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Is SAM still alive? A bibliometric and interpretive mapping of the strategic alignment research field

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ABSTRACT

The strategic use of IS and the alignment of IT with business needs are important managerial issues that need to be addressed if optimal organizational performance is to be achieved. IS research has proposed models to optimize the impact of IS investment on organizational performance. The Strategic Alignment Model (SAM) proposed by Henderson and Venkatraman is the most well-known and widely used of these models. However, 20 years on, there remains a significant disparity between the intended contribution of the literature built around SAM and the apparent practical consequences of its application in organizations. In this study, we explain this disparity using a grounded theory stance with a bibliometric and interpretive approach to help us analyze the literature: We use tri-citation analysis (with bibliometric data collected in 2011, and again in 2014) and investigate interpretatively the contents of the texts highlighted by our statistical results. This allows us to show that the research field built around SAM mostly appears not to challenge its basic assumptions and premises, although these may artificially constrain organizational reality and practices. In turn, this leads us to propose an explanation for practitioners' apparent failures to fulfill SAM's intended contribution. Beyond our theoretical and methodological contributions, we propose possible theoretical and practical improvements to adapt this model to the current organizational reality.

Introduction

Merali et al. (2012) identify four priorities for change in the strategic information systems (SIS) research domain: "conceptualisation of the SIS Domain as a Complex Adaptive System for the co-evolution of Physical and Social Technologies; the adoption of the network paradigm; access to a science of networks; and adoption of Complexity Science as an articulation device within SIS and across disciplines" (p. 125). Through a bibliographic and interpretive approach to the strategic alignment field, the present study identifies a fifth priority: the need for renewed awareness and revision of the assumptions and premises on which many concepts and models of the SIS field are currently being built.

Robert Solow's memorable words "you can see the computer age everywhere but in the productivity statistics" (1987), have had a significant and enduring[1] impact on the information systems (IS) community (Carr, 2003; Seddon, 2014). This

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[1] To witness the still current relevance of this issue, it may be interesting to note that Brynjolfsson and Hitt who discussed this issue in 1996 have been cited 410 times including 165 times during the last five years (Source: Web of Science).

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statement has been subsequently named "the productivity paradox" (Brynjolfsson, 1993); it suggests a lack of positive correlation between an organization's information technology (IT) investments and its productivity. The literature extended this more broadly to the firm's performance (Melville et al., 2004) as well as to its ability to develop a competitive advantage through value creation (Kohli and Devaraj, 2003). In his 2003 article, Nicholas Carr voiced skepticism regarding IT value, implying that organizations cannot obtain a competitive advantage from IT. Moreover, other authors claimed that organizations appear to over-invest in IT instead of focusing on the business itself (Anderson et al., 2003). A number of authors "largely resolved" the productivity paradox (Gregor et al., 2006: p. 250) by suggesting that it was mainly caused by measurement issues and analytical bias as well as mismanagement (Brynjolfsson and Hitt, 1996). Accordingly, researchers reoriented their focus: instead of attempting to prove the importance of IS for organizations, they focused on the necessity of optimizing IS management within organizations (Reix and Rowe, 2002). Moreover, such scholars began to develop theoretical frameworks and models aimed at helping managers efficiently manage IS.

The Strategic Alignment Model (SAM) is one such model, and to date has remained one of the most utilized models both in the literature and in corporations (Avison et al., 2004). It was first proposed by Henderson and Venkatraman in two conceptual working papers (1989, 1990) and popularized in 1993 in an article published in the IBM System Journal (hereafter referred to as "HV93"). Today, more than two decades later, HV93 is considered a seminal text, largely because SAM is at the source of one of the most active research areas in the field of Management Information Systems (MIS: Chan and Reich, 2007a, 2007b; Corrall, 2000; Earl, 1996; Labovitz and Rosansky, 1997), and because both business and IS practitioners consider strategic alignment to be a key issue (Luftman et al., 2006; Papp, 2001; Luftman et al., 1999; Tallon et al., 2000; Trainor, 2003).

Despite the rational prescriptions for managers that have come about as a result of this model, there is no lack of stories about failed change projects involving IT. Every year, organizations invest billions of dollars in IT, with a relatively low success rate (about 29% – See Chaos report, 2015 by the Standish group). Thus, another inconsistency has subsequently emerged: a lack of congruence between, on one hand, the intended purpose of the strategic alignment literature's theoretical recommendations toward gaining competitive advantage and, on the other hand, the practical results witnessed in firms. This issue must be addressed and explained.

SAM is anchored to contingency theories, which have been severely criticized by authors from both the organizational field (Longenecker and Pringle, 1978; Mohr, 1971; Pennings, 1975; Schoonhoven, 1981) and the strategic management field (Leonard-Barton, 1992; Meyer et al., 1993). More than 20 years after SAM was first proposed, the time may have come to question its legacy and investigate the theoretical, philosophical and epistemological bases on which the strategic alignment literature that is anchored to SAM has been developing over the years.

To conduct the present research, we took an exploratory classic grounded theory (GT) approach (Glaser, 1978; Glaser and Strauss, 1967). In line with classic GT precepts, we did not have a precise research question when we started our research. Our original intention was to broadly investigate the structure of the field and how SAM was diffused and legitimated over the years. We used bibliometrics to do so and we found that our results guided us toward a possible explanation for the issue highlighted above, which is the disparity between the strategic alignment literature's intended contribution and the apparent practical consequences of its application in organizations.

In a cumulative research tradition, such as MIS, research tends to cluster in informal networks within which similar problems are addressed in similar ways (De Solla Price, 1963). Within these networks, concepts and findings are exchanged, extended, tested, refined, and diffused (Culnan, 1986). All studies within a network are built upon other studies that they cite in their bibliographies; those citations, which they have in common, link them. In the present article, in order to analyze the combined logic of the literature built around HV93, we go beyond studying individual articles and, instead, study groups of articles, i.e. the network of articles mobilized through and around the original HV93 seminal article. Accordingly, using a bibliometric approach to highlight this network, and a qualitative approach to investigate it in depth, we examine SAM's diffusion and legitimation through a retrospective study of the literature. We make use of tri-citation analysis (TCA: Marion, 2002; McCain and McCain, 2002; McCain, 2009), which has rarely been used in IS research. TCA is similar to co-citation analysis (CCA: Garfield, 1979; Small, 1973), yet it constrains the analysis by adding a third reference (in our case, HV93) that must be shared by the entire sample of references (Marion, 2002). We apply this method with data collected in 2011 (Phase 1) and 2014 (Phase 2) to identify several theoretical *pillars* in the strategic alignment literature. This allows us to reduce a field that includes over ten thousand references to a core set of articles within which we identify significant theoretical clusters. We then code the content of the texts in each cluster.

Hence, our reading and analysis of the literature is guided by bibliographic data and bibliometric analyses. We draw on two sets of data: (i) bibliographic data, i.e., quantitative data resulting from co-citation counts and (ii) the content of the texts highlighted by the statistical analyses of the bibliographic data. We show how the theoretical *pillars used* in the strategic alignment literature (identified through the TCA) appear based on the same premises and assumptions as SAM, which have been neither questioned nor challenged. Our results allow us to infer some possible explanation for IS implementation failure rates in organizations. We also highlight alternative premises and assumptions, which have begun to emerge in the literature over the last decade or so, and are aimed at improving these failure rates.

The paper is organized as follows. First, we propose a theoretical overview of our work. Then, we describe our methodology and results. Finally, we discuss our results before investigating the limitations and contributions of our work, as well as possible avenues for future research.

Theoretical overview

In this section, we present SAM from a historical and theoretical perspective, and the dissociation phenomenon (Jarzabkowski and Wilson, 2006) that informed the "core category" (Glaser, 1978) of the theory that emerged from our work: '*dealing with the dissociation phenomenon*'. Even though the literature around our core category was investigated after the first phase of our research was well under way and close to being completed, we present it *ex ante* in order to preview our major findings and ease the understanding of our work for the reader (Suddaby, 2006).

The premises and assumptions of SAM

The concept of IS strategic alignment, and SAM itself, were developed in line with the legacy of contingency approaches found in the organizational and strategic management literature. This stream emerged in the 1980s, when IS were understood to be not only technologies, but also a fully-fledged dimension of organizations that managers must take into account in order to maximize their firms' overall performance and efficiency. Culnan (1987) notes that the concern of aligning IS with firms' strategic goals is a recurring topic in IS literature of the 1980s. During this period, the intensification of IT use reinforced its importance within organizations: IT was considered as strategic *per se*. This awareness coincided with the emergence of consulting groups that specialized in IS/IT management, and that legitimized and supported the development of this new concept of IS/IT strategic alignment (e.g., the IBM Consulting Group). The concept of strategic alignment was first used in the strategic management literature (Venkatraman, 1989a; Venkatraman and Camillus, 1984) before being extrapolated to IS by Henderson and Venkatraman (1989, 1990) and Venkatraman (1991) in the context of the MIT'90 research program (Scott Morton, 1991). These works laid the foundation for SAM, which itself was first proposed in 1993 by Henderson and Venkatraman in the *IBM Systems Journal*.

SAM considers that organizations are made up of four domains: business strategy and structure on one hand, and IS strategy and structure on the other (see Appendix A). Furthermore, it suggests that these domains are linked by two concepts: functional integration and strategic alignment (Henderson and Venkatraman, 1989). This approach offers a prescriptive and normative framework that asserts that these four domains should be mutually aligned and that this global alignment enhances organizational performance. For managers in charge of alignment operations, this model highlights a rule that shapes an ideal decisional behavior, itself built on the rationality of the model. IS and business managers must remain aware of one another's domains and be able to react to any possible changes.

As mentioned above, SAM was developed during a two-phase research program. The first phase is summarized in two working papers published in the context of the MIT'90 research program, and the second in the article published in the *IBM Systems Journal*.[2] In the first two working papers, which are both deeply theoretical and conceptual (in that they are devoid of empirical illustrations), the authors assume that SAM is a model for transforming organizations, i.e. that it has both a descriptive and a prescriptive role (Henderson and Venkatraman, 1990).

This model is constructed on three main assumptions and premises that have been highlighted by the literature: The first (P1) concerns *the true nature of organizational strategy*, i.e. strategy is supposed to be planned, explicit, known, accepted, and followed by all members of the organization (Ciborra, 1997). The second assumption (P2) relates to *the performativity of the model*. As highlighted by MacKenzie (2006), "theories and models are not simple descriptions of a setting but powerful "engines" which can profoundly transform the contexts they describe" (D'Adderio and Pollock, 2014: p. 3). Henderson and Venkatraman (1990) recognize that SAM is a model for «organizational transformation via information systems» (1990: pp. 25–26). Then, and according to Callon's perspective (1998), SAM is performative since it "describes and simultaneously participates in the construction of that reality as an object by acting on it" (Callon, 2006). Then, the model becomes "an ideal norm of behavior" (Dehouck, 1998: p.12); it creates "the phenomena it describes" (MacKenzie and Millo, 2003: p. 108). SAM is supposed to reflect *reality* and managers are supposed to follow its prescriptions in order to conform to the *reality* of the model, which reinforces at the same time its validity. This explains why the literature aimed at the same time to operationalize the dimensions of the model and to test and confirm its external validity (Renaud, 2012). The third assumption (P3) deals with *managerial rationality and the "redundancy" of organizational members*. Managers are considered to be rational since they are able to use the model, and to optimally design the strategy and structure of their organization. Other organizational members are taken into account not as actors, but rather as passive agents; they are expected to accept the optimal alignment situation as defined by the objective and rational model that is applied by objective and rational managers (Walsh et al., 2013).

The authors do not explicitly state these assumptions; however, they are revealed in the citations that they call on in justifying their theoretical framework, which is itself largely influenced by the design school of strategy and a contingent view of organizations. The managerial perspective of this model is highlighted when the four types of alignment are described as following "a top-down orientation" (Henderson and Venkatraman, 1989: p. 19). While these authors recognize the existence of other perspectives and affirm that their model is compatible with a "bottom-up" perspective of cross-domain alignments

[2] One might say that the chapter written by Venkatraman in the book *The Corporation of the 1990s* (Scott Morton, 1991) serves as an intermediate link between the two working papers and HV93. We consider that this chapter focuses not on SAM itself, but rather on the impact of IT on business reconfiguration; SAM is presented only as a managerial perspective.

(Henderson and Venkatraman, 1989: p. 20), they do not discuss this perspective in their work, arguing "limited prior attention to these perspectives" (Henderson and Venkatraman, 1990: p. 20).

HV93's contribution is a summary of Henderson and Venkatraman's previous two theoretical works. It gathers their main contributions in a single paper that is focused on the operational aspects of the model. This work, published in a practitioners' journal, defines the domains of the model and the four perspectives of alignment. The two authors deal specifically with its core components, but stop short of justifying their theoretical framework. Instead of referencing theory, the authors build their framework around their empirical experience. All of the underlying assumptions and premises that emerge from the first three works (Henderson and Venkatraman, 1989, 1990; Venkatraman, 1991) via the citation of research articles and complex ideas become simple statements; they are not discussed at length. The authors adopt a normative writing style, which effectively disconnects the graphical representation of the model from its conditions of validity (i.e. its assumptions and premises). The theoretical artifact is then quickly described and subsequently taken for granted, as the authors position it as a managerial norm and not as a theoretical and intellectual construction. This is reinforced by the fact that, in contrast to the first three contributions (which are theoretical works disseminated in an academic context), HV93 is practitioner-oriented due to its having been published in the *IBM Systems Journal*. Consequently, the authors pay less attention to academic standards of writing: They cite 28 documents and give 14 general references that readers may consult, but stop short of explaining how they utilize these documents and references.

Dealing with the dissociation phenomenon

Every theory is built on a series of premises and assumptions that ultimately shape its internal and external (or environmental) conditions of validity. In order to improve the credibility and legitimacy of their theories and models, theorists produce relatively simple representations of their contributions as a means of facilitating their assimilation and diffusion. However, such representations tend to isolate these models from the premises or assumptions on which they are constructed, thus creating the dissociation phenomenon highlighted by Jarzabkowski and Wilson (2006): Models become disconnected from their validity conditions, and theorists and/or practitioners simply use and diffuse them as they are. Jarzabkowski and Wilson (2006) have shown that the majority of models developed in the strategic management field are still used and diffused, even though their conditions of validity can no longer be verified, e.g. Porter's frameworks, which constitute examples of the dissociation phenomenon between a theoretical artifact (a model) and its native theory. If one compares the two working papers (1989, 1990) and the book chapter (1991) to the seminal HV93 publication, one finds another clear example of this dissociation phenomenon.

