# On the Research Paradigms and Research Methods Employed in the BISE Journal – A Ten-Year Update

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**Abstract.** In the past decade, there has been an intense discussion in the German-speaking IS research community about the different paradigmatic orientations and the methodological diversity. With the work at hand, we present an overview of the research paradigms and research methods that have been used in the German-speaking IS community, represented by the BISE journal, over the past decade. After analyzing 169 research articles, we contribute an overall picture of research paradigms and research methods, a detailed picture of research methods per research paradigm, and a picture of historical trends in research paradigms and research methods. A comparison with previous studies reveals the unique profile of the German-speaking IS community. However, our results also indicate that there might be a shift in the use of research paradigms and research methods. Hence, this study provides a useful basis for future discussions about the positioning and the challenges of the community.

**Keywords:** IS Research, Research Paradigms, Research Methods, Meta-Analysis.

## 1 Introduction

In the past decade, there have been several debates in the German-speaking Information Systems (IS) research community on how the field should develop and position as a scientific discipline [1-3]. Especially the different paradigmatic views between behavior science research and design science research have led to extensive discussions [4-7]. In general, the behavior science research paradigm is concerned with the development and justification of theories that explain human or organizational behavior, while the design science research paradigm intends to create novel IT artifacts to solve organizational problems [8], [9]. Since the establishment of the IS discipline, design-oriented research has been the dominating research paradigm in many European countries, especially in the German-speaking countries where engineering disciplines have a strong position [10], [11]. In the international IS literature, the situation has been quite opposite because most articles published in top IS journals follow the behavior science paradigm [12], [13]. Given the increased pressure to publish in high-ranked international IS journals [14], researchers in the German-speaking IS community have thus been

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concerned that design-oriented research approaches will be gradually displaced by behavior-oriented research approaches [15]. This would not only lead to a loss of identity of the German-speaking IS community but also reduce the methodological diversity which, however, is considered as critical to the relevance of the discipline [15-17].

As an interdisciplinary research field, IS draws upon a wide range of disciplines, such as informatics, economics, engineering, psychology, sociology, or mathematics [18], [19]. Consequently, a variety of research methods has been proposed and used to generate knowledge about the development, implementation, and use of information systems [10], [12], [20]. Meanwhile, several studies exist that examine the research methods and/or research paradigms of the IS discipline [e.g., 12], [13], [20], [21]. However, most of these studies target the international (predominantly the North American) IS community, while the German-speaking IS community has received little attention so far [5]. Well-known and frequently cited in the German-speaking IS community is the study by Wilde and Hess [10], who examined the methodological profile of the IS discipline of the German-speaking countries by examining research articles that had been published between the years 1996 and 2006 in the former German IS journal "WIRTSCHAFTSINFORMATIK". In 2014, the journal has been renamed to Business & Information Systems Engineering (BISE) journal and the publication language has been changed to English [22].

Given the existing debates about the positioning and the challenges of the German-speaking IS community, it becomes important to derive a clear understanding of the paradigms and the research methods that are currently being used in the community [5], [15]. Moreover, when considering the study by Wilde and Hess [10], it is interesting to see if the paradigms and research methods in the community have changed throughout the past decade. In this way, researchers can gain a better understanding of their own discipline and its underlying methodological variety. Such an understanding can moreover serve as basis for a well-informed discussion about the future development of a research community. Therefore, the aim of this paper is to provide a structured and up to date overview of the paradigmatic and methodological profile of the German-speaking IS community. In line with the study by Wilde and Hess [10], the German-speaking IS community in this paper is represented by research articles that have been published in the BISE journal, which describes itself as the "flagship journal of the German-language Information Systems community" [23]. In so doing, we remain able to compare our results with Wilde and Hess [10], which allows us to position this paper as a ten-year update. In particular, we address the following research questions:

1. What research paradigms and research methods have been used in the BISE journal in the past decade?
2. What are the most popular research methods per research paradigm in the BISE journal in the past decade?
3. Have the research paradigms and research methods in the BISE journal changed throughout the past decade?

To answer these research questions, we conducted a systematic meta-analysis on the research articles that have been published in the BISE journal in the last ten years. Research paradigms and research methods were analyzed, categorized, and counted per article. Furthermore, the results were compared with previous studies.

