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Article

Trends of Top IS Research by Region, Outlet, and Emergence: A Semi-Automated Literature Review

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Abstract: Global trends towards the rapidly increasing use of information systems (IS) apply to the IS research domain and related publications. Nonetheless, investigations of trends in publication behavior and emergence as well as changes in IS research are usually narrowly focused. This article contributes to the growing number of articles published in the IS domain by analyzing the evolution of trends and major research fields as well as the regional distribution of publications in the AIS Senior Scholars' Basket of Eight (AIS Bo8) and the International Conference on Information Systems (ICIS), changes in publication behavior, and the emergence of as well as changes to IS research fields and trends. Our semi-automated literature review integrates scientific methods to support the review and classification of publications. Based on 6692 articles published in the ICIS proceedings and the AIS Bo8 journals in a period of 16 years, we elaborate the key characteristics of research development. Our contribution provides and interprets a contemporaneous account of contextual factors influencing the IS research domain. Thus, our study enhances understanding of the development of the IS research domain.

Keywords: global information systems research; research trends; research field; (semi-) automated literature review; latent semantic indexing

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1. Introduction

The Association for Information Systems (AIS) states that "the history of any academic field plays an important role in shaping the field's present state and giving the field its unique identity. [. . .] It is important for all involved to study its past to understand its present, and to guide" [1] and bridge it to its possible future [2]. Ref. [3], who analyzed temporal trends in four top information systems (IS) journals and identified emergent themes that have begun to gain prominence in the IS research domain encourage other researchers to broaden their conversation by including a broader set of journals. Motivated by these statements and the need to avoid focusing solely on journals and research themes, our research paper focuses on shifts in research behavior and the development of the IS research domain, including geographical distinctions, differences in research fields, and trends in research fields and outlets (journals and conferences) to "provide important input in setting directions for future research" [4] (p. xiii).

Scientific articles in the IS domain have gained increasing interest along with the rapid growth of published articles over the last several decades [5–8]. A representative example of the rising number of articles is the ICIS, where the number of the overall publications increased from 94 articles in the year 2000 to 345 in 2015 [9]. Given the variety of topics and the interdisciplinarity of the IS research domain, multiple research choices exist. The sheer dynamism of IS and information technologies (IT), the variety of topics and the interdisciplinarity of the IS research domain offer a broad range of areas for investigation.

To understand the development of the IS research domain, it is important to understand how the research landscape has changed [8] and how scientific disciplines have evolved [10]. There is a need for a strong description of the origins and the development of IS research in different regions. To the best of our knowledge, no recent research on the development of IS research includes such a large database that looks not only at the trends but also at geographical differences and publication behavior in top IS journals and conferences.

In order to fill this gap in the literature, we review all AIS Senior Scholars' Basket of Eight (AIS Bo8) publications and publications in the proceedings of the ICIS over a 16-year period to answer the following research questions:

RQ1: *What is the regional distribution of publications in the AIS Bo8 and the ICIS?*
RQ2: *How has publication behavior changed by region, and what are the greatest changes?*
RQ3: *Where—in terms of region and outlet—do IS research trends emerge, and how have these changed over time?*

To address these research questions, we conducted a semi-automated literature study. We generated our data by reviewing the journals of the AIS Bo8 and the Proceedings of the ICIS between 2000 and 2015 to create a massive database containing information from 6692 research papers.

In Section 2, we argue for the importance and relevance of contemporaneous reports of IS research that take into account geographical differences as well as the differences between journals and conferences as a means of developing a detailed understanding and history of the IS research domain. Section 3 describes the multistage research process. This is followed by a presentation of the results of our analysis in Section 4. Following the discussion and implications in Section 5, we conclude by identifying limitations and providing an outlook for further research (Sections 6 and 7).

2. Related Work and Geographical Diversity

The comparatively young IS research domain emerged from several reference disciplines characterized by diverse research domains with regard to methods, theories, and topics (e.g., [11]). A representative example of the correlation with other disciplines was the introduction of a discussion held at the first ICIS in 1980. Keen ([12] (p. 10) stated, "Since MIS [Management Information Systems] is a fusion of behavioral, technical and managerial issues, there is no obvious or single reference discipline". With this fragmentation of the research domain, Keen [12] (p. 18) further concluded, "It would be impossible to identify a narrow set of topics that constitute MIS research". The resulting discussion has been dominated by the discourse of paradigms and diversity (e.g., [13,14]), methods used (e.g., [11]), topics and trends (e.g., [3]), and the value and identity of IS research (e.g., [15]).

Since research fields are already difficult to identify, detecting the source of such emerging research fields might be even more complex. In this context, literature reviews, meta-analyses, and scientometric analyses are useful tools for analyzing and improving the progress of research in the IS research domain. In the past few years, many researchers have published literature reviews including objective methodologies, such as text mining (e.g., [3,8,16,17]), meta-analysis (e.g., [11,18]), and scientometric analysis (e.g., [13,19,20]), to provide a periodic introspection that can show and improve the progress of research in the IS research domain. As mentioned by [21], reviews of the literature can revitalize knowledge development and can contribute to scientific progress from both the revolutionary and the cumulative perspective [4]. A first review of related work showed that the IS research community is influenced by organizational needs [22], interdisciplinary connections [23,24], outlet preferences [25–28], and geographical diversity (e.g., [6,8,13,14,29]).

Although the IS research domain is increasingly global, geographical diversity might be a source of trends given that "many US authors use no European contributions as references" [30] (p. 347), whereas "Europeans refer mostly to American literature" ([30] (p. 347)). Suomi's study was based on a citation analysis of one volume per journal (six American and six European based) from 1990. Ref. [31] similarly demonstrated that there

was a strong relationship between the "nationality" of authors and the "nationality" of the journals in which the authors' articles were published. Citation patterns were also the subject of [29]. In their article, they highlight the problem of underrepresentation of researchers and institutions outside North America. A more recent editor's comment by [14] notes that American dominance is slightly decreasing. They indicate "a hopeful trend in moving toward greater parity of regional representation in our leading journals" [14] (p. iv). Their investigation was based on the geographical author affiliation of published articles in the Management Information Systems Quarterly (MISQ). Specifically, from 2000 to 2004, the share of North and South American articles was approximately 85%, while from 2005 to 2009, this share decreased to 74.4%. Another study by [13] showed that researchers agree that MISQ and Information Systems Research (ISR) are the top research journals, regardless of geographic region. However, the data of their study revealed salient differences in perceived journal quality. North American researchers tend to favor management-science- and decision-science-oriented journals (e.g., Management Science and Decision Support Systems) more than European researchers do [13]. Furthermore, as mentioned by [13], European researchers tend to prefer active participation in research, and they also tend to prefer more interpretivist- and practitioner-oriented journals than North American researchers do. Another research work with a geographical focus is the work of [32]. They developed a profile of IS research for the Mediterranean region [32]. Ref. [33] considered the paradigmatic, thematic, and geographical development of Information Systems Journal (ISJ) publications from 1991 to 2007 (see also [34]). Ref. [35] examined the European Conference on Information Systems (ECIS) proceedings from 1993 to 2002 and revealed that European research has its own profile and is not directly influenced by North American research. This point was underlined by [8], who analyzed all papers published in ECIS proceedings during a 10-year period (2003–2012). They focused on the current research profile of the European IS research community, highlighting three main characteristics and the corresponding keywords "(1) continuation of the traditional European IS research profile as developed in the first decade . . . ; (2) convergence with aspects of the North American tradition . . . ; and (3) the development of a distinct perspective and approach to DS . . . " [8] (p. 12). Ref. [5] focused on the context of regional diversity in their research article on German-speaking countries in the Business and Information Systems Engineering journal and proposed recommendations that represent a long-term strategic realignment of the strategic information systems community. Other studies have also shown that perceptions of journal quality can be affected by geography [31].

With regard the previously described increasing parity between different geographic regions, both journal quality and geography may be influential. Moving toward the organizational needs perspective, ref. [22] investigated the core topics of three IS journals, ISR, Journal of Management Information Systems (JMIS), and MISQ, and two journals from other domains with a high share of IS content, Management Science (MS) and Decision Sciences (DS). In terms of the diversity of these North American journals from 1995 to 1999, JMIS had the broadest diffusion/variance in terms of topics, while MISQ had the smallest variety of topics. When analyzing the main topics of these five journals, organizational concepts, problem domain-specific concepts, and systems/software were most frequently discussed. Since organizational concepts were by far the strongest main topics, relevant subtopics identified were IT usage/operation, technology transfer, IT impact, and management of computing function. The fragmented IS foundation "created an interdisciplinary space that straddles the dis-courses of all these disciplines" [24] (p. 808). This growing variety of different research topics and vocabularies is seen as a weak point in the clear identification of IS subjects [36]. The interdisciplinary IS foundation mentioned by [12] was also addressed by [23]. They analyzed keyword networks in IS research journals (MISQ, JMIS, ISR, Information & Management, Decision Support Systems) over the period from 1999 to 2008 and revealed that the keyword diffusion process is a hierarchical one in which clusters are built under popular keywords. Since those clusters are strongly related, they suggest that interdisciplinary terms might have the potential to lead future research trends.

Furthermore, ref. [11] conducted a meta-analysis in their research work and focused on topic and methodological trends. They indicated that there was a partial mismatch between research and business needs.

Regarding outlet preferences, top IS journals can be differentiated from conference proceedings and lower-ranked journal publications. The results of a comprehensive study by [13] showed that researchers in the IS research domain rated MISQ and ISR as the top journals. Ref. [28] stated that "conference papers can only be used as a starting point" [28] (p. 566) for the discussion of topics. This statement leads to the suggestion that instead of top IS journals, conference proceedings are the source of new IS research. Furthermore, ref. [26] suggested that researchers "may appreciate the chance to publish an innovative idea more quickly, avoiding long review rounds and the rigor required for publishing in premier journals" ([26] (p. 431) compared to lower-ranked journals. Top IS journals are not the trendsetters in IS research. Following [27], the gap between top IS research and conferences should be improved with regard to their interaction and exchange. In contrast to other research disciplines, such as computing science, the reputation of conference proceedings should improve through high-quality review procedures that are comparable to those of top IS journals [37]. The ICIS was an exception by conducting high-quality double-blinded reviews, resulting in worldwide acceptance by top IS researchers [25].

3. Research Methodology

In our research article we followed the argument by [17] that the identity construction and the core of a research discipline can be revealed by "aggregating individual research papers at a higher semantic level" [17] (p. 470). In this context our research is based on an extended latent semantic indexing (LSI)-based literature review using an LSI tool [38]. We chose the underlying LSI-based approach because the number of publications and the complex information environment would have made an extensive literature review, without the support of a tool, an incredibly time-consuming task. Furthermore, keyword-based approaches also have their shortcomings (e.g., synonymy/polysemy problems). Due to the above-mentioned limitations, we wanted to use an approach, which is not solely based on term-matching methods. In this context, it would have been possible to use LSI-based approaches that include only the abstracts in the analysis (e.g., [17]). However, since abstracts usually have clear structures, they contain only aggregate content and we wanted to include substantial longer text corpora in our article to provide the broadest possible information base and to e.g., reliable identify research papers that belong to a specific research field. To structure our research process adequately and to make it comprehensive and clear, our approach is oriented toward the approach of [39]. Since the analysis of thousands of documents is time consuming, we divided our research approach into four different phases, which enabled a structured and efficient approach (compare Figure 1).

Phase 1 is characterized by problem identification and formulation and subsequently by the extraction of relevant literature. As in any literature study, our study emphasizes that the selection of journals and/or conference proceedings plays a central role. Although selecting a single journal or a conference proceeding may, in some cases, provide a clear research scope, in our case, this was not expedient because we wanted to investigate how the IS domain has changed over time, how trends develop, which geographical differences exist, and how publication behavior has changed. We also wanted to discuss the differences between conference papers and journal articles, which justified the inclusion of the ICIS proceedings. Before going into more details in the selection of IS journals and conference proceedings, an overview of encountered barriers is given. (1) Multidisciplinary journals can be mentioned as a source of uncertainty. For instance, the Journal of Business Research has published a number of IS paper (e.g., [40]). (2) The IS research discipline is multidisciplinary, nonhomogeneous, and without clear boundaries. (3) The population size for our research focus (complete academic IS literature) is too large to conduct a total population study. In addition, compiling a list of relevant journals in IS research and related fields is too complex, so we attempted to narrow down the journals and conference

proceedings to be studied in the most comprehensible way possible. Therefore, we used as a sample group all publications of the AIS Bo8 journals and the ICIS proceedings in the time period from 2000 to 2015. Our study integrates all journals of the AIS Bo8 and all articles of the ICIS proceedings in the previously mentioned time period because most IS scholars agree that these outlets are the most significant [7]. In addition to the Bo8 journals, we included the proceedings of the ICIS into our outlet, reflecting possible interesting trends of topics within conferences. We assume that certain topics are published within this outlet since conferences are the source of new IS research and an opportunity to acquire feedback on ideas more quickly based on the short revision times [26,28]. As mentioned, ICIS provides high-quality double-blinded reviews, resulting in worldwide acceptance by top IS researchers [25]. Consequentially, as recommended by [3], we have covered a wide range of top IS research with our included outlet that is recognized in the global IS community. We downloaded all publications from several sources and imported them into a literature management tool. We removed different elements, such as book reviews, errata notes, and editorials, which we documented in an exclusion list. Table 1 presents the number of articles per outlet.

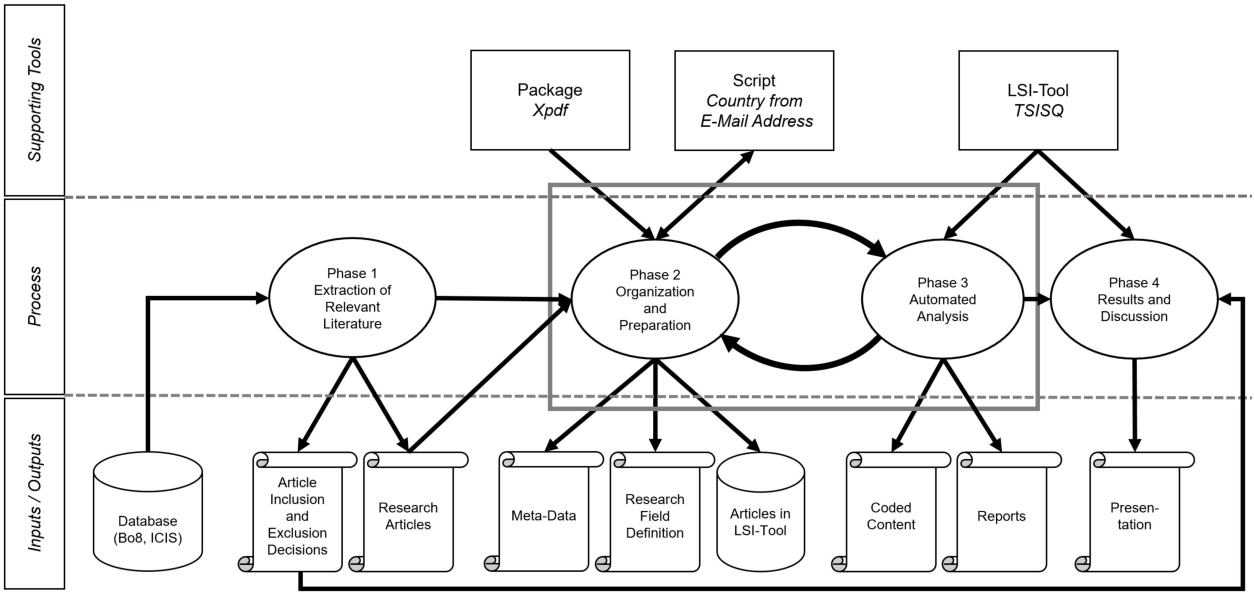


Figure 1. Research methodology and process model.