The disconnect between the theoretical artifact and its underlying assumptions and premises offers researchers freedom of interpretation and action. Researchers may not realize this and still apply the original model without taking into account the fact that premises and assumptions are no longer valid; alternatively, they may reconfirm the original premises and assumptions; or, they may even reconsider, adapt, or reconceptualize the original model to fit differing premises and assumptions.

Thus, one of the main issues for researchers is to have a retrospective perspective of the models in use within their academic field, as in this way they are able to understand the diffusion of such models, and, more broadly, the logic of the intellectual construction of that field (Culnan, 1986). In the present work, we investigate the theoretical bases on which SAM has been diffused in the IS literature and how these dealt with the dissociation phenomenon.

'Dealing with the dissociation phenomenon', emerged through our grounded theory approach as the "core category" (Glaser, 1978) that explains the field's "main concern" (Glaser, 1978), i.e. the investigated paradox.

Methodology

In our work, we chose a classic grounded theory (GT) approach (Glaser and Strauss, 1967; Glaser, 1978) as it is particularly helpful in developing new perspectives on well-established theoretical research areas (Sousa and Hendriks, 2006). Also, and beyond its use as a qualitative method, GT has been more broadly recognized as a meta-theory of inductive research design (Walsh, 2015): A GT research design may include qualitative and quantitative data, methods and techniques. Both *counting* and *meaning* – putting "qualitative flesh on quantitative bones" (Tarrow, 1995) – are often needed in research as mixing data/methods/techniques provides stronger inferences (Venkatesh et al., 2013). Throughout our work, we remained in an exploratory GT stance and used both quantitative and qualitative data, methods, and techniques.

In this section, we (1) show that bibliometric methods are valuable to help investigate the literature of a field; (2) describe the bibliometric method that we used; (3) report the data collection/treatment; and (4) detail our research design.

Bibliometrics as a complementary tool to investigate the literature of a field

Two broad approaches are available for investigating a body of literature (Acedo and Casillas, 2005). The first and more common is the traditional review of existing literature, in which researchers interpret the literature based on criteria that appear relevant to them (Webster and Watson, 2002). However, this method is subject to researchers' bias and frequently suffers from a lack of rigor (Tranfield et al., 2003). For instance, Chan and Reich (2007a, 2007b) reviewed and analyzed the

strategic alignment literature using a traditional approach and reported on the research method, theory base and findings. The completeness of their study is disputable, as they did not use objective criteria when selecting their sample of investigated articles.[3]

Another approach that may be used to investigate the literature and the makings of research fields (or subfields) is bibliometric analysis. First developed by researchers such as De Solla Price (1965) and Garfield (1963), it has attracted more and more attention in recent years as data availability has improved due to technological advances. This second approach uses quantitative methods and techniques in order to analyze a sample of articles that has been selected using statistical procedures; the approach aims to describe, evaluate, and monitor published research (Zupic and Čater, 2015). Using bibliometric analysis does not remove the need for authors to make some choices when they constitute their sample of texts to investigate and perform the analyses; authors have to define thresholds or cut-off points to identify these texts. As the end-purpose of bibliometric studies is to produce statistics that have meaning rather than merely for the sake of producing statistical results, these choices have to be made with specific attention given to the interpretations of results, rather than solely guided by statistical relevance. De Solla Price (1963) defined the principles of scientometrics, which involves the analysis and assessment of science and includes bibliometrics; he highlighted the need to abandon some of the required mathematic rigor in favor of an extended interpretive perspective. This is completely in line with our GT approach (Glaser, 2008). It does not mean that mathematical rigor is eliminated. It rather means that mathematical rigor is not the only element to consider but has to be combined with interpretation and meaningfulness to arrive at the best representation and mapping of a field. Thus, to define the thresholds or cut-off points used in a scientometric study (hence also in a bibliometric study), one cannot simply mobilize statistical criteria; the definition of the thresholds has to be processed through trial and error, striking a balance between statistical relevance and the significance of resulting data. This necessary trial and error process has also been highlighted by Zupic and Čater (2015).

It has also been argued recently by Felps et al. (2014) that, in order to provide a comprehensive representation of a field, to reach beyond the strictly descriptive level and to address some specific issues, bibliometric analysis and science mapping should not be used in isolation but should be combined with other analytical techniques, for instance qualitative analysis. In the present work, we chose this third approach, which combines both bibliometric and interpretive approaches.

Co-citation and tri-citation analyses

Through an extended review of 86 management studies that use bibliometric methods, Zupic and Čater (2015) highlight four methods used by analysts in this domain: co-citation, bibliographical coupling, social network analysis, and co-word or co-author analysis. The output of each method differs, and the analyst must choose one (or several) method(s) according to the research question being examined.

In our analyses, we have opted for co-citation analysis (CCA), and more specifically tri-citation analysis (TCA), a derivate of CCA, which appears suited to our investigation: CCA allows for the identification of the "invisible college" (De Solla Price, 1965; Crane, 1972; Noma, 1984), i.e. groups of productive and mutually interacting scientists within a field (De Solla Price, 1986; Zuccala, 2006), and contributes to understanding the theoretical foundations and structure of the field. CCA and TCA offer the possibility of representing a research field as being composed of several theoretical subfields. If a research field is sufficiently mature, this approach helps to determine groups of widespread, co-cited articles, which in turn reveals the theoretical perspectives and premises underlying the research field itself (Culnan, 1986, 1987; Small, 1980). Hence, co-cited articles constitute the basis of the field being investigated, and the citing articles within it enable its diffusion.

Traditionally, bibliometric studies analyze either entire scientific fields (e.g. the IS management field: Culnan, 1986, 1987; or the strategic management field: Nerur et al., 2008) or core theories found in the literature (e.g. the theory of Dynamic Capacities: Di Stefano et al., 2010; or the notion of Competence-Based Management: Prévot et al., 2010). In the present study, we analyze the literature in strategic management built on SAM as well as the diffusion of this model in the literature. Our reference point here is the seminal article HV93, as our samples include, at two different points in time, every article that cites it. This shared reference point guarantees the consistency of our sample and the suitability of CCA (Noma, 1984). The specificity of our analysis (i.e. its focus on a specific model via one article published in a large field of research) sees us using a method derived from the classic CCA analysis: TCA.

It is possible to conduct a CCA (or a TCA) of authors or of documents. In the first approach (CCA/TCA of authors), no distinction is made between the different works of a given author: "Cocitation of authors results when someone cites any work by any author along with any work by any other author in a new document." (White and Griffith, 1981: p. 163). The frequency of co-citation is a proximity index between two authors (Boissin et al., 2005; Nerur et al., 2008). The second approach (CCA/TCA of articles) consists of considering articles individually with the aim of identifying the more influential documents and analyzing the relational links between them (Fernandez-Alles and Ramos-Rodríguez, 2009; Ramos-Rodríguez and Ruiz-Navarro, 2004). Whichever approach is chosen, the objective is to illuminate the *invisible college*, i.e. the authors or documents that belong to the same research front (Crane, 1972; De Solla Price, 1963; Noma, 1984). In the present study, we have selected the document as our unit of analysis.

[3] They themselves warn: "With the hundreds of articles available today on IT alignment, it was not possible to cite each article. We acknowledge that we have not recognized every study and apologize for any oversight. We do encourage any researcher whose contribution was overlooked or not appropriately presented to bring it to our attention." (Chan and Reich, 2007b: p. 316).

CCA/TCA of articles is based on the study of references contained in scientific publications (Callon et al., 1993). Two articles are considered to be co-cited by a third when the latter simultaneously cites them. A pair of articles is co-cited several times if it is found in several bibliographies (cf. articles a and b in Fig. 1). Co-citation helps to provide additional information when compared to raw citation counting (Callon et al., 1993). Repetition of the citation of a pair of articles demonstrates the complementarity of these two articles. The logic of TCA as described by Marion (2002), McCain and McCain (2002), and McCain (2009) is almost the same, differing only in its requiring that all articles of a particular sample share a common reference to one author or one article: The citation of the same reference by a group of researchers means that they share the same representation of their research object. In our case, the key of our sample selection is the shared citation of HV93. In much the same way as Di Stefano et al. (2010), what we explore here is the intellectual basis of a theoretical field anchored in this seminal article (see Fig. 1: The green circle *source* is HV93, the blue circles represent the articles citing it, and the red circles represent the bibliographies of these citing articles).

Like other bibliometric methods, CCA/TCA implies that researchers choose "cut-off" points or thresholds during the different phases of the analysis. For instance, at the start and as one cannot analyze thousands of references, it is necessary to determine the *intellectual core* of the field, which is the set of references that are the most used by, and relevant for, the literature. To define the *intellectual core*, the first step is to compute the citation frequency for each reference. The higher the frequency, the more central the reference is for the literature. The main difficulty here is setting a threshold over which a reference is considered as belonging to the *intellectual core* and is included in the analyses, and below which it is excluded from them. The wider a sample, the more exhaustive it is, but at the same time the risk of statistical noise increases. Conversely, if the *intellectual core* is not broad enough, the resulting set of articles will be more meaningful, but results will not be precise enough to allow the researcher to reach a thorough understanding of the investigated field.

Data collection and treatment

In the present work, data were collected at two points in time, 2011 (phase 1) and 2014 (phase 2), and the same procedures applied to the two sets of data. Our data include bibliographic data, the results of our statistical enquiries, the content of the texts highlighted by our quantitative investigations and the researchers' memos written during the research process. Using the precepts of classic GT (Glaser and Strauss, 1967; Glaser, 1978), we kept comparing the quantitative data resulting from the statistical analyses and the qualitative data extracted from texts and memos, as one set. This led us to the choice of thresholds, which amounts to "theoretical sampling" (Glaser and Strauss, 1967) in GT terms. This theoretical sampling is detailed below. Bibliographic data were analyzed with the help of bibliometric software (BibExcel[4]) and quantitative data with the help of statistical software (SPSS 22), and text contents were coded with the help of NVivo 10 software.

Bibliographic data were collected from the *Web of Science* database.[5] We searched for all works that cited HV93. We imported the bibliographical notices of these works, as well as their abstracts, keywords, and bibliographies. Using the BibExcel software, we organized and cleaned the resulting database, identified the intellectual core, and computed the co-citation factors. Then, the co-citation index for each pair of articles of the intellectual core was computed. The greater the co-citation frequency of two articles, the closer is their proximity (Leydesdorff and Vaughan, 2006). The results are summarized in a raw co-citation matrix, which is symmetrical since the co-citation frequency of article a with article b is the same as that of article b with article a.

The treatment of the raw co-citation matrix raises a sharp and ongoing debate in the bibliometric literature, where we find three main differing perspectives. The first perspective considers that the raw co-citation matrix can be analyzed as it is (Ahlgren et al., 2003; Leydesdorff and Vaughan, 2006) and that the raw co-citation index is a good measure of similarity between articles (Culnan, 1986, 1987; Nerur et al., 2008). However, this has been contested since raw values, which are not normalized (Rowlands, 1999), and the null frequencies distort statistical treatments (Rowlands, 1999). The second perspective calls for the conversion of the raw co-citation matrix into a matrix of Pearson's correlations (Richter, 1979; McCain, 1990). However, Van Eck and Waltman (2008), following Ahlgren et al. (2003), demonstrate mathematically that Pearson's correlation is not a reliable measure for the similarity measure of co-citation profiles: "the Pearson correlation is a measure of the strength of the linear relationship between two random variables. Consequently, when applied to co-citation profiles, the Pearson correlation measures the strength of the linear relationship between the co-citation counts of two authors/two works. The important point is that a strong linear relationship between co-citation counts need not imply a high similarity between the authors/works and, conversely, a high similarity between two authors/works need not imply a strong linear relationship between the co-citation counts" (Van Eck and Waltman, 2008: p. 1654). Finally, the third perspective, proposed by Callon et al. (1986), which we use here, questions the reliability of the other perspectives and proposes to normalize the raw matrix by converting the raw co-citation index into an "inclusion index." This index refers to the number of co-occurrences (*Rij*) of two articles *i* and *j* divided by the number of citations of the least cited article (Min *Cij*). The formula is: (*Rij*)/(Min *Cij*). For example, if articles a and b are respectively cited ten and fifteen times, and at the same time co-cited five times, then their inclusion index will be 0.5 (5/10). Consequently, the co-citation index is normalized (value between 0 and 1); the scale effect is resolved and the data are not distorted. The diagonal values are 1 because the inclusion of an article with itself is maximal (see Appendices B and C).

[4] http://www8.umu.se/inforsk/Bibexcel/.

[5] This database, developed by Thomson Reuters, compiles all articles published in over 25,000 scientific journals and conferences.

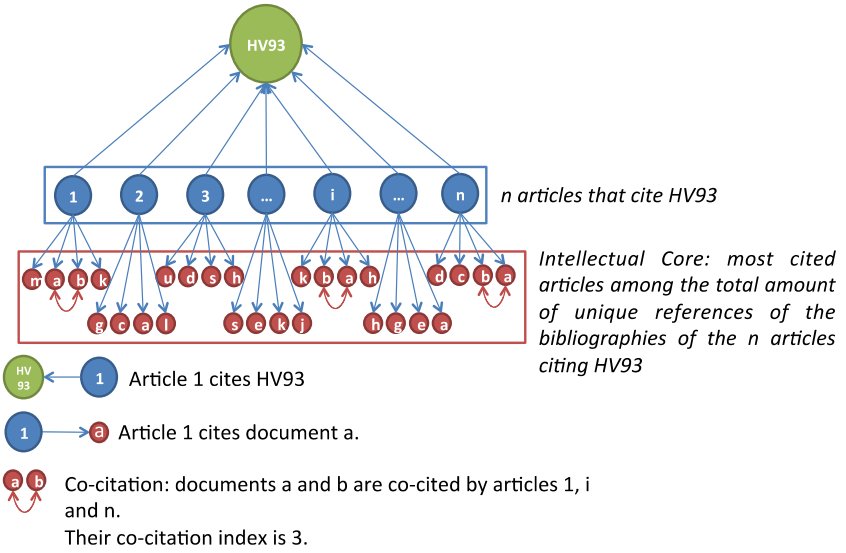


Fig. 1. The logic of the sample constitution.

In order to analyze the normalized co-citation matrix and help us understand our results, using SPSS 22.0.0 software, we applied (1) multidimensional similarity analysis through multidimensional scaling (MDS) to map references graphically and (2) principal component analysis (PCA) to identify groups of references in the intellectual core.

