

Information Systems Strategy

Theory, Practice, and Challenges for Future Research

IS strategy has been right at the top of IT management agendas for years. Given the technological and economic transformations we are currently witnessing, the topic's importance might even increase in the future. However, this trend is not adequately reflected in IS strategy research. Research activities had their peak in the 1990s and declined since then. In fact, it now appears that IS strategy research and practice have diverged significantly over time. Hence, it is not surprising that academic recommendations are rarely adopted by practitioners, if they are perceived at all. In response to this problem, the latest academic debate on IS strategy research suggests a turn towards practice. The paper at hand introduces a highly topical framework proposed to increase the practical relevance of IS strategy research. This framework particularly reflects current planning conditions as are characteristic for the "Information Age".

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1 Introduction

Information systems (IS) strategy¹ is a significant concern in practice which has dominated management agendas for more than 20 years now. (Galliers et al. 1994; Watson et al. 1997; McGee et al. 2005; Luftman and Ben-Zvi 2011). Accordingly, management positions devoted to IS strategy development can be found in many larger firms and organizations. Common job titles include "head of IT strategy" or "director strategic IT management". Editorial columns in practitioner magazines and practitioner conferences dedicated to the topic of IS strategy (for instance the column "IT-Strategie" in *Computerwoche*, a weekly German IT magazine, and the annual practitioner conference "Strategisches IT-Management" hosted by *Handelsblatt*, a German daily business newspaper) also underline the relevance of the topic.

As can be expected from its prominence in practice, IS strategy has also been an important field of research in academia both in the Anglo-American Information Systems discipline as well as in the German *Wirtschaftsinformatik* as its counterpart. Over the past 40 years,

extensive research has been done on the process of devising IS strategies, the methods and techniques that can be applied to it, the competitive impacts of IS, and the alignment of IS strategies and business strategies. Findings from this research have found their way into numerous publications, including conference and journal publications as well as doctoral dissertations. Nevertheless, research findings and academic recommendations are often ignored in everyday business. Instead, practitioners deal with IS strategy on practitioner conferences and in practitioner magazines which are largely disconnected from the academic debate. Adding to this, the practitioner debate differs so fundamentally from that of academics that both might appear to be lead in their own separate universe.

By now, the academic IS community has begun to recognize the apparent gap between IS strategy research and practice (Ward 2012; Hackney et al. 2000). Academics increasingly discuss the need for a shift of perspective in IS strategy research in order to respond to this development. This discussion is the focus of the paper at hand, which intends to contribute to an up-to-date and practically relevant understanding of IS strategy.

¹We prefer to speak of an IS strategy. Thus we intend to avoid overemphasizing either the technological means (IT) or the ends to which they are employed (i.e., information provided and exchanged). The term IS strategy simultaneously expresses that information and technology are used in pursuit of business purposes and that they are embedded into the organization. Information Systems are socio-technical systems and as such constitute themselves through the relations between business information needs, the users and the technology employed.

The paper starts with an overview of the current state of research on IS strategy. Initially, in Sect. 2 the topic of IS strategy is placed in the broader context of the debate on Strategic Information Systems Planning (SISP). Subsequently, Sect. 3 introduces IS strategy research in more detail, considering both the concept and the contents. Sections 2 and 3 are based on a systematic literature review that has been conducted according to the recommendations by Webster and Watson (2002). The review includes publications from the beginnings of IS strategy research in the 1970s up to 2005 (Teubner and Mocker 2008; Chen et al. 2010). Following this, Sect. 4 confronts the state of research with current IS strategy practice. The insights into practice provided in this section mainly build on experience from interviews with CIOs, findings from other researchers published in the academic literature and, above all, two studies the author has conducted together with colleagues. The first study is a case study of a financial service corporation that was conducted as an action research project over several months in 2003 (Teubner and Mocker 2005; Teubner 2007). The second study is a collection of qualitative in-depth interviews that were conducted with twelve selected IT strategy experts in 2005 and 2006 (Mocker and Teubner 2006; Mocker 2007; Teubner et al. 2009). The experts interviewed actively conducted strategic IS planning in their organizations on a regular basis. They had a formal responsibility for IS strategy in their organizations, which in most cases was also reflected in their job titles (e.g., head of IT strategy). In addition to this, all interviewees accepted as IS strategy experts also represented IS strategy externally by participating in inter-organizational and industry committees or by publishing on practitioner conferences and in magazines (Teubner et al. 2009, pp. 369 f.). All the experts interviewed worked for medium-sized to large companies with headquarters in Germany, most of which did business on an international scale. Finally, Sect. 5 addresses the need for a new perspective on IS strategy by introducing a recent and widely discussed proposition by Robert Galliers on necessary changes in academics' understanding of IS strategy. This proposition is discussed critically against the backdrop of the current state of IS strategy research in academia and its distance to practice. In doing so, we pay special attention to

the potential of Galliers' contribution of adding to the development of an up-to-date and practically relevant understanding of IS strategy. We conclude this paper by consolidating the results of this discussion into a brief summary and outlook section which includes a series of suggestions on how to refocus IS strategy research (Sect. 6).

2 Development of the Academic Debate

Until well into the 1960s, in the times of the so-called era of Data Processing, practical IS planning was dominated by technical problems and their solutions. Information Technology (IT) was primarily used to automate standardized mass data processing. The main aim of IS planning was to develop efficient systems for this purpose. During this time, IS planning was largely independent from business planning and, accordingly, did not have any immediate relationship to strategic business planning (Gibson and Nolan 1974).

During the 1970s, IT became increasingly more interactive, powerful, and less expensive. As a result, the number of areas of worthwhile IS deployment grew significantly. Especially the domain of management was discovered as an area of valuable IS application, so that the 1970s became known as the era of Management Information Systems (MIS) (Ward and Peppard 2002, pp. 17 ff.). This era's main characteristic was a growing demand from functional executives for IS that specifically supported their management tasks. The resulting IS – called management information systems (MIS) – gave this period its name. The main purpose of these MIS was to provide management with extensive information needed for planning and controlling. In reaction to these demands, several new methods for IS planning were developed and applied (Lederer and Sethi 1988), such as Business Systems Planning (IBM 1984), Critical Success Factor Analysis (Rockart 1979), and Method/1 (Arthur Andersen & Co 1982; Lederer and Gardiner 1992). These methods directly linked IS planning to business tasks and problems. More comprehensive methods such as Information Engineering (Martin 1989) finally supported a concerted company-wide planning of IS that aligned to the

company's business concerns and strategic goals. However, this link was one-way only, from business to IS. The approach to designing IS at that time was systematic and top-down, sometimes even adopting engineering-like qualities (Henderson and Sifonis 1988).

With rapid technological advances in data processing and especially in telecommunication in the 1980s, IT developed a competitive dimension: Individual companies began to realize strategic advantages by using information and communication technologies more effectively than their competitors. Charles Wiseman (1985) coined the term "Strategic Information System (SIS)" in order to accentuate this new, competitive view on information systems. For years, the notion that IT was able to deliver a superior competitive position became so popular among academics that this time has retrospectively been identified as the era of Strategic Information Systems (Ward and Peppard 2002, pp. 25 f). During this time, IS planning developed distinctive traits of competitive strategy: of central interest was the question of how IT could be used to support the competitive goals of a company. This new competitive view extended and, in terms of its methods, ultimately even superseded the traditional top-down view of IS planning. Planning methods originating from this time, such as the 5-Forces-Model, the Value Chain model (Porter and Millar 1985), the Strategic Opportunity Grid (Ives and Learmonth 1984), and the Strategic Thrust Model (Rackoff et al. 1985), primarily aim at exploiting the strategic and competitive potential of IT. In contrast to traditional top-down methods such as Information Engineering or Business Systems Planning, they neither prescribe a specific procedure nor do they require specific techniques for modelling and problem-solving. They should rather be understood as heuristic approaches to uncover the strategic and competitive potentials of IT.

In the early 1990s, systematic planning of SIS began to show first signs of its limitations. An analysis of prominent cases of successful SIS documented in literature revealed that, in many cases, SIS success was rather due to fortunate circumstances than to careful and circumspect planning activities (Senn 1992). In addition, the same study showed that strategic IS tended to develop from ordinary IS in the functional areas, particularly at

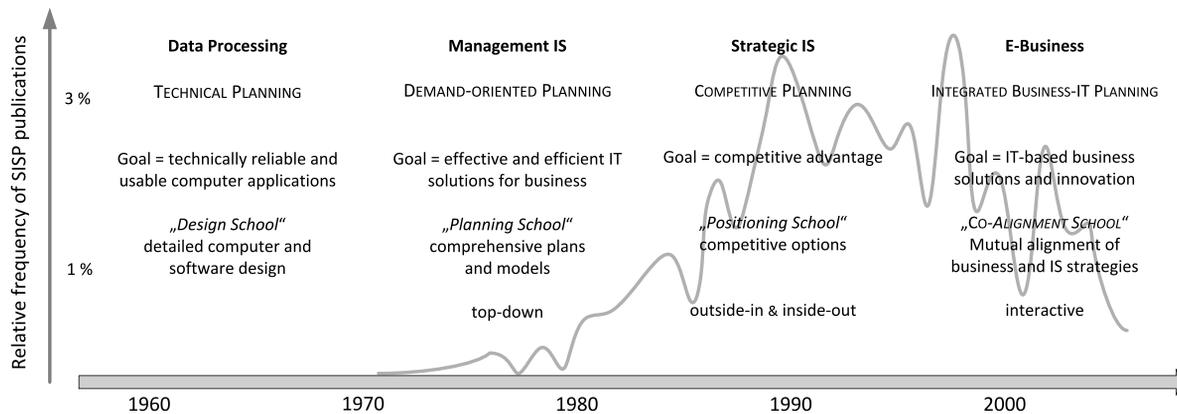


Fig. 1 Development of the academic debate on SISP

the interface to customers and suppliers. Hardly ever were they the result of deliberate initiatives by the IT department. IT departments took part in the process of SIS development, if at all, as technical innovators and moderator. Instead, the proximity to the users in the functional areas (Senn 1992, p. 10; Maier 1997, p. 44) as well as top-management support (Galliers 1991, p. 57) turned out to be of superior importance for the success of SIS initiatives. These insights questioned the kind of “outside-in” planning that most SIS methods had followed until that point. Instead, they turned this reasoning around by focusing on the capabilities of the company (“inside-out”) and emphasizing the link between business planning and IS planning. This link had already been recognized in the top-down methods of the MIS age, but only as a one-way street from business planning to IS planning.