Table 1. Number of articles differentiated by particular outlet.

Outlet (Journal/Conference)	Abbr.	# Articles	Rel. Share
European Journal of Information Systems	EJIS	562	54.30%
Information Systems Journal	ISJ	309	
Information Systems Research	ISR	551	
Journal of the Association for Information Systems	JAIS	381	
Journal of Information Technology	JIT	345	
Journal of Management Information Systems	JMIS	619	
Journal of Strategic Information Systems	JSIS	287	
Management Information Systems Quarterly	MISQ	574	
International Conference on Information Systems	ICIS	3058	45.70%
	$\sum$	6692	100%

Phase 2 aimed to organize and prepare the literature. We structured and organized the articles and assigned corresponding metadata. For the determination of geographical trends, we developed an algorithm to add this information by using the country suffix of e-mail addresses to assign the corresponding author to a country. Many publishers, such

as Elsevier, accept this restriction to only the first author [14]. With the aid of the package Xpdf, we converted the .pdf files to .txt files, which facilitated the further processing of the documents. Before the investigation of trends within the interdisciplinary research domain of IS can be conducted, we had to cluster topics in appropriate research fields. Specific IS research topics are covered under these research fields. Alternatively, we had way too many topics not manageable because of short interests and relevance of topics or several synonyms changing over the time. Each research field contains one or more topics equipped with a text module, which is necessary for the assignment of the articles. To group the topics into reasonable research fields, we used an inductive procedure. We tried to identify and describe similarities and patterns based on the collected data and observations (track descriptions, etc.) in order to derive descriptions of the research fields based on this. To do so, we analyzed topics of various track descriptions of the ICIS and special issues of AIS Bo8 journals. Based on this, we created a table containing different topics and corresponding descriptions. Within this iterative process, research fields were created, renamed, replaced, or consolidated along with a running adjustment of the corresponding text module. As a result, we identified 22 research fields consisting of a multiplicity of topics to cover all topics within 16 years of IS research in the mentioned outlets (see Table 2).

Table 2. Compilation of research fields.

Business Process Management	IS Projects & IS Development
Contribution of Applied Science	IS Security & Privacy
Data Science & Business Analytics	IS Strategy & (Out-)Sourcing
E-Business & E-Government	IT Implementation, Adoption, & Use
Funding of Innovations	Knowledge Management
Human Behavior & Cultural Aspects	Mobile Information Systems
Impacts of IT/IS	Open Source Software & Open Innovations
IS Curriculum & Education	Research Methods & Philosophy
IS History	Service Science in IS
IS in Healthcare	Social Media & Digital Collaboration
IS in Organizations & Society	Sustainability

In Phase 3, the literature database was analyzed. Researcher's face various challenges during the literature review process. The first challenge is selecting the correct keywords, since authors use synonyms and paraphrases. The second time-consuming challenge is screening the results for relevance [41,42]. Enormous savings of time are possible through using LSI [38,41]. LSI is an automated literature analysis approach using mathematical techniques to ascertain patterns between articles. By possessing a literature database, relating articles can be identified. An input for such an analysis is a complete article or just some text modules. Therefore, more and truly relevant publications that relate to the inserted article or text module can be identified resulting in a useful method for similarity queries [38,41]. For our investigation, we inserted our database consisting of 6692 articles into an LSI-Tool, which is located on a private server due to access restrictions of the contained publications. In this regard, we extended the approach of [3] because we used not only the textual data in the abstracts but also the textual data of the entire research articles (full text). For each article, the tool conducts an LSI process while the resulting queries were stored in a separate SQLite database representing the basis for our investigation. With inserting our developed text modules (compare Phase 2), these pass through this LSI process too, were compared to contained publications of our database and related articles were presented sorted by relevance. Throughout the entire LSI process, we manually checked the results to ensure the correct assignment of articles to research fields. Table 2 presents the 22 identified research fields.

To understand the sequence of LSI, the following section briefly focusses on the mathematical functionality. In a first step and before the proper mathematical operations start, often contained terms such as "the", "it" or "and" have to be eliminated, because words were expressed as vectors. The fundamental idea of LSI is the vector-space-model, which was developed by [43]. The model constitutes words or documents as vectors $d_i = (d_{i1}, d_{i2}, \ldots, d_{ij})$ where d_{ij} represents the weight of the jth terms. As advantage for a given vector query $q = (w_{1q}, w_{2q}, \ldots, w_q)$, the similarity can be calculated as the angle of the document vector and the query vector. The document vectors are summarized in a term document $m \times n$ matrix called A, where m represents the number of words and n the number of documents. With this basis, a Singular Value Decomposition (SVD) as core part of LSI is conducted. The results are three new matrices U, S, and V, which will be further rated by SVD. A rank reduction with the help of an empirical factor k has the consequence that the small singular values are deleted from the matrix which removes the noise from the documents [44]. At this point, the SVD is completed. The existent document matrix V_k^T contains the eigenvector values of the considered documents of d_i. The matrices U_k and S_k^{-1} are multiplied with the query vector q^T to achieve a rank-reduced query vector q_k which represents the final vector for the last operation. With the resulting vector, the actual query process can be started. Therefore, each entry of the matrix V_k^T is needed, here named as d_{Vi}, and the rank reduced vector q_k. The following Equation (1) shows the cosine of the angle from the two vectors with the Euclidean dot product expressing the similarity between the input words and documents:

$$\cos\theta = \frac{d_{Vi} \times q_k}{\|q_k\| \times \|d_{Vi}\|} \tag{1}$$

The value of this comparison can take a value between "1" (identical) and "0" (orthogonal). If the vectors are orthogonal to each other, the similarity is entirely not given. If the value is 1, they are equal.

For more information on the underlying theoretical concepts and applied methods of the used LSI-approach, see [38]. In Phase 4, we present our results in terms of the regional distribution of publications in the AIS Bo8 and the ICIS, the change in publication behavior, and the emergence and change of IS research fields and trends over time. In order to carry out a meaningful analysis of the temporal change in publication behavior, and the emergence and change of IS research fields and trends over time, we divided the entire period of 16 years into four-year segments (YS). This is justified by the fact that we needed a sufficient number of publications per YS and outlet (ICIS proceedings and AIS Bo8 journal) to carry out a meaningful analysis. To ensure this, each YS describes a time span of four years. This period allows enough time for the analysis of temporal changes in publication behavior and enough time for research fields to go through a large part of its life cycle [17,45]. In order to reflect the time span in each segment equally, we limited our analysis to the time period from 2000 to 2015 because JAIS began publishing in 2000. YS1 contains the years 2000–2003, YS2 2004–2007, YS3 2008–2011, and YS4 2012–2015.

4. Demonstration of Results

4.1. Regional Distribution of Publications in the AIS Bo8 and the ICIS

In this section, the results of our investigation are presented by answering the first research question with regard to the regional distribution of publications and their corresponding outlets. As explained, the foundation for our investigation is formed by a database of 6692 articles consisting of 3061 publications in the ICIS proceedings and 3631 AIS Bo8 journal publications from 2000 to 2015. Table 3 presents a time-independent classification of articles by continent and chosen country (groups) divided into the number of published articles in total (ICIS proceedings and AIS Bo8 journals). The color-coding (e.g., North America = yellow) is intended to clarify the assignment to the groups. This assignment is also used in the following figures or tables.

Table 3. Assignment of articles to geographical regions differentiated by outlet.

Continent Country (Group)	Total Articles	ICIS Articles	AIS Bo8 Articles	Continent Country (Group)	Total Articles	ICIS Articles	AIS Bo8 Articles
North America	3654	1529	2125	Asia	852	476	376
Europe	1738	818	920	China	319	174	145
Germany, Austria, and Switzerland	595	454	141	Singapore	276	200	76
Great Britain	574	140	434	Korea	92	39	53
Scandinavia	278	108	170	Taiwan	63	19	44
Northern Mediterranean	155	64	91	Further Asian countries	102	44	58
Benelux Union	124	45	79	South America	18	10	8
Further European countries	12	7	5	Africa	14	10	4
Australia	359	188	171	No country identifiable	57	30	27

Focusing on the overall continental distribution, in total North American researchers published approximately 55% (3654) of the worldwide articles in these IS outlets, followed by Europe with 1738 (approx. 26%), and Asian countries with 852 articles (approx. 13%). Less than 7% (448 articles) were from other regions of the world (Australia, South America, and Africa). These included 57 articles in which the country of the corresponding author was not identifiable. We merged Australia with Oceania because of the comparatively low share of Oceanian articles. Due to the small number of published articles, the South American and African regions were not subdivided into countries. Regarding Europe, most of the articles (approx. 17% in total) were published by researchers from Germany, Austria, and Switzerland (595 articles) as well as Great Britain (UK and Ireland) (574 articles). Scandinavian researchers (from Norway, Sweden, Finland, Denmark, and Island) produced 278 articles (4%), Northern Mediterranean researchers (consisting of Portugal, Spain, France, and Italy) produced 155 articles (2.3%), and researchers from the Benelux Union (Netherlands, Belgium, and Luxembourg) produced 124 articles (1.8%). The remaining publications (12 articles) were grouped as other European countries (approx. 0.1%). Analyzing Asia, researchers from China and Singapore published 319 and 276 articles, respectively, approximately 9% of the total number of publications. Researchers from Korea published 92 articles (slightly more than 1%), and researchers from Taiwan produced 63 articles (less than 1%). These are mentioned separately, while research articles from other Asian countries are grouped together.

In the next step, geographical appearance in the ICIS proceedings and the AIS Bo8 journal publications was investigated in more detail. North American publications dominated the AIS Bo8 journals with a total of 2125 articles from 2000 to 2015, representing nearly 60% of all articles within this span. In Europe and North America, there were more articles published in the AIS Bo8 journals than in the ICIS proceedings. Regarding the other continents, there were (slightly) fewer articles published in AIS Bo8 journals. Intracontinental differences were clearly visible in Europe and Asia. While researchers from Germany, Austria, and Switzerland were commonly present in the ICIS proceedings (454 articles), the majority of publications from the UK and Ireland were published in the AIS Bo8 journals (434 articles). In Asia, measured at share, China and Singapore were quite evident in the ICIS proceedings, but Singapore was less represented in the AIS Bo8 journals. On the contrary, articles by Korean and Taiwanese researchers as well as those from other Asian countries were published in the AIS Bo8 journals and comparatively less in the ICIS proceedings.

4.2. Temporal Change in Publication Behavior—A Geographical Perspective

Based on the above findings, the following investigations are focused on the detection of the temporal change in publication behavior. Figure 2 visualizes this change by application of YS with regard to ICIS proceedings and AIS Bo8 journal publication numbers.

YS1 contains the years 2000–2003, YS2 2004–2007, YS3 2008–2011, and YS4 2012–2015. For visualization and comparability reasons, Figure 2 is narrowed to continental trends, while the investigation of Table 4 includes the specific country-related distribution. As previously mentioned, the number of articles in the AIS Bo8 journals is continuously rising, and ICIS proceeding articles show a rapid increase, especially from YS2 to YS3, when the number of articles more than doubled. Upon investigation, the number of articles from Europe, Australia, Asia, and the other continents (South America, Africa, and unidentifiable) nearly doubled each YS. Except for YS2 to YS3, the North American researchers are quite similarly represented by comparing the number of articles between two segments. Regarding YS4, European and North American publications are at nearly the same level, which became apparent regarding the past trend. Analyzing the AIS Bo8 journal publications from YS1 to YS3, a steady rise in all regions is observable. The development in YS4 follows the primary development except in North America. The number of North American publications is slightly decreasing, although the number of overall articles is rising. To recap, in both outlets, the number of publications is increasing, while all regions over the time period show an increase, with the exception of North America in the last YS.

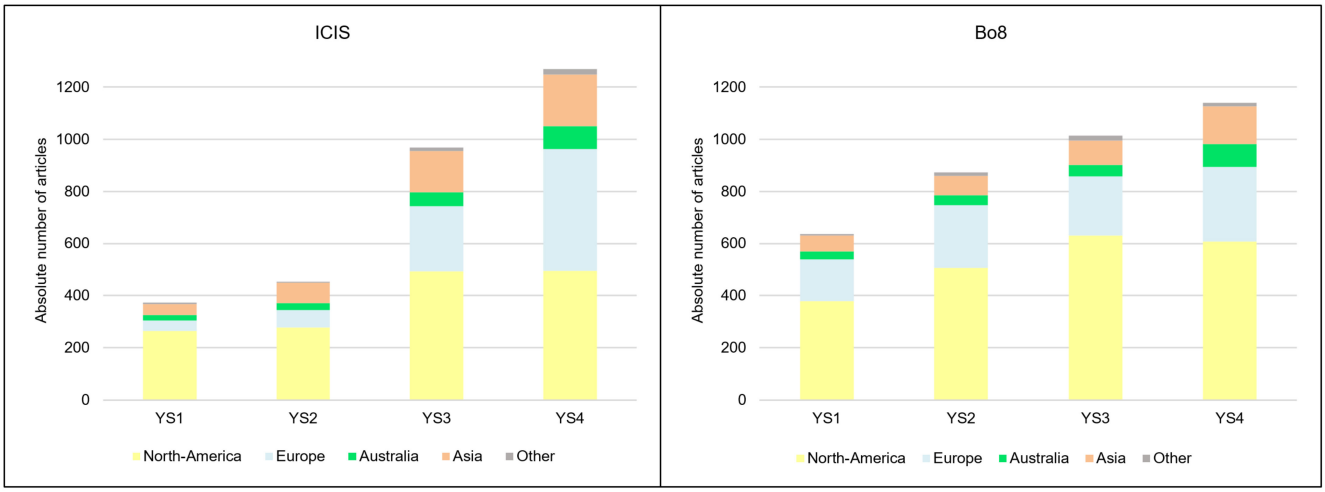


Figure 2. Absolute number of articles per YS and region in comparison to outlets.

