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Exploring the Path to Success: A Review of the Strategic IT Benchmarking Literature

by

Katharina Ebner[1], Nils Urbach, Benjamin Müller[2]

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[1] FernUniversität in Hagen
[2] University of Groningen

University of Augsburg, D-86135 Augsburg
Visitors: Universitätsstr. 12, 86159 Augsburg
Phone: +49 821 598-4801 (Fax: -4899)

University of Bayreuth, D-95440 Bayreuth
Visitors: Wittelsbacherring 10, 95444 Bayreuth
Phone: +49 921 55-4710 (Fax: -844710)

www.fim-rc.de

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Abstract

IT organizations use strategic IT benchmarking (SITBM) to revise IT strategies or perform internal marketing. Despite benchmarking's long tradition, many SITBM initiatives do not reveal the desired outcomes. The vast body of knowledge on benchmarking and IT management does not help overcome the challenges of successful SITBM. We therefore synthesize existing research on IT management and benchmarking into a concept relationship map and derive future research avenues. We find that there is much literature on how to produce SITBM results. However, research does not explain how these results are transformed into outcome – essentially the problem many practitioners struggle with.

Keywords: Benchmarking; strategic benchmarking; strategic IT management; IS assessment; IS evaluation; strategic IS planning

1. Introduction

Benchmarking has become an established approach for IT organizations to assess their performance (Alshawaf et al., 2005; Cragg, 2002; Krcmar, 2009). Key performance indicators (KPIs), such as IT costs per turnover or IT costs per employee, have found their way into most management accounting schemes used by IT executives (Kütz, 2010; Lin et al., 2014). External reference values for comparison with peers or alleged best practice companies are readily available for purchase from market researchers and analysts. In the past 15 years, IT benchmarking has become more sophisticated; it has moved from single cost KPIs to comprehensive assessments of an IT organization's strategic situation (Hong et al., 2012), including managerial aspects such as IT governance, processes, or elements of the IT strategy (Adebanjo et al., 2010; Anand & Kodali, 2008; Low & Siesfeld, 1998). In research, such types of benchmarking have been summarized under the term strategic benchmarking (Kyrö, 2003). Consequently, strategic IT benchmarking (SITBM) is a special type of strategic benchmarking that encompasses a structured comparison of IT management to a peer group. As such, it differs from 'classical' IT benchmarking approaches, which tend to focus on hardware and infrastructural improvements (Krcmar, 2009). By contrast, SITBM has been used to find starting points to improve business-IT alignment (Lacity & Hirschheim, 1995), form a basis for developing or revising IT strategies (Clayton & Luchs, 1994; Drew, 1997; Müller et al., 2009), or do internal marketing (Hirschheim et al., 2003; Lacity & Hirschheim, 1995; Seddon et al., 2002). It provides a high-level and cross-sectional analysis of the whole IT organization at a level of detail suitable for IT executives (Alshawaf et al., 2005; Chang & King, 2005), while classical IT benchmarking used to measure the performance of an IT organization's chosen domains longitudinally and in-depth (e.g., infrastructure, data center, or ERP systems).

While the relevance of strategic IT/IS assessments is still increasing (see, e.g., the panel at the Gartner CIO Summit 2013[1] or recent publications (Gregory et al., 2012; Lin et al., 2014)), benchmarking as one form of strategic assessment is still highly debated (Fuerstenau, 2012; Hong et al., 2012). For example, Credit Suisse`s CIO argues against SITBM because "it is hardly adequate to show the value of the IT organization to the business" by means of an "isolated measurement" (Zeitler, 2012). By contrast, Deutsche Bahn`s CIO argues that SITBM is crucial to objectify the debate of prices vs. IT value (Ellermann, 2013). Studies on this controversy have shown that IT managers find it difficult to fully exploit the information they are generating in their strategic benchmark endeavors (Curran, 2009; Müller et al., 2010). However, as SITBM is

[1]http://www.gartner.com/technology/summits/emea/cio-executive-german/about.jsp

typically expensive in terms of time and resources (Drew, 1997; Gräuler & Teuteberg, 2013), non-usage of the results should be prevented. In cases in which it has been applied, IT benchmarking often produced benchmark reports, but no further actions were taken based on the results (Adebanjo et al., 2010; Love et al., 1998; Seddon et al., 2002); thus not leading to desired outcomes such as better business-IT alignment or an IT strategy revision. Successful SITBM, however, results in tangible projects and initiatives (Anand & Kodali, 2008; Camp, 1989; Lacity & Hirschheim, 1995); also illustrated by the few known cases in which strategic benchmarking was successfully conducted (Clayton & Luchs, 1994; Zairi, 1998). Following this line of thought, it is important to understand that there is a difference between the success of a benchmarking project (including data collection and analysis) and the success of a benchmarking as a whole. A *benchmarking project* is successful if it delivers recommendations for improvements. Accordingly, the benchmarking project team members are not accountable for the implementation (or success) of the recommended initiatives, since these initiatives' implementation is performed as part of separate projects. By contrast, *benchmarking success* manifests not at a project level, but the organizational level (Anand & Kodali, 2008; Drew, 1997). Thus, we propose that s*trategic IT benchmarking is successful if it produces useful information about an IT organization's strategic position that is translated into sustainable initiatives to improve this position.*

Looking at the scientific literature, there is a vast body of knowledge on both general benchmarking and IT management. Knowledge of strategic benchmarking and SITBM, however, is still scarce. For the most part, papers on IT benchmarking focus on fairly technical issues (e.g., content or privacy). As SITBM poses specific challenges, it can only partly be explained by general benchmarking or IT management literature. First, only the analysis of the right issues allows organizations to gain improvements from their strategic assessments (Gimbert et al., 2010). Second, despite increasing standardization and commoditization of IT organizations, organizational structures and processes of various IT organizations still often differ remarkably, making it difficult to compare them (Krcmar, 2009). Third, as the results of a SITBM have long-term impact, they require a larger degree of organizational backing than it is required for traditional price and service benchmarking (Williams et al., 2012).

By reviewing the literature on strategic benchmarking and IT benchmarking, and the literature in the broader fields of strategic IT management and benchmarking, we aim to provide a starting point for a more theory-driven debate on SITBM success. We have three core research goals: (1) identify relevant concepts that influence the course of a SITBM project, (2) summarize the existing understanding of these concepts into a concept relationship map for SITBM success, and (3) derive a set of propositions on SITBM success and avenues for future research.

This paper is structured as follows. In the next section, we discuss the core foundations of SITBM. We differentiate it from other forms of (IT) benchmarking and embed it in the context of other strategic activities in IT organizations. In the third section, we introduce our research framework used to structure the review and analysis process. In the fourth section, we present our approach to literature selection and classification. In the fifth section, we perform an in-depth analysis of the current state-of-the-art and, in the sixth section, synthesize it into a concept relationships map for SITBM success. The paper concludes with a discussion and research perspectives for SITBM success in the seventh section.

2. Foundations of Strategic IT Benchmarking

We rely on the scientific discourse of two adjacent research fields. On the one hand, we argue that a careful evaluation of general benchmarking knowledge allows for valuable insights, especially regarding methodological facets. On the other hand, IT management represents the context in which SITBM is applied. It not only provides the content that SITBM should cover, it also influences how SITBM can be applied. In the next two sections, we discuss SITBM from the perspective of these two adjacent research fields to lay our theoretical foundations.

2.1 Benchmarking Perspective

Benchmarking is a continuous search for, and application of, better practices that lead to superior competitive performance (Watson, 1993). Since benchmarking gained attention through the Xerox case (Camp, 1989; Jacobson & Hillkirk, 1986), it has undergone several development stages. While early attempts were mainly product-oriented, contemporary approaches are also applied to processes and strategies (Anand & Kodali, 2008; Gräuler & Teuteberg, 2013; Legner, 1999). Definitions of strategic benchmarking vary. While Watson (1993) orients his definition towards process benchmarking, Clayton and Luchs (1994) focus on an assessment of general strengths and weaknesses as preparation for strategic planning. The most specific definition is provided by Drew (1997), who maintains that “strategic benchmarking is used to compare organizational structures, management practices, and business strategies” (p. 428). We base our definition of SITBM on this understanding and define *strategic IT benchmarking as a structured comparison of IT management to a peer group with the objective of improving IT organizational and cost structures, IT management practices, business-IT alignment, and/or IT strategies.*

2.2 IT Management Perspective

As defined above, SITBM assesses IT management, which, in turn, provides the benchmarking-relevant context and content. Looking at research on IT management therefore fosters our

understanding of these facets and their influence on SITBM projects. Literature suggests that SITBM is most valuable when performed as part of the annual strategy process (Ward & Peppard, 2003; Watson, 1993). In this context, much is known about strategic IT/IS planning and implementation (e.g., Boddy et al., 2005; Doherty et al., 1999; Earl, 1993; Galliers & Sutherland, 1994; Hackney & Little, 1999; Teubner, 2007). However, there is still a lack of understanding of the activities and contingencies that precede formal planning (Chen, 2005, Müller et al., 2009). While many researchers suggest analyzing an IT organization's external environment so as to contrast self-perception and external perception, they mostly focus on how to analyze the data, but not on how to obtain it (e.g., Lederer & Sethi, 1996, Newkirk et al., 2003, Ward & Peppard, 2003). However, lack of information and knowledge about own capabilities has been identified as a core problem of IT practitioners in strategic planning activities (Merali et al., 2012; Philip, 2007). Additionally, in their role as a consultant to the business (Segars & Hendrickson, 2000), IT organizations' strategic planning processes are also becoming more complex (Boddy et al., 2005; Serafeimides & Smithson, 2000): IT executives are required to collect a much larger amount of information, interpret, and explain it, before they render decisions, develop implementation action plans, and set out to realize them. As a result, the usefulness and quality of the data used for situation and competitive analysis is of utmost importance to draw reliable conclusions for strategy formulation or revision. By investigating SITBM as one method for obtaining comparisons with the external environment, we provide insights on how to gain such data for strategic planning.