In the 1990s, calls for a mutually aligned business and IS strategy, aiming at a good fit between the two, grew successively louder. This paradigm has been coined “Strategic Alignment” in the academic literature (Henderson and Venkatraman 1989, 1993; Teubner 2006). A more precise designation would actually be “Strategic Co-alignment”, as business and IS strategies are developed in parallel and matched interactively and continuously. The idea of Strategic Alignment was seminal to the IT developments of the late 1990s, which mark the transition to the era of E-Business. As the term “E-Business” already suggests, IT increasingly became integral to all areas and processes of regular business. This unprecedented degree of integration made the idea of Strategic Alignment even more meaningful. As a consequence, IS re-

search gradually moved away from researching and analyzing Strategic Alignment merely from the viewpoint of methodological challenges towards one that also includes a broader organizational dimension (Merali et al. 2012, p. 130; Chan and Reich 2007, p. 308).

The growing extent to which IT became an integral part of business was accompanied by intensified efforts to integrate IS within and even across company boundaries. Additionally, companies found it increasingly difficult to generate competitive advantages through intelligent IT use. First, IT markets had matured and IT products and IT services were generally available – they became a commodity (Carr 2003). Second, internet-based IT solutions were highly visible and could hence be more easily and quickly imitated. As a result, the late 1990s saw the pace and ferocity of competition greatly increasing. The potential to sustain a competitive edge gained by innovative IS rapidly diminished (McAfee and Brynjolfsson 2008). The discussion of IS planning acknowledged these changing circumstances by directing its attention to the “Resource Based View (RBV)” (Mata et al. 1995; Piccoli and Ives 2005). In contrast to the “Market Based View (MBV)”, which many of the methods of the SIS age are based on (Ives and Learmonth 1984; Porter and Millar 1985), the RBV maintains that sustainable competitive advantages do not simply result from individual IS or even particular technologies, but from the unique capabilities of a company. These include, in particular, the ability to develop and operate advantageous IS. Many studies show that this capability demands not only financial and technical prerequisites, but also

a certain level of technological know-how and management competence (Mata et al. 1995; Powell and Dent-Micaleff 1997; Melville et al. 2004).

Figure 1 graphically represents the development of the academic debate on SISP. The x-axis as the time axis shows the progress of the four IT ages in deliberately broad and schematic strokes. Each of the different ages is briefly characterized. The four designations are adapted from Mintzberg’s (1990) differentiation of planning schools. This seems legitimate as other authors also emphasize the correspondences between business planning and IS planning (Chan et al. 1997; Segars and Grover 1999), which, moreover, has been empirically substantiated (Sabherwal and King 1995). However, we do not intend to suggest that the development of strategic IS planning and strategic business planning can be simply equated (Lee and Hsu 2009).

Figure 1 depicts the publication activity as a distribution graph using data collected in a comprehensive literature study which investigated publications from 10 leading Anglo-American and five German IS journals beginning in the 1970s (Teubner and Mocker 2008). The y-axis represents the number of publications on SISP relative to the overall number of publications in these journals. The graph shows that, even accounting for a time lag between actual research activity and its publication in academic journals, the late 1970s mark the earliest point when there is a clearly discernible tendency towards researching strategic issues in IS planning. We are aware that the term “strategic” in conjunction with IS planning research was used before that time, but this happened only to differentiate IS planning focused on business needs from

earlier IS planning focused on technical needs.

A direct comparison of the Anglo-American with the German publication output shows that strategic IS planning is a dominant issue in the former community but only a minor one in the latter (at least as far as the publication of research results in academic journals is concerned). In fact, only very few such studies have been carried out in the German speaking parts of Europe (Brown 2004, p. 26). The publication activity in the “Wirtschaftsinformatik”, the leading German IS journal, may serve to illustrate this. In the last 10 years, there has been practically no publication activity on the topic of SISP. The few publications on SISP that actually exist date back to the end of the 1980s and early 1990s (for instance Kaucky and Niedereichholz 1988; Schumann and Hohe 1988; Roithmayr and Wendner 1992; Hildebrand 1994). The ostensibly low interest in SISP stems from the specific character of the research done in the German discipline of Wirtschaftsinformatik (WI). In contrast to Anglo-American IS research, which has a distinctive bias towards behavioral and mostly empirical research, the WI research concentrates much more on design and engineering aspects of IS (Steininger et al. 2009, p. 480). The engineering-related areas of WI research (Aier et al. 2009; Teubner 2003), such as Information Engineering (Kurbel et al. 1994; Heilmann et al. 1996), Business Engineering (Österle and Winter 2003), and Enterprise Architecture (Aier et al. 2008), include issues of IS strategy but these are not focus of research per se.

An analysis of the content reveals that the majority of SISP publications deal with the question of whether and how companies are able to gain a competitive advantage through the application of IT (Teubner and Mocker 2008). More than half of the studies concentrate on this question (53 %, multiple answers permitted). Other areas stressed are procedures, methods, and frameworks that can be employed for developing IS strategies (28 %) as well as Strategic Alignment which deals with how to bring business and IS strategies into agreement (14 %). One might expect that IS strategy itself as the eventual outcome of SISP would have also been a substantial matter of academic investigation. However, the literature study shows that only 13 % of all publications also deal with the question of what an IS strategy is and what its

contents are supposed to be. This finding corresponds with the assessments by Teo and Ang (2000, p. 275) and Gottschalk (1999, p. 78), both of which conclude that SISP research has so far mainly dealt with the planning process and less with the planning outcome, i.e., IS strategy. A literature study by Brown (2004) supports these results: The lion’s share of the publications studied (84 %) deals with the IS planning process, whereas only 26 % also address the IS strategy as the desired outcome (multiple answers permissible). We thus have to conclude that, despite remarkable research efforts, the construct of “IS strategy” as the eventual outcome of SISP has not received any substantial research attention yet. In light of this finding, the remainder of this article deals with the state of IS strategy research in greater detail. The subsequent section begins by introducing interpretations of IS strategy given in the respective academic literature.

3 IS-Strategy in the Light of the Current Academic Debate

SISP is commonly seen as the process in which IT-based application systems are developed in support of achieving a company’s business goals. This is supported by Earl (2003, p. 60), who asserts that it “is conventional wisdom and practice to think of the information systems plan as an applications development portfolio”. This basic agreement has held over all of the four different ages of SISP (Fig. 1). What has shifted, however, are the elements of SISP that the different periods accentuated. Whereas in the MIS age, SISP primarily focused on satisfying a demand or need for specific IS within a company, the SIS age concentrated on developing and using IS that would deliver a competitive advantage. To highlight this difference, some authors described SISP as “planning of strategic IS” in contradistinction to “strategic planning of IS” (Cavaye and Cragg 1993). In the age of e-business, SISP has become more proactive and concentrates on enabling new business strategies, diversifying business and opening up new business options (King and Teo 2000; Newkirk and Lederer 2006).

Linked to the view that the IT application systems portfolio is at the heart of IS strategy are issues of range and reach of application system support for business processes. Also stressed is the necessity of prioritizing IT application projects

according to economic criteria (Doherty et al. 1999). Some definitions also include planning of the requisite technical, financial, and human resources besides the application system itself (O’Connor 1993, p. 71). Baker (1995, p. 62) goes even further by defining SISP as a process of identifying and prioritizing IS “(…) that are efficient and effective and/or strategic in nature together with the necessary resources (human, technical and financial), management of change considerations, control procedures and organizational structures needed to implement these.” According to this definition, SISP also includes the design of organizational structures, processes, and governance mechanisms.

3.1 Information Systems Strategy Concepts

Beyond the basic agreement that the application systems portfolio constitutes the core of IS strategy, there is a certain heterogeneity in the interpretations of IS strategy and its contents. This is already indicated by the variety of labels that the result of SISP has been given. While some authors speak of “IS strategy” (Galliers 1991), others call it “IT strategy” (Gottschalk 1999), while again others use a combination of both, “IT/IS strategy” (Henderson and Venkatraman 1993). Also applied are the denominations “strategic information plan” (Lederer and Salmela 1996), or “information strategy” (Smits et al. 1997).

A deeper analysis of the common conceptions and ideas that researchers associate with the term IS strategy shows additional differences in comprehension. In our studies of the academic literature on IS strategy (Teubner and Mocker 2008; Chen et al. 2010), we were able to identify four different “mental concepts” (Laurence and Margolis 1999): First, IS strategy is seen as the basic disposition towards IT, or the generally accepted role of IT in the company. Second, IS strategy is seen as instrumental in and an “extended arm” of business strategy. Its purpose is to define the IT support required by strategic business initiatives. Third, IS strategy is understood as a general plan (“master plan”) for the build-out of the company’s information processing throughout the organization. The fourth view sees IS strategy as the departmental plan of the IT department.

Table 1 represents the four views according to four different criteria. The first

Table 1 Strategy concepts in academic literature

Conception	Criterion			
	Central question to be answered	Intended effect	Position adopted	Relation to Business Strategy
IS strategy as basic (managerial) disposition towards IT	What is the role of IT for our business? What is our disposition towards IT investments, IT use, and IT management?	Establishing an organization-wide consensus on importance and use of IT as well as on IT investments.	Organization-centric Normative	IS strategy is self-contained and distinguishable from business strategy.
IS strategy as departmental plan	Which tasks are to be carried out by the IT function in the next planning period?	Identifying required IT resources and ensuring their timely and reliable acquisition and allocation so that business can run smoothly.	Department centric	IS strategy is an operationalization of business strategy on the organizational level of the IT function.
	Which resources are required to do so?		Strategy execution oriented	
IS strategy as extended arm of business strategy	For a given business strategy, how can IT be used to support it?	Creating the IT facilities necessary for the implementation of the business strategy and attainment of competitive advantages.	Business-centric	IS strategy is subordinate to business strategy; it is an extension of business strategy rather than a strategy in its own right.
	In particular, how can IT be used to gain and sustain a competitive business advantage?		Competitive success-oriented	
IS strategy as master plan	Which IT and related assets are needed across the organization?	Provide the IT facilities and capabilities that render the organization able to do successful business in the future.	Information processing centric	IS strategy is a strategy in its own right, it is deployed in alignment with business strategy.
	How to develop and deploy IT and related assets?		Build-out oriented	

criterion is the set of central questions that the conceptualization of IS strategy answers (column 2). Related to this is the intended effect on the business that is sought by the IS strategy (column 3). The position adopted (column 4) defines the aim and focus of strategy formulation. This position also influences the answer to the question of how IS strategy should be aligned with business strategy and thus affects the relation of IS strategy and business strategy (column 5).