For deeper investigation and to understand how these continental trends are composed, the relative shares for continents and countries or respective country groups are presented in Table 4. As also apparent in Figure 2, the share of North American articles decreased from YS1 to YS4 especially for the number of publications in ICIS proceedings. Regarding Europe, for ICIS proceedings, the publication number continually grew from approximately 11% to approximately 37%, while for the AIS Bo8 journals, the relative share fluctuated by approximately 25%. For Australia, this shifting trend is also obvious, with little variation of approximately 1%. Considering the Asian countries, we see an increasing trend from YS1 to YS3 with a decrease in YS4 with regard to ICIS proceeding articles and a relative steady rise from 10% to 13% in the AIS Bo8 journals. For South American, African, and other countries, no pattern is identifiable because of small publication numbers.

Focusing on intra-European researchers, the impact of Germany, Austria, and Switzerland within YS1 in both outlets was almost not existent. In the following years, the relative share of publications considerably increased. For ICIS proceeding publications, the share more than tripled from YS1 to YS3, whereas from YS3 to YS4, the share doubled. Regarding AIS Bo8 journal publications, the relative share at least doubled. If we investigate Great Britain's researcher development in the ICIS proceedings, initially (from YS1 to YS2), the relative share increased, but from YS2 to YS4, the relative share of articles decreased from approximately 7% to only 3%. In the AIS Bo8 journals, this trend is also apparent. With more than 16% in YS1 and YS2, the relative share in YS3 and YS4 was reduced by approximately half (8%). The other European countries do not follow notable trends, fluctuating

approximately 1% or 2% between the YSs. In summary, the number of publications of German, Austrian, and Swiss researchers in both outlets increased over the years, which is the key factor in increasing the relative share of European articles. When investigating differences within Asia, the developments are not as distinct. For China and Singapore, which are the most represented countries, no clear trend in terms of increasing or decreasing the relative share of articles is observed. In China, the share of articles increased in both outlets, starting with approximately 2% in YS1 to more than 6% in YS4. On the contrary, the development in Singapore slightly decreased similarly in both outlets. For the other Asian countries, no generalizations about time-dependent trends are obvious, but of course, some small variations exist.

Table 4. Relative share of articles in terms of regional distribution and outlet in comparison to the YS.

Continent Country (Group)	ICIS				AIS Bo8			
	YS1 (2000–2003)	YS2 (2004–2007)	YS3 (2008–2011)	YS4 (2012–2015)	YS1 (2000–2003)	YS2 (2004–2007)	YS3 (2008–2011)	YS4 (2012–2015)
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
North America	70.85%	61.15%	51.09%	39.09%	58.88%	57.48%	61.28%	54.16%
Europe	10.70%	15.01%	25.75%	36.72%	25.08%	27.10%	22.18%	25.60%
Germany, Austria, and Switzerland	1.07%	3.31%	11.27%	25.85%	0.78%	1.93%	3.70%	7.05%
Great Britain	4.29%	7.06%	5.69%	2.92%	16.36%	16.33%	8.27%	8.92%
Scandinavia	2.41%	1.32%	4.03%	4.33%	3.58%	4.54%	5.54%	4.37%
Northern Mediterranean	0.53%	1.55%	3.00%	2.13%	1.87%	1.81%	2.72%	3.03%
Benelux Union	1.87%	1.77%	1.76%	1.10%	2.49%	2.38%	1.95%	1.87%
Further European countries	0.53%	0%	0%	0.39%	0%	0.11%	0%	0.36%
Australia	5.35%	5.96%	5.48%	6.93%	4.67%	4.31%	4.19%	5.62%
Asia	11.23%	17.22%	16.33%	15.60%	9.65%	8.50%	9.14%	12.93%
China	2.68%	3.97%	7.14%	6.07%	2.80%	1.81%	3.79%	6.42%
Singapore	6.69%	10.15%	6.10%	5.52%	2.34%	2.61%	1.65%	1.87%
Korea	0.80%	1.55%	0.92%	1.58%	1.40%	1.47%	1.46%	1.43%
Taiwan	0.53%	0%	1.03%	0.55%	0.47%	1.25%	0.98%	1.78%
Further Asian countries	0.53%	1.55%	1.14%	1.88%	2.65%	1.36%	1.26%	1.43%
South America	0%	0.22%	0.52%	0.32%	0.16%	0.35%	0.19%	0.18%
Africa	0%	0.44%	0.21%	0.47%	0.78%	1.13%	1.56%	0.89%
No country available	1.87%	0%	0.62%	0.87%	0.78%	1.13%	1.46%	0.62%

After the regional distributions of publications are presented for ICIS and the AIS Bo8, differences within the various AIS Bo8 journals can be examined. Figure 3 presents the number of articles for all AIS Bo8 journals and their continental distribution over time.

As the name suggests, EJIS is one of the leading European IS journals [46]. This is confirmed by the results. Almost half of the publications (259 out of 552) were of European origin, and 36% of the articles are published by North American researchers. When comparing these numbers with the sum total of AIS Bo8 from Table 4, it is clear that compared to the average over the years, many European articles and few North American articles were actually published in the EJIS. Asia and Australia are each represented with 9% and 7%, respectively. With regard to the temporal distribution, it is remarkable that the number of total publications in the EJIS has declined since YS2. In particular, the number of European publications decreased from YS2 to YS3, whereas the number of North American publications increased over the same period. The number of Asian and Australian articles at least doubled from YS1 to YS4. In addition to the EJIS, there was a surplus of European articles in the ISJ and JIT. Similar to MISQ, JMIS, JAIS, and ISR show a clear spatial origin focus on North America. In all these journals, however, a recognizable internationalization of the origin of the authors can be observed within the last two YSs. A special feature of the ISR is the comparatively high number of Asian articles in recent years. The JSIS cannot

be assigned to either trend. Initially more North American, it is now more influenced by European researchers and their publications.

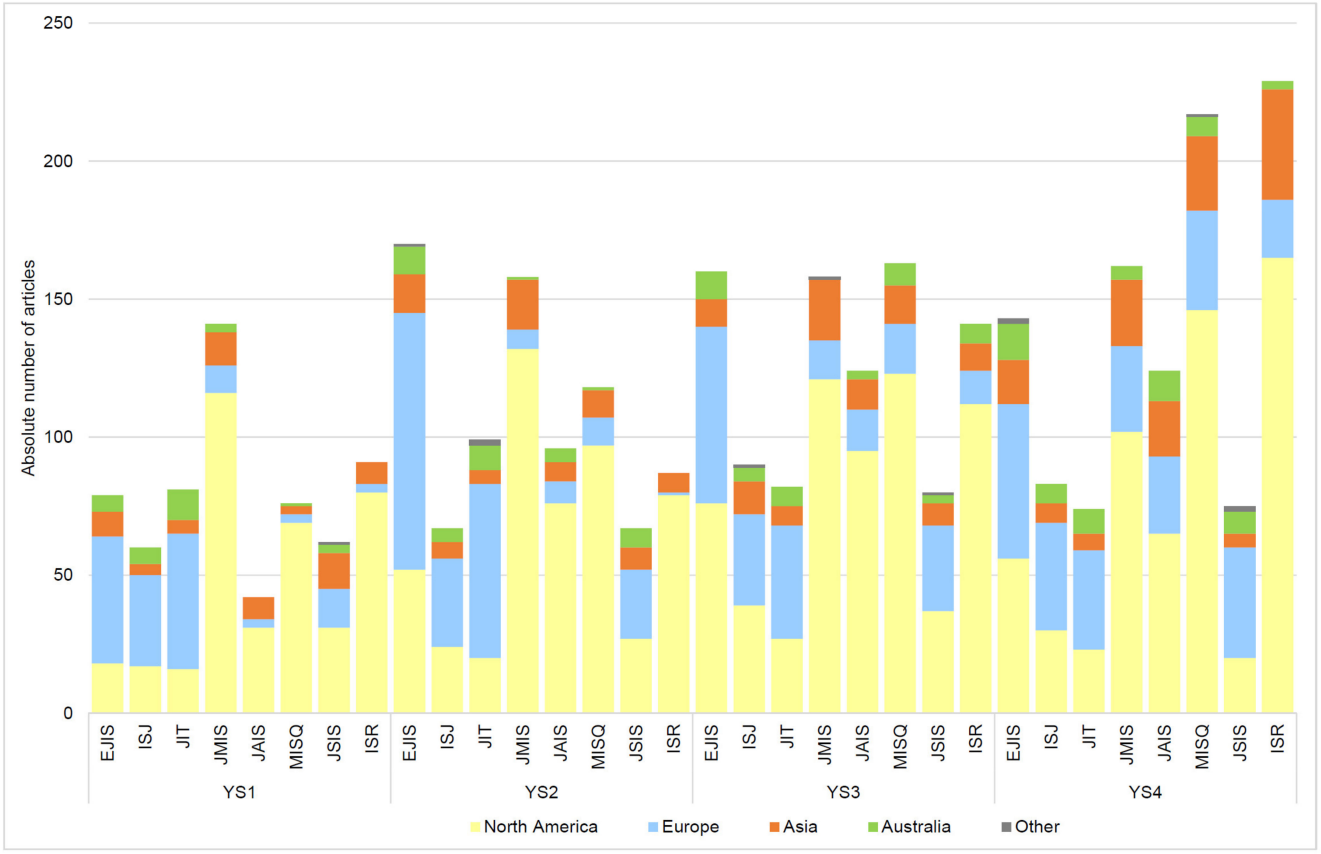


Figure 3. Continental distribution of articles within the Bo8 journals (EJIS, ISJ, JIT, JMIS, JAIS, MISQ, JSIS, and ISR).

Both outlets (ICIS proceedings and AIS Bo8 journals) show an increasing number of articles, although the increase within ICIS proceedings is much more obvious with a tripling from YS1 to YS4. Regarding the continental distribution, North America was the leading geographic region in both outlets over the investigated period, whereas the European countries were mainly represented in the ICIS proceedings. Asian countries were quite important with comparatively high publications in China and Singapore. Australia followed the slightly increasing trend, while South American, African, and other publications remained rare in top IS research in the ICIS proceedings and the AIS Bo8 journals. When analyzing the individual AIS Bo8 journals, there are journals with a strong focus on North American research and journals with a slight European focus and vice versa (compare Figure 3). A journal dominated by Asian or Australian researchers does not exist.

4.3. Development of IS Research Fields in Terms of Region and Outlet

To further investigate trends in terms of region and outlet over time, it is necessary to conduct calculations to obtain absolute and relative shares. Table 5 serves as the foundation for the following charts and figures to identify patterns in IS research fields. Table 5 presents the number of publications per research field grouped by YS as well as by outlet and presents the absolute number of matches and the relative share. The relative shares are determined by dividing the number of absolute articles of a research field within an outlet and a YS by the number of overall publications within this research field within an outlet and a YS. These relative shares serve as input for the following investigations.

Table 5. Absolute and relative scientific interest by outlet, research field, and time.

		YS1 (2000–2003)		**YS2 (2004–2007)**		**YS3 (2008–2011)**		**YS4 (2012–2015)**	
Overall Database of 6692 articles	AIS Bo8	637		872		1013		1114	
	ICIS	374		453		967		1269	
Research Fields (matches)	Outlet	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.
E-Business & E-Government (842)	AIS Bo8	83	13.03%	161	18.46%	139	13.72%	144	12.93%
	ICIS	39	10.43%	54	11.92%	101	10.44%	121	9.54%
Service Science in IS (785)	AIS Bo8	65	10.20%	112	12.84%	119	11.75%	140	12.57%
	ICIS	28	7.49%	65	14.35%	94	9.72%	175	13.79%
IS in Organizations & Society (785)	AIS Bo8	54	8.48%	114	13.07%	114	11.25%	425	38.15%
	ICIS	26	6.95%	66	14.57%	103	10.65%	357	28.13%
Contribution of Applied Science (758)	AIS Bo8	96	15.07%	125	14.33%	123	12.14%	116	10.41%
	ICIS	39	10.43%	80	17.66%	94	9.72%	85	6.70%
Social Media & Digital Collaboration (713)	AIS Bo8	43	6.75%	60	6.88%	95	9.38%	118	10.59%
	ICIS	23	6.15%	42	9.27%	133	13.75%	199	15.68%
Human Behavior & Cultural Aspects (664)	AIS Bo8	90	14.13%	110	12.61%	114	11.25%	112	10.05%
	ICIS	30	8.02%	53	11.70%	77	7.96%	78	6.15%
Impacts of IT/IS (651)	AIS Bo8	84	13.19%	115	13.19%	102	10.07%	112	10.05%
	ICIS	32	8.56%	49	10.82%	77	7.96%	80	6.30%
Research Methods & Philosophy (433)	AIS Bo8	39	6.12%	42	4.82%	61	6.02%	80	7.18%
	ICIS	11	2.94%	20	4.42%	59	6.10%	121	9.54%
IS Security & Privacy (319)	AIS Bo8	18	2.83%	28	3.21%	82	8.09%	57	5.12%
	ICIS	11	2.94%	22	4.86%	50	5.17%	51	4.02%
Mobile Information Systems (290)	AIS Bo8	11	1.73%	35	4.01%	31	3.06%	60	5.39%
	ICIS	11	2.94%	13	2.87%	28	2.90%	101	7.96%
IS in Healthcare (259)	AIS Bo8	5	0.78%	32	3.67%	41	4.05%	50	4.49%
	ICIS	1	0.27%	7	1.55%	53	5.48%	70	5.52%
Funding of Innovations (285)	AIS Bo8	17	2.67%	32	3.67%	28	2.76%	35	3.14%
	ICIS	12	3.21%	6	1.32%	39	4.03%	89	7.01%
Knowledge Management (242)	AIS Bo8	17	2.67%	36	4.13%	37	3.65%	36	3.23%
	ICIS	19	5.08%	27	5.96%	33	3.41%	37	2.92%
IS Curriculum & Education (205)	AIS Bo8	14	2.20%	21	2.41%	25	2.47%	17	1.53%
	ICIS	9	2.41%	24	5.30%	43	4.45%	52	4.10%
Data Science & Business Analytics (160)	AIS Bo8	10	1.57%	21	2.41%	22	2.17%	23	2.06%
	ICIS	8	2.14%	14	3.09%	19	1.96%	43	3.39%
IT Implementation, Adoption, & Use (146)	AIS Bo8	9	1.41%	14	1.61%	29	2.86%	18	1.62%
	ICIS	3	0.80%	10	2.21%	27	2.79%	36	2.84%
Business Process Management (123)	AIS Bo8	21	3.30%	10	1.15%	15	1.48%	14	1.26%
	ICIS	2	0.53%	8	1.77%	18	1.86%	35	2.76%
IS Projects & IS Development (93)	AIS Bo8	13	2.04%	16	1.83%	17	1.68%	12	1.08%
	ICIS	5	1.34%	5	1.10%	11	1.14%	14	1.10%

Table 5. *Cont.*

		YS1 (2000–2003)		YS2 (2004–2007)		YS3 (2008–2011)		YS4 (2012–2015)	
Open Source Software & Open Innovations (90)	AIS Bo8	5	0.78%	1	0.11%	16	1.58%	8	0.72%
	ICIS	7	1.87%	6	1.32%	14	1.45%	33	2.60%
Sustainability (90)	AIS Bo8	5	0.78%	7	0.80%	19	1.88%	11	0.99%
	ICIS	5	1.34%	2	0.44%	17	1.76%	24	1.89%
IS History (87)	AIS Bo8	7	1.10%	17	1.95%	12	1.18%	21	1.89%
	ICIS	4	1.07%	11	2.43%	6	0.62%	9	0.71%
IS Strategy & (Out-)Sourcing (84)	AIS Bo8	1	0.16%	4	0.46%	24	2.37%	15	1.35%
	ICIS	0	0.00%	11	2.43%	9	0.93%	20	1.58%

It must be mentioned that it is quite possible that a publication can be classified into two or even more research fields. For example, a publication that develops a mobile application for mobility is mentioned in the fields of "Service Science", "Mobile Information Systems", and "Sustainability". On the other hand, there are articles that are not assigned to one of the 22 categories. On average, a publication was assigned to 1.21 research fields. From our analysis four different trends in research field development were revealed. These differ in terms of development over time in relation to the number of publications on specific research fields in the AIS Bo8 journals and the publications in the ICIS proceedings. These four different trends are illustrated by four research fields ("Social Media & Digital Collaboration", "Impact of IT/IS", "Service Science in IS", and "Funding of Innovations") as examples and can be categorized as follows: (a) similarly increasing, (b) similarly decreasing, (c) similarly consistent, and (d) divergent (see Figure 4). Corresponding graphics for the other 18 research fields can be found in Appendix A.

