

INSTITUTIONALIZATION OF RESEARCH IN THE PROCEEDINGS OF FIVE INTERNATIONAL SYMPOSIA AND EXHIBITIONS ON ENVIRONMENTAL CONTAMINATION IN CENTRAL AND EASTERN EUROPE

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Abstract

Research institutionalization patterns reflected in the Proceedings of five international symposia and exhibitions on environmental contamination in Central and Eastern Europe were scientometrically analyzed. A set of several bibliometric parameters was dynamically followed-up: countries, cities/towns, nominations and thematic profiles of authors' institutions. The number of countries gradually increased: from 28 in the first symposium up to 38 in the second and 44 in the fourth. The total number of the countries participating in at least one international symposium was 58 but that of the cities/towns of authors' institutions was 607. Authors from 23 countries published their papers in the proceedings of all five symposia while researchers from 14 developing countries took part in one symposium only. There is remarkable science stratification in this rapidly advancing interdisciplinary field. Science in the USA dominates followed by that in Germany, England, Poland, Hungary, Yugoslavia, the Netherlands, Ukraine, etc. In Western Europe there is a certain balance between the university/education and firm structures while in Eastern Europe a dominance of the university/education structures still exists. The history, presence, and future of the idea and practical realization of this international symposium series deserves a more comprehensive scientometric evaluation to further promote science advancement in this actual interdisciplinary field.

Introduction

Institutionalization of science and university education is a challenging feature of contemporary society. Along with internationalization and interdisciplinarity, it forms a unity of these three "I" (1) being typical of the so-called 'hard science' involved in hot topic research and characterized by sufficient quality and application capacities. The organization of the international symposia and exhibitions on environmental contamination in Central and Eastern Europe in the capitals of three European countries (Budapest, 1992 and 1994; Warsaw, 1996 and 1998, and Prague, 2000) by the Institute for Central and Eastern European Cooperative Environmental Research at the Florida State University (FSU), USA (now the Institute for International Cooperative Environmental Research, IICER), has provoked enthusiastic efforts of numerous researchers and their institutions to answer the serious problems of global environmental pollution in our world. Contemporary computerized scientometrics is capable of identifying not only the so-called promising actual fields at the forefront of world science and the individual and collective contributions to science progress but also to follow-up the dynamics of the relative share of authors, institutions and countries that should solve the tasks of research and development (2,3,4).

The purpose of the present paper is to demonstrate some essential features of the dynamics of the institutionalization of research in the proceedings of five international symposia and exhibitions on environmental contamination in Central and Eastern Europe.

Methods

An own scientometric method was applied to outline the structure of this essential component of the system of scientific communications (5). The following bibliometric parameters were analyzed: i) countries of authors' institutions; ii) cities/towns of authors' institutions; iii) nominations of authors' institutions, and iv) thematic profiles of authors' institutions. A specific didactic distinction was made in order to process more effectively the vast amount of data concerning the nominations of authors' institutions:

A) University/educational structures:

University, Higher School, Higher Institute, Research Institute, Research Center, etc. along with their Departments, Clinics, Sectors, Divisions, Units, Laboratories, etc.

B) Firm structures:

Agencies (e. g., Environmental Protection Agency and its branches), Inspections, Industrial plants and factories, State and private firms, Consulting firms, Foundations, Independent laboratories, Ministries (State Departments), Municipal authorities, etc.

Results

There is a vast amount of data to be scientometrically processed although a very small set of parameters is concerned. The variety of nominations of scientific institutions which authors are involved in systemic research in the field of environmental pollution and its prevention is fascinating. There are, however, certain discrepancies and inaccuracies in certain authors' addresses necessitating a very precise identification procedure. There exist numerous opportunities for creation of purposeful statistical distributions in order to elucidate some essential peculiarities of the internationalization of the interdisciplinary scientific communications realized through these symposium proceedings. In this way, one could add the substantial links to the degree of institutionalization of research in preliminarily basic and preliminarily applied scientific disciplines.

The total number of countries participating in at least one international symposium is 58. The total number of cities/towns of authors' institutions is 607. Table 1 summarizes the participation of some countries in these five symposia and exhibitions through their cities/towns of authors' institutions, universities and firm organizations.

