

■ M. JOHNNY RUNGTUSANATHAM, Feature Editor, W. P. Carey School of Business, Arizona State University



Cipriano Forza

is a professor of management and operations management at the Università di Modena e Reggio Emilia (Italy) and at the Università di Padova (Italy). He also teaches in the European Institute of Advanced Studies in

Management's EDEN Seminars for European Ph.D. students. He has been a visiting scholar at the University of Minnesota, Arizona State University, and London Business School. He currently serves as the regional secretary of the Italian Association of Management and Engineering. Dr. Forza has published in the Journal of Operations Management, International Journal of Operations & Productions Management, International Journal of Production Research, Computers in Industry, and other journals. He also recently published a book on product configuration with McGraw-Hill.

forza.cipriano@unimo.it



Christer Karlsson

is a professor of innovation and operations management at Stockholm School of Economics and director of the Institute for Management of Innovation and Technology. He holds M.Sc. and Dr. Techn. (industrial manage-

ment) degrees from Chalmers University of Technology, Gothenburg, Sweden. He currently serves or has served as vice chairman of the board of the European Institute for Advanced Studies in Management, vice president of the Production and Operations Management Society, and vice president of the management division of the Royal Swedish Academy of Engineering Sciences. He also sits on the board of European Operations Management Association and the European Institute of Japanese Studies. He is a member of the editorial board of International Journal of Operations and Productions Management, Journal of Product Innovation Management, International Journal of Innovation Management, International Journal of Entrepreneurship and Innovation Management, and International Journal of Automotive Technology and Management, and publishes frequently in these and other journals.

christer.karlsson@hhs.se

How are European institutions of higher education developing or intending to develop Ph.D. scholars? This fundamental question, addressed by Forza and Karlsson, highlights changes being implemented within the European environment. These changes will provide opportunities for greater cooperation between U.S. and European higher education institutions, as well as result in increased global competition for students (raw materials) and doctorates (finished goods).

The European Ph.D. in Operations Management: Quality Assurance and Efficiency by Collaborative Networks

by Cipriano Forza, Università di Modena e Reggio Emilia (Italy); and Christer Karlsson, Stockholm School of Economics

European Ph.D. programs in Operations Management (OM) have experienced significant changes in the last 10 years. We expect even greater changes during the next decade. In this article, we draw a contrast between what has happened and what is currently happening to European OM doctoral programs in order to better understand the implications of these changes on the future work of OM scholars.

Background on OM Research and Ph.D. in Europe

In order to understand OM Ph.D. programs in Europe, one must take an evolutionary perspective. If we go back in history, we can see that in some European countries OM was present in universities or business schools even before the 1980s—for details on Italy, see De Toni & Filippini (1998); for details on Spain, see Ribera (1998). In Sweden, for example, full professorships devoted to product development and OM were established in the mid-1960s. One of the authors, in fact, received his doctorate in 1975 as the first Ph.D. in the OM field at the Chalmers University of Technology. But, a starting point is, of course, always a matter of definition and interpretation, and one should be aware that professorships in, for example, industrial management, work organization, and production planning have been around even longer.

The 1980s and 1990s, however, witnessed a number of separate events that led to the academic establishment of OM in several European countries. In 1980, the Università di Padova in Italy hired its first Italian OM full professor. That same year, the *International Journal of Operations and Production Management*, a popular journal outlet for European OM scholars, was also launched in the U.K. Five years later, the first association of OM scholars in Europe (OMA UK) was founded.

In 1985, the European Community (EC) also committed itself to creating a single European common market by the end of 1992. This single market would have no internal frontiers and would allow for free movements of goods, persons, services, and capital. Because this commitment translated into, for example, easier travel requirements among member countries (e.g., no passport required), the possibility of research funds for common projects, the availability of research grants to study abroad, it would greatly influence the lives of OM scholars in subsequent years.

In 1987, the European Institute for Advanced Studies in Management (EIASM) in Brussels, The Netherlands, launched the International Production Management Conference. While the conference was held bi-annually during the early years, the conference quickly became an annual event as a result of increasing interest. An extensive European network of OM researchers was

established and met annually, however, without a formal association.

