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RENEWING LITERATURE REVIEWS IN MIS RESEARCH?

A CRITICAL REALIST APPROACH

François-Xavier DE VAUJANY
DRM (UMR CNRS 7088)
Université Paris-Dauphine
devaujany@dauphine.fr

Nathalie MITEV
Management department
London School of Economics & Political
Science
n.n.mitev@lse.ac.uk

Matthew SMITH
International Development. Research Centre
msmith@idrc.ca

Isabelle WALSH
Rouen Business School
Isabelle.WALSH@neoma-bs.fr

Abstract: Literature Reviews (LR) are particularly useful for demonstrating the coherence and cumulateness (or lack thereof) of MIS research and for developing avenues for further research. Most top-tier journals now publish LRs, and many have even begun devoting specific sections to them. Our starting point is that LRs are not epistemologically neutral, and three approaches commonly underlie literature reviews: positivism (identifying the concepts, theories and models closest to the phenomenon that is being explained); interpretivism (identifying the various concepts and theories expressed by various actors and grouping them into multiple perspectives); and critical approaches (identifying both the underlying assumptions and conditions of the production of theories and their effects). We suggest a fourth approach to LRs underpinned by the philosophy of critical realism (CR) and argue that it can enable the (re)interpretation of existing literature through the identification of underlying generative mechanisms. These generative mechanisms provide a common denominator to enable the synthesis of concepts and theories in new ways, helping to bridge previously thought to be incompatible theories, and contributing to a more cumulative view of academic knowledge. We illustrate the value of a CR-based literature through its application to the topic of IT Strategic Value in the MIS and strategic management literature; we show how the identification of four generative mechanisms and three core agencies can support a more integrated view of IT Strategic Value. We then discuss the implications of the use of generative mechanisms and propose guidelines from a CR perspective for carrying out literature reviews.

Keywords: Literature review; Information Technology (IT); critical realism; strategic value; generative mechanism

RENEWING LITERATURE REVIEWS IN MIS RESEARCH?

A CRITICAL REALIST APPROACH

1. Introduction: A call for epistemological foundations of literature reviews in MIS research

Literature reviews are a growing part of MIS scientific activities, and remain invaluable to investigate and integrate a body of literature into one's research (Webster and Watson 2002). Indeed, most top-tier MIS journals now explicitly (through dedicated sections) or implicitly (as part of research papers) publish literature reviews, and editorial statements often provide extensive guidelines.

For the journal MISQ, the "Theory and Review" section thus *"aims to be the premier outlet for new theoretical insights that advance the study and practice of information systems design, development, management, use, and consequences"*. MISQ-TR is thus receptive to a wide range of philosophical foundations and disciplinary orientations, including perspectives that are constructively critical of established theory and practice. It publishes articles in a variety of formats, including research syntheses, theoretical essays and debates. A major emphasis is *"to support the development of theory that (1) addresses issues and concerns unique to IS theory and practice and (2) promotes further empirical research and practical developments."*¹. The context of this section was described by Webster and Watson (2002: xiii) in the following way: *"In the information systems (IS) field, we see few published review articles. As a result, the progress of our field is impeded. To address this concern, the MIS Quarterly launched MISQ-TR several years ago. The clear intention was to accelerate the*

¹ <http://www.misq.org/skin/frontend/default/misq/pdf/TheoryReview/>

accumulation of IS knowledge, A particular goal was to advance the state of theory within the IS field.” However, none of their criteria for the “ideal article” relate to the researchers’ epistemological stance.

In the context of the European Journal of Information Systems, Rowe has stated in a recent editorial (2012: 471) that “*literature reviews are useful when they provide some synthesis and a vision of part of the future in a knowledge universe where most objects are more and more atomistic. They are not so useful when they only rely on accounts based on already well-known categories and with little discussion of the results.*” Again, we see that LRs are expected to nurture the conceptual dynamics of the field.

Interestingly, other top-tier MIS journals (e.g. see ISR: Orlikowski and Iacono 2002 or JMIS: Alavi and Carlson 1992) publish literature reviews about specific streams of literature. Orlikowski and Iacono’s paper about the IT artefact epitomizes that kind of approach and has led to a fruitful return to the very underpinnings of the MIS discipline (see also its extensions with Akhlaghpour et al, 2013).

In spite of the aforementioned contributions and calls to expand, the MIS field still appears to be both diverse and heterogeneous (Benbasat and Weber 1996; de Vaujany 2009; Rowe 2012), and the issue of “native” MIS theories or concepts is often raised and discussed (Straub 2012). In contrast (and beyond the MIS field), Suchman’s (1995) work on institutional legitimacy in management and organization studies shows that LRs can be a helpful way to identify streams of research, or even typologies of research streams, and integrate literature.

In this paper, we offer a typology of literature reviews in MIS (selection, juxtaposition, deconstruction, partial integration) and suggest that a critical realist approach to LRs is a promising way not only toward the integration of MIS streams of research, but also to specify how we deal with IT and IT-related phenomena through a ‘multilayered’ vision. Accordingly,

we invite MIS researchers to demonstrate a heightened sense of reflexivity in the exercise of LRs via the development of a different “genre” i.e., a different way to develop and frame a scientific narrative (Rowe 2012), for instance a literature review.

MIS researchers have traditionally adopted three main stances while developing concepts and theories: positivism, to explain and predict; interpretivism, to make sense of; and a critical approach, to deconstruct key concepts or theories. These three strands of research stem from different philosophical approaches that have suffered at times from contentious relationships because they are often viewed as competing alternatives (Ashman and Baringer 2001). Here, it is suggested that the recent emergence of critical realism provides a possible fourth approach for the conduct of literature reviews. In particular, CR allows for the (re)interpretation of existing theories in terms of the generative mechanisms that are either explicit or implicit within them (Smith 2006).

We illustrate the value of a CR approach to LRs for the MIS literature through the investigation of the concept of IT Strategic Value. This allows us to adopt an integrated and dynamic conceptualization of IT Strategic Value. It helps us identify key principles linked to strategic value, and provides us with a useful way of integrating the large body of existing knowledge concerning IT Strategic Value that has accumulated over the last 30 years. Furthermore, we suggest that the same exercise could be repeated on other similarly important topics in IS research and yield valuable results in terms of deepening our understanding of the relationships between key concepts and theories.

The article proceeds as follows. First, we review key aspects of the CR perspective. We then detail the implications of this epistemological and ontological stance for literature reviews. We propose an integrated framework that provides guidance on how to conduct a literature

review in a critical realist stance. As an illustration, we then apply this framework toward a cumulative overview of the question of IT Strategic Value in the MIS research literature. Finally, we discuss the contributions and limitations of our work as well as avenues for further research.

2. Critical realism: key tenets

In this section, we review the key aspects of the CR perspective before discussing the implications that this epistemological and ontological stance may have on conducting a literature review.

2.1 Three layers and a central concept: generative mechanisms

The critical realist stance makes three main ontological assumptions (see Archer 1995; Danermark et al. 2002; Smith 2006; Mingers 2000, 2004a):

- (i) reality is stratified into “real”, “actual” and “empirical” layers;
- (ii) both social structure and individual agency exist and interact over time;
- (iii) the ebb and flow of reality is the result of causal generative mechanisms and their actualization.

The first ontological assumption is that reality is stratified into three layers (Bhaskar 1989): the real, the actual, and the empirical. The “real” layer consists of objects, their structures, and the causal generative mechanisms (GMs) that emerge from these structures (Kazi 2003). This layer includes the existing but non-actualized potentials that may or may not occur. The “actual” layer consists of the activities that occur, emerging from the actualization of GMs in

the real layer. The “empirical” layer is the set of actualized processes that are observed by people, and is thus only a limited portion of the actual layer.

Critically, the real and actual layers are considered to be distinct from one another: *“The crucial insight to take away from this ontological stratification is that structures and their generative mechanisms are ontologically decoupled from the events that they produce”* (Smith 2006 p. 201). As for the empirical layer, the inherent limitations of human capacity to understand the world have important implications for the nature of science. Bhaskar (1979, pp. 13-14) explains:

“Real structures exist independently of and are often out of phase with the actual patterns of events. Indeed it is only because of the latter that we need to perform experiments and only because of the former that we can make sense of our performances of them. Similarly it can be shown to be a condition of the intelligibility of perception that events occur independently of experiences. And experiences are often (epistemically speaking) ‘out of phase’ with events — e.g. when they are misidentified. It is partly because of this possibility that the scientist needs a scientific education or training.”

