ON THE CONCEPT OF EXNOVATION –

A Call for a Rebirth of the Concept, and for Exnovation Theory and Practice

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ABSTRACT

John Kimberly introduced the term "exnovation" in 1981, defining it essentially as the removal of an innovation from an organization in order to provide space for new innovation(s). Unfortunately, the term has not achieved prominent status in the management vocabulary. Other terms, such as elimination, termination, abandonment, disinvestment or unlearning are frequently used to describe essentially the same phasing out phenomenon. On the other hand, many authors who are using the term exnovation are referring to phenomena that differ from what Kimberly had in mind. There seems to be an urgent need for either abandoning the concept of exnovation, or give it a re-birth. The rate of innovation and change in society, and the need for transitions to more sustainable products and processes, suggest that a re-birth may be appropriate. In the present article we suggest a redefinition of the exnovation concept; we suggest sunk cost-theory as a default, rational-economic criterion for exnovation decisions; we further identify cognitive, emotional, and behavioral barriers to exnovtion, and we identify de-biasing approaches to exnovation decisions. We also suggest areas for further research and improved practice.

Keywords: Exnovation, exnovation process, innovation, innovation journey, barriers to exnovation, sunk cost fallacy, experiential attachment, de-biasing, organizational identity

INTRODUCTION

It is generally accepted that John R. Kimberly was the first to introduce the term exnovation. He defined exnovation as the removal of an innovation from an organization, and he argued in innovation-cyclical terms: exnovation takes place "when an organization divests itself of an innovation in which it had previously invested" (Kimberley, 1981, p. 91). In another early work, co-authored with Michael J. Evanisco, exnovation was defined as ".. a process whereby an organization decide to divest itself of an innovation that it had previously adopted" (Kimberley & Evanisko, 1981, p. 710).

John Kimberly's scholarly work has been the main inspiration for writing this article. It seemed to us that his writings provided an important combination of in-to (innovation) and out-from (exnovation) issues of change in organizations (cf. Kanter, Stein, & Jick, 1992, p. 503). As Kimberly (2014, p. 3) noted in a comment on empirical findings from the field of medicine: "If innovation has to do with getting something new successfully introduced, exnovation has to do with the other end of the process". In this "other end", old innovations often need to be discarded, in order for new programs, technologies, and products to be embraced. However, what needs to be discarded, is often not discarded. Kimberly (2014) calls this problem "the exnovation conundrum".

The "exnovation conundrum" is in focus in the present article. After a broad review of the literature we have come to the conclusion that "what needs to be discarded" – the exnovation content – in order to provide space for new innovations (i.e. what needs to be exnovated) may not always be limited to old innovations, but may also include whatever else needs to be removed or modified in order to provide space for the new innovation. Before providing the arguments for this expansion of exnovation content we shall review some of the notions of "phasing out phenomena" found in the relevant literature.

DEFINITIONS AND DELIMITATIONS

In semantics, onomasiology and semasiology represent different aspects of an analytic process aimed at establishing a clearer understanding of the relationship between objects, words/names, concepts, and meanings (Algeo, 1978; Baldinger, 1964, 1980; Geeraerts, 2002).

The *onomasiological* question asks about names and words that can be used homonymously to express an idea or describe an object, and about the process of ending up recommending one word over the others. As we shall see, there appears to be a great deal of confusion about the term exnovation.

The *semasiological* issue is about how one word (in our case exnovation) may give rise to many different meanings, and about the need to seek a unified understanding of the word. A main purpose of the present article is to suggest a definition and a framework for such a unified understanding.

The Onomasiological Issue

In the study of exnovation-type phenomena, most contributions start with the fact that very often something has to be removed before a new innovation can be adopted. The *onomasiological* question, then, is about the many names and words that can be used to express this idea, and how we come to end up recommending one word over the others.

In the case of exnovation, the relevant literature is ripe with alternative names used by different authors who describe essentially what Kimberly had in mind, without using the word exnovation.

Termination issues. First of all, there is a strong emphasis in relevant literature, that sooner or later an innovation needs to be somehow terminated. Zaltman, Duncan, and Holbek (1973) described the "rejection" or "discontinuing" of an innovation. Albert (1984) pointed out that the management of innovation should include "management of termination". Others have noticed the "fad" aspect of many managerial innovations and the need for "rejection" and "disappearance" of such innovations (Abrahamson, 1991), "collapse" or "elimination" (Abrahamson & Fairchild, 1999), "demise" or "cessation" (Carson, Lanier, Carson, & Guidry, 2000), "demoting and rejecting" (Abrahamson & Eisenman, 2008).

Peter Drucker was an early advocate of "total overhawl" of company rules and regulations (1985). Along the same lines, Brenneman reported on Continental Airlines' public burning of an 800 pages rule book and replacing it with an 80 page manual (1998). Richard Foster made a Wall Street Journal call for "junking the old" (1985) in order to make an effective transition from old to new technology. In the public sector Yin (1979, p. 180) referred to how a "displaced practice" would give room for improvisation and innovation, leading to new practices and routines, eventually ending up at a

"disappearance stage" – as a final stage of innovation. Clark and Staunton presented a modified version of Yin's model (1989, p. 207), where they replaced Yin's term "displaced practice (if relevant)" with the term "to be exnovated" as a precondition for innovation. Also, political scientists have written about the need for "organizational termination" and "policy dis-continuation" in the public field (Bardach, 1976; Daniels, 1995).

In the area of industrial management and strategy, Avlonitis (1983/1984, p. 46) wrote about the necessity of "product elimination" and "eliminating activities" in British engineering companies, and about the absence of procedures guiding the "product elimination process". In his dissertation on renewal in the automobile industry, Vekstein discarded the term exnovation in favor of "outnovation", seeing the divestment of problematic technologies and routines as a continuous process, not as a stage of an innovation cycle, and not limited to previous innovations (Vekstein, 1993). Abraham and Hayward applied the term "discontinuance" both to "the cessation of innovation production by a supplier and the termination of innovation usage by an adoptor" (1984, p. 209). Dranikoff, Koller and Schneider identified "divestiture" as a missing link in the business strategy field (2002), while Haynes, Thompson and Wright found that "voluntary divestment", leading to reduced diversification, had a positive impact on profitability (Haynes, Thompson, & Wright, 2002). On the other hand, Chakravarthy (1984) criticized the notion of "divesting "dog" businesses" according to portfolio planning and life cycle models in strategic management.

Alternative theory areas. While issues of "divestiture" and "divestment" are clearly linked to the concept of exnovation, they are not the same. However, lack of clarification makes it difficult to draw lines between the terms, and – perhaps more important – to build theories around what is decidedly a salient issue. The same hold for terms such as "unlearning" and "abandonment" – to which we shall return in more detail. Roman and Ash use the term "deadopting" about low-value care in hospitals (2014). Smeds et al refer to «vaccuum cleaning» and the need to sweep away "the dust of tradition" (1994). Several authors use the heftier term "cannibalization" and the need to "cannibalize" existing product lines and production systems (Chandy & Tellis, 1998; Conner, 1988; Kerin, Harvey, & Rothe,

1978; Landis, 2013; Merunka, 2010; Nijssen, Hillebrand, & Vermeulen, 2005) – given the chance that new products will be "chipping away at their existing market share" (Landis, 2013).

Far beyond what we have referenced her, authors deal with exnovation issues, or issues that are closely linked to exnovation problems, using a diverse vocabulary, where diversity of wording itself becomes a barrier to theoretical progress. Do we really need separate theories for dealing with issues of "vacuum-cleaning" as opposed to issues of "cannibalization", "divestiture" or "abandonment"? It seems to us that time is ripe for developing unified research approaches and an over-arching vocabulary.

The Semasiological Issue

The *semasiological* question starts with a word and asks what it means or what concepts the word refers to – why one meaning of the word should be preferred over alternatives. Our semasiological issue in relation to exnovation asks why some authors use the word exnovation when referring to phenomena quite dis-similar to what Kimberly had in mind.

Semasiological issues are typically settled by dictionary experts, often offering alternative interpretations, and often suggesting the most basic meaning. In the case of exnovation, none of the main international dictionaries even mention the concept. Also, Wikipedia for a long time was silent, and a recent entry offered a rather superficial definition and a faulty historical account. As of October 2018, the page was up-dated, and the following definition was offered: "Exnovation, the opposite of innovation, is where processes and practices that have been tested and confirmed are no longer effective or no longer fit with strategy and are therefore removed by organizations". Ford Motor Company and American Airlines are mentioned as "companies that have followed exnovation as a strategy to improve organizational performance", and the entry notes that the "term was coined in the year 1981 by John Kimberly", and that it has since then "proceeded to become a notable parlance in various practices, from management to medicine". This definition states that an exnovation is the "opposite" of innovation, but does not otherwise link exnovation to innovation, neither to phasing out a previous innovation, nor to making room for a new innovation. In this sense, the Wikipedia definition – while infinitely better than the former entry – is one among a variety of definitions floating around. A similar perception is offered by David (2018) in the online Oxford Handbook of Energy and Society, where exnovation is defined as

the opposite of innovation – in this case the divestment from fossil-fuel energy. We do not quite see why there is a need to talk about exnovation in cases where the main issue is plainly divestment. For us the overriding exnovation-issue is the need to create space for a new innovation.

More competition. Similarly to the case of onomasiology, semasiology involves a form of competition, where different meanings are competing for being a prime link to a concept, or for offering a prime understanding of a concept. When different authors use the concept exnovation, but evidently have quite different meanings in mind, what is the meaning that best exemplifies exnovation? Is it Kimberly's original definition, or is it rather some other kind of competing interpretation?

In a comment to Roman and Asch (2014) Kimberly writes about the "exnovation conundrum", and he characterizes Roman and Asch's examples of physicians' failure to stop old treatments, even when there is compelling evidence that the treatments do not work well, as an example of the conundrum – which he also sees as a universal phenomenon. Reasons for the intricate problem of exnovation are traced to a general problem of getting people to change. Habits and routines become ingrained, often at a subconscious level, leading to a "locked in" situation. The irony, for Kimberly, is that while innovation is becoming ever more of a catch word, causing what he calls a "pro-innovation bias", and while most scholars writing on the subject have "fallen into the trap of worshipping at innovation's altar" (2014, p. 2), innovation frequently fails at the implementation phase, because of lack of exnovation – because what needs to be removed, is not removed. The "pro-innovation bias" seems to go hand-in-hand with an "anti-exnovation bias".

An over-riding purpose. One of the ear-marks in Kimberly's original definition was that exnovation was specifically about removing earlier innovations, as a stage in an innovation cycle. It seems, however, that most authors who use the term exnovation essentially as meant by Kimberly, avoid his initial narrow linkage to a perceived innovation life cycle. In an article about the need for innovation in emerging markets (rather than just imitation of the West), exnovation was seen as a general "dumping of obsolete activities" (Khandwalla, 2006).

Further away from Kimberly's definition are applications that tend to make exnovation a special form of innovation, such as "a backward discovery" form of reversed engineering (Steenhuis & De Boer,

1998); or bringing to the surface qualities that are already present in the organization, but that tend to be overlooked by both managers and innovators (Mesman, 2008); or "innovation from within", where innovation is generated from regular practice by regular (non-inventor) practitioners (Hayes, Batalden, & Goldman, 2015; Ledema, 2015); or "innovation from the outside", based on ideas from customers or other outsiders to the organization (Geffroy, 2007).

Clearly, as noted earlier we are not only facing an onomasiological challenge, but also a semasiological challenge. Different meanings are competing for the right to be represented by the concept of exnovation. The semasiological solution seems to require a re-birth and an up-dating of Kimberly's original definition. We suggest that making space for new innovation(s) should be the over-riding purpose of all exnovation activities.

Failures to Break Through

Basic to all scientific progress, regardless of discipline, is a minimum of agreement about vocabulary. Such agreement may come as a result of an onomasiological "game" or "competition" among scientists, because coining a term or a variable plays an important part in theory-building and paradigm-making – and also in building scientific authority. Stinchcombe (2002) has suggested that theory development in the social sciences presupposes three mechanisms, commensuration, evangelization, and truth telling.

