Infobroker – an Emerging Profession of Informing Mediators?

Dimitar Christozov
American University in Bulgaria
dgc@nws.aubg.bg

Iliana Nikolova
Sofia University, Bulgaria
iliana@fmi.uni-sofia.bg

Abstract

In this paper we share the interim results of an on-going research on the emerging profession "broker of information" (*infobroker*) in today's *Information Society. The infobroker concept is developed and the required knowledge and skills for the infobroker successful professional performance are identified. The research findings are based on an extensive investigation and analysis of existing forms of information brokering and their evolvement and reshaping in the context of the rapid development of computer-based information and communication technologies, and Internet, in particular.*

The research reported here is limited to the market of information services in Bulgaria - a small, developing, non-English speaking country. The research objectives were to define the critical factors for professional success, including required knowledge, skills, and professional attitude, and to specify the job perspectives for an infobroker. Our further research aims at developing of a curriculum model for training infobrokers. We have found that in the last ten years the requirements for the infobrokers have changed significantly in two areas: professional attitude and computing skills. Changes were observed also in the requirements for foreign languages skills and narrow professional specialization. The research findings show that the infobroker profession nowadays differs significantly from the one in the pre-Internet era and we argue that it has to be considered a new emerging profession.

Keywords: infobroker, information and communication technologies, Internet

Introduction

Information is power. Nowadays, in the Information Society, the role of information becomes increasingly important: the need to locate relevant information and utilize it appropriately is of ultimate value for the citizens in the Information Society. Consequently, the importance of the infobrokers - professionals, possessing an adequate portfolio of knowledge and skills to serve as mediators in the above process - increases.

There have been professionals involved in information mediation in the pre-information society era, too. This paper focuses on the changes in the profession of infobrokers caused by the rapid development of information and communication technologies (ICT) and Internet, in particular.

During the last ten years the Internet has significantly changed the way people become informed. This has a great impact on the professions facilitating the access to information. Recently, the term “infobroker” has started to be employed (e.g. http://www.an-consult.de/projekte/info/broker.htm) to identify professionals, engaged in providing information services.

The role of the infobrokers is to serve as mediators between the end-users and the information sources in the process of accessing information.

The research reported here represents the findings of the Bulgarian team within the “EU-Infobroker” project, in the frames of the European Community “Leonardo da Vinci” program. These findings are based on an extensive investigation and analysis of existing forms of information brokering (http://www.nijhoff.bg/, http://www.femirc.bg) and their evolvement and reshaping in the context of the rapid development of computer-based information and communication technologies (Celko, 1996; Kovacheva, 1998; Waern, 1999; Wang, 1998)

Answers to the following questions are sought through our research:

What is the impact of the recent developments in the ICT on the infobroker profession?

How the success factors have been changed and what knowledge and skills are required in order to be successful in the information services market today?

Whether these changes are so critical to allow us to consider it a new, emerging profession, or this is just a smooth evolution provoked by the changes in the information and communication technologies?

What are the perspectives of such professionals in a small, developing, and non-English speaking country like Bulgaria?

And, finally:

How to train infobrokers?

The study compares the "old-style" (paper based) information services to the information services based on a heavy use of the Internet and other computerized information technologies. The comparison refers to the required knowledge and skills and to the professional attitude and behavior of the addressed professionals.

Basic Concepts and Research Principles

The role of Infobroker

The role of Infobroker was defined in relation to the six aspects of the process of access to information, as they are described in the literature (Buckland, 1991, pp 78-79): identification, availability, price to the user, cost to the provider, cognitive access (understanding), and acceptability.

To **identify** the relevant information sources and to **make information available** to the users is the essential task of inforbrokers. In the practice of "old-style" infobrokers, knowledge about information sources (*meta information*) was among the most valuable resources (Ugarchinsky, 1987; Todorov, 1987). Now ability to search the Internet to locate the source is considered as a valuable skill as well. Efficient searching and scanning requires knowledge about the information sources, channels to reach, and techniques to obtain information. It also requires ability to recognize relevant from non-relevant information and to distinguish valuable from non-valuable information (Schoderbek, 1990, pp 208-210).