The second important ontological assumption is the acceptance of the existence of both social structure and agency, and the notion that they interact through time (Archer 1995; Mutch 2010). For critical realists, social structures exist and thus have emergent GMs. Critically, however, the causal powers of social structures work differently from those of individuals (Lewis 2000). Social structures do not initiate activity, but rather they constrain and enable individuals depending on their position in these social structures, and they essentially provide material and normative reasons for behaviors (Archer 1982, 1995). For instance, a firm with

an IS orients an individual towards particular behaviors through the existing set of rules and norms that are associated with the individuals' role in the firm, as well as the set of affordances that the technology offers.² For example, consider the potential for action or an individual's action that is rendered possible through a technological environment and through the individual's ability to perceive this possibility (Gibson 1986; see also Strong et al. 2009 or Leonardi 2011 and 2013 for an extension of this conceptualization). Of course, individuals still have a wide set of their own capacities that they bring to each situation, and it is the combination of these individual and social GMs at any one point in time that fully determines an individual's ability to act (Smith and Seward 2009). It is then through such activities that individuals (re)produce and potentially transform the social structures within which they are situated (Archer 1982, 1988, 1995, 2003; Bhaskar 1998).

Lastly, the third central ontological assumption is the notion of causality as a "generative mechanism" which is a core and defining feature of critical realism (Bhaskar 2002). Objects that exist in the world (both natural and social, which we will discuss shortly) are relational, meaning that they consist of a structure that is made up of a set of relations between their component parts. A set of causal powers emerges from this relational structure. For example, the technological affordances that exist are due to how the material structure of the technology is configured; these affordances are then actualized (or not) depending on individuals' actions.

GMs can best be understood as "tendencies" (Bhaskar 2002). In contrast with the Humean vision of causality ("A causes B"), a GM can be reformulated as "A generates B in context C" (Cartwright 2003; Smith 2010). In this way, causality is a process of how causal powers are

² This can also be defined relationally (Leonardi 2011).

actualized in particular contexts, in which the GMs of that context (C) shape (modulate, dampen, etc.) the particular outcomes in those contexts. For example, a particular technology such as a mobile phone (A) will only allow two people to communicate (B) if it is connected via a mobile network (with the infrastructure that such a network implies) and if a person dials the number of another person through the technology, shares a common frame of reference with him or her and so on (C). Another way of expressing this is to question whether a causal power is activated and produces any particular outcome as the result of both intrinsic (the internal structure) and extrinsic (the structures in the context) conditions.³

Critically, and in contrast to a Humean notion of causality, one implication is that the critical realist notion of causal powers must always be contextualized (Carlson 2001); context is part of any causal theory. This is a key understanding as generative mechanisms may actually exist in a context (a person might have a mobile phone), but might not be actualized due to the context (but she can't make a call because she is out of range) (Carlson 2001; Smith 2007). The fact that it is not actualized does not imply, however, that the generative mechanisms intrinsic to the mobile phone do not exist or that the 'theory' underlying cell phone technology is wrong.

In the MIS literature, the three major key tenets of CR have been used to reconsider the following important issues:

- The nature of MIS research and the way that it deals with its research object (see Mutch 1997; Brooke 2002; Dobson 2001a and b, 2002; Carlsson 2004; Mingers 2000, 2004a, 2004b). From a CR perspective, knowledge about IS and their organizational

³ According to Tsang and Kwan (1999, p 762), "*Whether a causal power is activated depends on two types of contingent conditions - namely, intrinsic and extrinsic. Intrinsic conditions are satisfied when there is no change in the nature of an object for consistent operation of mechanisms: a car with a burst tyre cannot move properly.*

dynamics can include reflections at all levels – the real, actual and empirical – not simply just one level. In addition, critical realists have often called into question IS research methods and their possible combinatory and complementary properties (see Mingers 2004);

- The technology-organization interaction (Mutch 2002, 2005, 2010, 2013; Smith 2005; Leonardi, 2013). A CR approach to the IT-organization relationship implies a relational approach in understanding their mutual transformation or reproduction (see Mutch 2010). It also enables one to identify the GMs that are at stake in these dynamics;

- IT adoption and IT implementation (Fox 2009; Min Khoo and Robey 2007), which can be described in an analytical and stratified way;

- Techniques and methods for evaluating IS (Carlsson 2002, 2003a, 2003b; Morton 2006). From a CR perspective, through retrodution (which we will explain later), explanatory research attempts to go as far as possible in uncovering what lies beneath the “real” layer;

- The way that information is conceptualized (Mutch 1999) at each of these different levels.

Whatever the focus, CR appears to be a different way to conceptualize and theorize. This is the issue we will explore in the next section.

Extrinsic conditions are those external to the object and yet affect the functioning of mechanisms: dynamite will not explode if not ignited. When activated, mechanisms produce events in conjunctures.”

2.2 Critical Realism as an epistemological stance: implications for the practice of reviewing literature in MIS research

Critical realism makes epistemological and ontological assumptions that carry significant implications for both integrating theories and for IS research. In contrast to positivism, interpretivism or other critical approaches (see Orlikowski and Iacono 2001; Hirschheim et al. 1995), the CR assumptions emphasize different approaches to reviewing the theories and concepts developed about a specific research issue.

Positivism, for example, is mainly driven by the search for an external ontology (Hirschheim et al. 1995). In their literature reviews, positivists are driven by a desire to select theories/concepts (or rather, variables), that are closely related to the phenomena being observed for explanatory purposes.

In contrast, an interpretive stance implies a juxtaposition of theories rather than a search for one that offers a “better” understanding than another. Interpretivist researchers aim to understand the way in which situations are experienced and perceived, as opposed to their own ontological dynamics (Walsham 1993). For example, Walsham (2005: 155), a major interpretivist researcher, holds that theories of human agency in MIS,

*“cannot or should not be ‘integrated’ if what is meant by this is bringing them together in one grand theory of agency. I think, however, that we can use different theories, including structuration theory and actor network theory, to illuminate different issues, and to theorize different elements of the overall research topic”.*⁴

⁴ He also adds (ibid: 155): “So, I am more in the ‘thousand flowers’ camp. However, in case this is taken to mean that I think ‘anything goes’ in the way of theory, I do not. Researchers must show how and why they think their

Of course, this does not imply a loss or lack of rigor: the resulting theories and concepts can be more or less coherent, and more or less relevant. Similarly, according to Dobson (2001a: 289), “*Walsham suggests that different theories provide different, but not necessarily better perspectives on the situation.*”⁵

Compared to positivism, critical perspectives and interpretivism share a sense of openness to the pluralism of theories and concepts to understand specific research issues. More implicitly, theories and concepts are worth deconstructing according to two key notions: What are their underlying, tacit hypotheses? How do they reflect and impact their socio-historical context (in particular, what values and domination structures are at stake)? However, critical researchers (particularly in Critical Management Studies) differ from interpretivists in that they are more interested in the process of deconstructing theories rather than the validity of such theories *per se* (see Alvesson and Willmott 1992 or Grey and Willmott 2005). Furthermore, this difference is also the root of a key point of divergence with critical realism.

A critical realist perspective aims at a partial integration of theories or concepts rather than their selection (as done by positivists), juxtaposition (as done by interpretivists) or deconstruction (as done by critical researchers). It does this through the (re)interpretation of theories based on CR ontological assumptions (Smith, 2010; Befani 2005; Fleetwood 2001), in particular the existence of generative mechanisms that stem from underlying structures and their causal powers (Smith 2006).

theory is relevant, and they must convince readers and reviewers that their theory adds something new. But an integrated theory of agency is not the way forward.”

⁵ Still according to Dobson (2001b) “*both Walsham, Garcia and Qiak, argue that a more coherent research process can be achieved through such philosophical reflection, yet can such reflection and identification improve the coherence of the research process? Under this view philosophical reflection is seen to be an*

Focusing on underlying structures and their generative mechanisms means that theories can be used to analyze different structures that may exist concurrently, interact, or even be complementary, rather than seeing theories as competing with each other. For example, the trust literature often contrasts the rational self-interested model versus the moral model to explain trusting behavior. However, these two models of trust can instead be thought of as potentially complementary structures (with generative mechanisms) rather than competing. “Different causal components that may lead to trustworthy behavior (‘it is in my interest to do so and I think it is the honorable thing to do’) and to trusting behavior (‘I think she will do it because it is in her interest and I think she is a virtuous person’).” (Smith 2010, 49). In other words, both trust models describe underlying structures in the human brain that exist to differing degrees in people. However, whether or not they can explain any particular situation is also a function of the strength of those structures and the contextual factors that shape which of the ‘models’ are active.

The four general approaches (positivist, interpretive, critical and critical realist) are summarized in the table below. We provide details with regards to their positioning in relation to academic knowledge. We also propose some implications of each approach for the conduct of a literature review.