3. Research Framework

To better guide our review, we structured our literature review around a research framework. We looked for previous reviews on benchmarking and performed a meta-review on these to gain a first understanding of the relevant categories for analysis. In doing so, we identified a relatively large number of benchmarking review articles – since 1995, seven of these articles have been published. Each of these reviews accounts for different aspects of the state of research. For example, Zairi and Youssef (1995; 1996) discuss popular books, while Dattakumar and Jagadeesh (2003) perform a high-level review of more than 350 research articles. While these reviews concentrate on a broad analysis of benchmarking literature, other reviews focus on specific topics such as (lack of) theoretical foundations of benchmarking (Kyrö, 2003; Yasin, 2002), frameworks and approaches to benchmarking (Anand & Kodali, 2008), or benchmarking's ethical and legal aspects (Elmuti & Kathawala, 1997). These reviews provide a general structuring of research on benchmarking.

Concerning discussions of benchmarking outcomes, various researchers stress the notion of contextual factors influencing the overall benchmarking process (Adebanjo et al., 2010; Yasin, 2002). Further, Elnathan et al. (1996) suggest a research framework consisting of antecedent variables such as the chosen benchmarking methodology, preliminary analyses or experiences, contextual factors such as the scope of the benchmarking or partner structures, and outcome variables including improvement of financial and nonfinancial measures. Ramabadran et al. (2004) structure their research on context-related and process-related factors similarly. Their core statement is that context factors influence the benchmarking process and thus also, indirectly, the outcomes of a benchmarking endeavor. Based on these considerations, we structure our review along four core categories: methodology, project, success, and contextual factors (Figure 1).

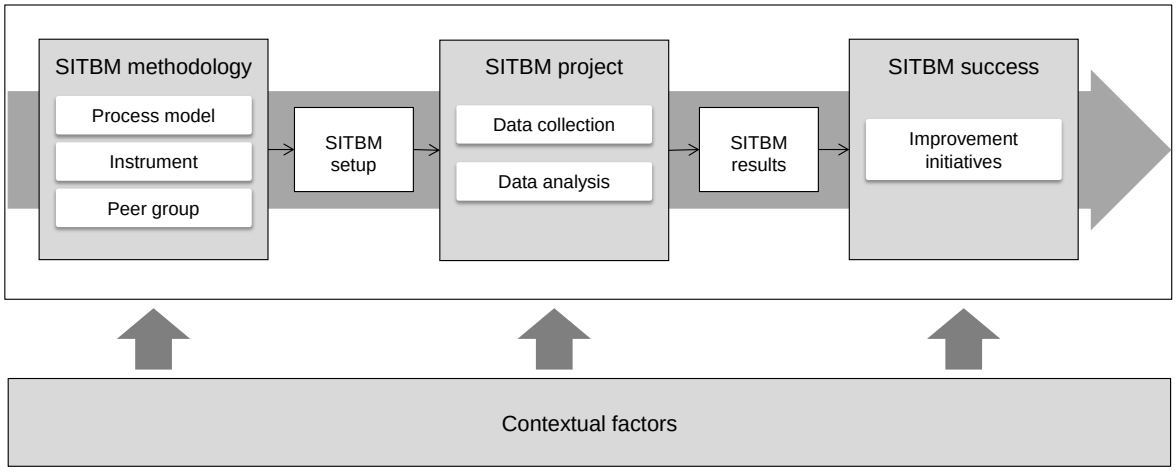


Figure 1. Research framework

The *SITBM methodology* category contains three subcategories. First, it deals with process models, that is, the structure of a benchmarking endeavor and various role definitions. Second, we extended our analysis of methodology to include instruments for SITBM. Instruments comprise questionnaires and other tools used to collect information for the benchmarking. Third, peer group subsumes matters of choice and fit of the organizations used for benchmarking.

Following the methodological decisions that determine the general setup, the *SITBM project* category comprises two subcategories representing the core phases of a benchmarking: data collection and analysis. The dynamics of these phases are crucial for the quality of results in strategic IT management projects (Müller et al., 2009). We therefore analyze the two subcategories of data collection and analysis specifically towards understanding how their dynamics contribute to the quality of the SITBM results, an important precondition for its success.

The category *SITBM success* contains one subcategory which looks at improvement initiatives based on the benchmarking's results. Typically, this set of initiatives is agreed upon during an IT organization's strategic planning phase.

Finally, the category *SITBM contextual factors* deals with aspects that might influence the course of a SITBM endeavor (e.g., available resources or project prioritization). In an attempt to better understand benchmarking processes, researchers have recently focused on the identification and better understanding of contextual factors (e.g., Müller et al., 2010; Ramabadran et al., 2004). By including this category into our analysis, we not only seek to provide an evaluation of context factors discussed in earlier reviews in the light of newer insights, but we also seek to provide researchers with a better understanding of more recent developments in this field.

4. Research Method

Our research objectives are threefold: First, to identify the current state of knowledge in the field of SITBM success. Second, to structure this knowledge into a concept relationship map. Third, to derive a set of research propositions. In doing so, we seek to shed light on SITBM success beyond mere issues of process models and identify future research opportunities. In light of these goals, we conducted a structured literature review. Such a literature review helps aggregating and facilitating current knowledge as a basis for building new insights (Rowe, 2014; Urbach et al., 2009; Vom Brocke et al., 2009). Methodologically, we rely on established guidelines for reviewing and synthesizing literature (Cooper, 1998; Fettke, 2006; Levy & Ellis, 2006; Webster & Watson, 2002). As introduced earlier, we focus our literature review on the two research streams benchmarking and IT management. Reviewing the general benchmarking literature allows us to summarize benchmarking's basic constituents and to theoretically conceptualize their impact on strategic situation analysis in IT. Further, looking at the literature on IT management makes it possible to frame strategic benchmarking as a tool in IT management and offers different lenses on our research question (Sylvester et al., 2013). Other, more distant streams (e.g., performance measurement systems or competitive intelligence) might provide valuable insights as well. The goal of our research, though, is to focus on SITBM in a narrow sense.

4.1 Literature Selection

As the basis for our review, we used the eight journals listed in the AIS Senior Scholar's Basket of Journals[2] as these represent the top journals in our discipline. Additionally, we extended this list

[2]http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=346

with further well-established IS journals for IT management and two major international IS conferences (Levy & Ellis, 2006). The journals were identified based on their mission statement and their position in the VHB Jourqual 2.0 ranking for information systems and information management.[3] To keep the number of journals manageable, we only included the top 20. Finally, we added domain-specific journals for benchmarking, which we identified based on our personal experience in the field (Vom Brocke et al., 2009). The full list of journals and conferences analyzed appears in Table 1.

We started our literature review by searching article abstracts, titles, and keywords for the strings "(IT *OR* IS) benchmarking," "strategic *AND* benchmarking," "benchmarking success," "(IT *OR* IS) management *AND* (assessment *OR* measurement)," and "strategic (IT *OR* IS) management *AND* content." While a database search may have resulted in a larger number of potential articles, we wanted to control for the quality and relevance of the papers from the beginning (Rowe, 2014). In addition, backward search assured that we would not miss relevant articles published in other journals (Vom Brocke et al., 2009; Webster & Watson, 2002). We did not include a formal time restriction in our search and included all papers that were published until January 2014. The resulting papers were directly checked for their relevance concerning fit with our research framework. For example, we included papers that reported on cases of benchmarking or strategic positioning and planning in IT organizations as well as papers dealing with respective success factors or methodological aspects. Conference papers were only considered in cases in which the findings were not published in a subsequent journal article. Additionally, we added seven books we considered relevant to our inquiry based on their frequency of citation in research papers.

After this step, we had 155 publications that we used as basis for a more detailed analysis. Two of the authors discussed the relevance of each publication and eventually agreed on 47 publications for further consideration. For example, we included all papers that introduced instruments for strategic assessments (e.g., strategic benchmarking or IT/IS assessments) as these provided insights on the content and design criteria for SITBM instruments. Furthermore, papers dealing with the benchmarking process were included, while papers dealing with the process of strategic IT/IS planning were only included in case they provided insights on the dynamics and the process of strategic situation analysis. Papers dealing with different types of IT/IS strategies, for example, and their impact on IT's value contribution were not included on account of not dealing with the benchmarking process or its relevant content. During in-depth

[3]http://vhbonline.org/service/jourqual/jq2/teilranking-wirtschaftsinformatik-und-informationsmanagement/

analysis of these publications, eight further articles were identified that were considered relevant, thus leading to a total of 55 publications.

Table 1. Covered IS journals and conference proceedings

Journals	*AIS Senior Scholars' Basket of Journals:* European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of the Association of Information Systems, Journal of Management Information Systems, Journal of Strategic Information Systems, Journal of Information Technology, MIS Quarterly *Established journals for IS and strategic IT management that were also included:* Business & Information Systems Engineering, ACM SIGMIS Database for Advances in Information Systems, Information & Management, IEEE Transactions on Engineering Management *Further domain-specific journals:* Benchmarking: An International Journal, International Journal of Operations & Production Management, Long Range Planning
Conferences	International Conference of Information Systems, European Conference of Information Systems

4.2 Literature Classification

Our classification of the literature covers three complementary facets: (1) historical and temporal aspects, (2) concept identification and analysis, and (3) concept mapping and proposition development.

In our analysis of the *historical and temporal aspects*, we only identified one publication before 1991 (Camp, 1989) which is also often regarded as the first core publication on benchmarking. Concerning relevant publications on IT management, we identified no publication relevant for our inquiry before 1991. This could be explained twofold. First, research on content of IT management mainly focused on technical issues such as infrastructure or applications and is generally regarded as outdated today (Taylor et al., 2010). Second, research on strategic processes in IT organizations only began to shift its focus towards process-related success factors at the beginning of the 1990s (Reponen, 1994; Taylor et al., 2010). Figure 2 provides an overview of the identified publications' distribution in five-year intervals.