Commensuration. *Commensuration* implies a standardization of vocabulary. From what we have seen, there is today no such standardized vocabulary in the area of exnovation. The word is clearly linked to innovation, however. To innovate comes from the Latin, *innovare*, which (according to Webster's New World Dictionary) means to renew, from *in-* and *novare*, which means to alter or make new, from *novus*. The *ex* in exnovation, is from both Latin and Greek, where *ex* generally means "out", as also "out of", or "free of", or "taken out of".

Used as a prefix, *ex-* can mean several things (citing Webster), including "away from", "out of", pointing to the "taking out" of the whole or a part of an old innovation in order to take in a new innovation. In this sense, the word exnovation seem to be a good choice of a word.

Evangelization. The point of evangelization is to gain support for giving preference to one concept over another – be it for reasons of rhyme, *onomatopoeia* (phonetically imitating the source), shared roots, shared syllables, or whatever might gain support. Whatever the influences, proponents of a particular terminology will seek to influence others in the field, spreading their ideas, convictions and vocabulary, seeking to convert other researchers to their own views – by writing scholarly articles and books, lecturing, and making key-note speeches.

In the case of exnovation, there is clearly a semantic connection between the words innovation and exnovation, but for unknown reasons there has been little effort going on in support of the word.

Truth telling. Finally, academic institutions come up with institutional arrangements of research for the aim of adjudicating among theories, such as having peer reviews of journal articles and public defenses of doctoral dissertations. Given the lack of adequate vocabulary and very sparse evangelization, it is no surprise that there is little truth telling when it comes to exnovation.

In the case of exnovation, there in fact seems to have been failures at all three levels, or all three mechanisms suggested by Stinchcombe (2002). If there is no viable exnovation concept, students and researchers may not feel encouraged to contribute to theory development in corresponding problem areas. Neither will there be much hope for truth examination, unless there is some agreement about the concept itself and about the phenomenon denoted by the concept.

We have identified a multitude of terms that have been applied for the "phasing out" phenomenon in organizations. Some of these are specifically for the phasing out of former solutions and practices in order to make room for new innovations, which se see as the essence of exnovation. We have, however, also found it useful to expand on Kimberly's definition of exnovation as "divestment of previously adopted innovations", to the phasing out of whatever investment, arrangement and routine that has to be removed in order to provide space for the new innovation.

TOWARDS REBIRTH AND REDEFINITION

Kimberly's main concern was the need to phase out or discard former innovations that were blocking the adoption of new innovations. The overriding purpose of exnovation, then, is to make space for new innovations. In our view, however, his definition includes two limiting assumptions: 1) the

stuff to be removed or discarded is limited to a former innovation, and 2) exnovation can be seen as a more or less predetermined stage in an innovation cycle.

In the following sections, we shall first argue against these two limiting assumptions. We shall first briefly consider the exnovation content part of the definition (removing specific former innovation versus broadly making space), and thereafter the process stages element. We build on the assumption that the need for exnovation applies to all forms of innovation (managerial and other, as implicitly suggested in the later writing by Kimberly, 2014), and that the overriding purpose of exnovation is to create space for new innovations. This also means that there is a need for a redefinition. Without a re-definition, we see little hope for a rebirth.

Also, before introducing our set of innovation and exnovation definitions, we shall draw the main lines of demarcation between the concept of exnovation and two of the closest concepts - those of unlearning and abandonment. Among the (onomasiologically) competing terms, these are perhaps the most important challengers, both representing a rich and professional literature about "phasing out" or "letting go" phenomena. However, we are going to argue that in order to make space for new innovations, the unlearning concept is too broad, and requires an explicit narrowing towards an exnovation purpose, while abandonment is similarly too broad (abandoning for whatever purpose) but also too narrow, involving only removal of something (related to what we shall call "removal exnovations") and not modifications, reinterpretations, adaptations, and local changes (related to what we shall call "modification exnovations").

Beyond Former Innovations

Kimberly seemed to assume in his early writings that the concept of exnovation only should apply to the removal of specific former innovations - apparently, not to other barriers to implementation of new innovations. We may ask, however, whether this is a useful delimitation.

It may be argued that as long as the purpose of exnovation is to be the provision of space for a new innovation, exnovation may denote anything that needs to be changed or removed in order to create such space.

The content issue. In order to make space for a new innovation, not only former innovations, but also of artefacts, rule books, policies, principles, routines, strategies, mission statements, technological paradigms, administrative solutions, and associated cognitions and emotions, may need to be changed or removed.

There are also theoretical and practical reasons for freeing ourselves from only exnovating former innovations. Organizational knowledge comes in many forms, including documents, systems, procedures and human knowledge. This also applies to knowledge associated with former innovations. Former innovations may have spread and "disappeared" (Yin, 1979) into different parts of the organization in the form of practices and routines, and they may not always be easy to identify as former innovations.

Bundles of innovation. Furthermore, different "old" innovations may also be bundled together (Ax & Bjørnenak, 2005; Eisenberg et al., 1989), making it difficult to specify exactly which innovation is to be exnovated. Similarly, Potts (2010) emphasizes that "creating space for innovation is hard", because it may "..disconnect from past decisions and knowledge" (p.143). Except for "substitution innovations", where a new innovation specifically replaces a former one, this disconnection issue cannot be solved only by "letting go" of specific obsolete or detrimental innovations.

Removals or modifications. As applied here, the concept of exnovation contains both removals and modifications of whatever represent barriers to new innovations**.** Without using the word exnovation, Canato et al. (2013) demonstrated in their study of 3M, that adoption and implementation of a radical innovation ("Six Sigma") was not all about the full removal, or the full getting rid of ideas, practices and artifacts (here termed "removal exnovation") but also about reinterpretations, modifications, adaptations and local changes (here termed "modification exnovation"). This suggests a complexity requiring both a need to go beyond former innovations and a need to open up for varieties of exnovation work and varieties of exnovation processes.

Beyond Stages and Life Cycle Assumptions

Life cycle assumptions about innovations, as of many other social and natural phenomena, are relevant in the sense that innovation processes tend to have a beginning and an end, and something in

between such as adoption, implementation and routinization. This does not mean, however, that any type of innovation process can be seen as a smooth, linear, "stage gate" progression.

Similar to other organizational processes, traditionally assumed to be targeted, planned and linear, innovation processes - and in particular processes behind radical innovations - have been found to be interactive, dynamic and non-linear.

The process issue. Van de Ven et al. (1999) applied the notion of an "innovation journey", having compared longitudinal case histories on the development of fourteen innovations. The authors found that none of the innovations developed in a simple linear sequence of activities over time. "Instead, a much messier and more complex progression of events was observed in the development of each innovation" (p. 23). Van de Ven and his colleagues called this progression of events "the innovation journey". In parallel to this, we suggest thinking of exnovation in "journey" terms.

This shift of perspective parallels similar changes in the neighboring area of strategic management (Earle-Chaffe, 1985; Mintzberg, 1995) emphasizing emergence over planning - and it also reflects more generally a turn towards assumptions about complexity and complex adaptive systems (Stacey, 1995; Stacey, Griffin, & Shaw, 2000; Tushman, Newman, & Romanelli, 1986; Westerman, McFarlan, & Iansiti, 2006).

Exnovation complexity. Faced with the real-life complexities of innovation processes (Carlisle & McMillan, 2006), and with exception for minor incremental processes, we shall suggest a decoupling of exnovation processes from the assumption of a more or less linear innovation life cycle. In terms of complexity, it can even be argued that "the dynamics of exnovation are much more complex than the dynamics of adoption" - which may be a reason why "calls for theorizing and research in this area still remain unheaded" (Rosenkopf & Abrahamson, 1999, p. 380).

Adding to such complexity is the relationship between exnovation issues and issues of identity and emotions. This was demonstrated in the 3M case by Canato et al (2013). In addition to revealing the need for both elimination and modification, the authors also show the importance of "compatibility as an attribute" (Rogers, 2003). They noted that in the 3M case, those content elements of the innovation ("Six Sigma"), that were experienced as "incompatible with core values of the organization", were

eventually removed or modified - implying that a "translation" (Roevik, 2016) of the innovation was an important part of the innovation process.

During "translation" of the innovation in the innovation process, values and principles of the organization had to be changed (removed or modified) during the exnovation process, requiring a "mutual adaptation" activity (Leonard-Barton, 1988) between the innovation and the exnovation process, where content elements from both the innovation and the adoption unit (the organization) may need modification.

Before settling for a re-definition of exnovation, we shall briefly examine the two rivalling concepts of unlearning and abandonment. In many cases, unlearning and abandonment are at the heart of exnovation, and both genres of literature can be highly useful for exnovation research, but we shall argue that they are not the same, and that they cannot be substituted for the term exnovation.

Beyond Unlearning

Unlearning abound with definitions, and the concept has for a long time served as an umbrella concept for the "phasing out" phenomenon, whether such phasing out is due to inefficiency of prevailing practices or to a need to adapt to new contingencies, and whether we talk about "forgetting", "discarding", or "setting aside" obsolete knowledge or behavior. Therefore, in terms of purpose, unlearning is similar to, but not identical to exnovation.

While exnovation is about the phasing out of something in order to make room for innovation, unlearning is about the phasing out of knowledge, skills or behavior for a wide set of purposes, not necessarily linked to implementation of new innovations. In this sense, we may say that exnovation is a special case of unlearning.

Clarity of purpose. To be specific about purpose is important not only on definitional grounds, but also in practical terms since clarity about purpose motivates people through meaning, not fear - "allowing people to understand the immediate need for change rather than feeling alienated by change that is imposed upon them" (EY BeaconInstitute, 2015, p. 3).

Clarity of purpose is also an important factor in the drive for overall impact (Craig & Snook, 2014) – issues to which we shall return in the concluding parts of this paper

Unlearning and innovation. Research results in the area of unlearning may inform research and practice of exnovation. For instance, Mieres et al. (2012, p. 417) found that ".. the greater the level of organizational unlearning, the greater the intensity of innovation within the firm". Furthermore, Yang et al. (2014) distinguished between the "change" and "forgetting" dimensions of unlearning, and identified a positive effect upon radical innovation by change (where internal stakeholders were most strongly affected), and a negative effect upon radical innovation by forgetting (where also external stakeholders were affected, perceiving the implications of memory loss in the focal firm). These and other studies suggest that different "types" of unlearning (Coombs, Hislop, Holland, Bosley, & Manful, 2013) may vary with respect to providing space for innovation, and possibly "foster" and even "drive" innovation (Rebernik & Sirec, 2007).

Beyond Abandonment

Like unlearning, abandonment is closely linked to exnovation - similar, but not equal. We have already noted that, with respect to purpose, the concept of unlearning is too broad. The same seems to hold for the abandonment literature – though it is also in some sense too narrow.

While focusing mainly on how strategies come to be abandoned or phased out, and whether this is a result of an internal efficiency calculus or a tendency to "contagion" – following industry trends (Greve, 1995, 1998; Oliver, 1992; Younkin, 2016), abandonment may also apply to getting rid of organizational practices, existing products or services, and technology solutions in business (Eisenberg et al., 1989) or in the military (Rosen, 1988).

Causality at the forefront. Thus, the main focus in abandonment is on causal factors behind the abandonment of strategies and other practices, not on the specific purpose of making space for new innovations (although such considerations may sometimes be included in the abandonment decision).

In this sense, the abandonment literature is too broad, since a wide array of purposes may be behind the decision to abandon. At the same time the term is also too narrow, including only cases of elimination of existing practices – not modifications.

Elimination or modification. The main thing in abandonment is that something has to be removed (or completely eliminated). In the case of exnovation, however, we shall need to include more

broadly what it takes to make room for innovations, including cases where things need to be modified – not necessarily abandoned or eliminated (Canato et al., 2013).