Table 1. Four possible literature review approaches		
Epistemological stance	Purpose of a literature review	Questions aimed at being answered by a literature review
Positivism	Selection. The review must identify the frameworks and concepts that have the strongest explanatory power.	What is the most predictive or explanatory theory?
Interpretivism	Juxtaposition. All theories are interesting; they offer different perspectives on an issue.	What are the different theories and concepts? What differentiates them from

afterthought; reflection proceeds after the selection of method and is seen primarily to illuminate application rather than provide a means to guide the research process.”

		one another?
Critical	Deconstruction. The review needs to make the underlying assumptions and structures of domination explicit.	What is the socio-historical context of emergence for each theory and its impact?
Critical realism	Partial integration. The research needs to identify the generative mechanisms that are at stake in the various frameworks.	What are the key generative mechanisms emphasized by each theory? What is the contextual relevance of each theory?

Concretely, how does a CR stance lead to a different way to complete a LR? As discussed previously, the CR ontological assumptions can help to integrate the different existing theories and concepts in a field, something that is difficult if not impossible to achieve when adopting the other three stances. Thus, Rycroft et al (2012) emphasize the possibility of synthesis supported by a critical realist stance (see also Clark, Lissel and Davis (2008) for an illustration in the field of nursing research). Condensing a literature using a CR stance will mean identifying and articulating GMs at the core of each theorization present in the literature.

A work which could claim a CR stance in that sense is that of Wonseok and Pinsonneault (2007) about IT strategic values. These authors compare the resource-based and contingency-oriented frameworks in the appraisal of IT Strategic Value. Their results indicate that (p. 239): *“The resource-centered and contingency-based approaches provide complementary understandings of the strategic value of IT”*. They estimate that the *“contingency-based approach is better at explaining the impact of cost-related IT applications on firm performance. Alignment between business strategy and information systems strategy on cost reduction was found to have a significant negative association with firm expense”*. For the second theory, *“the resource-centered perspective has a stronger predictive ability of IT impact on firm revenue and profitability. Our results indicate that investments in growth-oriented applications were directly and positively related to firm revenue.”*

Essentially, this literature review contextualizes the potential of the two theories, and is coherent with the CR stance as described above. Nonetheless, it does not identify the GMs that are at stake in each situation, and neglects other theoretical streams, somehow perceived as incommensurable, that may be likely to explain strategic value further (developed in our six perspectives below).

In the next section, we will illustrate and detail a CR approach for a literature review of research on IT Strategic Value.

3. Illustrating the conduct of a CR literature review: the investigation of IT Strategic Value

Over the years, Information Systems (IS) research has thoroughly investigated the business value of IT in organizations. It has been, and remains, a key topic for the field (Ciborra 1997; Vessey et al. 2002; Desq et al. 2002; Bannister and Remenyi 2005; de Vaujany, 2009), and has generated a number of powerful insights about the definition and nature of IT Strategic Value in organizations (Carlson and McNurlin 1992; Ciborra 1997, 1999; Bannister and Remenyi 2005; McGarry 2006; Neirotti and Paolucci 2007; Wonseok and Pinsonneault 2007).

In the literature, the notion of “strategic value” is often replaced or combined with the concept of “competitive advantage”. While strategic value often remains grounded in a legitimate price (as opposed to the effective price) that an organization is able to extract from customers (Porter 1980), competitive advantage can be seen as a differential between this legitimate price and those prices imposed by an organization’s competitors; competitive advantage is the

“the difference between the economic value a firm is able to create and the economic value its rivals are able to create” (Barney and Hesterly 2006 p. 12).

Despite the long history of research on IT Strategic Value, theorization has remained siloed, making it difficult for researchers and practitioners to apply insights across different research streams. By bringing together research streams focusing on information (Porter and Millar 1985), IT (Henderson and Venkatraman 1993; Ciborra 1997), and business models (Osterwalder et al. 2009), we synthesize below a number of theories concerning IT Strategic Value found in the literature according to the critical realist concepts discussed above. In doing so, our aim is to illustrate how to identify and integrate the GMs that are implicit in these theories. We identify four key GMs (causal powers) in the literature that tend to produce strategic value: legitimating, processing /communicating, creating/innovating, and coordinating. We argue that each of these mechanisms is activated by three types of behaviors (agencies), which relate to the information system at hand: adoption, assimilation and appropriation. We then propose an IT Strategic Value theoretical framework which brings these mechanisms and agencies together.

3.1 Methodology

In light of the large quantity of literature concerning the subject, taking stock of every theoretical framework that deals directly or indirectly with IT Strategic Value is a difficult exercise. Accordingly, we will present an overview of the literature by classifying it into six theoretical perspectives that approach the subject with different complementary perspectives. The broad classification that we propose emerged longitudinally in a classic grounded theory approach (Glaser and Strauss 1967), and results from, and is grounded in one of the authors' fourteen years of teaching and research experience in the field of MIS and strategy (which

helped build his ‘theoretical sensitivity’). During these fourteen years, a number of the articles and books published by this author served as memos that were critical in tracking the emergence of various elements. Our data include these memos and texts related to IT Strategic Value, which were collected and read over this period of fourteen years. Data were coded and recoded a number of times, eventually using a CR lens which proved useful in building an integrated understanding of all theories used in this field. We describe this process below.

We first identified the different perspectives used in the literature, through repeated comparative analyses and using three descriptive criteria, which emerged as differentiating elements: the nature of strategic value, the source of strategic value, and the level of analysis. The memos were useful in identifying a number of references and seminal authors that we perceived as being illustrative and representative of the various theoretical perspectives (see Appendix C and the description below of the various perspectives).

Of course, this grounded approach could be perceived as highly subjective and heavily influenced by the first author’s theoretical sensitivity. Therefore, in order to improve reflexivity and verify the robustness of the typology that had emerged, the first two authors engaged in an extensive literature review via a set of queries on Google ScholarTM (see Appendix A⁶). This allowed us to both identify works that could be assessed objectively as seminal due to the number of times they are cited, and to verify if these works fitted within our proposed typology. These queries were guided by the authors’ knowledge of the field. Two-term queries (Queries 1 to 4) and three-term queries (Queries 5 and 6) were used. The queries and the number of references they yielded are detailed in Table 2. When two-term queries were used, we considered a reference to be seminal only if it appeared within the first

⁶ Data updated in April 2012.

three pages of Google Scholar results and had more than 1,000 citations. For three-term queries, we also retained results from the first three pages but with more than 500 citations, as we found that the three-term searches yielded less-cited references. All references retained are detailed in Appendix A. Some references came up in more than one query (see Appendix A), the most striking being Melville et al. (2004), which ranked high in four out of the six queries.

We were aware that most recent work would be difficult to collect using this method. However, as our purpose was not to be exhaustive but to validate the proposed typology of established perspectives of thought for work considered as being seminal, this issue was not deemed as critical.

Table 2. The queries that guided our confirmatory literature review

Query Number	Keywords used	Number of references yielded	References retained were cited
1	"Information technology"+"competitive advantage"	102,000	> 1000 times
2	"Information technology"+"economic performance"	36,200	> 1000 times
3	"Information technology"+"strategic value"	8,100	> 1000 times
4	"Information technology"+"productivity"	301,000	> 1000 times
5	"Information technology"+"value"+"improvisation"	16,700	> 500 times
6	"Information technology"+"value"+"institutional"	216,000	> 500 times

This process resulted in the selection of 34 seminal references and 47 seminal authors, mainly from the fields of MIS, strategic management, economics (micro-economics), and organization theory. After having independently identified these references, the first two authors then collected the full texts, which they investigated and coded separately (Appendix B). This double coding demonstrated a solid rate of congruence (90%). Beyond this rate, the fact that both coders (coming from different academic and research backgrounds) were able to

easily classify the same seminal texts within the proposed typology confirmed the robustness of our method.

After Phase 1, which is described above, we identified (Phase 2) the main or ‘core’ concepts (Glaser 1992), which from a CR perspective emerged as being ‘generative mechanisms’ i.e., those mechanisms that are studied in each theoretical perspective of our typology, and that may (or may not) create IT Strategic Value. The identification of the concept of generative mechanism marked a decisive step in our research: the specificities of each theoretical perspective were re-coded around this core concept and its properties and our data finally made sense as a whole. To effect this theoretical coding (Glaser, 1978), we used three criteria based on the CR layers and ontological assumptions presented earlier: the modality of value actualization, the identification of the realized value, and the nature and structure of human agency; these were investigated in relation to the generative mechanisms identified as relevant to each theoretical perspective found in the literature (see Appendix C for details of the theoretical coding). Finally, we coded selectively (Glaser, 1978) and proposed a meta model of IT Strategic Value, which is detailed in the next section (Phase 3).

The entire process described above is synthesized in Table 3. Our results are summarized below and further details are provided in Appendix C.