As an example of a research field with a constant increase in the number of publications over time, the research field "Social Media & Digital Collaboration" can be mentioned. There is a similar increase in publications in this research field in both the AIS Bo8 and the ICIS proceedings. It should be noted, however, that in this context, the number of publications in the ICIS proceedings increased faster than in the AIS Bo8 journals and more publications were published in the ICIS proceedings over time than in the AIS Bo8 journals. This overall development indicates that these research fields are trending research fields and that the IS community has placed an even greater focus on such research fields. The overall interest in this research field is also reflected in the total number of publications (compare Table 5) as well as in a distinct increasing trend that has interest peaks in both the AIS Bo8 and ICIS. The development of the IS research community and its research interests appear to be somewhat fluid and follow certain trends in society. For example, the number of studies on "Social Media & Digital Collaboration" has grown considerably in number (YS1, YS2) together with the rise of, for example, Twitter and Facebook in 2006 and 2004. It is obvious that researchers have noticed this trend and its relevance for research. Most AIS Bo8 publications in this field have been published in EJIS, JIT, JAIS, and MISQ (compare Table 6 and Figure A17).

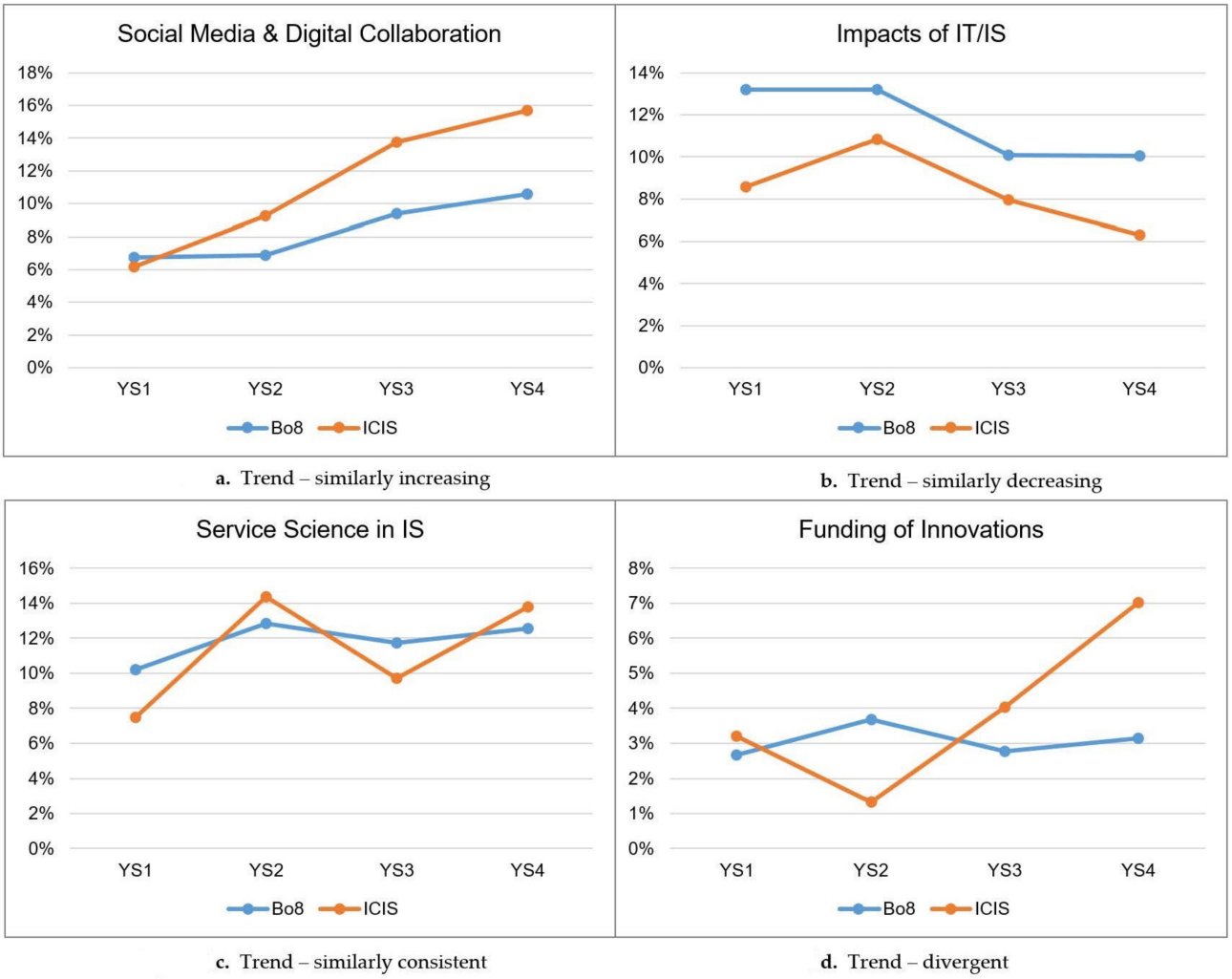


Figure 4. Identified pattern regarding outlet and YS' for exemplified research.

Table 6. Share of a journal in a research field.

Research Field	EJIS	ISJ	ISR	JIT	JMIS	JAIS	MISQ	JSIS	Total
Contribution of Applied Science	21%	9%	6%	9%	4%	27%	18%	6%	460
E-Business & E-Government	26%	9%	8%	17%	11%	7%	10%	12%	527
Funding of Innovations	16%	4%	9%	11%	11%	12%	19%	19%	112
Human Behavior & Cultural Aspects in IS	22%	13%	3%	20%	4%	15%	16%	8%	426
Impacts of IT/IS	17%	10%	3%	19%	19%	9%	14%	9%	413
IS in Healthcare	23%	2%	20%	9%	12%	13%	13%	7%	128
IS in Organizations & Society	20%	9%	4%	16%	5%	20%	16%	10%	425
IS Research Methods & Philosophy	29%	11%	5%	13%	3%	18%	15%	8%	222
IS Security & Privacy	17%	7%	8%	8%	12%	18%	19%	10%	185
Knowledge Management	17%	9%	6%	19%	8%	10%	20%	13%	126
Mobile Information Systems	8%	7%	11%	26%	4%	18%	18%	9%	137
Service Science in IS	20%	8%	5%	20%	3%	19%	17%	9%	436
Social Media & Digital Collaboration	18%	8%	6%	16%	6%	18%	22%	5%	316
Average	19%	8%	7%	16%	8%	16%	17%	10%	

Note: Only research fields with more than 110 publications in total were considered.

This result is in line with the findings of [8], who came to a similar conclusion in their study of developing research fields with a special focus on the European IS research community. Furthermore, we have identified areas of research (e.g., "IS in Healthcare")

that are in a nascent stage with a steadily increasing tendency and that are considered equally interesting by major IS journals, especially EJIS and ISR (see Table 6), and the ICIS. Although there are a few minor differences in the evolution of other research fields that have been attributed to this category (e.g., "IS in Healthcare", "Mobile Information Systems"), a similar pattern can be observed regarding the overall increased interest of the IS community in these research fields (compare Figures A1 and A2). In sum, the trends observed here suggest some interesting dynamics between society and publishing in leading IS journals and conference proceedings.

Regarding the decreasing overall interests, such trends are evident within research fields with high interest and, therefore, a comparatively high number of articles published over the years. Looking at the research field "Impact of IT/IS" (651 articles), it can be seen that the peak of scientific interest in the AIS Bo8 journals was achieved in YS1 and at the ICIS in YS2, followed by a slight decrease. This pattern can also be observed in other research fields, such as the "Contribution of Applied Science" (compare Figure A3). These findings illustrate the interesting dynamics in IS research and underline the sometimes short lifespan of research fields, as mentioned by [3]. In their analysis, these authors made a similar observation regarding the topic of virtual worlds, noting that even one of the hottest topics in research may lose importance in IS research and may wane in the top IS research outlets [3]. Most AIS Bo8 publications in this field have been published in EJIS, JIT, and JMIS (compare Table 6).

The third trend that we have identified based on our analysis is "similarly consistent". Although there are differences in the extent of development, the trends are very similar in both the AIS Bo8 and ICIS. Looking at the selected example, "Service Science in IS", it becomes clear that the number of publications initially increases, then decreases and then rises again and reaches its peak in YS4. Similar developments, which also show fluctuations in the number of publications, can be observed for other fields of research, such as "E-Business & E-Government", "IS Curriculum & Education", "Management IT Projects & Development", and "IS History" (compare Figures A4–A7).

The deviating evolution of research fields is represented by the category "divergent". In this category, very different courses of publication trends on specific topics can be observed. As an example, we have chosen the research field "Funding of Innovations". In this context, contrary development trends can be observed, which also differ according to the strength and characteristics. Research interest at the ICIS has significantly increased more in recent years than in the AIS Bo8 Journals. In the AIS Bo8, most publications in this research field were published in the EJIS, MISQ, and JSIS (compare Table 6). Other research fields that have a different development course with regard to the development in the AIS Bo8 and that of the ICIS are "IT Strategy & Outsourcing", "Business Process Management", and "Open Source & Open Innovation". This different development over time can be attributed to different reasons, such as the different times from submission until the paper is published or the perception of the importance and accuracy of individual research fields to the appropriate journal.

To show which journals have published in certain research fields above or below the average amount, we calculated the corresponding differences to the average of the respective journal (compare Table 7). The European-based journal ISJ has the lowest total deviation from the respective average value. The value varies between −6% and +5%. This broad thematic focus, without placing special focus on specific topics, has been mentioned by [34], who noted that the European-based ISJ is characterized by a methodological diversity and willingness to take on risky topics [34]. A similar characteristic can be found for the MISQ. Again, the deviations are relatively small compared to the other journals. Other journals, such as the ISR, JIT, and JAIS, have other characteristics. ISR has placed an even greater focus on the research field "IS in Healthcare", while JIT has focused on, for example, "Mobile Information Systems" and "Human Behavior & Cultural Aspects in IS", and JAIS has focused on research fields such as "Contribution of Applied Science" and "IS in Organization & Society". Of course, while it is not possible to characterize a journal

only by the number of publications on a given research field, this information provides a valuable indication of the journal's focus.

Table 7. Deviations from the respective average value.

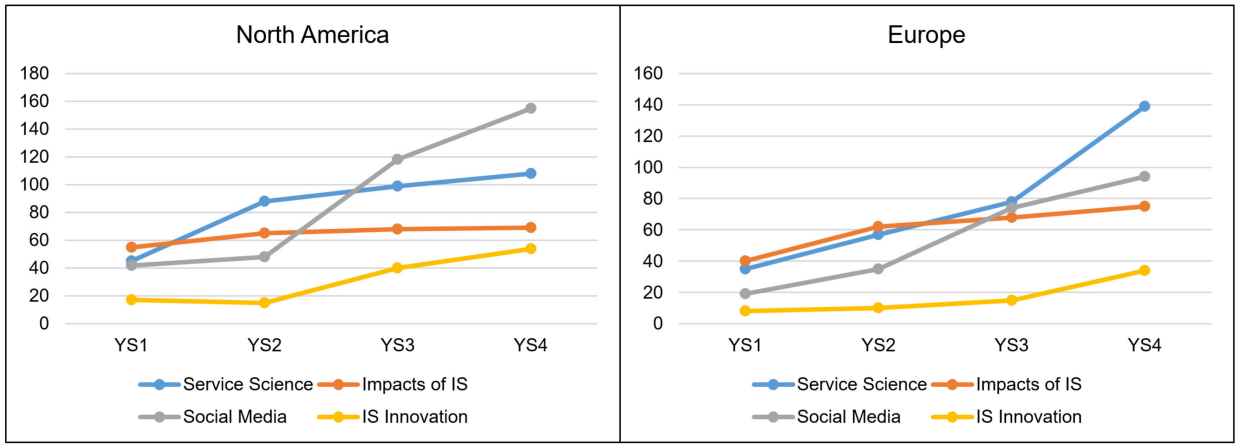
Deviations from the Respective Average Value	EJIS	ISJ	ISR	JIT	JMIS	JAIS	MISQ	JSIS
Contribution of Applied Science	1%	1%	−1%	−6%	−4%	11%	1%	−3%
E-Business & E-Government	7%	1%	0%	2%	3%	−9%	−6%	3%
Funding of Innovations	−3%	−4%	2%	−5%	3%	−4%	2%	9%
Human Behavior & Cultural Aspects in IS	2%	5%	−4%	5%	−4%	−1%	−1%	−2%
Impacts of IT/IS	−3%	2%	−4%	3%	11%	−7%	−3%	−1%
IS in Healthcare	3%	−6%	13%	−6%	4%	−2%	−3%	−3%
IS in Organizations & Society	1%	1%	−3%	0%	−3%	4%	0%	0%
IS Research Methods & Philosophy	9%	3%	−3%	−3%	−5%	2%	−1%	−2%
IS Security & Privacy	−2%	−1%	1%	−8%	5%	3%	2%	0%
Knowledge Management	−3%	1%	−2%	3%	0%	−6%	3%	3%
Mobile Information Systems	−11%	−1%	4%	10%	−4%	2%	1%	0%
Service Science in IS	0%	0%	−2%	4%	−5%	3%	1%	0%
Social Media & Digital Collaboration	−1%	0%	−1%	1%	−1%	3%	5%	−4%

Note: Color coding for the percentage deviation of the number of publications from the average value: Red = Deviation down from the mean; Green = Deviation upwards from the mean.

