget's definition of epistemology enriches and opens the conception of scientific knowledge to include knowledge whose value is assessed differently, in particular knowledge that is legitimized in epistemological paradigms other than the positivist and realist ones.

It is noteworthy that Mir and Watson's (2000) own conception of constructivism differs from both the teleological constructivist epistemological paradigm and that according to Guba and Lincoln. Indeed, while the teleological constructivist epistemological paradigm does not make any ontological founding assumption and Guba and Lincoln make a relativist ontology assumption, Mir and Watson improperly make a realist ontology assumption. This added to the confusion around constructivism and triggered a famous controversy (Kwan and Tsang 2001).

Constructivist scholars share yet another belief that, surprisingly, Mir and Watson (2000) did not set forth: they consider that the classical physical sciences' model does not represent an adequate model for organization research (Cannella and Paetzold 1994). However, it is not sufficient to contest the monopoly of the sciences of nature model to make up a scientific paradigm for organization research based on a constructivist epistemology. One needs to offer

an explicit, alternative model to replace it. The next section will argue that Simon's (1969) conceptualization of the sciences of the artificial is consistent with a constructivist epistemology and well suited for organization research. Hence it constitutes a good candidate for the missing model of science for constructivist research.

Bringing together the Sciences of the Artificial and the Teleological Constructivist Epistemological Paradigm (TCEP)

Unlike some of Simon's well-known contributions in economics, psychology, organization science, political sciences or artificial intelligence, his conception of the sciences of the artificial has diffused slowly. This most unwonted labeling of "artificial" probably did not help[4]. Indeed, the term artificial strikes one as contrary to the notion of science. It has a negative connotation. It evokes physical artifacts or artificial intelligence, while for Simon an artifact is any system, such as an organization, perceived as being shaped by some human intentions and embedded in an environment in which it evolves.

An Archetype of Science Alternative to that of the Sciences of Nature

Simon's (1969) idea for conceptualizing the sciences of the artificial originated from the following considerations. The world inhabited by humans shows evidence of human artifice almost everywhere: for instance, gardens, plowed fields, the very species upon which humans depend for their food. Two specific properties of artifacts render them inappropriate for being studied within the archetype of the sciences of nature: their being shaped by human intentions and their contingency to their environment. Because of the omnipresence of artifacts and their important roles in the environments in which humans live, it is crucial to develop knowledge about the functioning and evolution of actual artifacts. It is also important to develop knowledge for the design and implementation of future artifacts which would have certain desired properties. Considering that the archetype of the sciences of nature does not offer an adequate framework for studying artifacts, Simon engaged in the conceptualization of another archetype of science that would be dedicated to the study of artifacts of any kind. He named it the sciences of the artificial. His conceptualization relies on the development of appropriate means for modeling and understanding artifacts, i.e. phenomena in which human intentions as well as so-called natural laws are embodied. These means can take the form of notions or principles as diverse as symbols system, representation, problem space (see Box 1), heuristic search, procedural and substantive rationality, planning without final goal, and the principle of intelligent action. Then, using these means, scholars can develop knowledge relevant for understanding existing artifacts and/or for designing and implementing new artifacts having intended properties.

------ Insert Box 1 about here ------

In Simon's conception, the sciences of the artificial permit integration of knowledge stemming from the sciences of nature, whenever this appears relevant. For instance, his study of organizational decision-making explicitly took into account human bounded cognitive capabilities (Simon 1957). Hence, because of the way Simon conceived the sciences of the artificial, the union of the scopes of the sciences of nature and of the sciences of the artificial appears to cover all phenomena that scholars from any field may contemplate investigating. In addition, since an ever increasing number of phenomena are considered as being influenced, either deliberately or not, by human intentional actions, the scope of the sciences of the

[4] Much as the label "radical" does not help convey the agnostic character of radical constructivism. Hence my preference for the label "teleological constructivist epistemological paradigm" (Le Moigne 2001), which does not have any specific connotation besides its meaning which emphasizes the dependence of the knowledge generated upon the goal of the knowledge process (see Table 1).

artificial seems to be progressively enlarging. For instance, it henceforth encompasses the sciences of climate since researchers now view global climate evolution as being influenced by human activity while, until the mid-20th century, they considered it as human-independent.

The Consistency of Simon's Conception with the TCEP

I will now show that Simon's epistemological position at the time he started conceptualizing the sciences of the artificial does not contradict the TCEP's founding assumptions recalled in Table 1, even though, in 1947—hence years before—in a specific context, he explicitly stated that he was studying decision theory within the philosophical perspective of logical positivism.

Both the sciences of the artificial and the TCEP place empirical investigation of human experience at the core of the knowledge process (Glasersfeld 2001; Simon 1977a, 1977b, 1989). In addition, at least from the '70s on[5], Simon's position has not contradicted the core founding assumption shared by constructivist scholars, which states that an inquirer cannot rationally know such a thing as an independent, objective world that stands apart from his/her experience. Indeed, in his investigations of human problem-solving processes, Simon used to ask participants to think aloud while solving a problem that was given to them (Simon 1977a). This suggests that in developing knowledge on thought processes Simon relied on human experience and its expression in natural language, which is a particular form of symbolic construction. Simon's quotes in Box 1 also reveal that, as in the TCEP, the notions of representation and fit are central in his conception of the sciences of the artificial. For Simon, the substratum of human reasoning consists of representations. In particular, during design processes, models can offer representations of artifacts which do not yet exist (Simon 1969). As is the case for any and all artifacts, representations depend both on the goals towards which they are constructed and the specific context of this construction—in particular the availability of memorized representations functionally fitted to the problem at hand. Newly-created representations and solutions to problems are integrated into the system of previously memorized representations. This has two consequences: first, it enlarges the individual's subsequent problem-space creation capabilities; second, according to Simon's view of the adaptability of symbol systems recalled in Box 1, the integration of new representations may induce an adaptation of the previously memorized representations. Hence, Simon's view of knowledge construction is consistent with the teleological constructivist assumption which states that knowledge construction is context and goal-dependent, and furthermore, that new knowledge may induce modifications to the prior knowledge that served to build it.

Consequently, it seems legitimate to conclude that Simon's conceptualization of the sciences of the artificial is consistent with the foundational assumptions of the TCEP. Even though, to my knowledge, he never stated it overtly nor did he specifically address this question. Rather, he used the phrase "empirical epistemology" (Simon 1989) to describe his specific epistemological positioning in which empirical investigation played a central role.

-------- Insert Table 3 about here --------

Table 3 aims to illustrate, using references to published works, that there is no necessary correspondence between archetypes of science and epistemological paradigms. It cites Maturana's (2000) constructivist works in biology to show that even though the sciences of nature developed principally in association with a positivist epistemological paradigm until the mid-twentieth century, research in the sciences of nature can develop in either

[5] Simon's position seems to have progressively evolved to philosophical pragmatism (Simon 1977a, 1977b) and to what he called empirical epistemology (Simon 1989), which places human experience at its core. Indeed, in 1977, he stated that "when man describes [an ambiguous stimulus], he depicts not some external reality, but himself" (1977a: 2), and also expressed his regrets that: "we are accustomed to think of the scientist as observing the state of the world, but not of his observing as part of the state of the world" (1977b: 23, footnote 2).

epistemological paradigm. In the lower right-hand quadrant, it cites works explicitly developed in the TCEP (Le Moigne 2002; Van Gigch 2002), which concern a particular exemplar of the sciences of the artificial on which we are going to focus now, the sciences of design—also known as design sciences.