Table 3. Summary of our approach		
Phase 1: A typology of existing theoretical perspectives	Phase 2: Identification of the core concept-Generative Mechanisms (GM) and theoretical coding	Phase 3: Selective coding
Identification by the first author of the different theoretical perspectives, and their varying perspectives, via comparative analyses over a 14-year period. Emergence of six coherent	Identification of GM for each of the six theoretical perspectives. Modality of value actualization, identification of the realized value, and nature and structure	CR meta model of IT Strategic Value

theoretical streams. Verification of the emerging typology through search queries conducted using Google Scholar TM .	of human agency	
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3.2 Results

In this section we detail the results obtained during each of the three phases.

3.2.1 Phase 1- *The descriptive identification of the six theoretical perspectives*

The six perspectives that emerged from the literature, which are summarized below, should not be seen as definitive categories for IT Strategic Value research, but rather as existing general perspectives of thought that at times intersect (see Appendix C for an overview):

- i) The “econometric” perspective (where strategic value is equated with economic performance);
- ii) The “Porterian” perspective on IS (where strategic value appears as a question of adaptation to the industry or as the relevant combination of IS activities with other activities);
- iii) The “strategic alignment” perspective (where strategic value is above all a question of fit between IT and strategy);
- iv) The “value in practice” perspective (where strategic value is not a question of content or technology, but of the appropriation of content and technology);
- v) The “resource-based view” perspective (where strategic value is a question of the combination of resources);
- vi) The “institutional” perspective (where strategic value is a question of legitimate content or technology).

The econometric perspective (as represented in the debates about the IT productivity paradox) has a long history in both management and economics, and many authors have studied the mysterious lack of correlation between technology and economic performance (e.g., Loveman 1994; Stiroh 1998; Triplett 1999; Brynjoflsson and Hitt 2000; Willcocks and Lester 1999). These studies have aimed at understanding the causal relationships between technology and performance. They consider technology as an exogenous variable (that is the result of specific markets supplied by IT providers and manufacturers), whose causal power is likely to directly influence economic performance. Nonetheless, recent frameworks increasingly include the notions of implementation, parameter-setting, and even adaptation (e.g., Aral et al. 2006).

The Porterian perspective is heavily related to Michael Porter's first frameworks from the 1980s concerning strategic forces and value chain (see Porter 1980). In this case, technology is a variable that is positioned at a meso-economic level (that of the industry, including strategic groups and customers). As such, managers can either leverage strategic value by using technology in a way that influences strategic forces (for instance by reinforcing entry barriers) or by using IT so as to make the value chain more integrated and effective. Moreover, information collection and processing is a way to gain competitive advantage (McFarlan and Nolan 2003; Porter and Millar 1985). Interestingly, in this theoretical perspective there is no mention or consideration of organizational information systems; however, this shortcoming is overcome by the perspective that follows.

The strategic alignment perspective is extremely well-known in the MIS literature. It is epitomized in Scott-Morton (1991), Henderson and Venkatraman (1993)⁷, Venkatraman (1989, 1991), McDonald (1991), Luftman and Brier (1999) and Baets' (1992) frameworks,

⁷ Which appears as a highly cited reference in our queries.

which all espouse a contingency-theory⁸ view of the firm, with an objective external environment (see Wonseok and Pinsonneault, 2007). The basic idea here is that there should be a fit between business strategy, IT strategy, business infrastructure and IT infrastructure, and processes (see Appendix D). From this perspective, it is clear that technology and its value are not related to social action, i.e. actors, their interactions and interpretations are set aside (Ciborra 1997). As a whole, IT is positioned as an unambiguous object: its value is “out there”, and it is waiting to be *actualized* via the acceptance of end-users. The alignment perspective has thus a faithful partner, i.e. the approaches that are interested in IT acceptance and diffusion, such as the Technology Acceptance Model (Davis 1989; Davis et al.1989). Indeed roles are clear: on one side, some managers are expected to put value (freeze it) in IT at the design stage; on the other side, end-users are expected to assimilate IT and diffuse (defreeze it) value inside the organization.

The fourth perspective, the “value in practice” perspective, emphasizes IT enactment (Orlikowski 2000), drifts and improvisations (Ciborra 1997, 1999) through the notion of IT “use”. From this perspective, alignment does not necessarily result in performance (Ciborra 2000). Rather, local adaptations, bricolages, re-inventions, and “muddling through”⁹ are at the core of IT Strategic Value. The focus is on the perspective of stakeholders who are involved in IT valuation processes, and potential conflicts. IT Value (both operational and strategic) becomes a construct that is linked to unexpected outcomes of social actions.¹⁰ It is fragile, enacted and relative to a perspective. Sometimes, the various improvisations based on technology will be coherent, and will in effect result in a more efficient IT. At other times, they will not. In line with Wonseok and Pinsonneault (2007 p 232), it is tempting to relate this

⁸ See also Kearns and Lederer (2001), Sabherwal and Kirs (1994) or Chan et al. (1997) for an operationalization of this contingency perspective.

⁹ This can involve both designers and end-users.

stream of research to the so-called resource-based view, which assumes that resources “*confer a competitive advantage to a firm only when they are firm-specific, valuable, rare, inimitable, and non-substitutable.*”

The fifth perspective does draw on the resource-based view as proposed by (among others) Barney (1991). The main thesis defended by this theoretical perspective is that “*in order to create and sustain long-term competitive advantage, a firm should acquire IT resources bundles that are unique and not simultaneously implemented by competitors*” (Wonseok and Pinsonneault 2007 p 241). Strategic Value is also assumed to emerge from the combination of technical and non-technical resources (Powell and Dent-Micallef 1997; Melville et al. 2004; Wade and Hulland 2004).

Lastly, the institutional perspective proposes to extend the analysis to include the social context. An understanding of organizations and their culture, resources, and local practices is not sufficient to fully apprehend IT and its Strategic Value. It is instead necessary to make sense of the broader institutional and societal context (society, sectors, technology, professions, etc.). IT Strategic Value is also dependent on inter-organizational networks (Van de Ven 2005) and dominant discourses on technology (Swanson and Ramiller 1997). Media, professional societies and organizations, business perspectives, consulting firms, IT providers, etc. collectively produce “organizing visions”, i.e. focal ideas about the way that IT should be implemented and used (Swanson and Ramiller 1997, 2004). IT value is in this way related to the societal value of the objects it includes, and their “intrinsic” legitimacy.

¹⁰ This is coherent with structuration theory (Giddens 1984), which is often espoused by the promoters of this perspective.

3.2.2 Phase 2 - Generative mechanisms, their underlying structures and the activating agencies

When we re-examined the literature through the lens of CR, ‘generative mechanisms’ (GMs) emerged as the core concept around which each of the six theoretical perspectives could be summarized. We identified four **GMs**: legitimating, processing/communicating power, innovating, and coordinating, which are implicitly studied by authors within each of these six perspectives (see Appendix C). These GMs are *causal powers* that emerge from particular formations of the underlying **structures** (social beliefs, affordances, cognitive capacities, strategic alignment). The GMs are activated (and sometimes transformed) through three specific **agencies** (adoption, appropriation and assimilation) and ultimately produce strategic value (or not) (see Table 4).

As these three **agencies** are core IS phenomena and appear with different meanings in the literature, we redefine them first before delving further into the identified **GMs** and their underlying **structures**.

IT **adoption** by organizations is evoked by numerous theories, such as neo-institutionalist frameworks (Swanson and Ramiller 1997, 2004), IT stage-based models (Cooper and Zmud 1990) and the absorptive capacity model (Cohen and Levinthal 1990). In this article we define adoption at the organizational level as *the activities that consist in putting an artifact at the disposal of potential organizational users*. These activities chiefly include the act of purchasing IT, as well as the IT managerial practices of a group with a mandate for acting as such.

The concept of **assimilation** is heavily used not only in IS research, but also in the innovation and marketing fields. It is grounded in well-established theoretical frameworks, such as Roger's (1995) theory of innovation diffusion, and Davis' (1989) Technology Acceptance Model (TAM)¹¹ and its extensions, such as the Unified Theory of Technology Acceptance (as developed by Venkatesh et al. 2003). We define assimilation within an organizational context as *the activities that consist of accepting and regularly using a technological artifact within an organization*. This assimilation process can be more or less aligned with the use expected by IS designers, but it always implies cognitive control over the artifact.

The concept of **appropriation** is employed in various IS sociological frameworks. Structural approaches (such as the adaptive structuration theory of Desanctis and Poole 1994, or the structural model of Orlikowski 1992) and communication sociology (Proulx 2001) also draw on this concept in order to make sense of IT artifacts in organizations. We define appropriation within an organizational context as *the activities through which an organizational stakeholder makes an artifact useful for a given purpose*. Appropriation, which often involves bricolage (Ciborra 1997), results in the combination or re-combination of the resources at hand.

These three phenomena do not necessarily occur sequentially. It is tempting to assume that appropriation involves assimilation, which itself requires adoption. But an IT artifact or IS can be assimilated at the individual level without any adoption by the organization. For instance, by using a browser, an employee can download software directly from the web. He/she can also install software for private-use on her work laptop without any "official" agreement.

