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What's It Like to Do An Informtion Systems PhD in Europe? Diversity in Practice of IS Research

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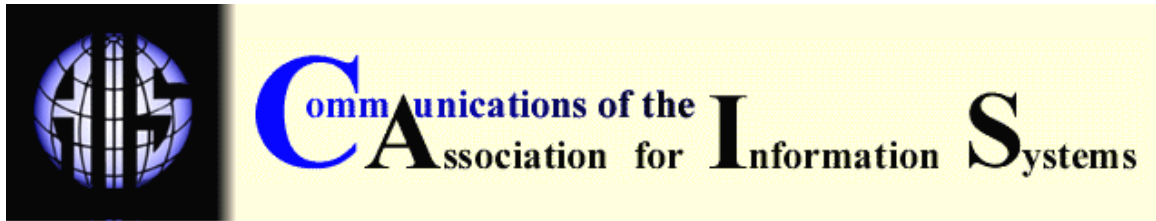
WHAT IS IT LIKE TO DO AN INFORMATION SYSTEMS PHD IN EUROPE? DIVERSITY IN THE PRACTICE OF IS RESEARCH

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ABSTRACT

This paper is based on a panel presented at ECIS 2003 that sought to explore the extent of diversity in practice in PhD programmes within AIS region 2. It presents respondents from six European countries: Germany, Norway, Italy, the United Kingdom, Spain, and the Netherlands. The participants address questions about the nature of their PhD programme in terms of such factors as admission, funding, style of dissertation, format of examination, employment prospects. Whilst some patterns exist amongst the experiences, diversity is still considerable. The paper concludes with a discussion of the impact of this evidence for the global field of information systems.

Keywords: PhD research, Europe, Diversity, globalisation

I. INTRODUCTION

This paper is based on a successful panel presentation at ECIS 11 in Naples, June 2003. The paper extends the oral presentations by enabling contributors to provide more detail than a 1½-hour slot enables and adding one further national contribution from a panelist who was unable to

attend the conference. It also includes further reflections by contributors to some of the questions raised by the audience.

The aim of the original panel was presented as follows:

> It is widely acknowledged that diversity is considerable in the process of doing a PhD, especially in Europe with its many different national models [Avgerou, *et al.* 1999] for PhD programmes. The aim of this panel is to explore the diversity of PhD experiences in Europe, from the perspective of the PhD students themselves. The panel will therefore consist of presentations from a number of current or recently completed PhD students who will reflect on a series of questions designed to highlight the differences and commonalities in their experiences.

By organising the panel, we sought to highlight just how diverse practices are, even amongst European countries that share many similarities. Experience with previous panels [Whitley, *et al.* 2000] has highlighted that even if diversity is expected in practice, there is still opportunity for surprise when the details are presented.

 At another level, many of the differences lie on top of underlying similarities: the benefits of applying the discipline of writing conference papers, and reacting to reviewer comments, are helpful whether producing a monograph thesis or a PhD by publication.

For IS academics, the paper therefore aims to contribute to the information systems field at three levels:

> 1. By providing information about practices in PhDs in AIS region 2. It is hoped that this will be generally informative, as well as providing opportunities for 'appropriating' examples of best practice. The paper will also prove useful for those involved in recruiting faculty from an international market (Freeman, *et al.* 2000), who participate in PhD consortia, or who examine theses internationally.

> 2. By providing a meta–analysis of the similarities and differences in practice amongst the countries and institutions under consideration.

> 3. By raising broader questions about the global nature of information systems: what are the consequences for IS theory and practice given these issues? Should the editorial practices of our journals change to accommodate these styles of PhD?

II. STRUCTURE OF THE PAPER

In the next section, the panellists will introduce themselves and their PhD studies. Next the students will answer these 7 questions:

- What kinds of timescales are involved in completing the PhD? How are PhD students funded? How many students start the PhD programme each year?
- Are PhD students expected to teach whilst completing their PhD?
- Are students expected to publish during their PhD?
- Do students choose their own topic, or does their supervisor allocate the topic to them?
- What is the course workload?
- What career opportunities do having a PhD open up?
- What is the format of the PhD examination?

Finally, they will reflect on how representative their experience is. For ease of reading, the answers to each question will be listed 'by country' rather than by student name. A brief discussion of the key issues arising from the responses follows each question.

The paper ends with a discussion of the implications of this data for the information systems field.

III. INTRODUCING THE PANELLISTS

GERMANY

Michael Rill. I am a PhD student in the Department of Information Systems at the University of Regensburg. I hold a diploma degree from the University of Regensburg. The topic of my PhD is service-oriented architectures in banking. The final thesis will be submitted, in the form of a monograph, in 2006.

NORWAY

Edoardo Jacucci. I am conducting my PhD studies at the Department of Informatics, University of Oslo. I received an MSc in Information Systems Engineering from the Politecnico di Milano, Italy. The topic of my PhD is the study of standards and standardization processes of information infrastructures in the health care sector. My research is based on two case studies in hospitals in Norway and in rural South Africa. I just started my third year of study out of four. The final thesis will be in the form of a collection of five articles. I already submitted the first three articles for review at international conferences. I plan to be finished in 2005.

ITALY

Chiara Frigerio. In 1999 I graduated in Business Administration at Università Cattolica di Milano with a thesis on ERP in Hospitals and I expressed the intention to continue to study this field. In 2003 I discussed my PhD thesis at Università Cattolica del Sacro Cuore in Milan. I attended my three-year PhD courses at LUISS University of Rome in Information Systems. (Rome is the only University hosting an IS PhD course in Italy and it is in a consortium with Università Cattolica).

