Development and Status of the Information Systems / Wirtschaftsinformatik Discipline

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ICB-RESEARCH REPORT

An Interpretive Evaluation of Interviews with Renowned Researchers: Part I – Research Objectives and Method

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Abstract

As part of a research project funded by the German Research Foundation (DFG) a series of expert interviews was performed with renowned researchers in the fields of Information Systems (IS) and *Wirtschaftsinformatik* – the corresponding IS field in German speaking countries. The interviewees selected have been in the field from its beginning and have not only observed the field's development but have shaped it, for example, through the initiation of conferences and associations, curriculum efforts and by establishing new IS departments. The study's objective is to reconstruct the development and status of the discipline by taking advantage of the diverse perspectives and experiences of the researchers. This report presents in detail the research approach of the interview study, including the selection of interview partners, the interpretation process, and the topical areas of interview schedule.

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Abbreviations

AACSB	Association to Advance Collegiate Schools of Business
AITP	Association of Information Technology Professionals
AIS	Association for Information Systems
CISR	Center for Information Systems Research
DPMA	Data Processing Management Association
GI	German Informatics Society (*Gesellschaft für Informatik*)
MIT	Massachusetts Institute of Technology
SIM	Society for Information Management
WI	*Wirtschaftsinformatik*
WITS	Workshop on Information Technology and Systems
WKWI	*Wissenschaftliche Kommission Wirtschaftsinformatik*

1 Introduction

Information and communication technology (IT) and information systems have been applied in industry already in the 1960s. Since then IT and IS have become more advanced, more complex, and more interwoven with business processes and strategies. The academic field of (Management) Information Systems (IS) started to be established in the 1970s dedicated to the "systematic investigation of the development, operation, use and / or impact of an information (sub)system in an organizational environment." ([IHD80], p. 910). Although there have been debates and ambiguous empirical results concerning the actual contribution of applying IT and information systems in business to an increase in productivity (known as productivity paradox [Bryn93], [BrHi98]), its important role for advancing production processes, increasing efficiency and opening new markets is broadly accepted.

Despite the general acknowledgement of the importance of information systems for enterprises, IS – the discipline dedicated to investigating phenomenon related to the usage of IS in enterprises – went through a series of identity crises (cf. [KiLy04]). In the early days of IS, several strong statements were made questioning the existence of IS as an academic discipline. Keen, for example, stated that it is "a self-defined community, not a 'field' or 'discipline'. There is nothing that is unique to ISR [i.e. IS research], in terms of topics, theory or methodology, and there are many researchers who study the same topics as the ISR community and in the same way but do not declare themselves as members of it" ([Keen91], p. 27). Since then the discussion of the identity or legitimacy of IS as a field of research has been lead in various ways: with respect to relationships to practice (e.g. various articles MIS Quarterly, Vol. 23, No. 1, 1999), appropriate research methods (e.g. [Lee99], [ApKi99]), a common body of knowledge [HiKl03], common goals and objects of research [BeZm03], and a strong theoretic core [LyKi04].

We took this apparent misfit of, on the one hand, the fast development and rising importance of IS/IT for enterprises and, on the other hand, a discipline of IS with – apparently – ongoing identification and legitimacy problems, as an opportunity for an in-depth empirical study of the discipline's development and status. Being part of the German speaking research community of IS (*Wirtschaftsinformatik*) we intend to complement the perspectives by comparatively investigating the US-American IS discipline[1] and the German counterpart *Wirtschaftsinformatik* (WI). The corresponding research project is funded by the German Research Foundation (*Deutsche Forschungsgemeinschaft*, DFG). It includes an analysis of introductory textbooks [FrLa04] and an extensive publication analysis, which is still in progress [Lang05a]; interviews with renowned researchers of both disciplines are another major part of this project. In this report, the corresponding research approach for the interview study is presented, including the research method, criteria for evaluation, information on interview partners and the interview schedule. The results of the interview interpretation will be presented in consecutive research reports, [Lang05b] contains the results of the interviews with North-American IS researchers and [Lang06a] describes the respective interview results with researchers from the *Wirtschaftsinformatik* community. A future publication will present a comparative evaluation of the interview series with particular emphasis on the similarities and differences between the North-American IS field and *Wirtschaftsinformatik*.

The study objectives and the research method applied are discussed in the following section (section 2). Subsequently, we give an overview of related empirical studies in order to point out the unique nature of our research (section 3). We present the interview schedule and give an overview

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[1] We restricted our focus on the IS discipline in the US and Canada, because prominent discussions have stemmed from North-American researchers and the size of the North-American IS discipline and its influence in highly rated journals and other publication outlets, which are already used to set standards for German research as well.

of the topical areas covered in section 4. The Appendix provides additional information, including the interview schedule, information on the interviewees, and a chronology of model curricula in IS.

2 Objectives and Research Method

Science in general and a field of research or discipline in particular, can be viewed as a social construction, which is created on the basis of the subjective experiences, preferences, and perspectives of its members. Our research method is aimed at capturing this subjective perspective assuming that it is important for understanding the evolution of the discipline as a whole. We strive to achieve objectivity (or trans-subjectivity), however, through a comparative study of multiple perceptions of the discipline, i.e. a survey of multiple IS researchers.

In order to develop this reconstruction we follow a partly explorative and partly hypotheses based research method. We chose an interpretive, hermeneutic approach to create a rich reconstruction of the discipline's development. This aspect is represented in the open ended questions in the interview schedule. Additionally, we developed hypotheses based on an extensive literature review as well as our[1] own experiences as researchers. They are represented through more specific questions in the interview schedule and can be evaluated with direct reference to the interview answers given.

The following subsections describe the research objective and approach, including information on the type of interviews and interpretation method. Additionally, we discuss criteria for evaluating the chosen research approach and introduce the structure to present the study results.

2.1 Research objective

The objective of this study is to reconstruct the development of the discipline in terms of its research methods and research objectives, institutional integration and relationship to other disciplines, as well as its relationships to industry practice. On the one hand we aim at investigating the *current status* including dominant research methods and cooperation with practice. On the other hand we deliberately look at the beginning of the field and at *changes over time*, for example w.r.t the acceptance by other disciplines and the support of public funding associations. Furthermore, we aim at drawing a picture of possible future perspectives of the discipline.

2.2 Research method

Type of interview
In order to gain access to the required information we decided to perform expert interviews with respected representatives of the IS discipline. The interview was designed in a partly standardized format, structured by topic areas, with relatively open introductory questions and additional more focused questions to test hypotheses.

Developing the interview schedule
The interview questions were developed based on a literature review, including literature on characteristics of a field of research as viewed from philosophy of science and publications on previous discussions on characteristics and challenges of the field. Parts of the interview schedule are based

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[1] That is, the experience of the three researchers mainly involved in the research project: Ulrich Frank, Rolf T. Wigand and the author of this text (Carola Lange).

on our own experiences in the field. We will motivate and develop the research questions when discussing the respective topical areas.

Sampling of IS researchers

Several criteria were applied to select the IS researchers (see also below 'evaluation criteria'); to achieve the objective of reconstructing the development of the discipline one criterion was for the researcher to have been in the field from its beginning and a certain level of engagement in the field. Another pragmatic criterion was access to the researchers and his/her willingness to participate. Of the nine interview partners selected from the North-American IS discipline all agreed to participate. Eight of the interviews conducted could be interpreted[1]. In the WI discipline seven researchers were asked to participate, of these six could be interviewed. Table 1 and Table 2 give an overview of the interviewees' educational background and current affiliation. All but three have been in the field for more than 30 years.