According to Buckland, "**the price to the user**" can include, but is not solely restricted to money: "the real price includes time, efforts, and discomfort, as well as money." Often, the task of an infobroker includes activities to reduce that price, which increases the **cost to the provider** in its more general sense. A significant part of activities to reduce the price to the user is dedicated to improving the **cognitive access** to information – assisting the user in the process of understanding. This may include activities as:

- ***Structuring of information***. This relates the source (*raw*) information to the particular needs of the user: transfer the original terms into the terms acceptable to the user and present information in a form suitable for further processing by the user (including easier understanding).

- ***Assessment of information***. Judging about its trueness and precision from the point of view of the objectives of the user; and understanding the user's objectives;

- ***Translation from foreign languages***.

Our overall research has shown that the typical activities of an infobroker can be summarized as follows:

- Searching for information
- Collecting information
- Storing information
- Classifying information
- Processing information
- Presenting information
- Disseminating (distributing) information (on request; on subscription)
- Consulting (helping clients get oriented within the information)
- Analyzing and synthesizing information.

This has led to elaborating the infobroker concept structure (see Figure 1).

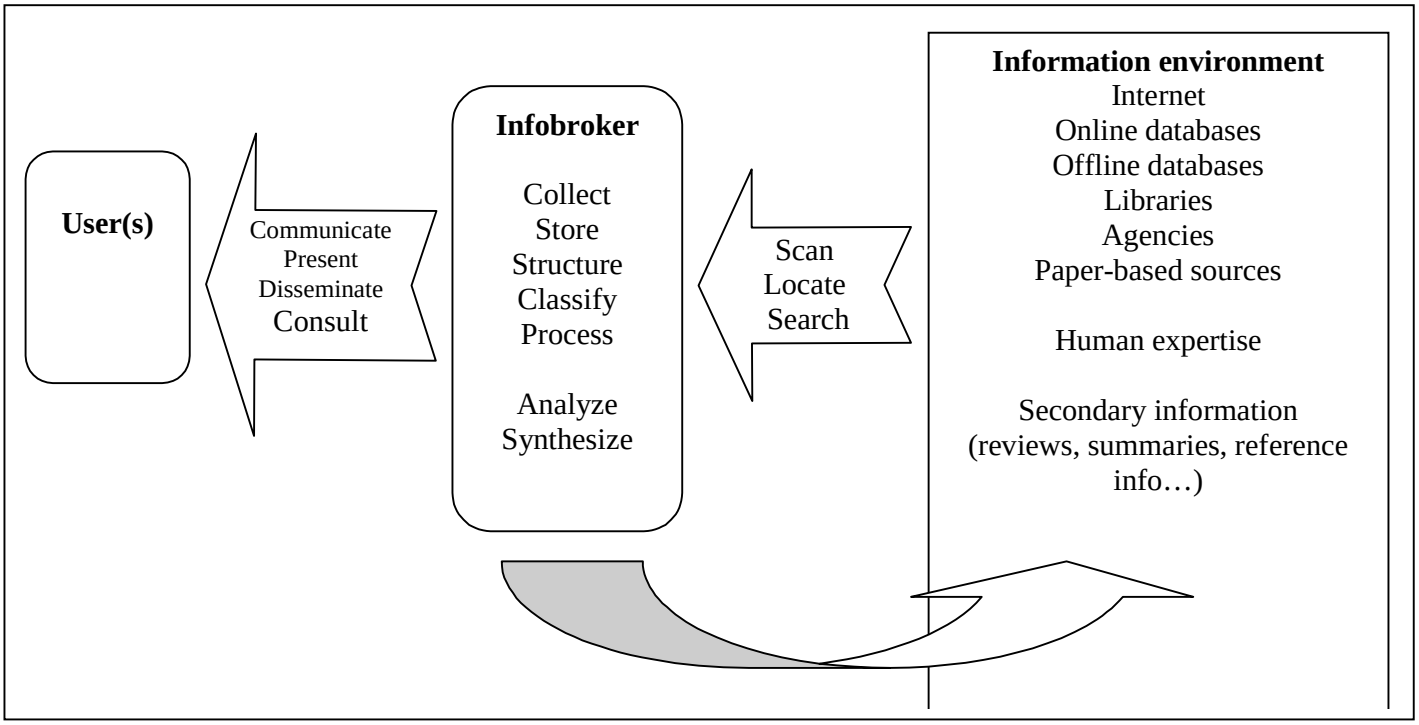

Figure 1: Infobroker - Concept Structure

Research Principles

The comparison between "paper based" and "Internet based" infobrokers was performed according to the practical experience of one of the authors (D. Christozov - during his work in the Information Center for Technology Transfer "Informa", 1986-1992) and the detailed study of the current operations of four companies engaged in providing information services: Intercredit-Sofia, Center for Innovative technologies, Martinus-Neihof–Bulgaria, and Consulting Center for European Integration. We have considered the types of activities, the required knowledge and skills, and applied techniques. Our investigation was focused on:

- computer skills, including skills of searching the Internet;
- foreign language skills;
- knowledge about meta information;
- professional behavior and attitude – dynamics (response time), comprehension, etc.

Types of Infobrokers

In our research we have distinguished the following three types of info-brokerage companies, according to the type of service:

- ***Producers of secondary information.*** They are specialized to scan a given sector and, on a regular basis, provide clients with reviews (referential, analytical, etc.)
- ***Agents of a given international information service.*** They distribute information on given local (regional) market and scan local (regional) information sources to fill the information funds
