Abstract. This paper describes something of Portugal’s contribution to the establishment of a European Information Market. It outlines some of the activities which are taking place in education and in postgraduate training for Information Science / Information Management and gives a recent example of "knowledge transfer" within the Community. The links with industrial and business sectors are also explored. The paper is presented from the viewpoint of the Local Coordinator of a Course leading to the award of the MSc in Information Management of the University of Sheffield in Portugal, but also takes account of the writer’s experience as Coordinator of the activities of the Portuguese National Focal Point and National Awareness Partner of the EEC’s IMPACT Programme.

1. CEC initiatives within Training in Information
The development of the European Information Market shows no uniformity. The CEC's IMPACT 2 programme takes account of this and is designed to put more emphasis on the demand side of the market by improving the accessibility of information at the European level for all the interested parties, as distinct from its predecessor IMPACT 1, which concentrated more on the supply side.

Each action line integrating the IMPACT programme covers and funds a number of related actions under the main heading. In particular, Action Line 3 covers increasing user-friendliness and improving information literacy. Under this main heading, Action line 3.2 relates to awareness, user support and training which has the objective of improving information awareness and hence increasing the use of electronic information services for professional activities, which in Europe generally, continues to be rather low compared with USA and Japan [1]. Within this action line the CEC is involved in projects such as [2]:

1.1. National Awareness Partners
The improvement of information awareness is receiving special attention through the "National Awareness Partners network" (NAP-network) whose activity was launched in September 1992. The organizations integrating this network are implementing awareness campaigns at national and regional level and are supported by the Central Support Team in Luxembourg.

1.2. Training of Trainers (TRAIN-TRAIN)
This is a project involving the mounting of ten short training courses (of two weeks duration) during 1993 in the five Less Favoured Regions (LFRs), to prepare trainers to train "information intermediaries" for the future [3].

1.3. Training of information services specialists in the LFRs (TRAIN-ISS)
This project promotes the vocational training of information service specialists in the LFRs, with the aim that they will assist information providers in the LFRs. The contract is scheduled to start on 1st September 1993 and will have a duration of two years [4]. According to the technical specifications for this CEC call for tenders, the objective of the action is to provide people and organizations in the LFRs with the necessary expertise for building databases and for operating information services. This is a prerequisite for
initiating and developing new services and databases in the LFRs. Thus, the action is contributing to IMPACT by:

- transferring know-how from the more developed regions to the LFRs,
- stimulating the creation of European databases,
- making access to information easier for the users in the LFRs,
- improving information literacy in the LFRs [5].

The project envisages mounting a long term course (nine months) leading to a formal "Common European Diploma", otherwise known as a "European Master's Degree".

1.4. Stimulation of universities

This activity is expected to be included in the IMPACT 2 work programme for 1994. The stimulation will encourage European universities to incorporate training on electronic information provision into the "normal" curriculum.

These CEC initiatives within Training in Information, which assume that the sustained development of the information market requires the existence of qualified information professionals and information-literate users, has a great significance, particularly for an LFR. The fact that CEC has supported a well diversified training programme through the IMPACT 2 programme, is a decisive factor in attracting resources and other support, to establish long-lasting education programmes (at postgraduate and other levels) in Information Science/Information Management in these countries.

2. The context for Information Management education in Portugal

As with other countries, the study of Information Science in Portugal has evolved in a fragmented way. Information Management has been approached from the many closely associated disciplines which have existed for some time: Comunicação Social (mass media), Ciencias Documentais (librarianship), Informatica Computação (Information Technology), Gestao (Management).

Information Science is only recently being recognized as a separate discipline in Portugal. An indication of the lack of awareness of Information Science as a scientific discipline is given by the results of a recent survey [6]. This survey was conducted by CITI, the Centre for Technical Information for Industry of INETI, within the context of our activities as a Member of the AGARD/TIP Panel, during January and February 1991, aiming at identifying what research on information science was being done in the country. A questionnaire was sent to all R&D state-owned organizations, Government R&D funded departments, private foundations and enterprises eleven in all. Seven replies to the questionnaire were received, but only one R&D Laboratory and one Government Funding Body reported that they were financing research in Information Science and/or Information Technology. However, we wonder if the definition given of "Information Science" was fully understood, as we are aware of one Governmental Department that by then was funding a PhD research project in Information Science but did not mention it as such.