The remainder of the paper is structured as follows. In the next section, we describe the theoretical background. In section 3, we illustrate our research procedure. The results of our analysis are presented in section 4. In section 5, we discuss our results in comparison with other studies, followed by the implications and limitations. In section 6, we conclude by summarizing our results.

## 2 Theoretical Background

In this section, we provide background information on the research paradigms and the research methods that are used in the IS discipline.

### 2.1 Research Paradigms in the IS Discipline

According to Hirschheim and Klein [24, p. 1201], a *research paradigm* is "the most fundamental set of assumptions adopted by a professional community that allows its members to share similar perceptions and engage in commonly shared practices". It consists of assumptions about knowledge and how to acquire it, and about the physical and social world. In the IS literature, a variety of research paradigms, as well as classifications of research paradigms, can be found. For instance, Chen and Hirschheim [12], Weber [25], as well as Fitzgerald and Howcroft [26] distinct between a positivist and an interpretive research paradigm, while Iivari [27] as well as Goles and Hirschheim [28] distinct between a functionalist, an interpretivist, a radical humanist, and a radical structuralist paradigm. In these studies, the term research paradigm is used to distinct between different epistemological and ontological positions. However, the term research paradigm has also been established in the IS literature to refer to a problem-oriented process that consists of two phases, problem understanding and problem solving [8], [9]. According to Hevner, et al. [8, p. 76], the *behavior science research paradigm* is understood as a problem understanding paradigm that "seeks to develop and justify theories (i.e., principles and laws) that explain or predict organizational and human phenomena surrounding the analysis, design, implementation, management, and use of information systems. In contrast, the *design science paradigm* is understood as a problem-solving paradigm that "seeks to create innovations that define the ideas, practices, technical capabilities, and products through which the analysis, design, implementation, management, and use of information systems can be effectively and efficiently accomplished" [8, p. 76].

In this paper, we focus on the distinction between behavior science research and design science research because both research paradigms are frequently discussed in the literature when it comes to the positioning and development of the German-speaking IS community [4], [6], [7].

### 2.2 Research Methods in the IS Discipline

In general, a *research method* can be understood as a set of activities that must be undertaken to conduct research [29]. It is a "well-defined sequence of elementary operations which permits the achievement of certain outcomes if executed correctly" [30, p. 165]. Given the diverse nature of the IS discipline and the different paradigmatic positions, researchers have employed a wide range of research methods to study the design, implementation, and use of information systems. Consequently, various classifications of research methods can be found in the international IS literature [12], [13], [20], [31], [32]. Well-known and frequently-cited in the German-speaking IS literature is the classification of research methods developed by Wilde and Hess [10]. The classification scheme consists of the following research methods: *formal-*, *conceptual-*, and *argumentative-deductive analysis*, *simulation*, *reference modeling*, *action research*, *prototyping*, *ethnography*, *case study*, *grounded theory*, *qualitative/quantitative cross-section analysis*, and *laboratory/field experiment* (detailed descriptions of these methods can be found in Wilde and Hess [10]). We use the classification of research methods developed by Wilde and Hess [10] in this paper because it is well-grounded and adapted to the German-speaking IS literature. Moreover, it covers research methods from the behavior science as well as the design science research paradigm. In contrast, classification schemes proposed in the international IS literature typically do not cover design-oriented research methods (e.g., argumentative-deductive analysis, prototyping, or reference modeling) because these classifications have been developed on studies that follow the behavior science research paradigm [12], [13], [20], [31], [32].

## 3 Research Procedure

Our research procedure follows the meta-analysis approach of Palvia, et al. [20] and Palvia, et al. [21], who investigated the use of research methods and topical trends in the international IS literature. Note that this approach has also been labeled as descriptive review, which is a particular type of a literature review that introduces some quantification (e.g., through a frequency analysis) in order to verify a particular proposition or to reveal an interpretable pattern [33]. Following Palvia, et al. [20] and Palvia, et al. [21], our research procedure consisted of three stages: (i) data selection, (ii) data classification, and (iii) data analysis.