Design Sciences: Sciences of the Artificial's Most Advanced Explicit Exemplar

Organizations are often depicted as artifacts initially founded by some individuals for some purpose, in a particular context that imposes a number of constraints on their functioning, rather than as objects created by Nature—like the planets in the universe. Organizations viewed as artifacts have no dispensation allowing them to ignore or violate the so-called laws of nature, which for instance put constraints on the physical and physiological capabilities of organization members.

Organizations have further specific properties stemming from the fact that they involve human beings. Indeed, human beings are usually considered as emotional and physical creatures with desires, tangible bonds, attachments and affiliations to communities. They are also considered as having other distinctive capabilities such as intentional behavior, consciousness, reflexivity (Weick 1999), creativity, and the capability to interpret situations as well as that of contesting interpretations (Yanow 2006). Consequently, organizational phenomena can be viewed as being shaped by the intentional acts of socialized human beings who are capable of designing intelligent actions for reaching their goals. The term "shaped" is taken to mean influenced rather than determined: there is no guarantee that the decisions reached will correspond to any overall goal (Simon 1964). All these properties render conceptualizing organization science as a science of the artificial relevant.

Simon emphasized the central role of design within the sciences of the artificial and initiated the conceptualization of a science of design as an exemplar of the sciences of the artificial. It is from this specific exemplar that the sciences of the artificial have developed the most, under various generic names such as sciences of design (Le Moigne 2001, 2002; Van Gigch 2002), design sciences (Hatchuel 2001; Romme 2003; Van Aken 2004, 2005; Tranfield 2006; *JABS* 2007; Denyer et al. 2008; *OS* 2008; *MISQ* 2008), or sciences for design (Jelinek et al. 2008).

The development of these sciences has gained important momentum in the last ten years. They have received strong support from the US National Science Foundation which carried out a large program on the "Science of design archetype and artifact development" from 2003 to 2009. Special issues published by three major academic journals in organization research (*JABS* 2007; *OS* 2008; *MISQ* 2008) on the topic of design sciences in between 2007 and 2008 offer complementary signs of this accelerating development.

Until now, the conceptualization of organization science as a science of the artificial has mostly been done in the narrower framework of the design sciences, under the label organizational design science (Mohrman 2007). It is to this notion of science, still in its infancy, that constructivist research about organizations will be connected in the rest of this paper, fostering an extension to earlier design research theorizing and methodological developments (Mohrman 2007; *JABS* 2007; *OS* 2008; *MISQ* 2008). Most of this research is not explicit enough about its epistemological positioning to be straightforwardly located in one row or the other of Table 3. Some like (Van Aken 2004, 2005, 2007; Grandori and Furnari 2008) implicitly or explicitly adhere to a positivist or critical realist paradigm. Stances taken by others, such as the development of customized syntheses based on research done in different epistemological paradigms (Denyer and Tranfield 2006; Denyer et al. 2008), can be justified in the TCEP but more rarely in a positivist or critical realist paradigm. Some scholars

like Romme (2003) and Jelinek et al. (2008), explicitly aspire to conceptualizing design sciences as a framework capable of integrating contributions elaborated in different epistemological paradigms. Finally, Le Moigne's (2001, 2002) and Van Gigch's (2002) contributions relative to the sciences of design can definitely be located in Table 3's lower right-hand quadrant.

Even though not all contemporary design sciences' scholars adhere to the TCEP, the arguments developed in the preceding sections provide a number of reasons which jointly make the archetype of the sciences of the artificial—as well as the model of the design sciences which constitutes an explicit exemplar of this archetype—a worthy candidate for the missing model of science in constructivism-founded organization research. These reasons are mainly: the consistency of Simon's conception of the sciences of the artificial with the TCEP; the adherence of a growing number of scholars to this archetype of science (at least through its design sciences' exemplar); the possibility of integrating contributions developed in different epistemological paradigms, a possibility offered by the TCEP while not offered by other epistemological paradigms ; and the aspiration of a number of design sciences' scholars for an epistemology having such an interesting capability.

In the constructivism-founded scientific paradigm for organization research founded on the TCEP, the model of the design sciences, and the constructivist scholars' shared beliefs (Mir and Watson 2000), knowledge is elaborated with an explicit intention of being useful for organizational design. From this point on, this paradigm will be labeled as a *constructivist view of organizational design science*. The rest of the paper will examine the issues of generation and use of knowledge about organizations in this particular view of organization science in order to take advantage of what is already known about these issues in organizational design science.

Generation and Use of Knowledge in the Constructivist View of Organizational Design Science

In organizational design science, the goal of research is to develop content and methodological knowledge to guide design processes (Mohrman 2007), i.e. knowledge which advances understanding of the functioning and the evolution of organizations and is intended to be useful for the design and implementation of organizational artifacts having desired properties, such as managerial processes, procedures and systems. The two specific properties of artifacts underscored by Simon, namely goal-directedness and dependency upon their environment, call for in-depth field research to study them. Since the primary outcome of such research is local knowledge (Geertz 1983), doing research in the constructivist view of organizational design science confronts researchers with the issues of generalizing local knowledge and justifying generalization. The following sections successively address these issues and then discuss actual use of knowledge generated in the constructivist view of organizational design science.

Scientific Knowledge Generation as Elaboration of Generic Knowledge

The question of generalizing local knowledge developed in field research has long received attention from scholars utilizing the grounded theory method (Glaser and Strauss 1967; Charmaz 2003, 2006). Even though Glaser and Strauss' positions were imbued with positivism, drawing upon this method in a constructivist epistemology no longer comes as a surprise after Charmaz' (2003, 2006) important contributions to this method. Besides, for Glaser and Strauss, grounded sociological theory must be useful in the theoretical advancement of sociology, and usable in practical applications. More precisely, they state

that: “Theory (…) must fit the situation being researched, and work when put into use. By ‘fit’ we mean that the categories must be readily (not forcibly) applicable to and indicated by the data under study; by ‘work’ we mean that they must be meaningfully relevant to and be able to explain the behavior under study.” (Glaser and Strauss 1967: 3) This normative view of sociological theory resembles what could be considered a theory in the constructivist view of organizational design science. Indeed, its criteria are not “truth” and “true explanation” as in positivist and critical realist paradigms, but “fit” and “work”, which have close similarity with Glasersfeld’s (2001) criterion of “functional fit” for evaluating knowledge in the TCEP.

In (Avenier 2009a, 2009b) it is advocated that in the TCEP, generalization of local knowledge follows a path similar to that suggested by Glaser and Strauss for going from substantive to formal grounded theory. Such generalization aims at upwardly extending the conceptual generality of local substantive knowledge by transcending the singularities of that knowledge and by setting forth meta-relationships that this local knowledge possibly instantiates. This extension is accomplished through a process of conceptualization and de-contextualization of local substantive knowledge *via* the systematic study of multiple comparison groups and substantive theories (Charmaz 2003, 2006). Since the phrase “formal theory” often has the connotation of a theory built by logical deduction from a priori assumptions and expressed in mathematical formalism, I prefer using the term “generic” to designate knowledge having a certain level of conceptual generality. This term has been chosen in reference to the notion of “generic proposition” developed by the pragmatist philosopher Dewey (1938). Interestingly, this term also appears in Charmaz’ (2006) definition of a formal (grounded) theory. Besides, the notion of “generic knowledge” benefits from having recently been taken up by researchers from various cognitive sciences (Carlson and Pelletier 1995; Prasada 2000) engaged in investigating pending epistemic questions that this notion raises. For illustration purposes, Appendix A offers an example of generic knowledge elaborated in a research project on strategizing in financial brokerage companies (Gialdini 2008).