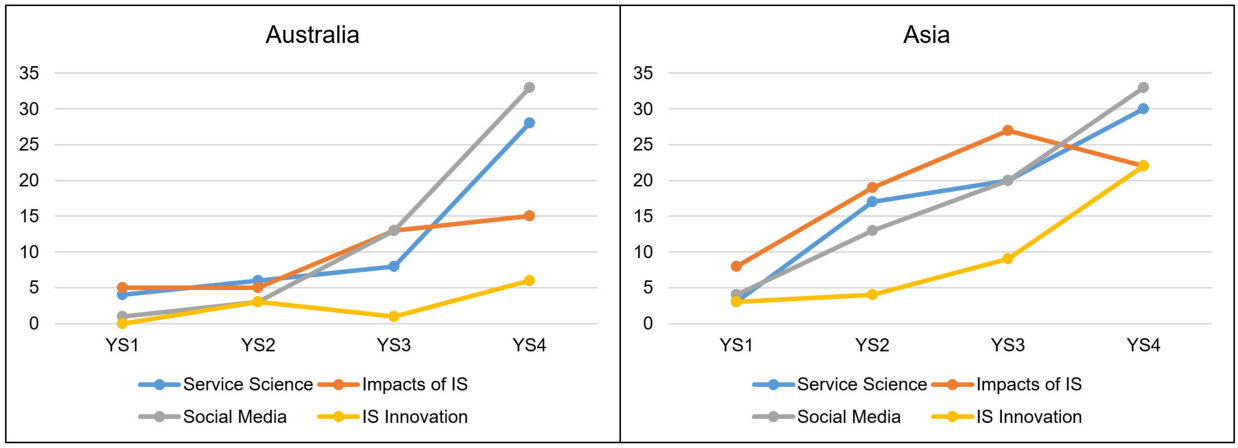
The number of publications in the respective AIS Bo8 journals for the individual research fields can be found in Appendix B, Figures A11–A17.

Since thematic, paradigmatic, and geographical aspects are important when analyzing the development of a research domain [8,33], we also want to take a closer look at the development of IS research fields in different regions. In this context, we again used the four research fields "Social Media & Digital Collaboration", "Impact of IT/IS", "Service Science in IS", and "Funding of Innovations". However, the geographical assignment was not based on journals (e.g., EJIS, and ISJ–European-based and MISQ, ISR–North American-based). Instead, the origin of the authors was used to make a corresponding geographical assignment of the publications to a specific region.

As we can see in Figure 5a,b, there are regional differences in the development of the respective research fields. The research field "Impacts of IT/IS" developed differently regionally. While it has been relatively steady throughout North America and Europe with a slight increasing trend, in Asia, a relatively steep increase can be observed before the trend in YS3 starts to decline. Visible geographical trends in the second decade (YS3 and YS4) compared with the first (YS1 and YS2) include the strong rise of contributions from North America, Australia, and Asia concerning the research field "Social Media & Digital Collaboration". Overall, the number of publications in all regions, except Europe, has risen sharply in this area. In Europe, there is also an increase in the second decade, but it is not as strong as in the other regions. These findings are in line with the conclusions drawn from Table 7: the number of publications in the research field "Social Media & Digital Collaboration" in European-based journals (e.g., EJIS and ISJ) is below the respective average value in terms of the proportions of journals in a research field. In contrast, this research field is more well represented in North American-based IS Journals (e.g., JAIS and MISQ).



(**a**)



(**b**)

Figure 5. (**a**) Regional development of research fields—North America and Europe. (**b**) Regional development of research fields—Australia and Asia.

5. Discussion and Implications

As mentioned by [35], some researchers developed their research papers on, for example, the evolution and state of the IS research domain or citation classics by drawing on data in earlier studies (e.g., [47]). Thus, there is a risk of path dependency because such studies normally had a tendency to analyze a limited set of ideas, approaches, and papers [35]. We argue that the use of papers published in the AIS Bo8 and in ICIS proceedings, which represent the highest quality of research in the field [48], provides a useful component for the presented longitudinal analysis because these data are less likely to suffer from problems of path dependency. The findings of our analysis, therefore, provide a useful complement to existing studies (e.g., [3,7,8]). Our study contributes to theory by following the commentary of [3] (p. 413) and examining "a much broader set of journals such as the Senior Scholar's basket of eight journals" to enhance the diversity. This was also mentioned by [17], who noted that a comparative study of North American versus European IS research identities by including journals with a higher share of European publications could be an interesting direction for further research. By additionally drawing on conference papers rather than only journals, we are able to examine to what extent current trends in society are reflected in research. Journal publications are not very well suited for this because of their sometimes very long publication times. Thus, conference proceedings may complement the analysis and provide a more up-to-date picture than can be found by analyzing journal articles alone [35].

The distribution of all publications speaks for itself. It should be noted that the majority of research contributions come from North American or European researchers. This finding is confirmed by studies by [33], who analyzed publications within the journal ISJ. They called for more internalization and cited China, India, South America, and Africa, in particular, as countries that "are hotbeds of IS practice and becoming hotbeds of IS research" [33] (p. 19). Looking at the distribution over the course of time, European research in the specific outlets has clearly adapted and caught up in terms of quantity. Ref. [29] criticize the under-representation of publications by non-North American researchers. Our results demonstrate a change in recent years. These developments have also been noted in general terms by [14]. During their investigations on MISQ, ISR, and EJIS from 2000 to 2009, they found a decrease in the publication numbers of American publications and a nearly doubling of European (and African) and of Asian and Australian publications. A decisive point for the future distribution is the number of published articles themselves. In the period under investigation, the number of ICIS publications more than tripled and almost doubled for AIS Bo8 publications. The only exception, with a decrease in published articles in this context, was the EJIS. The overall increase in publications as well as the increased interest over the past years has been identified by several authors [5,7,8].

Ultimately, it is questionable to what extent continental publication volumes will develop in the future. Under certain circumstances, European research may gain further importance within these outlets under consideration, while publication numbers from the US may stagnate or even shrink. In contrast to [8], who examined the development of European IS research based on ECIS, we did not find a leading position of the United Kingdom and Australia. However, we found an increase in the number of publications in Australia and Asia indicating that researchers from Australia and Asia may also experience an upswing in publication numbers. Despite this increasing internationalization of the IS research domain, it is still "disappointing that so few articles emanate from China and India" [33] (p. 19).

When considering journal-specific characteristics with regard to regional development, our study uncovered certain foci. While the EJIS, ISJ, and JIT have a more European focus, the majority of articles of the MISQ, JAIS, JMIS, and ISR are published by North American researchers. The JSIS was more North American at the beginning of the time periods considered here but has become a journal with a higher number of European articles, which is interesting, because the JSIS is one of the four important European IS journals in the AIS Bo8 [46]. Ref. [31] stated in their article that there is a clear connection between the origin of the author and that of the journal. Ref. [13] found that North American researchers prefer more management-science- and decision-science-oriented journals and that European researchers, in contrast, are more interpretive and practice-relevant in their research. One reason for the increase in publications in the JSIS and the overall AIS Bo8 by European researchers in the last YS may be the different publication behavior in Europe as opposed to North America. The German-speaking research community (Germany, Austria, and Switzerland) is characterized by participation in industry projects according to the engineering tradition [5] and has had a long-standing commitment to practice and business relevance [8]. Despite this close link between research and practice, Ph.D. students and junior faculty members (tenure track) are increasingly forced to publish in high-quality journals, especially while participating in doctoral or post-doctoral qualification program, and their guidelines are based on rankings. For example, the continuous increase of publications from German researchers can probably be explained by the A+ and A rating awarded to AIS Bo8 journals and ICIS papers by the Verband der Hochschullehrer für Betriebswirtschaft (VHB-JOURQUAL 3, 2015) [8]. This development, which has emerged in the German-speaking IS community over the last 15 years, leads to increased publication pressure and research performance and suggests that German-speaking Ph.D. students and junior faculty members are similar to North American researchers who are forced to publish in "elite" journals [35]. This development was also observed in a study by [8]. They examined the trends in European IS research, especially in the ECIS, and noted a large

increase in publications by German researchers. On the basis of our results, we could not find a similar development for the United Kingdom, thereby contradicting the study by [8] who stated that the relative drop in yearly contributions at the ECIS "may well be because of the Research Assessment Exercise/Research Excellence Framework (RAE/REF) pressures to publish in leading journals as against conference proceedings" [8] (p. 6). We could not confirm such a development because of a decrease in the number of publications from British researchers at the ECIS and the ICIS and in the AIS Bo8 journals. This is partially confirmed by the study by [33], who noted that the number of publications from the United Kingdom in ISJ has dropped by half. The increasing pressure to compete internationally might be one reason for this development. Regions such as South America and Africa are still very rarely represented. This applies to publications in the AIS Bo8 journals as well as at conferences. Visible geographic trends in the fourth YS compared to the first YS include the rise of contributions from Asia in both the ICIS proceedings and the AIS Bo8 journals. An interesting issue here is that there is a significant increase in publications by Asian researchers in journals with a more North American tradition (e.g., MISQ, JMIS, JAIS, and ISR). In journals with a more European tradition (e.g., EJIS, ISJ, JSIS, and JIT), there are significantly fewer publications by Asian researchers and no significant increase in the number of publications.

The longitudinal analysis of papers published by the ICIS and in the AIS Bo8 journals also confirms a number of characteristics in the context of research fields considered both the European and the North American research tradition. For example, in their study of research published by the ECIS, ref. [8] show that IS organizational and strategic as well as systems development themes were the most popular. Another study by [46], in which two European Journals–EJIS and ISJ–were compared showed that in both IS journals, the most popular research topics were related to IS development and IS management. Looking at the results of these two studies, the dynamics of our research domain are visible. If these results are supplemented by the results of our study, it becomes clear that in the further course of European IS research, research fields such as "IS Research Methods & Philosophy", "Human Behavior & Cultural Aspects in IS", and "E-Business & E-Government" have become relevant. E-government was also identified in a study by [49] as one of the relevant topics in the EJIS. The growth of papers on e-business and e-government is perhaps explained by the nature of IT and the growth of the Internet and the ongoing digital transformation [35,50]. The number of publications on these topics is significantly higher than the respective average value. More limited attention is given to specific technologies and the economic sector. This was also noted for the ECIS in a study by [8] and suggests that even during times of the internationalization and dynamization of our research domain, not all characteristics of the European or North American research tradition have changed. As an example of a research field with a constant increase in the number of publications over time, the research field "Social media & Digital Collaboration" can be mentioned. There is a similar increase in publications in this research field both in AIS Bo8 and in the ICIS proceedings. The overall interest in this research field is also reflected in the total number of publications as well as in a distinct increasing trend with peaks in both the AIS Bo8 and the ICIS. The development of the IS research community and its research interests appear to be somewhat fluid and follow certain trends in society (e.g., Use of Twitter and Facebook). On the other hand, it can also be observed that topics that were of great interest in research at the end of the 1990s and the beginning of the 20th century are decreasing in terms of publication numbers at the ICIS and in the AIS Bo8 journals. This development, which represents the dynamics in our research domain, becomes very clear here. While knowledge management was considered a growing research field in the studies by [15,29,50], we observed a decreasing trend here, with other research fields becoming increasingly important.

With this overview, we hope to provide scholars with sufficient information to identify the best outlet for reporting their research with regard to the thematic fit and, as mentioned by [8] (p. 12) "to prompt individual researchers to reflect on the motivation for their

research and justifications for their future research plans". A further implication is that knowledgeable researchers avoid unnecessary review cycles that occur when submitting research work to the wrong outlet [46].

6. Limitations

First, the aim of this study was to provide a more comprehensive overview of the development of research fields. One limitation is that we did not review all conference proceedings and journals in IS. For the database itself, which consisted of AIS Bo8 journals and ICIS proceeding publications, we focused on these outlets with regard to the classification and worldwide acceptance of the AIS. Certainly, there are journals at the top level and practitioner journals such as MISQ Executive [11] or Decision Support Systems and Information with a more Operation Research focus that are not part of this research due to an evident regional focus or varying reputations. For conferences and journals such as the Pacific Asia Conference on Information Systems (PACIS), Scandinavian Conference on Information Systems (SCIS), and Pacific Asia Journal of the Association for Information Systems, the regional influence is obvious. These conferences and journals can be explored in the future to examine the evolution of the regions in our IS community that are not wholly attributable to either the European or the North American IS research tradition. In addition, more (IS-)conferences could be included in the outlet, which have generally quicker revision times than academic journals, to identify and discuss short-term trends, "hot-topics", and fashion waives for specific topics in IS. Furthermore, it would be interesting to look at the development over the next 15 years. However, other papers show that the age of the sample does not necessarily affect scientific impact. For example, ref. [51] is still heavily cited today, even though their analysis of scientific practice examines the years 1997 to 1999. By including all the AIS Bo8 journals as recommended by [3], we have covered a wide range of top IS research that is recognized in the global IS community.

Regarding database preparation, the varying data provisions by the different publishers of the AIS Bo8 journals and the ICIS proceedings resulted in several challenges. The automatic identification of the reference managing software was sometimes incorrect due to different metadata pro-visions, resulting in extensive manual postprocessing. Each publisher uses a different template and varying corresponding information. In outlets, where a Digital Object Identifier (DOI) was available (EJIS, ISR, JMIS and partly ISJ, JIT, and JSIS), precise results were obtained. In cases with non-existent DOIs, we had to manually enter the metadata of each article because the journal sources are fragmented and the article layouts change over time, even if they are from the same source. Due to this extensive procedure, we cannot exclude some outliers despite a double check. Further limitations resulted from automatic country detection. Our developed algorithm was used to identify the origin of articles by using the country suffix of e-mail addresses. Therefore, we limited the investigation only to the corresponding author. However, this procedure is common, as noted in the database preparation section. In future studies, this method could be extended by an author position method. In cases where a public e-mail provider was used or no corresponding e-mail address was provided (JMIS), we had to manually determine the country of origin from the postal address. Due to different metadata and layout structures of the outlets, algorithms identifying the country, country code or zip code achieve unusable results in most instances. A further limitation on a related issue is that it was not possible to detect 57 of 6692 articles with regard to the author's origin, although this represented less than 1% of the overall database.