Table 1: Distribution of Some Countries According to the Number of Authors' Cities/towns, Universities and Firms

Country	Cities/towns					Universities					Firms				
	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
USA	88	70	73	74	70	22	25	25	22	25	82	54	58	65	52
Poland	7	8	15	15	15	9	8	27	32	27	1	2	8	10	1
Yugoslavia	2	10	11	14	8	3	26	41	32	26	1	9	11	15	6
Russia	2	2	4	8	10	2	5	8	19	21	0	0	2	3	4
Ukraine	1	3	5	6	6	1	8	19	26	26	0	2	2	0	6
Hungary	6	5	5	5	6	13	20	5	9	9	17	6	3	1	3
Czech Republic	5	5	4	3	7	3	7	3	8	16	2	4	3	1	4
Romania	2	6	5	6	6	4	10	15	22	18	3	1	0	3	1
Bulgaria	1	2	2	2	2	3	2	3	4	2	0	1	1	0	4
Macedonia	1	1	1	2	2	2	3	10	3	1	0	0	0	1	1
Slovenia	2	4	4	2	2	3	8	6	1	2	1	1	3	1	0
Germany	20	24	16	15	15	8	11	9	5	8	19	20	15	10	7
England	6	15	10	14	8	0	4	0	7	5	6	11	13	8	6
France	3	5	6	5	4	1	0	0	4	1	2	5	6	2	3
Netherlands	11	5	3	4	5	7	0	3	3	3	10	5	0	2	2

These dynamic patterns confirm the assumption of a permanently rising popularity of the idea and organization of these symposia. Figure 1 indicates the number of countries participating through their authors in a different amount of international symposia (from one to five symposia). Authors from 23 countries have participated in all five symposia and inhibitions while researchers from 14 developing countries have taken part in one symposium only. Figure 2 illustrates the number of cities/towns of authors' institutions in some leading countries participating in all five symposia as a whole. Figure 3 shows the dynamic augmentation of the number of the cities/towns of USA authors' institutions. As in almost all scientometric distributions, the science in the USA occupies a leading position according to any parameters of observation.

Discussion

The degree of institutionalization is differently manifested in single countries and cities/towns. An interesting peculiarity represents the dynamics of the firm structures in the capitalist and former European socialist countries. In the USA, the number of university structures remains significantly less than that of the firm structures. In Western Europe, there is a certain balance between these two types testifying to the strong involvement of the so-called "development" activity as a reasonable continuation of the theoretical and applied research. In Eastern Europe, there exists a stable dominance of the university structures during the whole period of the observation. However, there is already a tendency of gradual involvement not only of state authorities such as Ministry Departments, Hygienic Inspections and Agencies, and Municipality authorities but also of industrial enterprises, state and private consultant firms, often closely collaborating with the research institutions.

Besides the experience of the leading scientific countries such as the USA, England, the Netherlands, Germany, etc., gained through the more and more intensive international cooperation results in more comprehensive patterns of interdisciplinary research. Here the university structures interact not only with each other in one and the same disciplinary field but also engage firm structures of the same and other thematic profiles. As an example of advanced narrow-profile institutionalization, we would like to mention the nomination of an interdisciplinary research structure in Kiev, Ukraine: *State Scientific Center for Environmental Radiogeochemistry*. In fact, interdisciplinary institutional nominations occur quite often among the participating institutions from many countries.

We could suppose that there does not exist any saturation of the problem contents for some research collectives that dropped out in the last symposium. Probably, the financial restrictions for basic and applied research by both state and private organizations play a crucial role in this respect.

The relative share of the countries from Central and Eastern Europe increases gradually with the years. This tendency is most outlined when Yugoslavia, Poland, Russia and Romania are concerned.

The international collaboration initiated by the FSU through the IICER (6) plays, undoubtedly, a crucial role in the advancement of ecological science in the developing and small countries in Central and Eastern Europe, Asia, and Africa. Our previous data (7,8) proved the significance of the informal and formal communication channels in the process of internationalization of the scientific community involved in theoretical and applied research in the field of environmental contamination and its prevention.

Science stratification is an essential phenomenon of contemporary basic and applied research (9). The computerized scientometrics could serve as an evaluation tool in science policy management not only in big but also in small countries (10). The relatively objective scientometric assessment of interdisciplinary trends could essentially contribute to the improvement of the information infrastructure in modern science worldwide (11).