In the data selection stage, we selected all research articles published in the BISE journal from 2007 (volume 49, issue 1) to 2016 (volume 58, issue 4). The ten year period was chosen with reference to the study by Wilde and Hess [10], who analyzed research articles published in the BISE journal between 1996 and 2006. In line with Wilde and Hess [10], we selected only research articles that have been published in the section "Research Paper" of the BISE journal. Articles published in this section provide complete research results and substantial contributions to the literature. Articles published in other sections, such as "Catchword", "Interview", "Research Note", or "State of the Art", were excluded. Furthermore, the research articles published in volume 51, issue 1, 2009 of the BISE journal were excluded because this issue only includes former

best paper articles and some retrospective views on the history of the IS field. After this stage, our final data sample consisted of 169 research articles.

In the data classification stage, we systematically analyzed and categorized the contents of each research article with respect to its research paradigm and its research methods. Each research article was carefully read and categorized by three research assistants independently. The results were then compared in a roundtable session and variations in the results were discussed until a consensus was reached. To assess the intercoder reliability [34], a 10% random sample of articles was separately categorized by a fourth research assistant, resulting in an agreement of 94% (values of 80% or higher can be considered as acceptable, cf. [34]). According to our research questions, each article was categorized according to the both paradigmatic orientations, behavior science research and design science research (cf. section 2). In case the research paradigm has not been mentioned in an article, we followed the guidelines proposed by [8]. Articles addressing the design and evaluation of IT artifacts were assigned to the design science research paradigm, while articles addressing behavior-related aspects (e.g. use, adoption, or success of IT artifacts) were assigned to the behavior science research paradigm. In addition, we recorded the type of IT artifact that has been designed and/or evaluated in articles following the design science research paradigm. Categories for IT artifacts were constructs, models, methods, instantiations, and design theories [8], [9]. Furthermore, we analyzed the research methods that have been used in each article. For the categorization of research methods, we used the classification of research methods developed by Wilde and Hess [10] (cf. section 2). However, and in contrast to Wilde and Hess [10], we did not only focus on the primary research method of each research article (i.e., the research method that leads to the core contribution of the paper). Instead, we also captured all other research methods that were used and mentioned in an article. In this way, we were able to identify research articles that employed multiple research methods. The use of multiple research methods, for instance, is considered to be important in design science research in which IT artifacts are built and evaluated [8]. Therefore, we assigned research methods used in articles following the design science research paradigm to the build or to the evaluation process of the design science research project. Research methods used in articles following the behavior science paradigm were not assigned to specific stages because these behavior science research typically does not draw upon such a dichotomous research process.

In the data analysis stage, we analyzed the research articles based on the established categorization. The results of this stage are explained in the following section.

## 4 Data Analysis and Results

We structured the results of our analysis according to our research questions. First, we provide an overall picture of the research paradigms and the research methods that were used in the 169 analyzed research articles. Second, we provide a detailed picture of the use of research methods per research paradigm. Third, we provide a detailed picture of the historical trends in the use of research paradigms and research methods.

### 4.1 Overall Use of Research Paradigms and Research Methods

Figure 1 depicts the overall use of research paradigms (left side) and research methods (right side). With respect to the research paradigms, 65.1% (110) of the research articles follow the design science research paradigm, while 34.9% (59) of the research articles follow the behavior science research paradigm.

With respect to the use of research methods, the argumentative-deductive analysis (ADA) is used most frequently with 43.8%, followed by the case study (CS) with 30.8%. Other more frequently used research methods are the quantitative cross-section analysis (QNA) with 16.0%, the conceptual-deductive analysis (CDA) with 15.4%, and prototyping (PT) with 14.8%. All other research methods are used less frequently (<11%). Ethnography (ET) has not been used in any of the analyzed articles.

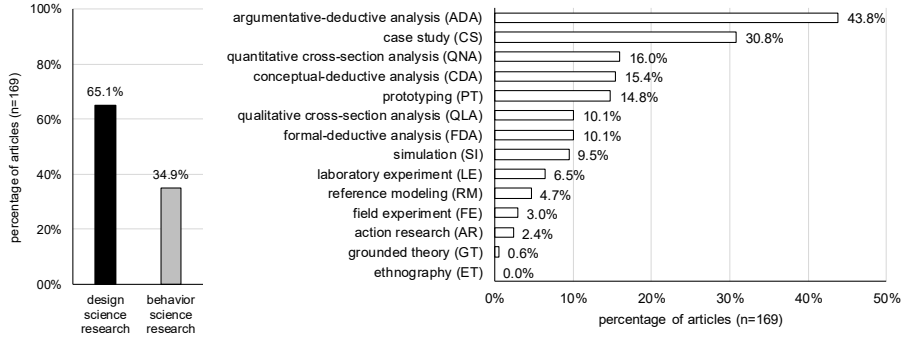


**Figure 1.** Overall use of research paradigms and research methods

### 4.2 Use of Research Methods per Research Paradigm

In the following, we first describe the results for the research articles following the design science research paradigm. Then, we describe the results for the research articles following the behavior science research paradigm.