Interviewee (Source)	Educational background	Current employment
Gordon B. Davis http://misrc.umn.edu/faculty/	Ph.D. in business administration from Stanford University, 1959	Professor of Management Information Systems, Carlson School of Management, University of Minnesota
Paul Gray http://www.cgu.edu/pages/2237.asp	Ph.D. in Operations Research from Stanford University, 1969	Professor Emeritus and Founding Chair of Information Science at Claremont Graduate University. (retired in May 2001)
Rudy Hirschheim http://projects.bus.lsu.edu/faculty/rudy	Ph.D is in Information Systems from the University of London, 1985	Professor of Information Systems at the Information Systems and Decision Sciences Department of the E. J. Ourso College of Business Administration at Louisiana State University
William R. King http://www.katz.pitt.edu/fac_pages/King.htm	PhD in Operations Research, Case Institute of Technology (now Case Western Reserve University), 1964	University Professor of Business Administration at the Joseph M. Katz Graduate School of Business, University of Pittsburgh
M. Lynne Markus http://web.bentley.edu/empl/m/lmarkus/	PhD in Organizational Behavior from Case Western Reserve University, 1979	John W. Poduska, Sr. Professor of Information Management at Bentley
Richard O. Mason http://faculty.smu.edu/rmason/Mresume.html	Ph.D. in business administration from the University of California, Berkeley, 1968.	Professor of Management Information Sciences at the Edwin L. Cox School of Business at Southern Methodist University.
John F. Rockart http://web.mit.edu/afs/athena.mit.edu/org/c/cisr/www/html/rockart.html	Ph.D., Massachusetts Institute of Technology, Sloan School of Management 1968	Senior Lecturer of Information Technology, Emeritus at MIT Sloan School of Management
Robert W. Zmud http://faculty-staff.ou.edu/Z/Robert.W.Zmud-1/	Ph.D. from College of Business and Public Administration, University of Arizona (major: management, minor: quantitative methods; computer science) , 1974	Professor and Chair in MIS at the Michael F. Price College of Business, University of Oklahoma

Table 1: Educational background and affiliation of interviewed IS researchers.

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[1] One transcript was not returned for approval due to time constraints of the interviewee.

Interviewee (Source)	Educational background	Current employment
Hans R. Hansen http://wi.wu-wien.ac.at/~hansen/	Doctorate in Business Administration from Würzburg University, Germany, 1970	Professor of Business Administration and Information Systems, Institute of Information Processing and Information Management, Vienna University of Economics and Business Administration (German: Lehrstuhl für BWL und Wirtschaftsinformatik)
Heidi Heilmann http://www.bwi.uni-stuttgart.de/index.php?id=1644&L=1	Doctorate in Social Science and Economics (Dr.rer.soc.oec) from Linz University, Austria, 1982	Professor Emeritus of Information Systems, Head of the Department for Information Systems, Institute of Business Administration, Stuttgart University, since March 2000
Lutz Heinrich http://www.winie.uni-linz.ac.at/	Studies on Industrial Engineering (Wirtschaftsingenieurwesen), Doctorate (Dr. rer. pol), Universität (TH) Karlsruhe, Germany, 1963 Habilitation in Business Administration, Universität (TH) Karlsruhe, Germany, 1968	Professor Emeritus of Information Engineering, Institute for Information Systems, Faculty of Social Sciences and Economics, Johannes Keppler Universität Linz (emeritus since July 2004)
Helmut Krcmar http://www.winfobase.de/	Doctorate in Business Administration, Saarbrücken University, Germany, 1983	Professor of Information Systems, Department of Informatics, Technische Universität München (German: Lehrstuhl für Wirtschaftsinformatik)
Karl Kurbel http://www.vg-u.de/euv-new-site/team_prof.asp	Doctorate in Business Administration, Mannheim University, Germany, 1977 Habilitation in Applied Computer Science, Berlin University, 1982	Chair of Business Informatics, European University Viadrina, Frankfurt (Oder)
Peter Mertens http://www.wi1.uni-erlangen.de/whoiswho/mertens.php	Doctorate in Industrial Engineering (Wirtschaftsingenieurwesen), Technische Hochschule Darmstadt, Germany Habilitation in Business Informatics, München University (TH), 1966	Professor of Information Systems, Department for Business Administration, University Erlangen-Nürnberg (Professor Emeritus since September 2005) (German: Lehrstuhl für Betriebswirtschaftslehre, insbesondere Wirtschaftsinformatik I)

Table 2: Educational background and affiliation of interviewed WI researchers.

We decided to include Rudy Hirschheim, who started to work in the field in the 1980s, in the sample, because we expect his international experience – he has worked at Universities in England and Australia and has experience with the German *Wirtschaftsinformatik* as well – to contribute to and complement the picture of the discipline. Additionally, we took the opportunity to interview M. Lynne Markus as a renowned representative of those researchers in the field who perform more interpretive research approaches. From the German speaking IS community we included Helmut Krcmar because of his in depth experience of IS research in Germany as well as in the U.S. – he worked as Assistant Professor at the Leonard N. Stern Graduate School of Business, New York University and at the Baruch College, City University of New York.

Conduction of interviews

The interviewees were given the interview schedule in advance to the meeting allowing them to prepare – if they felt the need. According to the standards of expert interviews the questions were asked in an open fashion. The interview schedule served as guidance in order to gain relevant insights to the experts' experience and lead them to the desired direction. The two interviewers themselves are knowledgeable researchers in the field, so that the discussions could take place on an even level and in the intended way.

The interviews were performed in the course of a conference or during personal visits of the respective interviewer. In most cases both interviewers were present, however with one mainly leading the discussion (see Table 3). The conduction of the interviews took between 50 and 95 minutes.

IS/WI	Interviewee	Interviewer	Date	Duration
IS	Jack Rockart	U. Frank (R. Wigand)	December 2004	00:49 h
	Richard Mason	U. Frank (R. Wigand)	December 2004	00:55 h
	Robert Zmud	U. Frank (R. Wigand)	December 2004	00:56 h
	Rudy Hirschheim	U. Frank (R. Wigand)	December 2004	00:57h
	Gordon B. Davis	U. Frank (R. Wigand)	December 2004	01:14 h
	M.Lynne Markus	R. T. Wigand	January 2005	01:58 h
	William R. King	R. T. Wigand	January 2005	01:24 h
	Paul Gray	R. T. Wigand	March 2005	01:46 h
WI	Hans R. Hansen	Ulrich Frank (R. Wigand)	February 2005	01:33 h
	Helmut Krcmar	Ulrich Frank (R. Wigand)	February 2005	01:28 h
	Karl Kurbel	Ulrich Frank (R. Wigand)	February 2005	01:30 h
	Peter Mertens	Ulrich Frank (R. Wigand)	February 2005	01:00 h
	Heidi Heilmann	Ulrich Frank	February.2005	01:30 h
	Lutz Heinrich	Ulrich Frank	March.2005	01:28 h

Table 3: Interview participants, dates and duration.

Method for interpretation

We applied an interpretative content analysis for evaluating the research results: After the transcription of the interviews the transcripts were checked for terms, expressions or sentences with an unclear or ambiguous meaning. These parts of the transcript were highlighted. Additionally, we looked for new aspects that have been suggested as important by other interviewees. The transcript together with a document containing the additional questions was sent back to the respective interviewees for revision and approval. The returned transcripts were then used as input for a comparing content analysis. According to the typical interpretive or qualitative content analysis the answers were condensed to reflect the main statements and redundant information was deleted (e.g. [Filk98]). Additionally, distinctive quotes have been kept for future citation.

2.3 Evaluation criteria

In order to develop criteria to assess the quality of interpretive research, we briefly turn to the 'traditional scientific method', which is referred to as quantitative, positivist, or behaviourist empirical research approaches.[1] Reliability and validity of research are typical criteria for evaluating behaviourist (quantitative) empirical research. In this context the criterion of *reliability* aims at the ability to reproduce the research results under equivalent conditions, i.e. different researchers at different times should be able to achieve the same (quantitative) research results using the same research method. The second criterion, *validity* of research relates to the compliance of the research result

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[1] For the following discussion on general evaluation criteria for interpretive research see books on qualitative and quantitative methods in social sciences, e.g. [Filk98].

with reality. This aspect is closely related to the aspired degree of *generalizability*. Typical research approaches in the natural sciences and behaviourist methods in general aim at identifying universal causal relationships to explain certain phenomena, i.e. they aim at complete generalizability of the research results.

In order to develop criteria for evaluating our research approach (expert interviews and interpretive/qualitative content analysis), these criteria should be reconsidered under the epistemological assumptions of more hermeneutic, interpretive research methods: While some approaches even question the existence of knowledge of the world independent from a particular researcher, we assume a realistic ontological viewpoint that allows us to reconstruct the actual development and status of the discipline. In any case, knowledge of the world that can be achieved through hermeneutic, qualitative methods usually does not claim to be universally true (e.g. [Filk98]). Nevertheless, the criterion of generalizability can also be applied in interpretive research approaches taking into account the aspired degree of generalizability.