As far as a researcher bases her or his research on one of the four conceptualizations shown in **Table 1**, this decision has immediate implications for the content of IS strategy:

- The concept of basic disposition towards IT, i.e., the role assigned to IT in a company (Leidner et al. 2011; Chen et al. 2010; Parsons 1983; Szyper-ski 1981), is closely associated with the importance of IT for the business. Generally, this notion of IS strategy is not concerned with particular decisions or planning issues, but rather takes form in, e.g., “mission statements”. Even though such dispositions are fairly abstract, they nevertheless have a discernible bearing on specific strategic decisions. A basic disposition

might for instance shape the course of IS/IT investment decisions. Such decisions will certainly vary according to whether IT is seen as a strategic factor or “competitive weapon” or merely a supportive tool or even a cost factor in an organization (McFarlan et al. 1983).

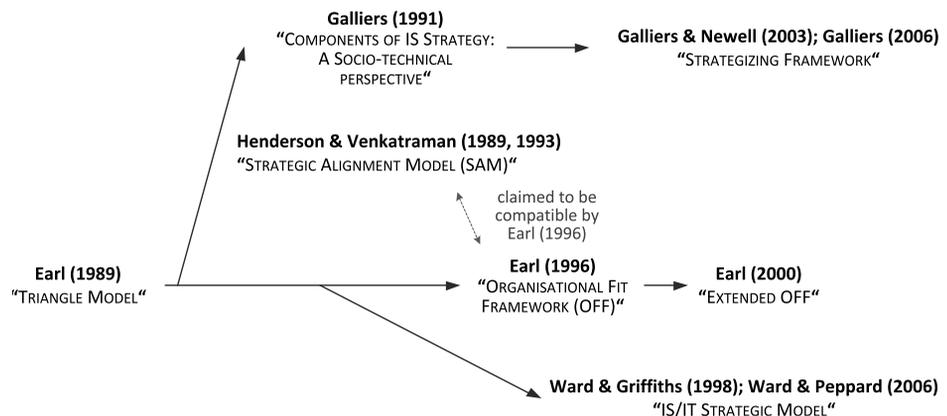
- In contrast to the first conceptualization, the notion of IS strategy as departmental plan (Smits et al. 1997; Boddy et al. 2005, p. 65; Lehner 1993, p. 16) makes use of IS strategy in a much more detailed and concrete form. The focus here is on the short or mid-term IT projects whose implementation constitutes much of the work of IT departments. Additional duties are operational tasks and the (re-)organization of IT functions (e.g., IT service management, risk controlling, or compliance projects). In addition, IS strategies as departmental plans are typically concerned with deploying the requisite IT resources (e.g., personnel and financial resources) to meet these obligations.
- If IS strategy is regarded as an extended arm of the business strategy (Gottschalk 1999; Hoey 1998; Hatten and Hatten 1997), it is constituted directly in relation to the goals and measures set forth in the business strategy.

The focus of IS strategy here is on providing the technical prerequisites for executing the business strategy. An important element of this, and hence also in the focus, are the projects that support strategic initiatives. Such projects are called “strategic projects” in order to distinguish them from operational projects that mainly result from maintenance needs. Particular attention is paid to projects that are directly linked to the competitive strategy of the company (SIS projects).

- In contrast, IS strategies as master plans (Henderson and Venkatraman 1993; Galliers 1991; Earl 1989) are blueprints for the development of a company-wide infrastructure for information processing. As such, these are comprehensive as well as concrete. They are comprehensive because they refer to the organization as a whole and consider technical questions as well as use and application contexts. They are concrete because they determine the principles and concepts and set the course for the build-out of the corporate IT-based infrastructure. Frequently, application systems, or the development portfolio of these, are of central importance here. They are

Table 2 Comparison of IS strategy checklist examples

Das et al. (1991) <i>literature analysis</i>	Conrath et al. (1992) <i>case study analysis</i>	Lederer and Salmela (1996) <i>method analysis</i>
<ul style="list-style-type: none"> ✓ Distinctive competence emphasized in strategic MIS planning ✓ Resources (e.g., IT budget) ✓ Dominant information processing technology ✓ Level of computerization (incl. the MIS function) ✓ Sources from which the firm obtains its information technology ✓ Contribution of MIS department to systems design and development ✓ Medium, by which MIS contributes ✓ Technical processes through which MIS are managed and controlled ✓ Organizational structure of the MIS function ✓ Administrative policies used to motivate and manage employees in MIS department 	<ul style="list-style-type: none"> ✓ Statement of objectives ✓ Hardware plan ✓ Projection of possible future MIS/EDP environment ✓ Recommended implementation plan ✓ Systems development plan ✓ Financial Plan ✓ Personnel plan ✓ Facilities plan ✓ Projection of possible future user environment ✓ Organization plan ✓ Educational plan ✓ Projection of possible future industry environment ✓ Summary of strengths and weaknesses of staff ✓ Comparison of past IS performance vs. plan ✓ Alternate strategies 	<ul style="list-style-type: none"> ✓ Summary of IT strategy ✓ Data plan (data requirements, initial entities), application plan (high-level specification of apps), security and training, tools for the IS function ✓ Cost, benefits, risks, and resource requirements resulting from the plans ✓ Change management plan: actions that will facilitate adoption of IS plan ✓ Human resource plan: newly required IS skills, new roles/ responsibilities ✓ Technical architecture of hardware, supporting databases and system software ✓ Migration plan: overall approach, key projects, their order of implementation with cost, benefits, risks of each project ✓ Process description: annually updating the plan

Fig. 2 Genealogy of Earl's strategy model

supplemented by development plans for the technical infrastructure, the information needs, and the required resources to be provided.

The different conceptions assumed by strategists will find expression in the contents of the resulting IS strategies. However, more studies exist which deal more explicitly with the contents of IS strategies. These are introduced in the next section.

3.2 Contents of Information Systems Strategies

Approaches to investigating the content of IS strategies can be divided into two basic categories: issue lists and conceptual models. The former comprise questions and problems that an IS strategy often deals with or that it should ad-

dress. They are based on literature studies (e.g., Das et al. 1991), case study and questionnaire research (e.g., Wexelblat and Srinivasan 1999; Conrath et al. 1992; Gottschalk 1999), or the analysis of SISP methods and their documentation requirements (e.g., Lederer and Salmela 1996; Flynn and Goleniewska 1993).

Table 2 displays three typical issue lists derived in different ways as examples. Their juxtaposition shows that these lists cover a broad variety of topics. Unfortunately, the terminology used in these lists is not universally defined and therefore very difficult to compare. Another significant problem lies in the fact that the issue lists possess little or no internal structure.

In contrast to issue lists, conceptual models attempt to explore the field of IS strategy in a logically deductive fashion. Among these models, the one intro-

duced by Earl (1989) is arguably the most prominent and influential. Since its inception, the model has undergone several updates and extensions (Earl 1996, 2000) and has inspired several other authors to develop their own models. **Figure 2** displays Earl's influence on the development of conceptual strategy models in terms of an inheritance tree, which we have created by way of a backward citation analysis (Teubner and Mocker 2009, p. 154).

Three central questions have guided Earl in the development of his model: Which business tasks should be supported by IT? How is IT to be used to support these tasks? Whose responsibility is it to provide IT-based solutions and services to the business? The last question also includes the decision as to which tasks are to be performed in-house (insourcing) or rather provided by exter-



Fig. 3 Earl's IS strategy model (Earl 2000)

nal suppliers (outsourcing). In response to these questions, three distinct dimensions of IS strategy result: systems strategy, technology strategy, and management strategy (Earl 1989, 1996): The systems strategy refers to the business areas that are to be supported by IT (what?). It consists of the application portfolio and the planned IS projects. Earl characterizes the systems strategy as oriented towards business goals and demand. The technology strategy in turn defines the necessary technologies and guiding principles which support and govern the implementation of the applications (how?). Earl describes it as implementation-oriented and technology-focused. Finally, the management strategy deals with the role of the IT function in the company (wherefore?) and the responsibilities in carrying out its tasks (who?). It clarifies the purposes of IT use and defines the requisite human resources and related responsibilities.

Earl sees the systems strategy at the heart of IS strategy as it provides the interface to the business and its processes. The systems strategy makes sure that a company's IT use is aligned with its business interests and needs. Furthermore, it ensures that IT is applied efficiently by evaluating and prioritizing IS projects. However, in his latest version (Fig. 3), Earl has added a fourth dimension that, in his view, takes a central role in creating business success in the information age. This dimension answers questions concerning the "where?": Where is value added, and where is potential for further development? In doing so, Earl acknowledges the role of information as an organizational resource. He puts particular emphasis on the role of commonly available information in organizational knowledge management and in developing critical competences (Earl 2000).

Strategy models, such as Earl's, can contribute significantly to a more structured understanding of IS strategies in practice. However, many of these models feature IS strategy contents only as far as they are necessary for illustrative purposes. A comprehensive depiction of the topics and decisions in the different strategy areas is lacking, as is a proof of their practical relevance. In contrast to this, issue lists give an idea of the concrete issues to be dealt with in IS strategies, whereas they fail to systematize these or to set priorities. Therefore, a concrete benefit for practice can only be attained by combining theoretical strategy models and empirical issue lists. The issue lists could fill the dimensions specified by the strategy models with content so that practitioners could be provided with, for instance, structured IS strategy checklists for different areas of IS strategy.

4 Research vs. Practice

In contrast to the academic interest in IS strategy, which has considerably waned over the last years (Fig. 1), practitioners continue to treat IS strategy with great attention (Luftman et al. 2006; Luftman and Ben-Zvi 2011). Recent studies of the IT Governance Institute suggest that the strategic importance of IT use in practice has even risen over the last years (ITGI 2008, 2011). The reasons for this are obvious. Information systems are ubiquitous, and a general scarcity of resources forces many companies to consider carefully how, for what, and at which costs to use IT. IT costs of typically 3–5 % of revenue – in some areas such as telecommunications and financial services even substantially more (Potter et al. 2011) – require dedicated top-management attention per se. In addition, IT has contributed greatly to an

intensification of competition, for example by increasing market transparency, accelerating innovation processes, and globalizing trade. IT has also fundamentally changed the structure of economic processes, for example in the form of dis-/intermediation, networked companies, or business ecologies (McAfee and Brynjolfsson 2008; Picot et al. 2008).