Figure 2 shows the use of research methods of articles following the design science research paradigm according to the design science processes, build (left side) and evaluate (right side). In the building process, the most frequently used research method is the ADA with 47.3%, followed by the CDA with 22.7%. Other more frequently used methods to build IT artifacts are the formal-deductive analysis (FDA) with 14.5%, PT with 11.8%, and reference modeling (RM) with 7.3%. Qualitative cross-section analysis (QLA) with 1.8%, CS with 0.9%, and action research (AR) with 0.9% have rarely been used to build IT artifacts. Research methods that have not been used in the building process are excluded from the diagram. These methods are QNA, simulation (SI), laboratory experiment (LE), field experiment (FE), grounded theory (GT), and ET.

In the evaluation process, the most frequently used research method is the CS (32.7%), followed by the ADA (11.8%) and PT (10.9%). Other research methods that have been more frequently used to evaluate IT artifacts are the QLA (10.0%) and SI (10.0%). LE are used in 6.4%, FE in 3.6% of IT artifact evaluations. Rarely used in the evaluation process are AR (2.7%) and the QNA (1.8%). Research methods that have

not been used in the evaluation process and that we excluded from the diagram are the CDA, the FDA, RM, GT, and ET.

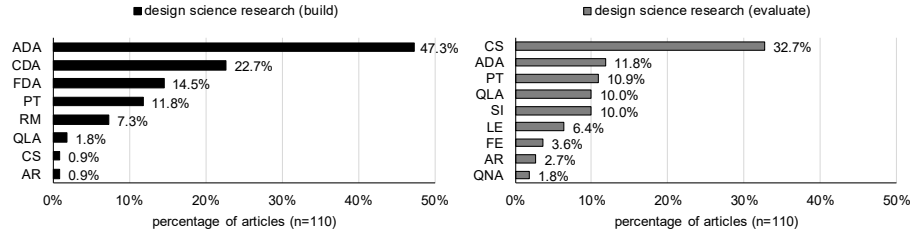


**Figure 2.** Use of research methods in design-oriented research articles

The separation between the building and the evaluation process enabled us also to investigate frequent combinations of research methods. The diagram on the left side of Figure 3 depicts how often research methods in the building and in the evaluation process have been used in combination. For instance, in 18 research articles, an ADA was used to build an IT artifact together with a CS to evaluate the IT artifact. In nine research articles, an IT artifact was built by using a CDA and the IT artifact was evaluated through a CS. In six research articles, an IT artifact was built by using a FDA and the IT artifact was evaluated through a SI.

The diagram on the right side of Figure 3 illustrates the number of research methods that have been used in design-oriented research articles. 24.5% of the design-oriented research articles only used one research method. In these articles, research methods were only used to build an IT artifact, but not to evaluate it. In 55.5% of the design-oriented research articles, two research methods were used to build and evaluate an IT artifact, while 18.2% of the articles used three research methods. Four research methods have been used in 1.8% of the design-oriented research articles.

| | | method (evaluate) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ADA | SI | AR | PT | CS | QLA | QNA | LE | FE |
| method (build) | FDA | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| | CDA | 5 | 2 | 0 | 4 | 9 | 1 | 0 | 2 | 0 |
| | ADA | 7 | 1 | 1 | 6 | 18 | 6 | 1 | 2 | 3 |
| | RM | 1 | 0 | 2 | 1 | 3 | 4 | 0 | 0 | 0 |
| | AR | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | PT | 2 | 1 | 0 | 0 | 2 | 1 | 1 | 3 | 2 |
| | CS | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | QLA | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

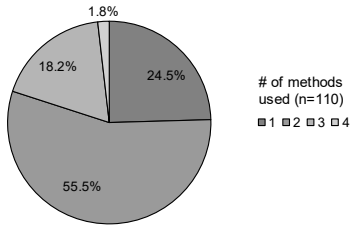


**Figure 3.** Combinations and number of research methods in design-oriented research articles

Considering the outcomes of the design-oriented research articles, the most frequent IT artifacts are methods (38.2%) and models (34.5%). Constructs have been build and/or evaluated in 17.3% of the articles. In 9.1% of the articles, the outcome represented instantiations. Design theories have been the outcome of 2.7% of the articles. The latter result reflects recent discussions in the literature that design science research should focus more on the development of design theories [35], [36].