My PhD thesis's aim was to study the relationship among information systems and organisational design in the banking industry. I use both the information systems and management literatures to understand how to study the relationship behind both a positivistic and "interpretative" point of view. I am working hard on my thesis in order to publish it.

UK

Mary Darking. I just came to the end of my third year of PhD studies at the London School of Economics and Political Science and I am currently writing up my dissertation on the integration of learning technologies into two UK universities. I hope to submit my thesis within the next few weeks.

SPAIN

Cristina Cáliz. My background is in economics in the Universitat Pompeu Fabra. I am in the final stage of my PhD studies at IESE Business School, University of Navarra, and I am currently writing up my dissertation on Information Systems. My thesis is about eLearning. My research seeks to provide some guidance about the effect of new information technologies in high–level executive education, providing a conceptual framework of the key factors that must be taken into account for the efficient and effective design of an executive education course that combines traditional face–to–face education with e–learning.

THE NETHERLANDS

Anna Nöteberg. My academic background is in media and communication studies. I am currently finalizing my dissertation entitled "The Impact of Electronic Communication Media on Belief Revision during Auditor-Client Inquiry" at the Department of Business Studies, University of Amsterdam. I am in my 4th year of study and expect to finish in the spring 2004.

IV. WHAT KINDS OF TIME SCALES ARE INVOLVED IN COMPLETING THE PHD? HOW ARE PHD STUDENTS FUNDED? HOW MANY STUDENTS START THE PHD PROGRAMME EACH YEAR?

GERMANY

On average, students need about four years to finish their PhD but there are no fixed time scales since the PhD is independent of the employment contract at the university. There are examples of PhDs taking 10 years and students needing just two years. In general, PhD students are hired as research assistants for Professors and then do a PhD, either based on the project they are working on, or independent of it.

Since an explicit PhD programme with fixed PhD courses does not exist, we don't have fixed entry dates when students begin their PhD in Germany. Each Professor will have about 5 to 7 PhD students at any one time. When they complete their PhD and leave the university, the position becomes vacant and a new student is admitted.

NORWAY

Officially the PhD takes 3 years, although 4 years is the norm if the student is financed by the Department of Informatics. In practice it may take much more time.

Acceptance onto the programme and financing are separate issues. The Faculty of Mathematics and Natural Science (of which the Department of Informatics is a part) decides on the acceptance to the 3-year PhD programme. The financing may come from the Norwegian Research Council (3 year contract), a private financer (3 year contract) or the Department of Informatics (a 4 year contract with a 25% teaching requirement). Our department currently includes 14 PhD students in Information Systems. On average, 2 to 3 new PhD students are accepted every year. Recent statistics are as follows: 3 new students in 2003, 2 in 2002, 1 in 2001, and 5 in 2000. In 2000, the high number was due to the launching of an international cooperation program involving new PhD students from Mozambique and India.

ITALY

In Italy the Information Systems PhD programme lasts three years. To enter the PhD programme students must apply to a national competitive examination open to all with a first degree. The examination consists of a written and an oral test. The examination committee decides who will be the PhD student's supervisor. In Italy 6–8 scholarships are offered per year for PhD students in Information Systems. The students are based in a consortium of four universities (LUISS in Rome, Università Cattolica in Milan, Università La Sapienza in Rome and Università di Bari). A small number of other PhD students (usually not more than 1–2 per year) are supported by private funding.

UK

The stated timescale for doing a PhD in the department is 3 years (full time study). If students receive funding from a research council or other funding body (a rare occurrence), funds cease after 3 years. However inscribed the model of a 3 year PhD is, the gap between this timescale and typical student experience is significant. The average time for a student to complete a PhD in our department is 4 years. Out of the 55 Information Systems PhD students in our department, 17 have been studying for more than 3 years; some are not yet finished after more than 10 years of study.   From a student perspective, when taking into account the number of students around who haven't finished, the sense is that completing in 3 years is unrealistic. This year, 12 students joined the PhD programme in the Department. This number is typical for recent years.

SPAIN

The programme lasts for a minimum of 3 years and a maximum of 5 years. Students generally finance their PhD through a combination of their own resources, scholarships, and bank loans. Candidates must possess a Spanish university degree or its equivalent. Those who completed

their studies in Spain must have a university diploma, engineering or architect's qualification granted by a Spanish university. All applicants must take The Graduate Management Admission Test (GMAT) and The Test of English as a Foreign Language (TOEFL) if their native language is not English. The Admissions Committee for the PhD in Management makes its final decision on each application based on the completed application materials and the interview report.

No application is disregarded for financial reasons. Financial aid based on need and merit may be granted by IESE in the form of scholarships within specific fields designated by IESE as areas of priority research. IESE offers eight full fellowships to outstanding students wishing to develop their doctoral thesis in the field of management. Such aid may be renewed each year depending on the student's academic record in the course of the PhD programme. Receiving an IESE fellowship implies working as a research assistant after the first year of the PhD Programme. Typically, eight full time fellowships are awarded each year.

THE NETHERLANDS

Doing a PhD in Information Systems in the Netherlands officially takes 4 years, meaning that once funding is granted, it lasts for 4 years. Students are either employed as research assistants or they receive a stipend. Depending on the financial position of the University, extension of this 4-year period is possible albeit rare. Although most IS departments employ PhD students on a full-time basis, in some cases people work as lecturers and complete their dissertation part-time. The number of students accepted each year varies widely across universities, departments, and professors. For example, my Department of Business Studies accepts between 1 and 3 PhD students per year, but out of these typically no more than one student per year starts in information systems.