We have seen that both unlearning and abandonment are closely linked to exnovation, and they provide rich sources of research inputs. But neither are the two terms identical (so that they cannot both be identical to exnovation, or make the term exnovation superfluous), nor do any of them fulfill the need for a concept of exnovation specifically targeted to purpose (make space for new innovations)

Defining Innovation and Exnovation

The concept, and the practice of innovation have received ever increasing interest in both business and public domains over the last fifty years. Innovation is at the heart of intellectual capital management, and intellectual capital is at the heart of modern value creation (Blackler, 1995; Grant, 2002; Kogut & Zander, 1992; Kogut & Zander, 1993).

Stockholder demands for growth and profit, and community demand for jobs, necessitate high levels of innovation and new product development, facilitated in many cases by customer inputs and open innovation (Chesbrough, 2003; Chesbrough & Appleyard, 2007; Chesbrough, Vanhaverbeke, & West, 2006; von Hippel, 1981, 1988) and increasingly by digitalized markets for inventions (Nambisan & Sawhney, 2008, 2009). For these reasons, and given that we perceive exnovation to be in many cases mandatory for innovation success, it seems natural to link our definition of exnovation to a definition of innovation. We shall do so through a three step process, first anchoring a definition of innovation, then adding a definition of an innovation process that is aligned with the definition of innovation, and finally adding definitions of both exnovation and the exnovation process, that are both aligned with the corresponding innovation definitions.

A definitional anchoring point. Given the popularity of innovation and innovation research (the "pro-innovation bias"), one might hope that researchers and practitioners would agree upon a shared definition of the word innovation. Unfortunately, that has not been the case. Dozens of definitions of the term innovation exist and are used side by side. In particular, there seems often to be a mix-up of the terms innovation and innovation process. While content involves "what" issues, process involves "how"

issues, suggesting ways in which innovation come about, while also accounting for the dynamics surrounding innovation development and implementation.

As an anchoring point, we shall go for a traditional content definition (Zaltman et al., 1973, p. 10), that states that an innovation is "any idea, practice, or material artifact perceived to be new by the relevant unit of adoption". This definition has the advantage of being well known, specific and practical. It is also robust, in the sense that most other definitions of innovation in the innovation literature, are at least compatible with it. As we shall see, it also lends itself to alignment with our definition of both innovation process, exnovation, and exnovation process.

Anchoring the process. Going from a content definition to a process definition, there is an abundance of studies of innovation processes, but not many attempts at coming up with a robust definition. There is also a considerable variety of characteristics of such processes, ranging from pre-planned, linear models to what Van de Ven & al. described in journey terms as a "much messier and more complex progression of events" (1999, p. 23). Also, while the progression of events may be messy, one might think that researchers at least would agree about what are the main stages of the process. But that is not quite the case.

At an early study, Myers and Marquis (1969) identified three steps in the innovation process: Idea development, problem-solving, and implementation. Van de Ven & al. (1999) identified initiation, development, and implementation or termination as common stages across different types of journeys. Bessant (2005) has suggested four stages of innovation processes: Searching (for signals, threats, and opportunities), selecting (among decision alternatives), implementing (by bringing selected alternative into use), and finally learning (from the progression of activities). Many more examples can be found from studies of specific areas of innovation. Early examples are Baker, Siegmann, and Rubenstein (1967), who identified stages of R&D processes, and Van de Ven and Koenig's (1976) study of innovation in social services.

It seems to us that a general definition of innovation processes needs to be sufficiently open with respect to the specific stages or steps taken, in order to account for both the general messiness of the process, for the huge variety of contexts, including recent digital innovation processes (Nylen, 2015;

Nylen & Homstrom, 2015) and for different types of innovation (such as radical versus incremental, modular versus architectural, and singular innovations versus innovation streams).

At bottom, and behind the messiness issue, there at least needs to be a clear understanding of the word process, and also in our opinion an alignment with the content definition of innovation. Bessant (2005) suggested that the innovation process "involves a series of linked activities" (p.35). In more elaborate terms, Pettigrew (1997, p. 338) defined the process as a "sequence of individual and collective events, actions, and activities unfolding over time in a context". Building from process characteristics and from our "anchoring" of an innovation content definition, we suggest that an innovation process can be defined as a sequence of linked events, actions and activities undertaken for the purpose of implementing and making use of any idea, practice, or material artifact perceived to be new by a relevant unit of adoption. Please see table 1 for an overview of definitions.

Parallel definitions. In parallel to the Zaltman et al. (1973) content definition of innovation, we will suggest that a content definition of exnovation is any idea, practice, or material artifact in the adoption unit that needs to be removed or modified in order to make room for new innovation(s). The words "removed or modified" reflect several considerations. First, as already mentioned, we do not see exnovation as the opposite of innovation, nor as a specific form of innovation. Neither do we see exnovation as necessarily a specific, closing stage of a former innovation. Our basic assumption is that in order to succeed with a new innovation, some "stuff" (ideas, practices, artifacts) may have to be removed or at least modified in order to make room for the new. This all add up to a high level of complexity of exnovation processes.

To summarize, we suggest that an exnovation process may be defined as a sequence of linked events, actions and activities undertaken in order to remove or modify ideas, practices, or material artifacts for the purpose of making room for new innovation(s).

Phenomenological definitions of innovation and exnovation. There are many different conceptualizations of the innovation phenomenon. A typical dictionary definition would be that innovation is about the introduction of something new - a new idea, a new method, process, tool, or device. When practitioners, entrepreneurs, politicians or social scientists refer to innovation, it is

frequently in such general terms. They talk about "levels of innovation" or about "need for innovation" - in the company, city, or country - or about innovation pressure, innovation intensity, new areas of innovation, or about innovations that have succeeded or failed.

Table 1: Three parallel definitions

Object / Definition types	Innovation	Exnovation
Content definition	An innovation is "any idea, practice, or material artefact perceived to be new by the relevant unit of adoption"*	An exnovation is any idea, practice, or material artifact in the adoption unit that needs to be removed or modified in order to make room for new innovation(s)
Process definition	An innovation process is a sequence of linked events, actions and activities undertaken for the purpose of implementing and making use of an idea, practice, or material artifact perceived to be new by a relevant unit of adoption**	An exnovation process is a sequence of linked events, actions and activities undertaken in order to remove or modify ideas, practices, or material artifacts for the purpose of making room for new innovation(s)
Phenomenological definition	Innovation means that something new appears and is put to use	Exnovation means that something is being removed or modified in order to allow space for new innovation(s)

* The content definition of innovation is a citation from Zaltman, G., Duncan, R. B., & Holbek, J. (1973). *Innovation in Organizations*. New York: John Wiley and Sons, p. 10.

** For the process definition of innovation we make reference to Pettigrew, A. (1997). What is a processual analysis? *Scandinavian Journal of Management, 13*(4), 337-348, and Bessant, J. (2005). Enabling Continuous and Discontinous Innovation: Learning from the Private Sector. *Public Money and Management, 25*(1), 35-42.

In science, "phenomenology is both a philosophy and a research approach" (Stierand & Dorfler, 2012, p. 947). Relevant to the content of this paper, innovation can be treated as a nebulous phenomenon and concept, but often with important implications for understanding and research. While phenomenological studies of innovation and exnovation is outside the scope of the present review, it is important to keep in mind that phenomenology has often been a central component in innovation and

(we suggest) exnovation processes - in opening and closing "new windows" (Menon, 2006). We shall therefore also include a phenomenological definition of both innovation and exnovation.

We believe that a more consistent use of vocabulary and definitions among academics may not only lead to theory development and systematic empirical research, but also to a more consistent language use among practitioners and professionals. We also believe that in order to succeed with innovation, exnovation is needed, and that the need for exnovation, and for new exnovation tools and instruments, are more likely to be acted upon when we have clear definitions and consistent use of terms.

It is now time to focus more directly on problem issues of exnovation. Overall, we see barriers to exnovation as parts of a greater organizational inertia issue, raising both macro-level structural issues (cf. Rumelt, 1995) and micro-level (cf. Felin, Foss, & Ployhart, 2015) cognitive and emotional bias issues. In the present paper, while not discarding structural aspect, we deal mainly with micro level issues. We shall first present an economical model of exnovation rationality and the issue of historical investments, before turning to cognitive biases and emotional influences that may impact exnovation decisions and practices. Finally, we shall suggest some areas for future discourse, research and practises related to exnovation.

OVERCOMING BARRIERS TO EXNOVATION

We have defined an exnovation as an idea, practice, or material artifact that needs to be removed or significantly modified in order to provide space for a new innovation, and we have defined an exnovation process as the process of removing or modifying ideas, practices, or material artefacts for the same purpose. We now need to consider why exnovation, so simple and logical in principle, sometimes turns out to be so challenging in practice.

We shall first consider an important principle for judging about the economic aspects of the exnovation decision, introducing the sunk cost criterion. From the "default" case of sunk cost economics, we shall turn to the cognitive and emotional reasons for biased decision-making and to ways of overcoming such biases. We shall also note that local experience and strong organizational identities may magnify the problems of biases and inertia.

The default case of economic rationality

When people base investment or divestment decisions on sunk cost considerations, they are said to be committing the "sunk cost fallacy". People commit this fallacy quite frequently due to a variety of human cognitive and emotional biases. The fallacy leads to what has been termed the "sunk cost effect", defined as "..the tendency to consider prior costs as facilitative of future commitments" (Leahy, 2000, p. 356). It is recognized that deciding against the sunk cost criterion and committing to the sunk cost fallacy may be major barriers to innovation (Pierce, 2002) as well as exnovation and abandonment. However, the decision to adopt an innovation, and to exnovate accordingly, is not just a rational economic choice. It is often a complex judgmental affair, involving ethical considerations, social and environmental concerns, experience attachments, and stakeholder issues.

Borrowing from the "resistance to change" literature, we are also reminded that an exnovation type of change process is not just about making a rational decision, but also about dealing with cognitions and cognitive biases, emotions and attachments, routines and behaviors; it is also about handling barriers to implementation rooted in path-dependent competence domains and institutional arrangements. These issues raise an important question: Is the sunk cost criterion a general criterion ("history does not count"), or is it a conditional criterion ("history matters under some conditions")? We will take a closer look at this question.

History does not count. Superimposed on the complexities of technical and managerial judgments is the rational, economic principle of sunk cost as a default model of exnovation economics. This classic economic principle or criterion applies to all cases of decision making, where some form of investment cost, made in the past, cannot be recovered or reversed. In general terms, this economic man ideal suggests that managers act rationally when deciding to exnovate any existing idea, practice, and artifact that stand in the way of introducing a new innovation. The principle says: "let decisions of the past go" - "disregard sunk costs" and bring only prospective costs and benefits into the equation.

A prospective cost is a future cost that will be incurred or altered depending on present decisions and future action. Even as the principle of sunk cost is generally quite clear and easy to comprehend, research in the behavioral sciences documents that the "sunk cost fallacy" of counting in former investments is indeed quite common - both in everyday life and in managerial work. A frequently used

example is that people who have bought a movie ticket, may feel they have to go and see the movie "since we already have bought the ticket", even if they would rather do something else that evening. A more high-level case would be that President George W. Bush in 2005 justified continued war in Iraq by claiming that the nation owed it to those who had given their lives in the war. At the managerial levels, "The Concorde fallacy" is about the continuation of investments in the Concorde aircraft project long after both French and British officials understood that the project would not be sustainable (Arkes & Ayton, 1999). The three examples demonstrate how tempting it is to commit the "sunk cost fallacy", and become involved in the irrational tendency to escalate commitment and willingly invest additional resources in areas of previous investments (Staw, 1976).

On the other hand, Mcaffe et al (2010) have suggested that the consideration of sunk costs may not always be a fallacy. In a broad range of situations, previous experience may present informational content, reputational benefits, loyalties and expertise that may make it rational to take sunk cost into consideration - contrary to the economic advice. Teams and organizations, investors and stakeholders may not be willing or able to mobilize for a new project if they already have worked hard for a project that is terminated. Does it mean that the principle of sunk cost is itself a fallacy?