The diagram on the left side of Figure 4 shows the use of research methods of articles following the behavior science research paradigm. In this context, the most frequently used research method is the QNA with 42.4%, followed by the CS with 25.4%. Other more frequently used research methods are the ADA (15.3%), SI (8.5%), the QLA (6.8%), and the LE (6.8%). CDA, FDA, FE, and GT have only been rarely used in these articles. Research methods that have not been used in the behavior-oriented research articles are PT, RM, AR, and ET. We excluded these methods from the diagram.

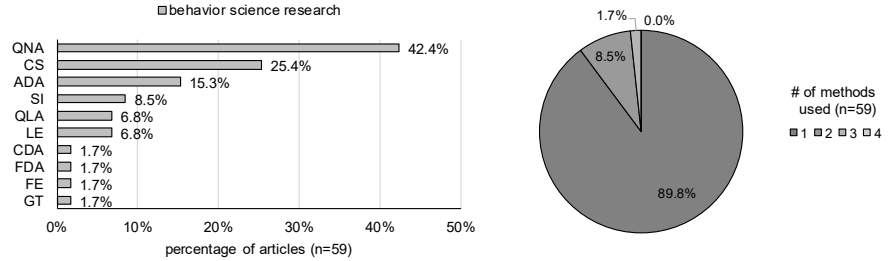


**Figure 4.** Use and number of research methods in behavior-oriented research articles

The diagram on the right side of Figure 4 depicts the number of research methods used in the behavior-oriented research articles. Most of these articles (89.8%) employ one research method. Two research methods are used in 8.5% of the articles, while three research methods are only used in 1.7% of the articles.

### 4.3 Historical Trends in Research Paradigms and Research Methods

To identify potential changes in the use of research paradigms and research methods, we analyzed the corresponding historical trends. Figure 5 illustrates the trend of research articles following the design science research paradigm vs. research articles following the behavior science research paradigm.

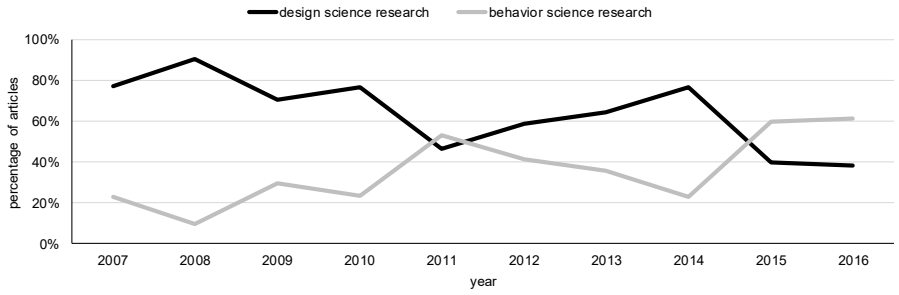


**Figure 5.** Use of research paradigms over the past decade

From 2007 to 2010, design-oriented research articles were in the majority in the BISE journal (on average, 78.7% design-oriented vs. 21.3% behavior-oriented). In 2011, the percentage of behavior-oriented articles was slightly above design-oriented articles

with 53.3% and 46.7% respectively. Between 2012 and 2014, the percentage of design-oriented articles increased from 58.8% to 76.9%, while the percentage of behavior-oriented articles decreased from 41.2% to 23.1%. Since 2015, the trend has changed to, on average, 39.2% design-oriented articles and 60.8% behavior-oriented articles. Furthermore, we analyzed potential changes in the research methods over the past decade. Figure 6 illustrates the trend for the top 5 research methods.

