

SOME ASPECTS REGARDING THE SCIENTIFIC RESEARCH AND INNOVATION FUNCTION IN IASI COUNTY IN THE TRANSITION PERIOD

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Abstract The scientific research and innovation function partially superimposed over the cultural function, in part over the education function, recently tending to create their own identity. Organized on three levels (Romanian Academy, Universities and private or estate companies) the scientific research imposes an area of influence that exceeds, in some cases, the country borders.

Keywords : research, innovation, research facilities, research staff, ISI papers, patents, participations in international scientific meetings

1.The organisational structure and the material basis of scientific research in the transition period

Even if it is not one of the dominant functions of Iasi, the scientific research has come to have a regional function due to the existing research units. Their dynamics is characterized by an upward trend, especially after 1989 when the number of research units increased about four times (from 16 to 62). The number of units has remained relatively constant over the period 1949-1989. Some units have been removed, but the number was kept constant by the emergence of new ones. The deficit in this period has been compensated after 1990 when new Institutes emerged in the Romanian Academy – the Iasi branch, also new research centers at major universities and many private establishments.

2.The scientific research staff

Regarding the scientific research staff, the situation for the county of Iasi is a favorable one, as it does not present the downward trend registered at the national level. (see fig. 1). The staff number declined continually during 1990 – 2000, becoming half due to a massive migration of researchers abroad (the so-called „brain drain”). Consequently, Romania ranks among the last regarding the number of employees who receive income from their activity at the Research and Development Department, reported as equivalent full-time activity per thousand inhabitants.¹

¹ Thus, with a total research staff of 33,000 full-time employees, our country has 1.5 persons working in the area of research and development per 1 000 inhabitants, while Bulgaria, Latvia and Poland each have 2 people working full time per 1000 inhabitants, Hungary (2.3), Slovakia and Portugal (2.5), Czech Republic, Croatia, Italy, Lithuania (2.8), Estonia (3) and Spain (3.4), Ireland

For the city of Iasi, and the entire North-Eastern Development Region (the percentage of employees in Iasi County is approximately 75% of the Region) there can be noticed an upward growth, the number of employees having doubled in the last 10 years, especially due to the emergence of new research centers.

Tab.1: Dynamics of the number of employees in Scientific research activities in Romania, the North Eastern Region and County with the period 1995 – 2007

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Romania	64138	62297	57714	57125	48113	37241	37696	38433	39985	40725	41035	42220	42484
Northeast development Region	3023	4440	4176	4130	3470	3510	3708	3368	2926	3168	3704	3981	4156
Iasi County	1577	2834	2472	2627	1943	1968	2099	1874	1463	1673	2329	2651	3013
%	52.16	63.82	59.15	63.6	55.99	56.06	56.6	55.64	50	52.80	62.87	66.59	72.49

(Data source : NSI)

In the county of Iasi, there is an upward growth (Fig. 2). If in 1995 there were 1577 employees, in 2007 their number amounted to 3013, that is about three times higher. It is a consequence of the dynamics in the number of institutes and the research reorganization and to an innovation network.

The dynamics of employees share in Iasi county and in the North East Development Region is also ascending. If in 1995, Iasi employees represented 52.2% of those in the North Eastern Region, in 2007 their share was 72.5%, that is an increase of 20%.

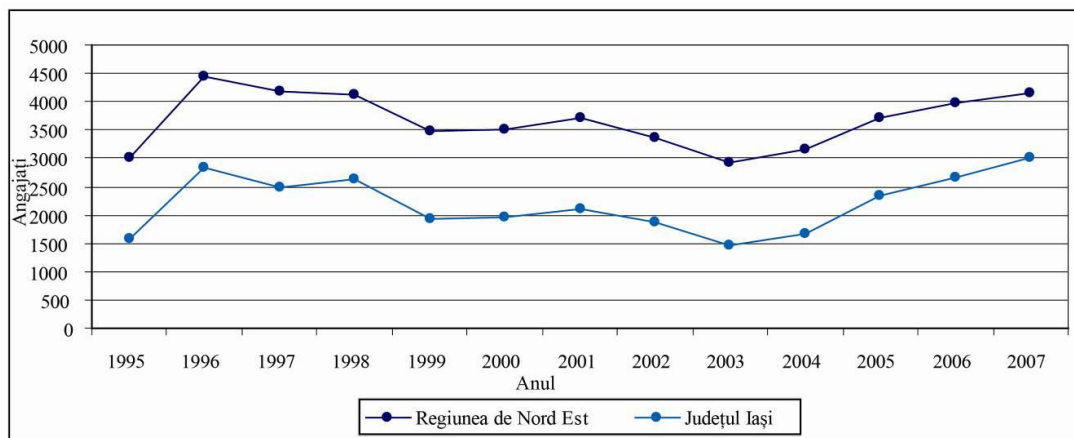


Fig. 1: The dynamics of the RDI staff in the North East Development Region in the county of Iasi, during 1995 - 2007 (Data source : NSI)