MDS transforms perceptions of similarity between objects into distances represented in a multidimensional space (Hair et al., 1998: p. 568). Here, we use a two-dimension space in order to illustrate results graphically. From the measure of similarity, the software will estimate the relative positions of these objects. We use the PROXSCAL analysis, which allows the researcher to specify whether data are measures of similarity or dissimilarity[6] (Leydesdorff and Vaughan, 2006). The strength of the graphic representation is given by the stress value. The lower the stress value, the stronger the correspondence is between configurations of objects in the space and the original distance. Identification of the groups of references (the *invisible college*) is obtained through factor analysis (Malhotra et al., 2007). PCA should be favored when seeking to determine a minimum number of factors and a maximum explained variance. In our study, the matrix of the inclusion index is factor analyzed using Varimax rotation. McCain (1990) asserts that the rotation of the matrix is a relevant approach since "[CCA] most commonly uses a principal components analysis, with an orthogonal (Varimax) rotation of the extracted factors. This produces factors that are uncorrelated, with most [items] having high loadings on only one ("simple structure")." (p. 440). In both studies, after multiple trials in different configurations, we chose the configuration that is, to our eye, the best balance between statistical and meaning relevance (De Solla Price, 1963). This leeway of action on statistical tools might imply the constraint of the number of factors, or the evolution of the chosen thresholds. He and Siu Cheung (2002) assess that "the whole [statistical] process depends very much on human interpretation and interaction" (p. 493). Leyesdorff (2005) adds that "the problem of how to estimate the number of clusters, factors, groups, dimensions, etc. is a pervasive one in multivariate analysis. If there are no a priori theoretical reasons—as is usually the case in exploratory uses of these techniques—such decisions tend to remain somewhat arbitrary. In factor analysis, methods such as visual inspection of the scree plot or a cutoff at certain eigenvalues are common practice." (p. 770). For instance, Culnan (1986, 1987) and Fernandez-Alles and Ramos-Rodríguez (2009) decided to suppress respectively one or many of their groups because the factors were not loaded sufficiently or the groups did not make sense. Nerur et al. (2008) preferred to constrain the factors analysis from 9 to 8 groups since one of the groups/factors previously highlighted did not make sense and because it improved statistical relevance (in terms of explained variance). In our work, we chose to follow Nerur et al.'s approach since it avoids eliminating works that could be important for the interpretation of the results (this could have been the case if we had followed the approach preferred by Culnan (1986, 1987) and Fernandez-Alles and Ramos-Rodríguez (2009)) and, statistically, the induced loss of explained variance was quite low.

Each factor groups together references that tend to belong to specific subdomains of the literature. The factorial score, the loading of each reference on a factor, is an indicator of the affiliation of this reference to each group. According to bibliometric standards (Culnan, 1986, 1987; Rowlands, 1999), a reference belongs significantly to a trend if its coefficient is higher than 0.4 in absolute value, and is a central contribution to the trend if it is higher than 0.7.

The groups of articles emerging from these analyses highlight the structure of the field. All texts were read, analyzed, and qualitatively coded (open, selective and theoretical coding: Glaser, 1978) and recoded a number of times, and memos written. For instance, the group descriptions that resulted from the reading of all texts highlighted by the bibliometric and statistical analyses, and that are summarized in Appendices G and H, were used as memos, which are also data in GT

[6] The ALSCAL analysis considers the data as dissimilarity measures.

terms. We first open-coded (Glaser, 1978) these qualitative data. Some broad categories emerged from the open coding, e.g. "perspective on strategy," "perspective on alignment," "user-oriented perspective vs. managerial perspective," etc. We also used the codes to highlight that the groups of texts help illustrate one or several dimensions of the original SAM. We kept open-coding until the core category (dealing with the dissociation phenomenon) emerged. We then coded substantively (Glaser, 1978) around this core category. This led us to three broad emerging categories, which were found to fit to SAM's premises and assumptions (P1, P2, and P3), and fed into the core category. Examples of this qualitative coding are provided in the results section (see Tables 2 and 3). Finally, the data were theoretically coded, which led us to a possible explanation of the paradox that is a major concern of the field.

Research design

Our research included two exploratory phases. The first phase (Snapshot of the field in 2011) allowed us to highlight the core category (dealing with the dissociation phenomenon) that explains the main concern (the disparity between the intended contribution of the strategic alignment literature and the apparent practical consequences of its application in organizations). The second phase (Snapshot of the field in 2014) was used not to confirm the first phase but rather to densify, saturate our categories and extend the scope of the resulting theory: It allowed us to formalize (Glaser, 2007) the substantive results previously obtained.

During both phases, when choices related to the statistical thresholds were being made, alternative possibilities were investigated, and the resulting data analyzed and interpreted. The final analyses were carried out many times while remaining in an inductive exploratory stance. The different possibilities that we investigated are briefly mentioned in the text: Due to space limitations, and also to lighten the reading of our work, we detail in the text only the choices that were made; however, some of the alternative possibilities that were eliminated are mentioned in the text, and are further illustrated and described in detail in Appendix D.

Phase 1: 2011

Data were collected in May 2011 and, at this point in time, HV93 had been cited 159 times by works whose bibliometric notices were available for download. We imported the bibliographical notices of these 159 articles and, after cleaning up, we ended up with 9726 references, of which 3725 were unique. The goal of CCA is to reveal the intellectual core, that is to say the main references mobilized by the literature. Then, only the most relevant, i.e., most cited, references are analyzed because works that have few citations will automatically and logically be less co-cited with other works. Having a wide sample of little cited works to analyze would create a high level of "statistical noise". The resulting matrix would be filled with 0 and this would increase the number of factors with items that load insignificantly. Therefore, and in order to identify the intellectual core, we performed the statistical analysis with different thresholds. We conducted the analysis with references cited at least 13 times (25 references), at least 14 times (39 references) and at least 15 times (45 references). After comparison of the results, we kept the references cited 14 times or more. This led to a second, refined sample of 39 documents, which represents the *intellectual core* of our investigated domain and matches the standard sample size observed in other bibliometric studies (Di Stefano et al., 2010; McCain, 1986, 1990; Bayer et al., 1990) i.e. between 35 and 50 articles. This *intellectual core* is summarized in Appendix E. After computation of the co-citation indexes, we obtained a 39×39 matrix of raw co-citation counts (see Appendix B1). We normalized it (Appendix B2) and performed PCA. After several exploratory trials (see Appendix D), taking into account both statistical and meaning criteria, we restricted PCA to eight factors that account for 80% of the variance. Details related to this PCA and corresponding group compositions are provided in Appendix F. This PCA is linked to an MDS with a stress factor of around 0.09. This stress value is representative of a good adjustment quality (Malhotra et al., 2007). The references with mixed loadings, i.e. with significant loading on several factors, were assigned to the factor on which they loaded highest.[7]

Phase 2: 2014

Data were collected again in June 2014, and processed and analyzed following the same procedures as those used during the first phase. At this second point in time, we found that HV93 had been cited 365 times by works with bibliometric details available. We imported the 365 bibliographical notices and ended up with a total of 21,303 references, of which 13,553 were unique. We computed the frequency of citation for each reference. To reduce our sample and increase the significance of our study, we kept only those cited at least 21 times, that is by 6% of the 365 articles, after trying and comparing the results with thresholds of 19 citations (51 references) and 20 citations (45 references). This led to a second *intellectual core* of 40 references, summarized in Appendix E. After computing the co-citation indexes, we obtained a 40×40 matrix of raw co-citation counts (see Appendix C1). From there, we normalized the raw matrix (Appendix C2) and performed the PCA, which was restricted to seven factors (72.96% of the variance) in order to increase the significance of the results regarding both the statistical and meaning criteria. Details of this PCA and corresponding group compositions are provided in Appendix F. The stress measure of the related MDS is 0.08, and is considered as relevant.

[7] Although this manipulation simplifies the analysis, it must be noted that it also hides the links existing between the factors.

Table 1
Summary of the TCA applied during the two phases.

	Phase 1	Phase 2
Data collection	2011	2014
Texts citing HV93	159	365
Unique bibliographical references	3725 (out of 9726)	13,553 (out of 21,303)
Citation threshold retained	14	21
Number of references in the *intellectual core*	39	40[a]
Number of groups	8	7

[a] Two references have been excluded from the analysis since they distorted the results. Indeed, the study by Teece et al. (1997) was not linked with other references, and the bibliographic notice of Powell and Dent-Micallef (1997) delivered by the Web of Knowledge was incomplete.

A comparison of the data used during both phases, and the various choices of cut-off points/theoretical sampling made during the two phases, are summarized in Table 1.

The two sets of groups, corresponding to the two phases of our research project, provide a means of understanding the logic of HV93 citation history through the analysis of its intellectual, theoretical, and epistemological legacy. These groups give us a number of clues for understanding the diffusion of the source article, i.e. the construction of its legitimacy as the beginning of a stream of research and as a tool for practice. Results obtained during the two phases were analyzed and compared. They are detailed in the next section.

Results

In this section, we (1) compare the two sets of groups of articles, the invisible colleges, which emerged from the 2011 and 2014 databases and (2) explain our "main concern" (Glaser, 1978), i.e. the paradox highlighted in the introduction, through our core category (dealing with the dissociation phenomenon).

The 2011 and 2014 invisible colleges

The mappings resulting from the two phases of the research, and which graphically illustrate the two sets of groups or invisible colleges, are presented in Fig. 2.

The invisible colleges highlighted by the data collected in 2011 and 2014 are described in detail in memos provided in Appendices G and H. In order to obtain a synthesized view of our results, and compare the groups obtained from the 2011 and 2014 databases, they are also summarized in Tables 2 and 3. In these tables, we also give for each group some illustrations of the selective coding related to HV93's premises and assumptions detailed in a previous section: P1, the true nature of strategy that is planned, explicit, known, accepted, and followed; P2, the performativity of the model; and P3, managerial rationality and the redundancy of organizational members.

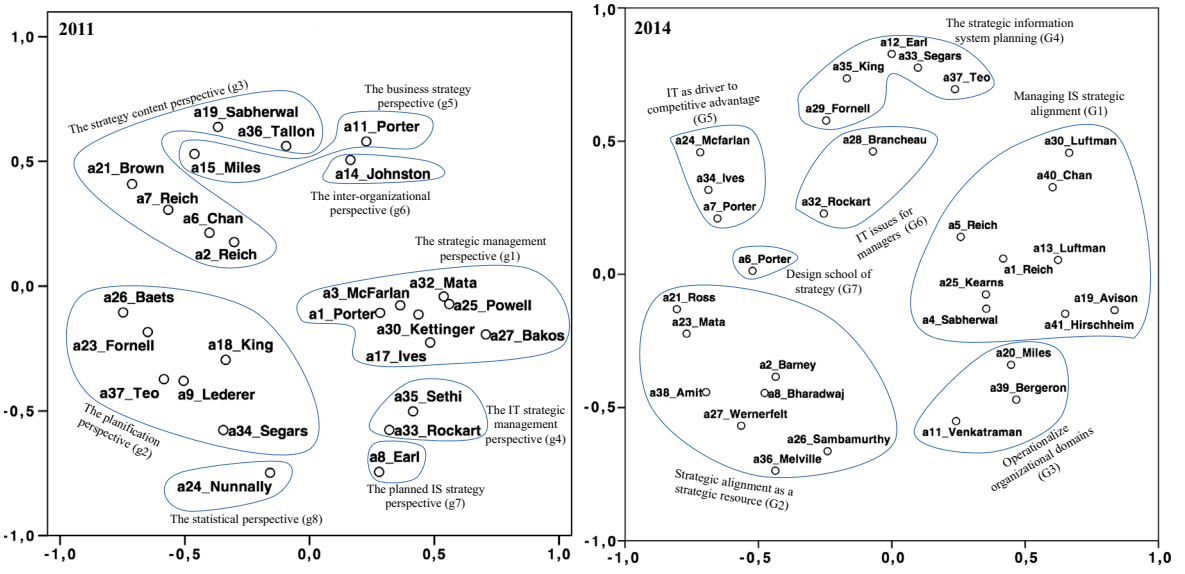


Fig. 2. The intellectual mappings of HV93's legacy. (For the sake of visual clarity, only the references with a factor loading higher than or equal to 0.7 are shown in the diagrams: they are those texts that are central contributions to the field and interest us more specifically in the present work. This explains why some groups appear to be single-item groups in the mappings, which is not the case in the factor analyses output (see Appendix F).)

Table 2
The *invisible college* highlighted from the data collected in 2011.