The construction of generic knowledge usually implies multiple iterations and back and forth connections of the information gathered, the local knowledge on which it is based, published knowledge, conjectures made by the researcher, going back to the field in order to collect further information and returning to academic literature to clarify emerging notions. This process is fairly similar to that described by Pawson and Tilley (1997) for uncovering “underlying generative mechanisms” in design sciences. These mechanisms can be considered as generic knowledge of a particular type, that of technological rules which can be anchored on knowledge from the sciences of nature. Such a rule is defined as a chunk of general—in the sense of generic—knowledge linking an intervention or artifact with a desired outcome in a certain application-domain (Van Aken 2004).

To sum up, generic knowledge can take the form of a set of consistent generic propositions such as those shown in Appendix A. It can also be expressed as “design rules” and “construction principles” (Romme and Damen 2007), design methods (Mohrman 2007), as well as “knowledge artifacts” (Jarzabkowski and Wilson 2006), such as frameworks, generic models, and tools, as, for instance, Porter’s five forces and generic strategy models.

Knowledge Legitimization

In the TCEP, the word *legitimization* is used to refer to the justification of the legitimacy of the knowledge being elaborated (Le Moigne 1995). In the design sciences, legitimization has two interconnected facets: epistemic and pragmatic legitimization. Epistemic legitimization concerns the justification of the epistemic value of a particular piece of knowledge, while pragmatic legitimization derives from knowledge effectiveness to guide

design processes (Mohrman 2007). This section focuses on epistemic legitimization in the constructivist view of organizational design science.

The question of how to establish the validity of a theory has long been settled in positivist and critical realist epistemologies: an assertion or a theory is considered as provisionally representative, as long as it is falsifiable and has withstood all hypotheses testing performed on it (Popper 1968). Piaget (1967) offered some fundamental ideas on knowledge legitimization in constructivist epistemologies. His ideas stemmed from reflections based on a vast interdisciplinary review of the main epistemological schools of thought concerning mathematics, physics, biology and human sciences realized under his direction. This led him to point out that since the mid-twentieth century epistemological reflection has increasingly arisen from within the sciences themselves. By becoming a reflection carried out by scientists themselves on the foundations of their own discipline, retroactive critique of the concepts, methods and principles used in the elaboration of knowledge becomes an instrument of scientific progress. Hence, in his view, this novel practice seemed likely to become rapidly accepted as a regular practice in all sciences. Later calls for epistemological reflection in organization studies by Burrell and Morgan (1979) echoed what Piaget (1967) perceived as having started earlier in other scientific fields. Finally, in the '90s, a number of organization scholars did become reflective, not only about their methodology, but also about the epistemological paradigm within which they were conducting their research (Guba and Lincoln 1989; Martinet 1990; Le Moigne 1990; Miles and Huberman 1994; Denzin and Lincoln 1998).

Epistemic Legitimization: Based on Epistemic and Empirical Work

At the same time that reflectivity developed in organization research, another notion started to diffuse in constructivist research, that of reflexivity. Sometimes reflexivity designates an overall scholarly attitude of awareness of the role of the self in the various phases of a research project (Weick 1999; Charmaz 2006; Schwartz-Shea 2006), whereas reflectivity refers more broadly to a practice which consists of regularly stepping back to reflect critically on the work that has been done and on the prior understandings and theory-in-action which have been implicit in the way it has been done (Schön 1983). Sometimes the terms are used interchangeably, which generates ambiguity.

To avoid perpetuating this ambiguity, what Piaget refers to under the name of epistemological critique, essentially epistemological reflectivity, will be labeled here *epistemic work.* This has both drawbacks and advantages. Its main advantage is to emphasize that epistemic legitimization in the TCEP rests on work that has two interdependent facets—the epistemic and empirical facets—which need to be mutually adapted to fit each other throughout the research project. Its main drawback is that this notion of epistemic work is different from the way Cook and Brown (1999) use this phrase. For these authors, epistemic work comes from human action itself, making it largely implicit. Here, as exemplified in Appendix B, epistemic work is deliberate, reflective work: digging into both the implicit assumptions made and the deep meaning of the notions that are used; tracking what seems self-evident; questioning the mutual relevance and consistency of the countless decisions the researcher makes along the entire research process, from the specification of the research design to the communication of the results in order to adapt them to the meaning systems and contexts of each specific audience (Tenkasi et al. 2007).

Since, in the TCEP, it is admitted that knowledge elaborated during a research project depends on the process of knowledge construction, knowledge legitimization in the TCEP primarily relies on legitimizing the epistemic and empirical work performed during knowledge construction. Three basic principles have been advocated for structuring this work, namely ethics, explicitness, and *ostinato rigore* (Le Moigne 1995, 2001, 2002). Since these notions may not be familiar to the reader, the following section discusses their meanings.

Legitimization's Guiding Principles: Ethics, Explicitness, and *Ostinato Rigore*

Concerning *ethics*, Wicks and Freeman (1998) argue that ethical considerations form an essential part of the very foundation of organization research and must be built into the "fabric of organization studies". Since organization research deals with human beings, researchers have to interact with those humans in a manner respectful of their dignity, their integrity, and their privacy (Guba and Lincoln 1989). In the TCEP, this goes well beyond the classical canons, which bear on deception, confidentiality and fully informed consent. For instance, the TCEP's agnostic character implies that no one can claim to have the single best representation of the phenomenon under study. This leads to interviewing all practitioners having experience concerning the phenomenon under study on an equal footing, regardless of their function in the organization—including those practitioners traditionally left aside as voiceless.

Explicitness (Le Moigne 1995; Simon 1996) is directly related to criteria for evaluating qualitative research that are almost ubiquitous in the literature, such as thick description, reflexivity, audit, and trustworthiness (Schwartz-Shea 2006). Indeed, thick description refers to the presence, in the research narrative, of sufficient detail about an event, setting, person, or interaction to capture context-specific nuances of meaning. Striving for explicitness also engages the researcher in a process of elicitation of the role of the self in the various phases of a research project, i.e. in reflexivity. The term audit is often used to denote a set of practices for documenting study procedures. An "audit trail" (Balogun et al. 2003) records, as precisely as possible, the various steps of the research. The goal of the audit trail is to render as explicit as possible the linkages between researcher decisions, information gathered, and inferences drawn. The principle of explicitness extends the usual scope of audits to formulating the founding assumptions of the epistemological paradigm in which the research has been carried out, as well as the possible ontological working assumptions made. Offering a detailed research report based on an extended audit trail provides a way to comply with the principle of explicitness. Such a report aims at providing sufficient grounding for the knowledge claims so that readers can form autonomous assessments of the knowledge generation process and check whether they agree with the knowledge claims. In other words, the report aims at building the credibility of knowledge claims (Charmaz 2006). Since trustworthiness refers to the many steps that a researcher takes throughout the research process to make their efforts self-consciously deliberate, transparent, and ethical (Schwartz-Shea 2006), explicitness plays a central role in building trustworthiness.