The abstract goal of interpretive research approaches in the social sciences is to understand the complex nature and different facets of a particular domain. The objective of understanding (*Verstehen*) is in its nature different from the objective of explaining in terms of identifying quantifiable causal relationships. The interpretive researcher tries to understand a phenomenon by looking at it in a particular context. The researcher's pre-assumptions, his involvement in the case and the process of gaining insights can hardly be reproduced. Furthermore, they are not intended to be reproduced: gaining insights from the perspectives of multiple researchers is sometimes even applied to complement the insights of each individual researcher.

2.3.1 Comparability and comprehensibility

Due to the presented specific characteristics of hermeneutic research approaches, *reliability* of this type of research cannot be evaluated in terms of the ability to reproduce the achieved research results. However, additional criteria can be developed that allow better comparison of research processes. By explicating the different steps of the research approach comprehensibility (*Nachvollziehbarkeit*) is increased. With respect to our particular research method chosen these criteria include explicating the

- qualification of interviewers,
- appropriateness of the interview schedule, and
- consequent separation of information according to its source.

We have already argued for the interviewers to have been appropriately qualified to conduct the interviews in the intended fashion: Rolf. T. Wigand is renowned in the field of Information Systems in the U.S. He has also taught at German universities and has considerable insights to the German *Wirtschaftsinformatik* community[1]. Ulrich Frank is an established researcher in the *Wirtschaftsinformatik* field and has participated at several conferences in the U.S. (HICSS, AMCIS and others). He is associate editor of the *Wirtschaftsinformatik* journal and also involved in committees and on editorial boards of the international IS community[2].

In order to check for the completeness and appropriateness of the interview schedule, the interviewees were asked to add further questions and bring up additional issues they considered important. A few additional issues were raised and selected aspects have accordingly been integrated in

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[1] You find more information on career and research interests of Rolf T. Wigand at http://digital.is.ualr.edu/.

[2] More information on Ulrich Frank can be found at http://www.icb.uni-due.de/um.

the review form. We will explicate the additional issues raised throughout the discussion of each topic area.

The process of interpretation started with the transcripts and in each step the source of different statements was annotated. Additionally, we provide a structured table of quotations supporting the interpretations in each topical area. This way we explicitly differentiate actual statements by interviewees from the author's interpretations in a transparent way.

2.3.2 Validity, authenticity, credibility

Our objective was to reconstruct the development and the current status of the field. Hence up to three different levels can be distinguished when applying the criterion of *validity*:

1. Level: Authenticity of subjects' recollections: Did the interview schedule and the conduction of the interview contribute to the interviewees reporting on their actual recollection (reconstruction) of the disciplines development and status? Are there any reasons that might have lead to the interviewees presenting the issues in a distorted or 'wrong' way not representing their actual reconstructions?

2. Level: Credibility of the author's reconstruction: Are the reconstructions as described by the author well-founded on the reconstructions reported by the interviewees? Is the process of interpretation or analysis – based on the interviewees' statements and leading to the researcher's conclusions – comprehensible?

3. Level: Actual generalizability of the presented reconstruction: Is the sample of interviewees sufficiently representative and appropriate to allow for generalizing from their recollections to the actual development and status of the discipline?

The authenticity of subjects' recollections is supported by the method design in several ways. (1) The interviewees were given the interview schedule in advance; hence they could prepare for the interview and refer to external personal sources to improve the completeness and accurateness of their recollections. (2) All interviewees can be considered as established in the discipline, some already retired, so that it is unlikely that there are strategic or political motives for deliberately reporting on 'wrong' recollections. (3) Furthermore, most interviewees have published on some of the relevant topic areas previously, so they could be expected to be familiar with the topics, already equipped with relatively consistent frames of references (see appendix A).

The first and second level of validity as described above have been supported by the process of communicative validation ([Filk98] p. 245): we returned the complete interview transcripts to each interviewee asking him/her to check on certain words or phrases, whose meaning was not clearly stated, and to give his/her approval for further analysis of the text.

We attempted to support the credibility of our reconstruction by explicating the research process and in this way improving comprehensibility. Even though we started the study with an existing framework of topics and related issues in mind, we deliberately omitted to explicitly define certain terms. This way we were able to capture the diversity of understandings and to stay open to new issues and aspects. This seemed particularly important since some issues had previously been discussed extensively in the discipline's literature. We will explicitly mention and discuss these terms in the respective topic areas.

It is our objective to achieve trans-subjectivity of the reconstruction through combining the different perspectives of each interviewee (triangulation). The intensive involvement of the interviewees in the field shows that they have major insights into the discipline and it's development (for a detailed listing see appendix A): they have been involved in different conference and association committees, they were/are editors of respected journals in the field, they have been working at diverse

universities, and they have been involved in various curriculum efforts. By initiating conferences, journals and research associations, some of the interviewees have even shaped the field.

While the various types of involvement in the field's development indicate good insights into the field, the personal backgrounds differ, so that biases in the perspectives should be taken into account. Therefore, we will explicitly refer to possible misconceptions or distortions of selected interview partners, if this is indicated by direct statements during the interview or by his/her personal background.

2.4 Structure for presentation

The interview schedule contains 7 topic areas and 35 questions (see appendices C and D). In order to comprehensively present the study results a structure for the discussion of each topical area was developed. This structure reflects both, the explorative as well as evaluative purpose of the interviews.

Motivation
We introduce and motivate each topic with brief reference to literature, pointing out the central issues.

Research objectives/questions
We explicate the research objectives and intentions related to the particular topic area in terms of research questions. These objectives are represented by one or more questions in the interview schedule.

Hypothesis *(optional)*
Based on prior research and literature analysis we developed a number of propositions or hypotheses, which lead to formulating some of the interview questions.

Results
The relevant analysis results will be presented in terms of

- Terminology *(optional)*: The questions were deliberately formulated without explicitly defining core terms; differences in terminology are explicated if they occur.

- Answers to research questions: The summarized and compared reconstructions of the interviewees give a descriptive answer to the relevant research question. The relevant quotations from the interview transcripts are presented in a structured table.

- Hypothesis evaluation *(optional)*: If a hypothesis has been formulated in advance, conclusions on its confirmation or rejection are discussed.

- Additional issues *(optional)*: Additional aspects related to this area that have been suggested as relevant by the interviewees are presented.

- Derived hypothesis (optional): New hypotheses are formulated if suggested by the interpretation results.

- Normative valuations *(optional)*: We tried to explicate in the course of the interview that we aim at getting descriptive answers. However the answers are nevertheless subjective so that interviewees at several points gave statements in a normative fashion as well. Those are discussed separately.

Potential bias *(optional)*
We explicitly point out potential bias of the interviewees as it has been indicated directly by the interviewee or can be derived from his/her academic or professional background.

Open questions *(optional)*
A section might conclude with open questions, which either could not be answered unambiguously or have been raised in the course of the interviews or the interpretation process.

3 Related work

In order to give an overview of the uniqueness and the methodical differences to existing studies, we discuss related studies with expert interviews that aimed at capturing the status or a forecast of the future development of the discipline. The overview in Table 4 shows that in most cases business executives participated in Delphi studies aimed at identifying key issues in Information Systems practice.

A series of Delphi surveys was performed by the MIS Research Centre at the University of Minnesota, in which institutional and board members of the Society for Information Management (SIM) – all high level IS executives – were asked to participate. Dickson et al. report on the study performed in 1983, 54 professionals participated and identified key IS management issues for the 1980s [DLW+84]. Brancheau and Wetherbe provide an update and comparison of key issues in Information Systems as a result of a Delphi Study performed in 1986 [BrWe87]. Wetherbe and Niedermann co-authored another article on the topic of key IS issues identified on the basis of a Delphi survey with SIM members in 1989 and 1990 [NBW91]. In 1994-95, SIM institutional and board members were asked again to determine the most critical issues facing IS executives over the next three to five years. In addition to the study results [BJW96] provides an overview of changes in key issues during the previous studies.

Watson and Brancheau analysed existing studies on key concerns of IS executives in different countries or areas of the world, comparing results from surveys performed in the USA, Europe, Australia, and Singapore [WaBr91].

König, Heinzl et al. conducted two Delphi surveys among German IS[1] professionals and academics from the field of *Wirtschafsinformatik*, Computer Science (*Informatik*) and Business Administration (*Betriebswirtschaftslehre*). The first survey was conducted May to September 1994 with the objective to identify the key research themes and methods of *Wirtschaftsinformatik* within the next ten years [KHP95a] (the corresponding working paper has been published in English [KHP95b]). Their study resulted in a set of general research directions refined by a number of research topics. [KHR+96] describes the results of this survey with a focus on research methods and core theories. In 1999 a consecutive Delphi study was performed targeted at identifying objectives of knowledge (*Erkenntnisziele*) of the *Wirtschaftsinformatik* discipline in the next three and ten years. 27 academics and 5 business professionals participated in this study [HKH01].