(3.7), Slovenia (4.3), Netherlands (5.3), France (5.6), Germany (5.8), Belgium and Norway (6), Denmark (7.8), Finland - 10 ;

3. Forms of organization and subordination on scientific research and areas of research and innovation in Iasi

In terms of organization and subordination, the research units are divided into three types: the Romanian Academy research units, the university research units and other research units subordinated to NASR (National Authority for Scientific research)

Note that scientific research areas have developed along major universities in the central Copou area – but also in the Tudor Vladimirescu area. The remaining neighborhoods are not served by any such research units, which shows the important role the centers have at regional, national and international level, and locally diminished importance.

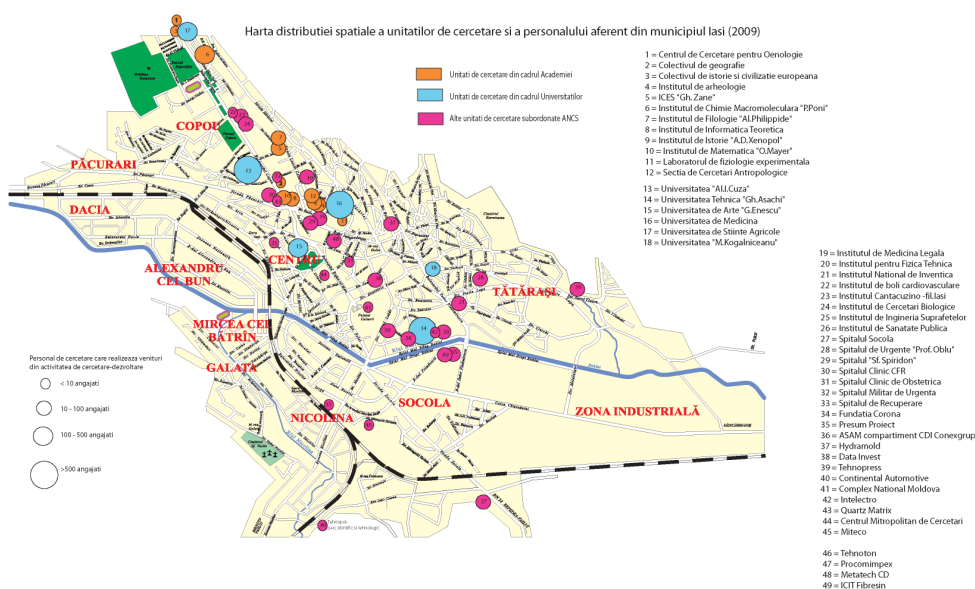


Fig. 2 – The spatial distribution map of research units and staff for Iasi (2009)

Of all the three forms, the universities are the main scientific centers of the county.

From the above table that summarizes data from self- assessments reports of the Universities of Iasi we can draw the following conclusions:

- The largest number of employees who receive income from the activity of scientific research is held by the University of Medicine and Pharmacy (1001);
- Most ISI Papers belong to the "Alexandru Ioan Cuza" University 1143 (51% of total works);
- Most patents have been made at the "Gheorghe Asachi" Technical University - 130 patents (equivalent to 76.9% of total achieved Universities)

- Developing products and technologies almost entirely partake “ Alexandru Ioan Cuza” University – 1270 products (89,2%);
- The numerous papers without ISI are from the University of Medicine and Pharmacy – 2656 papers written between 2003 - 2007;
- The "Gheorghe Asachi" Technical University of Iasi holds the first place concerning physical models, due to its technical profile;
- International recognition in terms of awarding is attributed to The "Gheorghe Asachi" Technical University of Iasi – with 23 international awards (92 of total);
- nationwide, “ Alexandru Ioan Cuza” University holds the most awards 137 (75% of total);

The Scientific research is, overall, an indicator of utmost relevance for the activities and standards of quality achieved by a university.