COMMENTS

From these responses it is apparent that the typical PhD (officially) takes three years, although the practice appears to be longer, especially if the student receives funding in return for teaching / research responsibilities. Some countries, especially the UK, are trying to shorten the completion time and increase PhD completion rates (for example, it seems likely that the national funding bodies in the UK will penalise universities for any students not completing their PhDs within the equivalent of four years full time study). This policy would suggest that the PhD is increasingly seen as the equivalent of a practising certificate; a practical project to be managed rather than an open-ended enquiry.

V. ARE PHD STUDENTS EXPECTED TO TEACH WHILST COMPLETING THEIR PHD?

GERMANY

Yes, PhD students are supposed to assist with at least one lecture per semester. Sometimes the working contract of a PhD student is tightly connected with a university teaching position. The professor usually holds the lecture itself with the PhD students undertaking supporting roles by preparing the lecture and holding the accompanying tutorial. If the professor is on sabbatical[1] PhD students usually give the lectures.

NORWAY

In Norway it depends on who is financing the student. If the PhD is financed by the Department (4–year contract) the student is expected to use 25% of the time (one year's work) on teaching and similar tasks. For other students teaching is not required.

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[1] In Germany professors are normally allowed to take one semester time out from teaching every 8 to 10 semesters to fully concentrate on their research activities

ITALY

In Italy the funding rules mean that PhD students must not teach during their period of research. Occasionally, professors can ask their students to substitute for them in a lesson but such cases must be exceptional and with the previous approval of the Faculty Board. However, PhD students are usually involved in teaching assistance, in the sense that they help their professors in some classes and with the students.

UK

LSE PhD students are strongly encouraged to teach whilst doing their PhD. Being an institution-wide approach, special policies and procedures support the employment of research students. These policies are designed to make sure students are not being taken advantage of and to ensure that academic standards are maintained. Implicit within the teaching experience is both formal and informal training on how to teach, how to mark assignments, and how to deal with student questions both in class and in 'office hours'. Students are commonly employed as either 'Occasional Teachers' or 'Teaching Assistants'. Occasional teachers teach classes of up to 15 students. Teaching assistants take part in class teaching and also take on administrative responsibilities for a course or programme of study. Neither occasional teachers nor teaching assistants give lectures. An upper limit of 15 hours teaching per week is imposed by the school. Like publishing, teaching is generally considered to be useful experience for those wishing to go into an academic career but no extra time is allowed for finishing the PhD for those students who take on teaching commitments.

In the last two or three years PhD students became increasingly involved in the use of on-line learning technologies within the school. In these cases, as well as being an occasional teacher, research students are also expected to be responsible for putting course materials into the on-line learning environment where such technologies are used.

SPAIN

Although the PhD may be partially financed by IESE, it does not involve any employment relationship with IESE, nor does it imply that IESE will necessarily include fellowship holders in its staff in the future. Because IESE offers only graduate programmes in which only professors with PhD degrees are allowed to teach, PhD students may not teach on any of IESE's programmes. Nevertheless, they may act as teaching assistants. PhD students are encouraged to teach at other universities after completing their special field examination.

THE NETHERLANDS

PhD students who are employed as lecturers spend more time teaching than doing research. However, in the case of research assistants, the focus is on research. Students are normally expected to teach approximately 1 day per week.

COMMENTS

This question reveals divergences in practice. PhD students progressing to an academic (rather than a research–only or business career) will be expected to teach; yet there is considerable variety in how they are to prepare for this very different role. The UK is the most structured, providing explicit training support for the teaching experience. Norway, in contrast, only provides this experience for some directly funded students, whilst other countries seem to expect PhD students magically to be skilled teachers upon completion of their theses.

VI. ARE STUDENTS EXPECTED TO PUBLISH DURING THEIR PHD?

GERMANY

There is no official rule, but most professors expect their PhD students to start publishing in their first year.

NORWAY

The usual PhD thesis is a collection of 5 to 6 published papers and a "kappa" (introductory chapter) of around 100 pages. The papers should preferably be published in peer-reviewed international conferences and journals. Often one paper published at IRIS is tolerated. Given these constraints, the papers in the thesis are normally written in English.

A monograph is acceptable but is becoming less customary. The monograph is usually in English.

ITALY

There is no specific rule about publishing papers or articles for the PhD. Students are expected to write a thesis that is a monograph about a specific topic. Each year, however, students are expected to write a report on their activities that is evaluated by a special committee. Publications contribute to a positive evaluation.

UK

There is no explicit expectation or ruling from the department that students should publish in either journals or conference proceedings during the course of the PhD. Publications are not taken into account at the examination. The significance of journal publications to an academic career is clearly communicated, but so is the idea that this is a measure which has not always been in place within the IS community.

SPAIN

It is not a formal requirement, but every student is encouraged to publish in the second stage of the PhD process. The final dissertation can be a monograph or a collection of papers. Those students that write a collection of papers are encouraged to publish each paper as soon as they finish them. Those that select the monograph are also encouraged to publish it, but after the dissertation is finished.

THE NETHERLANDS

Publication is not required but encouraged. At the end of the PhD process, the dissertation itself is published in a book format. The book does not preclude publication of the material in journals.