We agree that such "moderating" elements of experience should be part of the exnovation decision, but only when they influence the evaluation of prospective costs and benefits. If loss of prestige or loyalty from scrapping a project, will make a new innovation investment less profitable, this belongs to the estimation of prospective costs and benefits. Such issues should be taken into consideration, not because of the investments or sacrifices that have been made in the past, but because they may subvert the prospect for new innovation success.

History counts. While the whole issue of market level path dependencies is still unsettled (Hirsch & Gillespie, 2012; Liebowitz & Margolis, 1990, 1995) and of little relevance to our topic, the organizational path dependency phenomenon has deservedly received increasing attention in the management and organization literature. Vergne and Durand (2010) have defined path dependence as "a property of a stochastic process which obtains under two conditions (contingency and self-reinforcement) and causes lock-in in the absence of exogenous shock" (p. 737).

While the market mechanism ensures efficiency by allowing for "exogenous shocks" and disruptions to occur, our interest here is in how such shocks and disruptions, as well as internal sources of innovation, produce exnovation challenges to firms more or less deeply entrenched in a path, even to the extent of being "locked-in". Internally, firms will benefit from periods of prolonged rationalization, competence building, network and cluster formation, and there will be self-reinforcing elements intensifying adherences to a path. But events that may cause creative destruction and efficient clearances at the market level, at the same time also create crises and exnovation urgencies in incumbent firms.

Thus, path dependence may become a trap - of greater interest to organization researchers than to economists. The sunk cost principle tells us that historical investments should not be part of the decision of what to do next. History does not matter! Only prospective costs and benefits should enter the calculus. Path dependence theory tells us that history matters. History has brought about specialized competence, taylor-made structures and infrastructures, employee loyalties, economies of scale, unique business connections, efficient routines and behaviors, and organizational identity. The potential sacrifice of such path-dependent values needs to be considered, and should influence decisions during the exnovation journey - not because of what they have meant in the past, but because they will impact the prospective costs and benefits of a new innovation. Such decisions are colored by cognitions and cognitive distortions, by emotions and attachments.

Cognition and Emotion

When studying barriers to exnovation, we are seeking to understand the anti-exnovation bias commonly found in organizations. This bias is important because it hampers the introduction of new innovation, and may ultimately be a major source of firm heterogeneity and competitive disadvantage - especially in the cases of radical innovations in incumbent firms. Similar biases in decision-making are often mainly studied within a cognitive framework. We strongly believe, however, that emotional perspectives need to be added in order to gain a more robust perspective.

Similar bias-issues are also raised in the unlearning and abandonment literature, where cognitive perspectives traditionally have been dominating. In particular, an increasing number of abandonment studies are now reminding us to pay attention to emotional barriers to innovation - even to the point of

considering abandonment as a "death" event, suggesting transition rituals and "funerals" as a solution (Albert, 1984; Sutton, 1987).

We shall start with cognitive deviations. Cognitive biases may enter into the exnovation decisions in several forms, that may all add to our understanding of why managers fail to exnovate or why they end up with ineffective exnovation efforts.

Cognitive biases and distortions. In our dealings with exnovation type phenomena, we expect most managers to use common sense, and some managers to use more sophisticated, formal analyses. Common sense is a distinctly human capacity, and is based on our everyday cognitive ability to understand situations ("read" people and situations), and respond sensibly to problems and challenges (Watts, 2011). However, even when not influenced by provocative emotions, people tend to limit their search for relevant information (Simon, 1947). Executives may be trapped by faulty "pattern recognition" and "emotional tags" (Campbell, Whitehead, & Finkelstein, 2009). And we may all distort facts, get the statistics wrong, do superficial judgments, and make biased decisions (Fine, 2006; Kida, 2006; Plous, 1993; Tversky & Kahneman, 1974, 1981, 1986). People claim to base their decisions on experience, even when they have very little relevant experience, and we often make decisions based on very scant information.

More specifically, the psychology of "framing effects" can explain why managers may experience "loss aversion" when exnovating old practices and material artefacts. We tend to see a possible loss as more significant than an equivalent gain, and we tend to prefer a certain gain ("the certainty effect") over a probabilistic gain (Druckman, 2001; Plous, 1993; Tversky & Kahneman, 1981). We also tend to frame positively, and overestimate, the benefits of existing assets – which may be bad news for exnovation. In particular, such biases may be more serious for people with a personal responsibility for the former solution, who generally may exert more willingness to continue investing in the present (old) solution (Staw & Fox, 1977) - indicating a sunk cost fallacy as a result of personal responsibility, and resulting in an "escalation of commitment" at work (Whyte, 1986).

Blindness to bias. A particular problem with cognitive distortions and biases, is that we tend to be blind to our own biases: We are too blind to see our own blindness (Kahneman, 2011). Strong

conviction often built up gradually, with increasing commitment over time, reinforced by publicly stating one's convicitons and by the prestige stemming from successes associated with those convictions. When our convictions are challenged by new information, there will be a tendency for cognitive dissonance (Festinger, 1957; Festinger, Riecken, & Schachter, 1956; Knox & Inkster, 1968). A particular "trap" in cognitive dissonance is the "fallacy of centrality" (Westrun, 1993). Managers and experts who believe they are in the middle of things, where the level of expertise is highest, tend to have more problems giving up their convictions, and they are more prone to reject contradictory information.

There will also be "confirmation biases" (Kida, 2006; Nickerson, 1998; Plous, 1993). We tend to search for information that confirm our own convictions, and we tend to interpret new information and recall old information in ways that are consistent with previous convictions – a tendency that even seems to hold for scientific work (Koehler, 1993; Maccoun, 1998; Mahoney, 1977).

Cognitions and emotions combined. We suggest that emotional responses play a significant part in exnovation decisions and that emotions are particularly essential in understanding identity and attachment issues. While we here deal with both cognitive and emotional issues, this does not mean that we accept the traditional mind-body, cognition-emotion dualism. Brain research and advances in neuroscience has given ample proof that "pure thinking" – separated from emotional impulses – is illusory (Camerer, Loewenstein, & Prelec, 2005; Damasio, 1994). Whether we deal with everyday problem-solving or pure mathematics, bodily anchored emotions will be present and add sensations about being on the right track, or about failing, getting frustrated or satisfied. All our examples of cognitive biases hinge on emotional influences that are inherent to the way the human brain works.

Our concern is with the common tendency for management researchers to neglect the emotional aspects. In their treatise of change in organizations, the Heath brothers, Chips and Dan (2010) portrays the relationship between cognitions and emotions in management as a relationship between an elephant and driver un top of the elephant. The elephant goes where he likes to go – steered by emotions. The driver – guided by rational thinking – may know where he wants to take the elephant, but that is not enough. He needs to find ways to motivate and let the elephant "be moved" to go. Here the issue is not

to teach an elephant organization how to tap-dance, but to appeal to the emotion-elephants in individuals and groups in the organization.

Parallel systems of processing. Beyond the mere distinction between cognition and emotion, modern neuroscience also points to two parallel systems of cognitive processing. The reflexive system – linked to "Type 1" decisions (Larrick, 2004) – is to a great extent automatic and implicit, anchored in the limbic parts of brain evolution, tied to emotion, motivation and behavior, and strongly influenced by senses and memories. It can also be extremely fast. The reflective system – linked to "Type 2" decisions, on the other hand, is to a much greater extent deliberate and controlled, anchored in evolutionary late-comer parts of the brain, and being supportive of higher forms of cognition such as logical reasoning and planning (Lieberman, Gaunt, Gilbert, & Trope, 2002; Satpute & Lieberman, 2006). It can also be exceedingly slow.

While the "hot" reflexive system is much more affect-bound than the "cold" reflective system, both systems in fact build on both cognition and emotion. One cannot turn off the emotional part of thinking, even when engaging in reflection. Accordingly, it is important to understand the role of each part in managerial judgment and decision-making.

Calls for greater effort. There is a tendency to think of "cold" cognition as basic to rational decision-making and behavior, and to think of biased thinking as a result of "warm" or "soft" emotional impacts. According to Hodgkinson and Healey (2014) there is also a paradigmatic tendency, in the footsteps of Simon (1947) and Kahneman and Tversky (1979), to respond to managerial challenges (as when the elephant doesn't move) with calls for harder thinking – more "effortful processing of information" that "jolts decision makers into conscious reflection, thereby forcing them to revise their beliefs" (Hodgkinson & Healey, 2014, p. 1307). While this may work in some cases, it doesn't necessarily solve the general problem of adapting to the requirements of radical innovations.

If more effortful thinking, and the call to management and organization members for thinking harder, does not work: What does? Hodgkinson and Healey (2014) suggest that both scholars and practitioners need to make a paradigmatic shift and accept the need to deal directly with the emotional

component – not as a nuisance, or by-pass issue, but as a main issue. Herbert Simon, often considered at proponent of "thinking harder" – or at least an excellent analyst of why we don't think harder, should also be remembered for his later call for attention to the emotional aspect: "Hence, in order to have anything like a complete theory of human rationality, we have to understand what role emotion play in it" (Simon, 1983, p. 29).

The problem with exnovation-related decisions may not be so much at the "cold" cognitive level of limited information processing ability, as at the "warm" level of emotions – one of freeing oneself from inappropriate self-interests, distorting attachments to old beliefs and behaviors, and the presence of misleading memories. In fact, Campbell, Whitehead and Finkelstein found that in 80 percent of flawed decisions in their study of 83 cases, the decision-makers were guided by faulty pattern recognition and emotional tagging, and they failed to consider alternative options (Campbell et al., 2009).

Local Experiential Attachment

At the level of journeys, we have noted certain shared characteristics of innovation and exnovation. A distinct difference, however, relates to the impact of local experience. When making decision about new innovations, only a limited amount of knowledge exists about the innovation to be adopted. The exnovation decision, on the other hand, may be strongly influenced by local and long-lasting, hard-won experiences. This local experience-difference between new innovations on the one hand, and exnovation type "old stuff" on the other, is clearly emphasized in the professional literature.

Studying adoption and abandonment of matrix management programs (a complex and radical innovation), Burns and Wholey (1993) noted that ".. the abandonment decision seems to be based on information peculiar to an institution's direct experience" (p.133). Similarly, studying corporate venture capital (CVC) practices in the US, Gaba and Dokko (2016) found that while abandonment decisions to some extent depended on social learning and influence, ".. a theory of abandonment needs to differ from a theory of adoption, because abandonment decisions must also account for firms' direct experience with practice" (p.1559). Such local experience will create emotional "experience attachments" (Kleine & Baker, 2004), and have the power of a "deadly momentum" (Miller, 1990).

It has been empirically verified that such a preservation momentum imply "..a powerful tendency to keep rolling in the same direction" (Miller, 1990, p. 269), in particular when associated with past organizational successes. In his review of the literature, Sayles (1999, p. 65) concludes that "..success blinds management to what are critically problematic issues".

Experience preservation, due to attachment and commitment, also may lead to inertia and potentially lock-ins. Within a decision making framework, inertia has been defined as a choice to maintain the status quo (Polites & Karahanna, 2012), whereas exnovation calls for attempts to overcoming such inertia. We have pointed to cognitive and emotional reasons for inertia – while still aware that inertia also has been framed in structural terms (Rumelt, 1995).

Reducing Biases

We have considered human (cognitive and emotional) biases that act as barriers to exnovation and may cause defects in decision making. It is generally acknowledged that human bias is a normal operating characteristic of the human brain that can hardly be avoided. However, human bias in organizational settings can be reduced, and the reduction is considered important by practitioners.

In a survey of nearly 800 board members and chairpersons, Bhagat and Kehoe (2014) found that respondents ranked "reducing decision biases" as their number-one aspiration for improving performance (See comment by Baer, Helligtag, & Samandari, 2017). Specific examples of such high-level aspirations, with focus upon broad de-biasing operation, have increasingly emerged in the professional literature – such as McKee & Stuckler (2016) on the World Bank, and McKinsey Quarterly (2017, in an interview with Bernhard Günther) on the German electric utility RWE.