Avgerou et al. present the results of a questionnaire based survey of 360 European IS academics. As part of these results they identified a number of major research *themes* in IS ([ASB99], pp. 143 f)

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[1] Further on, the discipline name of IS is used to denote American IS and German *Wirtschaftsinformatik* together. It can be derived from the context if IS denotes only the American or German part of IS.

Publication	Participants	# Participants (final)	Method	Objective
[DLW+84]	IS executives, corporate general managers (SIM)	54	Delphi survey	Key issues in IS management
[BrWe87]		68		
[NBW91]		104		
[BJW96]		78		
[WaBr91]	-	-	Meta analysis	Key concerns of IS executives
[KHP95a/b]	IS professionals (7) and academics (23) (in Germany)	30	Delphi survey	WI subjects of research in the next 10 years
[HKH01]	IS professionals (5) and academics (27) (in Germany)	32	Delphi survey	WI objectives of knowledge for the next 3 and 10 years
[ASB99]	European academics	360	Questionnaire	Major research themes in IS

Table 4: Overview of related surveys.

The studies performed by Brancheau et al. focussed on key issues from the view point of IS professionals. The surveys performed in Europe targeted at identifying central issues from an academic view point. The survey by König et al. tried to combine both view points. This study extends the previous studies: The central objective of this study is not to identify 'key' issues but to reconstruct the discipline's development and its current status in terms of accepted research methods, prominent topics and aspects of its institutional integration.

4 Interview schedule – Topic Areas and Hypotheses

The topical areas in the interview schedule include questions on the status and development of IS research and teaching. Additionally, issues concerning the support of universities and other external institutions, such as funding organizations and governmental institutions are incorporated in the questions. The relationship of the IS discipline to practice, in terms of IS research alignment with practice and cooperation with industry, is another theme included in the interview schedule.

The original interview schedule in English is displayed in appendix C, the interview schedule for the German speaking *Wirtschaftsinformatik* researchers can be found in appendix D. The following subsections discuss each section by motivating each topical area and presenting the relevant research questions and hypotheses[1].

4.1 Foundations of IS

Information Systems is a relatively young discipline, compared to more traditional disciplines such as the natural sciences. The first publications under the name of MIS can be traced back to the 1970s (e.g. [VanH73]) and the first ICIS conference took place in 1980. At the conference Keen pointed out that "at present, MIS research is a theme rather than a substantive field" ([Keen80], p. 1). Although there are still debates between researchers who consider IS a research field and not a

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[1] For each hypothesis we explicitly denote, if it applies to the North-American IS field (IS), to the German Wirtschaftsinformatik (WI) or to both (WI+IS).

discipline (this is reflected in some interviews), today, there is a community of researchers, who feel part of the Information Systems field (or discipline), represented by an organization (AIS), with regular meetings at dedicated conferences (ICIS, AMCIS), with respected journals (MISQ, JMIS, ISR, etc.), and official degree programs certified by AACSB.

The origins of the field of *Wirtschaftsinformatik* can be traced back to the foundation of the first academic institution on data processing and business management at the University of Köln in the early 1960s (see [MCE+02]). In 1975 the Scientifc Commission for *Betriebsinformatik* (business informatics) was founded. The first discussions concerning the *Betriebsinformatik* discipline can be found in the journal *Angewandte Informatik* in 1975 [Hein75] and in the journal *Zeitschrift für Betriebswirtschaft* (ZfB) held by Wedekind, Heinrich and others in the early 1980s [Hein82]. In the meantime, the discipline's name has been changed to *Wirtschaftsinformatik*, is represented through the Scientific Commission of *Wirtschaftsinformatik* (WKWI), with annual conferences (WI conference) and a dedicated scientific journal (*Wirtschaftsinformatik*).

Against this background, we intend to investigate in more detail, which forces drove the foundation of the academic disciplines of IS in North-America and in the German speaking countries, respectively.

4.1.1 Root(s) of IS and role of closely related disciplines

The North-American IS discipline has drawn on existing disciplines heavily since its beginning. This is reflected in ongoing discussions on the role of neighbouring or related disciplines for IS research. The term 'reference discipline' has early been introduced in the discussions of the IS discipline's identity: According to Keen a reference discipline "is an established field to which one looks to get an idea of what good MIS research would look like" ([Keen80] p. 10). The frequently applied keyword classification scheme for IS research literature developed by Barki et al. contains a list of reference disciplines including Behavioural Science, Computer Science, Decision Theory, Organizational Theory, Economic and Management Theory [BRT93]. Architecture and Law have been suggested as reference discipline for IS ([MyMy00], [Lee91]). Recently it has been suggested that the IS field itself should serve as reference discipline [BaMy02]. Several publication analyses attempted to identify the different reference disciplines applied in IS research (e.g. [FaDr99], [EvKa97] and [VRG01/02]).

The close relationship of the German WI discipline to Business Management (*Betriebswirtschaftslehre*) and Computer Science (*Informatik*) is reflected through the incorporation of the WKWI in the Association of University Professors for Management (*Verband der Hochschullehrer für Betriebswirtschaft*, http://www.v-h-b.de/) and at the same time the integration of the *Wirtschaftsinformatik* special interest group (*GI Fachbereich*) with multiple working groups in the German Informatics Society (GI, http://www.gi-ev.de/).

The first question in this context is aimed at the roots of the discipline and at identifying if there was more than one root.

Hypothesis (IS, WI)
We propose that IS has several root disciplines contributing to its development.

A subsequent question explicitly aims at related disciplines and their role at the foundation of the IS field. Several authors have suggested reference disciplines for IS. For example, Vessey, Ramesh and Glass performed a publication analysis of major IS journals and on this basis identified the following "reference disciplines": Management, Economics, Cognitive Psychology, Computer Science, Social and Behavioural Science, and Management Science [VRG02]. Baskerville and Myers state that "in the early days, IS research drew primarily on engineering, computer science, cybernetic systems theory, mathematics, management science, and behavioral decision theory"

([BaMy02], p. 2). They argue, that later on other disciplines have been added to the list of reference disciplines, including Accounting, Finance, Management, Architecture, Economics, and Anthropology.

In the interview schedule, we suggest a list of reference disciplines, which apparently have played a particular role in the disciplines development and ask for the respondents impression on their actual relevance for the IS discipline:

- Computer Science
- Management Science
- Organization Science
- Economics

4.1.2 Perception by closely related disciplines

The development of a young discipline depends on support from related disciplines, in particularly on those of the schools and departments they are integrated in. The external credibility of a young discipline is then – to a certain degree – reflected in the perception by those related disciplines. Here, our research question aims at identifying how the discipline has been perceived by related disciplines, such as those mentioned previously.

Hypothesis (IS)
Diverse publications reflect that there has been a "persistent anxiety about the field's purported lack of academic legitimacy" [KiLy04]. So, we derive the hypothesis, that the early discipline had been perceived with little value by related disciplines, which was leading to debates on identity and legitimacy.

4.2 Legitimacy

We have shown that debates in the literature reflect a tendency in the (North-American) IS field to question its identity and legitimacy from the view point of other disciplines. We therefore want to investigate to which extend efforts for developing the field are driven by the need for an increased legitimacy.

Firstly, we look at the role of legitimation efforts for the disciplines development in general. We then aim at classifying particular efforts that have contributed to the disciplines legitimacy. Here, the interview schedule suggests the following particular efforts:

- success or acceptance of research results,
- demand by students and
- demand by practitioners, including demand for graduates and funding.

Hypotheses (IS)
We formulate the hypothesis that efforts for increasing legitimacy have been discussed in the discipline on a broad scale (see e.g. [Keen91], [Lee99], [KiLy04]), indicating a prominent role of legitimation efforts in the disciplines development (H5.1). Additionally, we propose that demand by practitioners, and in this way by students has largely contributed to the disciplines legitimacy.

4.3 Profile

A scientific discipline can be characterized by its main subject of research (domain), objectives of research and a certain more or less fixed set of research methods. The latter are applied in order to achieve the research objectives in the respective domain.