7. Conclusions

In the sense of cumulative research, we have expanded existing research on the understanding of the profile of IS research. This is useful because continual introspection helps any research domain as it thrives and matures [50]. Although recent studies have mentioned that there are differences in terms of the development of the IS research domain, academic research has not properly considered the role of geographical aspects and topic

emergence and has not taken into account various outlets, particularly the differences between publications in conference proceedings and journals. To shed light on this issue, we aimed to answer the following research questions: What is the regional distribution of publications in the AIS Bo8 and the ICIS? How has publication behavior changed by region, and what are the greatest changes? Finally, where-in terms of outlet and region-do IS research topics and trends emerge, and how have these changed over time? Our study offers contributions valuable for the IS community and its goal of developing an impact on research and society. First, in this longitudinal study, we investigated publications of top IS research outlets (all AIS Bo8 journals and the ICIS proceedings) in terms of geographical and periodical evolution from 2000 to 2015. With the help of a semi-automated database, we were able to handle a large number of articles (6692). Through the use of an algorithm to identify geographical emergence and a LSI tool, we established the foundation for our investigation. Based on the results of our analysis of 6692 papers, we were able to identify differences in terms of the development of research topics in general and, particular, differences in the geographical context as well as the choice of outlet. This effort provides in-depth insights into the overall landscape of IS publications and the emerging body of IS-specific knowledge. Prospective authors also benefit from our work because it provides a good overview of our relatively young research domain and its growth and development. With this overview, we hope to provide scholars with sufficient information to identify the best outlet for reporting their research with regard to the thematic fit and, as mentioned by [8] (p. 12) "to prompt individual researchers to reflect on the motivation for their research and justifications for their future research plans". A further implication is that knowledgeable researchers avoid unnecessary review cycles that occur when submitting research work to the wrong outlet [46]. Overall, this study shapes the future understanding and development of the IS research domain.

Author Contributions: Conceptualization, N.G., O.W. and J.P.; methodology, N.G. and J.P.; validation, N.G., O.W. and J.P.; formal analysis, J.P., O.W. and N.G.; investigation, N.G., O.W. and J.P.; data curation, O.W. and J.P.; writing—original draft preparation, N.G., O.W. and J.P.; writing—review and editing, N.G., O.W., J.P. and M.H.B.; visualization, N.G., O.W. and J.P. All authors have read and agreed to the published version of the manuscript.

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Appendix A. IS Research Fields Development Trends—Patterns in Terms of Outlet (Conference and Journal)

As mentioned in Section 4.3 four different trends in theme development revealed from our analysis. These differ in terms of development over time in relation to the number of publications on specific topics in the Bo8 journals and the publications in the ICIS proceedings. These trends can be categorized as follows: (1) similarly increasing, (2) similarly decreasing, (3) similarly consistent, and (4) divergent (see Figures A1–A10).

Trend—Similarly Increasing

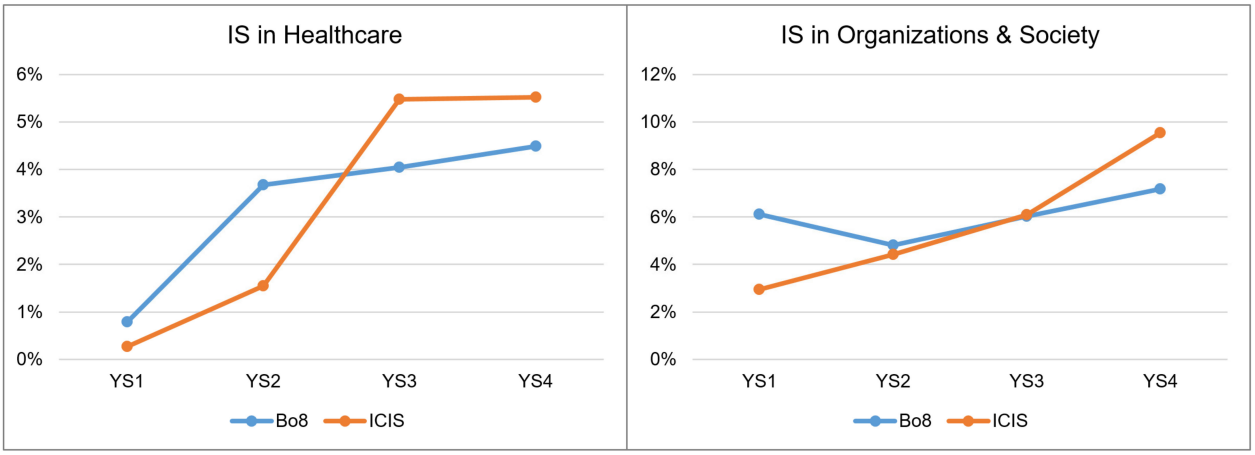

Figure A1. Development of research fields "IS in Healthcare" and "IS in Organizations & Society" in the Bo8 and the ICIS Proceedings.

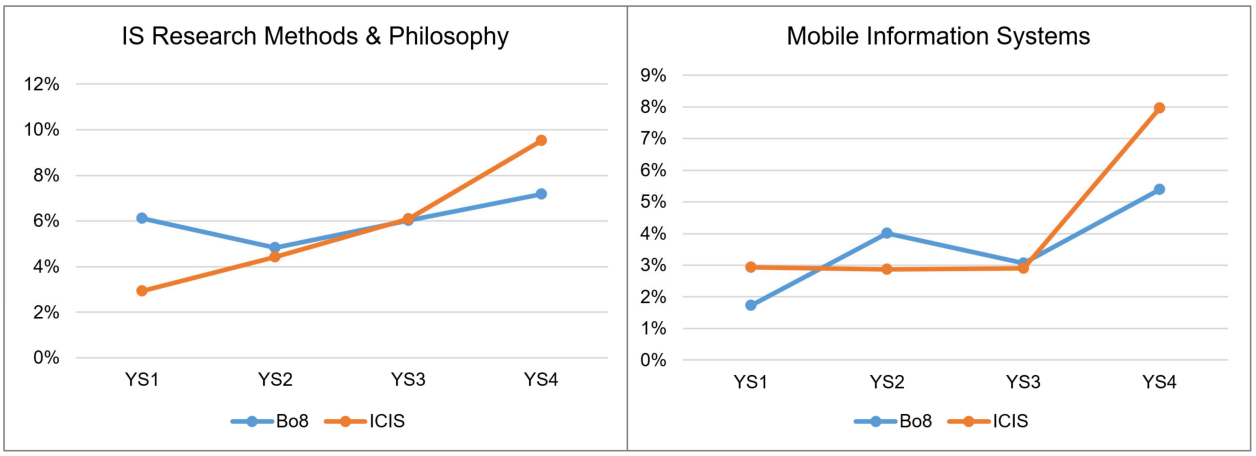

Figure A2. Development of research fields "IS Research Methods & Philosophy" and "Mobile Information Systems" in the Bo8 and the ICIS Proceedings.

Trend—Similarly Decreasing

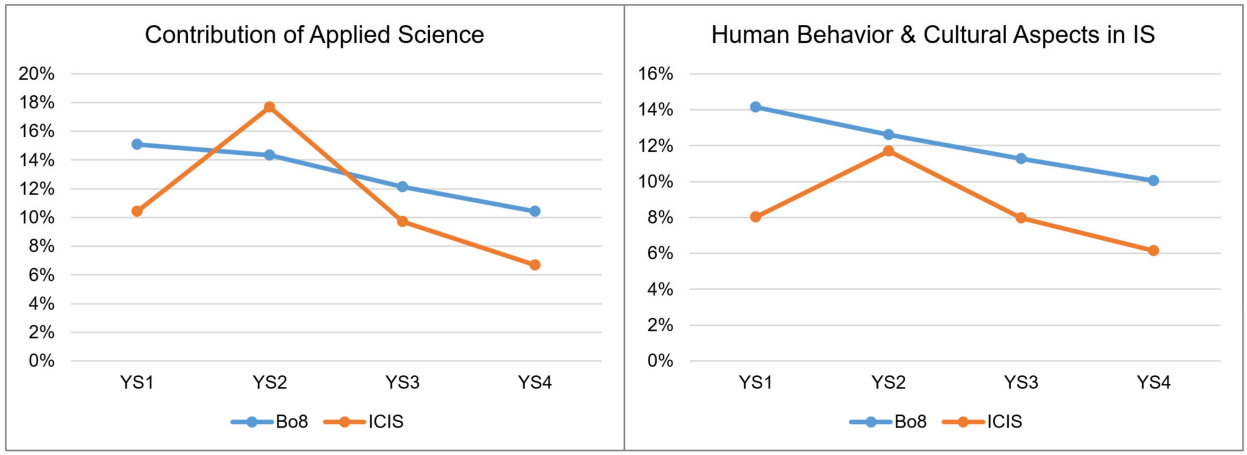

Figure A3. Development of research fields "Contribution of Applied Science" and "Human Behavior & Cultural Aspects in IS" in the Bo8 and the ICIS Proceedings.

Trend—Similarly Consistent

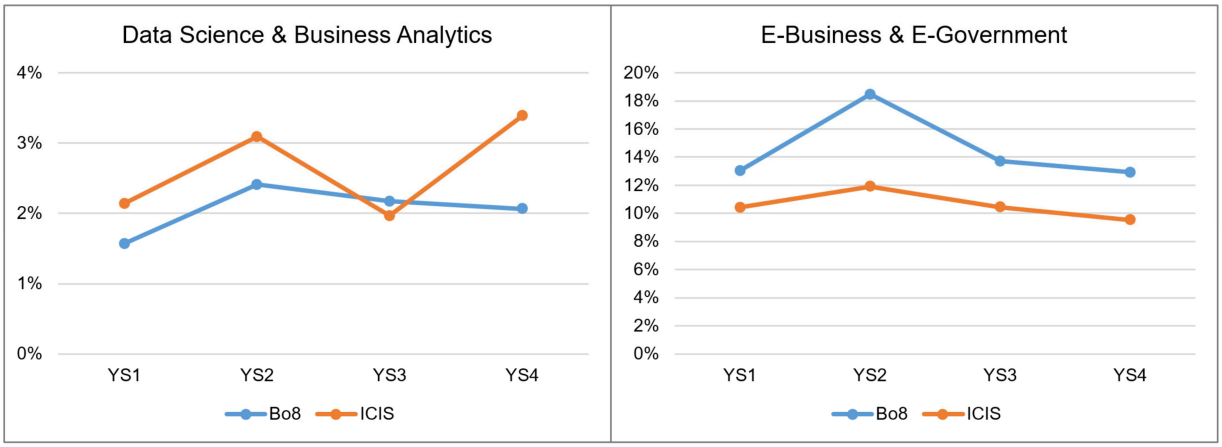

Figure A4. Development of research fields "Data Science & Business Analytics" and "E-Business & E-Government" in the Bo8 and the ICIS Proceedings.

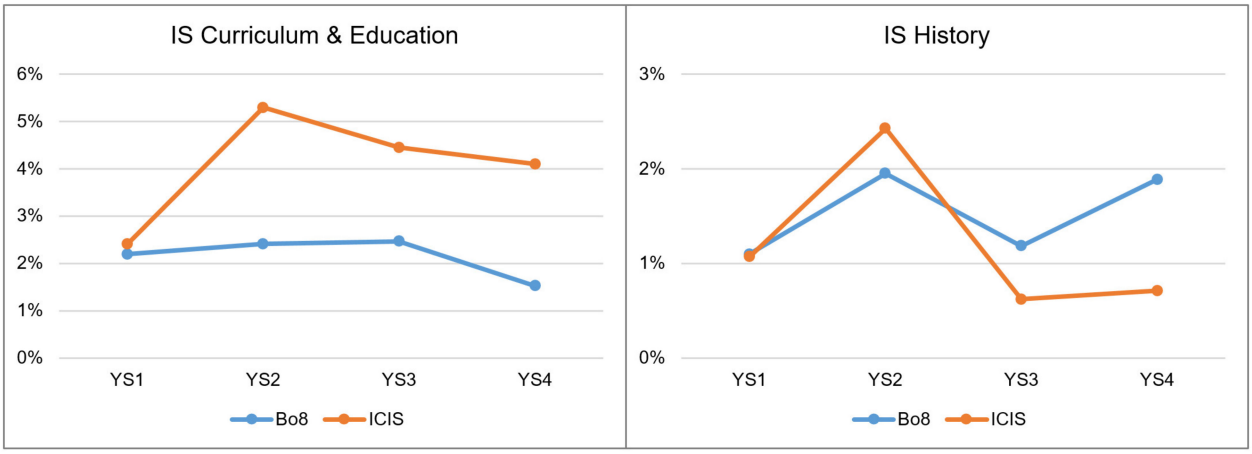

Figure A5. Development of research fields "IS Curriculum & Education" and "IS History" in the Bo8 and the ICIS Proceedings.

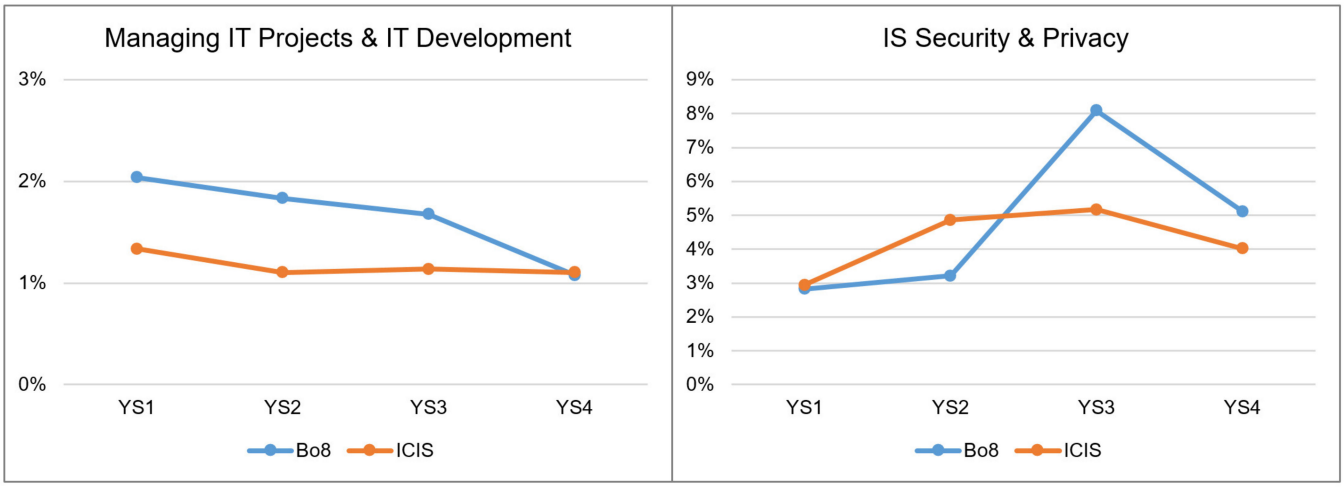

Figure A6. Development of research fields "Managing IT Projects & IT Development" and "IS Security & Privacy" in the Bo8 and the ICIS Proceedings.