Tabel 2 : Results of scientific research in the Universities from Iași

University	Founded	Staff numbers	ISI Paper	Patents	Products, Technologies	Papers without isi	presented on international conferences	Physics models	International awards	National awards
UAIC ²	1860	884	1143	28	1270	1495	2906	28	0	137
UTGA	1937	625	699	130	89	1798	3257	283	23	9
UAGE	1860	130	0	1	38	187	28	85	2	6
UMF	1948	1001	366	7	6	2656	983	19	0	21
USAMV	1948	108	28	3	21	1264	253	114	0	9
UMK	2005	58	7	0	0	17	20	0	0	0
		2806	2243	169	1424	7417	7447	529	25	182

(Data sources: Self-assessments reports accomplished for the period 2003- 2007)

If in terms of quantity, the three forms of organizations that we have opted for scientific research can be compared among themselves either in terms of material or scientific research staff, in terms of quality, there are major discrepancies. We have chosen three indicators for the qualitative analysis: the number of ISI papers, patents and papers presented at international conferences having program committees.

² UAIC – “ Alexandru Ioan Cuza” University

UTGA - The "Gheorghe Asachi" Technical University of Iasi

UAGE – University of Arts „George Enescu” Iasi

UMF – „Gr. T Popa” University of Medicine and Pharmacy Iasi

USAMV – „Ion Ionescu de la Brad” University of agricultural sciences and veterinary medicine

UMK – „Mihail Kogalniceanu” University Iasi

Tabel no. 3: ISI papers, patents and papers presented at international conferences in major units of scientific research in Iasi (2003-2007)

Research units	ISI Papers	%	Patents	Papers presented at international conferences
Institutes of Romanian Academy	827	23,1	25	1510
University research centers	1143	32.6	28	2906
2243	699		130	3257
	0		1	28
	366		7	983
	28		3	253
	7		0	20
Other research units	437	12.5	79	1226
Total	3507		273	10183

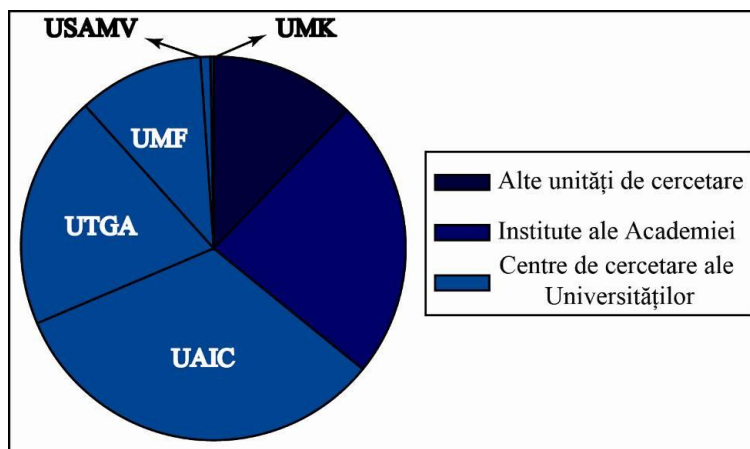


Fig. 3: The structure of scientific papers published in ISI journals (2003 - 2007)

ISI papers (3507 in all, in the period under analysis) represent an important indicator of quality regarding the scientific research performed by a particular unit. In Iasi, 2243 units of articles have been published in universities, 827 in institutes of the Romanian Academy and 437 in other research units. In terms of percentage, 64% belong to the universities, 24% to the Academy and 12 percent to other units. Among universities, Al I Cuza University with its 33% surpasses by far the others. Academy Institutes also take an internationally recognized research with a number of 827 ISI papers equivalent to 24%.

The highest number of patents, another indicator of research, also belong to universities - The "Gheorghe Asachi" Technical University (48% - 130 patents). University research centers alone have 62% of the total. Note that the other research units have a significant proportion in this respect - about 30% - some of

which were created with that purpose or based on a patent that subsequently developed it. According to the third indicator chosen, all university research centers take the first place with a significant percentage of 73% due to the funds available (mostly from grants) for research studies abroad.