The term trustworthiness is increasingly used in interpretive research as the baseline standard in lieu of rigor because of the relatively narrow connotation that rigor has in conventional organization science (Gulati 2007; Kieser and Leiner 2009). There it refers primarily to combating possible threats to reliability, and internal and external validity—as these notions are defined in positivist and realist epistemologies. Since the term is widely used in a much broader sense in sciences, along with Le Moigne (1995), I suggest not abandoning it, but rather using it in the sense of *ostinato rigore*, the favored motto of the emblematic design science practicing scholar Leornardo da Vinci. Indeed, this phrase accurately conveys the idea of an obstinate quest for becoming still more rigorous in the way researchers collect information, read and reread academic literature and field documents, and draw inferences. Hence, in the constructivist view of organizational design science the notion of rigor is richer than in the conventional view of organization science. Since the knowledge developed in organizational design science is also intended to be useful for design purposes (Mohrman 2007) rigor and relevance can be reconciled in this view of organization science, while these characteristics have been argued to exclude one another in the classical view of organization science (Kieser and Leiner 2009).

Triangulation, negative case analysis, and member checks, which are among the most frequently cited techniques in qualitative research textbooks for building research quality, are

particularly useful in the tenacious search for rigor associated with *ostinato rigore*. Since these techniques are already well-known, I will simply note that negative case analysis is not conceived as a Popperian falsification attempt. Rather, it is designed to prevent researchers from settling too quickly on a particular interpretation: researchers consciously search for any evidence that would throw into doubt their initial impressions and interpretations.

So, overall, the three basic principles of ethics, explicitness and *ostinato rigore* mirror and extend the major evaluative criteria advocated in textbooks about qualitative research, namely credibility, trustworthiness, reflexivity, and thick description. Techniques depicted in these books for conducting high quality research, such as triangulation, audit, and member checks, also offer important means for operationalizing the principles of legitimization discussed here. These principles are also interdependent with one another: for instance, ethics are needed to produce rigorous explicitness, while explicitness is needed for showing signs of the ethics and rigor with which a particular research project has been conducted.

When credibility (Charmaz 2006), trustworthiness (Schwartz-Shea 2006), or, as is the case here, knowledge's epistemic legitimacy is acknowledged, this knowledge can be built upon in subsequent research projects. In the constructivist view of organizational design science, this knowledge also aims at being useful for organizational design. So, if certain practitioners do consider this knowledge as relevant and potentially useful for their concerns, it can be put into use, which would contribute to its pragmatic legitimization. So, the next question to examine is: in the constructivist view of organizational design science, what does *putting knowledge into use* mean?

Use of Knowledge: Activation Rather than Application

Putting the knowledge elaborated in research projects into practical use for design purposes is a main goal of knowledge generation in organizational design science, as well as a means to enhance its pragmatic legitimization *via* putting it to the test of actual experience in various settings. Because of the founding assumptions of the TCEP, when put into use, any available knowledge, regardless of the epistemological paradigm in which it has been initially developed, is to be considered as a heuristic guide having several possible roles. These are essentially: to arouse scholar and practitioner reflection, to provide them with enlightening viewpoints of the problem at hand, and to stimulate their creativity in designing their action(s).

Generic knowledge cannot be applied as such. It needs to be contextualized/localized and interpreted according to practitioners' intended use and to the specifics of each setting—which is consistent with the context- and goal-dependency of phenomena that sciences of the artificial deal with (Simon 1969). Because of the complexity of contextualization, instead of speaking of knowledge application, some authors speak of knowledge put to action, put into use, or activation (Tenkasi et al. 2007). The term activation has the advantage of being more precise. Sometimes knowledge activation does not lead to any other action than the cognitive action of attempting to integrate it into one's thought process as a means to reflect or gain insight on a problematic situation. Knowledge activation can permit the appropriation of this knowledge, *i.e.* the integration of this knowledge into the individual's global knowledge enabling its subsequent reactivation as in Simon's view of problem-resolution recalled in Box 1.

The intentional use of knowledge, as for instance in ceremonial use, might not correspond to the purpose for which that knowledge has been developed in the first place (Jarzabkowski 2004; Jarzabkowski and Giulietti 2007). Even when both intentional use and initial purpose match, contextualization involves a complex process implying reflection and re-interpretation where knowledge might be dissociated from its theoretical foundations. This adaptation

process leads to instantiations and meanings that can be quite different across different local contexts, and may even induce modifications to the knowledge's initial meaning (Whittington 2003; Jarzabkowski and Wilson 2006; Tenkasi et al. 2007).

This phenomenon can be illustrated in an example taken up by Jarzabkowski and Wilson (2006) from (Chesley and Wenger 1999). This example shows how a tool designed to assess firm performance, the balanced scorecard model, was adapted to suit the organizational context of a public agency, which is not concerned with making profit but with meeting a budget. These adaptations initiated a series of recursive processes in the organization. In the end, the balanced scorecard that was actually implemented held little resemblance to its original format and content. Yet, it was operating and had facilitated strategic conversations across levels and divisions. This process had created strong commitment to change since the constant re-visiting and modifications made to the framework encouraged strong levels of buy-in from staff. This case illustrates a way to use a generic framework as a heuristic guide. As for Jarzabkowski and Wilson (2006), the dissociation process from the framework's theoretical foundations is not viewed as a failing of practice. Rather it is viewed as a practical activation of generic knowledge that may be valuable not only for the organization but also for enriching the understanding of researchers who study it.

Knowledge activation in a particular setting calls for empirical work aiming at understanding the specific circumstances of the setting, as well as epistemic work for investigating the legitimacy of activating this knowledge in that setting, given its idiosyncratic circumstances. In this regard, contextualization can be facilitated by, but not solely accomplished by researchers, even those acquainted with the setting, because it demands local sense making and self-design (Tenkasi et al. 2007).

Discussion

The discussion will focus on how bringing together organizational design science and constructivist shared beliefs as the main ingredients of a scientific paradigm for organization research anchored in the teleological constructivist epistemological paradigm may affect constructivist research as well as research conducted in organizational design science. The potential advantages and drawbacks for organizational design science research of deliberately relying on teleological constructivist epistemological foundations will be examined first. Then the potential advantages and drawbacks for constructivist research of subscribing to the framework of organizational design science will be explored.

Since any scientific endeavor needs to be explicit concerning the epistemological paradigm within which the knowledge elaborated will be justified, scholars in organizational design science need to be explicit about the epistemological foundations of their research. So far, organizational design science's advances have mainly focused on theory and methods (van Aken 2004; *JABS* 2007; *OS* 2008; *MISQ* 2008). Limited attention has been given to the epistemological paradigm in which these advances could beneficially develop, although certain scholars (Romme 2003; Jelinek et al. 2008) have explicitly formulated their desire for a design science which could enable the integration of knowledge developed in key epistemological traditions in organization research.