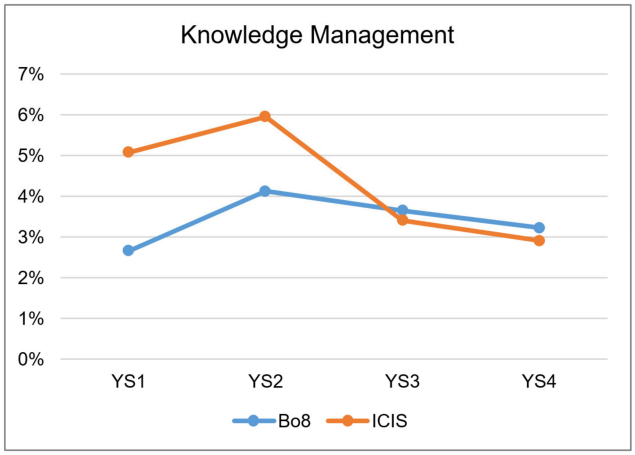

Figure A7. Development of the research field "Knowledge Management" in the Bo8 and the ICIS Proceedings.

Trend—Divergent

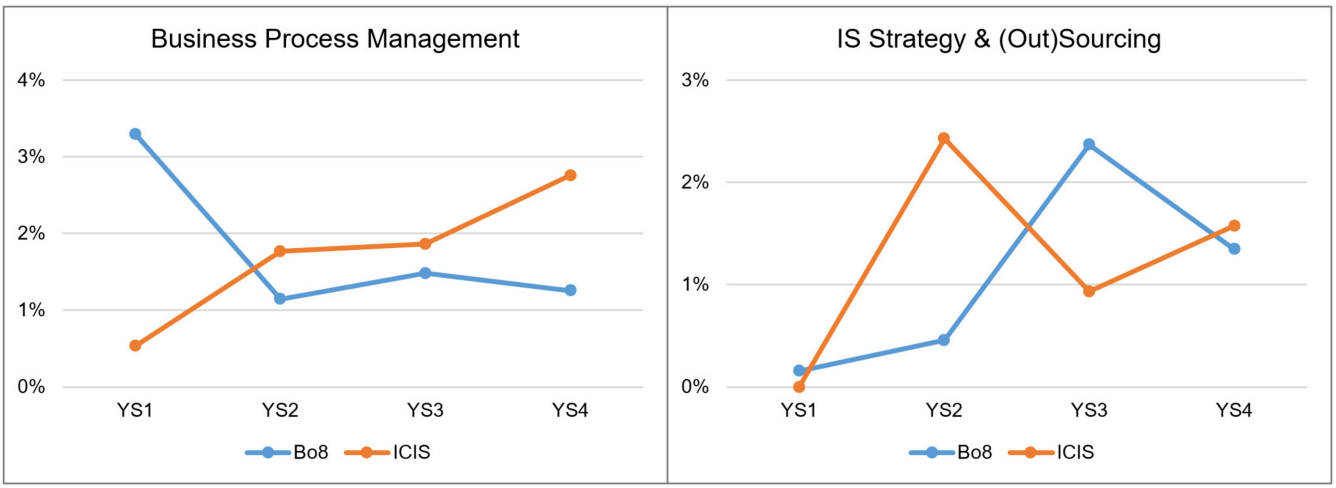

Figure A8. Development of research fields "Business Process Management" and "IS Strategy & (Out) Sourcing" in the Bo8 and the ICIS Proceedings.

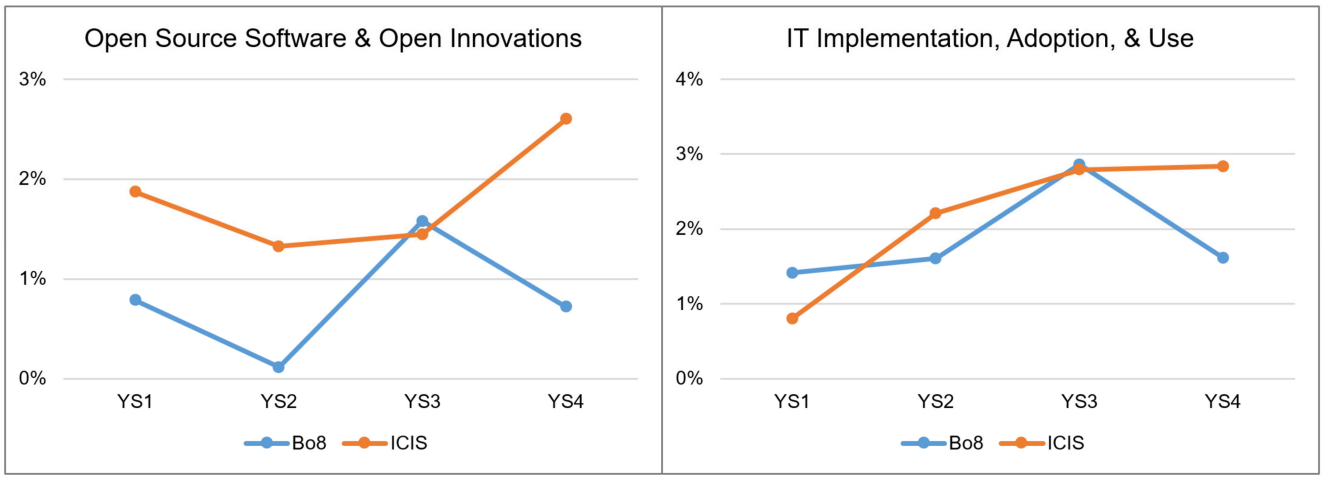

Figure A9. Development of research fields "Open Source Software" and "IT Implementation, Adoption, & Use" in the Bo8 and the ICIS Proceedings.

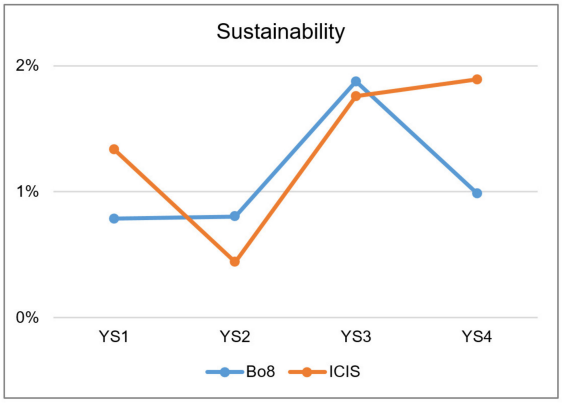

Figure A10. Development of the research field "Sustainability" in the Bo8 and the ICIS Proceedings.

Appendix B. Number of Publications on Individual Topics in the Bo8 Journals

As additional information intended to support the discussion and to clarify the distribution accordingly, in this part of the appendix we have separately depicted the respective number of publications in the individual journals in graphics for each research field. Only those topics were considered where the total number of publications in the Bo8 exceeds 110 publications.

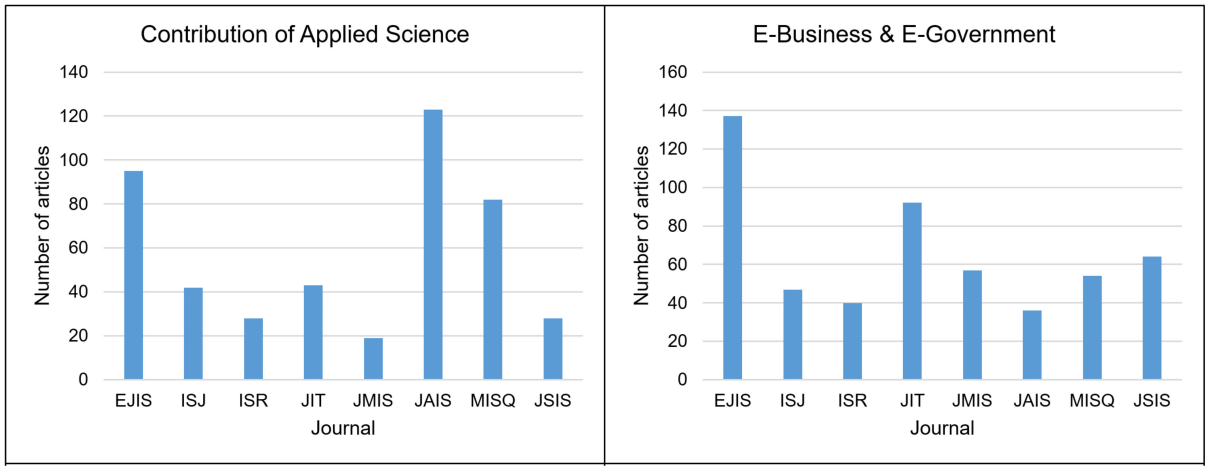

Figure A11. Number of publications in research fields "Contribution of Applied Science" and "E-Business & E-Government" in the respective Bo8 journals.

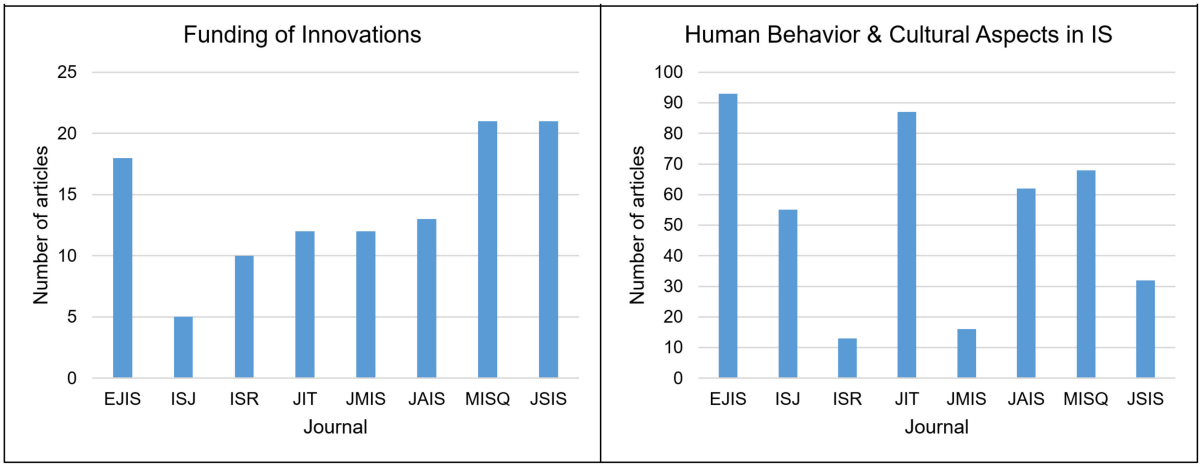

Figure A12. Number of publications in research fields "Funding of Innovations" and "Human Behavior & Cultural Aspects in IS" in the respective Bo8 journals.

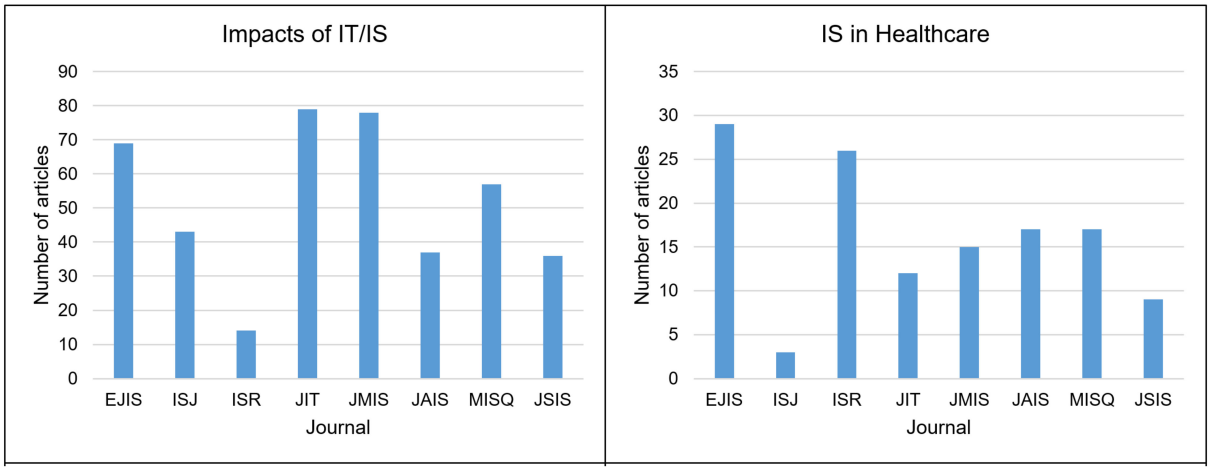

Figure A13. Number of publications in research fields "Impact of IT/IS" and "IS in Healthcare" in the respective Bo8 journals.

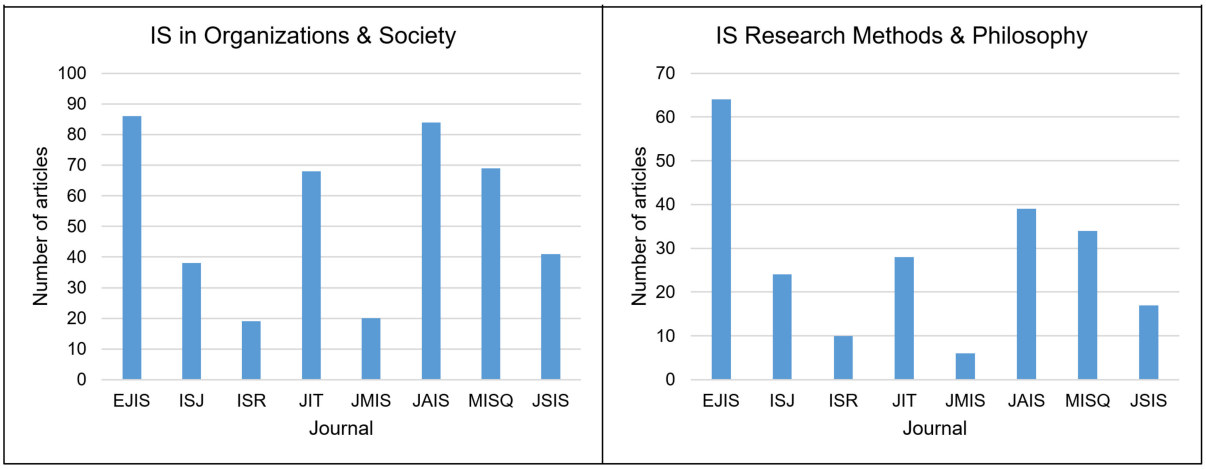

Figure A14. Number of publications in research fields "IS in Organizations & Society" and "IS Research Methods & Philosophy" in the respective Bo8 journals.