COMMENTS

This question reveals both some of the largest differences and areas of similarity. The clearest distinction is on the role that publications play in the final PhD. For some, such as Norway, the PhD is typically a collection of publications whereas in other countries the dissertation is a monograph.

It would be reasonable, therefore, to assume that publications play a very different role in these two systems. In practice, however, all PhD students gain something from submitting versions of their work for conferences and journals. The discipline of submitting by a particular date, presenting a structured argument in around 5000 words, and receiving detailed feedback from the peer review process are all helpful to PhD students. Moreover, many students develop their papers into chapters of the thesis, suggesting that the monograph as a whole may be closer to the PhD by publications than first assumed.

An important disciplinary distinction is worth noting, in that information systems focuses far more on journal article length pieces, whereas book length pieces are the norm in other disciplines. It is also worth noting that in an analysis of ECIS citation patterns (Galliers and Whitley 2002), the most frequently cited items were all books rather than journal articles.

VII. DO STUDENTS CHOOSE THEIR OWN TOPIC OR DOES THEIR SUPERVISOR ALLOCATE IT TO THEM?

GERMANY

In most cases, students applying for a position as a research assistant are also applying for a topic that goes with the assistantship. To this extent PhD students choose the general direction by choosing the professor.

If the topic is not allocated to the PhD student right from the start, it will be discussed between the student and the professor and a topic will be chosen which suits both. In some cases students are allowed to choose their own topic.

NORWAY

The topic is very much up to student, although it is often aligned with the research interests and approaches of the research group. The choice of the group and of a supervisor often reflects a choice of the research field and often of the field site.

ITALY

The student decides the topic in accordance with the interests of the supervisor. However, the main responsibility for the thesis is with the student who makes the final decision.

UK

Predominantly, the student chooses the topic although in consultation with a member of faculty with some interest and involvement in the general topic area.

SPAIN

We are free to choose the topic of the dissertation and then we must look for a supervisor interested in supervising the theme chosen by the student. However, IESE is the home of 8 research centres and 9 research chairs, which have their own funds and are developed under the direction of IESE faculty. Working in these areas is a big opportunity to obtain funds, although it implies more guidance in the topic selection.

THE NETHERLANDS

In most cases, students choose their topic in agreement with their thesis supervisor ("promotor"). However, sometimes faculty employ PhD students after they drafted their own research proposal.

COMMENTS

Although the students present different versions of the process of matching students with supervisors, the process is essentially the same: the relationship between student and supervisor is based on a match of interests between the two. In some cases, Germany especially, the supervisor explicitly looks for students to study a particular topic. From the answers given it would appear that in many cases, the match is only partial (the supervisor is looking for someone in a broad area, the student is looking for someone with interests roughly that match their own)

but with some leeway. In particular, the model does not seem to be one of selecting the best performing students in the field and allocating dissertation topics to them.

VIII. WHAT IS THE COURSE WORKLOAD?

GERMANY

A research assistant contract typically specifies a 40-hour week. If the dissertation topic is not part of the research project, most of the work for the PhD is done outside of those 40 hours.

PhD students are expected to learn about research methods during their diploma, especially when writing their diploma thesis. Since only students with a diploma grade of 2.5 or better are allowed to undertake a PhD they can be expected to know at least the basics. During the PhD it is more learning by doing (e.g., reading books about research methods, learning from colleagues). It makes life a lot easier if one makes some effort to improve formal research skills although you are not obliged to do so.

NORWAY

It used to be 18 credits but this is changing to 10 credits. 2 credits can be earned through a period of study abroad and external PhD courses. Attending and passing courses should gain the rest. Each course is worth 2 to 3 credits. There are two PhD specific courses (one on IS theories: one week) and several Master courses (semester based with a 2–5 hours/week course load). Ideally all credits should be gained during the first year.

ITALY

In Italy PhD students are totally paid by a fixed Government scholarship. Students are expected to do research with their supervisors and therefore cannot be paid for any other kind of extra work. That said, PhD students do not have any contract with the Government that obliges them to do a certain amount of research. Thus, students do not have to work a fixed time at the University.

They have just to deliver the final thesis and attend the PhD courses that are usually concentrated in the first year.   PhD courses are mainly held by full professors in IS, Organizational Theories, Sociology and Statistics. As yet, there is not a formal credit system but students must attend all classes.

During the second year they are expected to stay in a foreign university for not less than six months. They will choose the university in conjunction with their supervisor. At the end of the period they have to write a report about what they did at the foreign university.

UK

In the first year of the PhD programme, students are expected to take a two-term course on research methods that is run exclusively for first year PhD students. They are also required to take 2 other courses (one term each).   It is recommended that one of these courses be 'Interpretations of Information Systems', a theoretical course which considers some philosophical foundations of IS studies, and that the other be from a course area external to the department but within a related area of study.

SPAIN

It's variable depending on the year. The first 1st year has a full-time workload, with more that 600 hours of classes, organized on a trimester basis.

During the 2nd year students attend some advanced courses and specialized courses and seminars to prepare for the special field examination. From the 3rd year the rhythm and workload is managed by the supervisor, depending on such factors as eventual teaching loads, the number of conferences that a student plans to attend, and the thesis methodology and structure. Once the student has passed the special field examination, the proper dissertation work begins. This work is approved ex-ante, and the submission of a formal thesis proposal is required.

During the 4th and 5th year the student carries out the dissertation work.