Groups	References of this group	Some illustrations of our coding related to premises and assumptions
g1 The strategic management perspective (11 references)	Consider IS/IT as a source of competitive advantage from a strategic management perspective. A first subgroup assumes that IT is a source of competitive advantage. The second considers that IS/IT are strategic resources because they promote the exploitation of other resources that are the true sources of competitive advantage	P1 The author considers that IT is constitutive of strategic planning. He follows the Porterian legacy and adopts a strategy content perspective. **(a3 – m)** P2 With the model in place, it is possible to anticipate the conditions under which aspects of a firm's IT will be a source of competitive disadvantage, when they will be a source of competitive parity, and when they will be a source of either temporary or sustained competitive advantage. **(a32)** P3 Managers have the lead on strategic choices but, conversely to Porterian analysis, the decision is more than circumstantial. It is based on the management of the resources at the origin of the competitive advantage. **(a4 – m)**
g2 The planning perspective (9 references)	Assume that both IS and IT are strategic components of an organization and that it is necessary to plan them. The IS strategy should be thought of *ex post* according to a firm's actual business strategy	P1 Information systems planning can be defined as the process of establishing objectives for organizational computing and identifying potential applications that the organization should implement. **(a37)** P2 This article describes an operationally feasible approach for identifying and utilizing the elements of the organization's "strategy set" to plan for the MIS. **(a18)** P3 It was determined that the senior IS executive (vice president, CIO, director) represented the most accurate source of organizational information regarding SISP. **(a34)**
g3 The strategy content perspective (8 references)	Do not postulate any sort of hierarchy between IS and business strategy. The IS strategy should not be determined based on the business strategy due to the fact that IS and IT are strategic on their own and can drive the business side of a firm	P1 N/A P2 The proposed measures could also be used to identify (…) the nature of the problem; the appropriate courses of action to alleviate them could be determined. **(a2)** P3 The level of communication between business and IT executives will positively influence the level of alignment. **(a7)**
g4 The IT strategic management perspective (5 references)	Consider that there is no link between the amount of IS/IT investment and a firm's capacity to have competitive advantage. It is up to a firm to transform its IS/IT assets into organizational competences, thereby paving the way to sustainable competitive advantage	P1 IT management becomes a competitive weapon when (a) IT plans are aligned with the firm's strategic business priorities. **(a12)** P2 Given this environment, we see eight imperatives for the IT organizations of the late 1990s. To be truly successful, an IT organization must excel in each. **(a33)** P3 Adhering to strategic alignment allows both IT and business oriented managers to communicate with and become partners with each other. **(a31)**
g5 The business strategy perspective (3 references)	Include key articles on strategic management studies, which propose different evaluation methods of a firm's strategy	P1 This book proposes a guide to operationalizing the firm's strategic behavior by providing a typology of four strategic types. Each strategic type is described. Strategy needs to be implemented after a preliminary diagnostic to define which type is more convenient. **(a15 – m)** P2 N/A P3 Following an external diagnostic of the market, the top management chooses the right generic strategy to have a competitive advantage. **(a11 – m)**
g6 The inter-organizational perspective (1 reference)	Defend the idea that IS/IT are critical factors in competitive advantage building in inter-organizational systems	P1 N/A P2 A set of categories or frameworks can guide exploration of choosing appropriate organizations, deciding what functions the system will perform, and determining how these functions will provide sustainable advantage. **(a14)** P3 Once a potentially significant system has been identified, a series of questions should be posed before embarking on system development. These questions should evaluate the impact and opportunities from several management perspectives. **(a14)**
g7 The planned IS strategy perspective (2 references)	Investigate strategic IS planning and its impact on business strategy	P1 SISP has been defined as the process of deciding the objectives for organizational computing and identifying potential computer applications, which the organization should implement. **(a5)** P2 N/A P3 Within each firm, the author carried out in-depth interviews, typically lasting two to four hours, with three "stakeholders." A total of 63 executives were interviewed. **(a5 – m)**

Table 2 (*continued*)

Groups	References of this group	Some illustrations of our coding related to premises and assumptions
g8 The statistical perspective (1 reference)	Deal with structural equation methodology	P1 This reference demonstrates the importance of hypotheses testing and organizational domains measurement in the strategic alignment literature. **(a24)** P2 N/A P3 N/A

Note (applies to this table and Table 3):
P1, P2, and P3 correspond to the three SAM premises – P1: the true nature of strategy; P2: the performativity of the model; and P3: managerial rationality and the redundancy of organizational members.
a* refers to the code of the reference (cf. Appendix E).
"m" means that the source of the quote is one of the authors' memos. When only the reference code is provided, the quote is a direct quote of the corresponding text.
SISP = strategic IS planning; ISP = IS planning; CIO = chief information officer.

Until 2011, the strategic alignment literature relies on an *invisible college* of eight groups of references, which constitutes the network of intellectual contributions on which the field was built (see Appendix G for a full description of these groups). After analysis and coding, these groups were named: the strategic management perspective (g1 – 11 references); the planning perspective (g2 – nine references); the strategy content perspective (g3 – eight references); the IT strategic management perspective (g4 – five references); the business strategy perspective (g5 – three references); the inter-organizational perspective (g6 – one reference); the planned IS strategy perspective (g7 – two references); and the statistical perspective (g8 – one reference).

We found that all texts within this network investigate and justify some dimensions and relationships between the constructs of the original SAM (see Fig. 3). Through different perspectives, each group aims to overcome the productivity paradox. However, these perspectives are all anchored in SAM. The first (g1) and sixth (g6) groups assume that IS structure is a possible vector for a firm's competitive advantage. Indeed, while they implicitly recognize the necessity of aligning business strategy and business structure (Chandler, 1962), they also explicitly state that the IS/IT structure should be aligned to both the business strategy and the business itself in order to create competitive advantage. The fourth group (g4) implicitly assumes that IS/IT strategy and structure are aligned and that this alignment influences business structure, thereby leading to competitive advantage. The second (g2), third (g3), and seventh (g7) groups study the alignment between the two strategic dimensions of the model and the impact of this alignment on firm performance. The fifth group (g5) focuses on business strategy, and the eighth (g8) provides tools that enable the model to be used or verified via quantitative methods and a hypothetico-deductive approach, through structural equation modeling.

In the second phase, which uses data collected in 2014, the literature relies on an invisible college of seven groups (see Appendix H for a full description of these groups), namely: managing strategic alignment (G1 – 13 references); strategic alignment as a strategic resource (G2 – nine references); operationalizing organizational domains (G3 – five references); SISP (G4 – five references); IS/IT as a driver to competitive advantage (G5 – three references); strategic IS/IT issues (G6 – two references); and the Porterian/design school of strategy (G7 – two references).

Three of the groups are not directly linked to a specific domain of the model proposed by HV93 or an alignment relationship between these domains: The first (G1), second (G2), and sixth (G6) groups focus on strategic alignment management (and the fifth group, G5, could also be included in this perspective). They recognize the importance of the impact of alignment on the firm's performance, but they do not pay attention to what the alignment is *per se*. Rather than analyzing the content of the alignment, they consider it to be a prerequisite and suggest tools, advice, and perspectives on the means to attain this strategic organizational configuration. The four other groups (G3, G4, G5, and G7) test the model. The third group (G3) provides tools that are useful for operationalizing and measuring the different domains of the model. The fourth group (G4) is concerned with SISP, considers that it has to be in line with the business strategy, and proposes methods to perform it. The fifth group (G5) assumes that IS/IT are at the source of a firm's competitive advantage and that the IS/IT structure has to be aligned with the business strategy, which must also be congruent with the business structure. Finally, the seventh group (G7) is focused on the business strategy domain and clearly anchors the model into Porter's legacy. The results of both phases 1 and 2 are summarized in Fig. 3.

Toward explaining the paradox

Our results show that the strategic alignment literature has evolved between 2011 and 2014. In the 2014 analysis, the intellectual core is less focused on the model itself. Indeed, it stands back from it and considers SAM's prescriptions as prerequisites for the firm's performance. SAM is black-boxed and no longer discussed or justified by the authors, who mostly work on the conditions of success needed to foster the attainment of this desired situation. Even though the 2011 and 2014 *invisible colleges* differ, we note that the intellectual cores have 24 references in common (out of a total of 39 for the 2011 database and 40 for the 2014 database: See Appendix E). Thus, and even though the intellectual structure of the field has evolved slightly over the years, this evolution is certainly not a revolution. Among the shared references, we find most of

Table 3
The *invisible college* highlighted from the data collected in 2014.

Groups	References of this group	Some illustrations of our coding related to premises and assumptions
G1 Managing strategic alignment (13 references)	Recognize the difficulty for managers of dealing with SAM and applying its prescriptions. It proposes factors, methods and ideal behaviors that enhance the ability of a firm to be strategically aligned, and hence to be more efficient	P1 Although there are many business strategy frameworks, we chose to adopt the popular typology of Defenders, Prospectors, and Analyzers. **(a41)** P2 How do we maximize alignment enablers and minimize inhibitors? We have used a six-step approach that is designed to make strategic alignment work in any organization. (. . .) Companies that have achieved alignment can build a strategic competitive advantage that will provide them with increased visibility, efficiency, and profitability to compete in today's changing markets. **(a30)** P3 The purpose of this research is to identify or develop a practical framework for managers in general, though it is likely to be used by technology managers, to help them to identify the current level of alignment with the business and also to control future alignment. **(a19)**
G2 Strategic alignment as a strategic resource (9 references)	Posit a Resource-Based View of the firm and see IS/IT as a dynamic capability of the firm. Thus, IS/IT are not vectors of competitive advantage *per se*, but are strategic resources of the firm	P1 One revealing way to characterize competitive strategies is by means of Michael E. Porter's analysis. **(a26)** P2 With the model in place, it is possible to anticipate the conditions under which aspects of a firm's IT will be sources of competitive disadvantage, when they will be sources of competitive parity, and when they will be sources of either temporary or sustained competitive advantage. **(a23)** P3 Adhering to strategic alignment allows both IT and business oriented managers to communicate with and become partners with each other. **(a22)**
G3 Operationalizing organizational domains (5 references)	Provide tools to operationalize SAM domains	P1 The construct of strategic orientation of business enterprises was adopted to assess business strategy. This construct refers to realized as opposed to intended strategy **(a16)** P2 With information obtained from scanning the IT environment, management should envision the potential competitive uses of IT to adapt the firm's business strategy, with new or expanded strategic thrusts in the form of product/service differentiation and innovation, and new or expanded strategic targets in the form of growth and strategic alliances. Such changes also require a corresponding adaptation of IT structure to analyze and meet the increasing needs of both internal and external IS customers. **(a16)** P3 N/A
G4 SISP (5 references)	Mostly deal with SISP and assume its importance for organization. They consider that strategic alignment is a necessary but not sufficient condition to SISP performance. Then, SISP has to be aligned to business considerations in firms	P1 Once the organization's mission has been determined, its objectives – desired future positions or "destinations" that it wishes to reach – should be selected. These destinations may be stated in either quantitative or qualitative terms, but they should be broad and timeless statements, as opposed to specific, quantitative goals, or targets. **(a35)** P2 For ISP to be effective, it is crucial that IS plans be aligned with business plans so that IS can more effectively support business strategies. **(a37)** P3 It was determined that the senior IS executive (vice president, CIO, director) represented the most accurate source of organizational information regarding SISP. **(a33)**
G5 IS/IT as driver to competitive advantage (3 references)	Aim to demonstrate the strategic dimension of IS. This follows the Porterian legacy	P1 The author considers that IT is constitutive of the strategic planning. This follows the Porterian legacy and adopts a strategy content perspective. **(a3 – m)** P2 Authors assume that IS/IT reinforce organization in their willingness to create a competitive advantage since they help them to be more effective in the implementation of generic strategies. They propose a five-step process to make the most of opportunities offered by IS/IT **(a7 – m)** P3 Authors propose an analytical grid for managers in order to optimize their interactions with customers by showing that IS/IT applications could answer their needs. **(a34 – m)**
G6 Strategic IS/IT issues (2 references)	Assume that strategic alignment of IS is implicitly mandatory and that managers should take care of it in their daily practices	P1 N/A P2 Given this environment, we see eight imperatives for the IT organizations of the late 1990s. To be truly successful, an IT organization must excel in each. **(a32)**

Table 3 (*continued*)

Groups	References of this group	Some illustrations of our coding related to premises and assumptions
		P3 IT management must be knowledgeable about senior management's strategic and tactical thinking. The CIO must become either a formal or informal member of the top management team, and other senior IT executives must become members of key task forces. IT people must be present when business strategies are debated. **(a32)**
G7 Porterian/design school of strategy (2 references)	Include two Porterian contributions in which Porter proposes his two famous frameworks: the five forces and the value chain	P1 These works are enrolled in the design school of strategy **(a6 and a17 – m)** P2 N/A P3 N/A

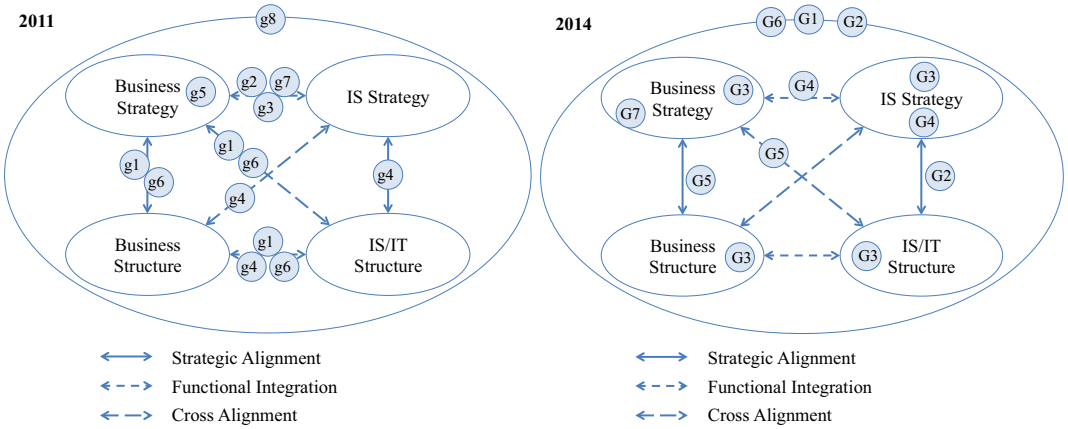


Fig. 3. The links between the groups highlighted in each study and the original model.

the seminal references in the strategy or IS literature (see Appendix E). This betrays that if the purpose of the literature did evolve from 2011 to 2014 (see Fig. 3), the logic of the field globally remains the same. Indeed, we found that within each text of the intellectual cores, one of SAM's premises and assumptions (P1, P2, or P3) – and sometimes two or all of them – may be identified as explicitly or implicitly accepted. When it is accepted explicitly, we quote directly from the text and give its label (a1, a2, etc.); when it is accepted implicitly, we quote from one of our memos related to this text and provide the label of the text followed by the letter "m," e.g. "a3 – m."

The selective coding that we used illuminates the fact that the perspectives of the literature are fairly stable over time and anchored in SAM's premises and assumptions. Due to the dissociation phenomenon, the original premises and assumption of SAM, its conditions of validity, were not discussed in order to better highlight the model in HV93. Since the model becomes atheoretical and not contextualized by its conditions of validity, one could have expected that the literature would handle the margin of free interpretation and develop alternative perspectives on SAM, anchored in practices or other theoretical legacy. However, we found that many authors, betrayed by their bibliographies, naturally adopt and reinforce Henderson and Venkatraman's original premises and assumptions.

If the conditions of validity of SAM are no longer maintained and cannot be met in organizations, it would therefore be unsurprising that the practical consequences of SAM and its legacy do not make their expected contributions. This could help explain the main concern investigated in this work; this is discussed in the next section.

Discussion

The evolution of the intellectual core between 2011 and 2014 tends to illustrate the evolution of the field highlighted by Merali et al. (2012) between the 1980s and 1990s. However, the assumptions and premises remain unchanged. In this section, we show that SAM's premises and assumptions have, however, been questioned in the IS literature and also in the broader management field, and highlight some emerging alternatives to help the field move forward.

Reconsidering SAM's premises and assumptions

Far from being "atheoric (...) because of its heavy reliance on the strategic management reference discipline and contingency approach" (Chan and Reich, 2007a: p. 311), we consider that much in the strategic alignment field is anchored in SAM, which is in itself a theory for design and action (Gregor, 2006). SAM is, however, grounded in premises and assumptions that

are recognized as no longer valid; and the field is confirmed as not really reconsidering these premises and assumptions, even though they have been heavily questioned in the literature.