One possible reason for the opposed development of IS strategy research on the one and practice on the other hand might be that both IS strategy and SISP have been sufficiently understood in research and that only the knowledge transfer from research to practice is still missing. At first glance, this argument is consistent with the empirical finding that practitioners responsible for IS strategy hardly consume any academic literature of that area (Teubner 2007, pp. 122 f.; Teubner et al. 2009, pp. 406 f.). However, upon closer inspection, this finding cannot be attributed solely to ignorance on the part of practice since there are strong indicators that practice's and research's notions of IS strategy are incompatible both in terms of how strategy is understood (Sect. 3.1) and what its contents are (Sect. 3.2).

Thus we can observe that the way in which IS strategy is interpreted in practice hardly corresponds to the concepts prevalent in academic literature. Table 3 provides an overview of the interpretations of IS strategy in practice that we have identified based on interviews with IS strategy practitioners (Mocker and Teubner 2006). The comparison with Table 1 shows that research and practice only overlap in the view that equates IS strategy with the departmental plan of the IT department – a conception that is theoretically problematic. Some of the other views show that practitioners stress the role of IS strategy as a marketing strategy of the IT department or as an agenda for change. It has to be mentioned, however, that, in contrast to the mental concepts of academics as shown in Table 1, the practitioner interpretations given in Table 3 are functional by nature. As such they not mutually exclusive and can overlap. They also vary widely. This observed heterogeneity in how IS strategy is understood is supported by a study by Brady et al. (1992, p. 183), which concludes that the interpretations of IS strategy differ not only between companies but often also within them.

Table 3 Practitioner’s interpretations of IS strategy

Interpretation	Criterion			
	Purpose	Trigger	Formalization	Core contents
Binding guideline	Sustainable development of the IIS	Business or technological changes	High	IT platform selection due to merger situation or because current platform not sufficient any more
	Mitigate the risk of locking the company into a wrong technological direction Ensure reliable delivery of IT services	Technical restriction that put into question fulfilment of future demands	Forms a sets of guiding principles Contracts and forms	Governance and role of the IT department vis-à-vis the business units
Departmental plan	Ensure that the aims, tasks and resources of the IT department are in line with the company’s business strategy	Regular business planning	High Formal requirements and conditions	Objectives, task assignments (including IS-projects) and resource assignments (including budget)
Change agenda	Change the way of how IT is currently conducted fundamentally	Innovations in technology emergence of standards	Low	Relevant technology developments, technical standards
	Make the CIOs work interesting	End of life of systems and technologies	Only core concerns get documented (e.g., in presentations) No coherent IS strategy document	Innovation projects Best management practices (e.g., ITIL, CobiT)
Marketing strategy of the IT department	Shaping the profile of the internal IT organization vis-à-vis the business	Management Workshops	High	Mission and Vision of the IT department
	Acceptance and appreciation by the business		Is the “constitution” of the IT department	Definition of customers and products, setup of the IT department to best serve its customers

However, much more striking than the heterogeneity among IS strategy interpretations in practice is the difference between practice and academic literature (Brady et al. 1992, p. 182; Brown 2010). A quick look at the contents of practitioner magazines suffices to illustrate this. Two thirds of the topics discussed in 2009/10 under the label “IS strategy” in the “CIO Magazine” and the German “Computerwoche” deal with new technologies (e.g., Cloud Computing, Service Oriented Architecture, Software as a Service, Web 2.0) or application trends (e.g., Customer Relationship Management, Social Software, Business Intelligence). Another 10 % of articles deal with IT governance and IT outsourcing. Smaller shares are held by further topics such as technology and process standards and IT security.

Whereas academics mainly discuss how to create competitive advantage and to plan IT application development

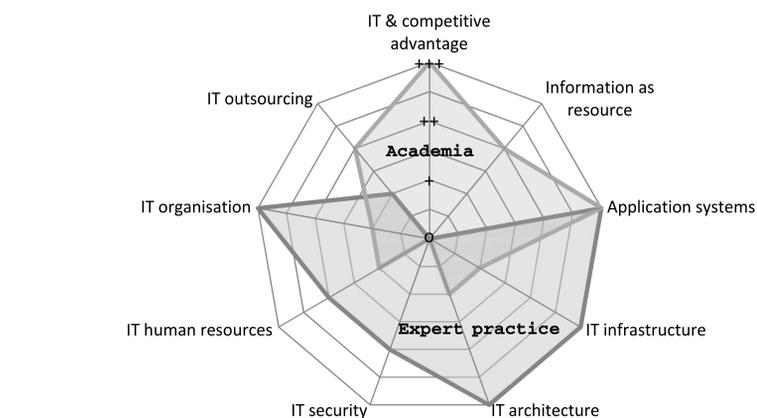


Fig. 4 IS strategy contents in academic discussion and professional practice

projects, practitioners are mainly concerned with technology development and standards as well as with the IT organization. These differences in emphasis are confirmed by an analysis by Teubner et al. (2012). In this study, nine distinct IS strategy planning areas were identi-

fied and rated according to their importance in the academic discussion and professional practice (for rating methods and scaling cf. Teubner et al. 2012, pp. 44 f.). **Figure 4** illustrates the results by means of a Kiviat diagram that shows the respective focal points as two differ-

ent areas: The upper area represents the IS strategy focus in the academic discussion (Sects. 2 and 3), which is on creating competitive advantage and planning the IT application portfolio. In addition, information as an organizational resource has also attained broader attention. The lower area represents the IS strategy topics important in professional practice. These are mainly IT architectures, the definition and introduction of standards for IT application systems, and IT-related processes (e.g., introduction of standards for IT project management or IT operations), IT sourcing, and IT organization (including the co-ordination between business and IT organization).

The differences regarding IS strategy contents can be partly explained by different interests of practitioners and academics concerning IS strategy. Whereas academic research usually studies IS strategy in a single business unit context, practitioners often take a corporate view which has to accommodate several individual business units in parallel (Teubner et al. 2012, p. 31). Such strategies do not regularly aim at supporting a specific business, its products and processes, but at realizing synergies across several business units. Therefore, topics such as corporate-wide systems standardization or the development of common IT infrastructures preponderate. This tendency is particularly evident in the two views that interpret IS strategy as a change agenda and a binding guideline (Table 3, first column). The academic discussion, on the other hand, has so far paid only limited attention to these questions.

In light of these differences, it is hardly surprising that IS strategy practitioners consider the academic discussion on IS strategy as less relevant to their work (Teubner 2007, pp. 122 f.). This is exacerbated by the fact that the results of the academic discussion have so far been presented in a rather unrelated and barely integrated fashion, which poses additional challenges for practitioners interested in adopting them (Lederer and Salmela 1996). Also Allen and Wilson (1996, p. 240) see this diversity as a considerable obstacle to a productive use of academic results in practice.

5 A New Perspective on IS Strategy

While original research on IS Strategy is on the wane (Fig. 1), academia is increas-

ingly recognizing problems of traditional IS strategy research. As a result, a debate has arisen in academic circles about new challenges and approaches to looking into IS strategies (Ward 2012; Merali et al. 2012; Buhl et al. 2012). A very recent issue (2/2013) of MIS Quarterly, for instance, discusses the concept of “digital business strategy”, analyzing the role of IT in devising, and giving direction to, business strategies. This discussion includes the question if and how a “digital business strategy” helps overcome the shortcomings of existing IS strategy concepts – particularly the understanding of IS strategy as a departmental plan (Table 1 and Table 2).

The debate about new perspectives in IS strategy research has two main sources: First, the fact that the relevance of existing research is perceived as low in practice (Sect. 4) and, second, the fact that the conditions of IS planning have changed substantially. The prime time of SISP research falls into a period of relatively stable economic conditions (Fig. 1), conditions which hardly exist anymore in today’s economic environment. Several researchers have therefore questioned whether the premises of traditional SISP research still hold in the current economic and societal circumstances (Tanriverdi et al. 2010; Salmela and Spil 2002; Hackney et al. 2000).

Such questions are not new and have already been discussed in business administration and management studies as related disciplines. Henry Mintzberg, for example, criticized central premises of classical strategy planning in a debate with Igor Ansoff as far back as the 1990s (Mintzberg 1994; Ansoff 1994). Following this debate, the informal planning processes as well as human aspects have gained more attention in strategy research. Whittington (1996) even suggests understanding strategy development as a social practice where the focus of research shifts to the human beings (the planners) and the actions they take in strategy development. In doing so, Whittington opens up a new perspective to research which has been missing so far and that has given rise to a practice turn in business strategy research (Whittington 2006; Jarzabkowski et al. 2007).

Associated with this turn in strategy research is a shift of focus away from formal responsibilities and procedures towards the “micro-activities” in daily strategy practice (Johnson et al. 2003). These micro-activities are also credited

with great importance in the Information Systems discipline (Ciborra 1997, 2001; De Vaujany 2008). Here, they are viewed as an adequate response to today’s discontinuous environmental conditions which have frequently been interpreted as part of the economic and societal change associated with the advent of the information society (Castells 2009; Lehner 2003, 2005; Schmid 2001). But which impact do practice turn and attention to micro activities have on the understanding of IS strategies? And how could a change of perspective come about in research? One proposition that has been met with growing recognition in the academic discussion (cf. for example the JSIS special issue of 2013, “Information Systems Strategy as Practice: Micro Strategy and Strategizing for IS”) has been put forth by Robert Galliers. He develops a so called “Strategizing” framework for IS strategy research; by choosing the term “strategizing” alone he already indicates that he draws on the practice turn of strategy research in the discipline of business administration (Johnson et al. 2003; Jarzabkowski et al. 2007).

5.1 The Strategizing Framework

The strategizing framework implies a fundamental shift in how IS strategies are viewed. This becomes evident in the direct comparison between the strategizing framework and earlier frameworks of Galliers’ that he proposed for strategy research in the 1990s. Whereas the original frameworks (Galliers 1991, 1993, 1999) organize strategy contents, the strategizing framework (Galliers 2006, 2011; Galliers and Newell 2003) models areas of concern in strategy formation.