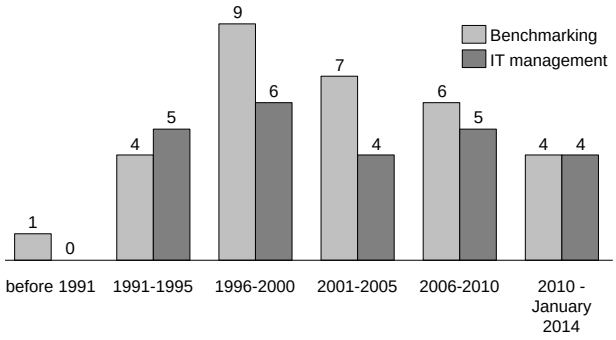


Figure 2. Overview of the identified articles by publication year

As can be seen in the distribution of papers, there was a peak in benchmarking publications from 1996 to 2000. During this time, the most process models for benchmarking were published in response to an increasing number of failing benchmarking projects. However, around the turn of the millennium, it increasingly turned out that more and seemingly better process models were not the key to benchmarking success. Since then, the number of publications (especially with respect to process models) decreased and research increasingly shifted its focus towards factors beyond process models. The number of empirical publications also rose after 2000, while many papers before this time were conceptual in nature. Concerning the identified publications on IT management, the number of publications remained fairly stable over time.

Beyond historical and temporal distribution, we explicitly focused our analysis on SITBM's history by including various articles that talk about the historical development of benchmarking and their implications for strategic benchmarking (Ahmed & Rafiq, 1998; Hong et al., 2012; Kyrö, 2003). In this, our long analysis time period (starting in 1989) allowed us to trace concepts relevant to SITBM back to the beginning of benchmarking. For example, some success factors suggest by Camp (1989) have later been shown to be only relevant for specific forms of process benchmarking (Maleyeff, 2003), while the relevance of context factors was highlighted for strategic benchmarking (Chen, 2005; Drew, 1997).

For our *concept identification and analysis* we employed a two-stage process to systematically categorize the final list of papers. In the first stage, we performed a concept-centric analysis (Webster & Watson, 2002) around the categories of SITBM shown in Figure 1. We used the qualitative data analysis software Atlas.ti to conduct a bottom-up classification based on open coding (Wolfswinkel et al., 2013). In doing so, we refined our initial categories and identified additional concepts. The resulting concept list can be found in Table 2, the classification of the publications according to these concepts is depicted in Tables 3 to 6. In the second stage, we extended and refined our initial research framework by mapping the newly identified concepts to the framework's general process (see Figure 1).

Table 2. Identified concepts for the categories from our research framework

Category	Identified subcategories and corresponding concepts*
SITBM methodology	Process models, Design, Quality criteria, Instruments, Content Design, Quality criteria, Peer group
SITBM project	Data collection, Data collection techniques, Data analysis, Analysis techniques
SITBM success	Initiated improvement initiative(s)
SITBM contextual factors	Top management support, Previous benchmarking experiences, Benchmarking team characteristics, Relevant stakeholders, Involvement of stakeholders, Cultural factors, Fear of sharing information, Resistance to change, Project-related behavior of stakeholders, IT strategy process integration
**Every concept was sorted to the respective category from Figure 1.*	

Beyond the identification and classification of relevant concepts, we specifically focused on two additional aspects. First, we wanted to gain a richer understanding of the nature of the relationships between the concepts. For example, instead of merely searching for evidence that top management support is relevant in the SITBM context, we aimed at understanding how its effect actually unfolds (Wolfswinkel et al., 2013). Second, in light of the process depicted in our research framework, we were particularly interested in the transitions between the an SITBM project's phases; that is, how the SITBM setup is transferred into the actual benchmarking project, how the project generates results, and how these results are transformed into outcome. This analysis and classification of the papers was initially performed by one researcher and then reviewed by at least one additional researcher.

As a result of this classification, we are able to: (1) identify concepts that extend and refine our initial research framework and (2) identify and analyze their relationships amongst each other. This allows us to engage in *concept mapping and proposition development*, the third facet of our literature classification. The key aspect of this facet is the development of a concept relationship map, that is, a graphical depiction of how the various concepts relate to one another. In this map we go beyond drawing arrows between concepts by expressly labeling these arrows to represent the conceptual logic for their linkages we identified in the literature. This concept relationship map will later be introduced as the result of our content analysis (Figure 3).

Building on the concept relationship map, we also used axial coding to build a larger understanding of the network of concepts and derive a set of research propositions (Miles & Huberman, 1994; Wolfswinkel et al., 2013). While these propositions build on the relationships described above (i.e., the existence of an arrow and its conceptual logic), they go beyond them by proposing specific constructs and effects that lend themselves to rigorous testing in future research. This way our work not only synthesizes and integrates the current state of SITBM research, but also proposes a way forward. This can support SITBM research's strive towards a theory of benchmarking in general (Moriarty & Smallman, 2009), and SITBM in particular.

Where previous research was still too vague to formulate sound propositions, we formulated areas that are still open to future research. While the current state of SITBM research does not (yet) lend itself to the development of a seamless nomological net, the directions for future research can help generate additional insights to help close current gaps in research and weave together all concepts relevant to describing and explaining SITBM's process and success.

5. Content Analysis

As shown in Table 2, our bottom-up classification allowed us to derive several new concepts for our initial categories from Figure 1. In this section, we discuss the state of research regarding every identified concept and outline how it is related to other concepts. Based on the literature, we first generate relationships that will be used to extend our initial framework toward the concept relationship map depicted in Figure 3. Second, where possible, we introduce the propositions we developed based on these relationships to illustrate how the different concepts contribute to SITBM success.

5.1 SITBM Methodology

The largest portion of the identified literature deals with methodological questions, that is, process models, benchmarking instruments, or peer groups. Bottom-up analysis revealed several sub-concepts for each of these three concepts. An overview of the classification results of all publications from the "SITBM methodology" category can be found in Table 3. As displayed in Figure 1, the three concepts underlying SITBM methodology form the SITBM setup that has to be agreed upon at the start of the project (e.g., Camp, 1989; Chen, 2005; Legner, 1999; Müller et al., 2010; Watson, 1993; Williams et al., 2012; Zairi, 1998). Hence, the first four relationships for our concept relationship map can be formulated as follows:

R1: The chosen process model is part of the SITBM setup.

R2: The chosen instrument is part of the SITBM setup.

R3: The chosen peer group is part of the SITBM setup.

R4: The SITBM setup has to be agreed upon at the start of the SITBM project.

Table 3. Concept matrix: SITBM methodology category

	Process models		Instruments			Peer group
Citation	**Design**	**Quality criteria**	**Content**	**Design**	**Quality criteria**	
Alshawaf et al. (2005)			x		x	
Alshawi et al. (2003)			x			
Anand and Kodali (2008)	x	x				x
Bhutta and Huq (1999)	x	x				x
Camp (1989)	x	x			x	x
Carpinetti and de Melo (2002)	x					
Chang and King (2005)			x	x	x	
Chen (2005)	x			x	x	
Chen et al. (2010)			x			
Clayton and Luchs (1994)	x	x				

Cragg (2002)			x		x	
Dong et al. (2012)			x	x		
Drew (1997)	x					x
Elmuti and Kathawala (1997)	x					x
Elnathan et al. (1996)						x
Fitoussi and Gurbaxani (2012)			x			
Fuerstenau (2012)			x	x	x	
Galliers (1991)			x			
Gleich et al. (2008)	x			x		
Gregory et al. (2012)			x			
Hinton et al. (2000)						x
Hong et al. (2012)					x	
Kardaras and Karakostas (1995)			x			
Kerschbaum et al. (2011)				x	x	
Krcmar (2009)			x		x	x
Kütz (2010)			x			
Lacity and Hirschheim (1995)						x
Legner (1999)	x	x		x	x	x
Maleyeff (2003)						x
Mentzas (1997)			x			
Mocker and Teubner (2005)			x			
Moriarty and Smallman (2009)		x				x
Müller et al. (2010)	x	x			x	x
Newkirk and Lederer (2003)		x	x			
Ohinata (1994)	x					x
Panagiotou (2007)						x
Ramabadran et al. (2004)						x
Rehäuser (1999)	x					x
Riempp et al. (2008)			x		x	
Saunders and Jones (1992)			x			
Serafeimides and Smithson (2000)			x		x	
Smith and McKeen (1996)			x		x	x
Ward and Peppard (2003)		x	x			
Watson (1993)	x	x				x
Zairi (1998)	x	x				x

In the next sections, we will outline how the underlying concepts of SITBM methodology contribute to our understanding of the role of methodological quality in SITBM endeavors and clarify their constituting

quality characteristics. Especially regarding the latter a systematic delineation has been called for in previous research (Moriarty & Smallman, 2009).

Process Models

Design: A large portion of benchmarking research focuses on process models, particularly on matters of process design (i.e., phases and role models) and quality criteria for process models. The probably most popular benchmarking model is the approach of Camp (1989), which consists of four main phases: (1) planning, (2) analysis, (3) integration, and (4) action. Other approaches range from very slim (e.g., Drew (1997) with only five steps) to very detailed (Anand and Kodali (2008) suggest 54 steps). In earlier years, there was broad consensus among researchers that a well-chosen benchmarking process is among the most important preconditions of successful benchmarking (Moriarty & Smallman, 2009). Additionally, there was evidence that an inappropriately chosen process hinders a benchmarking initiative's success (e.g., Ahmed & Rafiq, 1998; Clayton & Luchs, 1994). As a result, many researchers proposed new process models in response to unsatisfactory benchmarking endeavors; as reflected in the large number of process models initially depicted (Adebanjo et al., 2010). Although the importance of process models for benchmarking success has been relativized in recent years, it can still be argued that a high-quality process model contributes to the quality of the benchmarking results.

Quality criteria: In our literature analysis we were able to identify two quality criteria of benchmarking process models. The first one is *simplicity*: The detailed layout of the chosen process is less important than the degree to which the chosen process is understandable for the relevant stakeholders (Zairi, 1994). Therefore, Elmuti and Kathawala (1997) call for simple, easy-to-understand benchmarking processes by emphasizing that "the structure should not get in the way of the process" (p. 232). Especially inexperienced benchmarking teams tend to struggle if the process model is too complex (Elnathan et al., 1996; Ramabadran et al., 2004).

