

**Workshop on
Science, Technology and Innovation
Observatories in ESCWA Member
Countries**

Beirut, 18-20 January 2010

**Collecting and producing STI
indicators:
The steps undertaken in Tunisia**

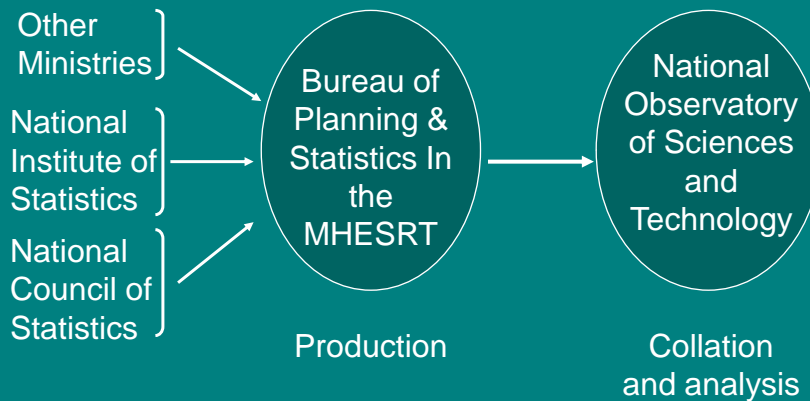
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Presentation outline:

- Actors of the National System Producing S&T Indicators
- Administrative procedure to collect informations
- National Surveys on S&T
- Main indicators' outputs
- Constraints
- Ambitions

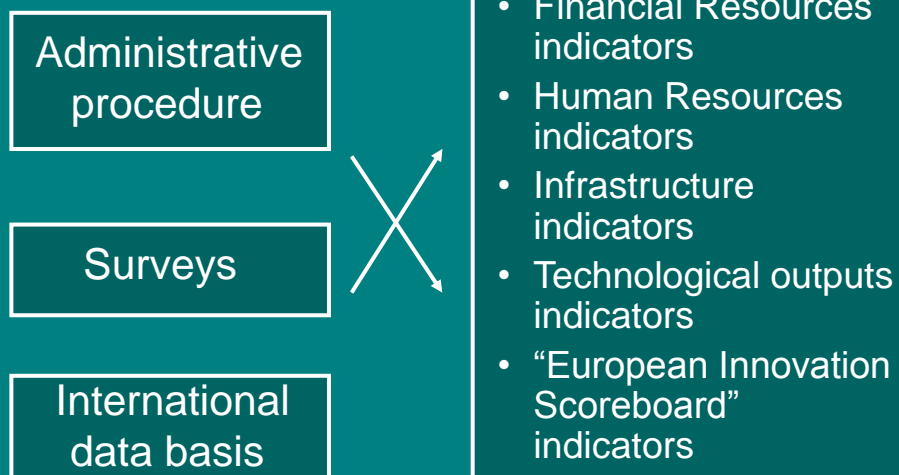
National Institutions Responsible for S&T Statistics



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Collecting S&T data: The Tunisian “hybrid” approach