Galliers’ early frameworks (Fig. 5) draw on the three part division of Earl’s original model (Fig. 2). In contrast to Earl (1989), who differentiates between three separate partial IS strategies (systems, technology, and management strategy), Galliers’ IS strategy is made up of a technology strategy (how?), an information strategy (what?), and a service strategy (who?), and the relationships existing between them. These three strategies are complemented by an implementation strategy that coordinates the realization of the former three strategies. The implementation strategy includes not only aspects of technical implementation but also the associated organizational change. For this reason, Galliers himself prefers the term “Change Management Implementation Strategy” instead of simply

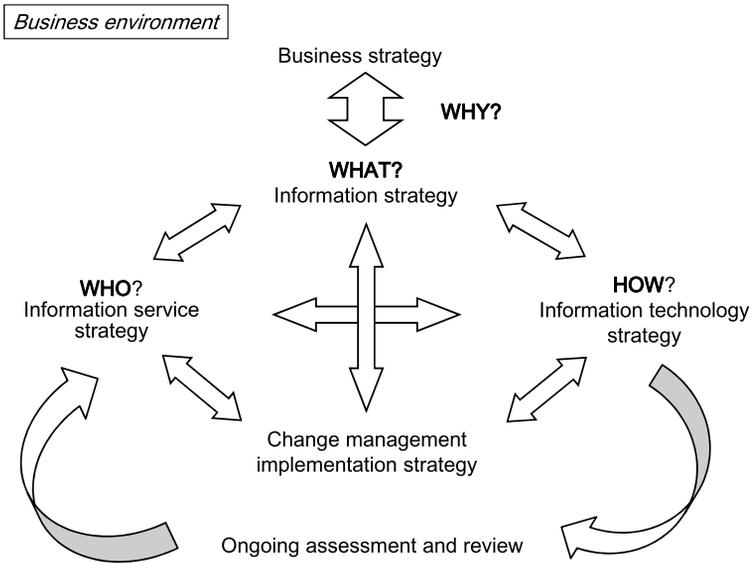


Fig. 5 Galliers' original IS strategy framework

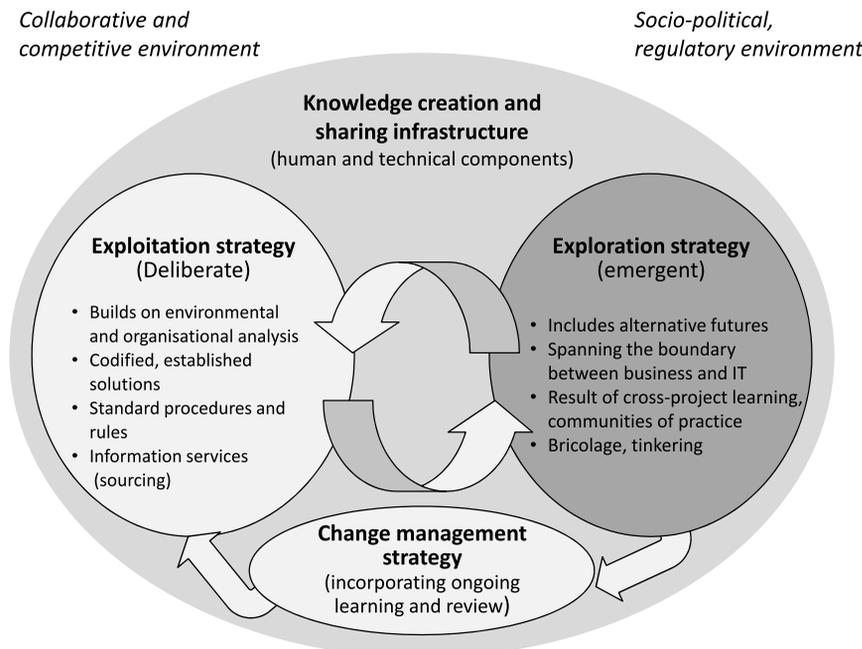


Fig. 6 Galliers' new problem-oriented strategizing framework

speaking of an implementation strategy. In his early framework, the business strategy is an outside entity which is related to and aligned with the IS strategy via the information strategy. However, Galliers advocates a strong connection between business and information strategy in order for both to inform each other productively.

Galliers' new framework (Fig. 6) does away with the separation of IS and business strategies. Now the IS strategy is no longer independent from the business

strategy in the sense that it (the IS strategy) can be thought of and planned independently. Instead, the IS strategy has become an integral part and prerequisite of the business strategy. The need for a "strategic alignment" is therefore eliminated.

The new framework also abolishes the explicit differentiation between information strategy, technology strategy, and service strategy. This is due to the model's new focus: it does not detail IS strategy according to areas of content but rather

according to areas of concern and dispositions of strategizing. Galliers still distinguishes three problem areas of strategy that need to be addressed: exploitation strategy, exploration strategy, and change management strategy.

- The exploitation strategy deals with the application of IT for predetermined operational purposes. The aim of the exploitation strategy is to enable efficient business operations. A typical example is the procurement and introduction of ERP software to support core operational tasks.

- The exploration strategy, in contrast, is tasked with exploring new business potentials. This may happen by successfully using IT competitively, as for example Wal-Mart or American Airlines have done. Strategic IS for this purpose are amply documented in literature (Kettinger et al. 1994). Other potentials lie in the exploration of new markets or the development of novel and innovative IT-based business models as for example in the cases of Ebay or Netflix.

- The change management strategy is partly equivalent to the implementation strategy in the original framework but puts less emphasis on the technical implementation of technology and more on the organizational change induced by IT.

Drawing on Mintzberg (1994), Galliers characterizes the exploitation strategy as a deliberate strategy, whereas he sees the exploration strategy as an emergent strategy. He believes that emergent planning processes and change management become more and more important as complexity and dynamism of the environment increase (Galliers and Newell 2003, p. 192): "IS strategy, therefore, in addition to the more deliberate, designed and codified IT 'solutions' that have conventionally been implemented, should be seen as being: on-going and processual; crucially dependent on learning from 'below' (...) on tinkering and improvisation; and ready to learn from and respond to the emergent and unintended consequences of strategic decisions (...)". With this, Galliers also argues the importance of generating and exchanging knowledge ("Knowledge Creation and Sharing Infrastructure") that aims at supporting strategy-related communication, collaboration and learning processes (Fig. 6, upper part).

5.2 Review of the Strategizing Framework

The shift of perspective from strategy to strategizing that Galliers proposes is borne out by the fact that IS strategies that are codified in strategy documents are seldom implemented completely, but mostly in smaller parts only (Lederer and Mendelow 1993, p. 320). The reasons are manifold and range from lack of top-management support over unsubstantiated investment appraisals to political or organizational resistance (Hartono et al. 2003; Teo and Ang 2001, pp. 467 f.; Gottschalk 1999). Researchers also mention discontinuities and planning risks as particularly challenging (Wilson 1991; Lederer and Mendelow 1993). Especially in the so-called “information age”, which is marked by rapidly advancing globalization, fragmentation of markets, short innovation cycles, intense competition, and fundamental societal change, IS strategies, once devised, tend to have very short life spans. Hence, Galliers (2006, p. 11) demands: “We should not lament fragmentation, provisionally, or incoherence, but rather take it as given. If we can’t predict the future, we should not pretend that we can.”

Galliers does not fundamentally doubt the possibility of planning IS strategically. His proposition is rather directed against an understanding of planning that was typical for strategic planning research in the 1960s and 1970s. According to this understanding, which has had a long-standing tradition in SISP research ever since, planning is about predetermining future action. Hence, the primary outcome of planning in this spirit is a set of decisions concerning future actions and resources needed for taking these actions, which is extensively documented in formal plans. Therefore, accurate and useful plans require as precise predictions of environmental developments as possible. These developments are to be assessed in careful analysis (e.g., SWOT analysis, risk-benefit analysis) which in turn can be supported by dedicated planning techniques (e.g., portfolio methods). However, while this approach may have been valid in the economic environment of the 1960s and 1970s, it hardly applies to the conditions of the late 20th century, and ever since the Mintzberg-Ansoff debate, at the latest, it is regarded as out-of-date. Accordingly, SISP is no longer understood as formal decision making about the future but as a combined learning

and decision process that aims at a better understanding of requirements, possibilities, and restrictions of IT use in business (Salmela and Spil 2002; Segars and Grover 1999; Auer and Reponen 1997). By considering the goals of the company and actively engaging with the environment, SISP is expected to help recognize environmental and technological changes early and to assess these changes with respect to their possible impacts on organizational information processing. The primary result of this is a shared understanding of challenges, relevant developments and options for action (Reponen 1994, p. 36). The consensus reached in the planning process will often be arranged into formal documents, such as declarations stating the official role of IT in the company, blueprints, or development portfolios. However, the presence of a formal documentation is not a prerequisite for an IS strategy to exist: “Strategy is what an organization knows, not what is written. The outcome of an IS strategy process should thus be an increased understanding of IS opportunities and constraints, and a shared view of IS utilization” (Auer and Reponen 1997, p. 32). This view is also evidenced in practice, where IS strategies are often recognized as a means to document learning progress and agreement (Clark et al. 2000). In these cases, strategies are seen as preliminary and are subject to constant revision. Accordingly, strategies understood in this way do not suffer from the same implementation problems which SISP had to deal with in the past (Hartono et al. 2003).

For these reasons, we applaud Galliers in his turn towards emergent planning as an answer to discontinuous environments. His motion to acknowledge the increasingly temporary and provisional character of IS strategies is also conclusive. Moreover, the differentiation as distinct areas of IS strategy formation contributes to the development of “organizational ambidexterity”, which has been identified as an answer to two conflicting challenges imposed on information age organizations (O’Reilly and Tushman 2004): On the one hand, companies need to create stable and efficient structures for current operations. On the other hand, companies need to continuously challenge these structures in the light of discontinuous and unpredictable environmental developments. Regarding IS strategy, this implies that all required

IT services need to be rendered reliably and cost-effectively, while at the same time new business opportunities enabled by technological progress and new IT services needs to be exploited. Finally, by removing the division between IS and business strategies, the strategizing framework matches the propositions made in the present discussion on digital business strategies. Nevertheless, against the backdrop of the current state and the shortcomings of IS strategy research as outlined in Sects. 2 to 4, Galliers’ proposition still has to be challenged in three central points.