- ***"On-request" information dealers.*** They provide specialized information, perform information researches, and consultancy

The services provided by the studied companies are dominated by a specific type of service.

Brief Description of the Companies Studied

Old-style infobrokers:

Information Center for Technology Transfer "Informa" (1986-1992) was specialized in providing information services to assist technology transfer within Bulgaria. This includes organizing a national information network for distributing and gathering information about production technologies; participation in international exchange of technological information, consulting in adoption of new technologies, organizing experts' groups in evaluating the feasibility of adoption of a new technology. During that period, Informa used to collaborate closely with all Bulgarian institutions engaged in offering any type of information services.

Infobrokers in Informa were specialized according to the foreign language they used, professional background (technological area of competence), and the set of information sources they worked with.

Computer skills were not required, and for the above period the average computer skill of an infobroker evolve from zero to elementary use of word processing. Whenever they used computerized resources, a specially trained operator was assisting.

Language skills were of high importance. Any inforbroker was proficient in at least one of the following languages: Russian, English, German, and French. The translation department used to organize translation from Spanish, Italian, even Japanese and Chinese when needed.

Knowledge of meta-information was also of high importance – any inforbroker was specialized in scanning a given set of information resources, printed, analytical and referential reviews, journals, and other publications. Meta information was studied in the process of serving.

Professional behavior and attitude – the emphasis was on comprehension, on careful research on information sources, on precision and relevancy. To conclude, Informa employees were typical closet scientists.

Modern Infobrokers:

The Center for Innovative Technologies is dedicated to supplying an international on-line database with information related to Bulgaria and to disseminating its contents to the Bulgarian market. This includes production of printed materials, translation, etc. They serve also as "on-request" information dealers.

Required computer skills: ability to use wide range of Information technologies, including on-line databases (using and designing), Internet, including web page design, and of course office automation.

Required language skills: knowledge of English was set as the necessary condition in hiring. Knowledge on additional foreign languages is considered an advantage

Knowledge about meta-information: not required. How to use some basic sources is trained in the process of working. Efficient searching techniques are considered as more important.

Professional behavior: more dynamic – response time is considered as the most important.