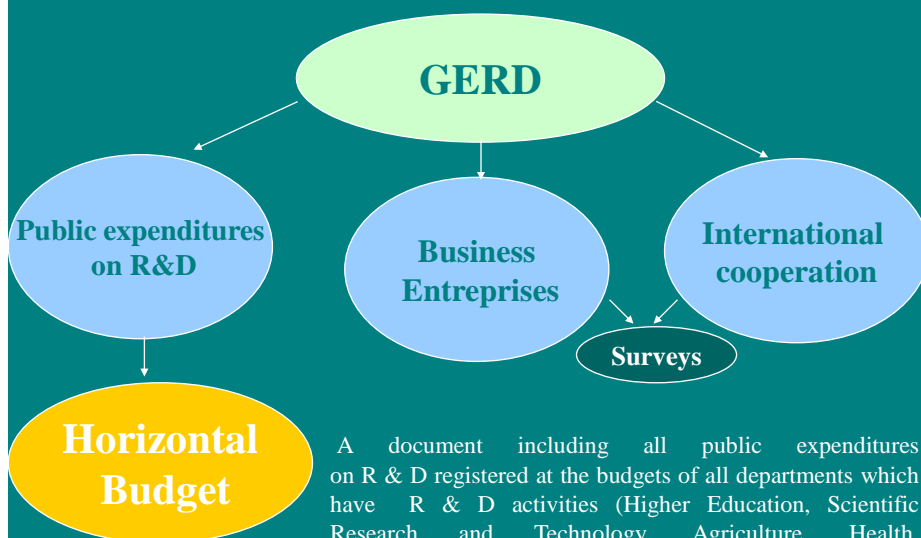


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Administrative procedure

Financial Resources (1):



A document including all public expenditures on R & D registered at the budgets of all departments which have R & D activities (Higher Education, Scientific Research and Technology, Agriculture, Health, Environment...)

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Financial Resources (2):

Horizontal Budget

Section 1

- Salaries: *between 10% and 100%*
- Current expenditure: *between 10% and 100%*
- Interventions : (scientific meetings: seminars, workshops, associations, publications... **100%**)

Section 2

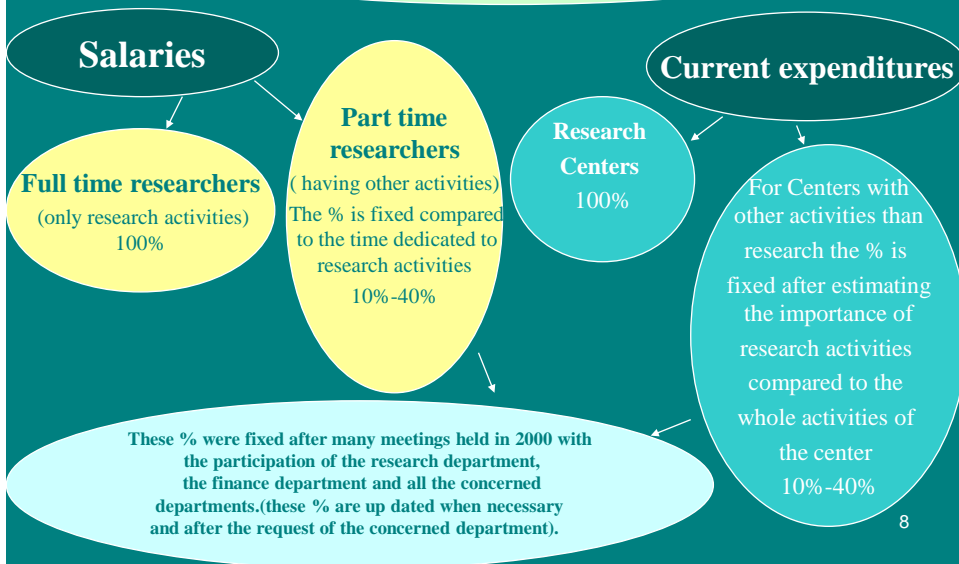
- Projects (structures, cooperation, evaluation...)
- Scientific equipments,
- Buildings research center, space... **100 %**

How can we determine the % for salaries and current expenditures?

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The estimation of research part



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Steps for preparing the horizontal Budget (year N)

January-February :the prime minister circular preparing the state budget :it invites all the concerned departments to send their R&D budget to both finance department and research department

March-April: the research department receive a draft of R&D budget of all the concerned departments (with the actualization of consumed credits for the year N-1)

May-June: meetings with each department to discuss proposals

A draft of the Horizontal Budget is prepared and presented to the Technical Committee of Scientific Research and Technology for discussion and approval to be sent after to the finance department

This committee provides coordination between the different ministries, in the follow-up of the progress and the execution of the research programs, their financing and in the preparation of the works of the Higher Council of Scientific Research and Technology.