While I cannot see any particular disadvantage to rooting organizational design science in the TCEP rather than in any another epistemological paradigm, I do perceive significant advantages. Those stem from important properties of the TCEP, which have been discussed in this paper. As seen above, one advantage is the specific possibility of thoughtfully integrating knowledge developed in other epistemological paradigms, a possibility not afforded by either

positivist or critical realist epistemological paradigms. Another advantage is the eligibility of any research method and/or technique for generating and *legitimizing* knowledge. Indeed, provided that the epistemic and empirical work are conducted with ethics, *ostinato rigore*, and explicitness, as defined earlier, knowledge legitimization does not require further hypothesis testing or replication across large samples, as is the case in positivist and critical realist paradigms. Hence, all the interactive methods such as action research (Argyris 1993; Eikeland 2006), intervention-research (Hatchuel 2001), collaborative research (Bartunek and Louis 1996; Balogun et al. 2003), grounded theory method (Charmaz 2003; 2006), and engaged research (Van de Ven and Johnson 2006) are eligible for elaborating legitimized knowledge. These methods are increasingly advocated and practiced because, beyond their being particularly adapted to developing knowledge capable of being relevant for practice, they also enable the cross-fertilization of knowledge generation and use of that knowledge (Avenier 2009b; Avenier and Gialdini 2009).

What are the potential advantages and disadvantages for constructivist research of being explicitly carried out within the organizational design science framework? High-quality research carried out in a constructivist epistemological paradigm—i.e. research satisfying the principles of ethics, *ostinato rigore* and explicitness—which aims at elaborating knowledge about organizations with a certain level of conceptual generality, can be viewed as a scientific endeavor within the wider framework of the sciences of the artificial. When the knowledge is elaborated with the further intention of being useful for organizational design purposes, the research can be considered as a scientific endeavor within the constructivist view of organizational design science. In my view, acquiring an explicitly scientific status can be a significant advantage for constructivist research. What are the drawbacks? I can see three possible sorts.

One comes from the explicitness requirement of high-quality research. This demands rendering explicit a number of assumptions usually left implicit such as the ontological working assumptions possibly made in the project under consideration. This also demands strong attention to a distinction often overlooked in constructivist discourse because one particular term, *reality,* is used to refer to two notions which are considered as distinct in the teleological constructivist epistemological paradigm. These notions are, on the one hand, the world as possibly is, which is also called reality in the TCEP; and, on the other hand, human experience and representation of that world. Not distinguishing between these notions in constructivist research generates lots of confusion.

Another possible drawback stems from the constraint imposed by the framework of the sciences of the artificial on the aim of research projects, namely that of elaborating knowledge with a certain level of conceptual generality. This may be considered by some constructivist and interpretive scholars as being at odds with the goal of their research that is conducted without an explicit intention of generalization. Do, however, the contributions which are published out of such studies solely offer juxtaposed local interpretations? Doesn't conceptual generality, i.e. generic knowledge, emerge from the research process even when it is not an explicit goal (Charmaz 2006)? What has been presented above as potential drawbacks for constructivist research manifest, in fact, as further efforts required to render the research still more rigorous and its broader results even more explicit. Rather than imposing unnecessary constraints, it encourages research to be of yet higher quality.

Specifically subscribing to the framework of organizational design science generates a further constraint: the knowledge needs to be elaborated with the explicit intention of being useful for organizational design purposes. Certain constructivist scholars may consider this requirement as going against their humanistic values—although they cannot prevent the results of their studies being used at a later date by others for organizational design purposes, either directly or as ingredients of further design science research. Nevertheless, this further

constraint may limit the attractiveness of the organizational design science framework, and reveals the potential value of developing a conceptualization of organization science based on the wider framework of the sciences of the artificial, which does not require that knowledge be developed with the explicit aim of being useful for design purposes.

Conclusion

This article has highlighted that constructivist epistemology and organizational design science can beneficially be combined to constitute the beginnings of a constructivism-founded scientific paradigm for organization research. It has also addressed the issues of generation of scientific knowledge about organizations in this constructivist view of organizational design science, and of actual use of this knowledge. It has argued that grounded theory methods are a potentially fertile but not exclusive way of doing research in this paradigm. Indeed, any method can be used to generate and legitimize knowledge provided it is carried out with ethics, *ostinato rigore* and explicitness.

This paper has also pointed out that this constructivist view of organizational design science provides a framework enabling the legitimization of knowledge which is constructed in an explicitly ethical and rigorous manner within research projects that interactively involve researchers and practitioners. More fundamentally this framework permits researchers to overcome numerous long-lasting problematic dichotomies in conventional organization science (Tsoukas 2005; Jarzabkowski 2005) such as that between rigor and relevance, and that between generation and use of academic knowledge about organizations. The potential this framework offers for bypassing dichotomies comes from the founding assumption shared by constructivist epistemologies which postulates that the inquirer and the inquired into, while distinct, cannot be dissociated in the knowledge process. This founding assumption leads to a number of interactionist assumptions shared by constructivist scholars.

In addition, the recognition of the sciences of the artificial (Simon 1969) as a legitimate developing archetype of science permits overcoming the dualism between “sciences” and “applied sciences” that has been particularly denounced by Simon (1969), Beyer (1982), Schön (1983), and Le Moigne (1990, 2001). As underscored by Van Gigch (2002) and Van Aken (2004), this dualism leads to viewing organization science as an “applied science”, meaning that researchers in organization science are supposed to confine themselves to applying knowledge developed in other sciences that are considered as more fundamental. Overcoming this dualism can be achieved by conceiving of science not as a monolithic unity but as a *unitas multiplex* (Morin 1992), i.e. as a unity made of parts that are diverse and may interact without loosing their identity. In this view, the sciences of the artificial are considered as sciences neither less, nor more, fundamental than the sciences of nature. These two archetypes of sciences appear complementary since they study two different kinds of phenomena: phenomena perceived as natural, i.e. considered as independent of intentional human actions, in the sciences of nature; and artifacts, i.e. phenomena perceived to be influenced by human intentional actions, in the sciences of the artificial. Since artifacts are viewed as possibly embodying natural phenomena while being embedded in nature, these two types of sciences appear not only as complementary, but also as partners (Van Aken 2004).

Last but not least, just as non-Euclidean geometry includes Euclidean geometry as a special case (Bachelard 1934; Guba and Lincoln 1989) and modern physics includes Newtonian physics (Kuhn 1970), because of the agnostic character of the teleological constructivist epistemological paradigm and the status conferred to knowledge in this epistemological paradigm, knowledge elaborated in this constructivist view of organizational design science can incorporate knowledge developed in other epistemological paradigms, bestowing upon this knowledge the status of plausible hypothesis. If this constructivist view

of organizational design science becomes a widely recognized, alternative scientific paradigm for organization science, this paradigm's integrative capability will not make this recognition appear to be the outcome of a paradigm war. Rather, it will make it appear more positively and fruitfully as an interim output of a process of paradigmatic expansion that is fed by the very achievements and conceptualizations that this constructivist view of organizational design science enables.

References

Abolafia, Mitchell Y.
1996 *Making markets.* Harvard University Press.

Argyris, Chris
1993 *Knowledge for action*. San Francisco: Jossey Bass.

Astley, W. Graham
1985 'Administrative science as socially constructed truth'. *Administrative Science Quarterly* 30: 497-513.