Martinus-Neihof – Bulgaria is a typical agent of an international information service. Their activities are limited to selling the information available in a number of on-line databases and CD to the Bulgarian clients. Computer skills, foreign language skills, database search skills, including use of on-line databases, are required.

Intercredit-Sofia is a typical "on-request" dealer. Their services include confirming and complementing the information about Bulgarian entities by request from international clients and offeing similar services to Bulgarian clients for their foreign partners. The use of Internet is very limited and therefore their experience was not quite suitable for our research.

Consulting Center for European Integration is another "on-request" dealer, specialized in providing information about the institutions of European Community. For them, searching the Internet is the basic instrument in providing their services.

Comparison

The information collected has been analyzed according to the main aspects of our study and has been summarized as to allow an immediate comparison (see Table 1):

It is clear that for the modern infobrokers computer skills and especially searching skills, including on-line information resources, are crucial.

As far as language skills are concerned, the variety of foreign languages used in the old style information-brokering seems to be nowadays more and more limiting itself to English mostly.

According to the professional attitudes and performance standards, there is a clear tendency of changing the emphasis from the comprehensiveness of the response to the response time. The latter becomes more and more important.

	Computer skills	Languages	Meta-Information	Professional attitude
ICTT Informa	not required	any language	required	comprehension
CIT	required	English – required, any other is an advan-tage	required to some extent	dynamics
Martinus-Neihoff	required	English	required	dynamics
Intercredit	useful	English/German	searching skills	dynamics confidence
CCEI	required	English	searching skills	dynamics

Table 1: Summary of the collected information from the companies studied

Summary of the Required Knowledge and Skills: Critical Success Factors

Below the knowledge and skills required for an infobroker, as identified during the study, are outlined.

Required qualification:

Education - higher vs. secondary and vocational:

In Bulgaria usually infobrokers have higher (academic) education and in the Western Europe that is not required. The following factors influence this difference:

- how important is the element of assessment of the information (lack of reliable and well structured information);
- how often the infobroker plays the role of consultant (lack of relevant expertise among the end users);
- linguistic skills;
- availability of a great number of unemployed higher educated professionals.

Language (English) proficiency

- to have very good English reading and writing skills
- to have good communication skills

Ability to locate and collect information

- "to have information about information", i.e. to be able to identify classical and online channels for obtaining information (local and worldwide) and institutions which deal with information provision
- to be able to create and work with standardized forms for collecting information
- to be able to retrieve information (e.g., to interview a human; to be able to apply appropriate methods and techniques for retrieving electronic information)
- to be able to motivate the potential source of information (e.g., to clearly show how providing information will be useful for the source)

Information processing abilities

- to be able to create and work with catalogs and "secondary" information - reviews, summaries, etc.)
- to be able to structure and order information appropriately (put information "in place")
- to be able to present information adequately (visualize information, etc.)

Professional knowledge

- to be familiar with the subject matter for which information is sought.

Ability to create specifications for software applications development and to control the implementation (e.g., to be able to specify an appropriate database format for storing information)

Ability to analyze and synthesize information

- to be able to distinguish relevant from non-relevant and valuable from non-valuable information
- to be able to select and assess information (judge the quality of the information)
- ability to summarize, generalize, infer.

Technology related skills (Internet, online databases)

We have distinguished the following three areas of expertise, which need to be addressed in the training of infobrokers:

Internet searching ability:

- to be able to search productively on the Internet - to formulate requests by using keywords and avoiding use of general terms;

Efficient use of predefined views, forms, and reports

Ability to formulate efficient queries in terms of the given Database:

- binary expressions in free text search (especially for text databases), and
- SQL for relational databases.

  It is an open question, whether an infobroker needs skills and knowledge to define a query without using predefined views. Current practice shows that they do not make such queries, rather, when they need a more complicated query they approach the supporting software engineer.

Conclusion

The rapid development of the ICT and Internet, in particular, has changed significantly the way in which information mediators work. Abilities to locate, search and utilize online information become increasingly important. The time of the response becomes of significant value. Internet based communication tools become a major part of the most widely used instruments of an infobroker today.