The second quality criterion is *adaptability*: Watson (1993) states that "it's important to understand that each benchmarking study does not have to complete the entire sequence of steps proposed […]. The models should be viewed as a guide to learning […]" (p. 65). Hence, even a widely accepted benchmarking approach might have to be adapted to fit the specificities of a certain organization (Clayton & Luchs, 1994). Adaptability has also been addressed by other benchmarking researchers (Bhutta & Huq, 1999; Legner, 1999) as well as researchers from the field of IS strategizing (Newkirk et al., 2003; Ward & Peppard, 2003). These researchers stress the relevance of feedback loops to continuously learn from the benchmarking / strategy process and adapt it accordingly over time. To sum up, there is no one-size-fits-all process, especially not in strategic benchmarking. Also the objectively best process model might be useless if it is not understandable or meaningful to the

benchmarking team members. Hence, simplicity and adaptability are the defining characteristics of process quality. Summing up these insights, we propose:

P1: The higher the quality of the process model, the higher the quality of the SITBM results.

Instruments

The underlying instruments are an integral part of every benchmarking study, reflecting the study's structure and focus (Camp, 1989; Fuerstenau, 2012; Legner, 1999). Further, they contribute to validity, reliability, and comparability of the benchmarking results (Carpinetti & Melo, 2002; Cragg, 2002).

Content: Looking at research on instruments for SITBM, a large portion of publications deals with the content to be benchmarked. For example, as Gimbert et al. (2010) argue, instruments used in a strategic context must cover the core domains of an organizational unit and structure these domains in a way that allows for strategic analysis (e.g., by using appropriate measures). Consequently, we included not only publications that deal with benchmarking instruments, but also those that analyze and structure the domains of IT management. Altogether, there is considerable research on the content of IT management and its structures that can be used as the basis for SITBM instruments (e.g., Chang & King, 2005; Chen et al., 2010; Gregory et al., 2012; Mocker & Teubner, 2005; Serafeimides & Smithson, 2000; Ward & Peppard, 2003). Some researchers argue for coverage of costs and structures of the most important IT products and services (Saunders & Jones, 1992). Others stress that information about an IT organization's core processes and structures (e.g., architecture or sourcing processes) should also be included (Clayton & Luchs, 1994; Cragg, 2002; Riempp et al., 2008).

Instrument design: Benchmarking instruments have different forms, such as questionnaires, interview guides (typically used as part of site visits), or discussion and moderation guides (e.g., used in focus groups and panels) (see also Gleich et al., 2008). In strategic benchmarking instruments usually take the form of questionnaires (Chen, 2005). These assure that relevant data is comprehensively collected – a facet especially relevant in strategic contexts (Riempp et al., 2008; Saunders & Jones, 1992; Smith & McKeen, 1996). Additionally, questionnaires ensure anonymity (Camp, 1989). While anonymity is often an issue in benchmarking, it is particularly relevant in strategic benchmarking, because companies do not want to provide information to their competitors directly (Panagiotou, 2007). Concerning the concrete design of benchmarking instruments, we identified only seven publications (Chang & King, 2005; Chen, 2005; Dong et al., 2012; Fuerstenau, 2012; Gleich et al., 2008; Kerschbaum et al., 2011; Legner, 1999). Of these, only three deal with instruments in an IT management context. The most comprehensive instrument has been introduced by Chang and King (2005), whose objective is to assess the performance of the IS function. By contrast, the works of Fuerstenau (2012) and Legner (1999) are both not focused on a broad assessment of an IT

organization, but rather on an assessment of the enterprise architecture and governance (Fuerstenau, 2012) or on the benchmarking of IT-supported processes (Legner, 1999), respectively. However, both works may be used as a basis for instruments in SITBM.

Quality criteria: Prior research has identified three quality criteria for strategic benchmarking instruments. The first is *careful quantification*. The benchmarking instrument needs to assure that the data from different organizations can be compared. This is achieved by providing all participants with precise operationalizations and definitions of the relevant data (Hinton et al., 2000; Smith & McKeen, 1996). While in a statistical perspective operationalizations should be as precise as possible, in practice, a tradeoff is needed between level of definition detail and compactness: a very detailed measure (e.g., cost breakdown) may allow for precise peer group comparisons, but is hardly manageable for the persons collecting the data (Alshawaf et al., 2005; Camp, 1989; Elnathan et al., 1996).

The second quality criterion is *contextualization*, that is, the enriching of instruments used in strategic benchmarking with abilities to collect context information. Context information has been shown to facilitate better interpretation of the results (Smith & McKeen, 1996) as it helps understanding why certain results may have arisen (Hinton et al., 2000; Müller et al., 2010). Few authors even argue that many of the problems ascribed to unsuitable peer groups are actually problems of lacking context information (Clayton & Luchs, 1994; Panagiotou, 2007).

The third quality criterion is *content fit*, that is, the instrument used in SITBM must cover the relevant content of IT management discussed earlier (Chang & King, 2005; Hong et al., 2012; Newkirk et al., 2003). In that regard, Smith and McKeen (1996) observed that IT managers often collect irrelevant information, because they revert to “what can be measured, rather than what should be measured” (p. 21). Regarding the quality of the resulting strategic insights, however, there is no difference between gathering no information and gathering strategically irrelevant information (Gimbert et al., 2010).

In summary, benchmarking instruments fulfilling the three discussed quality criteria have a positive impact on the quality of the benchmarking results: Careful quantification contributes to reliability and comparability of the data, contextualization increases validity and comparability, and content fit assures validity of the results. This improved results’ quality contributes to more substantial data analyses (Ahmed & Rafiq, 1998), and, eventually, to the overall outcomes of the benchmarking endeavor (Müller et al., 2010). It can, hence, be derived:

P2: The higher the quality of the instrument, the higher the quality of the SITBM results.

Peer Group

The peer group comprises the group of companies to which the company conducting the benchmarking is compared. Questions of suitability and comparability of the benchmarking peer group have been the subject of various investigations (e.g., Camp, 1989; Drew, 1997; Moriarty & Smallman, 2009). Research has often found a positive influence of a suitable peer group on the quality of the insights gained from a benchmarking (Maleyeff, 2003; Müller et al., 2010). Some authors even argue that peer group quality is a key success factor in IT benchmarking (Krcmar, 2009; Ramabadran et al., 2004). If the benchmarking team members do not feel like being comparable to the peer group or at least being able to derive insights regarding their potential future strategy, they probably will also not put much effort into transforming the SITBM project's output into outcome. Consequently, we maintain that:

P3: The higher the quality of the peer group, the higher the quality of the SITBM results.

Many companies want to compare themselves to competitors with a similar strategic environment (Panagiotou, 2007). Conversely, many companies that are leading in their group, want to retain this position and therefore do often not want to share their sensitive strategic information with competitors (Elmuti & Kathawala, 1997). On the other hand, the probability of uncovering practices that lead to superior performance is much higher when looking at companies external to the own industry (Camp, 1989; Drew, 1997). In addition, benchmarking against a top-class IT organization might result in a feeling of "doing everything wrong" and, consequently, may leave the benchmarking IT unit in a state of helplessness, thus hindering the success of the benchmarking project (Lacity & Hirschheim, 1995). Accordingly, building a suitable benchmarking peer group can be challenging. Therefore, companies performing a SITBM either only compare themselves to chosen partner organizations, or revert to big benchmarking clearinghouses, such as Gartner, who provide benchmarking data from companies in different industries. A third possibility is to join a benchmarking consortium of companies who are similar enough to reveal helpful insights (Drew, 1997; Elnathan et al., 1996; Rehäuser, 1999). Altogether, we hold that a well-balanced peer group structure comprising some competitors and some moderately similar companies from other industries is one characteristic of peer group quality.

Research and practice have also not yet found answers on how to determine the optimal peer group size (Elnathan et al., 1996). The recommended sizes of peer groups reported in our literature pool range from 2 (Watson, 1993), over 10 (Chen, 2005), to more than 20 organizations (Riempp et al., 2008). While many CIOs strive for maximizing the peer group size, it has been shown that there is a diminishing marginal utility with an increasing number of benchmarking partners: efforts related to coordination and fitting of instruments into the specific contexts of the various IT organizations (organizational and cost structures) tend to rise exponentially with peer group size (Rehäuser, 1999). Especially such contextual fitting is, however, crucial to prevent "apples to oranges comparisons"

(Maleyeff, 2003). In summary, although past research has provided several explanations and recommendations for feasible peer group approaches, many practitioners still feel uncomfortable when it comes to questions of comparability (Elnathan et al., 1996; Müller et al., 2010). As a result, the chosen peer group approach remains a source of pitfalls SITBM and a barrier to success that needs to be overcome.

Finally, and to loop back to our overarching category SITBM methodology, we can aggregate the findings of the three concepts process model, instrument, and peer group into one additional relationship for our concept relationship map:

R5: The employed SITBM methodology determines the validity and reliability of the SITBM results.

5.2 SITBM Project

Looking at the project category of SITBM, papers mostly deal with specific tools and techniques (see Table 4). Only few publications extend their analysis towards context factors that influence the course of data collection or analysis (these publications are discussed in the contextual factors category).

Table 4. Concept matrix: SITBM project category

	Data collection	**Data analysis**
Citation	**Data collection techniques**	**Data analysis techniques**
Ahmed and Rafiq (1998)		x
Anand and Kodali (2008)		x
Camp (1989)	x	x
Chen (2005)	x	x
Elnathan et al. (1996)	x	
Fuerstenau (2012)		x
Gleich et al. (2008)	x	x
Legner (1999)	x	x
Maleyeff (2003)		x
Moriarty and Smallman (2009)		x
Müller et al. (2010)	x	
Rehäuser (1999)	x	x
Ward and Peppard (2003)		x
Watson (1993)	x	x
Zairi (1998)		x

Data Collection Techniques

Data collection techniques involve the methods employed to collect benchmarking data. They mostly comprise unilateral data collection (public domain information, i.e. no partners are involved), site visits, surveys, or focus groups (Camp, 1989; Elnathan et al., 1996; Rehäuser, 1999). In this regard, they must not be confused with instruments for benchmarking. Instruments provide guidance regarding the necessary content that must be collected and its operationalization. Data collection techniques, on the other hand, involve how these instruments are applied. These are relevant because they form the basis for data analysis. If the data collected is deficient or incomplete, the data analysis phase may result in misleading or even wrong results. Accordingly, we derive our sixth conceptual relationship:

R6: The data collection should provide high-quality data for the data analysis.