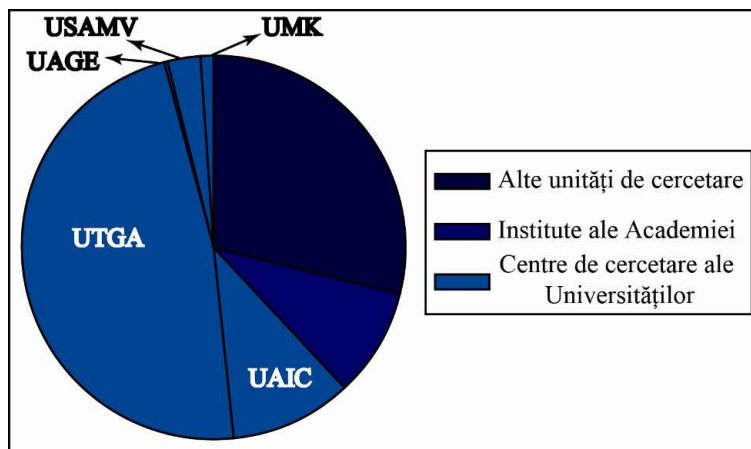


Fig. 4: Number of patents obtained in the scientific research in Iasi (2003 - 2007)

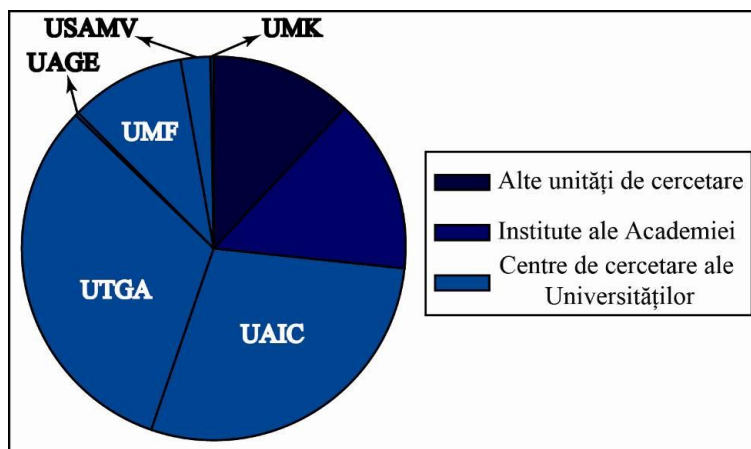


Fig. nr.5: Papers presented at international conferences with program committee made in the research units in Iasi (2003 - 2007)

Between 2003 – 2007 10,183 works were presented at international conferences. Universities and research centers had a rate of 73%. (UTGA - 32%, UAIC - 28.5%, UMP - 9.6%) and 14.8% the Romanian Academy.

4. Scientific events organized in Iasi (with international participation) and in other countries (with participation from Iasi)

The scientific events organized in Iasi (with international participation) and in other countries (with participation from Iasi) have increasingly intensified after 1990. Universities and institutes of the Academy are mostly those who organize such events that tend to turn Iasi into a city of congresses, conferences and symposiums.

In 2007, the universities of Iasi organized a number of 39 scientific meetings. Of these, 3 were organized by „Gr. T Popa” University of Medicine and Pharmacy, 7 - The "Gheorghe Asachi" Technical University, 27- Al. I Cuza University Veterinary Medicine - 1, UAGE - 1. Al. I. Cuza " ranks first, holding approximately 70% of all events organized by the Universities of Iasi.

Regarding the origin of the participants in the events of Iasi, it is quite poor compared to the opposite phenomenon (Iasi participation in international events). In 2007, a number of 302 persons from abroad attended 39 scientific events.

