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Information Systems and Business & Information Systems Engineering: Status Quo and Outlook

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Information Systems and Business & Information Systems Engineering: Status Quo and Outlook[i]

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Abstract. Although both communities share a common object of research, the Business and Information Systems Engineering (BISE) community from the German-speaking countries and the Information Systems (IS) community centered in North America have developed quite differently. The BISE community features promote connections with industry, attractive topics to students and practical relevance of publications. But due to various reasons numerous BISE researchers struggle with publications in top-ranked journals. While this weakness obviously is a strength of the IS community, we observe that the IS community struggles with its industry connections and enrollment numbers. What the global IS/BISE community needs is a more intense discourse that increases mutual understanding, creates awareness for the need for complementation, and ensures that the opportunity for complementation is seized. This paper offers insights on how by complementation both communities could mitigate some of their weaknesses and the global IS/BISE community could increase its success as a whole.

Keywords: Information Systems, Business and Information Systems Engineering, BISE, Critical Reflection, Scenario Analysis

1 The Need and Opportunity for Complementation

This is a story about complementation. Although it may seem contradictory, the foremost task of one advocating complementation is segmentation. It seems even more contradictory if one considers that in general segmentation is unable to capture a complex spectrum of shades of grey – particularly if phenomena such as scientific communities are concerned. The reason, however, is simple: Without segmentation, differences remain opaque and rationales for complementation cannot be justified.

For increased contour of argument and with admitted oversimplification, we focus on the community from the German-speaking countries, i.e., Germany, Austria, and Switzerland, and the community from North America. We choose these communities because they have developed rather independently for a long time and prototypically epitomize different characteristics [1, 2]. These characteristics include sources of funding, teaching, predominating research paradigm, doctoral and post-doctoral qualification, and interplay with other disciplines. In our opinion, focusing on the

communities from the German-speaking countries and North America is not too reductionist. On the one hand, some researchers pointed to similarities between the community from the German-speaking countries and other communities from Europe and Australasia [1, 3, 4]. On the other hand, the characteristics predominating in North America have been adopted by the vast majority of communities worldwide. A geographic segmentation seems appropriate because we are interested in the communities in their entirety and because any other set of segmentation criteria will result in oversimplification as well. Indeed, neither community is perfectly homogeneous. Some researchers from each community may feel closer to the other community regarding their individual approach and environment. The comparison of two large communities with a long tradition of high quality research allows us to determine notes for guidance to countries which only recently started out to participate in the international science scene.

Throughout this paper, we refer to the community from the German-speaking countries as BISE community. This is because the journal *Business & Information Systems Engineering (BISE)/WIRTSCHAFTSINFORMATIK* has been the community's primary publication outlet during the last fifty years and thus is a mirror of its evolution. As the characteristics predominating in North America have been adopted to a much higher extent than the characteristics of the BISE community, we refer to the North American community as the information systems (IS) community. Whenever we address all researchers dealing with information systems as object of research, we use the notion global IS/BISE community.

Both the IS and the BISE communities more and more think outside of the box and consider that a broad discussion on the opportunity for a better cooperation between both communities is advantageous. Among other things this is evidenced by the recent publication of the discussion [5] on the history of the journal BISE deriving some recommendations for both the IS and BISE communities. Also, an article [6] on learnings for the strategic information systems community from the experience of the BISE community is going to be published, with a main focus on the relationship to the industry. Apart from this intensifying exchange between the IS and BISE communities, there are an increasing number of authors who look beyond their home communities' noses [some examples are 1, 2, 7, 8, 9].

If both communities are willing to learn from each other, it will be possible to reduce the weaknesses of each individual community and to achieve a win-win setting for the global IS/BISE community. For new players on the market, like some of the Eastern European countries, the goal should be to adopt the rigor from the IS community and the relevance from the BISE community.

This article starts out with a short reflection of the status quo of the BISE community and compares the IS and BISE communities, the academic careers, the relation to industry, and to students (section 2). Based on the insight that the BISE and the IS community have the opportunity to make use of their complementary strengths, we discuss what might happen depending on whether this opportunity is seized or not (section 3). The paper concludes with recommendations from a BISE perspective that may serve as cornerstones for the transformation towards complementation (section 4).

2 A comparison of the BISE and IS Communities

At the beginning of this chapter we start out with a short status quo of the journal *Business & Information Systems Engineering (BISE)/WIRTSCHAFTSINFORMATIK*. After that, the chapter provides a comparison of the BISE community consisting of the German-speaking countries, and the IS community centered in North America that has a strong international dissemination.