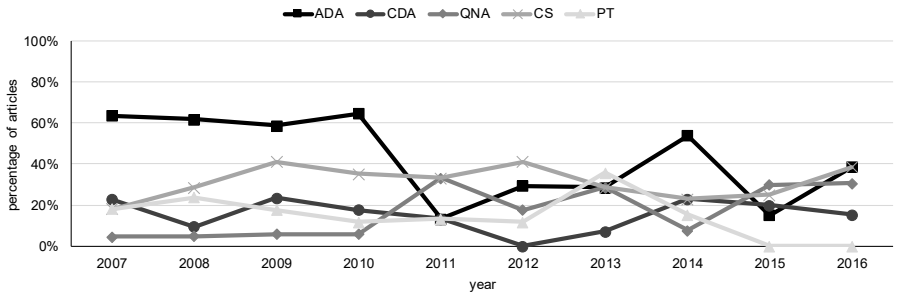


**Figure 6.** Use of research methods (overall top 5) over the past decade

Between 2007 and 2010, the ADA was the most frequently used research method (on average, 62.3%). In 2011, its use decreased to 13.3%, while between 2012 and 2014, its use increased to 53.9%. In 2015, its use again decreased to 15%, while in 2016, its use increased to 38.5%. Between 2007 and 2009, the use of CS increased from 18.8% to 41.2%. Since 2010, CS have been used, on average, in 33.3% of the articles. Between 2007 and 2010, the QNA has been used, on average, in 5.3% of the articles. Between 2011 and 2013, it was used, on average, in 26.5% of the articles, while in 2014, its use decreased to 7.7%. Between 2015 and 2016, the QNA has been used, on average, in 30.4% of the articles. Throughout 2007 and 2014, PT was used, on average, in 18.5% of the articles. However, since 2015, PT has not been employed in any of the analyzed articles. Between 2007 and 2016, the CDA has been used, on average, in 15.2% of the articles. In 2012, the CDA was not used in any article.

In addition, we analyzed the trend on the average number of research methods used per article over the past decade. Between 2007 and 2012, on average, 1.7 research methods were used per article. In 2013, the average number of methods increased to 2 methods per article. Between 2014 and 2015, the average number of methods decreased to 1.3 methods per article. In 2016, the average number of methods per article was 1.6.

## 5 Discussion

In the following subsections, we first compare our results with the study by Wilde and Hess [10] and Palvia, et al. [21], who examined the international IS literature. Then we discuss the implications and limitations of our study.

## 5.1 Comparison of Findings

Our results demonstrate that the majority (65.1%) of the 169 analyzed research articles follow the design science research paradigm, while 34.9% of the articles follow the behavior science research paradigm. When comparing our results with the study by Wilde and Hess [10], who analyzed research articles published in the BISE journal between 1996 and 2006, we notice a slight decrease in the percentage of design-oriented research articles. In the data sample of Wilde and Hess [10], the percentage of design-oriented and behavior-oriented research articles was 70% and 30% respectively. However, our results also reveal that since 2015, about 60% of the articles follow the behavior science research paradigm, while 40% of the articles follow the design science research paradigm. The results are in contrast to Wilde and Hess [10], who concluded that between 1996 and 2006 no indications can be found that lead to a shift in the research paradigms.

Figure 7 compares the overall use of research methods with the study by Wilde and Hess [10]. As suggested by Wilde and Hess [10], research methods are grouped according to their degree of formalization and according to the research paradigm in which these methods are typically applied. Note that the comparison only covers primary research methods (i.e., research methods that lead to the core contribution) since Wilde and Hess [10] only focused on the primary research methods (cf. section 3).