Avenier, Marie-José
2009a 'A methodological framework for constructing generic knowledge' in *Turning to practice with action research*. O. Eikeland & B. Brogger (eds.), Frankfurt: Peter Lang publishers (forthcoming)

Avenier, Marie-José
2009b 'Genericization' in *Encyclopedia of Case Study Research*. A.J. Mills, G. Durepos, E. Wiebe, London: Sage (forthcoming).

Avenier, Marie-José and Laurence Gialdini,
2009 'A methodological framework for capturing practitioners' knowledge'. Paper presented at *EURAM 2009*, May, Liverpool.

Bachelard, Gaston
1934 *Le nouvel esprit scientifique*. Paris: PUF.

Balogun, Julia, Anne S. Huff, and Phyl. Johnson
2003 'Three responses to the methodological challenges of studying strategizing'. *Journal of Management Studies* 40/1: 197-224.

Bartunek, Jean M., and Meryl R. Louis
1996 *Insider/outsider team research*. London: Sage.

Berger, Peter L., and Thomas Luckmann
1966 *The social construction of reality: A treatise in the sociology of knowledge.* New York: Doubleday.

Beyer, Janice M., editor
1982 'Introduction'. *Administrative Science Quarterly* 27/4: 588-590.

Burrell, Gibson, and Gareth Morgan
1979 *Sociological paradigms and organizational analysis*. London: Heinemann.

Cannella, Albert A. Jr, and Ramona L. Paetzold
1994 'Pfeffer's barriers to the advance of organizational science: A rejoinder'. *Academy of Management Review* 19/2: 331-341.

Carlson, Greg N., and Francis J. Pelletier, editors
1995 *The generic book*. Chicago: UC Press.

Charmaz, Kathy
2003 'Grounded theory: Objectivist and constructivist methods' in *Collecting and interpreting qualitative materials*. N. K. Denzin and Y. S. Lincoln (eds), 249-291. Thousand Oaks: Sage.

Charmaz, Kathy
2006 *Constructing grounded theory*. London: Sage.

Chesley, J., and Wenger, M.
1999 'Transforming an organization: Using models to foster a strategic conversation. *California Management Review* 41/3: 54–73.

Cook, Scott, and John Seely Brown

1999 ‘Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing’. *Organization Science* 10/4: 381-400.

Denyer, David, and David Tranfield
2006 ‘Using qualitative research synthesis to build an actionable knowledge base’. *Management Decision* 44/2: 213-227.

Denyer, David, David Tranfield, and Joan Van Aken
2008 ‘Developing design propositions through research synthesis’. *Organization Studies* 29/3: 393-413.

Denzin, Norman K., and Yvonna S. Lincoln, editors
1998 *The landscape of qualitative research*. Thousand Oaks: Sage.

Dewey, John
1938 *Logic, The theory of inquiry*. New York: Henry Holt.

DiMaggio, Paul J. and Walter W. Powell
1983, ‘The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields’. *American Sociological Review,* 48/2: 147-160.

Eikeland, Olav
2006 ‘The validity of action research - Validity in action research’ in *Action and interactive research*. K. Aagaard Nielsen and L. Svensson, (eds.), 193-240. Maastricht: Shaker.

Einstein, Albert
1955 *The meaning of relativity.* Princeton: Princeton UP.

Geertz, Clifford
1983 *Local knowledge. Further essays in interpretive anthropology*. New York: Basic Books.

Gialdini, Laurence
2008 ‘Understanding the legitimacy building process in financial intermediation: Brokerage on the French stock exchange’, Paper presented at *The 24th EGOS PhD Workshop Pre-Colloquium,* Amsterdam.

Giddens, Anthony
1984 *The constitution of society: Outline of the theory of structuration*. Berkeley: UC Press.

Glaser, Barney G., and Anselm S. Strauss
1967 *The discovery of grounded theory*. London: Aldine.

Glasersfeld, Ernst von
1984 ‘An introduction to radical constructivism’ in *The invented reality: How do we know what we believe we know*. P. Watzlawick (ed.), 17-40. New York: Norton.

Glasersfeld, Ernst von
2001 ‘The radical constructivist view of science’. *Foundations of Science*, special issue on Impact of Radical Constructivism on Science, 6/1-3: 31-43.

Glasersfeld, Ernst von
2005 ‘Thirty years radical constructivism’. *Constructivist Foundations* 1/1: 9-12.

Grandori, Anna, and Santi Furnari
2008 ‘A chemistry of organization: Combinatory analysis and design’. *Organization Studies* 29/03: 459-485.

Guba, Egon G. and Yvonna S. Lincoln
1989 *Fourth generation evaluation*. London: Sage.

Guba, Egon G. and Yvonna S. Lincoln
1998 ‘Competing paradigms in qualitative research’, in *The landscape of qualitative research*. N. Denzin and Y. Lincoln (eds), 195-220. London: Sage.

Gulati, Ranjay

2007, 'Tent poles, tribalism, and boundary spanning: The rigor-relevance debate in management research'. *Academy of Management Journal* 50/4: 775–782.

Habermas, Jürgen
1975 *Legitimation crisis*. Boston: Beacon Press.

Hatchuel, Armand
2001 'The two pillars of new management research'. *British Journal of Management*, 12(SI): S33–S39.

JABS
2007 'Special issue on the integration of the perspectives of design sciences and organizational development'. *Journal of Applied Behavioral Science* 43/1: 8-170.

Jarzabkowski, Paula
2004 'Strategy as practice: Recursiveness, adaptation, and practices-in-use'. *Organization Studies 25*/4: 529–560.

Jarzabkowski, Paula
2005 *Strategy as practice: An activity-based approach*. London: Sage

Jarzabkowski, Paula, and Monica Giulietti
2007 'Strategic management as an applied science, but not as we (academics) know it.' Paper presented at The Third *Organization Studies* Summer Workshop, Crete, June 2007.

Jarzabkowski, Paula, and David C. Wilson
2006 'Actionable strategy knowledge: A practice perspective'. *European Management Journal 2*4/5: 348-367.

Jelinek, Mariann, A. Georges L. Romme, and Richard J. Boland
2008 'Introduction to the special issue organization studies as a science for design: Creating collaborative artifacts and research'. *Organization Studies* 29/03: 317-329.

Kieser, Alfred, and Lars Leiner
2009 'Why the rigour-relevance gap in management research is unbridgeable'. *Journal of Management Studies*, 46/3: 516-533.

Kuhn, Thomas
1970 *The structure of scientific revolutions*. 2nd ed. Chicago: UC Press.

Kwan, Kai-Man and Eric W. K. Tsang
2001 'Realism and constructivism in strategy research: A critical realist response to Mir and Watson'. *Strategic Management Journal* 22/12: 1163-1168.

Latour, Bruno and S. Woolgar
1989 *Laboratory life: The construction of scientific facts*. Princeton: PU Press.

Le Moigne, Jean-Louis
1990 'Epistémologies constructivistes et sciences de l'organisation', in *Epistémologie et Sciences de Gestion.* A.C. Martinet (ed), 81-140. Paris: Economica.

Le Moigne, Jean-Louis
1995 *Les épistémologies constructivistes*. 1st edn. 2007: 2nd edn. Paris: PUF.