Driven by the "Wirtschaftswunder" (economic miracle) and the increasing opportunity for industry to adopt electronic computers, the BISE journal's progenitor Elektronische Datenverarbeitung (Electronic Data Processing) was founded in 1959 by Hans Konrad Schuff, the executive manager of the first European software house mbp. Already at this time, the editorial board included editors from academia and industry [10]. After an eventful history the *WIRTSCHAFTSINFORMATIK* (the journal was renamed in the meantime) went through some challenging times before its 50th anniversary due to decreasing submissions and a dwindling subscriber base caused by higher scientific standards that had been established which made papers cumbersome to read for practitioners. Therefore, on the occasion of its 50th anniversary, WIRTSCHAFTSINFORMATIK implemented a strategic realignment and is henceforth complemented by the English-language e-journal *Business & Information Systems Engineering (BISE)*. The editorial board was extended by experts from the IS community who form bridges between both communities. Departments were established and staffed with editor teams from both communities. Editors from industry were kept as well. In addition, there was a consensus that a single journal cannot simultaneously satisfy the needs of international researchers and German-speaking practitioners. Therefore, the Wirtschaftsinformatik & Management (WUM) journal was launched to maintain knowledge exchange with industry – analogous to MIS Quarterly Executive. WUM inherited the practitioner-oriented sections of the scientific journals, developed them further, and provides management summaries of research papers. The connection between industry and academia was further strengthened by the fact that subscribers have access to all online archives no matter which of these journals he or she obtains in print.

The strategic realignment of the journal *BISE/WIRTSCHAFTSINFORMATIK* with its integrative approach - combining some strengths of both the IS and the BISE communities - was quite successful: It was announced as the first AIS Affiliated Journal just prior to *ICIS* 2010. In 2011, *BISE*'s full text downloads mounted up to 300 % compared to 2009 and the impact factor tripled within three years.

After this brief review of the changes in the journal, a comparison between the IS and BISE community follows. As outlined above by using the recent history of the BISE journal as example, the BISE community has been closely linked with industry since its very beginnings. Many of the features that characterize the BISE community today have been determined or at least influenced by its industry connections. On the other hand the IS community has a long history of publishing their scientific research results in top-journals. Mainly adhering to the natural science paradigm, theories are used for explanation and prediction [11, 12]. The link with industry, however, is not especially strong, and the added value for decision makers in companies is often rather low.

Associated community: BISE chairs have their origin mostly from engineering and computer science schools and the self-conception of the BISE chairs follows the tradition of engineering science. Even if BISE chairs are located at business schools, they often receive considerably better staffing and funding as if they were located at a computer science or engineering school. Therefore, they use a design-oriented way to solve business problems and have a high involvement with industry. Peter Mertens [13], one of the BISE community's founders, postulates that researchers prove themselves in a decathlon of objectives. Almost half of these objectives require boundary spanning between academia and industry (e. g., conducting applied research projects, supporting start-ups and spin-offs, placing students as interns, and raising funds from industry). This model is crisis-proof and leaves more freedom to individual researchers as legitimation may be drawn from various sources. There is a reason why BISE researchers have recently earned a reputation as "happy souls" [2].

Numerous BISE professors expand their chairs to "scientific think tanks" of more than 20–30 research assistants that do both fundamental and applied research. In some cases, several professors team up and found research centers. Such think tanks and research centers feature a staff that is diverse enough to conduct (applied) research projects with various foci. They manage to maintain und increase research and project management competences in an environment where most of the staff drops out after 3–5 years due to the end of their doctorates.

According to our perception, many IS researchers are excellent in investigating the transformational power of IT and its impacts on individuals or teams [14]. They disclose general insights and document them as justified theories [15]. Their research is mostly explanation-oriented with the goal of predicting how society or parts of society interact with Information Systems. However, solving the problems of the industry is mostly not the main goal.

Academic careers: The vast majority of doctoral students in the BISE community intentionally seek management careers after finishing their doctorate. Doctoral work therefore emphasizes analytical and project management skills, while training in research methods and writing skills has been secondary for a long time.

In the IS community PhD programs are geared to scientific careers, which is why researchers dispose of profound theoretical knowledge and have a high command of research methods. They are also inducted into a strong publishing and reviewing culture. Accordingly, numerous scholarly IS journals are recognized as standard setters with respect to methodological rigor and scholarly writing.

Relation to the industry: As mentioned before, BISE is strongly connected to industry. Throughout its evolution, the BISE community maintained its focus on solving business problems by means of useful artifacts. The consequences manifest themselves in the community's sources of funding. Most chairs additionally employ an arbitrary number of research assistants funded by grants or applied research projects with industry. Altogether, approximately 44 % of research assistants are funded by industry [1].

In contrast, the IS community has separated from the business problems and applied research projects. The research is dedicated to general insights and to documenting them as justified theories. The result is a "disconnect between the

worlds of business and academia" [16]. The funding of IS chairs has gone down from "90% industry funding to 95% government funding" [17] over the last 20 years.