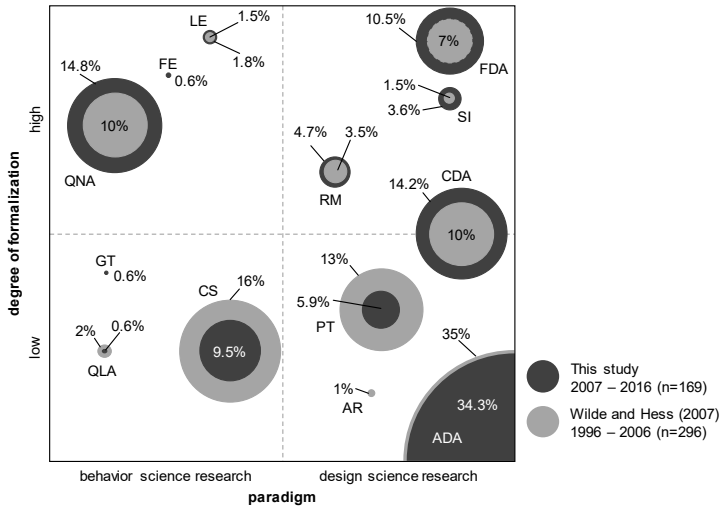


**Figure 7.** Use of research methods compared to Wilde and Hess [10] (only primary methods)

The results of the comparison illustrate that the ADA hast been the most frequently used method over the last twenty years (from 35% to now 34.3%). Moreover, we can observe an increased use of research methods with a higher degree of formalization, such as the QNA (from 10% to 14.8%), the CDA (from 10% to 14.2%), the FDA (from 7% to 10.5%), or RM (from 3.5% to 4.7%). In turn, the use of research methods with a lower degree of formalization decreased, such as the CS (from 16% to 9.5%), PT (from 13% to 5.9%), or the QLA (from 2% to 0.6%). In the study by Wilde and Hess [10],

the six most frequently used research methods in descending order are: ADA, CS, PT, QNA, CDA, and FDA. Wilde and Hess [10] define these methods as the six core methods of the German-speaking IS discipline. Our findings confirm the importance of these core methods because these methods have also been the six most frequently used primary research methods in our data sample but in a different order: ADA, QNA, CDA, FDA, CS, and PT. Note that attention should be given when assigning research methods to research paradigms. For instance, in line with Wilde and Hess [10], we assigned research methods, such as the CS, the QNA/QLA, or the LE, to the behavior science research paradigm. However, as our results in section 4.2 reveal, the CS, for instance, has also been frequently used in design-oriented articles for the evaluation of IT artifacts.

In line with Wilde and Hess [10], we also compare our results with the international IS literature. In this context, Wilde and Hess [10] compared their results with the study by Palvia, et al. [20], who examined the use of research methods in the international IS journals between 1993 and 2003. In 2015, Palvia, et al. [21] presented a ten-year update (2014-2013) of this study, in which they analyzed 2487 research articles published in several top-ranked international IS journals. We compare our results with the study by Palvia, et al. [21] because the suggested classification of research methods is similar to the classification of Wilde and Hess [10] and frequency statistics are provided for each research method. Following the argumentation of Wilde and Hess [10], we merged the research methods suggested by Palvia, et al. [21] with our research methods in the following way: The research methods "literature review" and "literature analysis", as suggested by Palvia, et al. [21], were assigned to the argumentative-deductive analysis, which is conceptually similar to these methods. In a similar way, the methods "survey", "secondary data", and "content analysis" were assigned to the quantitative cross-section analysis. The method "interview" was assigned to the qualitative cross-section analysis and the method "field study" was assigned to the case study. The formal-deductive analysis and the simulation were grouped together since Palvia, et al. [21] do not differentiate between these two methods. Moreover, the research method "speculation/commentary" was excluded since we focused in our analysis on articles that provide complete research results (cf. section 3). Figure 8 illustrates the comparison of our study with the study by Palvia, et al. [21]. Following Wilde and Hess [10], we only compared the use of primary research methods.

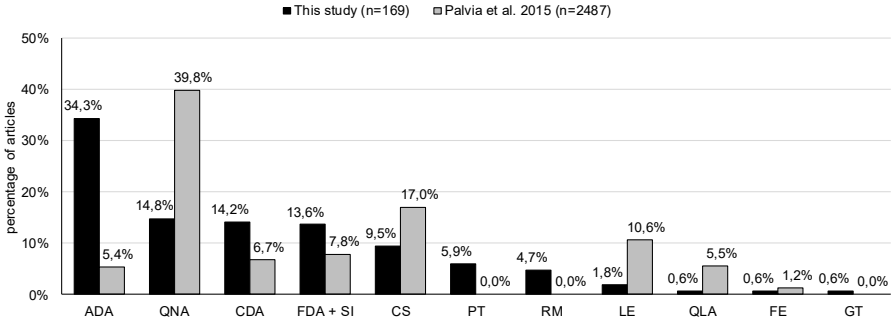


**Figure 8.** Comparison with Palvia, et al. [21] (only primary methods)

The comparison with the international IS literature reveals that research methods, which are typically associated with design science research paradigm, such as the ADA, the CDA, or the FDA/SI have been quite more often used in our data sample. Interestingly, PT, RM, and GT have not been mentioned in the international IS literature. In contrast, research methods, which are typically associated with the behavior science research paradigm, such as the QDA, the QLA, the CS, or LE, are more often used in the international IS literature than in our data sample. Consequently, our results support the assumption that the design science research paradigm still has a strong position in the German-speaking IS community [10], [11].