Figure 1: Participation of Countries in Different Number of International Symposia

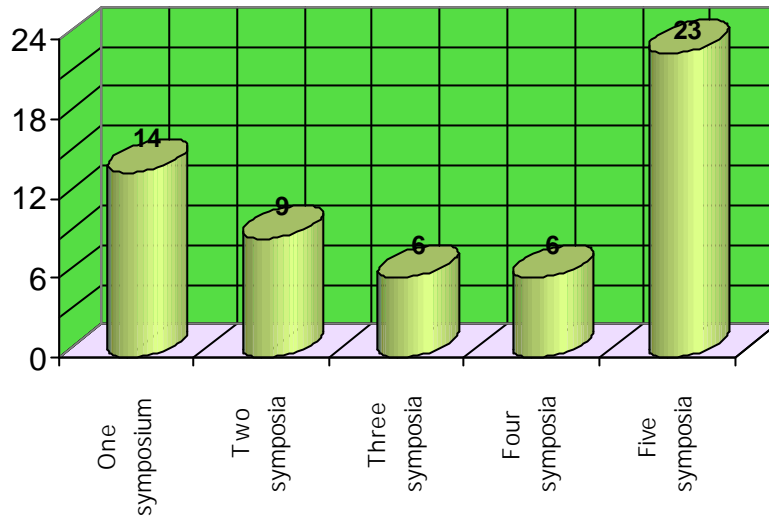


Figure 2: Country Distribution According to the Number of Cities/towns of Authors

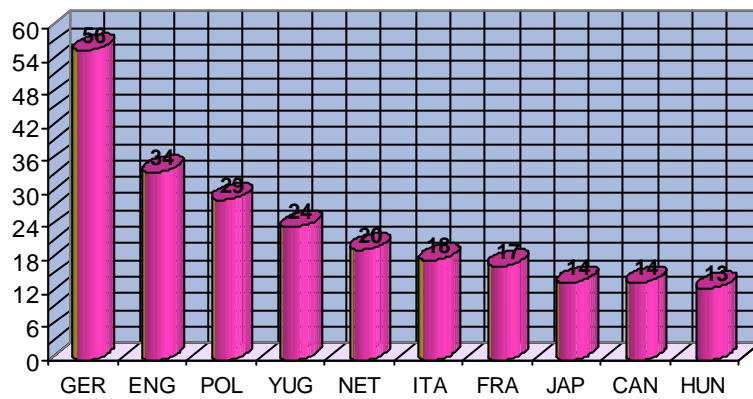
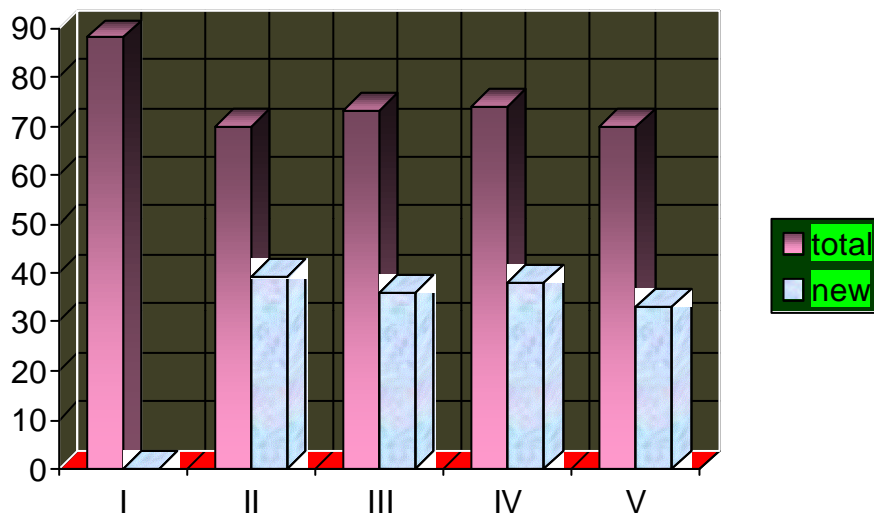


Figure 3: Dynamics of the Number of the Cities/towns in the USA in Five Symposia



Our results convincingly demonstrate the great socio-medical importance of these symposia and exhibitions for the improvement of the local and global environment in all over the world. A more comprehensive data presentation would reveal the intrinsic mechanisms of the gradual advancement of the institutionalization of research in world ecological science through the acquisition and promotion of the positive experience gained in the leading countries. This investigation represents a continuation of our work devoted to the international interdisciplinary scientific communications on environmental contamination in Europe. A citation analysis of the proceedings of the six international symposia and exhibitions on environmental contamination in Central and Eastern Europe and in the Commonwealth of Independent States (1992-2003) should be our next scientometric task.

Conclusion

The history, presence, and future of the idea and practical realization of the international symposia and exhibitions on environmental contamination in Central and Eastern Europe and the Commonwealth of Independent States deserves, obviously, a more comprehensive scientometric evaluation to further promote science advancement in this actual interdisciplinary field.

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