Students: As for degree programs, companies usually get involved both financially and by means of additional courses (e. g., project seminars, guest lectures, jointly supervised bachelor or master theses) to get acquainted with future graduates at an early stage. Hence, courses deal with topics of practical relevance, include cases from applied research projects, and are enriched by the researchers' practical experience. To sum up, BISE degree programs are highly attractive. In Germany, for instance, annual BISE enrollments doubled from 2000 to 2010 (Federal Statistical Office 2011). Almost all universities from the German-speaking countries offer dedicated BISE degree programs.

On the other hand, in the IS community enrollment numbers are falling and courses are deleted from MBA programs at many universities [18, 19, 20, 21]. The consequence of very theoretical research is also a very theoretical education of students. Therefore, graduates of IS programs are mostly less attractive for industry than comparable graduates of BISE programs.

Current challenges: Opinions on the respective other community are inspired more by anecdotes than by facts. The resulting prejudices can sometimes be read between the lines and are known by hearsay. For instance, "BISE is consulting!", "IS is irrelevance at the highest stage!", "BISE does everything that gets funded by industry!", "IS publishes everything where data is available!", "BISE has never shown results for the money invested in research!", or "IS is no more than behaviorist research!"

From these exaggerate statements the current problems of the two communities can be summed up pointedly: BISE follows research that borders perilously on consulting, is addicted to technological fads, has a sloppy reviewing and quality culture, and lacks a long-term research agenda. Others criticize the substandard output of publications in top-ranked journals. In recent years, industry connection is at risk because universities and funding organizations increasingly impose incentives as well as assessment and tenure criteria that are rather exclusively based on publications in top-ranked journals. Instead the IS community struggles with its identity, legitimation, and industry connection [16, 22, 23, 24, 25, 26, 27].

If everything continues as before, both communities run into major problems. IS uses methodologically rigorous research, but lacks practical relevance. BISE has relevant applied research close to consulting, but lacks rigor. Still, both will claim to be rigorous and relevant.

3 What may lie ahead: possible scenarios

Dinosaurs heading blindly towards extinction or BISE becomes like IS: On the one hand, Lyytinen et al. [9] argue that replicating the U.S. system would lead to more publications in top-ranked journals for BISE researchers. On the other hand, IS scholars discuss that "if European researchers are tempted to move away from their practice-informing activities in a quest for U.S.-style research publications, that does not bode well for the European model of [IS] research" [8]. So what could be the consequence for BISE's currently established system?

The title "doctor in BISE" will lose its hard gained reputation in industry and become less attractive for young academics, due to a necessary cut of the relation to industry and education of project management skills. The cut is required to make sure that the researcher can compete with U.S.-style doctoral programs. U.S.-style doctoral programs focus on a pure research career. Many BISE researchers are not trained in typical IS methods and publishing cultures. They usually have no interfaces to psychology, philosophy, or social science. Thus, building up U.S.-style doctoral programs will almost never directly lead to publication success. Instead, these programs will compete with the BISE typical scientific think tanks for young academics.

Second, if top journal publications keeps becoming the predominant criterion for grants, those grants will be given to few specialized "mile deep/inch wide lonesome cowboys" who exclusively focus on research and supervise only few doctoral students. Ironically, lonesome cowboys love their lonesomeness and apply for grants rather for the kudos than for the money. This renunciation of industry-related research will lead into a drop of BISE's enrollments and private funding. As a result, BISE's scientific think tanks, which are currently successful regarding the societal and economic impact of their research, will be lose the financial and human capital that is the fundament of their success. In a vicious circle, BISE's enrollments and private funding will drop. The system as it used to be will die – so the fear – with 99 % of frustrated losers and 1 % of neurotic winners.

This loss of global diversity will also accelerate IS' expected "downward spiral because of […] increasing narrow-mindedness" [17]. IS will continue to lose enrollments, to be stuck in its identity crisis, and slowly become an endangered species.

Although some IS scholars complain about perpetually "lamenting the state of information systems as a discipline" [25], those tendencies worry many BISE researchers. They wonder: "Why should we let that happen? Why should we take IS as a role model, despite its problems in identity, enrollments, and relevance? BISE is successful as it is except for publications in journals, which no practitioner ever reads anyway. Why should we adopt the IS identity crisis?"

A split of communities or irrelevant vs. ir-rigorous researchers: Each community might split into (even more) *distinct* sub-communities. IS-style scholars in German-speaking countries prefer to collaborate with their North American counterparts and not with their local colleagues. BISE-style researchers in North America prefer to collaborate with computer scientists or engineers who consequently begin to take over

those fields of research. BISE and IS will be regarded as no more than fringe groups of computer science and sociology.

IS will be rigorous research, but lack relevance. BISE will be relevant applied research close to consulting, but lack methodological rigor. Over time, business schools will prefer to tenure IS scholars. Computer science or engineering schools will tenure BISE scholars. The opportunities for academic offspring to become acquainted with the respective other perspective will be rare. Even journals might decide on their affiliation. There will be silence between both communities.