(1) The Process Aspect of Strategy Development is Emphasized in a Disproportionally Strong Manner It is a basic observation that IS strategy research has paid considerably more attention to the process of strategy development than to the IS strategy itself as the eventual outcome of this process (Sect. 2). This disproportionality is reinforced in Galliers’ strategizing framework. In our opinion, however, it is precisely this neglect of the IS strategy itself as the object of research that is in large parts responsible for the limited usefulness of available strategy frameworks, heuristics, and instruments. For matters of logic alone, the question of what an IS strategy is and what it is composed of, precedes any considerations of how it can and should be developed. This is true not only for systematic and deliberate planning processes that have been in the focus of traditional SISP research, but also for the emergent strategizing processes highlighted by Galliers. On the one hand, without an understanding of the nature and contents of IS strategy, emergent planning processes can hardly be identified as a separate area of research. In what other way if not by topic can the emergent communication and learning processes related to strategizing be separated from other in-company communication and learning processes? On the other hand, a better understanding of the nature of IS strategy is also a prerequisite for the development of practical advice on and of useful instruments for strategizing which aim at animating, structuring, and moderating communication processes and consensus finding.

(2) The Importance of Exploitation and Change Strategy is Underestimated Galliers’ problem-oriented division of IS strategy into exploitation, exploration,

and change management strategies is an important contribution to a modern understanding of IS strategies. This tripartite does not only advance a more differentiated understanding of IS strategy itself but also of its underlying processes. This is mainly due to the fact that the three partial strategies are associated with three different modes of strategy development. In the case of exploitation strategies, strategy development is characterized by deliberate, goal-oriented, and partially formalized analyses and decision processes. The same holds for the case of change management strategies. Here, technical implementation processes can even resemble engineering processes (Österle and Winter 2003). In the case of exploration, however, the informal and creative processes of strategizing predominate. These are, above all, coordination and learning processes that take place across individual planning teams on multiple levels of the organization, from top-management to project committees.

In contrast to Galliers, who emphasizes the exploration strategy and the emergent processes associated with it, IS strategy practice seems to pay more attention to the reliability and cost efficiency in IT use, while questions such as IT enabled innovation and development of new business potentials are of secondary importance. In other words, practice focuses on exploitation and implementation strategies rather than on exploration. This is especially true for IS strategies on a corporate level (Sect. 4). Even accounting for the fact that explorative strategies are hard to observe in practice since they are the result of emergent – and thus mostly informal and fragmented (“bricolage”) – processes, research should not give them precedence over exploitation and implementation strategies per se.

(3) *The Potential of Systematic Planning is Regarded in a Too Restrictive Way*
The importance given to the exploration strategy under the discontinuous environmental conditions of today has an immediate bearing on one’s view on the limits of systematic planning. This is due to the fact that exploration strategies come into being in emergent processes which, according to Galliers, are very difficult to support by systematic analysis and formal planning methods. Empirical research, however, casts the possibilities and limits of systematic planning in a slightly different light. Some researchers

have shown that systematic planning can be in fact effective even under conditions of highly dynamic environments and uncertainty (Chi et al. 2005; Newkirk et al. 2003; Hartono et al. 2003; Teo and Ang 2000). These findings apply under the premise that IS strategies are not seen as unchangeable entities determined once and for all, but viewed as subject to regular revisions. Segars and Grover (1999), for instance, show the effectiveness of planning systems based on rational decision making even under turbulent environmental conditions. Grover and Segars (2005) show moreover that, in practice, planning systems become the more complex and elaborate, the greater the environmental uncertainty – with considerable success. Furthermore, Salmela et al. (2000) demonstrate by means of case studies that a comprehensive systematic planning approach can outperform incremental planning approaches even in turbulent environments.

6 Conclusions and Desiderata for Future Research

The importance of IS strategies will not diminish in the information age, in spite of occasional beliefs to the contrary. Rather the opposite will hold true. The dynamic advances in IT are not only central to the technological changes surrounding us, but also driver and mediator of societal and economic changes. Businesses need to react to these changes in concerted and organized ways, an important part of which are IS strategies. The conditions of dynamic change do not challenge the significance of IS strategies as such but merely an orthodox understanding according to which an IS strategies is simply an unchangeable pre-determination of future action. This strategy understanding, which has its roots in the planning theory of the 1960s and 1970s, has to be regarded as outdated. Instead, it is far more appropriate to view the IS strategy of today as the result of processes of analysis, communication, and reaching consensus about relevant future societal and technological developments, requirements, and alternative options for action. This view implies that IS strategies are instruments of strategic knowledge management and organizational learning. They are also often preliminary and do not necessarily have to be put down in formal strategy documents.

This view of IS strategies allows them to remain effective even under conditions of planning discontinuities (Newkirk and Lederer 2006; Leidner et al. 2011). Thus, organizations which do not develop IS strategies leave the potential of IT to meet new business challenges unused or to chance. For Wirtschaftsinformatik and Information Systems as applied sciences, the challenge of developing specific guidance and recommendations for action arises. However, to meet this challenge is difficult given the current state of research. Neither has the construct of IS strategy been sufficiently understood nor is there agreement on its contents (Sect. 3). In addition, there is a significant gap between the traditional focus of IS strategy research and IS strategy practice (Sect. 4). This gap can be narrowed if research takes a turn towards actual IS strategy practice. Galliers’ strategizing framework contributes to a better understanding of the challenges which IS strategy planners face under conditions of increasingly discontinuous change. The framework does not directly address the issues of IS strategy concepts and contents but emphasizes the need to engage with the practice of IS strategy. This also means to become more involved with the topics that IS strategists deal with in practice (Teubner and Pellengahr 2013). There are at least two good reasons for this: First, the topics favored by practitioners diverge substantially from those featured in research (Sect. 4). Second, research may thus become more firmly grounded in practice, which, in turn, will render its findings and results more usable in practice. Buhl et al. (2012) second the call for a closer relationship between research and practice, and point out the potential of design-oriented research as characteristic for the German Wirtschaftsinformatik in this regard.

Our call that research should pay greater heed to practical needs and circumstances is not an encouragement to adopt practical views and priorities completely and unquestioningly. It is true that research needs to investigate in more detail how practitioners view the construct of IS strategy and which topics they connect with it. A good starting point for this may be the existing issue lists. But since these are difficult to compare and hardly structured, future research will have to take a decisive step ahead. Contents need to be investigated and compared systematically, taking individual business and planning contexts

into account. Additionally, the question of “why?” needs to be addressed. This requires investigating in more detail the reasons why practitioners regard certain topics as “strategic”. These reasons also need to be challenged from a theoretical point of view, since not all topics on practitioners’ strategy agendas measure up to academic scrutiny. The well-known “Year 2000 problem” (Y2K problem) is a case in point. The reason why this topic featured so prominently on many IS strategy agendas towards the end of the 1990s was the general fear of the risk that IT systems would suddenly cease functioning upon the turn of the century. But many technological interventions, such as those deemed necessary to address the Y2K issue, put smooth and well-functioning IT operations at risk. Hence, just because an issue involves risk, there is no sufficient cause to classify said issue as strategic.

However, other topics on practitioners’ IS strategy agendas appear reasonable (Fig. 4). These include architecture decisions as well the choice and the design of relationships to IT suppliers and service providers. Such decisions are typically binding for a longer period; they create restrictions for future actions, and often entail substantial investments. Other important topics are staffing and organization of the IT department. These issues are strategic because of their long-term effects (long-term or unrestricted work contracts), the costs entailed, and the effects on IT-related capabilities and competencies of the organization. All of these topics are not entirely ignored in Information Systems Research but studied in other contexts. Many are featured in studies that originate from other areas but that also deal with strategic issues. Among these are, for example, studies on outsourcing (Gottschalk and Solli-Saether 2005; Cheon et al. 1995), IT architecture and infrastructure (Ross 2004; Hay and Munoz 1997; Weill et al. 2002), standardization (Buxmann and König 1998), as well as knowledge management and organizational learning (Tanriverdi 2005; Duhan et al. 2001; Galliers 1999). However, what has been missing so far is the direct link to and an active consideration of these topics in the academic discussion and research on IS strategy.

References

Aier S, Riege C, Winter R (2008) Unternehmensarchitektur – Literaturüberblick und Stand der Praxis. *WIRTSCHAFTSINFORMATIK* 50(4):293–304