¹¹ See also Davis, Bagozzi and Warshaw (1989).

Conversely, certain types of software adopted by a specific dominant organizational stakeholder may never reach their expected end-users.

More interestingly, individual appropriation may occur without any organizational assimilation, or without organizational adoption. An artifact can also be made useful for a given purpose even without its physical presence. This can occur for instance at the earliest stages of an ERP implementation in which the technology is not present yet, but some stakeholders can use the idea of an ERP to scare other stakeholders. Appropriation does not automatically imply cognitive control over the artifact. From an analytical point of view, it is thus extremely important to distinguish between adoption, assimilation and appropriation, even if these phenomena are often superimposed “in practice”.

Having described the agencies, we now present the four **GMs** we have identified from reviewing the literature.

- **Legitimizing** emerges from social beliefs held by the people interacting with the technology. The IT artifact is expected to help people (organizational members) conform to social structures (i.e. roles and rules inside the organization). Technology itself can make the organization more or less legitimate in the eyes of its internal and external stakeholders.
- **Processing and communicating** are grounded in the affordance of the technology (Gibson 1986; Leonardi 2011): technology has a processing power (it can help organizational members to process and structure a large amount of data) and a communication power (it can help disseminate a large amount of data in and outside the organization).

- **Innovating** flows from the cognitive structures (i.e. cognitive capacities) of people improvising with technology. Based on their cognitive capacities users display a wide range of GMs that affect their behavior. What actors know about themselves or the world, their skills (technological or otherwise), and their interpretations of technology, inter alia, are activated and tend to determine the nature of IT use and appropriation. The actualization of innovation can be expected to strengthen the differentiation of an organization (Porter 1980).
- **Coordinating** emerges from the alignment of IT and strategy. It is a fit between the artifacts themselves as well as between the artifacts and the organizational strategy as carried out by organizational members. This degree of strategic adaptation, i.e. the alignment of IT and strategy corresponds to a GM which appears as highly critical for today's organizations: coordination. A better fit facilitates information sharing and, thus, coordination among people, and between people and artifacts.

Consequently, the **agencies** activate **GMs** and that gives rise to strategic value.

Adoption is activated (or not) by both **legitimizing and processing/communicating** powers, which are in turn grounded both in the social and material design of IT (see Hutchby 2001 and Leonardi 2011). The activation of both legitimating and processing/communicating power is likely to make the organization more adapted to its environment, in particular the competitive forces it has to contend with (Porter 1980).

Appropriation activates the **creating and innovating** powers of individuals and groups within the organization. Through the practice of combining or re-combining the resources at hand, the organization's cognitive capabilities are maintained and/or transformed. This sometimes results in beneficial drifts (Ciborra 1997) for the organization.

Lastly, through the **assimilation** of ITs, the potential **coordinating** power (incorporated into the very design of technology) tends to be activated. The more or less aligned ITs do not produce an effect in practice per se, but must be put into practice (through IT assimilation by organizational members) in order to leverage coordination, which will then positively impact economic performance.

Finally, we outline briefly the four underlying **structures**: cognitive capacities, social beliefs, affordance and strategic alignment. Cognitive capacities correspond to individual structures, social beliefs to social structures, affordances to technology structures, and strategic alignment to organizational structures. Conceptualized this way, we show how all of these **structures** (and the **GMs** that they are related to) can be co-active. Indeed, cognitive capacities, affordances, social beliefs and the degree of strategic alignment will always be part of the IT strategic value equation.

Having identified the four generative mechanisms at play, their underlying structures and the agencies which can activate them, we can now revisit the six theoretical perspectives we have identified in the literature:

- The **econometric, Porterian, and strategic alignment** perspectives rely on *assimilation* agency. Technology is more or less aligned or designed, and coordination is facilitated; then, depending upon how individuals assimilate it, its economic performance is impacted (or not);
- The **“value in practice”** perspective relies on actors’ innovativeness, which is activated through *appropriation* agency;

- The **institutional** perspective implies a legitimacy that is activated through *adoption* agency, and an organizational process that is more or less identified by internal and external stakeholders;
- The **resource-based view** implies both *adoption* (acquisition of resource) agency and *appropriation* agency (re-combination of resources) to activate processing and communication powers.

Using a CR perspective enables us to integrate the various approaches provided by each school of thought, thus allowing us to consider that strategic value reproduction and transformation involves assimilation, adoption and appropriation agencies.

Our critical realist analysis of existing theoretical perspectives is grounded in the **GMs** and helps us understand IT Strategic Value as related to:

- (i) **adoption** which is based on the social legitimacy and the affordance of the artifact itself;
- (ii) **assimilation** which is a way of putting “design values” into practice;
- (iii) **appropriation** in which the various emergent competencies and adaptations (improvisations or drifts) sometimes reinforce innovation and adaptive potential capacity.

The relationships between GMs, underlying structures and agencies and the resulting strategic actual value according to CR are summarized in Table 4.

Table 4. GMs, structures, agencies and the resulting actual value			
Generative mechanisms	Emerge from (structures)...	Are activated by...	Produce as strategic value...
Legitimizing (of the organization)	Social beliefs (social level)	Adoption agency	Higher legitimacy. Organization is more

			adapted to social needs.
Processing power / communicating power (through IT)	Affordances of IT (Technological level)	Adoption agency	Better understanding of internal and external environments, adapted communication.
Innovating (at the individual and organizational levels)	Cognitive capacities (individual level)	Appropriation agency	High capability for innovation and differentiation.
Coordinating (of individuals)	Strategic alignment (organizational level)	Assimilation agency	Higher systemic integration between strategy and organization (and higher economic performance).

The next section expands on this investigation of the literature using a CR perspective in order to propose an integrated CR theoretical framework that applies across existing theoretical perspectives about IT strategic value.

3.2.3 Phase 3 - A meta model of IT strategic value

In the previous section, we identified (at the real level) four GMs, three key IT-related agencies that are likely to activate them (or not) and four structures. We will now suggest a framework that integrates these aspects. In this model, the three IT-related agencies (adoption, assimilation and appropriation) drive the interaction between the individual and social structures that actualize IT Strategic Value. This value exists as a potentiality (to be actualized or not) in the real layer.

In our model, IT Strategic Value emerges from the processing/communicating and legitimating powers brought by the artifact itself, from the coordinating between IT and the various objects and people hosted by the organization, and from users' innovating. Strategic value thus relies both on intrinsic and extrinsic (contextual) mechanisms. The source of strategic value originates from a process of intra- and inter-organizational adoption, as well as from individual assimilation and/or appropriation. From this perspective, IT Strategic Value can exist as a potential value which is ultimately actualized and experienced (within and

outside the firm) at the organizational and individual levels. We see these structures and their GMs as co-active in organizations. This means that they can all occur at once and may interact in ways that dampen or reinforce each other. They may also occur in cumulative, embedded ways, e.g. assimilation and related value can rely on and result from adoption (but this is not always the case).

At the real level (see Figure 1), potential IT value includes material and social elements. Various technologies, along with their intrinsic affordances, that are seen as having a level of legitimacy are at the disposal of organizations on the IT market. Actors have a diverse range of cognitive capacities; for example, actors' level of innovativeness may be low or high, and organizational mindfulness may be more or less developed (Swanson and Ramiller 2004). The technology adopted may be more or less relevant depending on its location in the organizing vision cycle (Ramiller and Swanson 1997), and the fit between the socio-technical system features and its strategy and environment may be more or less adequate. All four GMs are included and constitute the potential for generating IT strategic value.

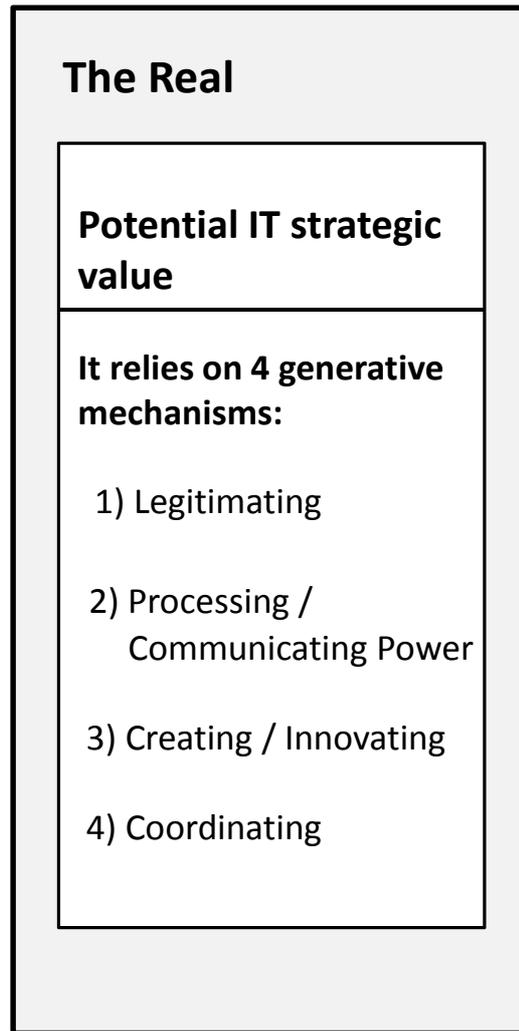


Figure 1. The Real domain and potential IT strategic value

At the actual level (see Figure 2), innovative IT can be *adopted* or not, the overall IT infrastructure can be more or less *assimilated* by end-users (Henderson and Venkatraman 1994)¹², and the technology can be more or less continuously *appropriated* by end-users and IT managers. Similarly, Figure 2 summarizes the relationships between GMs and agencies and how the agencies bring actual value.