Looking for safeguards. Finkelstein et al. (2009) assembled a database of 83 case-decisions that they felt were flawed at the time they were made. From our analysis of these cases, they say, "we concluded that flawed decisions start with errors of judgement made by influential individuals" (Campbell & Whitehead, 2009). The authors found that errors of judgement and distorted decisions occurred due to inappropriate self-interest, misleading memories, and emotional attachments. Calling such distortions "red-flag"-conditions, the authors argue strongly, that managers need to recognize the sources and strengths of these biases, and then design safeguards that inject "fresh experience and

analysis", introduce "further debate and challenge", or impose "stronger governance". It appears that these safeguards are generic recommendations and methods that depersonalize difficult decisions - not leaving pivotal choices in the hands of one or just a few emotion-constrained and bias-hampered individuals. While seeking advice from others is an under-utilized de-biasing technique (Yaniv & Milyavsky, 2007), it can help individual decision makers overcome narrow thinking and increase decision readiness (Soll, Milkman, & Payne, 2015).

Soll et al. (2015, p. 924) discuss "..two general approaches available for de-biasing decisions: (1) de-biasing by modifying the decision maker (e.g. through education and the provision of tools) and (2) de-biasing by modifying the environment (e.g. by creating optimal conditions for support of wise judgments)". While some bias-reducing recommendations have the advantage of being characterized by simplicity and generic content, much research suggest that the most successful de-biasing methods should be domain-specific (Heath, Larrick, & Klayman, 1998; Soll et al., 2015).This may imply decision-quality control by means of checklists, with questions of particular relevance to certain types of decisions (Kahneman, 2011; Kahneman, Lovallo, & Sibony, 2011). Such domain-specific tools may usefully be added to generic approaches, and in our case tailor-made to exnovation decisions.

We have earlier in this paper presented some of the most important human biases as related to exnovation decisions, and we have emphasized that a major problem with such decisions is the existence of cognitive and emotional attachment to what should be removed, and that the most visible consequences of this attachment is the sunk-cost fallacy and path dependence biases. Reviewing the literature on prescriptive strategies, Larrick (2004) notes that these biases - as well as others - are "multiply-determined" and that "..there is unlikely to be a one-to-one mapping of causes". Since different processes may also be "inter-dependent", Larrick (2004, p. 332) recommends a combination of approaches: "Together, simplicity and domain-specificity greatly enhance the memorability and applicability of the practices, making them more likely to be adopted in practice".

Dealing with the complexities of de-biasing. Commenting on the future of debiasing, Larrick (2004) first emphasizes the importance of identifying "debiasing techniques for affect-based biases" (see also Lerner, Li, Valdesolo, & Kassam, 2015). Next, Larrick (2004) points to the growing interest in "the robustness of intuitive strategies", asking "when is intuition (Type 1 decisions) sufficiently

reliable that intervention is not worthwhile" (p.334). Of particular relevance to radical innovation and exnovation decisions is the question of how a balance can be achieved between "Type 1" decisions (the intuitive, reflexive decisions) and "Type 2" decisions (the analytical, reflective decisions).

It is important to note that researchers in the field of emergency medicine (frequently implying radical and fast decision making) have found that expert decision makers blend the two types of systems. Helman (2015, p. 2) has summarized the results of research in emergency decision-making: "Experts use their experience and past errors/mistakes to reflect on their knowledge and their biases and develop heuristics (cognitive short-cuts) and cognitive forcing strategies that allow them to use their Type 1 system for rapid decision making in EM (emergency medicine) rather than having to slow down using their Type 2 system". We find it reasonable to hypothesize that in an exnovation context this implies a need for balancing Type 1 and Type 2 approaches, depending on time-frames, levels of uncertainty and availability of relevant data. Where the picture is unclear, and the data do not suggest a clear-cut recommendation, even high level decision-makers may base their judgment on a "gut feeling".

Exnovation and Identity

Considering our comments so far about cognitions, biases, emotions and attachments, much of what we have called "constraints" can be linked to – and sometimes summarized – in the concept of organizational identity. Identity is a powerful concept (Albert, Ashforth, & Dutton, 2000; Bouchikhi & Kimberley, 2008) "invoked to make sense and explain action" (Gioia, Patvardhan, Hamilton, & Corley, 2013, p. 125), and it is critical because of its "tremendous potential to motivate and shape (and be shaped by) strategic choice and action" (Ashforth & Mael, 1996, p. 20).

The identity literature is wide and deep, and it is beyond the scope of the present paper to give a full review with links to the concept of exnovation. Instead, we shall point out one main issue. Traditionally organizational identity expresses what is central or core to the organization's character or self-image (key values, labels, products, services, or practices, etc.), that makes the organization distinctive from similar organizations, and that can be viewed as enduring or as having continuity over time (Albert & Whetton, 1985; Gioia et al., 2013).

Strength or inertia. While a strong identity can generally be considered a source of strength, it may also be a source of inertia (Reger, Gustavson, Demarie, & Mullane, 1994; Stimpert, Gustafson, & Sarason, 1998) and of resistance to change (Dutton & Dukerich, 1991; Fox-Wolfgramm, Boal, & Hunt, 1998). It may over time even provoke a lock-in relationship between the organization and its environment (Burgelman, 2002). Pressures for change may cause members to defend organizational identity (Elsbach & Kramer, 1996) and resist innovation and change.

A more recent approach, however, portrays organizational identity as a more fluid and unstable construct: "There must be fluidity of the notion; otherwise, the organization stagnates in the face of an inevitably changing environment" (Gioia, Schultz, & Corley, 2000, p. 65). The words "central", "distinctive", and "continuity" are often called the pillars of identity. It is the combination of these characteristics that may create problems in times of change, making renewal difficult.

Widening, dynamizing and compatibilizing. We may consider three main factors that may ease the relationship between identity and renewal, and also between identity and exnovation: 1) Widening the mission and relevant strategy areas; 2) Dynamizing the identity of the organization, building innovative capacity and exnovation capability explicitly into the central, distinctive and lasting elements of identity; and 3) Compatibilizing by seeking out innovations that are compatible with such an identity.

Widening the mission and the relevant strategy space, is about grading various elements of identity, such that more concrete, specific products and services will be considered temporary and changeable by members of the organization. On the other hand, more abstract elements are seen as basic and lasting (Margolis & Hansen, 2002).

Dynamizing identity means to build it around a core of innovativeness, change-capacity and "exnovativeness". The discussion of costs and benefits of a strong identity is in this regard similar to the discussion of costs and benefits of a strong organization culture. A strong static culture may be a liability in times of change, whereas a strong innovative culture – and an identity built around innovativeness and "exnovativeness" – may in fact be a greater benefit the more change and radical innovativeness there is in the environment (Hatum & Pettigrew, 2006; Pratt, 1998; Tripsas, 2009). A good example is

how 3 M Company over consecutive years was an innovation winner, where inventiveness was built into the core of the identity.

Compatibilizing means that managers should seek out innovation areas that are compatible with the identity of the organization. Steve Jobs moved Apple from "computers" to "digital products", a revolutionary step in terms of strategy, while the firm still remained basically the same in the eyes of its key constituencies.

We suggest that these three dimensions of an identity-strategy should not be considered independently or in isolation, but as an integrated whole. Together they may also provide answers to Anthony and Tripsas's (2016) concerns regarding categories of innovation (identity-enhancing, identity-stretching, and identity-challenging innovations).

FUTURE DISCOURSE, RESEARCH, AND PRACTICE

Having proposed a redefinition of exnovation and also dealt with some main challenges to exnovation management, we shall briefly suggest some areas for exnovation research and practice. We would like, however, to add that resistance to exnovation may be entirely rational. We clearly sympathize with Piderit's (2000) call for a focus on ambivalence to change, more than on resistance to change.

We are not saying that there should be more exnovation or less, only that scholars in the field need to agree upon a definition and develop theories about the relationship between this phenomenon and related phenomena in order to improve research and make theoretical progress, and in order to give better practical advice. We are also saying that whether or not more exnovation is desirable, decision-makers should at least try to steer free of biases. In particular, we suggest that the emotional component needs to receive more attention.

We have suggested, and our definitions presupposes a journey perspective or framework for exnovation studies. Van de Ven and his colleagues saw the journey as "highly ambiguous and often uncontrollable and unique to its travelers" (1999, p. 21). Van de Ven has recently restated the journey perspective of innovation and argued for better maneuvering of the journey (Van de Ven, 2017). We suggest that a similar search for better maneuvering of the exnovation journey may be an equally worthy

enterprise. Expeditions into the unknown do not proceed randomly, but neither do they proceed in a predictable, linear manner. Both journeys are frequently marked by trial-and-error and learning-by doing, and they can perhaps best be studied from a complex adaptive systems perspective (Carlisle & McMillan, 2006). And while innovation and exnovation journeys share some characteristics, they represent two processes with distinctly different attributes of decision-making and behaviors. Following Fiol and O'Conner (2017), the "old" is never fully extinct, and we will argue with these two authors that an organization is likely to require "repetitive interaction" between "old" and "new" – in our terms: repetitive interaction between the two journeys over time.

Diagnosis and profile mapping

Hodgkinson and Healey (2014) suggest specific intervention strategies for dealing with emotional resistance and hesitance to change. Such intervention strategies may be framed in exnovation terms. Specifically, the authors suggest that "capabilities in diagnosing and acting on emotional signals, not suppressing them, thus differentiate dynamic firms from their less responsive counterparts" (Hodgkinson & Healey, 2014, p. 1308). A good diagnosis will help organizations "put systems, structures and tools in place to enable emotion learning from dissonance" (2014, p. 1308). The authors then, building on Manfred, De Vries, & Miller (1984), suggest starting with a mapping of the organization's "adaptive-affective style". This means to identify – on the one hand – "avoidance emotions" and maladaptive "neurotic styles", automated responses of distrust and "ostricism", and a tendency to seek protection behind rules and regulations. Or – on the other hand – the organization may be marked by "openness emotions", and by routines and incentive systems that favor openness for radical innovations.

Recognizing the salient role of identity, Bouchikhi and Kimberly (2003) devised an «identity audit" with a series of cognitively anchored questions, targeted towards the identification of "identity traps". We suggest that more work should go into developing and improving diagnostic tools specifically designed for exnovation, following the Rautenbach, Sutherland and Scheepers (2015, p. 161) reasoning that: "Once the executives have more insight, a proactive approach towards letting go of harmful attachments can be adopted instead of a reactive approach". Thus, diagnostic tools may be used to

identify strategic contradictions linked to innovation transitions; tendencies to "group think" or "thinking in the box"; structural and governance-type barriers to exnovation; or identity anchoring to too narrow paths – thus informing our avenues for exnovation research and management that follow, starting with strategic transitions.

Installing New Governance for Exnovation

Beyond the roles of individual "opponents" or "challengers", structural initiatives to identify "red flag" conditions and organize de-biasing arrangements may be taken. Campbell, Whitehead and Finkelstein (2009) suggested "governance" and "monitoring" as "safeguards" against attachment and identity-caused biases, and they suggest that quite simple measures, such as adding a subcommittee of the board, may sometimes do the job.

As a more lasting solution, we suggest going back to the kinds of adjudication structures suggested by Delbecque and Mills (1985) for enhancing innovation capability in organizations, and we suggest similar measures for exnovation purposes. Organizations may sometimes benefit from having separate set-ups for innovation and exnovation purposes. Delbecque and Mills suggested that an institutional set-up, with a non-partisan screening of innovation ideas, an independent source of funding of innovation or new product development, and institutionalized organizational support for testing, refining and marketing of a new innovation, would allow less room for conflicts and for jealously guarding old domains and budget positions. Adding a similar non-partisan arrangement for planning and execution of exnovation seems like an obvious, practical step to take.