- Aier S, Krupjuweit JS, Winter R (2009) Enterprise architecture design as an engineering discipline. *AIS Transactions on Enterprise Systems* 1(1):36–43
- Allen DK, Wilson TD (1996) Information strategies in UK higher education institutions. *International Journal of Information Management* 16(4):239–251
- Ansoff HI (1994) Comment on Henry Mintzberg’s rethinking strategic planning. *Long Range Planning* 27(3):31–32
- Arthur Andersen & Co (1982) Method/1. An information systems methodology. Subject file AA4665, Item 57, Arthur Anderson, Chicago
- Auer T, Reponen T (1997) Information systems strategy formation embedded into a continuous organizational learning process. *Information Resources Management Journal* 10(2):32–43
- Baker B (1995) The role of feedback in assessing information systems planning effectiveness. *Journal of Strategic Information Systems* 4(1):61–80
- Boddy D, Boonstra A, Kennedy G (2005) Managing information systems: strategy and organization, 2nd edn. Pearson Education, Harlow
- Brady T, Cameron R, Targett D, Beaumont C (1992) Strategic IT issues: the views of some major IT investors. *The Journal of Strategic Information Systems* 1(4):183–189
- Brown ITJ (2004) Testing and extending theory in strategic information systems planning through literature analysis. *Information Resources Management Journal* 17(4):20–48
- Brown ITJ (2010) Strategic information systems planning: comparing espoused beliefs with practice. In: Alexander PM, Turpin M, van Deventer JP (eds) Proc 18th European conference on information systems. Pretoria
- Buhl HU, Fridgen G, König W, Röglinger M, Wagner C (2012) Where’s the competitive advantage in strategic information systems research? Making the case for boundary-spanning research based on the German business and information systems engineering tradition. *Journal of Strategic Information Systems* 21(2):172–178
- Buxmann P, König W (1998) Das Standardisierungsproblem: Zur ökonomischen Auswahl von Standards in Informationssystemen. *WIRTSCHAFTSINFORMATIK* 40(2):122–129
- Carr NG (2003) IT doesn’t matter. *Harvard Business Review* 81(5):41–49
- Castells M (2009) The rise of the network society. The information age, 2nd edn. Economy, society, and culture, vol I. Blackwell, Malden
- Cavaye ALM, Cragg PB (1993) Strategic information systems research: a review and research framework. *Journal of Strategic Information Systems* 2(2):125–137
- Chan JE, Reich BH (2007) IT alignment: what have we learned? *Journal of Information Technology* 22(4):297–315
- Chan YE, Huff SL, Barclay WW, Copeland DG (1997) Business strategic orientation, information systems strategic orientation and strategic alignment. *Information Systems Research* 8(2):125–150
- Chen D, Mocker M, Preston DS, Teubner RA (2010) Information systems strategy: reconceptualization, measurement, and implications. *MIS Quarterly* 34(2):233–259
- Cheon MJ, Grover V, Teng JTC (1995) Theoretical perspectives on the outsourcing of information systems. *Journal of Information Technology* 10(4):209–219
- Chi L, Jones KG, Lederer AL, Pengtao L, Newkirk HE, Sethi V (2005) Environmental assessment in strategic information systems planning. *International Journal of Information Management* 25(3):253–269
- Ciborra C (1997) De Profundis? Deconstructing the concept of strategic alignment. *Scandinavian Journal of Information Systems* 9(1):57–82
- Ciborra C (2001) From control to drift: the dynamics of corporate information infrastructure. Oxford University Press, Oxford
- Clark C, Clark J, Gambill S, Fielder B (2000) Strategic information systems planning paradoxes. *Information Strategy: The Executive’s Journal* 17(1):27–31
- Conrath DW, Ang JK, Mattay S (1992) Strategic planning for information systems: a survey of Canadian organizations. *Informatica* 30(4):364–378
- Das SR, Zahra SA, Warkentin ME (1991) Integrating the content and process of strategic MIS planning with competitive strategy. *Decision Sciences* 22(5):953–984
- De Vaujany FX (2008) Strategic alignment: what else? A practice based view of IS value. In: Proc 29th international conference on information systems, Paris
- Doherty NF, Marples CG, Suhaimi A (1999) The relative success of alternative approaches to strategic information systems planning: an empirical analysis. *Journal of Strategic Information Systems* 8(3):263–283
- Duhan S, Levy M, Powell P (2001) Information systems strategies in knowledge-based SMEs: the role of core competencies. *European Journal of Information Systems* 10(1):25–40
- Earl MJ (1989) Management strategies for information technology. Prentice Hall, Essex
- Earl MJ (1996) Integrating IS and the organization. In: Earl MJ (ed) *Information management: the organizational dimension*. Oxford University Press, Oxford, pp 485–502
- Earl MJ (2000) Every business is an information business. In: Marchand DA, Davenport TH (eds) *Mastering information management*. Financial times. Prentice Hall, London, pp 16–22
- Earl MJ (2003) Integrating business and IT strategy: reframing the applications development portfolio. In: Luftman JN (ed) *Competing in the information age: align in the sand*, 2nd edn. Oxford University Press, Oxford, pp 51–61
- Flynn DJ, Goleniewska EA (1993) Survey of the use of strategic information systems planning approaches in UK organisations. *Journal of Strategic Information Systems* 2(2):292–319
- Galliers RD (1991) Strategic information systems planning: myths, reality and guidelines for successful implementation. *European Journal of Information Systems* 1(1):55–64
- Galliers RD (1993) Towards a flexible information architecture: integrating business strategies, information systems strategies and business process redesign. *Journal of Information Systems* 3(3):199–213
- Galliers RD (1999) Editorial: towards the integration of e-business, knowledge management and policy consideration within an information systems strategy framework. *Journal of Strategic Information Systems* 8(3):229–234
- Galliers RD (2006) Strategizing for agility: confronting information systems inflexibility in dynamic environments. In: De Souza K (ed) *Agile information systems*. Butterworth Heinemann, Oxford, pp 1–15

Abstract

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Information Systems Strategy

Theory, Practice, and Challenges for Future Research

The paper depicts the current state of IS strategy research with the aim of identifying research needs as well as appropriate ways to study IS strategy in the future. To this end, the paper introduces the results of an extensive analysis of academic literature on IS-strategy. In addition, it sheds light on current practice as uncovered in case-study research and through in-depth interviews with IS strategy professionals. A comparison reveals that the issues prevalent in practice and the ones traditionally focused on in the academic debate on IS strategy often vary considerably. A conspicuous attempt to fill this is the so-called “Strategizing” framework put forward by Robert Galliers. This framework, which is receiving increasing attention in the current academic debate, calls for a practice turn in IS strategy research in that it treats strategy as something people or, more precisely, IS strategists do. In addition, by identifying the challenges and problems IS strategists are faced with, the framework intends to better reflect the new planning conditions which are often seen as characteristics of the information age. The framework distinguishes three general problem domains of IS strategizing: exploration, exploitation, as well as implementation and change management.

Keywords: Strategic information systems planning, Information systems strategy, Strategic information systems, Strategy conceptions, Strategy contents, Strategy rationales

- Galliers RD (2011) Further developments in information systems strategizing: unpacking the concept. In: Galliers RD, Currie W (eds) *The Oxford handbook of management information systems: critical perspectives and new directions*. Oxford University Press, Oxford, pp 229–245
- Galliers RD, Newell S (2003) Strategy as data plus sense-making. In: Wilson DC, Cummings S (eds) *Images of strategy*. Blackwell Publishing, Oxford, pp 164–196
- Galliers RD, Merali Y, Spearing L (1994) Coping with information technology? How British executives perceive the key information systems management issues in the mid 1990s. *Journal of Information Technology* 9(3):223–238
- Gibson CF, Nolan RL (1974) Managing the four stages of EDP growth. *Harvard Business Review* 52(1):115–126
- Gottschalk P (1999) Implementation predictors of strategic information systems plans. *Information and Management* 36(2):77–91
- Gottschalk P, Solli-Saether H (2005) Critical success factors from IT outsourcing theories: an empirical study. *Industrial Management and Data Systems* 105(6):685–702
- Grover V, Segars AH (2005) An empirical evaluation of stages of strategic information systems planning: patterns of process design and effectiveness. *Information and Management* 42(5):761–779
- Hackney R, Burn J, Dhillon EC (2000) Challenging assumptions for strategic information systems planning: theoretical perspectives. *Comm AIS* 3(1):9
- Hartono E, Lederer AL, Sethi V, Zhuang Y (2003) Key predictors of the implementation of strategic information systems plans. *The Database for Advances in Information Systems* 34(3):41–53
- Hatten ML, Hatten KJ (1997) Information systems strategy: long overdue – and still not here. *Long Range Planning* 30(2):254–266
- Hay G, Munoz R (1997) Establishing an IT architecture strategy. *Information Systems Management* 14(3):67–69
- Heilmann H, Heinrich LJ, Roithmayr F (1996) *Information Engineering. Wirtschaftsinformatik im Schnittpunkt von Wirtschafts-, Sozial- und Ingenieurwissenschaften*. Oldenbourg, München
- Henderson JC, Sifonis JG (1988) The value of strategic IS planning: understanding consistency, validity, and IS markets. *MIS Quarterly* 12(2):187–200
- Henderson JC, Venkatraman N (1989) Strategic alignment: a framework for strategic information technology management. CISR working paper No. 190, Center for Information Systems Research, Sloan School of Management, Cambridge
- Henderson JC, Venkatraman N (1993) Strategic alignment: leveraging information technology for transforming organizations. *IBM Systems Journal* 32(1):4–16
- Hildebrand K (1994) Strategische Informationssystemplanung (SISP). *WIRTSCHAFTSINFORMATIK* 36(1):69–73
- Hoey A (1998) Inside the RUC: information technology and policing in Northern Ireland. *International Review of Law Computers* 12(1):15–26
- IBM (1984) *Business systems planning: information systems planning guide*. GE20-0527-4, 4th edn. IBM Corporation, Atlanta
- ITGI (2008) *IT governance global status report 2008*. ISACA/IT. Governance Institute, Rolling Meadows
- ITGI (2011) *IT status report on the governance of enterprise IT (GEIT) – 2011*. ISACA/IT. Governance Institute, Rolling Meadows
- Ives B, Learmonth GP (1984) The information system as a competitive weapon. *Comm ACM* 27(12):1193–1201
- Jarzabkowski P, Balogun J, Seidl D (2007) Strategizing: the challenge of a practice perspective. *Human Relations* 60(5):5–25
- Johnson G, Melin L, Whittington R (2003) Micro strategy and strategizing: towards an activity-based view (guest editor's introduction). *Journal of Management Studies* 40(1):3–22
- Kaucky G, Niedereichholz J (1988) Strategische Planung betrieblicher Informationssysteme unter Berücksichtigung des informationstechnologischen Angebotes. *Angewandte Informatik* 30(6):235–236
- Kettinger WJ, Grover V, Guha S, Segars AH (1994) Strategic information systems revisited: a study in sustainability and performance. *MIS Quarterly* 18(1):31–58
- King WR, Teo TSH (2000) Assessing the impact of proactive versus reactive modes of strategic information systems planning. *Omega* 28(6):667–680
- Kurbel K, Eicker S, Kersten F, Schnieder T, Teubner A (1994) I-CASE bei der Entwicklung eines großen Informationssystems: eine Information-Engineering-Fallstudie. *WIRTSCHAFTSINFORMATIK* 36(2):130–144
- Laurence S, Margolis E (1999) Concepts and cognitive science. In: Margolis E, Laurence S (eds) *Concepts: core readings*. MIT Press, Cambridge, pp 3–81
- Lederer AL, Gardiner V (1992) The process of strategic information planning. *Journal of Strategic Information Systems* 1(2):76–84
- Lederer AL, Mendelow AL (1993) Information systems strategic planning and the challenge of shifting priorities. *Information and Management* 24(6):319–328
- Lederer AL, Salmela H (1996) Toward a theory of strategic information systems planning. *Journal of Strategic Information Systems* 5(3):237–253
- Lederer AL, Sethi V (1988) The implementation of strategic information systems planning methodologies. *MIS Quarterly* 12(3):444–461
- Lee GG, Hsu WL (2009) The evolution of planning for information systems. In: King WR (ed) *Planning for information system*. ME Sharpe, Armonk
- Lehner F (1993) *Informatik-Strategien: Entwicklung, Einsatz und Erfahrungen*. Hanser, München
- Lehner F (2003) *Informationsgesellschaft und wissenschaftliche Volkswirtschaft: Bilder des wirtschaftlichen und sozialen Wandels*. In: Institut Arbeit und Technik (eds) *IAT Jahrbuch 2002/2003*. Institut Arbeit und Technik, Gelsenkirchen, pp 55–76
- Lehner F (2005) “Alte” und “neue” Industrie. In: Institut Arbeit und Technik (eds) *IAT Jahrbuch 2005*. Institut Arbeit und Technik, Gelsenkirchen, pp 8–28
- Leidner DE, Lo J, Preston D (2011) An empirical investigation of the relationship of IS strategy with firm performance. *Journal of Strategic Information Systems* 20(4):419–437
- Luftman J, Ben-Zvi T (2011) Key issues for IT executives 2011: cautious optimism in uncertain economic times. *MIS Quarterly Executive* 10(4):203–212
- Luftman J, Kempaiah R, Nash E (2006) Key issues for IT executives 2005. *MIS Quarterly Executive* 5(2):27–45
- Maier JL (1997) Rethinking strategic information systems. *Information Systems Management* 14(4):42–48