The research carried out in Information Science at INETI (formerly LNETI) was initiated in 1984 and since then the R&D activities have been oriented mainly towards the development of information systems, aiming to increase the efficiency and effectiveness of information transfer to several kinds of users in Portugal. It was in 1991 that Information Science was firmly established as one of the ten research disciplines at INETI by CRAF (Conselho Responsável pelas Actividades de Formação) along with Information Technology, Materials Science, Fine Chemistry and Biotechnology, Energy, Environment Science and Technology, Nuclear Energy, Food Technology, Innovation, Industrial Organization and Management.
3. INETI advanced training programme in information management

3.1. The postgraduate course for information intermediaries
Portugal’s response to the challenge of successive development programmes, implemented since the 1974 revolution, has been hindered by the lack of trained information specialists, able to take advantage of the knowledge bases which exist in the information-rich areas of the world. Opportunities for innovation and technology transfer have been missed because of a lack of awareness of information available to entrepreneurs in the industrial sector. From 1935 to 1983, the only information-related training available in Portugal was a course in librarianship, taught in the University of Coimbra. In 1983, the University of Lisbon introduced a two-year Postgraduate Course in Librarianship and Documentation and this is now being offered at the Universities of Coimbra, Lisbon and Oporto.

The lack of trained information professionals and the means to provide them, were both highlighted by the introduction of the Programme for the Development of an Information System for Industry in Portugal. This programme envisaged the creation of information nodes at Industrial Associations. It was immediately apparent that there was a shortfall of trained information professionals, with the necessary skills profile, to staff those nodes; their early supply was identified as a critical factor in the successful completion of the programme. LNETI/CITI had been appointed as the Programme’s coordinating organization; its response was to implement a Postgraduate Course for Information Intermediaries, an intensive six-month training course, in collaboration with the University of Sheffield. This course ran for three consecutive years, 1987-90 [7].

3.2. The MSc in Information Management from the University of Sheffield in Portugal
The success of this "fire-fighting" response and the ready acceptance by the market of these information professionals created the environment in which more permanent training arrangements could be considered. The development of the Master’s degree in Information Management of the University of Sheffield, taught at LNETI since 1991, was a natural consequence of the close association between the two organizations during the teaching of the six-month Postgraduate Course for Information Intermediaries [8].

The MSc in Information Management, taught at the Department of Information Studies at the University of Sheffield (USDIS) has built an international reputation since its establishment in 1983. That reputation is indicated by the fact that it is now the largest of three taught MSc courses in the department and has a major share of the 55 "overseas" students from 32 different countries.

For the past two and half years, USDIS has been collaborating with INETI and its Centre for Technical Information for Industry (CITI) in offering the MSc in Information Management course with the support of PEDIP (Programa Específico para o Desenvolvimento da Indústria Portuguesa - Specific Programme for the Development of Portuguese Industry), a programme aimed at creating the conditions to enable Portuguese industry to adapt to the new rules and challenges from the EEC open market.

A detailed account of the course organization and administration, as well as of the curriculum and evaluation of the students, is described elsewhere [8], but the following gives some indication of the special arrangements for this joint venture.

The MSc course is delivered at INETI as a result of an agreement between INETI and the University of Sheffield, whereby, with the financial support of the PEDIP, the course preparation, teaching, and travel/subsistence expenses are paid to the University of Sheffield; additional local costs (local teachers, library costs, on-line access and telecommunications costs, etc.), are met from the same source. Students register for the degree of MSc in Information Management at the University of Sheffield, but the course is taught in Lisbon on the premises of INETI at Lumiar. The course consists of twelve
months of taught modules followed by a six-month period during which the student undertakes an independent research project and dissertation. The version of the course that has been delivered within the INETI/USDIS protocol, includes some modifications and inputs from local staff, which have enabled the course to meet national (Portuguese) requirements. Members of staff of USDIS contribute about 25 man-weeks of teaching input of the course at INETI, as well as preparing the self-study materials and assisting with dissertation supervision.

The MSc in Information Management delivered through this model of collaboration constitutes an innovative experience, for several reasons:

1) The syllabus combines different disciplines essential to equip future information managers with the necessary knowledge and tools to operate in the rapidly changing information environment: management; information services, computers and information; information database systems, information storage and retrieval and research methods; this combination of subjects makes it unique compared to other Information Management courses that have started to be offered recently in the country.

2) The course is a working example of "knowledge transfer", using as it does, visiting lecturers, distance learning material and locally appointed tutorial staff. This sharing of activities meets the circumstances under which resources could be obtained from PEDIP and it is the method by which this new area could be more quickly advanced in a country like Portugal, where there is a lack of qualified teachers in this new field.

3) The national teaching resource has been expanded by the decision to send INETI-CITI staff to Sheffield to study for their PhDs in Information Management. They then return, fully up-dated, to take up their tutorial duties on the MSc course.

4) Students are selected from varied professional positions, taking into account the funding agency requirements and their academic backgrounds. They are admitted with previous academic degrees in Engineering/Applied Sciences, Business Administration/Economics, Social Sciences and Humanities. The aim of this admissions policy is to stimulate cross-disciplinary inquiry on the concepts and problems in the information management area and the sharing of professional knowledge and experiences. This is achieved by applying the PEDIP funding arrangements, which require that a basic minimum number of students (50%) are chosen from manufacturing industry and business, technological organizations and industrial associations. The other 50% is chosen for the contribution they can provide from their respective professional positions and academic backgrounds.