Along the same line, exnovation may benefit from top-level strategic support, but the authority of a CEO may not always be sufficient to sustain a radical exnovation measure. When dealing with complex and risky strategic issues, often under severe time pressure, CEOs often feel weak. They may feel uncertain about consequences, and they may postpone decisions – and when they finally decide to act it may be too late and insufficiently grounded – much as described by Kathleen Eisenhardt in the case of "fast strategic change" (Bingham & Eisenhardt, 2011; Eisenhardt, 1989). Some exnovation decisions can incur extreme consequences for the whole organization, such as in cases of interruptive innovations and creative destruction (as when "calling it a day" for analogue photography). Principles

from diversity in teams may then be added to established authority structures in order to provide for better grounding of decisions. Eisenhardt found that people working intensively in diverse strategic teams, in formal and informal settings, with a focus on "real time information", tended to develop a «collective intuition» and a gut feeling for threats and opportunities. They were also better able to handle "constructive conflict", and deal with ideas, nuances and criticism without loss of time or prestige. They might also use "frame-breaking tactics", such as scenarios, role-playing or "backcasting" in order to generate alternatives, and avoid loss of face and "not invented here" positions. Eisenhardt also found that such teams were able to develop a "natural rhythm" of milestones and dead-lines for ending up with a robust decision in time.

Some studies emphasize the need for multiple foci and interactions among "process champions", with different roles in the two journeys, respectively the innovation journey and the exnovation journey. In most cases, it is the importance of innovation champions that have been emphasized (Royer, 2003). We suggest that the concept of an exnovation champion will highlight similar commitments to abandon or letting go of old ideas, practices, or artifacts. An example here is provided by Becker (2014, p. 593), who studied abandonment of traditional budgeting, and found that it was "..only achieved through skillful agency by dominant insiders". Such exnovation champions are not studied very often. However, Ginsberg and Abrahamson (1991, p. 173) presented an important finding about "champions of change" in top management teams. It was primarily new members who were willing to "..counteract inertial forces that may block the implementation of change". A possible interpretation here is that new members were not inhibited by local attachments and local experience, and for this reason could more easily take the role of exnovation champion.

Other considerations

It is beyond the scope of the present article to initiate systematic exnovation research. But in addition to the areas already mentioned, we may add that the exnovation journey also may be informed by research findings from the general organizational change field and from abandonment and unlearning research, that can be replicated on exnovation issues by making them directly linked to the introduction of new innovations. In the area of complex adaptive systems, the study of exnovation journeys can help us identify roles for stage-planned and controlled exnovation processes versus emergent and non-linear

processes. Also, with more research, the study of exnovation challenges can be linked to specific innovation types and characteristic, such as single innovations versus innovation streams, radical versus incremental innovations, architectural/systemic versus modular/component innovations, and managerial versus technological innovations. Along the same line, exnovation challenges may take on different characterics when the pressure to innovate and change path comes from inside or outside the organization, from above or from below (Conway & Steward, 2009), from individuals, teams or commanding levels in the organization.

Along the same line, we should also observe how issues of exnovation are at the core of much public debate. This include common concerns such as the transition to green energy, food without toxins, medicines without serious side effects, ethical and effective refugee policies, ethical mass media and ethical finance.

From our proposed re-definition of exnovation, it follows that the content to be removed consists of ideas, practices and artifacts that somehow block the adoption of new innovations. We have noted Kimberly's observation that in literature and managerial practice there seems to be a "pro-innovation bias", and we have suggested that this bias goes along with an "anti-exnovation bias": Somehow academics in the field have refused to make exnovation issues a specialized area in a broader discipline of innovation and change, with a specific vocabulary and systematic, comparable and accumulative research.

CONCLUSION

We started out this paper with a reference to John Kimberly's early call (1981) for the study and practice of exnovation, and with a review of similar terms used to discuss essentially the same "phasing out" phenomenon. We also exposed how many authors have used the term exnovation when referring to phenomena that differ from what Kimberly had in mind. We pointed out an urgent need for either exnovating the concept of exnovation – or give it a re-definition and a re-birth.

The scale of innovation in society, and the seeming "pro-innovation bias" coupled with an "exnovation conundrum" or an "anti-exnovation bias", have lead us to suggest a redefinition of the exnovation concept. We have suggested that exnovation generally means that "something has to be

removed in order to allow space for new innovation(s)" (phenomenological definition). This means that we depart from Kimberly's definition, where exnovation is only about the removal of a specific, former innovation. In providing space for new innovations, it is often difficult to distinguish between former innovations and all kinds of stuff that need to be removed.

Specifically, we have suggested that "an exnovation is any idea, practice, or material artifact in the adoption unit that needs to be removed or modified in order to make room for new innovation(s)" (content definition). We have also suggested that "an exnovation process is a sequence of linked events, actions and activities undertaken in order to remove or modify ideas, practices, or material artifacts for the purpose of making room for new innovation(s)" (process definition). We have also compared this process to an "innovation journey" (Van de Ven et al., 1999). We see the exnovation journey not as a particular "stage gate" type stage, but rather a set of activities at various stages of a journey, and we see the two journeys as potentially parallel and interacting. Finally, we have also introduced the notions of "removal exnovation" and "modification exnovation", emphasizing that exnovation is about making room for new innovations, in whatever form that may take.

Furthermore, we should also note that exnovation is mainly of concern to incumbent firms, and that exnovation decisions and execution can be more challenging the more radical or interruptive the new innovation is, and the more it come to challenge organizaitonal identity and emotional attachments.

Finally, we have examined cognitive, emotional and behavioral constraints and biases, suggesting the "sunk cost fallacy" as a main hurdle to rational decision-making, and organizational path dependence and experience as a main causal factor why exnovation may be expensive and sometimes prohibitive. We have also suggested structural and institutional arrangements for improved exnovation practice, and we have listed a few examples of relevant research issues – where the potential for improved research is unlimited.

REFERENCES

Abraham, S. C. S., & Hayward, G. (1984). Understanding Discontinuance: Toward a More Realistic Model of Technological Innovation and Industrial Adoption in Britain. *Technovation, 2*, 209-231.

Abrahamson, E. (1991). Managerial fads and fashions: The diffusion and rejection of innovations. *Academy of Management Review, 16*(3), 586-612.

Abrahamson, E., & Eisenman, M. (2008). Employee-management techniques: Transient fads or trending fashions? *Administrative Science Quarterly, 53*(4), 719-744.

Abrahamson, E., & Fairchild, G. (1999). Management fashion: Lifecycles, triggers, and collective learning processes. *Administrative Science Quarterly, 44*(4), 708-740.

Albert, S. (1984). A delete design model for successful transitions. In J. R. Kimberly & R. E. Quinn (Eds.), *Managing organizational transitions* (pp. 169-191). Homewood, Ill.: Richard D. Irwin.

Albert, S., Ashforth, B. E., & Dutton, J. E. (2000). Organizational Identity and Identification: Charting New Waters and Building New Bridges. *Academy of Management Review, 25*(1), 13-17.

Albert, S., & Whetton, D. A. (1985). Organizational Identity. *Resarch in Organizational Behavior, 7*, 263-295.

Algeo, J. (1978). The taxonomy of word making. *Word, 29*, 122-131.

Anthony, C., & Tripsas, M. (2016). Organizational Identity and Innovation. In M. G. Pratt, M. Schultz, B. E. Ashforth, & D. Ravasi (Eds.), *The Oxford Handbook of Organizational Identity* (pp. 417-435). Oxford: Oxford University Press.

Arkes, H. R., & Ayton, P. (1999). The Sunk Cost and Concorde effects: Are humans less rational than lower animals? *Psychological Bulletin, 125*(5), 591-600.

Ashforth, B. E., & Mael, F. A. (1996). Organizational Identity and Strategy as a Context for the Individual. *Advances in strategic Management, 13*, 19-64.

Avlonitis, G. J. (1983/1984). Improving product elimination in engineering companies. *Journal of General Management, 9*(2), 42-56.

Ax, C., & Bjørnenak, T. (2005). Bundling and Diffusion of Management Accounting Innovations - The Case of the Balanced Scorecard in Sweden. *Managment Accounting Research, 16*, 1-20.

Baer, T., Helligtag, S., & Samandari, H. (2017). The Business Logic in Debiasing. *Mckinsey Quarterly*(May).

Baker, N., Siegmann, J., & Rubenstein, A. (1967). Effects of perceived needs on the generation of ideas in R&D labs. *IEEE Transactions on Engineering Management , EM 14*, 156-163.

Baldinger, K. (1964). Semasiologie et onomasiologie. *Revue de linguistique romane, 28*, 249-272.

Baldinger, K. (1980). *Semantic Theory*. Oxford: Basil Blackwell.

Bardach, E. (1976). Policy termination as a political process. *Policy Sciences, 7*, 123-131.

Becker, S. D. (2014). When Organizations Deinstitutionalise Control Practices: A Multiple-Case Study of Budget Abandonment. *European Accounting Review, 23*(4), 593-623.

Bessant, J. (2005). Enabling Continuous and Discontinous Innovation: Learning from the Private Sector. *Public Money and Management, 25*(1), 35-42.

Bhagat, C., & Kehoe, C. (2014). High-Performing Boards: What's on Their Agenda? . *Mckinsey Quarterly*(April).

Bingham, C. B., & Eisenhardt, K. (2011). Rational Heuristics: The "simple rules" that strategists lear from process experience. *Strategic Management Journal, 32*, 1437-1464.

Blackler, F. (1995). Knowledge, Knowledge Work and Organizations: An Overview and Interpretation. *Organization Studies, 6*, 1021-1046.

Bouchikhi, H., & Kimberley, J. R. (2003). Escaping the Identity Trap. *MIT Sloan Management Review, 44*(3 -Spring), 20-25.

Bouchikhi, H., & Kimberley, J. R. (2008). *The Soul of the Corporation: How to Manage the Identity of Your Company*. Upper Saddle River, N. J. : Pearson Prentice Hall.

Brenneman, G. (1998). Right Away and All at Once: How We Saved Continental. *Harvard Business Review, 76*(5), 162-179.

Burgelman, R. A. (2002). Strategy as Vector and the Inertia of Coevolutionary Lock-In. *Organization Science, 47*, 325-357.

Burns, L. R., & Wholey, D. R. (1993). Adoption and abandonment of matrix management programs: effects of organizational characteristics and interorganizational networks. *Academy of Management Journal, 36*(1), 106-138.

Camerer, C., Loewenstein, G., & Prelec, D. (2005). Neuroeconomics: How Neuroscience Can Inform Us. *Journal of Economic Literature, XLIII*(March), 9-64.

Campbell, A., & Whitehead, J. (2009). Why Good Leaders Make Bad Decisions. *Harvard Business Review*(February), 1-6.

Campbell, A., Whitehead, J., & Finkelstein, S. (2009). *Think Again: Why Good Leaders Make Bad Decisions and How to Keep It from Happening to You*. Boston: Harvard Business Press.

Canato, A., Ravasi, D., & Phillips, N. (2013). Coerced practice implementation in cases of low cultural fit: Cultural change and practice adaptation during the implementation of six sigma at 3m. *Academy of Management Journal, 56*(6), 1724-1753.

Carlisle, Y., & McMillan, E. (2006). Innovation in organizations from a complex adaptive systems perspective. *Emergence: Complexity and Organizations, 8*(1), 2-9.

Carson, P. P., Lanier, P. A., Carson, K. D., & Guidry, B. N. (2000). Clearing a path through the management fashion jungle: Some preliminary trailblazing. *Academy of Management Journal, 43*(6), 1143-1158.

Chakravarthy, B. S. (1984). Strategic Self-Renewal: A Planning Framework for Today. *Academy of Management Review, 9*(3), 536-547.

Chandy, R. K., & Tellis, G. J. (1998). Organizing for Radical Product Innovation: The Overlooked Role of Willingness to Cannibalize. *Journal of Marketing Research, XXXV*(November), 474-487.

Chesbrough, H. W. (2003). *Open Innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business School Press.

Chesbrough, H. W., & Appleyard, M. M. (2007). Open Innovation and Strategy. *California Management Review, 50*(57-76).