P1 – The true nature of organizational strategy

The drift from one historical perspective to another that is evidenced by our results does not mean that the global approach to strategic alignment has changed. In the two phases of our work, the investigated literature stays within the three persistent strands of SIS research, illuminated by Chen et al. (2010): IS strategy as the use of IS to support strategy; IS strategy as the master plan of the IS function; and IS strategy as the shared view of the IS role within the organization. While these three perspectives differ in their definition of both IS strategy (as a position, plan, or perspective) and the relationship between IS strategy and business strategy, they share a managerial and top-down perspective (Hambrick et al., 1996; Smith and Tushman, 2005) in which IS strategy or business strategy is intended, planned, and explicit. As highlighted by Chen et al. (2010), all strands avoid "the contradicting views on emergent versus deliberate strategies" (p. 243), which is an established debate in the management field (see Mintzberg, 1978; Mintzberg and Waters, 1985).

This issue has recently been actualized through the Strategy as Practice (SaP) stream of thought. Within the context of SaP, Whittington (1996) calls for a new vision of strategy centered on practices. He stresses the importance of the role and interactions of various actors at the root of organizational strategy. Strategy is thus defined as something for which actors are responsible. It is not simply the content or the action plan resulting from a decision (Hambrick, 2004; Jarzabkowski, 2004), but rather it is a well-placed activity, constructed and shared on a social footing (Jarzabkowski and Spee, 2009). This perspective breaks away from conventional literature on strategy, which "*[focuses] primarily on top managers, as if only one elite group could act strategically*" (Jarzabkowski and Spee, 2009: p. 69).

Research in strategic management through SaP, just as much as IS research through the works of Ciborra (1997, 1998), shows the limited view on strategy and strategizing of the approaches that the literature built on SAM is constructed upon. Both suggest going beyond these traditional perspectives. However, most authors quoting HV93 have ignored these approaches, even though they offer inspiring perspectives for organizations. It stands out that among the 9726 (from the 2011 database) and the 21,303 (from the 2014 database) citations that we investigated, Ciborra (2000) is quoted only five and six times respectively, and Ciborra (1997) four and three times. Concerning key authors of SaP (Jarzabakowski, Rouleau, Baron, Langley, etc.), they are not quoted in the 2011 sample (with the exception of Whittington, quoted twice; however, these quotes refer to a 1993 article that has no bearing on SaP). In 2014, there are eight citations of Whittington's works, of which four are linked to SaP. Jarzabkowski and Balogun are cited only once. This tends to show that SaP is not significantly mobilized by the literature citing HV93.

P2 – The performativity of the model

Models are abstract, disconnected from organizational reality and managers have a difficult time effectively appropriating them. Avison et al. (2004), Maes (2000) and Maes et al. (2000), suggest that SAM is a victim of this problem, as it does not reflect the complexity of the environment or the field considerations of managers. Ciborra (1998) adds his voice to this criticism in questioning the discrepancies of what he calls the *Galilean research model*, which itself aims to give an approximate representation of reality through the power of abstraction and the formal structure of geometry. Here, Ciborra contests that these representations are perceived not as approximations or representations, but rather as accurate descriptions of reality. If the complexity of reality makes our world unpredictable, the belief in the accuracy of the models tends to make us forget that the uncertainties and imperfections that they produce are precisely manifestations of *reality*.

Even if there is an evolution between the two periods (2011 and 2014), all highlighted groups of cited references betray the loyalty of the investigated research field to Henderson and Venkatraman's (1989, 1990) premises and assumptions, which are reinforced and the model black-boxed (especially during the latter period investigated). This, in turn, contributes to perpetuating and encouraging reality to be investigated through the *scientific* measure of a *quantifiable* state, i.e. the level of fit between various domains that is assessed through the correlation of the set of variables used to operationalize these domains, thus reinforcing SAM's performativity assumption even though it appears to no longer hold true.

P3 – Managerial rationality and redundancy of organizational members

Ciborra (1998) claims that the application of the scientific Galilean method in our discipline diverts researchers' attention away from "the fundamental role of the everyday life world of the agents, users, designers, managers, and the messiness and situatedness of their acting" (p. 9). Models describe sociotechnical systems through geometric representations in which practitioners and the social dimension of the IS disappears behind theoretical abstractions. Researchers adopt a vision of reality that they perceive as being objective, focusing solely on top management.

One facet of the SaP research stream focuses on how theoretical models relate to practices; it tries to reconceptualize these theoretical constructions by drawing on effective practices. The ultimate purpose of such work is to dismantle the theoretical constructions and reconstruct them based on a so-called "practical reality."

SAM is designed for *top managers*, who are the actors linking the model and its subject, i.e. organizations. SAM implies that if managers are rational and they follow the rational prescriptions of a rational model, then organizational performance should theoretically improve (but often does not). As a result, much of the literature that builds on SAM reinforces this managerial stance by looking almost exclusively at top-level management; this is the case whether works aim to help managers to appropriate the model by providing them with tools and detailing theoretical constructs (Maes, 2000; Maes et al., 2000;

Avison et al., 2004), to describe the antecedent factors of strategic alignment (e.g. Reich and Benbasat, 1996, 2000) or to reinforce the model's scientificity and adequation (for a full review, see Renaud, 2012).

SAM emphasizes the technical aspect in its organizational transformation perspective, and neglects all social and environmental factors involved in such change (Baskerville and Smithson, 1995; Besson and Rowe, 2011). Indeed, the top management teams, who are supposed to make decisions and act intentionally and rationally according to the model, are in fact embedded in a complex world of local tinkering (Ciborra, 1992, 1997, 2002; Orlikowski, 1996, 2000) and emergences. Rather than applying rational models, processes and methods, managers "improvise" while following a trajectory that does not fit within a rational and top-down vision. At the time that SAM was first proposed, IT could hardly be considered *adaptable* and the conditions of validity of the model were respected. Today, however, we find ourselves in a world of flexible IT (Leonardi, 2011) in which users and technologies are embedded: User routines and practices are essential variables in the complex and non-Galilean equation of strategic alignment. The importance of organizational members/end users has been strongly highlighted by authors working on IT rejection (Leonardi, 2009), IT resistance (Kim and Kankanhalli, 2009; Lapointe and Rivard, 2005), adaptation (Beaudry and Pinsonneault, 2005), and IT acceptance (Beaudry and Pinsonneault, 2010); other authors adopt a sociotechnical perspective on IS/IT change (Avgerou and McGrath, 2007; Doherty and King, 2005; Luna-Reyes et al., 2005), perspective in which organizational members/end users are neither neutral nor redundant. The sociomaterial perspective reinforces this perspective since it recognizes that "the social and the material are considered to be inextricably related" (Orlikowski, 2007: p. 1437). Then P3, which deals with the managerial rationality and the redundancy of organizational members, could perhaps be reconsidered in favor of a sociotechnical approach that recognizes the active role played by all organizational members involved in IS/IT projects: IT, users and organizations are intrinsically embedded and interrelated, since each of them shapes the others.

What next?

With regard to the emerging paradox referenced in the introduction, it would appear that SAM's conditions of validity do not entirely meet the requirements of the intended contribution of this model. In other words, despite its apparent rationality, and although providing necessary conditions, it does not offer a comprehensive practical framework that is sufficient for reducing the risk of failure of IS projects.

We propose that IS researchers could update SAM by reconsidering its conditions of validity – that is, its underlying premises and assumptions with the help of new approaches that are being used in sub-disciplines connected with IS in the management field. One could consider adopting a radical perspective, abandon altogether the concept of alignment, and propose a new reading of organizational reality and practices as is done by Renaud (2012). However, we suggest that the proposed update of SAM's theoretical construction should not aim to call the model and resulting literature into question, but rather should adapt these elements to the everyday practices of today's practitioners. The overall prescription of aligning organizational domains is, in our reading, indeed still valid but the conditions of its application could profitably be adapted to new organizational contingencies. This would enable researchers to create alternative theoretical constructions that could avoid the pitfalls of many of the existing models that are distancing them further and further from actual practices. Moreover, new perspectives could provide managers with clues to implement solutions that are effectively aligned rather than rely solely on the rationality of both SAM's prescriptions and the managers.

During the last decade, the black box of SAM's premises and assumptions has started to be prized open, and new perspectives that deserve attention are emerging. Some moves have been made to take practices into account, in order to approach organizational reality as closely as possible and make the model more relevant, e.g. Campbell et al. (2005), Galliers (2009, 2012), and Walsh et al. (2013). Campbell et al. (2005) aim to capture alignment in action by focusing on middle managers who handle top management decisions; however, these last authors stick to a managerial perspective (interviewees are managers). Interestingly, Galliers (2009) proposes a new framework to capture IS strategizing and overcome some MIS *myths*; IS strategizing is seen as a facet of business strategy (Galliers, 2012). Furthermore, adopting a critical realist stance, Walsh et al. (2013) also propose to revisit and reconceptualize strategic alignment as a three-level network through a SaP (Whittington, 1996) perspective. Hence, for these authors, SAM is still alive since it may be actualized (Campbell et al., 2005) or re-conceptualized (Galliers, 2012; Walsh et al., 2013) as a component of a broader, non-functionalist model.

Limitations, contributions, and future directions

The main limitation of our work is inherent in our method of analysis: CCA analysis is a retrospective analysis and not a prospective analysis of the literature. CCA and TCA focus on the most heavily cited articles and rely on a threshold; as such, it is clear that the number of citations is correlated to the age of a publication. Thus, our samples – based on heavily cited sources – create a bias favoring older studies (Gregoire et al., 2006), despite its being built on articles published through to 2011 in the first study and through to 2014 in the second. Due to the publication process, we were unable to consider the latest developments in the strategy and IS literature. Furthermore, our study neglects the most recent literature on IS strategic alignment due to the fact that it has had less time than other works to leave its mark on the field. Therefore, our sample may have overlooked certain articles that may become seminal works in the future (Vogel and Güttel, 2013): Some of the more recent works do in fact question SAM's assumptions and premises, and propose certain revised

conceptualizations of strategic alignment (e.g. Galliers, 2012; Walsh et al., 2013). This limitation could be overcome in the future by complementing our TCA with a bibliographical coupling analysis (Kessler, 1963) that is a bibliometric method with a focus on the current and future trends of a specific research domain.

One of the contributions of our work is methodological. CCA is little used in IS research; when it is used, it mostly takes the form of author CCA, whereas our CCA of articles provides a finer analysis of a research field. Additionally, we conducted a type of CCA (TCA) that, to our knowledge, has never been applied before in IS research, despite it being an interesting means of synthesizing and investigating research subfields. Through our work, we hope to make researchers in the field aware of the fact that CCA is a valuable tool that brings complementary information to traditional, solely interpretive, literature reviews.

In the literature, bibliometric methods are mainly used with statistical techniques toward studies that are mostly descriptive e.g., to describe a field (Culnan, 1986, 1987) or the use of a core theory (Di Stefano et al., 2010). Very few studies combine bibliometrics with other analytical approaches to address a theoretical or a practical issue, even though this is starting to change in the management field of research as highlighted by Felps et al. (2014). Furthermore, when CCA is used to provide the necessary theoretical sampling of texts to be used in an interpretive approach, the combination provides endless possibilities.

Finally, a GT approach has been used by other authors to analyze the literature (Wolfswinkel et al., 2011). However, to our knowledge, it has never been used with bibliometric techniques to help do so: The classic GT approach proved essential to guide our research; it may inspire other researchers and help them in their endeavors.

The methodological choices that we made (bibliometric and interpretive approach applied with a classic GT stance) provided important information that we could not have obtained otherwise, and furthered our contributions. It allowed us to highlight, pay attention to, and question the intellectual pillars on which the investigated research field has been constructed, and its philosophical anchorage. Chan and Reich's (2007a) literature review aimed to capture the various perspectives used in the literature to study strategic alignment. Their approach was descriptive and they focused on the methods, content, and findings of the articles investigated. They did recognize some debate about the concept of alignment, but solved it by highlighting the perspective they considered as most relevant (i.e. "alignment is inherently of value and contributes to organizational success": p. 298) and by suggesting what should be done in this perspective e.g. improve the methods used to assess alignment, pay more attention to the process of alignment, and be more specific to the contingency factors. Their goal was not to challenge the literature, but rather to propose an anthology of previous works.

Even though we did limit our perspective to the literature that cites Henderson and Venkatraman (1993), we do not have in our work a preconceived view of the *right* perspective. Our conclusions are drawn through the interpretation of statistical results and the content of these results. They lead us to highlight the necessity of a thorough awareness and overhaul of basic assumptions and premises in SIS research. Our goal was not to point at one best perspective but to open the black box of the myth of SAM. A paradigm shift may not be necessary to advance SIS research (Merali et al., 2012). It appears, however, essential to be aware of, question, and challenge the premises and assumptions on which research in the field is being built.

Through our work, we have provided a synthesized view of the strategic alignment literature built on SAM. This view has enabled us to highlight the need to broaden perspectives, i.e. to reconsider strategic alignment using different perspectives grounded in different assumptions and premises.

Conclusion

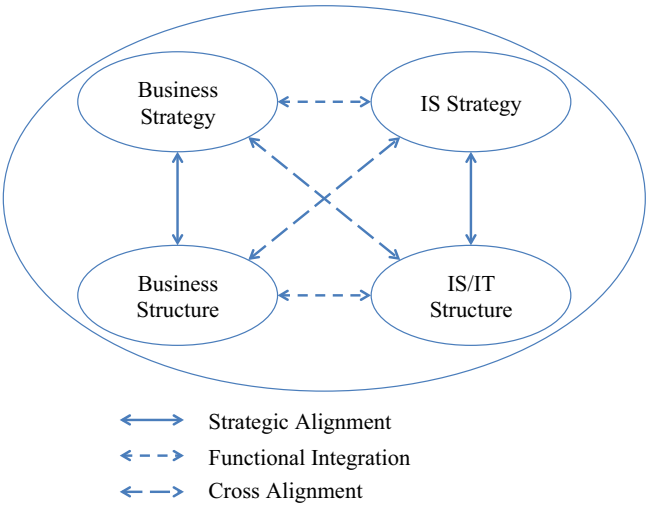
In the present work, we have uncovered the deep structure and the invisible colleges of the strategic alignment field anchored to HV93. Thus doing, we highlighted some possible significant explanations for the disparity between the intended contribution of the corresponding literature and the practical consequences of its application in organizations. Moreover, we proposed solutions and different possible approaches to address this issue.