- Martin J (1989) Information engineering. Book 1: Introduction. Prentice Hall, Englewood Cliffs
- Mata FJ, Fuerst WL, Barney JB (1995) Information technology and sustained competitive advantage: a resource-based analysis. *MIS Quarterly* 19(4):487–505
- McAfee A, Brynjolfsson E (2008) Investing in the IT that makes a competitive difference. *Harvard Business Review* 86(7–8):98–107
- McFarlan FW, McKenney JL, Pyburn P (1983) The information archipelago – plotting a course. *Harvard Business Review* 6(1):145–156
- McGee K, Plummer DC, Comport J, Tully J, Hafner B, Mahoney J, Fenn J, Morello D, McDonald MP, Prentice S, Kutnik D (2005) The Gartner scenario 2005: IT leaders' next big decisions. Gartner Inc
- Melville N, Kraemer K, Gurbaxani V (2004) Review: information technology and organizational performance: an integrative model of IT business value. *MIS Quarterly* 28(2):283–322
- Merali Y, Papadopoulos T, Nadkarni T (2012) Information systems strategy: past, present, future? *Journal of Strategic Information Systems* 21(2):125–153
- Mintzberg H (1990) Strategy formulation. Schools of thought. In: Frederickson JW (ed) *Perspectives on strategic management*. Harper Business, Grand Rapids, pp 105–235
- Mintzberg H (1994) Rethinking strategic planning. *Long Range Planning* 27(3):12–21 (Part I) und 22–30 (Part II)
- Mocker M (2007) Defining the content of information strategy: linking theory and practice. Doctoral dissertation, Information Systems Department, University of Münster. http://miami.uni-muenster.de/servlet/DerivateServlet/Derivate-4151/diss_mocker.pdf, Accessed 2012-06-04
- Mocker M, Teubner RA (2006) Information strategy – research and reality. In: Ljungberg J, Andersson M (eds) *Proc 14th European conference on information systems*. Goteborg, Sweden
- Newkirk HE, Lederer AL (2006) The effectiveness of strategic information systems planning under environmental uncertainty. *Information and Management* 43(4):481–501
- Newkirk HE, Lederer AL, Srinivasan C (2003) Strategic information systems planning: too little or too much? *Journal of Strategic Information Systems* 12(3):201–228
- O'Connor AD (1993) Successful strategic information systems planning. *Journal of Information Systems* 3(2):71–83
- O'Reilly C, Tushman M (2004) The ambidextrous organization. *Harvard Business Review* 82(4):74–81
- Österle H, Winter R (2003) *Business Engineering. Auf dem Weg zum Unternehmen des Informationszeitalters*, 2nd edn. Springer, Heidelberg
- Parsons GL (1983) Fitting information systems technology to the corporate needs: the linking strategy. Teaching note 9-183-176, Harvard Business School, Boston
- Piccoli G, Ives B (2005) IT-dependent strategic initiatives and sustained competitive advantage: a review and a synthesis of the literature. *MIS Quarterly* 29(4):747–776
- Picot A, Reichwald R, Wigand R (2008) *Information, organization and management*. Springer, Berlin
- Porter ME, Millar VE (1985) How information gives you competitive advantage. *Harvard Business Review* 63(4):149–160
- Potter K, Smith M, Guevara JK, Hall L, Stegman E (2011) IT metrics: IT spending and staffing report, 2011. G00210146, Gartner Inc
- Powell TC, Dent-Micaleff A (1997) Information technology as competitive advantage: the role of humans, business, and technology resources. *Strategic Management Journal* 18(5):375–405
- Rackoff N, Wiseman C, Ullrich WA (1985) Information systems for competitive advantage: implementation of a planning process. *MIS Quarterly* 9(4):285–294
- Reponen T (1994) Organizational information management strategies. *Information Systems Journal* 4(1):27–44
- Rockart J (1979) Chief executives define their own information needs. *Harvard Business Review* 57(2):81–92
- Roithmayr F, Wendner J (1992) Ergebnisse einer empirischen Studie über den Zusammenhang zwischen Unternehmensstrategie und Informationssystem-Strategie. *WIRTSCHAFTSINFORMATIK* 34(5):472–480
- Ross JW (2004) Enterprise architecture: driving business benefits from IT. CISR working paper Nr. 359 and MIT Sloan working paper 4614-06, Center for Information Systems Research, Sloan School of Management, Cambridge
- Sabherwal R, King W (1995) An empirical taxonomy of the decision-making processes concerning strategic applications of information systems. *Journal of Management Information Systems* 11(4):177–214
- Salmela H, Spil TAM (2002) Dynamic and emergent information systems strategy formulation and implementation. *International Journal of Information Management* 22(6):441–460
- Salmela H, Lederer AL, Reponen T (2000) Information systems planning in a turbulent environment. *European Journal of Information Systems* 9(1):3–15
- Schmid BF (2001) What is new about the digital economy? *International Journal of Electronic Markets* 11(1):44–51
- Schumann M, Hohe U (1988) Nutzeffekte strategischer Informationsverarbeitung. *Angewandte Informatik* 30(12):515–523
- Segars AH, Grover V (1999) Profiles of strategic information systems planning. *Information Systems Research* 10(3):199–232
- Senn JA (1992) The myths of strategic systems: what defines true competitive advantage? *Information Systems Management* 9(3):7–12
- Smits MT, van der Poel KG, Ribbers PMA (1997) Assessment of information strategies in insurance companies in the Netherlands. *Journal of Strategic Information Systems* 6(2):129–148
- Steininger K, Riedl R, Roithmayr F, Mertens P (2009) *Moden und Trends in Wirtschaftsinformatik und Information Systems*. WIRTSCHAFTSINFORMATIK 51(6):478–495
- Szyperski N (1981) Geplante Antwort der Unternehmung auf den informations- und kommunikationstechnischen Wandel. In: Frese E, Schmitz P, Szyperski N (eds) *Organisation, Planung, Informationssysteme*. Poeschel, Stuttgart, pp 177–195
- Tanriverdi H (2005) Information technology relatedness, knowledge management capability, and performance of multibusiness firms. *MIS Quarterly* 29(2):311–334
- Tanriverdi H, Rai A, Venkatramen N (2010) Reframing the dominant quest of information systems strategy research for complex adaptive business systems. *Research commentary*. *Information Systems Research* 21(4):822–834
- Teo TSH, Ang JSK (2000) How useful are strategic plans for information systems? *Behaviour and Information Technology* 19(4):275–282
- Teo TSH, Ang JSK (2001) An examination of major IS planning problems. *International Journal of Information Management* 21(6):457–470
- Teubner RA (2003) *Information Engineering*. WISU – Das Wirtschaftsstudium 32(8):1061–1070
- Teubner RA (2006) *IT/Business Alignment*. WIRTSCHAFTSINFORMATIK 48(5):368–371
- Teubner RA (2007) Strategic information systems planning: a case study from the financial services industry. *The Journal of Strategic Information Systems* 16(1):105
- Teubner RA, Mocker M (2005) Strategic information planning – insights from an action research project in the financial services industry. ERCIS working paper No 3, Münster ERCIS working paper
- Teubner RA, Mocker M (2008) A literature overview on strategic information systems planning. ERCIS working paper No 6, Münster
- Teubner RA, Mocker M (2009) Towards a comprehensive model of information strategy. In: Galliers RD, Leidner DE (eds) *Strategic information management: challenges and strategies in managing information systems*, 4th edn. Chapman & Hall, London, pp 147–170
- Teubner AR, Pellengahr RA (2013) The IS-strategy divide and its implications for research. ERCIS working paper No 16, Münster
- Teubner RA, Mocker M, Pellengahr RA (2009) Information strategy: confronting research with practice. In: King WR (ed) *Planning for information systems*. Sharpe, Armonk, pp 387–412
- Teubner RA, Pellengahr AR, Mocker M (2012) The IT strategy divide: professional practice and academic debate. ERCIS working paper No 12, Münster
- Ward JM (2012) Information systems strategy: Quo vadis? *Journal of Strategic Information Systems* 21(2):165–171
- Ward J, Peppard J (2002) *Strategic planning for information systems*, 2nd edn. Wiley, Chichester
- Watson RT, Kelly GG, Galliers RD, Brancheau JC (1997) Key issues in information systems management: an international perspective. *Journal of Management Information Systems* 13(4):91–115
- Webster J, Watson RT (2002) Analyzing the past to prepare for the future: writing a literature review. *MIS Quarterly* 26(2):XII–XXIII
- Weill P, Subramani M, Broadbent M (2002) Building IT infrastructure strategic agility. *Sloan Management Review* 44(1):57–65
- Wexelblat RL, Srinivasan N (1999) Planning for information technology in a federated organization. *Information and Management* 35(5):265–282
- Whittington R (1996) Strategy as practice. *Long Range Planning* 29(5):731–735
- Whittington R (2006) Completing the practice turn in strategy research. *Organization Studies* 27(5):613–634
- Wilson T (1991) Overcoming the barriers to the implementation of information system strategies. *Journal of Information Technology* 6(1):39–44
- Wiseman C (1985) Strategy and computers: information systems as competitive weapons. Dow Jones-Irwin, Homewood