In addition, students are offered the opportunity to work as research assistants to IESE faculty members during the summer between the first and second years of the programme. Often this work will entail participation in key research projects being carried out by IESE's faculty.

THE NETHERLANDS

Most Dutch universities have no formal course structure or requirement for PhD students. PhD students typically follow courses depending on their research interest and methodology choice. Courses are available on a national level or abroad.

COMMENTS

This is an area where there is once again considerable diversity in practice and in the underlying logic behind the practice. For example, the German model presumes that students have the requisite background knowledge and skills, whereas the British and Spanish models provide specialist training in these skills as part of the PhD programme. The amount of time devoted to such training also varies considerably. Table 1 gives links to some of the courses available.

A feature of the Italian system, particularly, is the requirement that students spend at least six months studying overseas. This requirement is common for all PhD courses, not only the ones in IS. Ignoring the practical issues of arranging such visits, the process does ensure that the students are exposed to a range of theoretical approaches and styles, thus developing their own individual style rather than simply replicating that of their supervisor (Dreyfus 2001).

Table 1 Links to Courses Taken by the Students

Country	PhD Courses
Norway	http://www.ifi.uio.no/~systarb/in460/ http://www.unik.no/~ketillu/emnebeskrivelser/MNVIT401.htm Plus a choice from upper level Master courses (series INF5000): http://www.uio.no/english/academics/courses/
UK	http://is.lse.ac.uk/phdprog/IS555.htm and http://is.lse.ac.uk/Events/res_seminars.htm
Spain	http://www.iese.edu/en/Programs/PHD/ProgramStudy/Programofstudy.asp

IX. WHAT CAREER OPPORTUNITIES DOES HAVING A PHD OPEN UP?

GERMANY

A PhD opens up both executive management and scientific positions. Some students choose the academic route and do their postdoctoral lecture qualification to become a university professor or directly apply for a position as a professor at a polytechnic.

In the economy, a PhD opens up higher-level executive positions at larger companies but eliminates most chances to become employed at small companies.

NORWAY

PhD graduates work for industry, in applied research contexts, and academia. The last two graduates from the department remained in academia.

ITALY

The PhD title is a prerequisite to an academic career. Usually firms do not ask for such research competence partly because Italian enterprise culture is less prone to investing in research.

UK

The PhD offers research training. Most of the students who take it end up in research careers. For some, this encompasses careers in management consultancy and business but the majority pursue an academic career.

SPAIN

Especially research and teaching positions at business schools and universities. However, because the degree is a PhD in Management, candidates can also open up executive management positions, especially in multinational companies.

THE NETHERLANDS

Like other European countries, PhDs in the Netherlands end up either in research and teaching positions, in management positions, or a combination of both. Combining the two seems to be a commonly chosen route for PhD graduates in the Netherlands.

COMMENTS

Given that PhD students will spend 3–4 years working in a very specialised area, it is perhaps not surprising that they commonly continue their careers in academia where this level of specialisation is appreciated and rewarded. The extent to which a PhD is seen as suitable for commercial / managerial positions seems to vary by country.

X. WHAT IS THE FORMAT OF THE PHD EXAMINATION?

GERMANY

The PhD examination consists of three parts:

1. Dissertation: The dissertation is a monograph containing the scientific conclusions of the PhD student. It is supposed to show the student's ability to work scientifically. Two doctorial professors, the supervisors, mark it. In Regensburg it must be written in German but the doctorial commission can make an exception and decide to accept a dissertation written in another language.
2. Two oral examinations, the rigorosum and the disputation:

    a. Rigorosum: The rigorosum is an intense discussion with the two doctorial supervisors about two subjects being connected to the dissertation's topic. The two subjects are communicated to the student in advance. The rigorosum takes 90 minutes and is not public.
    b. Disputation: Once dissertation and rigorum are passed, the doctorial commission set up a board of three professors for the disputation. The board usually consists of the two doctorial supervisors and the faculty's dean. The objective of the disputation is to discuss the dissertation's main findings with the PhD student and to check whether the student is in control of the scientific area. The disputation is in public and can sometimes get very tense since the board of professors

question the results of the dissertation.
The overall mark is calculated as the mark of the dissertation times four plus the marks of the rigorosum and the disputation divided by six.

The hardest part of doing a PhD in Germany is writing the dissertation since students receive little feedback, which makes it especially psychologically demanding. Once they successfully mastered the writing part (students usually get their marks for the dissertation before the oral examinations) the chance of failing overall is small. I haven't heard of a case where a student successfully passed the dissertation and failed due to the oral examinations. Having worked on their topic for three to four years, the students usually know about the strengths and weaknesses of their work. Therefore they have some kind of "home field advantage" in the defence examination. Nevertheless it is the last critical step of the PhD. In Germany the PhD is a "one shot operation" meaning that you are not allowed to try again if you fail, so you have to be thoroughly prepared.

NORWAY

A thesis is required, normally in the form of a collection of papers with an introductory chapter (100 pages).

In Oslo the examination works as follows:

When the candidate feels ready and (usually) the supervisor agrees, a mock defence is organized. The mock defence is a simulation of the real defence. The main purpose is to assure the quality of the thesis. For this purpose a committee is chosen to simulate the real committee: one external faculty, an internal faculty, and (!) the next internal PhD student in line. As a member of the committee this other student will also have to read the thesis and judge it. During the mock defence, the real defence is simulated as described below. After the defence a report is written with suggestions for improvement and an overall judgement.