In doing so, we have responded to the challenge of identifying the *intellectual core* of the research field built around HV93 through TCA (a variation of CCA that is rarely used in IS research). We have also highlighted the intellectual structure of this field through the identification of the most influential sources in which its literature is anchored. Even though the basic assumptions and premises of SAM have largely been called into question, we have shown, through qualitative analysis of the highlighted sources, that these sources identify, confirm, justify, validate, and reinforce the original positioning of HV93, and anchor the field in a specific, prescriptive, normative, and top-down approach to strategic alignment management.

IS strategic alignment may be considered today as a truism (Ciborra, 1997) and it is supported by a well-established body of literature. However, the vast majority of articles citing HV93 either test or validate the constructs of SAM and the relationships between them. The majority of these articles do not question the assumptions of SAM (the true nature of strategy; the performativity of the model; managerial rationality and organizational members' redundancy). Indeed, the constraining assumptions of HV93 appear to be implicitly integrated in the field, within its intellectual structure. This fact is particularly significant as it reveals that the field of research is homogeneous: Articles from the *intellectual cores* re-anchor themselves in theoretical pillars that relate to the three initial hypotheses, despite the fact that these hypotheses have been openly contested within the IS literature (see, for instance, Ciborra, 1997, 1998; Campbell et al., 2005) and the strategic management literature (for instance, by the SaP stream: Whittington, 1996; Jarzabkowski and Spee, 2009). This illuminates the fact that

most of the literature citing HV93 appears disconnected from the current organizational reality and the practices therein. It seems therefore essential to move out of the framework imposed by the concepts and representations of HV93 in order to "*go back to the basic evidences, and encounter the world as it presents itself in our everyday experience*" (Ciborra, 1997: p. 72). We urge researchers both to reconsider and to reconceptualize the IS strategic alignment from an alternative perspective that questions, adapts and/or reframes SAM in closer relation to today's evolving reality. Perhaps then, we might begin to amend the success rate of new IT implementation in organizations.

Appendix A. The strategic alignment model (adapted from HV93)



Appendix B. 2011 Matrices

B.1. Raw matrix

	a1_Porter	a2_Reich	a3_McFarlan	a4_Barney	a5_Earl	a6_Chan	a7_Reich	a8_Earl	a9_Lederer	a10_Porter	a11_Porter
a1_Porter		7	17	9	8	4	5	5	4	8	7
a2_Reich	7		7	4	10	15	15	3	10	5	7
a3_McFarlan	17	7		9	8	3	3	9	7	7	6
a4_Barney	9	4	9		2	4	2	3	1	6	3
a5_Earl	8	10	8	2		6	6	8	12	5	3
a6_Chan	4	15	3	4	6		11	3	6	3	2
a7_Reich	5	15	3	2	6	11		3	5	1	3
a8_Earl	5	3	9	3	8	3	3		5	2	3
a9_Lederer	4	10	7	1	12	6	5	5		0	3
a10_Porter	8	5	7	6	5	3	1	2	0		9
a11_Porter	7	7	6	3	3	2	3	3	3	9	
a12_Ross	0	4	8	8	3	3	3	6	1	6	3
a13_Branche	0	6	2	4	5	3	6	3	5	2	1
a14_Johnsto	1	7	8	4	3	5	5	2	4	6	4
a15_Miles	0	7	3	0	5	4	7	4	6	1	9
a16_Hamme	6	0	5	5	1	1	0	2	0	3	2
a17_Ives	14	4	14	8	5	2	0	4	3	7	4
a18_King	8	7	7	2	6	6	5	2	9	2	3
a19_Sabherv	3	9	1	2	2	8	10	2	3	2	3
a20_Bharadv	5	5	5	10	2	5	4	2	2	5	2
a21_Brown	1	10	2	3	2	7	7	4	2	2	2
a22_Das	7	6	4	2	5	6	4	2	7	2	2
a23_Fornell	4	8	2	1	3	8	5	1	7	1	3
a24_Nunnall	3	4	3	1	0	4	4	3	2	4	3

B.2. Normalized matrix

	a1_Porter	a2_Reich	a3_McFarlan	a4_Barney	a5_Earl	a6_Chan	a7_Reich	a8_Earl	a9_Lederer	a10_Porter	a11_Porter
a1_Porter	1,00	0,26	0,65	0,36	0,32	0,17	0,21	0,22	0,18	0,36	0,33
a2_Reich	0,26	1,00	0,27	0,16	0,40	0,63	0,63	0,13	0,45	0,23	0,33
a3_McFarlan	0,65	0,27	1,00	0,36	0,32	0,13	0,13	0,39	0,32	0,32	0,29
a4_Barney	0,36	0,16	0,36	1,00	0,08	0,17	0,08	0,13	0,05	0,27	0,14
a5_Earl	0,32	0,40	0,32	0,08	1,00	0,25	0,25	0,35	0,55	0,23	0,14
a6_Chan	0,17	0,63	0,13	0,17	0,25	1,00	0,46	0,13	0,27	0,14	0,10
a7_Reich	0,21	0,63	0,13	0,08	0,25	0,46	1,00	0,13	0,23	0,05	0,14
a8_Earl	0,22	0,13	0,39	0,13	0,35	0,13	0,13	1,00	0,23	0,09	0,14
a9_Lederer	0,18	0,45	0,32	0,05	0,55	0,27	0,23	0,23	1,00	0,00	0,14
a10_Porter	0,36	0,23	0,32	0,27	0,23	0,14	0,05	0,09	0,00	1,00	0,43
a11_Porter	0,33	0,33	0,29	0,14	0,14	0,10	0,14	0,14	0,14	0,43	1,00
a12_Ross	0,00	0,20	0,40	0,40	0,15	0,15	0,15	0,30	0,05	0,30	0,15
a13_Branche	0,00	0,33	0,11	0,22	0,28	0,17	0,33	0,17	0,28	0,11	0,06
a14_Johnsto	0,06	0,39	0,44	0,22	0,17	0,28	0,28	0,11	0,22	0,33	0,22
a15_Miles	0,00	0,39	0,17	0,00	0,28	0,22	0,39	0,22	0,33	0,06	0,50
a16_Hamme	0,35	0,00	0,29	0,29	0,06	0,06	0,00	0,12	0,00	0,18	0,12
a17_Ives	0,82	0,24	0,82	0,47	0,29	0,12	0,00	0,24	0,18	0,41	0,24
a18_King	0,47	0,41	0,41	0,12	0,35	0,35	0,29	0,12	0,53	0,12	0,18
a19_Sabherv	0,18	0,53	0,06	0,12	0,12	0,47	0,59	0,12	0,18	0,12	0,18
a20_Bharadv	0,31	0,31	0,31	0,63	0,13	0,31	0,25	0,13	0,13	0,31	0,13
a21_Brown	0,06	0,63	0,13	0,19	0,13	0,44	0,44	0,25	0,13	0,13	0,13
a22_Das	0,44	0,38	0,25	0,13	0,31	0,38	0,25	0,13	0,44	0,13	0,13
a23_Fornell	0,27	0,53	0,13	0,07	0,20	0,53	0,33	0,07	0,47	0,07	0,20
a24_Nunnall	0,20	0,27	0,20	0,07	0,00	0,27	0,27	0,20	0,13	0,27	0,20

Appendix C. 2014 Matrices

C.1. Raw matrix

	a38_Amit	a19_Avison	a2_Barney	a39_Bergeron	a8_Bharadwa	a28_Branche	a31_Brier	a15_Brown	a40_Chan	a3_Chan	a43_Chan	a16_Chan
a38_Amit			17	1	15	3	3	1		2		2
a19_Avison			4	7	3	1	5	5	7	7	4	7
a2_Barney	17	4		8	26	8	8	6	3	10	2	7
a39_Bergeron	1	7	8		3	3	5	6	5	10	7	7
a8_Bharadwa	15	3	26	3		5	5	4	2	10	2	5
a28_Branche	3	1	8	3	5		3	7	4	8	1	1
a31_Brier	3	5	8	5	5	3		6	4	8	7	7
a15_Brown	1	5	6	6	4	7	6		5	15	5	4
a40_Chan		7	3	5	2	4	4	5		9	4	4
a3_Chan	2	7	10	10	10	8	8	15	9		10	12
a43_Chan		4	2	7	2	1	7	5	4	10		13
a16_Chan	2	7	7	7	5	1	7	4	4	12	13	
a9_Earl	5	5	5	1	3	3	2	4	3	8		
a12_Earl	2	3	3	4	2	6	5	3	3	8	5	1
a29_Fornell	3		4	2	8	3	5	3	1	10	3	2
a44_Grant	9	2	15	4	13	5	1	4	1	5	1	2
a41_Hirschhe	1	6	4	4	2	2	4	8	7	10	3	4
a34_Ives	2	1	9	1	4	3	1	5	3	6	1	1
a42_Kearns	1	4	3	4	2	3	3	5	5	7	3	4
a25_Kearns	1	9	7	9	6	4	9	6	8	12	7	9
a35_King	2	1	3	2	4	5	2	3	3	8	2	1
a13_Luftman	1	8	5	9	3	4	7	9	9	12	10	9
a30_Luftman		8	4	6	1	3	5	6	11	7	4	3
a22_Luftman		4	4	5	3	3	7	5	2	6	4	5
a23_Mata	9	3	17	1	13	2	3	4	1	4	1	2
a24_Mcfarlan	2	1	8	2	4	2	3	2	2	4		
a36_Melville	6	1	13	3	14	3	2	2		5	1	4
a20_Miles	2	6	5	6	4	3	7	5	4	12	5	7

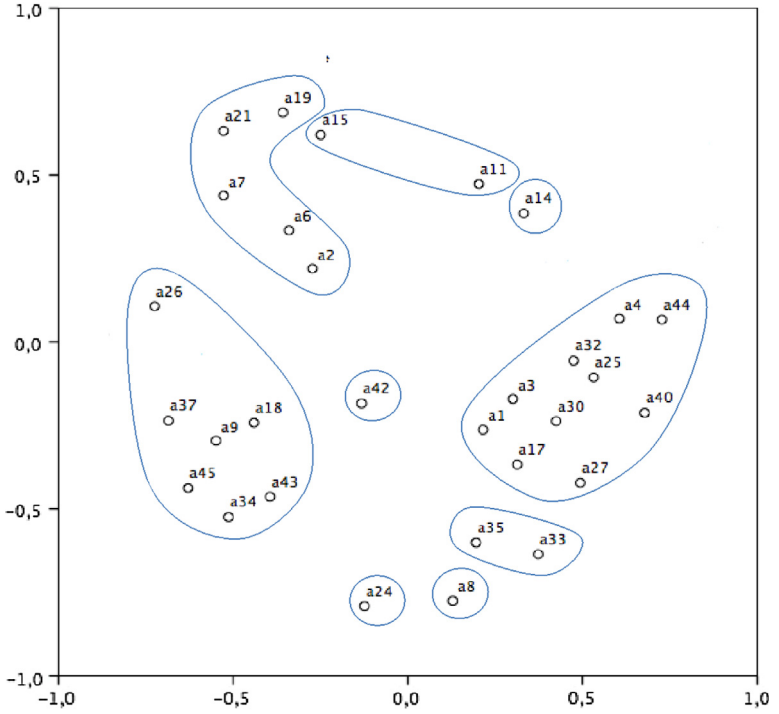
C.2. Normalized matrix

	a38_Amit	a19_Avison	a2_Barney	a39_Bergeron	a8_Bharadwa	a28_Branchea	a31_Brier	a15_Brown	a40_Chan	a3_Chan	a43_Chan	a16_Chan
a38_Amit	1,00	0,00	0,81	0,05	0,71	0,14	0,14	0,05	0,00	0,10	0,00	0,10
a19_Avison	0,00	1,00	0,14	0,33	0,11	0,04	0,22	0,18	0,33	0,25	0,20	0,25
a2_Barney	0,81	0,14	1,00	0,38	0,70	0,33	0,35	0,20	0,14	0,20	0,10	0,23
a39_Bergeron	0,05	0,33	0,38	1,00	0,14	0,14	0,24	0,29	0,24	0,48	0,35	0,33
a8_Bharadwa	0,71	0,11	0,70	0,14	1,00	0,21	0,22	0,13	0,10	0,27	0,10	0,17
a28_Branchea	0,14	0,04	0,33	0,14	0,21	1,00	0,13	0,29	0,19	0,33	0,05	0,04
a31_Brier	0,14	0,22	0,35	0,24	0,22	0,13	1,00	0,26	0,19	0,35	0,35	0,30
a15_Brown	0,05	0,18	0,20	0,29	0,13	0,29	0,26	1,00	0,24	0,50	0,25	0,13
a40_Chan	0,00	0,33	0,14	0,24	0,10	0,19	0,19	0,24	1,00	0,43	0,20	0,19
a3_Chan	0,10	0,25	0,20	0,48	0,27	0,33	0,35	0,50	0,43	1,00	0,50	0,40
a43_Chan	0,00	0,20	0,10	0,35	0,10	0,05	0,35	0,25	0,20	0,50	1,00	0,65
a16_Chan	0,10	0,25	0,23	0,33	0,17	0,04	0,30	0,13	0,19	0,40	0,65	1,00
a9_Earl	0,24	0,18	0,14	0,05	0,08	0,13	0,09	0,13	0,14	0,22	0,00	0,00
a12_Earl	0,10	0,11	0,10	0,19	0,06	0,25	0,22	0,10	0,14	0,26	0,25	0,03
a29_Fornell	0,14	0,00	0,17	0,10	0,33	0,13	0,22	0,13	0,05	0,42	0,15	0,08
a44_Grant	0,45	0,10	0,75	0,20	0,65	0,25	0,05	0,20	0,05	0,25	0,05	0,10
a41_Hirschhe	0,05	0,29	0,19	0,19	0,10	0,10	0,19	0,38	0,33	0,48	0,15	0,19
a34_Ives	0,10	0,05	0,41	0,05	0,18	0,14	0,05	0,23	0,14	0,27	0,05	0,05
a42_Kearns	0,05	0,19	0,14	0,19	0,10	0,14	0,14	0,24	0,24	0,33	0,15	0,19
a25_Kearns	0,05	0,36	0,28	0,43	0,24	0,17	0,39	0,24	0,38	0,48	0,35	0,36
a35_King	0,10	0,05	0,14	0,10	0,18	0,23	0,09	0,14	0,14	0,36	0,10	0,05
a13_Luftman	0,05	0,29	0,16	0,43	0,10	0,17	0,30	0,30	0,43	0,39	0,50	0,30
a30_Luftman	0,00	0,33	0,17	0,29	0,04	0,13	0,22	0,25	0,52	0,29	0,20	0,13
a22_Luftman	0,00	0,15	0,15	0,24	0,11	0,13	0,30	0,19	0,10	0,22	0,20	0,19
a23_Mata	0,43	0,11	0,63	0,05	0,48	0,08	0,13	0,15	0,05	0,15	0,05	0,07
a24_Mcfarlan	0,10	0,04	0,31	0,10	0,15	0,08	0,13	0,08	0,10	0,15	0,00	0,00
a36_Melville	0,29	0,05	0,59	0,14	0,64	0,14	0,09	0,09	0,00	0,23	0,05	0,18
a20_Miles	0,10	0,21	0,18	0,29	0,14	0,13	0,30	0,18	0,19	0,43	0,25	0,25
a17_Porter	0,43	0,07	0,48	0,00	0,41	0,17	0,17	0,14	0,14	0,21	0,15	0,17