### 5.2 Implications

By illustrating potential shifts in the use of research paradigms and research methods, our results can be used as a basis for future discussion about the positioning and the challenges of the German-speaking IS community. Moreover, our results can also be considered as best practices that support researchers to become more familiar with the profile of the German-speaking IS community. In this way, researchers striving to publish their work in German-speaking IS outlets might better understand how they should position their research and which research methods might best fit to their research projects. For instance, our results show that research articles following the behavior science research paradigm typically employ a quantitative cross-section analysis or a case study. Accordingly, researchers following the behavior science research paradigm can also focus one of these methods or explicitly focus on a less frequently used research method (e.g., grounded theory) in order to generate new insights and further advance the field. Our results also support researchers following the design science research by showing which research methods are typically used in which stage of the design science research process (i.e., build or evaluate) and how these methods can be effectively combined. For instance, our results show researchers following the design science research paradigm that an IT artifact that is built by employing an argumentative-deductive analysis can typically be evaluated through the use of a case study.

### 5.3 Limitations

Our study has several limitations. First, the German-speaking IS community in this study is only represented by research articles published over the last ten years in the BISE journal. To verify our results, additional journals (e.g., ISeB) and conferences (e.g., WI, MKWI) of the German-speaking IS community have to be examined. Moreover, research articles published in international IS journals (e.g., AIS basket of top journals) and IS conferences (e.g., ICIS, ECIS) should be examined, given the fact that many researchers of the German-speaking IS community publish their work predominantly in the international IS literature.

Second, we focused in our study on the two paradigmatic positions, behavior science research and design science research because these two positions are frequently discussed in the German-speaking IS community [4-7]. However, and as illustrated in sec-

tion 2, research paradigms can be classified in different ways. Future studies, for instance, can follow the approach of Chen and Hirschheim [12] and examine the use of positivist and interpretative research paradigms in the German-speaking IS literature.

Third, we used the established classification scheme developed by Wilde and Hess [10] to systematically categorize the collected research articles. By doing so, we were able to compare our results directly with the study by Wilde and Hess [10]. While each research method is well described in this classification scheme, it was sometimes not obvious for the research assistants how a particular research article should be categorized. While variations in the results were intensively discussed until a consensus was reached, other researchers might categorize an article in a different way. Nevertheless, we found the classification scheme very robust and we had no reasons for modifications. However, researchers might also apply other classification schemes (e.g., [13]).

Fourth, in our data analysis, we took a more detailed look at the research articles following the design science research paradigm. We made this decision because design science research is considered as the dominant research paradigm in the German-speaking IS community. In a similar way, researchers could also take a more detailed look at research articles following the behavior science paradigm. In this context, research, for instance, could examine average data sample sizes, potential combinations of qualitative and quantitative research methods, or cross-sectional vs. longitudinal studies.

Fifth, we did not consider various environmental factors. For instance, the identified shift in research paradigms (cf. section 4.3) might be a result of the change of the publication language of the BISE journal in 2014 [22]. However, to verify such assumptions, further analyses (e.g., interviews with the journal editors and editorial board members) have to be conducted.

## 6 Conclusion

In this paper, we summarized which research paradigms and research methods have been employed in the German-speaking IS community, represented by the BISE journal, in the past decade. Doing so enabled us to provide a trend for the last decade on which research methods were most often employed and on how the ongoing positioning discussion of the German-speaking IS community may have led to a change in the diffusion of research paradigms. By examining the use of multiple research methods, we gathered our data in a different way than the study of Wilde and Hess [10]. Accordingly, we were able to depict how many research methods were typically used in one research article and to show in how far the number of methods varied between behavior science and design science articles. Furthermore, we showed which research methods were most often used in combination and which research methods were used to build and to evaluate IT artifacts. With our results, we contribute towards guiding researchers when faced with the decision on how certain IT artifacts could be evaluated or how multiple research methods could be combined in one research approach. Within the light of the IS discipline being an interdisciplinary research field, we, therefore, contribute towards

maintaining the paradigmatic and methodological diversity of our community. Moreover, we provide a fruitful and grounded basis for future debates about the positioning of the German-speaking IS community.

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