4.3.1 Main subject of research

There is no official statement of the AIS, for example, characterising the main subject of research. However, from literature a more or less common subject of research can be derived. In 1980 Keen described the disciplines subject as "the effective design, delivery and use of information systems in organizations" ([Keen80], p. 12). Ives et al. suggest a short definition of MIS research including its main subjects of research: "MIS research is the systematic investigation of the development, operation, use and / or impact of an information (sub)system in an organizational environment." ([IHD80] p. 910). Another similar definition can for example be found in [ASB99]: "The field of information systems (IS) studies phenomena associated with the utilisation of information and communication technologies, primarily in the context of business organizations." (p. 136). King and Lyytinen state that "the IS field [..] has an identity gathered from the consistency of its focus on the systematic processing of information in human enterprise" ([KiLy04] p. 541). The Scientific Community for *Wirtschaftsinformatik* (WKWI) representing the German IS community has defined the subject of research in its profile published in [WKWI94] as "Information and communication systems in industry and administration".

Hypothesis (IS, WI)
Based on our own experience in the field and a review of related literature we developed the hypothesis that information systems in businesses and organizations are the main subject of research in IS.

Changes over time

Information technology has developed on a fast pace for the last 40 years. We intend to more precisely describe the main subject(s) of research in IS by investigating possible changes over time.

Role of re-occurring topics or fads

Fast technological changes have led to quick developments in the software industry and these developments are further pushed by consulting firms. The dot-com boom and bust was a prominent example of a technological hype that has been lead by corresponding industries in order to push new markets. Other topical areas have been coined by the IT industry or consultancy firms; examples are terms such as customer 'relationship management', 'business intelligence' or 'pervasive computing'. Fads in German IS practice and research have been investigated by Mertens [Mert95].

With a closely related industry to a large extent being determined by 'fads' we are interested in knowing if re-occurring topics or 'fads' have also played a particular role in the IS discipline.

4.3.2 Fundamental objective(s) of research

A goal or objective of research can be described on varying levels of abstractions: as a general objective of knowledge or achievement for the entire discipline (e.g. "put a man on the moon") or as an abstract objective of a particular research project. Here, our research question aims at identifying the central objectives of research in IS. We, initially, do not define the kind of research objectives but leave it open for the interviewees to discuss.

Role of description, explanation, construction/design

From an epistemological view point the kind of knowledge aspired through scientific research can relate to insightful descriptions of real-world phenomenon and their explanation through theoretical models. Information systems themselves represent constructions that can influence the real-world environment and processes they support. Therefore, constructs or artefacts that help to improve the process of information systems development or implementation are another type of IS research objective. At this point we want to investigate in further detail, which role the objectives of description, explanation and construction play in IS research.

Hypothesis (IS)

The results of prior literature analyses indicate that explanation in terms of identifying causal relationships to explain a phenomenon plays an important role in North-American IS research (e.g. [Farh87], [OrBa91], [VRG01], [AWK04]). At the same time, prior research shows, that construction or design is very rare in IS research journals. Therefore, we propose that construction or design research plays a minor role in IS.

Hypothesis (WI)

Existing publication analyses indicate, that empirical research plays a minimal role in WI research, while construction oriented research is central for the WI discipline (e.g. [RoKa94], [EvKa97], [HeWi97]).

Role of problems in business practice

The general subject of research in IS, i.e. information systems in organizations, is per se closely related to business practice. The actual practice orientation of a discipline can be measured according to the relevance of actual problems in business practice for determining research objectives. Hence, our research question focuses on the role of problems in business practice for formulating research objectives. (More aspects considering relationships to practice are discussed in section 4.6)

4.3.3 Research methods

Previous literature reviews and analyses indicate that there is only a particular set of research methods, which is most commonly applied in those research projects, whose results are presented in prominent North-American IS journals. At this point we want to look more closely at accepted or common research methods in IS.

Set of accepted research methods

On the one hand we are interested in knowing if there is a set of accepted research methods in IS. On the other hand we intend to find out if there have been any changes w.r.t. the set of accepted research methods over time.

Hypothesis (IS)

Based on the results of prior literature analyses we propose that positivist, behaviourist (quantitative) research methods determine the set of accepted research methods in North-American IS research.

Relevance of particular research methods

Asking for the relevance of selected research methods the subsequent question is formulated more explicitly. The suggested list of relevant research methods includes

- quantitative empirical research following the traditional "scientific" method, i.e. aimed at identifying quantifiable causal relationships,

- interpretive studies, i.e. research approaches that do not aim at identifying quantifiable causal relationships, but aim at understanding the complexity of social systems (frequently also called qualitative research),

- Action Research as a distinguished research method characterized by the researchers involvement in the field and aimed at gaining in-depth understanding of social systems and changes therein,

- design oriented research as a research method, which focuses on constructing or designing artefacts to solve particular problems ("research by development", "design science" [HMP04]).

4.3.4 Diversity

Discussions on diversity in IS research – primarily lead in the North-American IS community – have related to the variety of research topics covered, and research methods applied. A recent literature analysis indicates that research published in different journals reflects different degrees of diversity [VRG02]. While Robey argues for a disciplined diversity ("disciplined methodological pluralism" [Robe96]) Benbasat and Weber view a diversity of theories and concepts in IS as a danger for the disciplines unity: "If theories keep proliferating, each with its own measures, terms, concepts, and research paradigms, at some point in time there will be nothing holding the IS discipline together" ([BeWe96], p. 394). We want to complement the discussion on common research subjects and methods in IS by explicitly investigating the diversity in the field.

Debates

We focus on diversity as reflected in debates on research topics and appropriate methods in the IS field. Here, we want to gain further insights into how these debates have been conducted and if they had any effect on the discipline.

Communities

Diversity in a discipline or field of research is also represented by different sub-fields or communities as part of the discipline. Hence, we complement our discussion on diversity by investigating if there are different communities in the field and how these communities perceive each other.

4.4 Political and Institutional Context

Most North-American IS researchers are integrated in business schools. A large number of *Wirtschaftsinformatik* researchers belong to business management departments. In order to describe the discipline's development we complement the core properties (research subject, object and method) by investigating the support and influence of related research institutions (e.g. business school or university officials and administrators) and other public institutions, such as funding organizations and governmental institutions.

Support by universities

We start with investigating the support by universities. We look at the motives of university institutions for providing or not providing support for the development of the IS field.

Picture of the discipline

The description of the support by universities in general can be complemented by a discussion about the assessment of IS by closely related disciplines. We want to investigate how the IS field and its representatives have been perceived by other related disciplines at business schools, such as business administration and management, as well as by computer science.

Influence of research associations

Research associations may help to improve a discipline's recognition by funding organizations, governmental institutions, by other disciplines and university officials. The Association of Information Systems (AIS, http://www.aisnet.org) was founded in 1994. The Scientific Commission for *Wirtschaftsinformatik* (WKWI, http://wi2.uni-hohenheim.de/wkwi/) represents the German IS community; it was founded in 1987. We intend to clarify the influence the AIS, WKWI and other research associations have had on the development of the respective disciplines.

Influence of political institutions

Because most IS researchers are integrated in public universities, we investigate the influence of political institutions for the development of the discipline, as for example the bureaus of educational affairs, the National Institute of Standards and Technology (U.S.), and the Federal Ministry of Education and Research (Germany).

Influence of funding organizations

To complete the discussion on the influence of public organizations on the discipline's development we want to investigate to which extent public funding organizations (e.g. National Science Foundation NSF, German Research Foundation DFG) have influenced the fields.

4.5 Development of Teaching

The status of an academic discipline is characterized not only by its research characteristics but also by its teaching activities. These can be described through official curriculum developments, actual teaching contents and the attractiveness of the corresponding degrees in practice.

Development of the IS curriculum

The literature provides a detailed overview of the history of model curricula in IS (e.g. [TFG+03]) and *Wirtschaftsinformatik* [GI03]. A detailed listing of the curricula history in IS is provided in appendix B.

We want the interviewees to sketch the process of IS curriculum development and the factors that influenced this process. In this way we intend to find out, which role the curriculum efforts have played for the discipline members and how they affected IS teaching.

Role of Computer Science / Business Management in IS classes

IS research and practice can be located at the intersection of Computer Science and Business Management research. To characterize the distinct IS teaching characteristics, it seems appropriate to investigate the role of, on the one hand, Computer Science and, on the other hand, Business Management concepts in IS classes.

We intend to find out more about the role and importance of Computer Science concepts in IS classes. And we want to draw a picture of the relevance of business and management concepts in IS classes, particularly in relationship to the role of Computer Science in IS teaching.