Appendix D. Illustration of the trial and error process with the 2011 data set

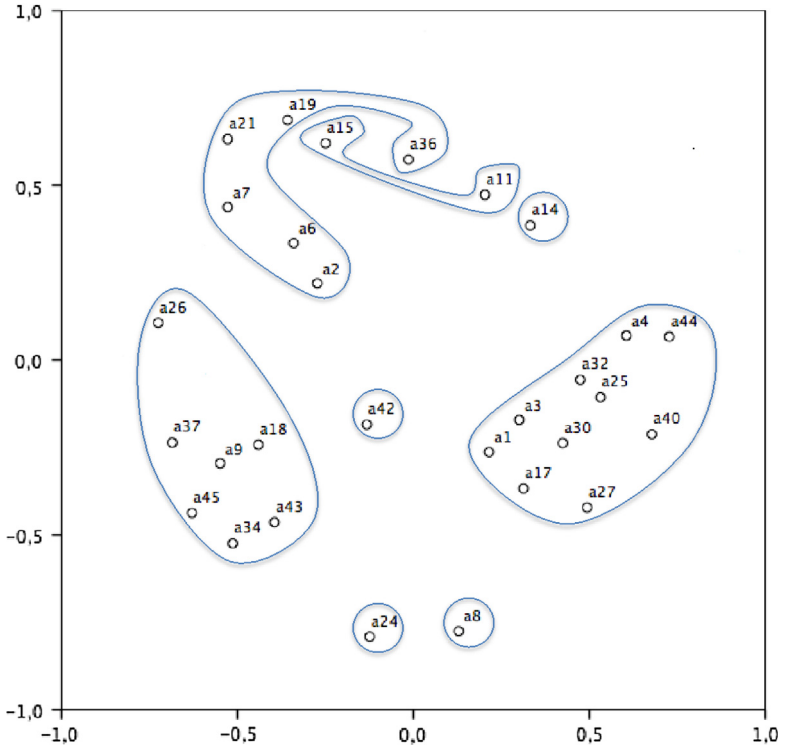
Our analysis was conducted with three threshold levels. We compared the results according to two combined criteria: statistical relevance and meaning.

Intellectual core threshold: 13 citations (45 references)



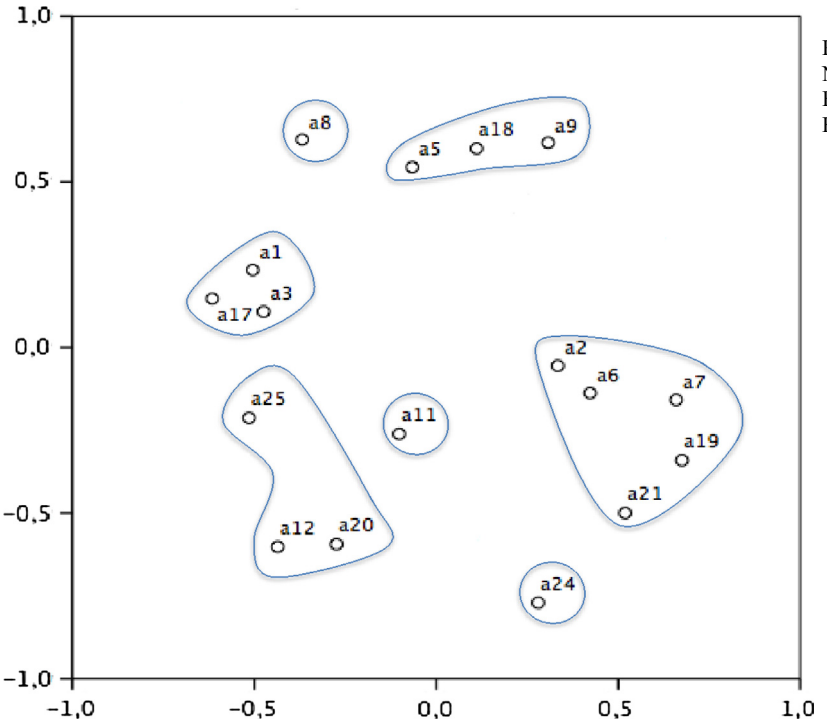
Principal Component Analysis
Non-constrained: 9 factors
Explained variance: 80.455%
Kruskal Stress: 0.088

The non-constrained analysis results in nine factors, of which four are loaded by a single reference. This reduces the significance of the results; thus, we decide to perform the analysis with a constraint of eight factors. If the composition of the group changes slightly, we do not reduce the single-loaded factors: This constraint does not lead to better representation of the field. We conclude that the sample could be too large with 45 references.



Principal Component Analysis
Constrained to 8 factors
Explained variance: 77.701%
Kruskal Stress: 0.088

Intellectual core threshold: 15 citations (25 references)



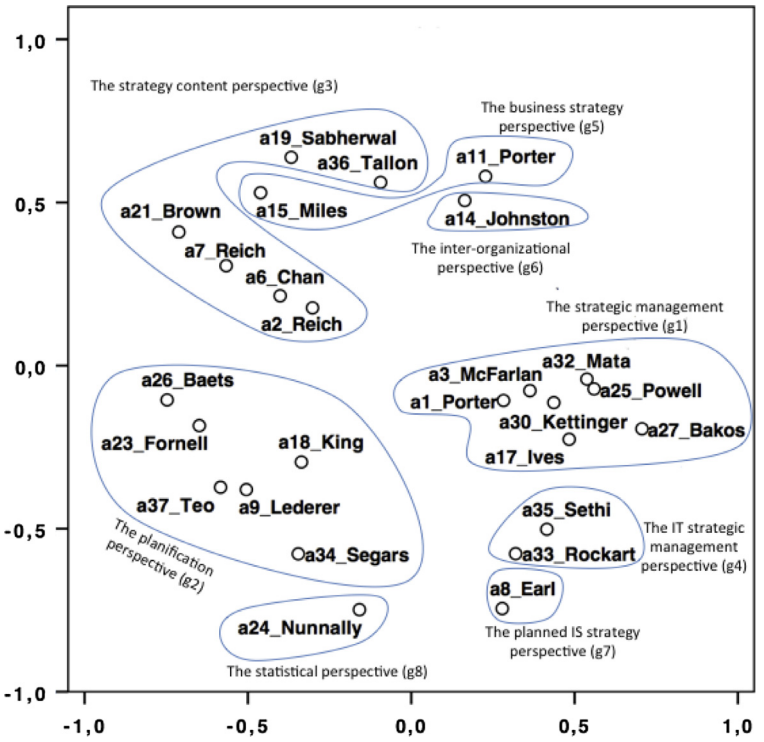
Principal Component Analysis
Non-constrained: 7 factors
Explained variance: 80.6 %
Kruskal Stress: 0.077

With the intellectual core composed of 25 articles, the analysis leads to seven groups, of which two are single-loaded. But with the factor-loading threshold of 0.7, only 16 out of 25 articles are represented in the mapping, which limits the analysis.

Intellectual core threshold: 14 citations (39 references)

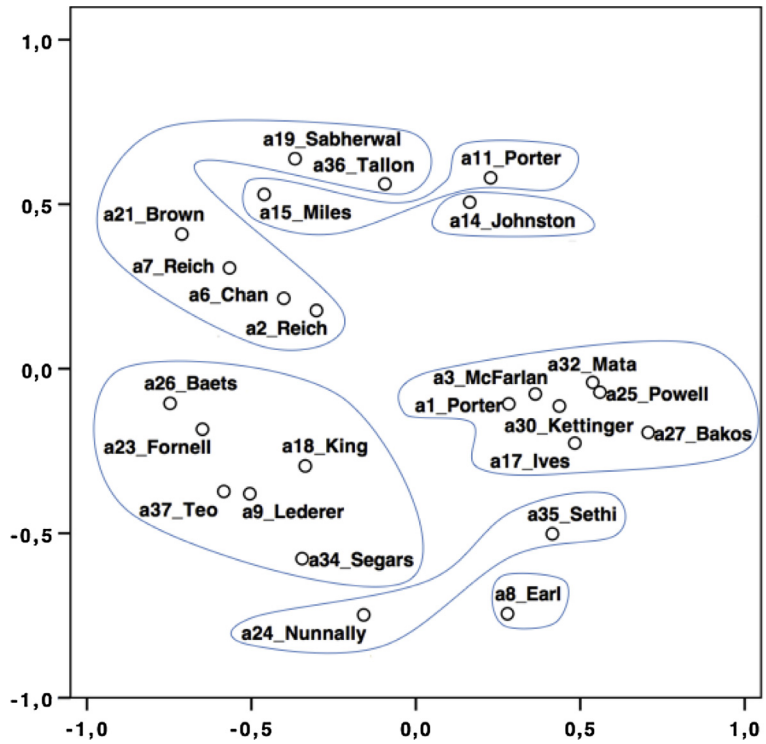
The non-constrained analysis results in nine groups for an explained variance of 82.494%. But of the nine factors, one is not significantly loaded by any reference of the intellectual core, and another is poorly loaded. Thus, we constrain the

analysis to eight factors. If we lose some explained variance and the composition of the groups is roughly the same, the factor loadings are stronger.



Principal Component Analysis
Constrained to 8 factors
Explained variance: 79.640%
Kruskal Stress: 0.086

We also attempted an analysis with a constraint of seven factors, but the extra meaning garnered was negligible compared to the loss of statistical meaning. Indeed, if the mapping with eight factors has a single group more, this is not an issue since this reference is atypical (a statistical method on structural equation reference).



Principal Component Analysis
Constrained to 7 factors
Explained variance: 76.335%
Kruskal Stress: 0.086

Appendix E. Composition of the intellectual cores (2011 and 2014) (References that are common to the two intellectual cores are italicized.)

Intellectual core, 2011			Intellectual core, 2014		
Code	Authors & publication dates	#Cit.	Code	Authors & publication dates	#Cit.
a26	Baets (1992)	14	a38	Amit and Schoemaker (1993)	21
a27	Bakos and Treacy (1986)	14	a19	Avison et al. (2004)	28
a4	Barney (1991)	25	a2	Barney (1991)	52
a20	Bharadwaj (2000)	16	a39	Bergeron et al. (2004)	21
a13	*Brancheau et al. (1996)*	18	a8	Bharadwaj (2000)	37
a21	*Brown and Magill (1994)*	16	a28	*Brancheau et al. (1996)*	24
a6	*Chan et al. (1997)*	24	a31	Luftman et al. (1999)	23
a22	Das et al. (1991)	16	a15	*Brown and Magill (1994)*	30
a28	Davenport (1993)	14	a16	Chan and Reich (2007a)	30
a8	*Earl (1989)*	25	a40	Chan (2002)	21
a5	*Earl (1993)*	23	a3	*Chan et al. (1997)*	51
a23	*Fornell and Larcker (1981)*	15	a9	*Earl (1989)*	37
a16	Hammer and Champy (1993)	17	a12	*Earl (1993)*	31
a29	Henderson (1990)	14	a29	*Fornell and Larcker (1981)*	24
a17	*Ives and Learmonth (1984)*	17	a41	Hirschheim and Sabherwal (2001)	21
a14	Johnston and Vitale (1988)	18	a34	*Ives and Learmonth (1984)*	22
a30	Kettinger et al. (1994)	14	a42	Kearns and Lederer (2000)	21
a18	*King (1978)*	17	a25	Kearns and Lederer (2003)	25
a9	Lederer and Mendelow (1988)	22	a35	*King (1978)*	22
a31	*Luftman et al. (1993)*	14	a13	Luftman and Brier (1999)	31
a32	*Mata et al. (1995)*	14	a30	Luftman (2000)	24
a3	*McFarlan (1984)*	26	a22	*Luftman et al. (1993)*	27
a15	*Miles and Snow (1978)*	18	a23	*Mata et al. (1995)*	27
a24	Nunnally (1978)	15	a24	*Mcfarlan (1984)*	26
a11	*Porter (1980)*	22	a36	Melville et al. (2004)	22
a10	*Porter (1985)*	23	a20	*Miles and Snow (1978)*	28
a1	*Porter and Millar (1985)*	27	a7	*Porter and Millar (1985)*	40
a25	Powell and Dent-Micallef (1997)	15	a6	*Porter (1980)*	40
a2	*Reich and Benbasat (1996)*	24	a17	*Porter (1985)*	29
a7	*Reich and Benbasat (2000)*	27	a5	*Reich and Benbasat (1996)*	43
a33	*Rockart et al. (1996)*	14	a1	*Reich and Benbasat (2000)*	53
a12	*Ross et al. (1996)*	20	a32	*Rockart et al. (1996)*	23
a19	*Sabherwal and Chan (2001)*	17	a21	*Ross et al. (1996)*	28
a34	*Segars and Grover (1998)*	14	a4	*Sabherwal and Chan (2001)*	46
a35	Sethi and King (1994)	14	a26	Sambamurthy et al. (2003)	25
a36	*Tallon et al. (2000)*	14	a33	*Segars and Grover (1998)*	23
a37	*Teo and King (1997)*	14	a14	*Tallon et al. (2000)*	31
a38	*Venkatraman (1989a)*	14	a37	*Teo and King (1997)*	22
a39	Venkatraman (1989b)	14	a11	*Venkatraman (1989a)*	32
			a27	Wernerfelt (1984)	25

Appendix F. PCA results and corresponding groups resulting from the two phases of our research