Le Moigne, Jean-Louis
2001-2002 *Le constructivisme, Tomes 1-2*. Paris: L'Harmattan.

March, Salvatore T., and Veda C. Storey
2008 'Design science in the information systems discipline: An introduction to the Special Issue on design science research'. *MIS Quarterly* 32/4: 725-730.

Martinet, Alain-Charles, editor
1990 *Epistémologie et sciences de gestion*. Paris: Economica.

Maturana, Humberto

2000 ‘The nature of the laws of nature’. *Systems Research and Behavioral Science* 17: 459–468.

McKelvey, Bill
1997 ‘Quasi-natural organization science’. *Organization Science* 8/4: 352-380.

Miles, Matthew B. and A. Michael Huberman
1994 *Qualitative data analysis*, 2nd ed. London: Sage.

Mir, Raza, and Andrew Watson
2000 ‘Strategic management and the philosophy of science: The case for a constructivist epistemology’. *Strategic Management Journal* 21/9: 941-953.

MIS Quarterly
2008 ‘Special issue on design science research’. *MIS Quarterly* 32/4: 725-868.

Mohrman, Susan Albers
2007 ‘Having relevance and impact. The benefits of integrating the perspectives of design science and organizational development’. *Journal of Applied Behavioral Science* 43/1: 12-22.

Morin, Edgar
1992 *Method: Towards a study of humankind: the nature of nature (Vol. 1)*. New York: Peter Lang.

OS
2008 ‘Special issue on organization studies as a science for design’. *Organization Studies* 29/3: 317-485.

Pawson, Ray, and Nick Tilley
1997 *Reatistic evaluation*. London: Sage

Pfeffer, Jeffrey
1993 ‘Barriers to the advance of organizational science: Paradigm development as a dependent variable’. *Academy of Management Review* 18/4: 599-620.

Piaget, Jean
1967 *Logique et connaissance scientifique*. Paris: Gallimard.

Popper, Karl R.
1968 *Conjectures and refutation*. New York: Harper and Row.

Prasada, Sandeep
2000 ‘Acquiring generic knowledge’. *Trends in Cognitive Sciences* 4/2: 66-72.

Riegler, Alexander
2001 ‘Towards a radical constructivist understanding of science’. *Foundations of Science*, special issue on impact of radical constructivism on science, 6/1-3: 1-30.

Romme, A. Georges L.
2003 ‘Making a difference: Organization as design’. *Organization Science* 14/5: 558-573.

Romme, A. Georges L. and Inge C.M. Damen
2003 ‘Toward science-based design in organization development. *Journal of Applied Behavioral Science* 43/1: 108-121.

Schön, Donald A.
1983 *The reflective practitioner*. New York: Basic Books.

Scott, W. Richard
2001 *Institutions and organizations,* 2nd edn. London: Sage.

Schwartz-Shea, Peregrine
2006 ‘Judging quality. Evaluative criteria and epistemic communities’, in *Interpretation and method. Empirical research methods and the interpretive turn*. D. Yanow and P. Schwartz-Shea (eds), 89-113. London: Sharpe.

Simon, Herbert A.

1947 *Administrative behavior*. New York: The Free Press.

Simon, Herbert A.
1957 *Models of man*. New York: Wiley.

Simon, Herbert A.
1964 'On the concept of organizational goal'. *Administrative Science Quarterly* 9/1: 1-22.

Simon, Herbert A.
1969 *The sciences of the artificial*, 1st edn. 1981, 2nd edn. 1996, 3rd edn. Cambridge: MIT Press.

Simon, Herbert A.
1977a *The new science of management decision*. Englewood Cliffs: Prentice Hall.

Simon, Herbert A.
1977b *Models of discovery*. Boston: Reidel.

Simon, Herbert A.
1989 'Epistemology: formal and empirical', in *Acting and reflecting: The interdisciplinary turn in philosophy*. W. Sieg (ed), 127-128. Dordrecht: Kluwer.

Tenkasi, Ram V., Susan A. Mohrman, and Allan Mohrman, Jr.
2007 'Making knowledge contextually relevant: The challenge of connecting academic research with practice'. Paper presented at The Third *Organization Studies* Summer Workshop, Crete, June 2007.

Tranfield, David
2006 'Management as a design science mindful of art and surprise'. *Journal of Management Inquiry* 15/4: 413-424.

Tsoukas, Haridimos
2005 *Complex knowledge*. Oxford University Press.

Van Aken, Joan E.
2004 'Management research based on the paradigm of the design sciences: The quest for field-tested and grounded technological rules'. *Journal of Management Studies* 41/2: 219-246.

Van Aken, Joan E.
2005 'Management research as a design science: Articulating the research products of mode 2 knowledge production in management'. *British Journal of Management* 16: 19–36.

Van Aken, Joan E.
2007 'Design science and organization development interventions'. *Journal of Applied Behavioral Science* 43/1: 67-88.

Van de Ven, Andrew H. and Paul E. Johnson
2006 **'**Knowledge for theory and practice'. *Academy of Management Review* 31/4: 802–821.

Van Gigch, John P.
2002 'Comparing the epistemologies of scientific disciplines in two distinct domains: Modern physics versus social sciences'. *Systems Research and Behavioral Science* 19: 551-562.

Weick, Karl E.
1999 'Theory construction as disciplined reflexivity: Tradeoffs in the 90's'. *Academy of Management Review* 24/4: 797-806.

Weick, Karl and Karlene H. Roberts
1993 'Collective mind in organizations'. *Administrative Science Quarterly* 38: 357-381.

Wicks, Andrews C., and R. Edward Freeman,
1998 'Organization studies and the new pragmatism: Positivism, anti-positivism, and the search for ethics'. *Organization Science* 9/2: 123-140.

Whittington, Richard

2003 ‘The work of strategizing and organizing: For a practice perspective’. *Strategic Organization* 1/1: 119–127.

Yanow, Dvora.
2006 ‘Thinking interpretively: Philosophical presuppositions and the human sciences’ in *Interpretation and method. Empirical research methods and the interpretive turn*. D. Yanow and P. Schwartz-Shea (eds), 5-26. London: M.E. Sharpe Inc.

Appendix A: Generic Knowledge Developed in the Study of Strategizing in Financial Brokerage Companies by Gialdini (2008).

"In financial brokerage activities, legitimacy matters are at the core of strategizing.

Legitimacy is considered as a justification which evolves over time and context (Habermas 1975).

The existence of brokerage companies is conditioned by their reputation and their expertise. The legitimacy of brokerage companies is based on the sense that brokers and their clients give to brokerage companies and brokers' activity. Hence, the notion of legitimacy permits to link the three dimensions of strategizing.

With Jarzabkowski (2005), the strategy building process in brokerage is considered as integrating both the "*interactive strategizing/interpretative legitimacy"* pair and that of "*procedural strategizing/structural legitimacy"*. The first pair is built by different interactions that support change in strategy (Weick and Robert 1993). The second one is based on existing routines and controls which reinforce strategy already in place (Giddens 1984). The first has primacy when there is environmental stability, the second when there are environmental transformations." (Avenier and Gialdini 2009: 15)

Appendix B: Epistemic Work Performed in the Study of Strategizing in Financial Brokerage Companies by Gialdini (2008).