Several different instruments such as questionnaires and interviews may be involved during data collection. Elnathan et al. (1996) carried out a detailed investigation of various data collection techniques. Their recommendation is to use site visits, because the insights gained from this technique allow for more substantive analyses than other techniques. However, they also acknowledge that whenever anonymity is a crucial concern, unilateral approaches or surveys are to be preferred. As a result, in many strategic benchmarking projects, surveys or consortia with anonymized data gathering are used (Chen, 2005; Hong et al., 2012; Müller et al., 2010). One of the most comprehensive approaches to strategic benchmarking is the one proposed by Watson (1993), who suggests a multi-method approach based on questionnaires as core data collection instrument enriched by a systematic search for secondary data and interviews with chosen stakeholders to better account for context. By contrast, Zairi (1998) presents the benchmarking process of a company conducting a strategic benchmarking that focused solely on an anonymized assessment of key success factors and practices. A mixed approach was described by Gleich et al. (2008). The companies in the benchmarking they describe knew about each other, but the extensive data collection and analysis is performed by an independent third party who anonymized the gathered insights afterwards. In summary, regardless of the respective approach to data collection, authors in our literature pool suggest that while anonymity is an issue in strategic benchmarking, it should not hinder capturing context information because such context information is a great facilitator of more substantive data analysis. Thus, we propose:

P4: The more context information collected with the chosen data collection technique, the more substantive the data analysis.

Several benchmarking authors argue that data analysis needs more scrutiny than data collection (Moriarty & Smallman, 2009; Ohinata, 1994). This finding is consistent with the results of Anand and Kodali (2008), who found that of 35 prominent benchmarking models, only 37% deal with matters of

data collection in greater detail. By contrast, researchers from strategic planning in IT organizations indicate that the way data is analyzed during strategic situation analysis is less important than the way data is collected (Gregory et al., 2012; Ward & Peppard, 2003). As strategic benchmarking is a tool to generate data during IT/IS strategizing, it seems reasonable that similar effects may also be et play here. However, current research does not allow for definite statements on these effects. This leads us to suggest that the data collection phase needs more attention in benchmarking research.

Data Analysis Techniques

Once collected, benchmarking information is analyzed and evaluated using various methods and tools. Numerous techniques are available for benchmarking data analysis that have received considerable attention in research, with gap analysis being the one mostly applied (Anand & Kodali, 2008; Legner, 1999; Zairi, 1998). However, gap analysis alone is not sufficient for successful benchmarking (Camp, 1989; Elnathan et al., 1996). Instead, additional information is needed to foster contextualization and help explain the gap (Legner, 1999; Müller et al., 2010). As a result, many different data analysis approaches have been suggested as an extension to the classical gap analysis. For example, Ahmed and Rafiq (1998) suggest a data analysis approach that integrates several established analysis techniques such as gap analysis, balanced scorecards, and analytical hierarchical process. Chen (2005) suggests an extension of gap analysis called “strategic matrix” that links an organization’s core competencies to its benchmarking ratings, with the aim of providing better and ranked inputs for strategic planning. Beyond gap analysis, other approaches can be found, such as data envelope analysis (Moriarty & Smallman, 2009), statistical process control (Maleyeff, 2003), or modifications of process cost accounting (Gleich et al., 2008) for systematic analysis of processes, and dependency analysis for structured analysis of capabilities and organizational structures (Fuerstenau, 2012). Altogether, we formulate the next relationship for our concept relationship map as follows:

R7: The techniques employed in data analysis produce the SITBM results.

Several quality criteria for data analysis techniques in SITBM can be derived. First, specific analysis objects (e.g., cost structures, processes, or capabilities) require specific analysis techniques that adequately account for the data peculiarities. Accordingly, as in SITBM different kinds of analysis objects are assessed, the employed data analysis techniques should also adequately account for the respective data specifics. Hence it can be derived:

P5a: The better the employed data analysis approach handles the specific requirements of different types of analysis objects, the higher the quality of the SITBM results.

Second, the results of the analysis should be presented in a management-oriented way to directly support the forthcoming strategic planning (Lin et al., 2014; Williams et al., 2012). In that regard, the

strategic matrix introduced by Chen (2005) is a promising approach, but also dashboard-like charts have been suggested (Gleich et al., 2008; Watson, 1993). Altogether, it can be stated:

P5b: The more management-oriented the results of data analysis are presented, the higher the probability that results are actually used in the subsequent strategic planning.

5.3 Strategic IT Benchmarking Success

For SITBM to be successful, the results of the data analysis have to be transformed into further actions. These actions reflect in a new or revised IT strategy, that is, a set of short-term and long-term initiatives to improve the IT organization's strategic position (Clayton & Luchs, 1994; Watson, 1993). Our review showed that research papers dealing with benchmarking success are scarce – only ten publications were identified in that area (see Table 5). In these, the authors have realized that methodological factors alone are not sufficient to explain SITBM project success. They also indicate that several context factors influence the overall outcomes. However, as many of these researchers note, research lacks a deeper understanding of how these factors impact the SITBM project as a whole (e.g., Müller et al., 2010; Ramabadran et al., 2004; Williams et al., 2012).

Table 5. Concept matrix: SITBM success category

	Success – Initiated improvement initiatives
Citation	Camp (1989), Clayton and Luchs (1994), Drew (1997), Elmuthi and Kathawala (1997), Lacity and Hirschheim (1995), Müller et al. (2010), Ohinata (1994), Ramabadran et al. (2004), Watson (1993), Williams et al. (2012)

Initiated Improvement Initiatives

Researchers in the identified publications have reached consensus regarding the criteria for successful SITBM (i.e. a set of initiatives to improve the current strategic position) and often provide various success factors. For instance, Clayton and Luchs (1994), discussing a strategic benchmarking success story, suggest that strategic benchmarking should always be integrated with strategy revision and be considered a starting point for further, increasingly in-depth analyses of identified problem fields. Beyond that, they have a strong focus on methodological facets, that is, the overall process and the content that was captured in this case. Few others focus on specific facets such as team characteristics (Ohinata, 1994) or cultural aspects (Elmuti & Kathawala, 1997; Lacity & Hirschheim, 1995; Williams et al., 2012). Yet, regarding an understanding of these various aspects' effects on the whole benchmarking process, the mentioned authors mostly focus on the identification of the facets, but do not link them to the whole benchmarking process or investigate their effects in depth. Only four of the ten publications attempt to understand successful benchmarking holistically.

Drew (1997) was one of the first to realize that explaining successful benchmarking requires a sound understanding of the effects of various success factors along the whole benchmarking process. Among the factors he uncovered are external forces (e.g., industry standards or hostile competitive environments) and internal barriers (e.g., lack of time and resources) that impact the execution of the project, as well as culture- or methodology-related aspects (e.g., resistance to change or inappropriate peer group) that hinder the implementation of the learnings from the benchmarking. However, Drew's focus was on uncovering these facets. Accordingly, he left their specific effects open for future research. Ramabadran et al. (2004), building on this idea, surveyed how factors related to project team behavior during data collection and data analysis as well as partner characteristics influence satisfaction with benchmarking results and benchmarking success. While they found a positive impact of partner characteristics and project behavior on results satisfaction, they did not find a correlation between these aspects and benchmarking success.

These two publications use a confirmatory survey approach. The authors of the third publication on SITBM success we identified employ an exploratory qualitative approach. Müller et al. (2010) propose a benchmarking success model that links various contextual factors such as top management support, culture, or process integration to methodological variables. Leaning on IT/IS strategy research, they suggest that various psychological effects during the benchmarking have to be triggered for success. In that regard, they suggest stakeholder commitment as a key trigger for these effects. Still, however, they leave a detailed analysis of their proposed mechanisms open for future research.

Finally, in the most recent publication, Williams et al. (2012) perform a literature review to identify barriers to benchmarking and potential solutions to overcome these. They identified two barriers relevant for benchmarking success, namely inertia impeding pursuit of new practices and concerns regarding specific impacts of implementing new practices. The recommendations of Williams et al. to overcome these barriers are, first, to involve the relevant stakeholders from the beginning and address their reservations. Second, they argue that a sound benchmarking methodology will help lowering resistance to change. Beyond, they suggest that future benchmarking may be regarded more positively by the organizational stakeholders when prior benchmarking projects are positioned as success stories and supporters are rewarded. Still however, the analysis in this publication focuses on aspects that precede the benchmarking. The dynamics of the project phase are not subject of their investigation.

To sum up, looking at the overall process of how SITBM success emerges, we find that only two of four publications attempt to understand how various effects during project execution lead to benchmarking success. As both publications focus on different aspects and come to different results, we are not yet able to formulate any generalized statements, propositions, or relationships on the mechanisms that

facilitate the transformation of SITBM results into outcome. In our concept relationship map (see Figure 3) we therefore left the respective arrow empty and placed a question mark there instead.

5.4 Contextual Factors

Previous research has identified a variety of different contextual factors that influence a SITBM initiative's course (see Table 6). Contextual factors cover a wide range of concepts that are relevant before or during a benchmarking project. For this review, we have concentrated on concepts named more than once in our literature pool. While few barriers to success such as lack of top management support as well as integration into IT strategy processes have received considerable attention (e.g., Drew, 1997; Hinton et al., 2000; Lederer & Sethi, 1996), publications dealing with cultural or team factors are rather sparse and fragmented. For instance, of the 11 publications dealing with stakeholder involvement, only four are from the benchmarking research stream (whereas only the works of Müller et al. (2010) and Ramabadran et al. (2004) suggest how such an involvement may look like).

Top Management Support

Top management support refers to the extent to which management supports a project with resources, clearly communicates its objectives, and stresses its importance (Müller et al., 2010). Top management in a SITBM project is most often represented by the CIO, but IT's middle management might also be involved (Ruohonen, 1991). Looking at the reviewed literature, top management's role has been the most considered context factor that influences benchmarking initiative success (e.g., Clayton & Luchs, 1994; Ohinata, 1994; Ramabadran et al. 2004) and of the IT strategic process (e.g., Earl, 1993; Lederer & Sethi, 1996; Mentzas, 1997).