July-August: discussion of each department budget with the finance department and approval of its R&D credits investments

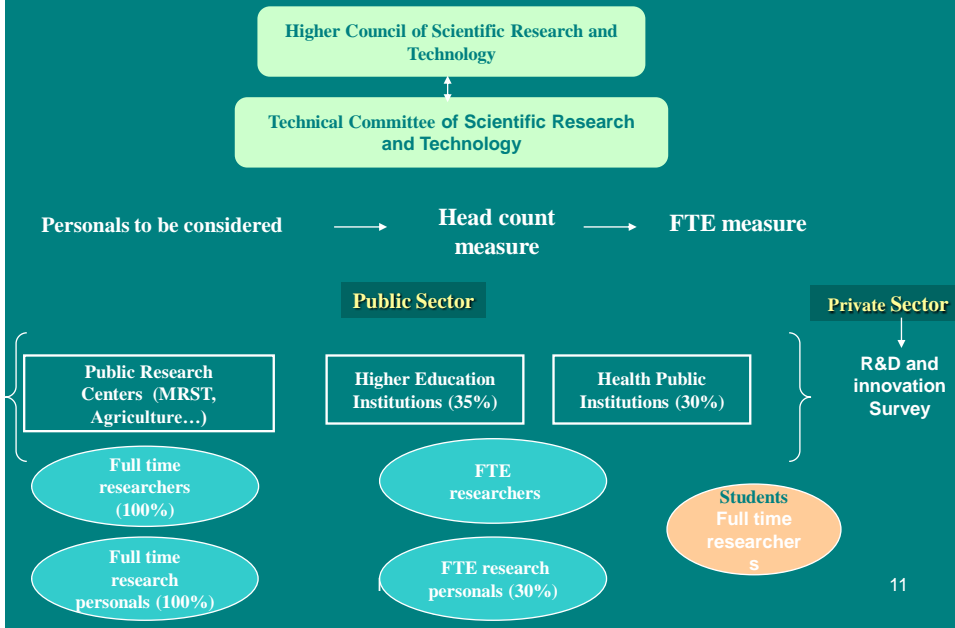
In case of disagreement
arbitration between the minister of finance and the concerned minister

If /No solution
Prime minister intervention

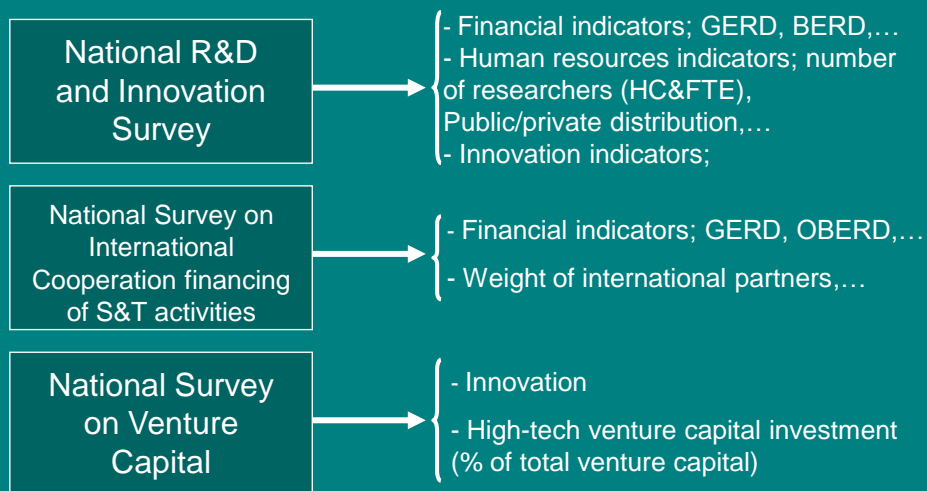
Actualization of the draft budget and preparation of the final document

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Human Resources:



National Surveys on S&T:



R&D and Innovation Survey: Methodology and main results

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National context:

- Creation of the Secretariat of state of Scientific Research in 1991
- Foresight study on S&T (Tunisia-2010) in 1995
- First report of the Higher Council of Scientific Research and Technology in 1998
- First report of the Consultative Council of Scientific Research in 2003
- Electoral program of the President (2004-2009)