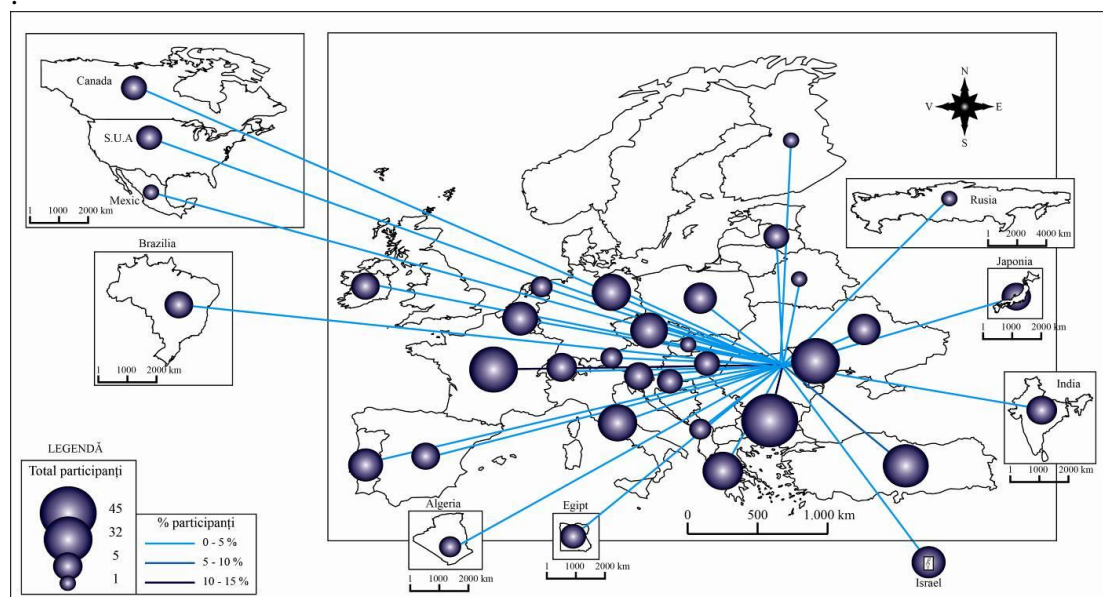


Figure 6 Sources of foreign participants at scientific events organized by the Universities of Iasi in 2007

Bulgaria ranks first with a total of 45 participants representing approx. 15% of all foreigners who came to scientific events organized in 2007 in Iasi, followed by France and Moldova, each with a rate of approx. 10%. Note that more than 50% of the participants came from Europe. As for Asia, persons from India and Japan participated in events organized by UTGA, given the technical profile and the industry in these countries. America was represented by participants from Canada, the United States, Mexico and Brazil (three from each). It should be mentioned that some participants from these

continents are researchers of Romanian origin who had emigrated earlier and have been working at prestigious international institutions.

Tabel no.4: Participants from Iasi in international scientific events during 2003 - 2007

	2003	%	2004	%	2005	%	2006	%	2007	%		%
UAIC	337	38.12	502	41.94	643	36.83	643	43.33	571	30.15	2696	37.4
UTGA	357	40.38	497	41.52	751	43.01	598	40.30	1050	55.44	3253	45.1
UAGE		0.00		0.00	17	0.97	4	0.27	6	0.32	27	0.4
USAMV	25	2.83	46	3.84	44	2.52	75	5.05	60	3.17	250	3.5
UMF	165	18.67	152	12.70	291	16.67	164	11.05	207	10.93	979	13.6
	884		1197		1746		1484		1894		7205	100

(Source: University self-evaluation reports / Newsletters Department of International Relations)

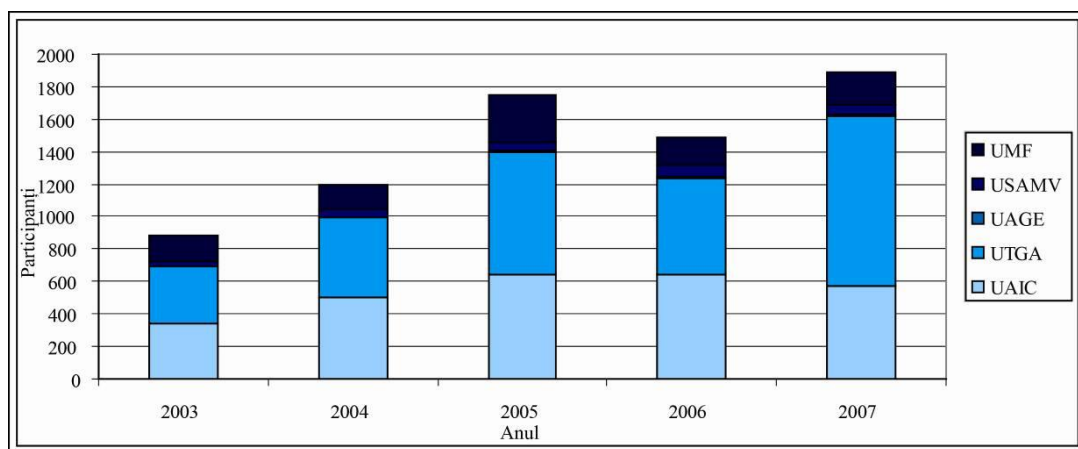


Fig. nr. 7: Dynamics of the number of participants at international scientific events in Iasi universities during 2003 – 2007

Iasi participation at international events has grown in recent years. Analyzing the dynamics of Iasi academic participation in international conferences having program committees we can draw the following conclusions:

- it has a rising trend. The participation has increased from 884 in 2003 to 1894 in 2007 (about 2.1 times);
- approximately 80% of the participants come from two universities: UAIC and UTGA. If in 2003 they had roughly equal percentages (38.12 - UAIC, 40.38 - UTGA), in 2007, 55.44% of the participants came from UTGA;
- the last place with an extremely small number of holdings is held by UAGE - considering the period being analyzed.