Chesbrough, H. W., Vanhaverbeke, W., & West, J. (2006). *Open Innovation: Researching a new paradigm*. Oxford: Oxford University Press.

Clark, P., & Staunton, N. (1989). *Innovation in Technology and Organization*. London and New York: Routledge.

Company, M. (2017). A case study in combating bias. *Mckinsey Quarterly*(May).

Conner, K. R. (1988). Strategies for Product Cannibalism. *Strategic Management Journal, 9*, 9-26.

Conway, S., & Steward, F. (2009). *Managing and Shaping Innovation*. Oxford: Oxford University Press.

Coombs, C. R., Hislop, D., Holland, J., Bosley, S. L. C., & Manful, E. (2013). Exploring types of individual unlearning by local health-care managers: an original empirical approach. *Health Services and Delivery Research, 1*(2 - June), 1-127.

Craig, N., & Snook, S. A. (2014). From Purpose to Impact. *Harvard Business Review*(May).

Damasio, A. R. (1994). *Descartes Error - Emtion, Reason, and the Human Brain*. New York: Avon Books.

Daniels, M. R. (1995). Organizational termination and policy continuation: Closing the Oklahoma Public Training Schools. *Policy Sciences, 28*, 301-316.

David, M. (2018). Exnovation as a Necessary Factor in Successful Energy Transitions. In D. J. Davidson & M. Gross (Eds.), *Oxford Handbook of Energy and Society* (pp. 519-538). Oxford: Oxford University Press.

Delbecq, A. L., & Mills, P. K. (1985). Managerial practices that enhance innovation. *Organizational Dynamics, 14*(1), 24-34.

Dranikoff, L., Koller, T., & Schneider, A. (2002). Divestiture: Strategy's Missing Link. *Harvard Business Review*(May), 75-83.

Drucker, P. (1985). *Innovation and Entrepreneurship*. London: Heinemann.

Druckman, J. (2001). Evaluating framing effects. *Journal of Economic Psycholog, 22*, 96-101.

Dutton, J. E., & Dukerich, J. M. (1991). Keeping an Eye on the Mirror: Image and Identity in Organizational Adaptation. *Academy of Management Journal, 34*(3), 517-534.

Earle-Chaffe, E. (1985). Three models of strategy. *Academy of Management Review, 10*(1).

Eisenberg, J. M., Schwartz, J. S., McCaslin, C., Kaufman, R., Glick, H., & Kroch, E. (1989). Substituting Diagnostik Services – New Tests Only Partly Replace Older Ones. *JAMA: Journal of the American Medical Association, 262*(9), 1196-1200.

Eisenhardt, K. M. (1989). Making Fast Strategic Decisions in High Velocity Environments. *Academy of Management Journal, 32*, 543-576.

Elsbach, K. D., & Kramer, R. M. (1996). Members Responses to Organizational Identity Threats: Encountering and Countering the Business Week Rankings. *Administrative Science Quarterly, 41*(3), 442-476.

Felin, T., Foss, N. J., & Ployhart, R. E. (2015). The Microfoundations Movement in Strategy and Organization Theory. *The Academy of Management Annals, 9*(1), 575-632.

Festinger, L. (1957). *A Theory of Cognitive dissonance*. Stanford: Stanford University Press.

Festinger, L., Riecken, H., & Schachter, S. (1956). *When Prophecy Fails: A Social and Psychological Study of A Modern Group that Predicted the Destruction of the World*. New York: Harper-Torchbooks.

Fine, C. (2006). *A Mind of its Own: how your brain distorts and deceives*. Cambridge, UK: Icon books.

Finkelstein, S., Whitehead, J., & Campbell, A. (2009). *Think Again: Why Good Leaders Make Bad Decisions and How to Keep it from Happening to You*. Cambridge, Mass.: Harvard Business Press.

Fiol, C. M., & O'Conner, J. E. (2017). Unlearning established organizational routines - Part II. *The Learning Organization, 24*(2), 82-92.

Foster, R. N. (1985). To Eploit New Technology, Know When to Junk the Old. In D. Asman & A. Meyerson (Eds.), *The Wall Street Journal on Management - The Best of the Manager's Journal* (pp. 64-67). New York: New American Library - A Plume Book.

Fox-Wolfgramm, S. J., Boal, K. B., & Hunt, J., G. (1998). Organizational Adaptation to Institutional Change: A Comparative Study of First-Order Change in Prospector and Defender Banks. *Administrative Science Quarterly, 43*(1), 87-126.

Gaba, V., & Dokko, G. (2016). Learning to let go: social influence, learning, and abandonment of corporate venture capital practices. *Strategic Management Journal, 37*, 1558-1577.

Geeraerts, D. (2002). The scope of diachronic onomasiology. In V. Agel, A. Gardt, U. Hass-Zumkehr, & T. Roelcke (Eds.), *Das Wort. Seine strukturelle und kulturelle Dimension. Festschrift für Oskar Reichmann zum 65. Geburtstag* (pp. 29-44). Tübingen: Niemeyer.

Geffroy, E. (2007). *Schneller als der Kunde: Exnovation statt Innovation*. Düsseldorf: Econ Veerlag.

Ginsberg, A., & Abrahamson, E. (1991). Champions of Change and Strategic Shifts: The Role of Internal and External Change Advocates. *Journal of Management Studies, 28*(2), 173-190.

Gioia, D. A., Patvardhan, S. D., Hamilton, A. L., & Corley, K. G. (2013). Organizational Identity Formation and Change. *Academy of Management Annals, 7*(1 - June), 123-193.

Gioia, D. A., Schultz, M., & Corley, K. G. (2000). Organizational Identity, Image, and Adaptive Instability. *Academy of Management Review, 25*(1), 63-81.

Grant, R. M. (2002). The Knowledge-Based View of the Firm. In C. W. Choo & N. Bontis (Eds.), *The Strategic Management of Intellectual Capital and Organizational Knowledge* (pp. 133-148). Oxford: Oxford University Press.

Greve, H. (1995). Jumping Ship: The Diffusion of Strategy Abandonment. *Administrative Science Quarterly, 40*, 444-473.

Greve, H. (1998). Performance, Aspirations, and Risky Organiztional Change. *Administrative Science Quarterly, 43*(1), 58-86.

Hatum, A., & Pettigrew, A. M. (2006). Determinants of Organizational Flexibility: A Study in an Emerging Economy. *British Journal of Management, 17*, 115-137.

Hayes, C. W., Batalden, P. B., & Goldman, D. (2015). A "work smarter, not harder" approach to improving healthcare quality. *BMJ Quality & Safety, 24*, 100-102.

Haynes, M., Thompson, S., & Wright, M. (2002). The Impact of Divestment on Firm Performance: Empirical Evidence from a Panel of UK Companies. *The Journal of Industrial Economics, 1*(2), 173-196.

Heath, C., & Heath, D. (2010). *Switch - How to change things when change is hard*. NY: Broadway Books.
Heath, C., Larrick, R. P., & Klayman, J. (1998). Cognitive repairs: How organizational practices can compensate for individual shortcomings. *Research in Organizational Behavior,, 20*, 1-37.
Helman, A. (2015). Episode 75 - Decision Making in EM Part 2: Cognitive Debiasing, Situational Awareness and Preferred Error. *Emergency Medicine Cases*(January).
Hirsch, P. M., & Gillespie, J. J. (2012). Unpacking Path Dependence: Differential Valuations Accorded History Across Disciplines. In R. Garud & P. Camoe (Eds.), *Path Dependence and Creation* (pp. 69-90). East Sussex: Psychology Press.
Hodgkinson, G. P., & Healey, M. P. (2014). Coming in from the cold: The psychological foundations of radical innovation revisited. *Industrial Marketing Management, 43*, 1306-1313.
Institute, E. B. (2015). *The state of the debate on purpose In business - A report of the EY Beacon institute*.
Kahneman, D. (2011). *Thinking Fast and Slow*. New York: Farrar, Straus and Giroux.
Kahneman, D., Lovallo, D., & Sibony. (2011). The Big Idea: Before you make the big decision. *Harvard Business Review*(June), 50-60.
Kahneman, D., & Tversky, A. (1979). Prospect theory: Analysis of decision under risk. *Econometrica, 47*(2), 263-291.
Kanter, R. M., Stein, B. A., & Jick, T. D. (1992). *The Challenge of Organizational Change: How Companies Experience it and Leaders Guide it*. New York: The Free Press.
Kerin, R. A., Harvey, M. G., & Rothe, J. T. (1978). Cannibalism and New Product Development. *Business Horizons*(October), 25-31.
Khandwalla, P. N. (2006). Tools for Enhancing Innovativeness in Enterprises. *Vikalpa, 31*(1, March).
Kida, T. E. (2006). *Don't believe everything you think: the 6 basic mistakes we make in thinking*. Amherst, New York: Prometheus Books.
Kimberley, J. R. (1981). Managerial Innovation. In P. Nystrom & W. Starbuck (Eds.), *Handbook of Organizational Design* (Vol. 1, pp. 84-104). New York: Oxford University Press.
Kimberley, J. R. (2014). The Exnovation Conundrum. *Health Policy$ense*, 1-2. Retrieved from http://ldi.upenn.edu/voices/2014/04/29/the-exnovation-conundrum
Kimberley, J. R., & Evanisko, M. J. (1981). Organizational Innovation: The Influence of Individual, Organizational, and Contextual Factors on Hospital Adoption of Technological and Administrative Innovations. *Academy of Management Journal, 24*(4), 689-713.
Kleine, S. S., & Baker, S. M. (2004). An Integrative Review of Material Possession Attachment. *Academy of Marketing Science Review, 2004*(1), 1-35.
Knox, R. E., & Inkster, J. A. (1968). Postdecision dissonance at post time. *Journal of Personality and Social Psychology, 8* (4), 319-323.
Koehler, J. J. (1993). The influence of prior beliefs on scientific judgments of evidence quality. *Organization Behavior and Human Decision Processes, 56*, 28-55.
Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science, 3*, 393-397.
Kogut, B., & Zander, U. (1993). Knowledge of the firm and the evolutionary theory of the multinational corporation *Journal of International Business Studies, 244*, 625-645.
Landis, S. (2013). Beware the Cannibal in Your Product Line. *Harvard Business Review,* (June). Retrieved from https://hbr.org/2013/06/beware-the-cannibal-in-your-pr/
Larrick, R. P. (2004). Debiasing. In D. J. Koehler & N. Harvey (Eds.), *Blackwell Handbook of Judgement and Decision Making* (pp. 316-338). Hoboken: Blackwell Publishing.
Leahy, R. L. (2000). Sunk Costs and Resistance to Change. *Journal of Cognitive Psychotherapy: An International Quarterly, 14*(4), 355-371.
Ledema, R. (2015). Working smarter, not harder. *BMK Qual Saf*. Retrieved from doi: 10.11.36/bm/qs-2015-003996 website:
Leonard-Barton, D. A. (1988). Implementation as Mutual Adaptation of Technology and Organization. *Research Policy, 17*, 251-267.

Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and Decision Making. *Annual Review of Psychology, 66*, 799-823.

Lieberman, M. D., Gaunt, R., Gilbert, D. T., & Trope, Y. (2002). Reflection and reflexion: a social cognitive neuroscience approach to attributional inference. *Advances in Experimental Social Psychology, 34*(199-249).

Liebowitz, S. J., & Margolis, S. E. (1990). Network Externality. *Journal of Economic Perspectives, 8*(2 - Spring), 133.150.

Liebowitz, S. J., & Margolis, S. E. (1995). Path dependence, lock-in and history. *Journal of Law, Economics and Organization, 11*, 205-226.

Maccoun, R. J. (1998). Biases in the interpretation and use of research results. *Annual Review of Psychology, 49*, 259-287.

Mahoney, M. J. (1977). Publication prejudices: an experimental study of confirmatory bias in the peer review system. *Cognitive Therapy and Research, 1*(2), 161-175.

Manfred, F. R., De Vries, K., & Miller, D. (1984). Neurotic style and organizational pathology. *Strategic Management Journal, 5*(1).