The changes in the way the information mediators work are not only quantitative but also qualitative. There are enough reasons to consider the infobroker in today's Information Society as an emerging profession.

The increasing role of the information in all aspects of the human life and the increasing variety of the available information sources, forms and accessing techniques, place the emerging profession of infobrokers among the most dynamic and challenging. Our research on the required knowledge and skills provides a background for further curriculum development to train infobrokers.

Acknowledgements

The research reported here has been performed in the frames of the EC "Leonardo da Vinci" Program, "EU-Infobroker" Project /D/99/2/PI/09194/II.1.1B/FPC

References

Celko Joe (1996) DBMS Online: Understanding and managing Textbases (an on-line publication)

EU-Infobroker project WWW site: http://www.an-consult.de/projekte/info/broker.htm

Kovacheva Eugenia (1998) How to find something on the Internet. TopTeam, Sofia (in Bulgarian).

M. Buckland (1991) Information and Information Systems, New York, NY: PRAEGER

Martinus Nijhof-Bulgaria Web site: http://www.nijhoff.bg/

News. Bulletin of the European Innovation Center, Sofia (in Bulgarian) http://www.femirc.bg

On-line dictionaries and encyclopedias: http://www.hotbot.lycos.com/, http://foldoc.doc.ic.ac.uk/foldoc/, http://webopedia.internet.com/

Schoderbek P., Schoderbek C., Kefalas A. (1990) Management Systems: Conceptual Considerations. Homewood IL: BPI IRWIN.

Spitzer Tom (1997) Internet Systems: Textbases Deliver Web Results (an on-line publication)

Todorov T., Fotev B., Trichkov V. (1987) Handbook on automated systems for scientific and technical information. Sofia: Technica (in Bulgarian)

Ugarchinsky B., Christozov D., Denchev S., Hicova T., Deneva L. (1987) Information Service in Technology Transfer: Basic Sources and Channels of Technology Information. Sofia: ICTT Informa (in Bulgarian)

Waern A. et al (1999) ConCall: Edited and adaptive Information Filtering (an on-line publication)

Wang Yun (1998) Building a Knowledge Management System: Get the Most of Your data through Organization and Automation (an online publication)

Biographies

Dimitar Christozov has been an Associate Professor of Computer Science at the American University in Bulgaria since 1993. He started his career as a software engineer with the Central Institute of Mechanical Engineering at 1979 after graduating mathematics at University of Sofia. His doctoral thesis, completed at 1986, was in the field of theory of reliability and computer based assessment of machine's reliability. Between 1986 and 1993 he worked at the Information Center for Technology Transfer "Informa" as a senior researcher, head of department "Advanced Information Technologies" and Scientific Secretary. At 1990 he was granted a scholarship at the University of California, Berkeley. At that time he was recognized among the leading experts in Bulgaria in the field of information systems supporting quality management. During the 1999/2000 academic year, Dr. Christozov was a visiting researcher at the Tel Aviv University. His area of specialization lies on the intersection of computer science, information systems, applied statistics, and quality management. Dimitar Christozov has published two separate volumes and more than forty papers in refereed journals and conference proceedings.

Iliana Nikolova is a chief assistant professor at the Department of Information Technologies, Faculty of Mathematics and Informatics, University of Sofia, Bulgaria. She holds a Ph.D. in Computer Science (University of Sofia, Bulgaria) and a M.Sc. in Educational and Training Systems Design (University of Twente, The Netherlands). Her PhD thesis, titled “Design and Delivery of Web-based instruction: Methodology and Tools” is devoted to online teaching and learning. Iliana Nikolova has been involved in research and teaching in the following areas: ICT applications to education and training, educational multimedia, flexible and distance learning, telelearning. She has rich experience in international research and development projects in the field of information society technologies and emerging applications. Currently she is a country director of the USAID sponsored project for establishing public computer and communication centers (telecenters) in Bulgaria.