At the same time, a growing interest in OM issues from practitioners, universities and business schools, together with the increasing internationalization of research in Europe, led to an increased membership in OMA UK from continental Europe. In September 1992, at the London Business School, OMA UK chairman Professor Chris Voss (UK) asked both Professor Roberto Filippini (Italy) and Professor Roland van Dierdonk (Belgium) to explain what role they thought the OMA UK could play in Europe. After a debate, OMA UK decided to expand into continental Europe, eventually becoming EurOMA, without creating a separate chapter (Mitchell, 1992). In 1994, Voss and the EIASM International Production Management Conference creator and chair, Christer Karlsson, decided to merge the two separate networks combining the OMA UK conference and the EIASM conference into the annual EurOMA conference. By 1995, EurOMA was drawing affiliates from Italy, Belgium, Sweden, the Netherlands, France, Spain, and the UK.

European OM Ph.D. Education—Today Versus Ten Years Ago

At the beginning of the 1990s, it was not easy for European OM Ph.D. students to carry out research outside of their home country. Travel expenses, language difficulties, lack of contacts and, sometimes, even passports made it difficult to work abroad. Today, however, in some Ph.D. programs (e.g., Italy), Ph.D. students are required to spend at least six months abroad. This openness towards the internationalization of the Ph.D. experience has promoted cross-fertilization among different schools and approaches. Consequently, there is now a larger network of European OM scholars who could facilitate the definition and conduct of cross-country research projects.

Besides the possibility to work in different countries, another difference in European OM Ph.D. education is the quality of research being conducted. Today, European OM Ph.D. students are publishing at a greater rate than they were a decade ago. This is due in part to the fact that many of these students enter doctoral programs often with well-developed backgrounds in

OM. Furthermore, more sophisticated research tools and methods are being deployed in OM research. In fact, several well-known centers of excellence can now be found across Europe [see New (1998) and Voss (1998)]. Also, because scientific publications are more easily available from electronic journals and abstracting services, there is greater and more widespread awareness of the need to further improve Ph.D. training, with special emphasis on research methods.

Yet another important difference in European OM Ph.D. education today versus a decade ago is the increased time pressure on faculty who can supervise Ph.D. dissertations. Because teaching loads today are generally higher than they were 10 years ago, faculty availability for supervising Ph.D. students has become a constrained resource. Many Ph.D.-granting institutions have reacted not only by restructuring their curriculum but also by sharing the responsibilities for training Ph.D. students such that Ph.D. courses or seminars can be made available to Ph.D. students, irrespective of what discipline these students belong to and irrespective of where these students are enrolled.

The EDEN Project

Realizing the need to intensify and systematize its assistance in the research training of Ph.D. students, EIASM launched the EDEN (European Doctoral Education Network) program in June 1988. By December 2001, the EDEN program has involved 1,564 fellows and 196 professors and now functions as a European resource for enhancing doctoral education not only in OM but also in other management areas (adapted from EIASM Website).

The EDEN program comprises of 4.5-day to 6-day seminars on topics that are specific to different functional areas, as well as methodologically oriented topics that are applicable across disciplines. Although students have flexibility in choosing what and how many seminars to participate in, they are strongly encouraged to attend seminars not only in their own field of study but also in other disciplines of management as well. Currently, EIASM delivers EDEN seminars in accounting, finance, marketing, organization studies, and operations and production management.

Besides these seminars and courses, EIASM organizes doctoral workshops in collaboration with its member associations including the European Operations Management Association (EurOMA) and other management associations (e.g., EURAM, EAA, EARIE, EFA, EIBA, EMAC, IAAER). These workshops provide opportunities for Ph.D. students to present their own research works.

EDEN Seminars in Operations and Production Management

The EDEN seminars in operations and production management are organized over a period of two years and include:

1. Research Methodology in Production and Operations Management,
2. Materials and Production Control,
3. Human and Organizational Issues in POM, and
4. Operations Strategy and Economic Environment.

Each seminar typically involves 20-30 Ph.D. students annually. Some of the EDEN seminars in operations and production management are actually held in different places year after year. This mobility constitutes a stimulus to local improvement and contributes to the growth of a multi-centric system of Ph.D. training. Furthermore, Ph.D. students can gain a better knowledge regarding differences that exist between different environments across Europe.

The EDEN seminars in operations and production management, as well as similar initiatives at the country level (e.g., summer schools), are clearly contributing to setting and improving the quality of European OM Ph.D. education. One benefit of these initiatives is the development of materials that can be used in subsequent Ph.D. training—see, for example, the special issue of *International Journal of Operations and Production Management* on research methods in operations management (Karlsson, 2002).