Margolis, S. L., & Hansen, C. D. (2002). A Model for Organizational Identity: Exploring the Path to Sustainability During Change. *Human Resource Development Review, 1*(3), 277-303.

McAfee, R. P., Mialon, H. M., & Mialon, S. H. (2010). Do Sunk Costs Matter? *Economic Inquiry, 48*(2), 323-336.

McKee, M., & Stuckler, D. (2016). Reflective Practice: How the World Bank Explored its Own Biases. *International Journal of Health Policy and Management, 5*(2 February), 79-82.

Menon, M. G. K. (2006). *The Role of Innovation, Interdisciplinarity and Phenomenology as Components of Creativity in Opening up New Windows; Paths of Discovery* (Vol. Acta 18). Vatican City: Pontifical Academy of Sciences.

Merunka, D. R. (2010). Cannibalism. *Wiley International Encyclopedia of Marketing. 1.* Retrieved from DOI: 10.1002/9781444316568.wiem01008 website:

Mesman, J. (2008). *Uncertainty in medical innovation. Experienced pioneers in neonatal care*. New York: Palgrave MacMillan.

Mieres, C. G., Sanchez, J. A. L., & Vijande, M. L. S. (2012). International Marketing, Innovation and Performance in Business Service Firms: The Role of Organizational Unlearning. *International Journal of Management, 29*(4), 403-429.

Miller, D. (1990). *The Icarus Paradox*. New York: Harper Business.

Mintzberg, H. (1995). Five Ps for Strategy. In H. Mintzberg, Quinn, J.B., and Ghoshal, S (Ed.), *The Strategy Process* (pp. 13-21). London: Prentice Hall.

Myers, S., & Marquis, D. (1969). *Successful Industrial Innovation*. Washington, DC: National Science Foundation.

Nambisan, S., & Sawhney, M. (2008). *The Global Brain*. Upper Saddle River, NJ: Pearson Education, Inc.

Nambisan, S., & Sawhney, M. (2009). Making the Most of the Global Brain for Innovation. *international Commerce Review - ICR, 8*(2-4 Winter), 129-135.

Nickerson, R. S. (1998). Confirmation Bias: A Ubiquituos Phenomenon in Many Guises. *Review of General Psychology. Educational Publishing Foundation, 2*(2), 175-220.

Nijssen, E. J., Hillebrand, B., & Vermeulen, P. A. M. (2005). Unraveling willingness to cannibalize: a closer look at the barrier to radical innovation. *Technovation, 25*, 1400-1409.

Nylen, D. (2015). *Digital Innovation and Changing Identities: Investigating Organizational Implications of Digitalization. (Doctoral Dissertation)*. Umeå, Sweden: Department of Informatics, Umeå University.

Nylen, D., & Homstrom, J. (2015). Digital innovation strategy *Business Horizon, 58*(1, January-February), 57-67.

Oliver, C. (1992). The antecedents of deinstitutionalization. *Organization Studies, 13*, 563-588.

Pettigrew, A. (1997). What is a processual analysis? *Scandinavian Journal of Management, 13*(4), 337-348.

Piderit, S. K. (2000). Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change. *Academy of Management Review, 25*(4), 783-794.

Pierce, T. C. (2002). Sunk Costs Sink Innovation. *Naval Institute Proceedings Magazine*, 1-3. Retrieved from http://www.hawaii.edu/uhmfs/uarc/Attach_001.Pierce.pdf

Plous, S. (1993). *The psychology of judgment and decision making*. New York: McGraw-Hill.

Polites, G. L., & Karahanna, E. (2012). Shackled to the Status Quo: The Inhibiting Effects of Incumbent System Habit, Switching Costs, and Inertia on New System Acceptance. *MIS Quarterly, 36*(1), 21-42.

Potts, J. (2010). Can behavioural biases in choice under novelty explain innovation failures? *Prometheus, 28*(2 - June), 133-148.

Pratt, M. G. (1998). To be or not to be? Central Questions in Organizational Identification. In D. A. Whetton & P. C. Godfrey (Eds.), *Identity in Organizations: Building Theory Through Conversations* (pp. 171-208). London: Sage Publications.

Rautenbach, R., Sutherland, M., & Scheepers, C. B. (2015). The process by which executives unlearn their attachements in order to facilitate change. *South African Journal of Labour Relations, 39*(3), 145-164.

Rebernik, M., & Sirec, K. (2007). Fostering Innovation by Unlearning Tacit Knowledge. *Kybernetes, 36*(3/4), 406-419.

Reger, R., K., Gustavson, L. T., Demarie, S. M., & Mullane, J. V. (1994). Reframing the Organization: Why Implementing Total Quality is Easier Said than Done. *Academy of Management Review, 19*(3), 565-584.

Roevik, K. A. (2016). Knowledge Transfer as Translation: Review and Elements of an Instrumental Theory. *International Journal of Management Reviews, 18*(3 July), 290-310.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press - Simon and Schuster.

Roman, B. R., & Asch, D. A. (2014). Faded Promises: The Challenge of Deadopting Low-Value Care. *Annals of Internal Medicine*, 1-2.

Rosen, S. P. (1988). New Ways of War: Understanding Military Innovation. *International Security, 13*(1), 134-168.

Rosenkopf, L., & Abrahamson, E. (1999). Modeling Reputational and Informational Influences in Threshold Models of Bandwagon Innovation Diffusion. *Computational & Mathematical Organization Theory, 5*(4 December), 361-384.

Royer, I. (2003). Why Bad Projects Are So Hard to Kill. *Harvard Business Review, 81*(2 - February), 48-56.

Rumelt, R. P. (1995). Inertia and Transformation. In C. A. Montgomery (Ed.), *Resource-Based and Evolutionary Theories of the Firm: Towards a Synthesis* (pp. 101-132). New York: springer Science.

Satpute, A. B., & Lieberman, M. D. (2006). Integrating automatic and controlled processes into neurocognitive models of social cognition. *Brain research 1079*, 86-97.

Sayles, L. R. (1999). *The Working Leader*. New York: The Free Press.

Simon, H. A. (1947). *Administrative Behavior: a Study of Decision-Making Processes in Administrative Organization*. New York: Macmillan.

Simon, H. A. (1983). *Reason to Human Affairs*. Stanford, CA.: Stanford University Press.

Smeds, R., Hiuida, O., Haavio-Mannila, E., & Kauppinen-Toropainen, K. (1994). Sweeping Away the Dust of Tradition: Vacuum Cleaning as a Site of Technical and Social Innovation. In C. Cockburn & R. Fürst-Dillic (Eds.), *Bringing Technology Home: Gender and Technology in a Changing Europe*. Buckingham and Philadelphia: Open University Press.

Soll, J. B., Milkman, K. L., & Payne, J. W. (2015). A User's Guide to Debiasing. In G. Keren & G. Wu (Eds.), *Handbook of Judgement and Decision Making* (pp. 924-951). London: Wiley-Blackwell.

Stacey, R. D. (1995). The Science of Complexity: An Alternative Perspective for Strategic Change. *Strategic Management Journal, 16*, 477-495.

Stacey, R. D., Griffin, D., & Shaw, P. (2000). *Complexity and management - Fad or radical challenge to systems thinking?* London and New York: Routledge.

Staw, B. M. (1976). Knee Deep in the Big Muddy: A study of Escalating Commitment to a Chosen Course of Action. *Organizational Behavior and Human Decision Process, 16*, 27-44.

Staw, B. M., & Fox, F. V. (1977). Escalation: The determinants of commitment to a previously chosen course of action. *Human Relations, 30*, 431-450.

Steenhuis, H.-J., & De Boer, S. J. (1998). *Know-How on International Technology Transfer: a research model and a case study*. Paper presented at the 2nd International Symposium on Management of Technology and Innovation, ISMOT '98, Zejiang University, Hangzhou, China.

Stierand, M., & Dorfler, V. (2012). Reflecting on a phenomenological study of creativity and innovation in haute cuisine. *Hospitality Management Decision, 24*(6), 946-957.

Stimpert, J. L., Gustafson, L. T., & Sarason, Y. (1998). Organizational Identity Within Strategic Management Conversation. In D. Whetton & P. Godfrey (Eds.), *Identity in Organizations: Building Theory through Conversation* (pp. 83-98). Thousand Oaks, CA: Sage.

Stinchcombe, A. (2002). New sociological microfoundations for organizational theory: A postscript. In M. Lounsbury & M. Ventresca (Eds.), *Research in the sociology of organizations: Social structure and organizations revisited* (Vol. 19, pp. 415-433). Oxford: JAI/Elsevier.

Sutton, R. I. (1987). The process of organiztional death: Disbanding and reconnecting. *Administrative Science Quarterly, 32*, 542-569.

Tripsas, M. (2009). Technology, Identity, and Inertia Through the Lens of "The Digital Photography Company". *Organization Science, 20*(2 March-April), 441-460.

Tushman, M. L., Newman, W. H., & Romanelli, E. (1986). Copnvergence and Upheaval: Managing the Unsteady Pace of Organizational Evolution. *California Management Review, 29*(1), 1-16.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science, 185*(4157), 1124-1131.

Tversky, A., & Kahneman, D. (1981). The Framing of Decisions and the Psychology of Choice. *Science, 211*, 453-458.

Tversky, A., & Kahneman, D. (1986). Rational Choice and the Framing of Decisions. *Journal of Business, 59*(4), 251-278.

Van de Ven, A. H. (2017). The innovation journey: you can't control it, but you can learn to maneuver it. *Innovation: Organizaiton & Management, 19*(1), 39-42.

Van de Ven, A. H., & Koenig, R. (1976). A process model for program planning and evaluation. *Journal of Economics and Business, 28*, 161-170.

Van de Ven, A. H., Polley, D., Garud, R., & Venkatraman, S. (1999). *The Innovation Journey*. New York, NY: Oxford University Press.

Vekstein, D. (1993). *Dynamics of Organizational Growth in the International Automobile Industry*. Tucson: The University of Arizona.

Vergne, J.-P., & Durand, R. (2010). The Missing Link Between the Theory and Empirics of Path Dependence: Conceptual Clarification, Testability Issue, and Methodological Implications. *Journal of Management Studies, 47*(4 (June)), 736-759.

von Hippel, E. (1981). Users as Innovators. In R. R. Rothberg (Ed.), *Corporate Strategy and Product Innovation* (pp. 239-251). New York: Free Press.

von Hippel, E. (1988). *The Sources of Innovation*. New York: Oxford University Press.

Watts, D. J. (2011). *Everything is obvious - once you know the answer*. New York: Crown Business, Random House.

Westerman, G., McFarlan, F. W., & Iansiti, M. (2006). Organization Design and Effectiveness over the Innovation Life Cycle. *Organization Science, 17*(2), 230-238.

Westrun, R. (1993). Thinking by groups, organizations and networks: A sociologist's view of the social psychology of science and technology. In W. Shadish & S. Fuller (Eds.), *The Social Psychology of Science* (pp. 329-342). New York: Guilford.

Whyte, G. (1986). Escalating Commitment to a Course of Action: A Reinterpretation. *The Academy of Management Review, 11* (2), 311-321.

Yang, K.-P., Chou, C., & Chiu, Y.-J. (2014). How unlearning affects radical innovation: The dynamics of social capital and slack resources. *Technological Forecasting & Social Change, 87*, 152-163.

Yaniv, I., & Milyavsky, M. (2007). Using advice from multiple sources to revise and improve judgments. *Organizational Behavior and Human Decision Processes, 103*, 104-120.

Yin, R. K. (1979). *Changing Urban Bureaucracies - How New Practices Become Routinized*. Lexington, Mass.: Lexington Books.

Younkin, P. (2016). Complicating Abandonment: How a Multi-Stage Theory of Abandonment Clarifies the Evolution of an Adopted Practice. *Organization Studies, 37*(7), 1017-1053.

Zaltman, G., Duncan, R. B., & Holbek, J. (1973). *Innovation in Organizations*. New York: John Wiley and Sons.