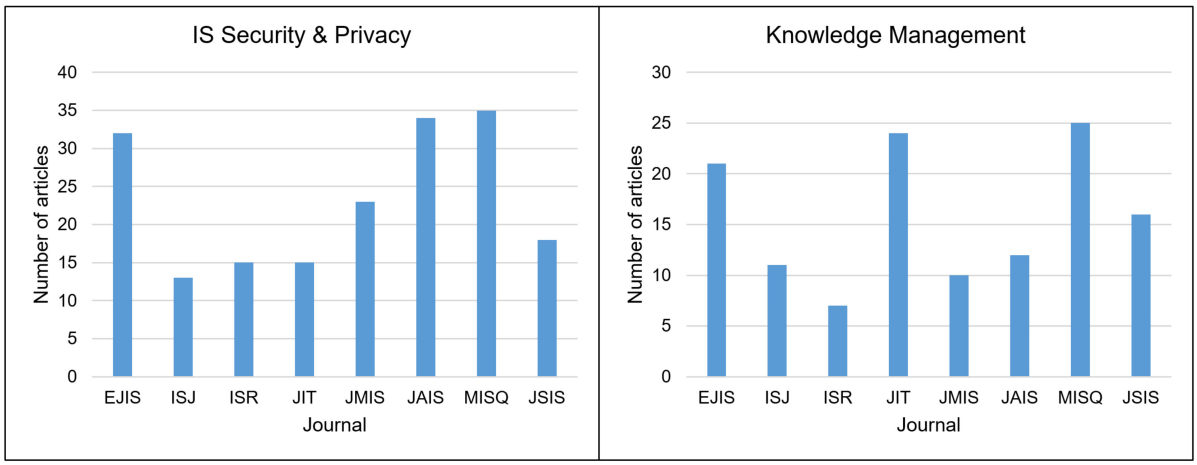

Figure A15. Number of publications in research fields "IS Security & Privacy" and "Knowledge Management" in the respective Bo8 journals.

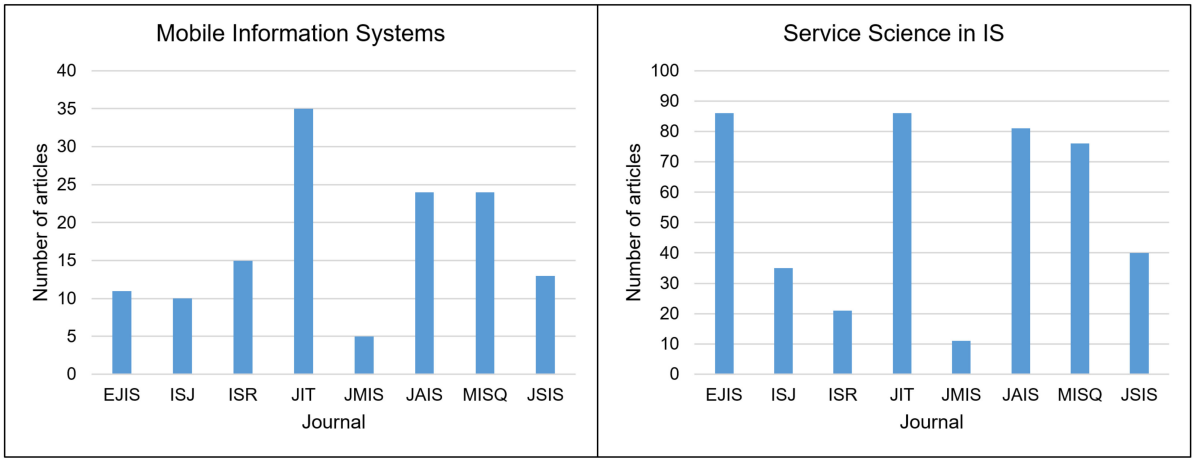

Figure A16. Number of publications in research fields "Mobile Information Systems" and "Service Science in IS" in the respective Bo8 journals.

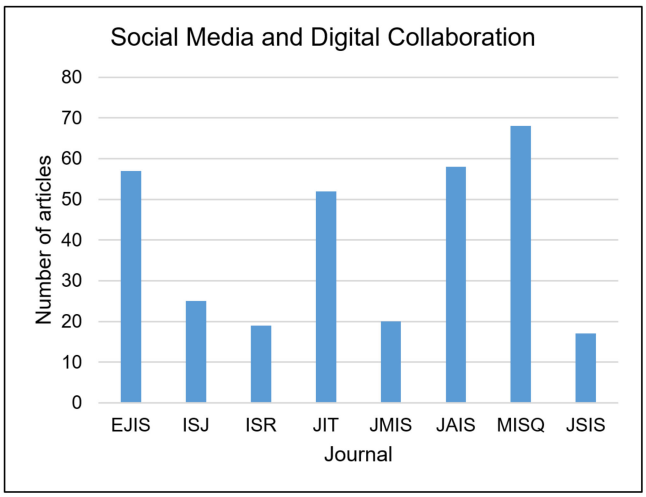

Figure A17. Number of publications in the research field "Social Media & Digital Collaboration" in the respective Bo8 journals.

References

1. AIS. About IS History. 2020. Available online: https://history.aisnet.org/ (accessed on 20 January 2020).
2. Bjørn-Andersen, N.; Clemmensen, T. The Shaping of the Scandinavian Socio-Technical IS Research Tradition. Confession of an accomplice. *Scand. J. Inf. Syst.* **2017**, *1*, 4.
3. Goyal, S.; Ahuja, M.; Guan, J. Information Systems Research themes: A seventeen-year data-driven temporal analysis. *Commun. Assoc. Inf. Syst.* **2018**, *43*, 404–431. [CrossRef]
4. Webster, J.; Watson, R.T. Analyzing the past to prepare for the future: Writing a literature review. *MIS Q.* **2002**, *26*, xiii–xxiii.
5. Buhl, H.U.; Fridgen, G.; König, W.; Röglinger, M.; Wagner, C. Where's the competitive advantage in strategic Information Systems Research? Making the case for boundary-spanning research based on the German business and information systems engineering tradition. *J. Strateg. Inf. Syst.* **2012**, *21*, 172–178. [CrossRef]
6. Galliers, R.D.; Whitley, E.A. *Vive les differences?* Developing a profile of European Information Systems Research as a basis for international comparisons. *Eur. J. Inf. Syst.* **2007**, *16*, 20–35. [CrossRef]
7. Hassan, N.R.; Mathiassen, L. Distilling a body of knowledge for Information Systems development. *Inf. Syst. Res.* **2018**, *28*, 175–226. [CrossRef]
8. Stein, M.-K.; Galliers, R.D.; Whitley, E.A. Twenty years of the European information systems academy at ECIS: Emergent trends and research topics. *Eur. J. Inf. Syst.* **2016**, *25*, 1–15. [CrossRef]
9. AIS. Advanced Search. 2020. Available online: https://aisel.aisnet.org/do/search/advanced/?fq=virtual_ancestor_link:%22https://aisel.aisnet.org%22 (accessed on 20 January 2020).
10. Straub, D. The value of scientometric studies: An introduction to a debate on IS as a reference discipline. *J. Assoc. Inf. Syst.* **2006**, *7*, 241–245. [CrossRef]

11. Palvia, P.; Kakhki, M.D.; Ghoshal, T.; Uppala, V.; Wang, W. Methodological and topic trends in Information Systems research: A meta-analysis of IS journals. *Commun. Assoc. Inf. Syst.* **2015**, *37*, 630–650. [CrossRef]
12. Keen, P.G.W. MIS research: Reference disciplines and a cumulative tradition. In Proceedings of the International Conference on Information Systems, Philadelphia, PA, USA, 8–10 December 1980.
13. Lowry, P.; Romans, D.; Curtis, A. Global journal prestige and supporting disciplines: A scientometric study of Information Systems journals. *J. Assoc. Inf. Syst.* **2004**, *5*, 29–77. [CrossRef]
14. Straub, D.; Anderson, C. Authorship from 2000 through 2009. *MIS Q.* **2010**, *34*, iii–vi.
15. Neufeld, D.; Fang, Y.; Huff, S. The IS identity crisis. *Commun. Assoc. Inf. Syst.* **2007**, *19*, 447–464. [CrossRef]
16. Hirschheim, R.; Klein, H.K. A glorious and not-so-short history of the Information Systems field. *J. Assoc. Inf. Syst.* **2012**, *13*, 188–235. [CrossRef]
17. Sidorova, A.; Evangelopoulos, N.; Valacich, J.S.; Ramakrishan, T. Uncovering the intellectual core of the Information Systems discipline. *MIS Q.* **2008**, *32*, 467–482. [CrossRef]
18. Everard, A.; Pierre, K.S.; Heck, J.L. Contributors to the high-impact IS journals (1977–2014): An aid for setting research standards. *Commun. Assoc. Inf. Syst.* **2017**, *40*, 53–81. [CrossRef]
19. Fleischmann, M.; Miglena, A.; Benlian, A.; Hess, T. Cognitive biases in Information Systems research: A scientometric analysis. In Proceedings of the European Conference on Information Systems, Tel Aviv, Israel, 9–11 June 2014.
20. Wagner, G.; Prester, J.; Schryen, G. Exploring the scientific impact of Information Systems Design Science Research: A scientometric study. In Proceedings of the International Conference on Information Systems, Seoul, Republic of Korea, 10–13 December 2017.
21. Schryen, G.; Wagner, G.; Benlian, A. Theory of knowledge for literature reviews: An epistemological model, taxonomy and empirical analysis of IS literature. In Proceedings of the International Conference on Information Systems, Fort Worth, TX, USA, 13–16 December 2015.
22. Vessey, I.; Ramesh, V.; Glass, R. Research in Information Systems: An empirical study of diversity in the discipline and its journals. *J. Manag. Inf. Syst.* **2002**, *19*, 129–174. [CrossRef]
23. Choi, J.; Yi, S.; Lee, K.C. Analysis of keyword networks in MIS research and implications for predicting knowledge evolution. *Inf. Manag.* **2011**, *48*, 371–381. [CrossRef]
24. Hassan, N.R. Value of IS research: Is there a crisis? *Commun. Assoc. Inf. Syst.* **2014**, *34*, 801–816. [CrossRef]
25. Chen, W.; Hirschheim, R. A paradigmatic and methodological examination of Information Systems Research from 1991 to 2001. *Inf. Syst. J.* **2004**, *14*, 197–235. [CrossRef]
26. Loebbecke, C.; Leidner, D. The contribution of top IS publications to subsequent research: A citation analysis. *Commun. Assoc. Inf. Syst.* **2012**, *30*, 423–438. [CrossRef]
27. Te'eni, D. Journals and conferences in discourse. *Eur. J. Inf. Syst.* **2013**, *22*, 589–591. [CrossRef]
28. Te'eni, D.; Rowe, F.; Ågerfalk, P.J.; Lee, J.S. Publishing and getting published in EJIS: Marshaling contributions for a diversity of genres. *Eur. J. Inf. Syst.* **2015**, *24*, 559–568. [CrossRef]
29. Lowry, P.B.; Karuga, G.G.; Richardson, V.J. Assessing leading institutions, faculty, and articles in premier Information Systems research journals. *Commun. Assoc. Inf. Syst.* **2007**, *20*, 142–203. [CrossRef]
30. Suomi, R. On the nationality balance of authors and references in selected MIS journals. *Inf. Manag.* **1993**, *24*, 339–347. [CrossRef]
31. Galliers, R.D.; Meadows, M. A discipline divided: Globalization and parochialism in Information Systems Research. *Commun. Assoc. Inf. Syst.* **2003**, *11*, 108–117. [CrossRef]
32. Pouloudi, N.; Poulymenakou, A.; Pramatari, K. A profile of information systems research in the Mediterranean region. *Eur. J. Inf. Syst.* **2012**, *21*, 345–357. [CrossRef]
33. Avison, D.; Dwivedi, Y.K.; Fitzgerald, G.; Powell, P. The beginnings of a new era: Time to reflect on 17 years of the ISJ. *Inf. Syst. J.* **2008**, *18*, 5–21. [CrossRef]
34. Avison, D.; Fitzgerald, G. Reflections and opinions on 25 years with the ISJ. *Inf. Syst. J.* **2012**, *22*, 179–193. [CrossRef]
35. Whitley, E.A.; Galliers, R.D. An alternative perspective on citation classics: Evidence from the first 10 years of the European Conference on Information Systems. *Inf. Manag.* **2007**, *44*, 441–455. [CrossRef]
36. Barki, H.; Rivard, S.; Talbot, J. A keyword classification scheme for IS research literature: An update. *MIS Q.* **1993**, *17*, 209–226. [CrossRef]
37. Chen, J.; Konstan, J.A. Conference paper selectivity and impact. *Commun. ACM* **2010**, *53*, 79–83. [CrossRef]
38. Koukal, A.; Gleue, C.; Breitner, M.H. Enhancing literature review methods—Evaluation of Literature Search Approach based on Latent Semantic Indexing. In Proceedings of the International Conference on Information Systems, Auckland, New Zealand, 14–17 December 2014.
39. Bandara, W.; Furtmueller, E.; Gorbacheva, E.; Miskon, S.; Beekhuyzen, J. Achieving rigor in literature reviews: Insights from qualitative data analysis and tool-support. *Commun. Assoc. Inf. Syst.* **2015**, *37*, 154–204. [CrossRef]
40. Tian, M. Turning a technology into many solutions: A case study of embedding an information system. *J. Bus. Res.* **2019**, *101*, 23–39. [CrossRef]
41. Dumais, S.T. Improving the retrieval of information from external sources. *Behav. Res. Methods Instrum. Comput.* **1991**, *23*, 229–236. [CrossRef]
42. Foltz, P. Using Latent Semantic Indexing for information filtering. In Proceedings of the ACM SIGOIS and IEEE CS TC-OA Conference on Office Information Systems, Cambridge, MA, USA, 25–27 April 1990.

43. Salton, G.; Wong, A.; Yang, C.-S. A vector space model for automatic indexing. *Commun. Assoc. Inf. Syst.* **1975**, *18*, 613–620. [CrossRef]
44. Deerwester, S.; Dumais, S.T.; Furnas, G.W.; Landauer, T.K.; Harshman, R. Indexing by Latent Semantic Analysis. *J. Am. Soc. Inf. Sci.* **1990**, *41*, 391–407. [CrossRef]
45. Merali, Y.; Papadopoulos, T.; Nadkarni, T. Information systems strategy: Past, present, future? *J. Strateg. Inf. Syst.* **2012**, *21*, 125–153. [CrossRef]
46. Dwivedi, Y.K.; Kuljis, J. Profile of IS research published in the European Journal of Information Systems. *Eur. J. Inf. Syst.* **2008**, *17*, 678–693. [CrossRef]
47. Walstrom, K.A.; Leonard, L. Citation classics from the information systems literature. *Inf. Manag.* **2000**, *38*, 59–72. [CrossRef]
48. Lowry, P.B.; Moody, G.D.; Gaskin, J. Evaluating journal quality and the Association for Information Systems (AIS) Senior Scholars' Journal Basket via bibliometric measures: Do expert journal assessments add value? *MIS Q.* **2013**, *37*, 993–1012. [CrossRef]
49. Mustafee, N. Evolution of IS research based on literature published in two leading is journals—EJIS and MISQ. In Proceedings of the European Conference on Information Systems, Helsinki, Finland, 9–11 June 2011.
50. Palvia, P. A profile of Information Systems research published in Information & Management. *Inf. Manag.* **2007**, *44*, 1–11.
51. Boudreau, M.C.; Gefen, D.; Straub, D.W. Validation in information systems research: A state-of-the-art assessment. *MIS Q.* **2001**, *25*, 1–16. [CrossRef]