The Construction of a European System of Ph.D.s

The EDEN initiative promoted by EIASM is the first signal of a considerable change that higher education in Europe is under-

going. The first official act in planning this change is the Bologna declaration on European space for higher education. This declaration, signed in June 1999 (on the premises of the Sorbonne declaration of May 1998), is a pledge by 29 countries (those of the EC and Eastern Europe) to reform the structures of their higher education systems in a convergent way. Significantly, the Confederation of the EU Rectors Conference and the Association of European Universities prepared the basis of the signed document [the Magna Carta Universitatum (1988)]. The common goal is to create a European space for higher education in order to enhance the employability and mobility of citizens and increase the international competitiveness of European higher education. The action program states that the European space for higher education should be completed in 2010. The specified objectives are:

- Adoption of a common framework of readable and comparable degrees,
- Introduction of undergraduate and post-graduate levels in all countries,
- ECTS-compatible credit systems also covering lifelong learning activities,
- European dimension in quality assurance, and
- Elimination of the remaining obstacles that inhibit the free mobility of students (as well as trainees and graduates) and teachers (as well as researchers and higher education administrators).

The European effort to build a European system of higher education affects OM Ph.D.s in several ways. Firstly, it affects Ph.D.s directly since it states that the European Commission would support the development and launch of a series of new joint doctoral courses, with DG RTD support. A pilot project will test the running of "European Masters" and doctorate courses in the academic year 2002-2003. Secondly, it affects Ph.D.s by promoting mobility. The "Socrates-Erasmus Student Charter" to be launched in 2002-2003 will clearly state the rights and obligations of mobile students (no tuition fees, full academic recognition, etc.). The creation of models of "European Virtual Universities" will allow access to a Europe-wide course offer and provide incentives to combine physical and virtual mobility. A third type of influence is related to the promotion of European cooperation

in quality assurance. There will be a promotion of "quality culture" within universities, helping universities to introduce internal quality assurance mechanisms, improve their quality levels, and prepare them in a better way for external evaluations. Finally, it includes promotion of the attractiveness of the European Higher Education Area through databases on job and learning opportunities, and through the creation of synergies between the "European Area for Higher Education" and the "European Research Area."

From the Ph.D.'s point of view, it is important to note that there is a plan to change not only Ph.D. programs but also the system that will employ Ph.D. graduates. The aim of building a European Research Area with more abundant and more mobile human resources will affect how Ph.D. students should approach their training. It is recognized that researchers in Europe are not as mobile as they could be in proportion to requirements. One aspect that plays a significant role is the lack of familiarity of European researchers with the research "cultures" that exist in other countries, and the lack of attraction that the researchers feel for them. This problem, however, is rapidly decreasing, given greater networking and studying abroad opportunities. There are also obstacles of an administrative nature. Application at the national level of community directives on free movement and right of establishment, social or pension cover is not always straightforward and requires an effort from interested parties that can be dissuasive (Commission of the European Communities, 2000: p.16). Mobility between countries and mobility between the academic and the business worlds will be promoted by the EC to actualize a European Research Area.

A second kind of initiative that the EC is planning to take regards the introduction of a European dimension into a scientific career. The problem, in fact, is that "in Europe today the career of researchers unfolds by and large within a national reference framework. Recruitment methods that give preference to nationals for academic or scientific careers and the lack of adequate career structures for researchers from other European countries deprive research organizations of the possibility of benefiting from the experience and knowl-

edge of brilliant researchers trained elsewhere. Appointments and promotions amounting in some cases to penalizing researchers who have remained outside national frontiers for too long discourage mobility" (Commission of the European Communities, 2000: p.16).

Institutional Reactions

Universities and business schools are reacting to the changes that are taking place. Institutions have already started competing for good Ph.D. students; others internationalize their Ph.D. students and their researchers by looking outside the home country. Furthermore, while most institutions are following national regulations that oblige the performance of a minimal evaluation of the Ph.D.s, others are anticipating future needs by establishing connections with other institutions to set up more articulated quality assurance systems. A few examples of what is happening are given below.

Leading business schools in Europe are connected through a loose network of "Community of European Management Schools, CEMS." In general the leading school in each country can be a member of CEMS. For a long time, a common Master degree, the CEMS Master, has been given. CEMS has recently proposed a common standard for a CEMS Ph.D. degree. The idea is not so much a common program, but a resource and quality focus through pooling of resources and set quality criteria that have to be fulfilled by participating schools. Important requirements are minimum standards regarding, for example, admission, course content, international tutors, and exchange periods.