If the candidate passes the mock defence, the student and the supervisor propose a real committee to the Department of Informatics and, in turn, to the Faculty of Mathematics. If the committee is approved, then the thesis is sent to the committee for a first examination. The committee consists of two external faculty (the first and the second opponents) and an internal faculty (the administrator).

After reading the thesis the committee says whether the thesis is ready. If it is, the real defence is organized. Otherwise ... I don't know (it seldom happens)—In fact, the student is given at least six months of time to resubmit the thesis with considerable changes. In the real defence, the candidate gives a 2 hours lecture in the morning and defends the thesis in the afternoon.

The committee gives details of the lecture only 14 days before the defence date. The purpose of the lecture is to test the competence and ability of the candidate to organize, in a short time, an insightful and interesting lecture on a new topic. For example it may be a lecture on a perspective that was not used in the thesis.

The defence in the afternoon starts with the presentation of the thesis by the first opponent. Then the opponent starts the discussion by asking questions and clarifications of the candidate. The candidate answers. Then the second opponent discusses the thesis asking questions and clarifications and the candidate answers. Normally the internal (and third) opponent does not ask questions. I have seen nice defences with the opponents raising quite tough (though right) comments. Just attending to the defence is good in order to understand how serious and rigorous one has to be when writing. Between the first and the second opponent members of the audience can intervene and oppose the thesis. This happened once 25 years ago in the faculty of Theology but otherwise never happens.

After the defence the committee retires for the final judgement. Then the judgement is announced and (usually) champagne is served.

One has to consider that once the committee approves the thesis (before organizing the defence) the outcome of the examination is more a "formal approval" than a "real test". The event that the candidate fails the viva is not even considered in the regulations of the exams. As mentioned the system is changing. The older doctoral programme (*Doctor Scientiarium*, or *Doc. Scient.*) is leaving the stage for the *Philosophy Doctor* programme. The changes also affect the examination process. In the following table I will summarize the main differences.

Table 2. Comparison of Doc. Scient and PhD in Norway

	Doctor Scientiarium or *Doc. Scient* (Old)	*Philosophy Doctor* or *PhD* (New)
Course credits needed	18	10
Minimum number of supervisors	1	2
If committee fails the thesis: minimum time to provide improved thesis	6 months	4 weeks
Entity of change required	Major: basically rewriting the thesis	Also minor and specific (e.g. adding a new publication or editing the *kappa*)

ITALY

The PhD candidate should write a thesis, which is a 200-250 pages monograph, written with the supervisor's consensus. The thesis is usually written in Italian but the supervisor can also ask the Committee for it to be written in English. The thesis should be discussed at the end of the third year (or the fourth one in exceptional cases) by an oral examination conducted by a special Committee composed of three full professors: an internal (to the consortium) member and two external members. The latter are nominated by the consortium, which is stable during all the period. All supervisors of the PhD students of the course compose it. The supervisor could be the internal member of the Committee. The Committee meets once a year usually in October or November. That is, all PhD candidates of a given course, who want to discuss their thesis in a year, have to be present in the same day with the same Committee.

The discussion consists of 1-2 hours of defence. At the end, the PhD candidature could be accepted or rejected. If accepted, the student becomes Doctor, otherwise he/she cannot apply anymore to any PhD examination and any other PhD course. PhD candidates should apply to be examined by the Committee once their supervisor approved the work done, so are unlikely to fail. However, the supervisor cannot reject a candidature of a PhD. The consortium of supervisors that examines the thesis formally before the discussion could do this.

The examination is open to the public. However, no formal ceremony is foreseen and at the end usually Doctors go home without any champagne or wine!!

UK

The PhD is assessed by an oral examination conducted by two examiners. Six months prior to the oral exam, PhD students are asked to submit confirmation of their thesis title. The supervisor nominates two examiners (often in consultation with the student) who they would like to conduct the oral exam. One of these must be internal to the University and the other must be external. In LSE, the examiners are known to the student before the exam, in other UK institutions (e.g. Cambridge) the student only discovers the identity of the examiner upon entering the examination room.

The student is given the final say as to whether the thesis is ready to be examined. Although supervisors can make strong recommendations, they cannot prevent a thesis from being examined.

The oral examination is private, with two examiners asking the candidate about the thesis. The style of questioning varies according to the examiner. The typical duration of an examination is 2–3 hours. If the thesis is very good, the candidate may be given an especially hard time by the examiners.

The possible outcomes of the oral examinationare set out by the University of London and are as follows:

1. Pass
2. Pass with minor changes (normally typographical corrections)
3. Pass with 3 month revisions
4. 18 month for revisions
5. MPhil.
6. Fail

SPAIN

The Special Field Examination is developed during the second year of the Doctoral Programme and consists of deepening knowledge in the area of specialization, under the Special Field Director's supervision. The student must complete specified courses. Upon completing these courses and lectures, the student must prepare two research papers:

> 1. A document, which we call "horizontal". This document must provide an adequately referenced, clear overview or map of the area of specialization. It should not be an excessively long document—always fewer than 50 pages—in which, instead of describing all relevant papers and authors, a structured overview of the area is presented.

> 2. A document that we call "vertical". This document describes the literature on a very specific issue or management problem and its purpose is to provide a bridge for advancing in the future development of the student's thesis. This document's length should be equivalent to that of an article that could be published in any scientific journal.

These two documents are prepared under the supervision and direction of the Special Field Director. Together with the student, the Special Field Director draws up a list of names for the Special Field Tribunal. This tribunal is composed of two IESE professors in addition to the Special Field Director, and must be approved by the Doctoral Programme Committee. Of these two professors, at least one should be from the specialization area. The Doctoral Programme Committee asks this tribunal to decide on an agreed date for the special field examination.