Within the first intake, which lasted from April 1991 to September 1992, 15 students were awarded the MSc in Information Management degree. In the second intake, which started in June 1992, 25 students are preparing their dissertations.

Having been tested through two consecutive cycles, the course in its present form offers a well grounded basis for success.

3.2.1. The research component of the MSc in Information Management programme

The establishment of Information Science/Information Management as a separate discipline in Portugal requires a continuous supply of postgraduates in this area in the country and the development of a cumulative knowledge-base through research. This has been the underlying strategy for the activity of INETI in the area of Information Science. The MSc in Information Management programme has contributed to this strategy in several ways. Firstly it is preparing the much-needed postgraduates who will operate in a diversity of organizations in the country. Also, through the research
component within the information management curriculum, the students in the MSc programme are designing and developing projects which address problems experienced by the Portuguese industrial and business sectors.

The research component of the course provides the students with the opportunity to examine, interpret and review related research and then to develop an independent research project. This component consists of a module on research methods, research proposal development and the research leading to a dissertation. The links forged with the industry and business sectors in Portugal, as well as the contribution to the knowledge base in Information Science, can best be illustrated by some examples of dissertations produced so far:

1) National Information Policy: A study of the Portuguese legal framework (1989-1992). National legislation, published in the Diário da Republica, 1a Série, January 1980 to June 1992, was reviewed to identify documents relating to a national information policy and the legislative initiatives taken to formulate such a policy. The study includes a chronological presentation of all relevant legislative documents found in the review.

2) Teaching PASCAL-A tutorial system in GUIDE. This study was concerned with the design of a hypertext system for the teaching of PASCAL programming language.

   After an introduction to hypertext, the author describes in detail the structure of the Pascal lessons, drawing on his experience of teaching the subject in the University of Algarve.

3) Sistemas de analise da concorrencia - Competitor Intelligence Systems. A study of the external sources of information available to an organization when developing its marketing strategy. The study involved interviews with managers of seven large Portuguese companies and analysis of existing competitive intelligence systems.

4) Associação Industrial Portuense: a divisão de informarção e análise económica - situação e perspectivas. This was a broad study to survey the information resources and flows within Industrial Portuense (AIP) and sought to match these with perceived user needs. The study took small to medium enterprises as its user sector, since these constitute some 70% of the members of AIP.

5) Estudo da implementação de um projecto de videotexto. This was a study to determine the likely impact of a specific information product, videotext, on the same user sector as (4) above. It was the basis for a videotext system to be implemented by AIP and will connect its Headquarters with all its members.

6) Analysis and design of a production management system (Shipyard), using Oracle Case Tool. This study was concerned with the analysis and design of an information system to support the planning and control of shipyard production activities. The work was undertaken using Oracle Case structured methodology and techniques.

It is expected that, through the application of this strategy, we can contribute to a better understanding of the advantages of an efficient information management function within Portuguese industries and businesses, and also highlight the role of information in the economy and society in general.

3.2.2. The profile of the Information Manager

It is still too early to comment on the effect that the possession of the MSc has on career and promotion prospects. However it is possible to characterize the profile of the
Information Manager trained by this programme by the roles the students are performing, such as:

1) design and development of database systems for business applications, taking account of the latest developments in hypertext and expert systems;
2) information support work for senior and middle executives through an understanding of their information needs, and of sources of business information, both published and on-line;
3) end-user support staff for users of corporate computer services, assisting in the choice of software packages and contributing to user-education programmes;
4) specialists in the electronic information industry, with a particular understanding of user's needs and a thorough grounding in the basics of computer-based information systems;
5) assisting in the design and development of on-line information systems in the information market and acting as user-support staff in this industry;
6) undertaking middle management roles in corporate computer services through their wider understanding of management information needs.

5. The future
As knowledge bases associated with traditional disciplines grow in size and complexity, there comes a time when it is no longer possible for one individual to absorb, process and encompass the information, within his or her lifetime. The result is an ever-increasing number of sub-disciplines, each with its own programme of teaching, research and application.

Yet, history tells us that most innovations and breakthroughs stem from an association of ideas and disciplines. Indeed multidisciplinary teams are now formed in recognition of the adverse consequences of over-specialisation. The future for Information Science and Information Management would therefore seem to be along two distinct but complementary paths:

– the first is the study of cumulative knowledge bases, their structure and development, with the emphasis on the laying-down of information in such a way that it can be effectively retrieved according to the mindset of the individual rather than by a set of pre-determined rules;
– the second is the through-life education and training of each member of society, to the best of his or her ability, so that each is aware of and uses these knowledge bases to improve the quality of life.

Thus, the challenges are two-fold but they must be addressed together because they are interdependent.

Only then can the Information Society be deemed to have truly arrived!

References

How to cite this paper