¹² Contrary to Henderson and Venkatraman's vision, IT infrastructure, organizational infrastructure, corporate strategy and IT strategy are considered here to be enacted constructs. This interpretive stance (see Walsham 1993) also implies that these constructs may not make sense in some organizational settings.

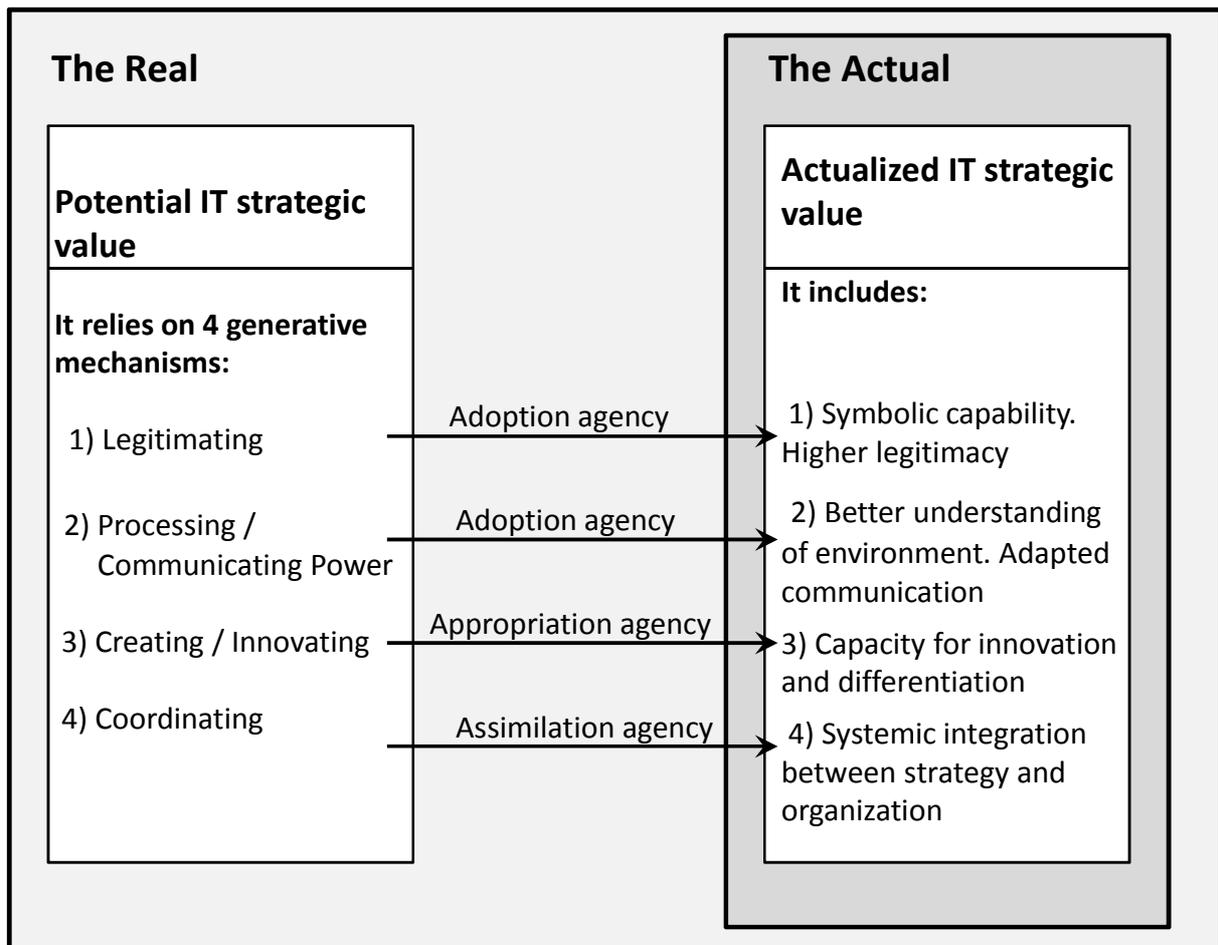


Figure 2. the Real to the Actual domain: the actualized IT strategic value

Lastly, at the empirical level (see Figure 3), events, which have been actualized through adoption, assimilation and appropriation activities, are experienced by individuals and collective actors. In a critical realist approach, Figure 3 illustrates the overall dynamics of the IT strategic valuation process as the result of diverse GMs. This figure borrows from Mingers' (2004, p. 94) illustration of the three embedded domains of the real.

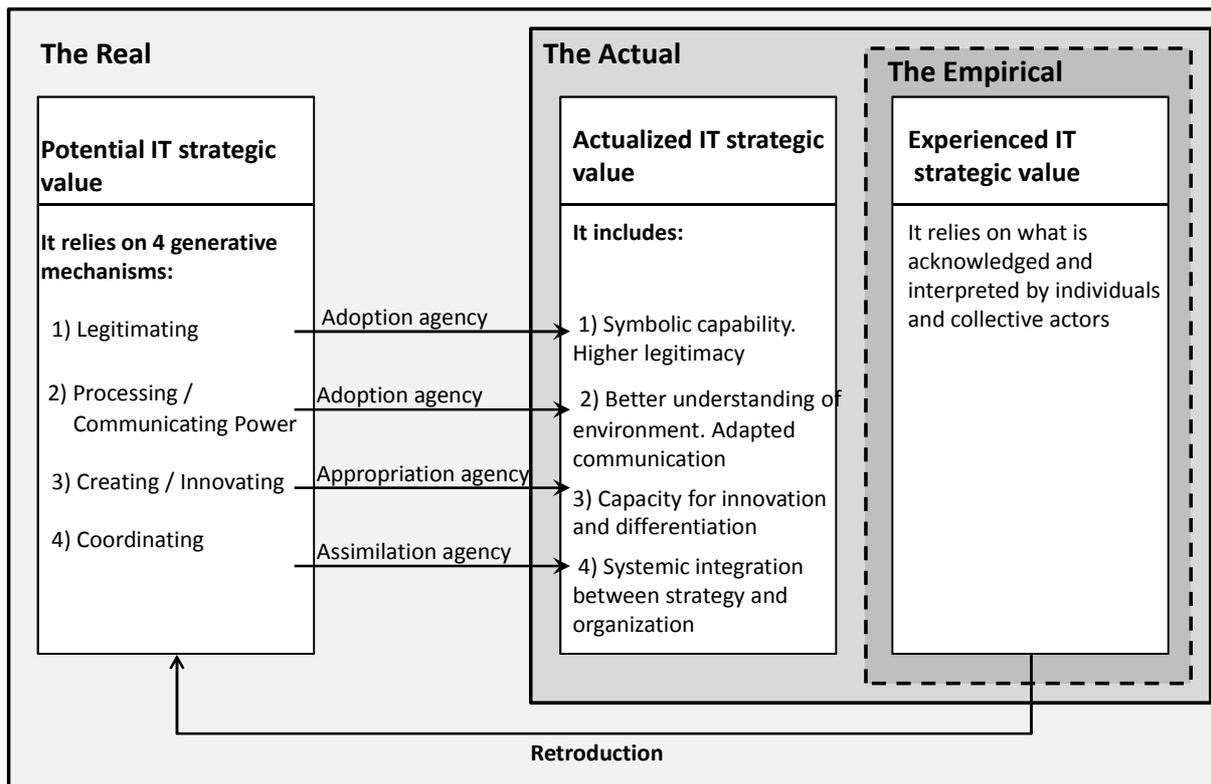


Figure 3. From potential to experienced value: the IT strategic valuation process

It is what is experienced in the empirical realm that allows people to posit the various GMs that produce these events via “retroduction” (i.e. “*positing mechanisms which, if they were to exist and act in the postulated manner, would account for phenomena singled out for explanation*”, Lawson 1998: 164, see also Mingers 2000), much like a police detective attempts to reconstruct a crime scene¹³. For instance, if in the empirical realm one verifies in a positivist stance the fit between a new IT and business needs, retroduction from objective elements such as cost control might only allow for the investigation of the alignment structure and the positing of the coordinating GM. This might induce the neglect of other important elements which should be taken into account in IT strategic value, for instance human agencies’ cognitive capacities and the corresponding creating/innovating causal power, which can also generate value.