Table 6. Concept matrix: Contextual factors

Citation	Top management support	Previous benchmarking experiences	Benchmarking team characteristics		Cultural factors			IT strategy process integration
			Relevant stake-holders	Involvement of stake-holders	Fear of sharing information	Resistance to change	Project-related behavior of stake-holders	
Adebanjo et al. (2010)	x		x		x			
Bhutta and Huq (1999)				x				
Camp (1989)	x							
Chen (2005)								x
Chen et al. (2010)				x				
Clayton and Luchs (1994)	x							x

Doherty et al. (1999)				x				x
Drew (1997)	x				x	x		x
Earl (1993)	x			x			x	
Elmuti and Kathawala (1997)	x				x	x		x
Elnathan et al. (1996)	x	x				x		
Galliers (1991)								x
Hinton et al. (2000)				x	x	x		
Krcmar (2009)		x						
Lacity and Hirschheim (1995)					x			x
Lederer and Sethi (1996)	x							x
Legner (1999)	x							
Lin et al. (2014)		x						x
Mentzas (1997)			x	x				
Moriarty and Smallman (2009)	x	x						
Müller et al. (2009)				x			x	x
Müller et al. (2010)	x			x		x	x	x
Ohinata (1994)	x		x					
Ramabadran et al. (2004)	x	x					x	
Rehäuser (1999)	x	x				x		
Ruohonen (1991)			x					
Segars and Grover (1999)				x			x	x
Serafeimides and Smithson (2000)						x	x	
Ward and Peppard (2003)	x							x
Watson (1993)	x							x
Wiiliams et al. (2012)	x	x		x		x		

Without sufficient resources available for a project and appropriate prioritization, the project members might not put the required effort into the collection and analysis of the benchmarking data. Such behavior often results in invalid or unreliable ‘guesstimates’ (Watson, 1993, p. 49), or causes stagnation of the whole project (Williams et al., 2012). We therefore add a further relationship to our concept relationship map:

R8: Top management support grants resources and priority for the data collection.

Not surprisingly, many survey respondents cite lack of top management support as one of the most important reasons for their benchmarking project’s failure (e.g., Adebanjo et al., 2010; Drew, 1997; Hinton et al., 2000). Camp (1989) even holds that “[t]here is no more crucial indication of potential for success in benchmarking than strong, concerted, and interested support by management“ (p. 35). By

contrast, Lederer and Sethi (1996) found that while top management is a necessary antecedent to successful strategic planning in IT organizations, it is not sufficient. This finding is confirmed by other, more recent studies, which indicate that the often used formula 'more top management support = better results' is not fully correct (Müller et al., 2010, Ramabadran et al., 2004). Still, while the role of top management for SITBM success might have to be considered in a more differentiated way, researchers agree on its general relevance for smooth execution of a benchmarking project and its resulting positive, moderating impact on the quality of the benchmarking results. We thus propose:

P6: The higher the degree of top management support, the higher the impact of the data collection results on the quality of the SITBM results.

Previous Benchmarking Experiences

Project members can have a certain level of routine that helps them overcome potential pitfalls and problems (Krcmar, 2009; Lin et al., 2014). Through this, previous experiences shape the way projects are conducted. In our review, this concept was mentioned in seven publications. The respective authors argue for including experienced benchmarkers in the project team because they positively influence project progress. However, the importance of benchmarking experience depends on the chosen peer group approach. For example, doing strategic benchmarking using the partner-based approach requires more experience because companies must act very autonomously in finding suitable partners, developing instruments, and conducting the process (Elnathan et al., 1996; Rehäuser, 1999). Accordingly, we formulate:

R9: Previous benchmarking experiences prevent pitfalls and problems during the SITBM project.

Yet, this concept's explanatory value has been disputed. Recently, Lin et al. (2014) were able to provide statistical evidence on the relationship between organizational maturity and the ability to successfully perform complex strategic IT/IS assessments. By contrast, Krcmar (2009) argues that experience is valuable in IT benchmarking, but not crucial: many inexperienced companies use IT benchmarking as a means for performance evaluation along a defined performance standard (the benchmark) rather than for best practice derivation; the former requires much less experience than the latter. Further, Ramabadran et al. (2004) only found marginal correlations between benchmarking experience and efficiency and effectiveness of the benchmarking process. An explanation for this result has been provided by Moriarty and Smallman (2009) who observed that many inexperienced benchmarkers hire experienced consultants to guide the benchmarking process. This is especially true for strategic benchmarking (Lin et al. 2014; Ohinata, 1994). The issue of experience therefore remains relevant, but becomes less critical. Altogether we propose:

P7: The higher the level of previous benchmarking experience, the higher the likelihood of achieving SITBM success.

Benchmarking Team Characteristics

Two concepts were identified with respect to team characteristics in benchmarking: First, a select few publications investigate the *relevant stakeholders of SITBM.* Second, a larger research stream of research deals with *stakeholder involvement in benchmarking projects*. While the effects and relationships discussed in the literature are fragmented, the following relationship can be derived from benchmarking and IT management research:

R10: Benchmarking team characteristics have an impact on the acceptance of the SITBM results.

Relevant stakeholders: Literature shows that having the "right" stakeholders involved in the benchmarking positively influences the overall project progress (Ohinata, 1994; Ramabadran et al., 2004; Williams et al., 2012). In our literature pool, however, only four publications investigated relevant stakeholders of SITBM. Benchmarking teams are mostly comprised of representatives from management, internal employees and process owners, a few internal as well as external customers and suppliers, and sometimes also external benchmarking experts (Adebanjo et al., 2010; Ohinata, 1994). Looking at the stakeholder groups identified for IT strategy processes reveals a similar picture. Ruohonen (1991) identified three core stakeholder groups in IT strategy planning: top management (including the representatives of company management), the user management group (including core representatives of the business units), and the IT/IS management group (including the CIO and the IT organization's middle management). While Mentzas (1997) identified the same groups, he also suggested including issue-specific experts for specific organizational domains as well as external experts, especially during situation analysis and strategy conception.

Stakeholder involvement: Researchers argue that high involvement of the relevant stakeholders is positively associated with the success of strategic initiatives and benchmarking. However, in benchmarking research, the importance of stakeholder involvement has only recently been the subject of in-depth investigations (Müller et al., 2010; Williams et al., 2012). This is remarkable, since Hinton et al. (2000) already observed that both practitioners and researchers lack understanding about the relevance and effects of stakeholder involvement in benchmarking projects. In the publications originating from the IT management stream, we found evidence that approaches to IT/IS strategic planning that focus on actively incorporating all relevant IT stakeholders result in highest acceptance of the strategy (Doherty et al., 1999; Earl, 1993; Segars & Grover, 1999). This incorporation is particularly important during the strategic situation analysis and strategy conception phase (Mentzas, 1997; Müller et al., 2009). Chen et al. (2010), building on the work of Earl (1993), also stress this notion by

maintaining that the target of the IT strategy process should be “a shared view regarding the role that IS plays within the organization” (p. 241). This target can only be achieved by incorporating all relevant stakeholders into the strategy process. Summarizing the findings from benchmarking and IT management research, we can derive insights on the role of stakeholder involvement in SITBM:

P8: Involvement of relevant stakeholders positively influences the acceptance of the SITBM results.

Cultural Factors

Although culture’s importance on organizational undertakings is widely acknowledged (Hofstede, 2001), this aspect has to date widely been neglected in benchmarking research. Only a few researchers deal with cultural facets, and even fewer look at cultural factors’ influence on the benchmarking process in any detail. While the appreciation of cultural factors is limited, our review identified three key concepts: fear of sharing information, resistance to change, and stakeholders’ project-related behavior.

Five papers report on *fear of sharing information* with partner organizations or benchmarking clearinghouses (Adebanjo et al., 2010, Drew, 1997, Elmuti & Kathawala, 1997, Hinton et al., 2000, Lacity & Hirschheim, 1995). While such fears may seem prohibitive to engage in SITBM to begin with, many IT organizations are mandated by the company’s management to do so. In such a situation, benchmarking teams might provide only rough approximations or even tampered data, thus leading to untrustworthy results (Lacity & Hirschheim, 1995). A solution to this dilemma has been promoted by Elmuti & Kathawala (1997) who recommend not sharing any sensitive strategic information and to see strategic benchmarking not as a means to spy on benchmarking partners, but to gain mutual benefits. However, many companies still worry and revert to consortia or clearinghouses, as noted earlier. We therefore propose:

R11: Fear of sharing information impacts the quality of the SITBM results.

If present, such a fear of sharing will negatively impact the quality of the SITBM result. We thus propose:

P9: The higher the fear of sharing information, the lower the quality of the SITBM results.

The second cultural barrier to successful SITBM is *resistance to change*. Several IT executives use SITBM as a means to justify their costs or to prove their team’s efficiency. In both cases, there is little willingness to initiate actions based on the benchmarking’s results (Elmuti & Kathawala, 1997, Hinton et al., 2000). Similar observations can be found in research on IS evaluation (Serafeimides & Smithson, 2000). However, it has been shown that benchmarking is an inadequate marketing instrument (Beatham et al., 2004) – if an IT organization is perceived to have low performance or low business-IT alignment, a positive benchmarking report will not change this perception (Lacity & Hirschheim, 1995). By contrast, only concrete improvement initiatives are an adequate means to address such negative

perceptions (Chen, 2005; Müller et al., 2009), especially in the long run (Watson, 1993). There is also evidence that many executives doubt the results of benchmarking (Drew, 1997, Hinton et al., 2000), especially when they contradict their own perceptions (Elmuti & Kathawala, 1997). Finally, also fears related to unintended consequences of implementing benchmarking outcomes (e.g., job or reputation loss) have been identified (Williams et al., 2012). Altogether, we derive:

R12: Resistance to change hinders the initiation of improvement initiatives.

P10: The higher the resistance to change, the lower the SITBM success.