The tribunal members read and evaluate the documents prepared by the student and send their comments to the Special Field Director. In the special field examination, the student presents elements of the two papers as previously agreed with the Special Field Director. During the examination, the tribunal members give their comments and ask questions, which the student must discuss orally. Upon completing the questions, the tribunal decides whether the student passes the specialization, needs additional work, or should repeat the examination and/or one or another of the documents.

The Special Field Examination is only graded as Pass or Fail. The tribunal writes a report on the student's papers.

To obtain the official degree of "Suficiencia Investigadora" (research sufficiency), the students who passed the special field examination must prepare a file of the research work performed to

date, which is assessed by a Tribunal designated by the DP Committee. The members of the Tribunal also receive a written evaluation signed by the Special Field Tribunal. The student makes a public presentation before the Tribunal on the day it decides to meet that year. The presentation should highlight the candidate's previous and present career path.

Students who successfully complete the required and specialized courses and approve the special field examination, but choose at that point to discontinue their PhD studies, can obtain a MSc Management degree.

Thesis examination. The thesis is written under the supervision of the Thesis Director, who can be a different person from the Special Field Director. Once the candidate passes the special field examination, the Thesis Director is chosen in accordance with the thesis theme. The thesis could be a collection of three papers or a monograph. A monograph is around 250 pages, written in English, with chapters devoted to methodology, literature review, etc. In the case of a collection of papers, candidates must prepare the papers with a structure that allows them to be published in important journals. The thesis examination consists of an oral presentation session with a committee of 5 members, two of them from our university and 3 professors from other universities. The examination is open to everybody, although only attendees with a PhD degree are allowed to ask questions or make comments. The Thesis Director cannot be a member of the committee. The maximum time for the presentation is 30–45 minutes, with as much time as needed for questions from the committee members. Candidates must present the thesis around 3 months before the defence day. After the presentation and questions from the committee the final thesis grade is immediately communicated to the PhD candidate.

THE NETHERLANDS

The PhD student works closely with their *promotor* (supervisor) and possibly *co-promotor* (2nd supervisor). Five months before the planned dissertation defence, the supervisors form the PhD committee. This group consists of 3 to 7 members. Committee members must be PhDs themselves, and should preferably also be assistant or full professors at the home or other universities. Full professors should form the majority of the committee. Members should be knowledgeable in the field the dissertation is written in. Although promotors officially choose the committee members, PhD candidates are commonly invited to state their preferences.

Once the promotor(s) approve of the final manuscript (about 3 months before the planned defence) the manuscript goes to the PhD committee. It is up to the committee to judge whether the manuscript is ready to be defended. The members either accept or reject the manuscript. In the case of acceptance, they are not allowed to require any revision at this point. If the manuscript is rejected, the PhD candidate is given one more year to make changes and adjustments under the promotor's guidance before resubmission. Upon the committee's final acceptance of the manuscript, the dissertation defence can be scheduled.

The public defence itself is more a ceremonial formality than a true examination. First, the PhD candidate gives a 10-15 minute presentation, mainly to inform the audience in lay terms about the central tenets of the dissertation. Then, the promotors, the PhD committee and the Dean enter and start questioning the student. From this point onward, the candidate has to defend his or her dissertation by answering questions raised by the committee members. After exactly one hour, the *pedel* (the person assisting in the ceremony) enters and shouts "hora est" (Latin for "it is time"). Then the promotors, the PhD committee and the Dean retreat for a 10-minute discussion. Only on rare occasions will the candidate will be rejected at this point. Upon their return, the candidate is given the PhD title.

COMMENTS

Perhaps unsurprisingly given the historical role of universities in the countries represented in the panel, there are very different forms of the PhD examination. Of particular note, however, is when the decision is taken that the dissertation makes a sufficient contribution. In some systems,

this process is handled internally, meaning that any dissertation that comes through that stage is very likely to succeed, whereas other systems leave the final decision to the examiners who have been asked to review the thesis. For example, in the UK system, the thesis advisor cannot prevent a student from submitting a thesis, even if the advisor does not feel it is ready to be examined.

All the examination processes involve both the examination of the written dissertation and an oral discussion of the ideas contained within it. The Norwegian system takes this one stage further, requiring the candidate not only to be able to present the work in the thesis, but also to demonstrate general academic abilities by presenting on a completely different topic.

XI. HOW TYPICAL ARE YOUR EXPERIENCES, IN TERMS OF YOUR COUNTRY

Given that you are all doing PhDs in your own particular institution, how typical are your experiences for the country as a whole?

GERMANY

It is not meaningful to talk about *the* German PhD programme, as in practice various kinds of PhD programmes are set up by individual universities. As a result, PhD programmes differ quite substantially among universities. I will introduce the main differences among those programmes and then concentrate on the programme being conducted at the University of Regensburg.

1. Contractual engagement: The three major forms of contractual engagement when undertaking a PhD project.
   - In the most common, a PhD student is employed by a professor and works as a scientific assistant. This kind of engagement is usually not bound to a formal PhD programme. The student mainly concentrates on the assistant job and works on the dissertation as time permits.
   - A PhD course, which is usually connected to a scholarship and a formal programme.
   - An external PhD student, where the university does not employ the student. These kinds of students have an agreement that the professor will supervise the PhD project. There is no further engagement between the two parties.
2. Dissertation: All PhD programmes in Germany require the submission of a dissertation, although there is some variation as to whether the dissertation is a monograph or a collection of published papers.
3. Formal education: As indicated above, the PhD programme can be either a formal one with a set of courses and colloquia to attend or an informal one where a student is expected to take care of his scientific education on his own.