Attractiveness of IS degree

The IS discipline was established in the early 1980s. Since then the developments and innovation cycles in IT increased significantly. Additionally, the relevance of fads in IS industry was prominently exemplified by the dot-com boost and bust. Hence, it is likely that the attractiveness of the IS degree has changed over time. At this point we want to investigate in further detail how the attractiveness of the IS degree developed, i.e. if the attractiveness has changed over time and which were the relevant factors that influenced its attractiveness.

Hypothesis (IS + WI)

Since the IS field was established more or less in parallel to the technological progress of IT and its increasing application in industry practice, we propose that demand from industry for graduates has significantly determined the attractiveness of the IS degree.

4.6 Relationship to Practice

According to the WI profile published in [WKWI94], the German IS discipline considers itself a "*Realwissenschaft*", emphasising that cooperation with practitioners in an industrial context for gaining and confirming knowledge is necessary for successful research. In North-American IS research the debate on relevance to practice being or not being required for good IS research is documented in multiple publications ([Keen91], [Lee99], [West99], [BeZm99] and other articles in MIS Quarterly 23/1 1999, [KGH+02]). At this point of the interview schedule, we intend to determine the role of cooperation with practitioners for IS research and want to describe the current status of cooperation with practitioners.

The relationship between research and practice can additionally be characterized by the way IS research results and IS faculty are perceived by IS/IT professionals in industry. We aim at identifying the picture of the perception of the discipline and its members by IS/IT-professionals in industry, e.g. Chief Information Officers and IT managers.

We finalize the topical area of relationships to practice by explicitly discussing and identifying the value (importance) of practice relevance, i.e. alignment with practice demand, for the profile of the IS discipline. Additionally, we look at possible changes of the importance of relevance over time.

4.7 General Assessment

The interview discussions close with the general evaluation of the discipline, including strengths and weaknesses as well as forecasts for future developments and recommendations for the future. This assessment is based on the different facets of the discipline discussed in the previous topic areas and allows the interviewee to emphasise certain aspects and complement his reconstructions concerning the current status of the discipline.

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[West99]   Westfall, Ralph: **An IS Research Relevancy Manifesto**, Communications of the
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[WKWI94]   Wissenschaftliche Kommission Wirtschaftsinformatik: **Profil der Wirtschaftsinforma-
             tik**, Wirtschaftsinformatik Vol. 36, No. 1, 1994, pp. 80-81.

Appendix A: Involvement of interviewees in the disciplines

Interviewee	Particular involvements in the field[1] and experience in topical areas covered in the interviews
Gordon B. Davis http://misrc.umn.edu/faculty/	IS curriculum development (diverse publications) IS textbook "Management Information Systems: Conceptual Foundations, Structure, and Development" (1974; 1985, McGraw-Hill) recognized as a foundational classic in the field In 1967, he and two colleagues initiated the first academic degree programs in management information systems
Paul Gray http://www.cgu.edu/pages/2237.asp	IS curriculum development (MSIS 2000 graduate model curriculum) Founding editor of the Communications of AIS *Topics*: IS research relevance [KGH+02], core of the IS field (as editor in Communications of the AIS, Vol. 12, No. 1, 2003)
Rudy Hirschheim http://projects.bus.lsu.edu/faculty/rudy	Has been on the editorial board of numerous IS journals including MISQ, EJIS, JAIS *Topics*: Reflections on the state of the discipline [HiKl03]
William R. King http://www.katz.pitt.edu/fac_pages/King.htm	Founding president of the Association for Information Systems (AIS) Served as editor-in-chief of the Management Information Systems Quarterly Key figure in founding the journal Information Systems Research
M. Lynne Markus http://web.bentley.edu/empl/m/lmarkus/	*Topics*: Rigor vs. relevance in IS research [DaMa99]
Richard O. Mason http://faculty.smu.edu/rmason/Mresume.html	Has consulted with numerous corporations, including General Motors, Hughes Aircraft, J. C. Penney, Kodak, the U.S. Census Bureau, the U.S. Forest Service, Wells Fargo Bank, and Xerox Consulting editor for the JOSSEY BASS Management Series
John F. Rockart http://web.mit.edu/afs/athena.mit.edu/org/c/cisr/www/html/rockart.html	Has taught and conducted research on the management and use of computer-based information systems since 1966 at the Sloan School of Management, MIT Was the director of the Center for Information Systems Research (CISR) at MIT until June of 2000 Serves on the Board of Directors of three organizations. Named by InformationWeek magazine in 1988 as one of the top ten MIS consultants *Topics*: IS research relevance [KGH+02]
Robert W. Zmud http://faculty-staff.ou.edu/Z/Robert.W.Zmud-1/	Served as the Editor-in-Chief of MIS Quarterly from 1995 to 1998, as a founding Senior Editor of Organization Science Currently Senior Editor with Information Systems Research, the Journal of AIS, and MISQ Executive *Topics*: Practice relevance of IS [BeZm99], IS identity [BeZm03]

Table 5: Involvement of IS researchers in the discipline.

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[1] The involvements mentioned here represent the reasons for including the respective researchers in the interview study. The activities and publications listed are only extracts of the researchers' contributions to the field; they support the claim that the selected researchers have been in the field from the beginning and have shaped its development. As discussed in the text, Richard Mason is known for research with close relationships to practice and M. Lynne Markus is renowned for applying more interpretive research approaches.

Interviewee	Particular involvements in the field[1] and experience in topical areas covered in the interviews
Hans R. Hansen http://wi.wu-wien.ac.at/~hansen/	Publishes one of the first introductory textbooks "Wirtschaftsinformatik" (1st edition in 1978, currently 9th completely revised edition, 2005)
Heidi Heilmann http://www.bwi.uni-stutt-gart.de/index.php?id=1644&L=1	Established the *Wirtschaftsinformatik* Institute at the University of Stuttgart; editor in chief of the journal "HMD, Praxis der Wirtschaftsinformatik" and edits Information Systems literature for the dpunkt publishing house, Heidelberg, Germany
Lutz J. Heinrich http://www.winie.uni-linz.ac.at/	Publishes (partly with co-authors) the lexicon on "Wirtschaftsinformatik" (1st ed. 1986, 7th ed. 2004) and a widely used and cited textbook on information management ("Informationsmanagement", 1st ed. 1985, 8th ed. 2005) Co-editor of the study guide for Information Systems in Germany ("Studienführer Wirtschaftsinformatik [MCE+02]) *Topics*: Disciplines status and history (e.g. [Hein75], [Hein82], [Hein85], [MeHe02], [Hein04]), empirical research in WI ([GrHe97], [Hein95], [HeWi97])
Helmut Krcmar http://www.winfobase.de/	Assistant Professor for Information Systems at the Leonard N. Stern Graduate School of Business, New York University, New York and at the Baruch College, City University of New York (1985-1987) Publishes a widely used textbook on information management ("Informationsmanagement", 4th edition, 2005)
Karl Kurbel http://www.vg-u.de/euv-new-site/team_prof.asp	Engaged in curriculum efforts as member of the German Informatics Society and the WKWI since 1989 Co-editor of the study guide Information Systems in Germany ("Studienführer Wirtschaftsinformatik" [MCE+02])
Peter Mertens http://www.wi1.uni-erlan-gen.de/whoiswho/mertens.php	Publishes (with co-authors) several popular introductory textbooks, including "Grundzüge der Wirtschafttsinformatik", currently 9th rev. edition, 2004; engaged in early curriculum efforts as member of the German Informatics Society and the WKWI [Gi03]; co-editor of the study guide Information Systems in Germany ("Studienführer Wirtschaftsinformatik" [MCE+02]) *Topics*: Fads in *Wirtschaftsinformatik* research [Mert95], history [Mert98] and the current status of *Wirtschaftsinformatik* [Mert05]

Table 6: Involvement of WI researchers in the discipline.

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[1] The involvements mentioned here represent the reasons for including the respective researchers in the interview study. The activities and publications listed are only extracts of the researchers' contributions to the field; they support the claim that the selected researchers have been in the field from the beginning and have shaped its development. As discussed in the text, Helmut Krcmar has not been in the field from its beginning but has particular international experience, which is why we included him in the sample.