Analyzing the structural diagram above one can see that most researchers participating in international scientific meetings came from the Technical University of Iasi (45.1%), followed by the "Al. I. Cuza" - 37.4% and the University of Medicine and Pharmacy "Gr T Popa" - 13.6%. The last two places are held by USAMV - 3.5% and UAGE - 0.4%.

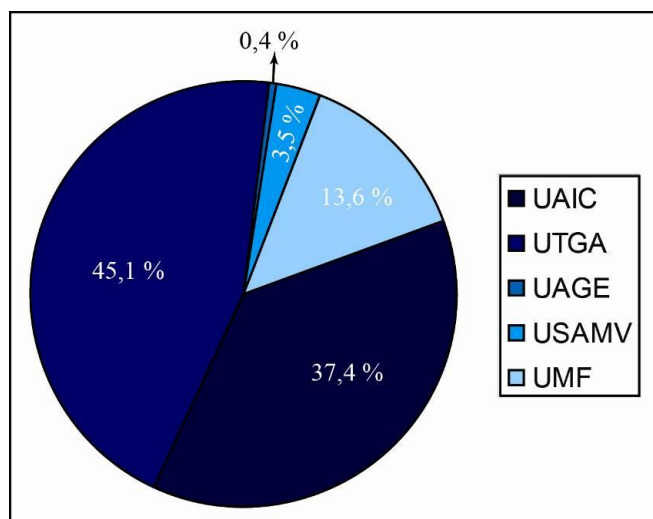


Figure no. 8 : Structure of Romanian researchers' participation at international scientific events in the period 2003 – 2007

Each of these universities has its own area of participation, all of them having been submitted to analysis and presented below, taking into consideration the same period, 2003-2007.

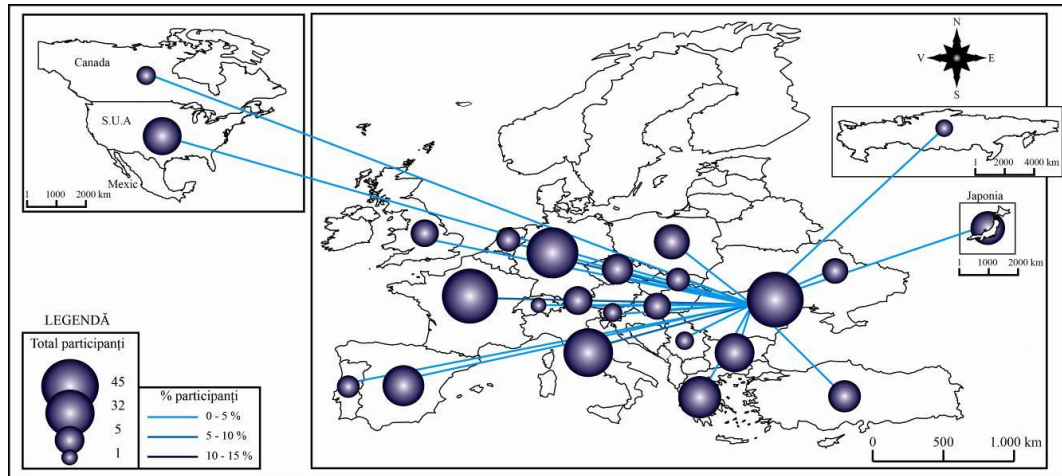


Fig. no. 9: UAIC's Participation in international scientific meetings (2003 - 2007)

Data source: Department of International Relations Newsletters UAIC

In order to analyze the countries participants go to, we have reviewed the newsletters provided by the Department of International Relations, University "Al. I. Cuza" Iasi. 10% - 121 of those participating in international events go to Moldova, the distance is an important criterion in the choice. Next, European countries, among the most

economically developed and well known for the high interest they take in the scientific research: France (9.8%), Germany (8.1%) and Italy (7.9%).

Taking into consideration the continents, there is a clear dominance of the European continent (about 80% of participation). however travels to America occur (USA and Canada - about 6%), Asia (especially Japan), Africa (Algeria, Morocco, South Africa - insignificant percentages) and Australia.

In Romania, UAIC researchers participate in international events organized in Iasi, the host institution being the same, respectively UAIC. The percentage held by Iasi is very, high exceeding 50% (namely 58%). Bucharest comes second - the largest university center in the country, known for its international events, by about 10%.

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