In Regensburg most PhD students are employed by a professor as a scientific assistant. External PhD students are enrolled, but that is rather uncommon. The dissertation must be handed in as a monograph. No formal education is involved in the programme. This kind of programme is the most common one in Germany. The information in this section is mainly based on my experience in Regensburg and discussions with German PhD students from other universities.

NORWAY

The rules and regulations for the PhD programme in Norway are uniform at the national level. The programme is defined at national level. Localization and additional rules at University, Faculty, and Department level are allowed. For example, the constraint in the Doc. Scient. Programme that a failed thesis cannot be resubmitted before six months is a local regulation stipulated at Faculty level. Specific requirements on the curriculum of study for the completion of the PhD are formulated at Department level. More generally, I observed large similarities in PhDs pursued in other Norwegian Universities. After all, Norway is a relatively small country.

ITALY

From my experience I cannot see strong differences with my colleagues in the same IS course or in other ones outside of my University. The reason is that the general law which governs the PhD process is mandated by the Italian Government. Universities can only change it in minor ways. Moreover, the low number of academicians in the Italian universities contributes to the fact that usually PhD students are heavily and directly supporting their supervisors, so student's roles are in some ways, although informally, "institutionalised".

SPAIN

IESE's PhD in Management Programme is not a typical PhD in Spain. Although the programme is accredited by the Spanish Ministry of Education and Science, the differences between this programme and other PhDs in this country are huge: in terms of such factors as requirements, language, and course workload. For example, doctoral programmes in Spain generally require two years of further study, including coursework and dissertation, while IESE programme lasts for a minimum of three years and a maximum of five, given that the student starts working on the dissertation after the second year. Another difference is in the course workload. While other Spanish programmes require 32 credits (12 credits in fundamental content, 5 in external courses and 9 in research work), IESE's programme require two years of study involving more than 600 hours.

UK

In terms of subject area, LSE is fairly unique because it has a large information systems department sitting within a social science institution. This means that

- a large PhD cohort interacts at all stages of the PhD process;

- the topic matter of dissertations in the Department are not confined to business or applied computing as is common in for other students doing PhDs in information systems in business schools or computer science departments.

The Department maintains a very strong emphasis and institutional support for qualitative and interpretive research, which I find very useful for my own work, but does run counter to the prevailing studies in the mainstream journals. This difference also becomes very apparent when visiting other universities and taking part in doctoral consortia.

XII. CONCLUSIONS FOR INFORMATION SYSTEMS

Looking at the patterns in the answers given by the panellists, in some areas processes are quite similar.   Similarities include the choice of topic, the time spent normally completing the dissertation, and the expectation to publish whilst undertaking the PhD.   Understanding this uniformity directly impacts the expectations of journals and conferences that expect to publish work undertaken, at least in part, by PhD students. For example, our journals might wish to review articles coming out during the middle of the thesis against different criteria from those produced at the end of the dissertation. Similarly, with many recent doctorates going into teaching positions, it is imperative that their employers adjust their workloads to allow them sufficient time to develop the ideas emerging from their completed theses.

Questions of research funding vary considerably from country to country and can lead to very different skills in doctoral students. Thus recruiters in the global marketplace should be aware of the extent to which new hires previously undertook paid research or teaching. The kind of career opportunities offered by PhDs also seems to vary by country, and raises particularly interesting questions for Departments hosting PhD students from overseas.   Managing the mismatch between Departmental expectations for future careers and those of the students are likely to continue to be a cause of some concern.

The most visible differences exist at the level of the course workload and format of the dissertation (monograph or collection of papers). It is unlikely that these differences will change. These findings suggests that Information Systems will continue to evolve in an environment where the diversity among people completing PhDs in the area is considerable (in terms of research topic, research approach and research skills).   These people will be employed internationally. Therefore, it will not be possible to think of the information systems community living and acting in self–enclosed spaces of national states and their respective national societies (Beck 2000).

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REFERENCES

Avgerou C., J. Siemer, J. and N. Bjorn-Andersen (1999) The Academic Field of
          Information Systems in Europe. *European Journal of Information Systems* 8(2), 136-153.
Beck U. (2000) *What is Globalization?* (translated by P. Camiller) Cambridge: Polity Press.
Dreyfus H L (2001) *On the Internet.* London:Routledge.
Freeman, L A, S. L. Jarvenpaa and B.C. Wheeler .(2000) The Supply and Demand of Information
          Systems Doctorates: Past, Present, and Future. *MIS Quarterly* 24(3), 355-380.
Galliers R. D., and E. A. Whitley (2002) An Anatomy of European Information Systems Research
          ECIS 1993-ECIS 2002: Some Initial Findings. In *10th European Conference on
          Information Systems,* (S. Wrycza, ed.) 3-18, Gdansk, Poland.
Whitley E. A., A. Poulymenakou, D. Roode, G. Shoib, and G. J. Hofstede (2000) Panel: The Y2K
          Date Rollover: Experiences and Lessons Learned from AIS Region 2. In *8th European
          Conference on Information Systems* (H. R. Hansen, M. Bichler,and H. Mahrer eds.) 561,
          Vienna.

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