In an interview with Laurence Gialdini she recounted how the view expressed in Appendix1, of the central role played by legitimacy matters in strategizing in financial brokerage companies, emerged and was progressively justified through epistemic work. This view initially emerged from interactions with practitioners, was reinforced by interactions with scholars, and then theoretically grounded by going back to the literature.

The epistemic work that she performed can briefly be summarized as follows. A detailed study of practitioners' interviews suggested that the existence of brokerage companies is conditioned by several attributes such as their reputation, expertise, and power. Further close reading of all the interviews led Gialdini to perceive that the notion of legitimacy systematically underlay the notions that condition the existence of brokerage companies. Later, in the activation of Jarzabkowski's (2005) activity-based model in the financial field, it seemed that the notion of legitimacy permitted connecting the three aspects of Practice, practices and practitioners' role, through their mutual justification. Discussion of this view with other scholars reassured her about the relevance of this perspective for understanding strategizing in financial brokerage and incited her to go back to neo-institutional theory (DiMaggio and Powell 1983; Scott 2001) and to the literature about legitimacy, with particular focus on Habermas (1975). These readings reinforced her view of legitimacy in financial brokerage as a justification process which depends on time and context.

She refined the links between legitimacy, strategizing and processes by building upon Jarzabkowski's (2005) view of the strategy building process as integrating both the "*interactive strategizing/interpretative legitimacy"* pair and that of "*procedural strategizing/structural legitimacy"*. The first pair was connected to Weick and Roberts' (1993) study on change supported by interactions, and the second to Giddens' (1984) view that existing routines and controls reinforce the continuity of what is practiced. Finally, the statement that legitimacy matters are at the core of strategizing in financial brokerage activities was derived from the activation of Jarzabkowski's activity-based model in the case of financial brokerage combined with these other authors' complementary views.

Table 1: **Core Founding Assumptions of the Two Constructivist Epistemological Paradigms**

Nature of questioning	**Teleological Constructivist Epistemological Paradigm** (Glasersfeld 2001; Le Moigne 1995, 2001, 2002; Riegler 2001)	**Guba and Lincoln's Constructivist Epistemological Paradigm** (Guba and Lincoln 1989, 1998)
Ontological *What is there to be known?* *What is the nature of reality?*	The existence of an objective world populated by mind-independent entities is neither denied nor asserted. ***Phenomenology's basic assumption:*** Humans cannot rationally know such a thing as an independent, objective world that stands apart from their experience of it. Human experience is knowable. Because of the phenomenological assumption, no founding assumption on the nature of reality is made.	***Relativist ontology assumption:*** There exist multiple socially constructed realities not governed by any natural laws, causal or otherwise.
Epistemological *What can be known?* *What is the relationship of the knower to the known (or the knowable)?* *How can we be sure that we know what we believe we know?*	The inquirer cannot be separated from the inquired-into in the knowledge process. The elaboration of knowledge is portrayed as a process of intentional elaboration of symbolic constructions, called representations, based on experience. The notion of "truth" is meaningless because of the unfeasibility of determining if representations are similar, or not similar, to the world that has induced the experience. To know is not to possess true representations of reality, but to possess ways and means of acting and thinking that allow one to attain the goals one happens to have chosen. The role of knowledge construction shifts from constructing (supposedly) *true* representations to *functionally fitted* representations. The knowledge elaborated is context and goal-dependent. It may induce modifications in the prior knowledge that served to build it.	The inquirer cannot be separated from the inquired-into in the knowledge process. "Truth" is defined as the best informed and most sophisticated construction on which there is consensus. Theory is viewed as an act of generation, rather than the formalization of an underlying reality.
Methodological *What are the ways of elaborating knowledge?*	Any method, including hermeneutical dialectical methods, is eligible. Criteria: explicitness, rigor, ethics	Only hermeneutical dialectical methods of inquiry are eligible. Criteria: trustworthiness, authenticity, ethics

Table 2: **Main Beliefs Shared by Constructivist Scholars According to Mir and Watson (2000)**

Belief B1	Knowledge is theory driven: researchers approach a problematic situation with a preconceived notion about the nature of the problem. As long as researchers are transparent about their a priori theoretical position, the process of research is not impeded. Constructivists oppose a nomothetic approach which assumes that researchers are essentially discoverers of 'natural' phenomena and that adherence to systematic protocol and technique will eliminate all biases from the research process.
Belief B2	Even though the researcher and the phenomena under investigation are viewed as distinct, their separation is considered not feasible in the following sense: the philosophical positions held by researchers determine their findings. Organizational 'reality' (Astley 1985) and the truth that academic disciplines avow (Cannella and Paetzold 1994) are socially constructed.
Belief B3	Constructivists believe that theory and practice are fundamentally interlinked. Pre-theoretical praxis leads to the formalization of theory, which ultimately guides future praxis. Researchers are actors rather than mere information processors or reactors. They do not merely observe organizational structures and report their findings. They also play a role in the process determining which structures are more or less likely to be adopted.
Belief B4	Researchers cannot be objective or value-neutral. Constructivists subscribe to the view that theory is discursive and power-laden. They suggest that theories are transmitted across space and time through discursive practices. Institutions are the sites where discourses produce communities of agreement.
Belief B5	Research occurs within a community of scholarship where mutually held assumptions are deployed to create conversations. Latour and Woolgar (1989) show that "the construction of scientific facts, in particular, is a process of generating texts whose fate depends on their subsequent interpretation". (p. 273)
Belief B6	Constructivism has been conceptualized as a methodology, which is distinct from a method. A methodology may be regarded as an intricate set of ontological and epistemological assumptions that a researcher brings to his or her work. Researchers need to be explicit about their choice of methodology. A researcher who is anchored in constructivist methodology may employ a variety of methods including statistical analysis.

Table 3: **Examples of Associations between Scientific Archetypes and Epistemological Paradigms in the Academic Literature**

Explicit Scientific Archetypes / **Explicit Epistemological Paradigms**	**Sciences of Nature**	**Sciences of the Artificial**
Positivist and Critical Realist Epistemological Paradigms	**Conventional organization science** Quasi-natural organization science (McKelvey 1997)	**Design sciences** (Van Aken 2004, 2005; Denyer and Tranfield 2006; Denyer et al. 2008; Grandori and Furnari 2008)
Teleological Constructivist Epistemological Paradigm	Maturana's (2000) works in biology	**Sciences of design** (Le Moigne 2001, 2002; Van Gigch 2002)

****

Box 1: **Examples of Central Notions in Simon's Conceptualization of the Sciences of the Artificial**

"Symbol systems are almost the quintessential artifacts, for adaptivity to an environment is their whole *raison d'être.*" (Simon 1969: 22).

"Every problem-solving effort must begin with creating a representation for the problem—a problem space in which the search for the solution can take place. Of course, for most of the problems we encounter in our daily personal or professional lives, we simply retrieve from memory a representation that we have already stored and used on previous occasions. (…) Occasionally, however, we encounter a situation that doesn't seem to *fit* any of the problem spaces we have encountered before, even with some stretching and shaping. Then we are faced with a task of discovery that may be as formidable as finding a new natural law. Newton was able to discover the law of gravitation because he had previously found a new representation, differential calculus. More often, problems of representation arise that are mid-way in difficulty between simply adapting a known representation and inventing calculus." (Simon 1996: 108-109, italics added)