Closely related, benchmarking research has only recently started to investigate approaches to overcome resistance to change. We have summarized these approaches under the third cultural concept: *stakeholders' project-related behavior*. Directness and quantity of communication between the project stakeholders as well as the nature of team members' interaction seems to influence project progress and overall satisfaction with the project output (Müller et al., 2010; Ramabadran et al., 2004). IT management researchers have also long identified the supremacy of open-minded, change-oriented, and learning-oriented approaches to strategic planning (Earl, 1993; Müller et al., 2009; Segars & Grover, 1999). However, benchmarking research still lacks understanding on how such participative approaches may help overcome resistance to change and foster SITBM success. In this regard, the three benchmarking publications we identified arrive at different results. On one side, Ramabadran et al. (2004) found that high communication levels during a benchmarking project are associated with overall satisfaction with the benchmarking results, but not with benchmarking success. On the other side, Müller et al. (2010) found the participative leadership styles increase SITBM success. In light of the findings from IT management research, we lean towards the latter and argue:

R13: Stakeholders' project-related behavior should be participative in order to increase the satisfaction with the SITBM results.

Accordingly, derive a respective proposition:

P11: The more participative stakeholders' project-related behavior, the higher the satisfaction with the SITBM results.

In summary, while research increasingly investigates cultural factors in benchmarking and SITBM projects, there is still no consistent body of knowledge. Since culture has been shown to be an important driver of project outcomes generally (El Arbi et al., 2012), more research on this facet is needed.

IT Strategy Process Integration

The likelihood of succeeding in SITBM is increased when the project is integrated into the processes of strategic IT management. After top management support, the concept of IT strategy process integration is the most regarded context factor in SITBM projects (e.g., Chen, 2005; Clayton & Luchs, 1994; Drew, 1997; Elmuti & Kathawala, 1997; Lin et al., 2014). Integration in this context means that the SITBM project should be performed as part of the strategic situation analysis and needs to be completed before strategic planning as such (Lin et al., 2014; Watson, 1993). During this step, strategic benchmarking is valuable owing because it evaluates strategically relevant information against an IT organization's competitive environment (Clayton & Luchs, 1994), fostering inside-out and outside-in analysis (Chen, 2005). Strategic benchmarking thus facilitates the exposure of an IT organization's strengths and weaknesses and assures that the resulting strategy does not lose focus on the external environment. Additionally, a few cases have shown that a SITBM endeavor that is completed too late to provide input for the strategy planning, or that is not integrated into the strategy process, is unlikely to result in any outcome (Lacity & Hirschheim, 1995, Müller et al., 2009). Consequently we derive:

R14: IT strategy process integration increases the probability of initiation of improvement initiatives after completion of the SITBM project.

P12: The better the IT strategy process integration, the higher the SITBM success.

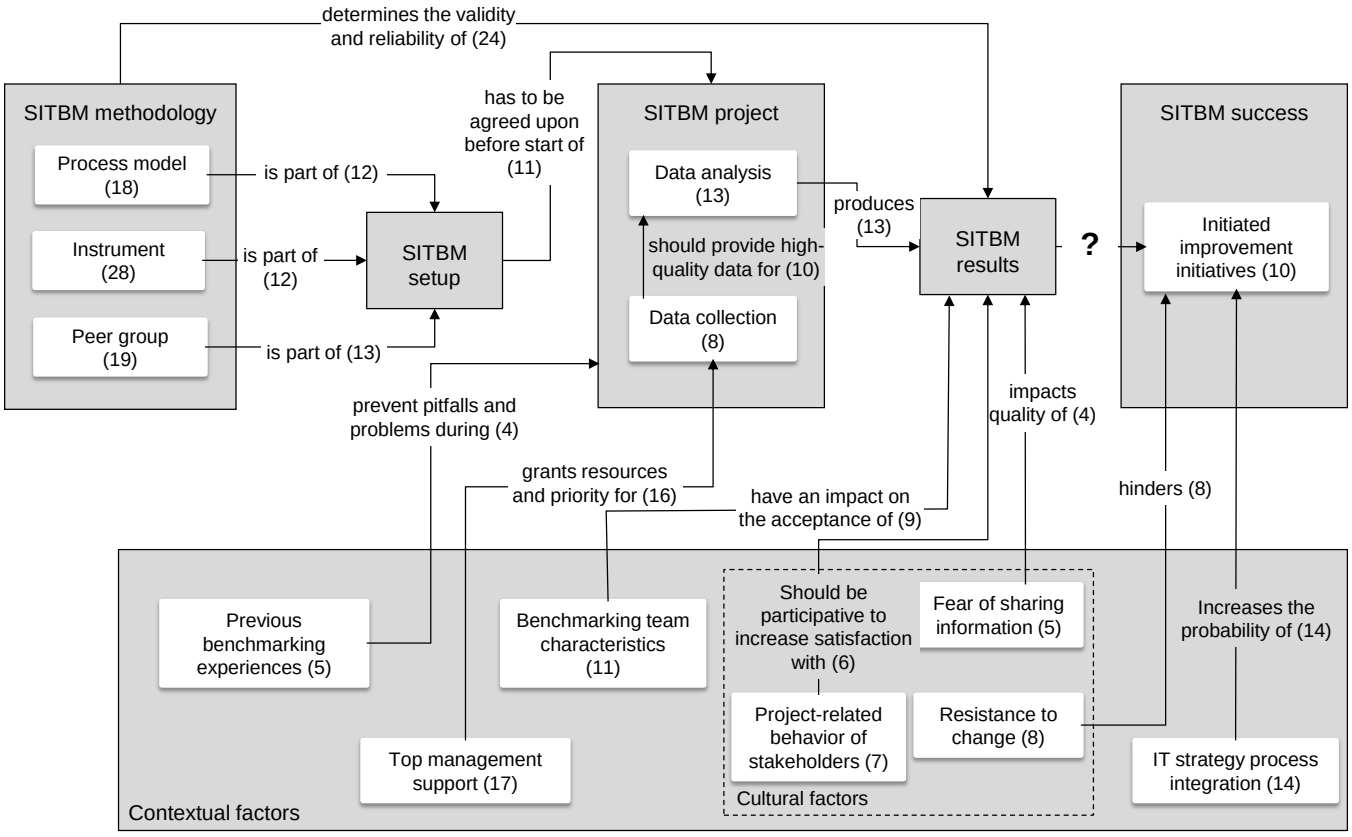
6. Synthesis and Discussion

The objective of our research is to understand which concepts influence SITBM success and how. A systematic analysis of existing research provided valuable insights into the concepts relevant for SITBM success. Several insights can be drawn from our review. First, existing research provides information on potential success factors for SITBM. For instance, abundant research is available on methodological quality as an important precondition of successful SITBM. Also some contextual factors such as top management support and integration in strategy processes have received considerable attention in prior research. Second, although much of this research has found its way into practice, SITBM initiatives still often fail. Studies report that although practitioners know various aspects relevant to successful SITBM initiatives, they not fully understand how and when they should address them (Adebanjo et al., 2010, Drew, 1997, Hinton et al., 2000, Ramabadran et al., 2004).

To this end, our results offer an overview of relevant factors related to SITBM success. Through our concept relationship map (Figure 3) we provide insights into how these interact and why so. Beyond this, Table 7 summarizes the propositions we were able to derive from these relationships.

Table 7. Summary of the relationships and propositions derived from the literature review

Relationships	***SITBM methodology:*** **R1**: The chosen process model is part of the SITBM setup. **R2**: The chosen instrument is part of the SITBM setup. **R3**: The chosen peer group is part of the SITBM setup. **R4**: The SITBM setup has to be agreed upon at the start of the SITBM project. **R5**: The employed SITBM methodology determines the validity and reliability of the SITBM results. ***SITBM project:*** **R6**: The data collection should provide high-quality data for the data analysis. **R7**: The techniques employed in data analysis produce the SITBM results. ***Contextual factors:*** **R8**: Top management support grants resources and priority for the data collection. **R9**: Previous benchmarking experiences prevent pitfalls and problems during the SITBM project. **R10**: Benchmarking team characteristics have an impact on the acceptance of the SITBM results. **R11**: Fear of sharing information impacts the quality of the SITBM results. **R12**: Resistance to change hinders the initiation of improvement initiatives. **R13**: Stakeholders' project-related behavior should be participative in order to increase the satisfaction with the SITBM results. **R14**: IT strategy process integration increases the probability of initiation of improvement initiatives after completion of the SITBM project.
Propositions	***SITBM methodology:*** **P1**: The higher the quality of the process model, the higher the quality of the SITBM results. **P2**: The higher the quality of the instrument, the higher the quality of the SITBM results. **P3**: The higher the quality of the peer group, the higher the quality of the SITBM results. ***SITBM project:*** **P4**: The more context information collected with the chosen data collection technique, the more substantive the data analysis. **P5a**: The better the employed data analysis approach handles the specific requirements of different types of analysis objects, the higher the quality of the SITM results. **P5b**: The more management-oriented the results of data analysis are presented, the higher the probability that results are actually used in the subsequent strategic planning. ***Contextual factors:*** **P6**: The higher the degree of top management support, the higher the impact of the data collection results on the quality of SITBM results. **P7**: The higher the level of previous benchmarking experience, the higher the likelihood of achieving SITBM success. **P8**: Involvement of relevant stakeholders positively influences the acceptance of the SITBM results. **P9**: The higher the fear of sharing information, the lower the quality of the SITBM results. **P10**: The higher the resistance to change, the lower the SITBM success. **P11**: The more participative stakeholders' project-related behavior, the higher the satisfaction with the SITBM results. **P12**: The better the IT strategy process integration, the higher the SITBM success.



Note: the values in the brackets refer to the number of papers we identified for all categories (and their concepts) or relationships

Figure 3. Concept relationship map for SITBM success

Reflecting on our insights from the previous sections, the summary of the current state of discussion on SITBM also allows us to compile a list of research gaps in places where the nomological net our propositions suggest is not yet complete. SITBM methodology, for example, is one of the mostly investigated success factors. Beyond peer group aspects, we have identified a large amount of research concerning process design and its various quality criteria. The focus of many of the resulting process models is on planning the benchmarking study and analyzing the data technically (i.e. a listing of steps and description of tools). Based on the results of our review, however, we feel that many practitioners would also benefit from prescriptions related to behavioral aspects of the benchmarking processes. Consequently, future research may want to move one step ahead by not only describing which activities have to be performed, but also how they have to be performed.