2011						2014					
Factor/ Group	Factor/Group composition	Factor loading	Factor/ Group	Factor/Group composition	Factor loading	Factor/ Group	Factor/Group composition	Factor loading	Factor/ Group	Factor/Group composition	Factor loading
g1	a17_Ives	0.91	g3	a2_Reich	0.83	G1	a40_Chan	0.79	G3	a11_Venkatraman	0.84
	a1_Porter	0.86		a19_Sabherwal	0.80		a25_Kearns	0.77		a20_Miles	0.68
	a3_McFarlan	0.85		a6_Chan	0.77		a1_Reich	0.75		a39_Bergeron	0.62
	a30_Kettinger	0.78		a7_Reich	0.76		a30_Luftman	0.74		a9_Earl	−0.59
	a32_Mata	0.76		a21_Brown	0.70		a41_Hirschheim	0.73		a3_Chan	0.57
	a27_Bakos	0.71		a36_Tallon	0.69		a19_Avison	0.72		a16_Chan	0.56
	a25_Powell	0.66		a38_Venkatraman	0.55		a5_Reich	0.71	G4	a12_Earl	0.81
	a4_Barney	0.57	g4	a35_Sethi	0.77		a13_Luftman	0.71		a33_Segars	0.79
	a10_Porter	0.48		a33_Rockart	0.74		a4_Sabherwal	0.69		a29_Fornell	0.76
	a28_Davenport	0.44		a20_Bharadwaj	0.61		a42_Kearns	0.60		a37_Teo	0.73
	a13_Brancheau	−0.46		a12_Ross	0.53		a14_Tallon	0.55		a35_King	0.62
g2	a9_Lederer	0.89	g5	a31_Luftman	−0.48		a15_Brown	0.50	G5	a34_Ives	0.89
	a18_King	0.85		a11_Porter	0.82		a31_Brier	0.46		a24_Mcfarlan	0.83
	a37_Teo	0.84		a15_Miles	0.67	G2	a8_Bharadwaj	0.91		a7_Porter	0.82
	a34_Segars	0.80		a39_Venkatraman	0.50		a2_Barney	0.87	G6	a32_Rockart	0.79
	a23_Fornell	0.74	g6	a14_Johnston	0.81		a36_Melville	0.86		a28_Brancheau	0.62
	a26_Baets	0.70	g7	a8_Earl	0.77		a27_Wernerfelt	0.85	G7	a6_Porter	0.70
	a22_Das	0.61		a5_Earl	0.62		a38_Amit	0.81		a17_Porter	0.53
	a29_Henderson	0.47	g8	a24_Nunnally	0.85		a23_Mata	0.71			
				a16_Hammer	−0.43		a21_Ross	0.69			
							a26_Sambamurthy	0.68			
							a22_Luftman	−0.41			

Appendix G. Description of the 2011 *invisible college*

Group 1: The strategic management perspective (11 references – g1)

The first group (g1) includes the works of Ives and Learmonth (1984 – a17), McFarlan (1984 – a3), Porter (1985 – a10*), Porter and Millar (1985 – a1), Bakos and Treacy (1986 – a27), Barney (1991 – a4*), Mata et al. (1995 – a32), Kettinger et al. (1994 – a30), Powell and Dent-Micallef (1997 – a25), Davenport (1993 – a28*), and Brancheau et al. (1996 – a13*). This first group considers IS/IT as a source of competitive advantage from a strategic management perspective. It is divided into two subgroups. The first is built around the work of Porter and Millar (1985). It considers that IS do not create value in themselves, but rather that they support value creation and competitive advantage through their influence on different strategic forces (McFarlan, 1984) or competitive strategies (Bakos and Treacy, 1986; Ives and Learmonth, 1984). This perspective shows that IT has more than a support function: It is the source of competitive advantage. Hence, managers should be aware of technological opportunities in the market in order to stay ahead of their competitors. The second subgroup, composed of articles published after 1990, criticizes the fact that IS/IT can create a sustainable competitive advantage, due to their being easily imitated and standardized (Mata et al., 1995; Kettinger et al., 1994; Powell and Dent-Micallef, 1997). This group is inspired by Barney (1991) and considers that IS/IT are important resources for a firm because they promote the exploitation of other resources that are the true sources of competitive advantage (Powell and Dent-Micallef, 1997). It follows that the manager should not focus on technologies *per se*, but on their organization and management within the firm (Mata et al., 1995). Competitive advantage is not guaranteed by advanced technology, but rather by technology that serves the strategic resources and competences of the firm (Kettinger et al., 1994).

Group 2: The planning perspective (nine references –g2)

The second group (g2) includes articles by King (1978 – a18), Fornell and Larcker (1981 – a23), Henderson (1990 – a29*), Das et al. (1991 – a22*), Baets (1992 – a26), Teo and King (1997 – a37), Segars and Grover (1998 – a34), Lederer and Mendelow (1988 – a9), and Davenport (1993 – a28*).[8] This group assumes that both IS and IT are strategic components of an organization and that it is necessary to plan them (King, 1978). The IS strategy should be thought of *ex post* according to a firm's actual business strategy. As such, business and IS strategy are strongly linked and aligned (Teo and King, 1997; Baets, 1992; Segars and Grover, 1998; Lederer and Mendelow, 1988); however, this link is unidirectional in the sense that IS strategy should be aligned with business strategy, and not the other way around.

Group 3: The strategy content perspective (eight references – g3)

The third group (g3) includes the following articles: Venkatraman (1989a – a38*), Brown and Magill (1994 – a21), Reich and Benbasat (1996 – a2, 2000 – a7), Chan et al. (1997 – a6), Tallon et al. (2000 – a36), Sabherwal and Chan (2001 – a19), and Hammer and Champy (1993 – a16*). This group does not postulate any sort of hierarchy between IS and business strategy. The IS strategy should not be determined, based on the business strategy: IS and IT are strategic elements in themselves to be taken into account; they can drive the business side of a firm. These authors study the impact of strategic alignment on performance (Tallon et al., 2000; Sabherwal and Chan, 2001). They have a strategy content approach: They study realized strategic alignment along with its impact on performance (Sabherwal and Chan, 2001), as well as the key success factors that lead to strategic alignment (Reich and Benbasat, 1996, 2000; Brown and Magill, 1994).

Group 4: The IT strategic management perspective (five references – g4)

The fourth group (g4) includes the articles written by Sethi and King (1994 – a35), Rockart et al. (1996 – a33), Ross et al. (1996 – a12*), Bharadwaj (2000 – a20*), and Luftman et al. (1993 – a31*). This group is concerned with the importance of IS/IT in building up competitive advantage. Like the second subgroup of the first group, the authors here consider that there is no link between the amount of IS/IT investment and a firm's capacity to have competitive advantage. It is up to a firm to transform its IS/IT assets into organizational competences, thereby paving the way to sustainable competitive advantage (Bharadwaj, 2000). They then propose different methods in order to manage these assets efficiently (Rockart et al., 1996; Ross et al., 1996). Moreover, they also define several organizational requirements that are mandatory for an organization to develop global IT capability (Rockart et al., 1996). Finally, these authors propose objective means of measuring how competitive advantage is linked to IT, which can help managers to evaluate and make decisions about the IS/IT dimension of their organizations (Sethi and King, 1994).

Group 5: The business strategy perspective (three references – g5)

The fifth group (g5) is built around the articles of Porter (1980 – a11), Miles and Snow (1978 – a15), and Venkatraman (1989b – a39*). This group includes key articles in strategic management studies, which propose different evaluation methods of a firm's strategy (Miles and Snow, 1978; Porter, 1980; Venkatraman, 1989b). They are helpful for authors who want to investigate and implement the business strategy dimension of SAM.

Group 6: The inter-organizational perspective (one reference – g6)

Johnson and Vitale's (1988 – a14) work constitutes the sixth group (g6), which is related to the first group in that it defends the idea that IS/IT are critical factors in competitive advantage building. However, this group concentrates on inter-organizational systems.

[8] a28 is equally loaded in Groups 1 and 2. While this article links these two groups, our analysis here does not focus on these links.

Group 7: The planned IS strategy perspective (two references –g7)

The seventh group (g7) is composed of two contributions written by Earl (1989 – a8*, 1993 – a5), in which he investigates strategic IS planning and its impact on business strategy. It is both similar to and different from the second group in its being more business-strategy-focused than IS-focused.

Group 8: The statistical perspective (one reference – g8)

The final, eighth group (g8) includes a single reference – Nunnally (1978 – a24) – and is concerned with statistical issues. This article deals with the structural equation method and demonstrates the importance of hypotheses testing in the strategic alignment literature. This group is significantly linked to the third group.

Appendix H. Description of the 2014 *invisible college*

Group 1: Managing strategic alignment (13 references – G1)

The first group (G1) includes the works of Chan (2002 – a40), Kearns and Lederer (2003 – a25, 2000 – a42), Reich and Benbasat (2000 – a1, 1996 – a5), Luftman (2000 – a30), Hirschheim and Sabherwal (2001 – a41), Avison et al. (2004 – a19), Luftman and Brier (1999 – a13), Sabherwal and Chan (2001 – a4), Tallon et al. (2000 – a14*), Luftman et al. (1999 – a31*), and Brown and Magill (1994 – a15*)[9]. Documents in this group posit that strategic alignment is a factor of firm performance (Hirschheim and Sabherwal, 2001) and a condition needed to develop a competitive advantage (Kearns and Lederer, 2000). All of them follow SAM's legacy; however, while not criticizing the model in itself, they recognize the difficulty for managers of dealing with it and applying its prescriptions to the course of their daily actions (Avison et al., 2004 – a19). Consequently, these articles propose different ways of bringing the model closer to the managerial *reality* and propose, in a cumulative research tradition, factors, methods, and ideal behaviors that enhance the ability of a firm to be strategically aligned and so to be more efficient.

Group 2: Strategic alignment as a strategic resource and capability (nine references – G2)

The second group (G2) includes articles by Bharadwaj (2000 – a8), Barney (1991 – a2), Melville et al. (2004 – a36), Wernerfelt (1984 – a27), Amit and Schoemaker (1993 – a38), Mata et al. (1995 – a23), Ross et al. (1996 – a21), Sambamurthy et al. (2003 – a26), and Luftman et al. (1994 – a22*). These documents share a Resource-Based View (now RBV) of the firm (Wernerfelt, 1984; Barney, 1991). As in the Porterian perspective, the managers still have the lead on the strategic choice, and IT value creation is influenced by its competitive and macro-environment (Melville et al., 2004). But its role is more than in decision-making on an environmental basis; it must also manage the resources at the origin of the competitive advantage (Amit and Schoemaker, 1993). However, Mata et al. (1995) show that IT is not a strategic resource in itself. The IT managerial skills of the organization are strategic. As we saw in the previous group, the capacity of a firm to be strategically aligned is one of these managerial skills. Bharadwaj (2000), Ross et al. (1996), and Sambamurthy et al. (2003) underline these outcomes by defining the optimal way of managing these strategic resources and capacities.

Group 3: Operationalize organizational domains (five references – G3)

The third group (G3) includes the following documents: Venkatraman (1989b – a11), Miles and Snow (1978 – a20), Bergeron et al. (2004 – a39), Earl (1989 – a9*), Chan and Reich (2007a – a16*), and Chan et al. (1997 – a3*). These works provide tools to operationalize the various SAM domains, as in Chan and Reich (2007a), who propose a complete review of the literature on strategic alignment that specifies the operationalization of SAM's domains. The typology proposed by Miles and Snow is anchored in the legacy of Chandler (1962) or Rumelt (1974). Venkatraman (1989) proposes six methodological perspectives to operationalize and measure the concept of fit. This point is central in our analysis, because it indicates that the literature is influenced by a statistical approach to SAM. Authors that mobilize this work will naturally try to test, verify, and validate the model in a cumulative research perspective (cf. Ciborra's critique, 1998). Earl (1989) proposes an approach to operationalize Porter's framework: He helps managers identify IT strategic implications and make decisions in line with previously determined business objectives (Avison et al., 2007). The Bergeron et al. (2004) article is an example of the operationalization of the model. From a Gestalt perspective (Venkatraman, 1989b), authors test the impact of the model, as a whole, on performance. This explains the presence of this work in the group: The authors propose methods to operationalize each domain of the model and provide tools for researchers to test the links between domains in a cumulative research perspective.

Group 4: The strategic information system planning (five references – G4)

The fourth group (G4) includes the works of Earl (1993 – a12), Segars and Grover (1998 – a33), Fornell and Larcker (1981 – a29), Teo and King (1997 – a37), and King (1978 – a35). These references mostly deal with SISP and assume its importance for organization. Therefore, they consider that strategic alignment is a necessary but not sufficient condition to SISP performance. Thus, King (1978) assumes that SISP is the adaptation and transformation of the organizational strategy set into the MIS strategy set. Earl (1993) deepens this perspective and considers that SISP is more than a simple plan definition, since it covers the definition of a method, a process, and the implementation of the plan. Teo and King (1997), as well as Segars and Grover (1998), propose practical tools to optimize SISP management and performance.

[9] Note that this article is more loaded on the sixth group, but, in terms of meaning, it is closer to this one.

The methodological contribution of Fornell and Larcker (1981) on structural equations illustrates the conception driven by these perspectives, that is the measurability of the domains of SAM, and this shows the importance of hypotheses testing in the strategic alignment literature.

Group 5: IT as a driver to competitive advantage (three references – G5)

The fifth group (G5) is constructed around the articles of Ives and Learmonth (1984 – a34), McFarlan (1984 – a24), and Porter and Millar (1985 – a7). These works follow the same objective: demonstrating that IS have a strategic impact. Based on Porter's Five Forces Framework and its generic strategies (1979), McFarlan shows that the development of the new ICT in the 1980s had a considerable impact on the way organizations compete, and is at the origin of competitive advantages since it optimizes the adoption and implementation of the generic strategies. Porter and Millar (1985) confirm this analysis, and therefore assume that IT is a driver for competitive advantage through the optimization of both the internal value chain and the value system that involve its suppliers and buyers.

Group 6: IT issues for managers (two references – G6)

Rockart et al. (1996 – a32) and Brancheau et al. (1996 – a28) constitute the sixth group (G6). Brancheau et al. (1996) publish a longitudinal study of the key concerns of IS managers and show that the technical concern, i.e. the development and the implementation of a performing IT, is the key issue for practitioners; concerns about planning and alignment are less important. This means that the strategic alignment of IS is implicitly mandatory and that managers should now pay particular attention to managing this alignment. This is confirmed by the work of Rockart et al. (1996), which assumes that managers must respect eight imperatives to manage IT effectively; strategic alignment is as important as managerial issues, building effective teams, the ability to deliver and implement new systems, and so on.

Group 7: Design school of strategy (two references – G7)

The seventh group (G7) is composed of two contributions written by Porter (1980 – a6, 1985 – a17*), in which he proposes his two seminal contributions: the five forces and the value chain frameworks.

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