The process that is summarized in Figure 3 moves from potential to experienced IT Strategic Value through actualized value. Moreover, Figure 3 summarizes the IT-valuation process. Through the adoption and the subsequent communication of a strategic choice aimed at legitimizing actors, the appropriation and accomplishment of innovativeness, and investment decisions that actualize mindfulness, potential value can be (or not be) experienced. The realization of potential value depends mainly on the “in practice” combination of legitimating, assimilative, and appropriative activities, as well as on their overall integration.

3.3 CONTRIBUTIONS LIMITATIONS AND FUTURE DIRECTIONS

In this section we discuss the limitations, implications and contributions of our work from two angles: for the literature on IT Strategic Value and more generally for the conduct of literature reviews in MIS.

3.3.1 Applying a CR approach to conduct a literature review

The starting point for this article is that literature reviews (as any other scientific exercise) are not epistemologically neutral. A researcher sticks consciously or unconsciously to an epistemological stance. This paper argues for the benefits of a critical realist vision of literature reviews, and provides a specific protocol to map a literature (mainly based on the identification of generative mechanisms).

Compared to positivist, interpretive or critical stances, we believe that a CR approach is conducive to synthesizing academic knowledge about a specific research issue, increasing its *cumulativeness*. In a situation where the heterogeneity and lack of coherence of the MIS

¹³ This is what we tried to do with our illustrative LR of strategic value.

literature is sometimes denounced, we see in this approach an interesting way to elaborate meta-theories and develop useful maps about the state of knowledge. As shown in our illustrative study (and in coherence with a CR stance), this is likely to include some concepts and theoretical frameworks which have been formalized from different theoretical perspectives. For the field of research which has been our focus here (IT strategic values), our CR literature review is therefore a way to answer the call made by Chan and Reich (2007) for a more integrated theorizing on IS strategic alignment and more generally, IT strategic analysis:

"It has been argued by many a reviewer that current alignment research is largely atheoretic. Because of its heavy reliance on the strategic management reference discipline and contingency theory (which some do not consider as a theory), it is not rich in the use of theories such as institutional theory, the resource-based view of the firm and stakeholder theory. Greater use of well-established theories in alignment research is needed" (Chan and Reich 2007: 311).

Nonetheless, we believe that a CR approach to an MIS literature review is probably likely to be more relevant for research which has emerged in the context of an 'institutionalized' research question. De Vaujany et al (2011) have identified this in the MIS literature as an 'enigma' or a paradox (e.g. the "productivity paradox") which can be theoretical, methodological or epistemological. It starts from a recurring and institutionalized research question and is characterized by an absence of consensus as to its solution therefore displaying an ongoing weakness in the literature. For solving an enigma, alternative theories or concepts can be proposed, thereby gathering a community in search of several alternatives which need to be compared, integrated, put into perspective etc. This is in contrast to research filling a gap in a well-defined model, solid framework or established literature (e.g. the TAM

model), for which there is no need to explore further alternative concepts in the literature. For the latter, our CR-based literature review principles are not necessary. For the former, the following guidelines may be useful for researchers attempting to explore and integrate concepts in the literature:

- Step 1 (data collection): Collect the literature covering an institutionalized research question. Make the LR as exhaustive as possible (which means beyond a limited selection of top-tier journals...). Imagine a set of requests likely to cover all aspects of the institutionalized question at the core of the study;
- Step 2 (identification of generative mechanisms): Identify the generative mechanisms at stake in the set of papers collected. What are the enduring shapes, properties, relations... which are described in the theories and theoretical frameworks?
- Step 3 (conceptualization of combinations, activations and a meta-model): Identify ways in which these GMs are activated and sometimes combined in the literature. Gradually, elaborate a multi-layered framework. To do this, keep in mind the three layers suggested by CR (real, actual and empirical).
- Step 4 (test): Of course, the resulting meta-model needs then to be tested (internal consistency, relevance) by means of various methods or combinations of methods (Mingers, 2001).

We will not discuss further the relationship between our suggested approach and a grounded analysis of a literature; but of course we are aware of the similarities between our guidelines and the open, axial, selective scaffolding proposed by Corbin and Strauss (1966).

3.3.2 A meta-model of IT Strategic Value

Through the literature we explored to illustrate our thesis, our analysis also contributes indirectly to the MIS literature itself. It results in a meta-model of IT strategic values and their managerial implications. The strategic valuation of IT is stratified from the real to the empirical. A potential value created and acknowledged/activated by a given stakeholder can be unacknowledged, disputed, leveraged and misinterpreted by another key stakeholder at the empirical level. Organizational capabilities are not necessarily experienced and reinforced through adoption, assimilation and appropriation agencies. With respect to the three identified layers of the IT valuation process, our research results in three key propositions about IT Strategic Value, its dynamics and management, which are congruent with the literature:

- (i) IT strategic value assessed at a given moment results from a multilayered process involving three layers: the real, the actual and the empirical; IT value is first potential in the real layer, it may then be actualized and only some portions of the actualized value are experienced in the empirical layer;
- (ii) The valuation process, which drives from the real to the empirical layers, is largely unpredictable (namely because of the unexpected outcomes of social action described both by Giddens 1984 and Archer 1995). A fully aligned IT, an innovatively appropriated technology or a legitimate technology, do not guarantee strategic value. Similarly, the (isolated or joint) activation of some generative mechanisms does not necessarily sustain strategic value. Organizations remain open systems in which many actualizations or non-actualizations are at stake and intersect in complex ways (Bhaskar 1979; Archer 1995)
- (iii) Consequently, a “potential” IT value is not automatically an “experienced” value, even though it may be actualized.

3.3 Limitations and avenues for further research

We used an open data base as a starting point for the proposed typology of theoretical perspectives related to IT Strategic Value that we verified further through Google ScholarTM. The same work based on ABI or EBSCO (which include more systematically top-tier journals) might have resulted in a slightly different typology of theoretical perspectives. However, we expect that it would not have fundamentally altered the resulting analysis.

Part of the process of IT strategic valuation we described in this work was grounded primarily in the first author's theoretical sensitivity (see Glaser and Strauss, 1967) which is of course idiosyncratic and has influenced the proposed meta-model; although we do believe that cross-coding and co-authoring have been a way to widen and validate further the coding and interpretation of the collected data.

In addition, we did not move to step 4 described in 3.3.1 and did not test the internal consistency and relevance of the meta-model offered (e.g. by means of a longitudinal case study).

Lastly, we did not enter into more epistemological debates about the incommensurability of the positivist, interpretivist and critical epistemological stances with CR (see for instance Danermark et al, 2002 or Ashman and Baringer, 2001). We believe that this was beyond the scope of this research.

Future research could test our meta-model and explore other areas of research in MIS with the same research protocol. We believe this could be interesting for our institutionalized research

questions, e.g. IT project failure or the relationship between material and social dimensions of IT in organizations. It would also be valuable to analyze further the specificities of a CR approach to academic knowledge compared to positivism, interpretivism or other critical approaches.

Our primary aim was to demonstrate the potential value of a critical realist perspective for the conduct of literature reviews in MIS research. By proposing a four steps approach, we illustrate how the CR vocabulary and its focus on generative mechanisms can be used for studying this important MIS topic and integrate theories across existing theoretical perspectives. We do hope to spark further interest in CR-based perspectives and their usefulness in mapping bodies of literature in a more holistic manner.

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Appendix A. Search queries (For each query, the order of appearance of the references on Google Scholar¹⁴ has been retained)

Summary	Query No.	Query details	References retained	Citations
Two-term queries: only references appearing in first three pages and with a minimum of 1000 citations were retained	1	"Information technology" + "competitive advantage" 102,000 references	Powell and Dent-Micallef 1997	1238
			Mata, Fuerst, and Barney 1995	1404
			Porter and Millar 1985	3697
			McFarlan 1984	1110
			Barney 1991	23831
			Melville, Kraemer and Gurbaxani 2004	1078
			Applegate and Austin 2007	1460
			Henderson and Venkatraman 1993	2115
			Bharadwaj 2000	1760
			Hall 1993	1256
	Oliver 1997	1299		
	2	"Information technology" + "economic performance" 36,200 references	Brynjolfsson and Hitt 2000	1755
			Melville, Kraemer and Gurbaxani 2004	1078
			Black and Lynch 2001	1022
			Jorgenson 2001	1102
			Bresnahan, Brynjolfsson and Hitt 1999	1997
			Henderson and Venkatraman 1993	2115
			Davenport 1993	4872
	Powell and Dent-Micallef 1997	1238		
	3	"Information technology" + "strategic value" 8,100 references	Teece 2003	1883
Shapiro 1999			6536	
Zack 1999			1347	
4	"Information technology"+"productivity"	Brynjolfsson 1993	1842	

¹⁴ Full list of references analyzed here are available upon request.