Quality in doctoral education is a key focus and has been a most important effort during the last year. A framework for quality assurance outlining factors indicative of quality for further work with quality assurance in the Ph.D. programs has been developed at the Stockholm School of Economics and presented to EDAMBA (European Doctoral Programmes Association in Management and Business Administration). Quality assurance has been analysed in terms of how quality is influenced from the input of doctoral students as well as the throughput system in terms of resources, structures, and processes. The

quality that can be measured in the output is the final important set of quality assessment factors.

Beginning in 2002, a process has started to analyse the existing and wanted levels of each indicative factor of quality. Some examples of these quality factors may be illuminating. Input factors include, for example, candidate degree, candidate test score, candidate attitude, and the actual recruitment process. Resource factors include, for example, formal courses, financing, tutor hours, administrative support, the library, and of course the Ph.D. program budget. Structural factors include, for example, the tutors, the tutorial committee, the research team/group, the Ph.D. program, and the organizational climate. Process factors, include, for example, tutor assistance, dissertation plan, seminars, review activities, and external context activities such as conference participation. Eventually there is an output in terms of not only the dissertations but also articles, positions for Ph.D.s, and throughput time. The model is summarized in Figure 1.

Certainly, this is a very ambitious program, but there is a determination to develop the qualitative aspects of Ph.D. programs to an even more "role model" position. Actually, several European schools are considering or already applying this quality assurance system.

Conclusion

The changes that Europe has experienced during the last 10 years have modified dramatically the context in which OM Ph.D.s operate. The consequence of the liberal circulation of goods and people pursued by the EC, as well as the willingness to build a European Research area and to homogenize the various educational systems, are affecting employment in European academia. We are witnessing the nurturing of an open European labor market for researchers and teachers in higher education. Competition between universities for good Ph.D. students and competition for good researchers and teachers are growing among the best academic institutions. The picture that emerges from our consideration tells us that we are at a turning point: Europe will have a higher education market with integrated systems for Ph.D.s different from that seen in the U.S.

INPUT	THROUGHPUT			OUTPUT
	RESOURCES	STRUCTURES	PROCESSES	
Candidate degree	Formal courses	Tutors	Tutor assistance	Dissertations
Candidate test score	Financing	Committee	Dissertation plan	Articles
Candidate attitude	Tutor hours	Research team/group	Seminars	Positions for PhDs
Recruitment process	Administrative support	PhD program	Review activities	Throughput time
Ph.D. program budget	Library	Organizational climate	External context activities	Dissertation assessment

Figure 1: Quality in Ph.D. education—An outline of indicative factors.

Given these changes, our American colleagues no doubt may have some questions. For example, what space will be left to build joint EU-U.S. initiatives? Will competition between the two systems affect the possibility to cooperate? As an example, strong arguments have been proposed to make the CEMS Ph.D. exclusive to European collaboration, although this proposal has been turned down by representatives of European schools with extensive and long-standing global exchanges with the U.S.

A final remark from the authors who have been trained in both the EU and the U.S. . . . Personal experience and the experience of our Ph.D. students, who in turn have been trained across the ocean, confirm that it is possible to collaborate across the ocean and that this collaboration will, indeed, greatly benefit both sides. The different orientation present in the U.S. and Europe continues to be very useful for conducting research and for training Ph.D. students.

References

- Commission of the European Communities. (2000). Towards an European research area, COM, 6.
- De Toni, A., & Filippini, R. (1998). Operations management in Italy. *International Journal of Operations and Production Management*, 18(7), 644-648.
- EUROMA. (1996). Membership list 1995/1996. Brussels.

EUROMA. (2002). Membership list 2001/2002. Brussels.

Karlsson, C. (2002). Guest editorial of IJOPM special issue on research methodology in operations management. *International Journal of Operations and Production Management*, 22(2), 141-147.

Mitchell, L. (1992). OMA (Europe)?. Operations Management Association UK Newsletter, November (6), 1.

New, C. (1998). The state of operations management in the UK—A personal view. *International Journal of Operations and Production Management*, 18(7), 675-677.

Ribera, J. (1998). Regional report on operations management in Spain. *International Journal of Operations and Production Management*, 18(7), 639-643.

Voss, C. (1998). Operations management in the UK—An additional personal perspective. *International Journal of Operations and Production Management*, 18(7), 678. ■

M. Johnny Rungtusanatham
Arizona State University
W. P. Carey College of Business
Department of Management
Tempe, AZ 85287-4006
(480) 727-6268/fax (480) 965-8314
j.rungtusanatham@asu.edu