Appendix B: History of model curricula in IS

Year	Level	Organization(s)	Source
1972	Graduate	ACM	Ashenhurst, R. L. (Ed.) 1972. "A Report of the ACM Curriculum Committee on Computer Education for Management: Curriculum Recommendations for Graduate Professional Programs in Information Systems." Association for Computing Machinery, Inc., 1972.
1973	Undergraduate	ACM	Couger, J. (Ed.) 1973. "Curriculum Recommendations for Undergraduate Programs in Information Systems," Communications of the ACM, Volume 16, Number 12, December 1973, pp. 727-749.
1981	Undergraduate	DPMA	DPMA. 1981. DPMA Model Curriculum, 1981. Park Ridge, Illinois: Data Processing Management Association. (original source not available, information from the [TFG+03] appendix.)
1983	Graduate/ Undergraduate	ACM	Nunamaker, Jay F., J. Daniel Couger, and Gordon B. Davis. 1982. "Information Systems Curriculum Recommendations for the 80s: Undergraduate and Graduate Programs," Communications of the ACM, Volume 25, Number 11, November 1982, pp. 781-805.
1984/ 85	Undergraduate	DPMA	Different curriculum recommendations (no original source available, information from the [TFG+03] appendix).
1990	Undergraduate	DPMA	Herbert E., Jr., and David L. Feinstein (Eds.) 1991. IS'90: The DPMA Model Curriculum for Information Systems for 4 Year Undergraduates. Park Ridge, Illinois: Data Processing Management Association.
1990	Undergraduate	ACM, IEEE	ACM/IEEE Computing Curriculum for Computer Science for Undergraduates (no original source available, information from the [TFG+03] appendix.)
1995	Undergraduate	ACM, DPMA, AIS	Longenecker, Herbert E., David L. Feinstein, and John T. Gorgone 1994. "Development and Review of IS'95 — A Joint Curriculum of DPMA, ICIS/AIS, and ACM for Four Year Information Systems Programs." Proceedings of the International Academy for Information Management, 1994, p. 1 (not available), Progress Report in: John T. Gorgone, J. Daniel Couger, David Feinstein, George Kasper, Herbert E. Longenecker: "Information systems '95 curriculum model: a collaborative effort", ACM SIGMIS Database, Volume 25 Issue 4, November 1994.
1997	Undergraduate	ACM, AIS, AITP	Couger, J. Daniel; Davis, Gordon B.; Gorgone, John T.; Feinstein, David L.; Longenecker, Herbert E.: IS '97: model curriculum and guidelines for undergraduate degree programs in information systems, The DATA BASE for Advances in Information Systems, Volume 28, No. 1 (1997), pp. 101 - 194
2000	Graduate	ACM, AIS	Gorgone, John; Gray, Paul: MSIS 2000: model curriculum and guidelines for graduate degree programs in information systems, Communications of the Association for Information Systems, Volume 3, No. 1 (2000)
2002	Undergraduate	ACM, AIS, AITP	[TFG+03] Topi, Heikki; Feinstein, David L.; Gorgone, John; Davis, Gordon B.; Valacich, Joseph S.; Longenecker, Herbert E.: IS 2002 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems, Communications of the Association for Information Systems, Volume 11, No. 1 (2003), see also http://192.245.222.212:8009/IS2002Doc/Main_Frame.htm
current	Undergraduate	ACM, AIS, IEEE	Draft, see http://www.acm.org/education/curricula.html

Table 7: History of curriculum development in IS.

Appendix C: Interview Schedule (English)

I Foundations of (Management) Information Systems

1. What were the most important forces droving the foundation of the (M)IS discipline?

2. Does the IS discipline have *one* common root or more?

3. What was the role of the most closely related (or reference) disciplines with respect to the foundation of the discipline?[1]

   - Computer science
   - Management science
   - Organization science
   - Economics
   - Are there any other relevant closely related (or reference) disciplines? (see note below)

4. How was the emerging discipline of (M)IS perceived by the most closely related (or reference) disciplines?

   - Computer science
   - Management science
   - Organization science
   - Economics
   - Are there any other relevant closely related (or reference) disciplines?

Note: Other *reference disciplines* are mentioned in the literature including:

- management, economics, cognitive psychology, computer science, social and behavioural science, and management science (identified by Vessey, Ramesh and Glass in this order of relevance according to a publications analysis of major IS journals, see [VRG02])
- Baskerville and Myers: "in the early days, IS research drew primarily on engineering, computer science, cybernetic systems theory, mathematics, management science, and behavioral decision theory" ([BaMy02], p. 2). They argue, that later on other disciplines have been added to the list of reference disciplines, including accounting, finance, management, architecture, economics, and anthropology.
- Other possible reference disciplines include operations research and accounting systems.

II Legitimating Information Systems as (scientific) research discipline

1. What role did efforts for legitimating IS play in the development of the discipline?

2. By which efforts was legitimation primarily achieved?

   - Success or acceptance of research results
   - Demand and interest for IS by students
   - Demand by practitioners (graduates, funding)

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[1] Computer science, management science, organization science, and economics (key reference disciplines of IS" according to Swanson and Ramiller, see [SwRa93], p. 326)

III Profile and distinctiveness of Information Systems

Subjects of research

1. What is the main subject of research?
2. Did any changes occur with respect to the main subject(s) of research over time?
3. What has been the role of cooperation with practitioners and companies for IS research?
4. What has been the role of re-occurring topics or 'fads'?

Objectives of research

5. What are the fundamental objectives of research in IS?
6. How relevant are description, explanation and construction/design for achieving these goals?
7. What is the role of problems in business practice when formulating research objectives?

Methods of research

8. Is there a certain – more or less fixed – set of accepted research methods?

   If yes: Since when? Have there been significant changes in the set of accepted research methods throughout time?

9. How relevant are the following research methods?
   - Quantitative empirical research
   - Interpretative studies (qualitative research, e.g., interpretive case studies)
   - Action research
   - Design oriented research ("design science", research by development)

   For each, what is the role of description, explanation, and design?

Diversity

10. How would you assess the development of the diversity of research topics and methods in IS? More specifically:

    a) Have there been debates concerning research topics?

       If yes: How were these debates conducted? What results and effects did they bring about?

    b) Have there been debates concerning appropriate research methods?

       If yes: How were these debates conducted? What results and effects did they bring about?

11. Are there different communities as part of the IS discipline?

    If yes: How would you describe these communities and what are their relationships? (indifferent, reserved, hostile …)?

IV Political and institutional context

1. How would you assess the support of universities and academic institutions for the development of the discipline?

   What are the main motives for providing (or not providing) support?

2. How would you assess the picture of the discipline as seen by closely related disciplines such as computer science, business administration and management or their representatives, respectively?

   How would you assess their respective organizational, political support?

3. How would you characterize the influence of research associations for the development of the discipline? (e.g., AIS (Association for Information Systems))

4. What was the influence of political institutions for the development of the discipline? (e.g., bureaus of educational affairs, National Institute of Standards and Technology)

5. To what extent did research funding organizations (e.g., Fulbright Program, National Science Foundation and others) influence the development of the discipline?

V Development of IS teaching

1. How did the development of the IS curriculum proceed?

   What were the major factors influencing its development?

   (e.g., associations of interest, closely related disciplines, requests from practitioners)

2. What is the role of computer science in IS classes?
3. What is the role of business and management concepts in IS classes?
4. How did the attractiveness of an (M)IS degree develop?

VI Relationship to practice (relevance)

1. How would you assess the development and the current status of cooperation between IS researchers and practice?

   (e.g., joint projects, workshops, consulting, conferences)

2. According to your opinion, how is the IS discipline perceived by IT/IS professionals?
3. What is the value of relevance (i.e. alignment with practice demands) for the discipline's profile?
4. Has the importance of relevance changed over time?

VII Assessment of current and future status

1. What are the central strengths and weaknesses of the discipline, which you would like to point out as result of the analysis above?

   (e.g. with respect to quality, acceptance, and usefulness of research results, research competition, and discipline identity)

2. Based on the results of the analysis: What future development do you forecast for the IS discipline?

   (e.g., with respect to identity, international competition, …)

3. What changes or actions would you recommend for the discipline's future development?

   (e.g., with respect to identity, international competition, …)

References

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[VRG02]   Iris Vessey, V. Ramesh, Robert L. Glass : **Research in Information Systems: An Empirical Study of Diversity in the Discipline and Its Journals**, Journal of Management Information Systems, Volume 19, No. 2 (2002), pp. 129 - 174.