Concerning instruments, prior research provides an understanding of the content and the quality criteria relevant for instruments for (strategic) IT benchmarking, and the impact these instruments have on the quality of the benchmarking results. At the same time, however, knowledge of the activities necessary to design respective artifacts is fragmented (e.g., Dong et al., 2012; Fuerstenau, 2012). While there are many instruments for benchmarking existing in practice, looking at the ongoing discussions in practice

and research regarding the validity of these existing benchmarking instruments indicates that more effort should be put into the scientific discourse on development of valuable instruments for SITBM.

Another field that remains open for future research is the SITBM project category. Researchers have a good understanding of various tools and techniques to perform data collection and analysis, particularly concerning the data analysis phase. By contrast, most of the success factors for SITBM currently identified by previous research do bypass the project phase. In that regard, publications focus on aspects that precede the actual project (e.g., planning process integration, assuring of top management support, fear of sharing information, choice of a sound methodology). However, findings from few authors indicate that important effects towards SITBM success are triggered during the data collection phase (e.g., Ramabadran et al., 2004; Williams et al., 2012). These findings seem even more relevant in light of IT management and project management research that stresses the relevance of linking antecedent factors and the project success dimension through group or individual level concepts (i.e., the individuals acting in a project) (e.g., Gregory et al., 2012; Weissbein et al., 1998; Wilson & Howcroft, 2002). For example, an increasing number of project management researchers transfer concepts from work motivation (e.g., Colquitt, 2001; Klein et al., 1999; Locke & Latham, 2004) into project management research to better understand how individuals can be committed to a course of action also beyond the boundaries of a single project (e.g., Gattiker & Carter, 2010; Jha & Iyer, 2007; Leung et al., 2004). We feel that future SITBM research could benefit from incorporating these concepts because for benchmarking projects it is important to sustain the results beyond the project.

Looking at the results perspective (i.e., the transition between the SITBM project and SITBM success in Figure 3), we find that research does not yet provide definite answers how and under which conditions the results are transformed into actual outcome (i.e. initiated improvement initiatives). For long, researchers considered improved quality of the benchmarking results as most important antecedent of SITBM success. However, since the turn of the millennium, this position has relativized. Researchers started investigating the result perspective beyond quality and introduced concepts such as satisfaction and acceptance of results. Still, findings are vague or inconsistent. For example, researchers investigating the role of satisfaction with results came to contradictory results regarding its relevance (Müller et al., 2010; Ramabadran et al., 2004). Furthermore, concerning acceptance of benchmarking results we found that researchers are still speculating on its formation and effects (Hong et al., 2012; Lee et al., 2006; Moriarty & Smallman, 2009). Building upon suggestions of few benchmarking authors (e.g., Müller et al., 2010; Williams et al., 2012) and findings from IT management (e.g., Doherty et al., 1999; Merali et al., 2012; Raman, 2009), we hold that the investigation of satisfaction and acceptance of benchmarking results seems to be a promising route towards a better understanding of SITBM

success. Researchers may particularly explore how both concepts differ in their effects and if one of them has a stronger impact on success than the other.

Beyond these aspects concerning benchmarking results, few researchers have started to address the phenomenon of failing transformation by investigating SITBM success holistically. In doing so, they have uncovered a variety of new concepts, which are, however, mostly on a conceptual level, yet, and require more research as well as empirical grounding (e.g., Moriarty & Smallman, 2009; Williams et al., 2012). Nevertheless, the findings suggest that our concept relationship map in Figure 3 is not yet complete: Additional concepts may emerge and existing concepts may have to be split or merged.

Regarding contextual factors that influence SITBM success we identified two promising avenues for future investigation. First, concerning stakeholder involvement prior research has understood that involvement is positively associated with the success of strategic initiatives and benchmarking (e.g., Bhutta & Huq, 1999; Gregory et al., 2012; Mentzas, 1997). Still, we can only speculate on the mode of involvement, and how strong this involvement should be during which phases of the benchmarking. Consequently, future research should not only explore the effects of different kinds of involvement in a SITBM project, but also develop different role and cooperation models for SITBM. Another interesting field of research could be to investigate the linkage between stakeholder involvement and stakeholder communication and interaction during a SITBM. While both concepts have been treated relatively independent from each other in previous research (e.g., Hinton et al., 2000; Ramabadran et al., 2004; Serafeimides & Smithson, 2000), it seems reasonable that they are at least related to each other. The behavior of the stakeholders is also the second promising research avenue we identified regarding the contextual factors category. As of now, various different concepts regarding behavioral aspects have been proposed and explored by prior researchers. However, the different parts of this research are rather fragmented; there is not yet a consistent body of knowledge. Consequently, future researchers may want to put more effort in investigating how, for example, directness and quantity of communication between the project stakeholders influence project progress and perception of the SITBM's results. Further, the different suggested concepts may have to be consolidated and their underlying "conceptual essence" extracted.

Table 8 provides a summary of these proposed opportunities for future research and compares them to the current state of the respective discussion in SITBM research.

Table 8. Research on SITBM success: Status and future research opportunities

Field of research	State of discussion	Future research opportunities
1. SITBM processes	• Vast amount of research on process models • Focus of process models is on preparing benchmarking and analysis techniques	• Include prescriptions related to behavioral aspects of benchmarking processes

		• Move one step forward by not only describing which activities have to be performed (i.e. what), but also how they have to be performed
2. SITBM instruments	• Few publications on the design of instruments • Instruments are criticized for lacking quality	• Conceptualization and development of instruments or artifacts for SITBM
3. SITBM project	• Good understanding of various tools and techniques to perform data collection and analysis • Data collection has received less attention than data analysis • Current success factors (and respective propositions) for SITBM do not link to the project phase, but mainly focus on aspects preceding the actual project • There is indication that in the data collection phase important effects towards SITBM success are triggered • No group or individual level concepts have been discussed by prior benchmarking research – in project management research such concepts link antecedent factors with success	• Put more effort on understanding the psychological effects of the data collection and analysis phases beyond tools and techniques • Investigate the social dynamics of the project phase (i.e. group and individual-level concepts) • Transfer knowledge from research on strategic IT management, project management, or commitment and work motivation to understand these social dynamics
4. SITBM results	• SITBM results of higher quality do lead to success with higher probability • Researchers started investigating the result perspective beyond quality and introduced concepts such as satisfaction and acceptance of results • Findings on the role of results' acceptance or satisfaction are still vague or inconsistent	• Investigate the effects of satisfaction and acceptance of results towards SITBM success • Contrasting the impact of quality, acceptance, and satisfaction with SITBM results to determine if one of these concepts may overcome the challenge of transforming results into improvement initiatives
5. SITBM success	• Successful SITBM results in further initiatives • The transformation of the results into such initiatives does not always work in practice • Researchers have only recently started to address the phenomenon of failing transformation • First attempts to better understand the transformation are still on a conceptual level	• Search for further uncovered factors that influence SITBM success and explore their effects • Test and evaluate the various success factors' effects on their actual impact on a SITBM project
6. Stakeholder involvement during benchmarking process	• Involvement is positively associated with the success of strategic initiatives and benchmarking • Involvement seems to trigger various (psychological) effects towards SITBM success • Research on the forms and effects of stakeholder involvement in benchmarking is still in an early phase	• Research different role and cooperation models for SITBM • Explore the effects of different kinds of involvement in a SITBM project as a whole and on its success • Investigate the relation to the project-related behavior of the stakeholders (see also next)
7. Project-related behavior of stakeholders	• Nature of team members' interaction seems to influence project progress and overall satisfaction with the project output	• Investigate how different identified behavioral aspects impact project progress and perception of the SITBM

	• There is not yet a consistent body of knowledge on behavioral aspects	results • Consolidate the various suggested concepts

7. Summary

In this paper, we performed a literature analysis on the concept of SITBM success. We found that traditional process models for benchmarking focus on hard methodological factors and tend to neglect the soft contextual ones. We addressed this gap by suggesting a concept relationship map that not only incorporates these hard factors into the benchmarking process, but also provides guidance on the effects of soft aspects. In doing so, we contribute to research and foster comprehensive understanding by synthesizing existing SITBM literature. Moreover, we provide a conceptual model of SITBM success and derive a set of propositions from it. We also shed light on the as-yet-unanswered question of how SITBM output is transformed into outcome. Together with future research weaving together the as yet incomplete nomological net we propose through our proposition, our work can thus lay the foundations for a theory of SITBM success.

Bearing these contributions in mind, it is important to also mention our research's limitations. First, our literature search and classification process might be biased owing to our choice of keywords, the focus on domain-specific and top IS journals, as well as the subjective interpretations and preferences that influenced the paper selection and classification. Thus, we cannot rule out that some publications that other researchers may deem as relevant were not considered here. We also decided to intentionally leave out some related streams of research such as (strategic) performance measurement or competitive intelligence research to keep the amount of research investigated focused and manageable. We therefore would like to encourage future researchers to enhance our work by including insights from these fields. Second, we have not included an analysis of benchmarking's ontological and methodological constituents. Hence, we cannot rule out that some links between the concepts in our concept relationship map would be different, if ontological and methodological assumptions of the different authors were analyzed in depth. We believe that a more in depth analysis of these aspects is a fruitful avenue for future research. While a few authors have already made attempts in this direction (e.g., Kyrö, 2004; Moriarty & Smallman, 2009), their findings suggest that past researchers are often silent on their ontological and methodological positions. Consequently, we encourage future researchers to perform a thorough investigation of this topic using a substantial ontological and epistemological framing. Further, future researchers may also want to reflect our findings in the light of emerging or changing IT practitioner dispositions. Given that the publications our syntheses is based upon are often also silent on this issue, including it here would be beyond the scope of what our review is able to achieve. Hence, in our analysis, we do not analyze how and why

practitioners may choose a specific SITBM setup or how and why specific contextual factors develop before and during the benchmarking. Nonetheless, future research should also investigate assumptions and predispositions of relevant actors involved in the benchmarking, since these effects may have nuanced, complex, and conceptual effects of the overall course and success of a SITBM. Despite these limitations, we believe that our insights build upon a sound theoretical grounding and that we did not overlook critical aspects. We believe that future researchers and practitioners will benefit from our work in sustaining and further developing SITBM in organizations.

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