There may even be a break-up of universities. On the one hand, there would be purely publicly funded research universities with high scientific impact, e. g. in theoretical physics, mathematics, social science, or business research. But neither the researchers themselves nor their students would achieve business impact; business schools would even be harmful for management practices [28]. On the other hand, applied universities with a high portion of private funding would have strong engineering schools with high relevance, but no chance for public grants following international criteria. If at all, they could get grants from the ministries responsible for economics or technology.

Surely, any individual scholar could be happy within one of these scenarios as each kind of research – be it IS or BISE, rigorous or relevant, behavioral or design-oriented – would be allowed. The question is: What would be the long-term impact on the IS/BISE community, and even more importantly, on business and society? Science and industry becoming more and more independent obviously bears the risk of losing touch. Theory would develop models far from reality and business would substitute gut feelings for methodologically well-founded decisions. Neither model would be appealing for young academics who seek rigor *and* relevance as well as jobs at the intersection between business and research. Except for very few talents, IS and BISE would cease to exist. Maybe the last dinosaurs lived a happy life, too.

Before getting to our favored scenario, we have a quick look at two (not really serious) scenarios with a low probability.

IS becomes BISE: Even if recent articles like Lee [12] or Gill and Bhattacherjee [8] are weak signals that IS scholars are becoming more and more aware that Europe offers different approaches that could be fruitful for the relevance of their research, this is not really a serious scenario.

BISE and IS switch roles: Having said that, if the "Americanization" of the European research landscape continues, there is a small, but positive probability for the opposite scenario, that BISE and IS simply "switch roles". Thus we would probably have the same discussion the other way around in some dozen years.

Towards IS and BISE as complements: In our opinion, only one scenario yields strong contributions to theory, business, and society: IS and BISE complement each other and make use of their strengths to cope with respective weaknesses and threats. BISE researchers strive for "giant leaps" to boldly answer relevant research questions no man has asked before. In contrast, typical IS journals value "incremental articles

[that] focus on a single question based on an assumption ground that has been established elsewhere" [9].

Both approaches are required, however, both must be complementary and not mutually exclusive. After a revolutionary discovery, it must be possible to perform further developments evolutionarily. When you compare the characteristics of the IS and BISE communities, it becomes evident that more practical orientation in IS research and more theoretical foundation in BISE research, would be a useful complement. For this purpose, it is necessary to raise the relevance of the issues in the IS and get a better methodological basis in students education in BISE. A respectful cooperation is essential for a close collaboration between the two ways of our discipline. Only then is it possible to share knowledge, complement strengths, and compensate weaknesses and threats. The priority objective is an integrated approach of the global IS/BISE community.

Henning Kagermann, former CEO of SAP, who actually holds a professorship in theoretical physics, draws an interesting parallel to the research culture in his original discipline [29]: Physics integrates mathematical modeling, experiments and empirical tests. In design science, there is an integration of methodologies, too. But there is one crucial difference: Typical definitions of design science require design and evaluation to be done by the *same* researchers and to be published jointly in *each* design-oriented paper. Theoretical physicists are not good experimental physicists and vice versa. Nevertheless, both respect one another and there exist a lot of research groups in physics where theoretical and experimental physicists team up to complement each other.

If all representatives of the IS and BISE community respect one another and neither would seriously doubt the others' strengths and mission, they could share enough knowledge to communicate their problems at hand. Complementarity between the IS and BISE communities, or in other words division of labor with defined interfaces, is necessary for contributing to theory, business, and society. Wouldn't that be an interesting perspective for the entire IS/BISE community?

4 Recommendations

The goal should be an integrative approach. It must make use of the respective IS and BISE strengths and the weaknesses must be compensated. An exchange of both communities is essential. From this, other communities could learn as well and use the experience of such two large communities for their benefit. The crucial point is not to repeat mistakes, but instead to prevent already-known weaknesses of the IS and BISE scientific system and to adapt the strengths of the whole IS/BISE community.

This way, developing scientific communities in emerging countries will reduce the distance to the leading nations significantly faster and increase the probability to become a major player in the global science market.

From our perspective, both communities have to strive for a *common* vision over the next years and decades. Three things are certain: First, there has to be an even more intensive discourse within and between both communities. Second, multiple stakeholders will have to act or be forced to act. Third, deliberate adaptation will be

necessary to avoid losing parts of the communities. Accomplishing this is not going to be a walk in the park, but will pay off in the long run!

Summarizing, comparing the BISE community's strengths and weaknesses due to its industry relations in funding, teaching, and research with the perceived strengths and weaknesses of the IS community, we conclude that the BISE community can offer experience in areas where the IS community seems to have problems and vice versa. Thus, both communities have the opportunity to complement each other.

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