Three-term queries : only references appearing in first three pages and with a minimum of 500 citations were retained		301,000 references	Fitzimmons and Fitzsimmons 1999	1127
			Black 2001	1022
			Hitt and Brynjolfsson 1996	1122
			Melville, Kraemer and Gurbaxani 2004	1078
			Brynjolfsson 2000	1755
			Davenport 1993	4872
	5	"Information technology" + "value"+ "improvisation" 17,700 references	McDermott 1999	926
			Mukhopadhyay, Kekre and Kalathur 1995	751
			Tippins and Sohi 2003	576
			Orlikowski 2008	2025
	6	"Information technology"+"value"+"institutional" 216,000 references	Melville, Kraemer and Gurbaxani 2004	1078
			Fountain 2001	1102
			Sambamurthy, Bharadwaj and Grover 2003	826
			Orlikowski and Barley 2001	574
		Davenport 1993	4872	
		Tapscott 1996	1532	
		Taylor and Todd 1995	3086	
		Castells 2009	743	
		Castells 1991	3498	
		Tellis 1997	743	
		Teece 2003	1883	

Appendix B. Coding

References	1st coder	2nd coder	Score	Final coding (after discussion)
Applegate and Austin 2007	Alignment	Alignment	1	Alignment
Barney 1991	RBV	RBV	1	RBV
Bharadwaj 2000	RBV	RBV	1	RBV
Black and Lynch 2001	Econometric	Institutional	0	Econometric
Bresnahan, Brynjolfsson and Hitt 1999	Econometric	Econometric and strat.alignment	0.5	Econometric
Brynjolfsson and Hitt 2000	Econometric	Econometric	1	Econometric
Brynjolfsson 1993	Econometric	Econometric	1	Econometric
Castells 2009	Institutional	Institutional	1	Institutional
Castells 1991	Institutional	Institutional (from the title - no access to text in English)	1	Institutional
Davenport 1993	Porterian	Porterian	1	Societal
Fitzsimmons and Fitzsimmons 1999	Strategic alignment	Strategic alignment	1	Strategic Alignment
Fountain 2001	Institutional	Institutional	1	Institutional
Hall 1993	RBV	RBV	1	RBV
Henderson and Venkatraman 1993	Alignment	Alignment	1	Alignment
Hitt and Brynjolfsson 1996	Econometric	Econometric	1	Econometric
Jorgenson 2001	Econometric	Econometric	1	Econometric
Mata, Fuerst, and Barney 1995	RBV	RBV	1	RBV

Melville, Kraemer and Gurbaxani 2004	RBV	RBV	1	RBV
McDermott 1999	Practice	Practice	1	Practice
McFarlan 1984	Porteran	Porterian	1	Porterian
Mukhopadhyay, Kekre and Kalathur 1995	Econometric	Porterian	0	Porterian
Oliver 1997	Institutional	RBV and institutional	0.5	Institutional
Orlikowski 2008	Practice	Practice	1	Practice
Orlikowski 2001	Institutional	Institutional	1	Institutional
Porter and Millar 1985	Porterian	Porterian	1	Porterian
Powell and Dent-Micallef 1997	RBV	RBV	1	RBV
Sambamurthy, Bharadwaj and Grover 2003	RBV	RBV	1	RBV
Shapiro 1999	Institutional	Institutional	1	Institutional
Tapscott 1996	Institutional	Institutional	1	Institutional
Taylor and Todd 1995	Alignment	Econometric-alignment	0.5	Alignment
Teece 2003	Institutional	Institutional	1	Institutional
Tellis 1997	Practice	Practice	1	Practice
Tippins and Sohi 2003	RBV	RBV	1	RBV
Zack 1999	RBV	RBV	1	RBV

30,5/34

Rate of Agreement 90%

Appendix C. Overview of our literature review and our CR interpretation

Proposed typology	The literature				Critical realist interpretation			
Perspectives of thought	Illustrative references that emerged during the GT process and seminal references identified subsequently	Nature of strategic value	Source of strategic value	Level of analysis	Generative mechanisms investigated	Actualized through....	Realized value identified ...	Structure and human agency as they are considered
Econometric	Aral, Brynjolfsson and Wu (2006). Black and Lynch (2001), Bresnahan, Brynjolfsson and Hitt (1993), Brynjolfsson and Hitt (2000), Brynjolfsson (1993), Hitt and Brynjolfsson (1996), Jorgenson (2001), Loveman (1994), Mukopadhyay, Kekre and Kalathan (1995), Stiroh (1998), Triplett (1999), Willcocks and Lester (1999).	Exogenous (market). Value itself is not really at stake	Adoption of IT by top management and its economic effects. Two key foci: the choice of IT and the way it impacts economic performance.	Organizational	Processing / communication power (at the level of IT itself).	Adoption	As economic performance (e.g. higher processing power makes the firm more efficient)	Individuals are rational agents. Structures are mainly economic (e.g. industrial) structures

<p style="text-align: center;">Porterian</p>	<p>Davenport (1993), Mc Farlan (1984), Porter and Millar (1985)</p>	<p>Exogenous (sector of industry and its dynamics)</p>	<p>Assimilation of IT by the organization. Positioning of IS with respect to industry characteristic s.</p>	<p style="text-align: center;">Organizational and meso- economic</p>	<p>Coordinati on and legitimacy (e.g. with customers and suppliers)</p>	<p style="text-align: center;">Assimilation</p>	<p>Through its adaptation with the industry's competitive forces (firm is more legitimate) or as a constitutive element of the value chain (activities are better integrated)</p>	<p>Individual are rational agents. Structures are both meso- economic and organizational (e.g. with the value chain);</p>
<p style="text-align: center;">Strategic Alignment</p>	<p>Applegate and Austin (2007), Baets (1992), Fitzsimmons and Fitzsimmons (1999), Henderson and Venkatraman (1993), Luftman and Brier (1999), McDonald (1991), Taylor and Todd (1995) Venkatraman (1989, 1991).</p>	<p>Exogenous (external and internal environment, with low levels of restrictivenes s)</p>	<p>Design and assimilation. Structural and processual alignment</p>	<p style="text-align: center;">Both organizational and individual</p>	<p>Coordinati on</p>	<p style="text-align: center;">Assimilation</p>	<p>Better information sharing, better systemic integration</p>	<p>Individuals are rational agents. Structures are again both meso-economic and organizational. Organization is conceptualized as an infrastructure and a set of processes</p>

<p>Value As Practice</p>	<p>Ciborra (1997, 1999, 2000), McDermott (1993), Orlikowski (2000/2008¹⁵), Tellis (1997) Orlikowski (1999).</p>	<p>Both endogenous and exogenous.</p>	<p>Appropriation and more generally, practices (in particular improvisations), are the primary location of value</p>	<p>Individual and group</p>	<p>Innovativeness</p>	<p>Appropriation</p>	<p>New ways of thinking and doing. Differentiation.</p>	<p>Individuals are both cognitive and normative agents. Social structures (mainly organizational and based on rules and resources) are thoroughly investigated</p>
<p>Resource-Based View</p>	<p>Barney (1991), Barney (1995), Bharawadj (2000), Hall (1993), Mata, Fuest and Melville, Kraemer and Guarbaxani (2004), Powell and Dent-Micallef (1997), Sambamurthy, Bharawadj and Grover (2003), Tippins and Sohi (2003), Wade and Hulland (2004), Zack (1999)</p>	<p>Mainly endogenous</p>	<p>Appropriation. A relevant combination of technical and non-technical resources grants (through its complex combination, i.e. appropriation activities) economic performance. Imitability of strategic resources or combinations of strategic resources is the crux of the matter.</p>	<p>Organizational</p>	<p>Innovativeness and legitimacy</p>	<p>Appropriation</p>	<p>As shaped and re-shaped by a combination of resources. Differentiation.</p>	<p>Individuals are not really described. Structures are mainly organizational.</p>

¹⁵ Orlikowski (2000) appeared strangely as a 2008 reference on Springer's TM website.

Institutional Perspective	Castell (1991), Castell (2009), Orlikowski (2001), Shapiro (1999), Swanson and Ramiller (1997, 2004), Tapscott (1996), Teece (2003), Van de Ven (2005)	Mainly exogenous	Adoption. Institutional changes and/or sectorial transformations are the primary location of value	Meso social	Legitimacy	Adoption	If in conformity to established norms	Individuals are mainly normative agents. Structures are mainly organizational fields.
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Appendix D. Henderson and Venkatraman (1994) strategic alignment model