Appendix D: Interview schedule (German)

Gründung der Wirtschaftsinformatik

5. Was waren die wichtigsten Kräfte, die zur Gründung der Disziplin geführt haben?

6. Hat die Disziplin *eine* gemeinsame Wurzel oder sind es mehrere?

7. Welche Rolle spielten die Nachbardisziplinen bei der Gründung?

   - Informatik
   - Betriebswirtschaftslehre
   - Gibt es andere relevante Nachbardisziplinen?

8. Wie wurde die junge Disziplin von den Nachbardisziplinen wahrgenommen und bewertet?

   - Informatik
   - Betriebswirtschaftslehre
   - Gibt es andere relevante Nachbardisziplinen?

Legitimation der Wirtschaftsinformatik als wissenschaftliche Disziplin

1. Welche Rolle hat das Bemühen um Legitimation für die Entwicklung der Disziplin gespielt?

2. Wodurch hat sich Legitimation vor allem eingestellt?

   - Forschungserfolge
   - Nachfrage bei Studierenden
   - Nachfrage in der Praxis (Absolventen, Drittmittel)

Inhaltliche Profilierung

Forschungsgegenstände

1. Was ist der zentrale Forschungsgegenstand der Disziplin?

2. Hat es bzgl. des zentralen Forschungsgegenstandes der Disziplin Änderungen im Zeitverlauf gegeben?

3. Welche Rolle spielt(e) die Kooperation mit Unternehmen für die Forschung?

4. Welche Bedeutung kam/kommt Modethemen zu?

Forschungsziele

5. Was sind die wesentlichen Forschungsziele der Disziplin?

6. Welche Bedeutung haben dabei Beschreibung, Erklärung und Gestaltung?

7. Welche Rolle spielen Probleme in der Praxis bei der Formulierung von Forschungszielen?

8. Gibt es herausragende Forschungsergebnisse, die das Profil der Disziplin wesentlich geprägt haben?

Forschungsmethoden

9. Gibt es in der Disziplin einen – mehr oder weniger festgelegten – Satz akzeptierter Forschungsmethoden?

   Wenn ja: Seit wann? Hat es diesbezüglich im Laufe der Zeit deutliche Änderungen gegeben?

10. Wie ist die Bedeutung folgender Forschungsmethoden einzuschätzen?

   - Empirische Untersuchungen (positivistisch, „quantitative" Forschung)

   - Interpretative Studien (Fallstudien, „qualitative" Forschung)

   - Aktionsforschung

   - Konstruktionsorientierte Forschung („Design Science", „Forschung durch Entwicklung")

   Welche Bedeutung haben dabei Beschreibung, Erklärung und Gestaltung?

Vielfalt

11. Wie schätzen Sie die Entwicklung der Themen- und Methodenvielfalt innerhalb der Disziplin ein? Konkreter:

   c) Hat es inhaltliche Auseinandersetzungen gegeben? Wenn ja: Wie wurden sie geführt? Was haben sie bewirkt?

   d) Hat es Auseinandersetzungen bzgl. der angemessenen Forschungsmethoden gegeben? Wenn ja: Wie wurden sie geführt? Was haben sie bewirkt?

12. Gibt es innerhalb der Disziplin verschiedene Communities? Wenn ja: Wie ist das Verhältnis der Communities (indifferent, Vorbehalte, verfeindet…)?

(Hochschul-) politischer Kontext

1. Wie ist die Unterstützung der Entwicklung der Disziplin durch die Universitäten zu bewerten?

   Was sind dabei die wesentlichen Motive?

2. Wie würden Sie das Bild der Disziplin in und die hochschulpolitische Unterstützung durch die – bzw. Fachvertreter der – Nachbardisziplinen BWL und Informatik beschreiben?

3. Wie lässt sich der Einfluss wissenschaftlicher Verbände auf die Entwicklung der Disziplin charakterisieren? (z. B. Verband der Hochschullehrer für Betriebswirtschaft, WKWI, GI, AIS)

4. Welchen Einfluss hatten politische Institutionen (z. B. Wissenschaftsministerien) auf die Entwicklung der Disziplin?

5. Inwiefern haben Förderinstitutionen (z. B. DFG) die Entwicklung der Disziplin beeinflusst?

Entwicklung der Lehre

1. Wie verlief die Entwicklung disziplinspezifischer Curricula?

   Welche Einflussfaktoren haben deren Entwicklung maßgeblich bestimmt?

   (z. B. Standesorganisationen, Nachbardisziplinen, Anforderungen aus der Praxis)

2. Welche Rolle spielt die Informatik in den Inhalten der Lehrveranstaltungen der Disziplin?

3. Welche Rolle spielen betriebswirtschaftliche Konzepte in den Inhalten der Lehrveranstaltungen der Disziplin?

4. Gibt es einen deutlichen Unterschied zwischen Forschung und Lehre oder kann man eher von einer Einheit sprechen?

5. Wie hat sich die Attraktivität des Abschlusses in der Praxis entwickelt?

Verhältnis zur Praxis

1. Wie schätzen Sie die Entwicklung und den aktuellen Stand der Kooperation von Wissenschaftlern der Disziplin mit der Praxis ein?

   (z. B. gemeinsame Projekte, Workshops/Seminare, Praktikerkonferenzen, Beraterfunktion)

2. Wie ist Ihrer Meinung nach das Bild der Disziplin und ihr Ansehen in Fachkreisen in der Praxis einzuschätzen („IT/IS Professionals")?

3. Welche Bedeutung messen Sie der Praxisorientierung für die Profilierung der Disziplin bei?

   Hat sich der Stellenwert der Praxisorientierung im Laufe der Entwicklung der Disziplin gewandelt?

Beurteilung der gegenwärtigen und zukünftigen Situation

1. Welche zentralen Stärken und Schwächen der Disziplin würden Sie als Ergebnis der Ist-Analyse hervorheben?

   (z. B. im Hinblick auf Qualität und Nutzen der Forschungsergebnisse, Stand im internationalen Wettbewerb, Eigenständigkeit der Disziplin)

2. Auf die Ist-Analyse aufbauend: Wie prognostizieren Sie die zukünftige Entwicklung der Disziplin?

   (z. B. bzgl. Profilierung, internationaler Ausrichtung)

3. Welche Empfehlungen würden Sie für die weitergehende Entwicklung der Disziplin geben?

   (z. B. bzgl. Profilierung, internationaler Ausrichtung)

The Institute for Computer Science and Business Information Systems (ICB), located at the Essen Campus, is dedicated to research and teaching in Applied Computer Science, Information Systems as well as Information Management. The ICB research groups cover a wide range of expertise:

Research Group	Core Research Topics
Prof. Dr. H. H. Adelsberger Information Systems for Production and Operations Management	E-Learning, Knowledge Management, Skill-Management, Simulation, Artificial Intelligence
Prof. Dr. F.-D. Dorloff Procurement, Logistics and Information Management	E-Business, E-Procurement, E-Government
Prof. Dr. K. Echtle Dependability of Computing Systems	Dependability of Computing Systems
Prof. Dr. S. Eicker Information Systems and Software Engineering	Process Models, Software-Architectures
Prof. Dr. Ulrich Frank Information Systems and Enterprise Modelling	Enterprise Modelling, Enterprise Application Integration, IT Management, Knowledge Management
Prof. Dr. M. Goedicke Specification of Software Systems	Distributed Systems, Software Components, CSCW
Prof. Dr. T. Kollmann E-Business and E-Entrepreneurship	E-Business and Information Management, E-Entrepreneurship/ E-Venture, Virtual Marketplaces and Mobile Commerce, Online-Marketing
Prof. Dr. B. Müller-Clostermann Systems Modelling	Performance Evaluation, Modelling and Simulation, SAP Capacity Planning for R/3 and mySAP.com, Tools for Queueing Network Analysis and Capacity Planning, Communication Protocols and Distributed Systems, Mobile Systems
Prof. Dr. K. Pohl Software Systems Engineering	Requirements Engineering, Software Quality Assurance, Software-Architectures, Evaluation of COTS/Open Source-Components
Prof. Dr.-Ing. E. Rathgeb Computer Networking Technology	Computer Networking Technology
Prof. Dr. R. Unland Data Management Systems and Knowledge Representation	Data Management, Artificial Intelligence, Software Engineering, Internet Based Teaching
Prof. Dr. Stephan Zelewski Institute of Production and Industrial Information Mangement	Industrial Business Processes, Innovation Management, Information Management, Economic Analyses