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R&D surveys in Tunisia:

- 1998: first survey (R&D)
36 firms (public)
realized by BEPPS in the Sect. of State of SRT
- 2002: second survey (R&D)
70 firms (public and the largest private firms)
realized by BEPPS in the Sect. of State of SRT with the support of an economic research unit in the University El Manar (Tunis)

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Survey's framework: General informations

- National visa 2005
- Planned into the national statistic 10th plan (2002-2006)
- Coordination with National Institute of Statistics (Tunisia)
- Period: June to septembre 2005
- References; Oslo and Frascati manuals
 - * Mixed survey (with two separate modules; R&D and Innovation).
 - * Business enterprise.
 - * European CIS.

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Some logistic informations:

- 3 regional offices of the NIS,
- 25 experimented interviewers,
- 4 supervisors,
- 3 full days of training on “concepts” and on the questionnaire,
- Experimental period: 2 weeks,
- Full cost: 80000\$

Survey's framework: Main objectives

- Measure the amount of R&D expenditures by Tunisian firms,
- Build a data base of innovative companies,
- Update the national statistic system of science and technology indicators,
- Cooperation between partners (other firms, research centers, universities, ...),
- Realisation of innovative products (new to the firm or new to the market) and processes,
- Factors hampering the innovation process,
- Government support,
- Technoparks' programme

Presentation of the sample:

- Guided sample on the basis of : National identification (IPA,NIS,...), Size (number of employees, Capital, sales turnover,...), Patents (INNORPI), Government support (PNRI, PIRD,VRR).
- 739 identified firms (586 responses)
- 3 years informations demanded (2002-2003-2004)
- All tunisian regions were represented
- All industrial sectors were represented including ICT services

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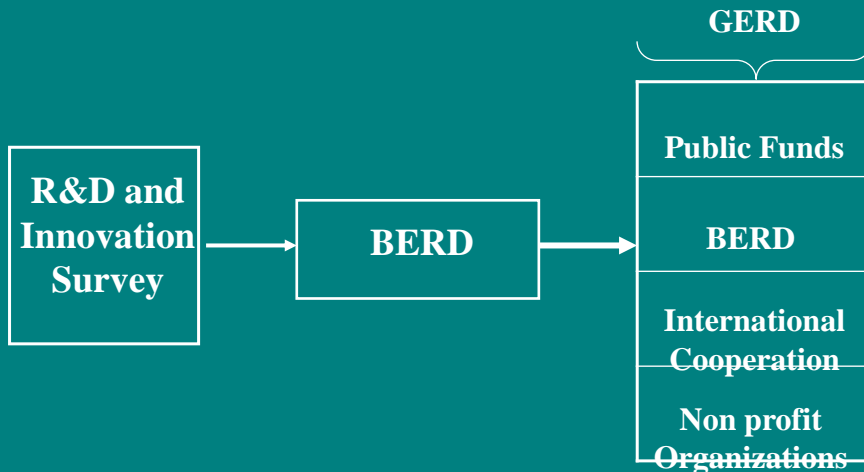
Presentation of the second survey

- Programmed for 2007 and finally done in 2008 (September –December)
- Planned into the national statistic 11th plan (2007-2011)
- 3 years information demanded (2005-2006-2007)
- Modifications implemented:
 - Oslo new version (2005)
 - More Services

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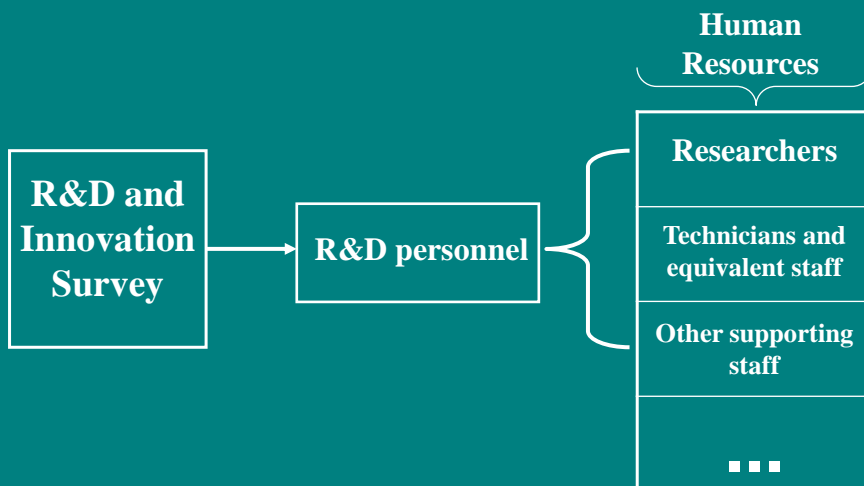
R&D and Innovation Survey for BERD:



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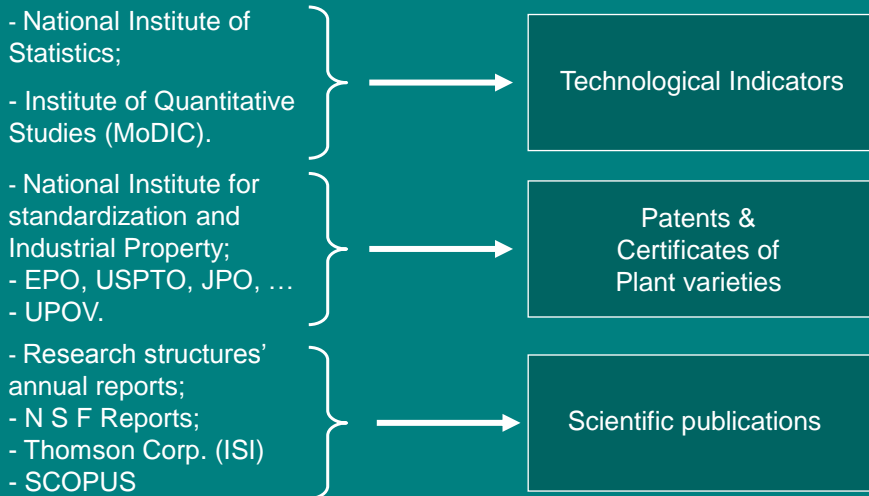
R&D and Innovation Survey for R&D personnel:



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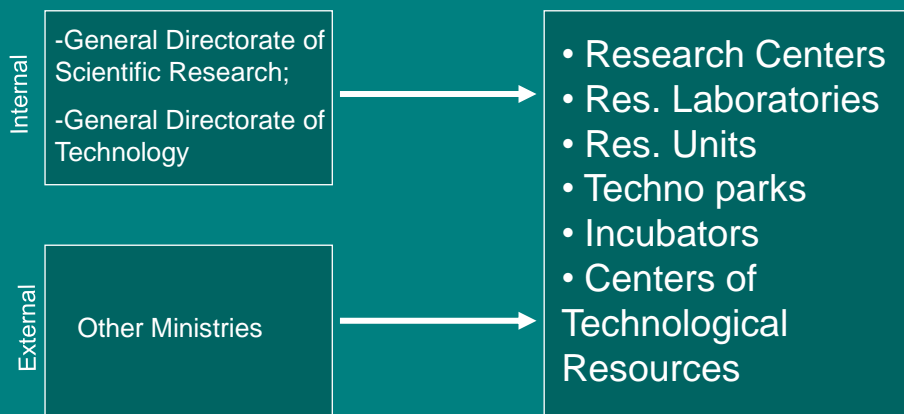
Outputs Indicators:



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Infrastructure Indicators:



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Main indicators' outputs

Human resources indicators:

- **Evolution of the number of researchers**
- **Evolution of the number of researchers per 1000 actives**
- **Number of full time equivalent (FTE) researchers**
- **Number of researchers per 1000 actives: International comparisons**

Human resources indicators for Tunisia:

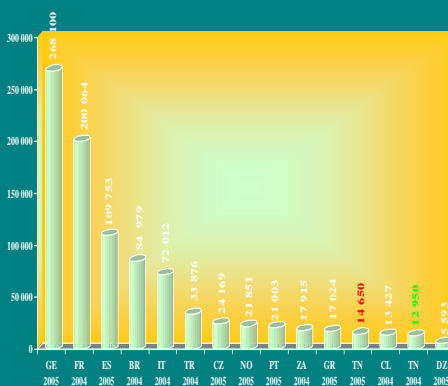
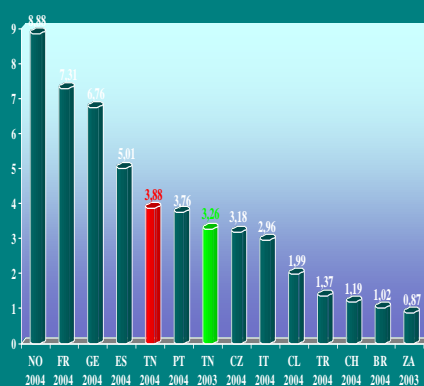
Year	Researchers (Head Count)	Researchers (FTE*)
1998	11 720	6 563
1999	12 642	6 911
2000	13 836	7 516
2001	15 368	8 515
2002	17 725	9 910
2003	20 050	11 265
2004	22 845	12 950
2005	25 445	14 650
2006	27 529	15 833

Year	Nb of researchers	Nb of researchers / 1000 actives
1998	6 563	2,14
1999	6 911	2,20
2000	7 516	2,34
2001	8 515	2,59
2002	9 910	2,94
2003	11 265	3,26
2004	12 950	3,88
2005	14 650	4,28
2006	15 833	4,52

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Human resources : international comparisons



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Financial Resources:

- GERD/GDP (in %)
- GERD distribution by source of funds
- Gross domestic expenditures on R&D (GERD in million \$PPP)
- GERD per capita (in \$ PPP)
- Public expenditures on R&D (% of GDP)
- Business expenditures on R&D (% of GDP)

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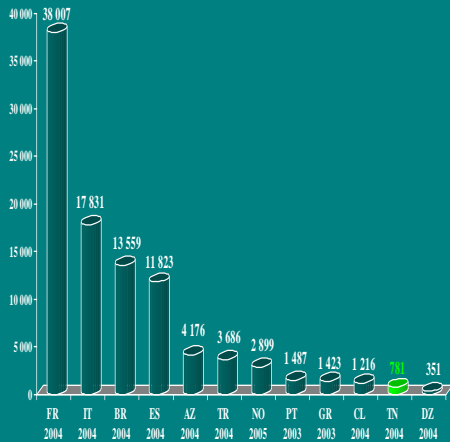
GERD evolution and distribution by sources of funding



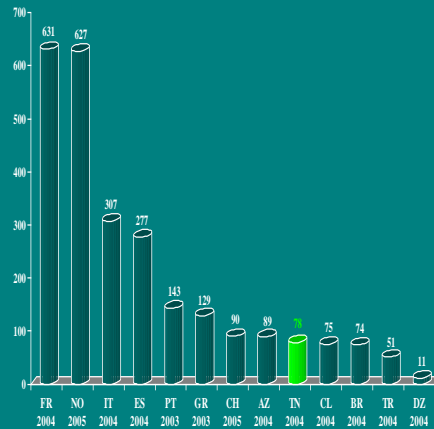
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GERD in million \$PPP



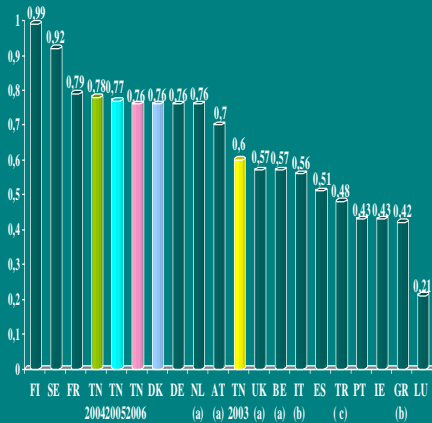
GERD per researcher in 1000 \$PPP



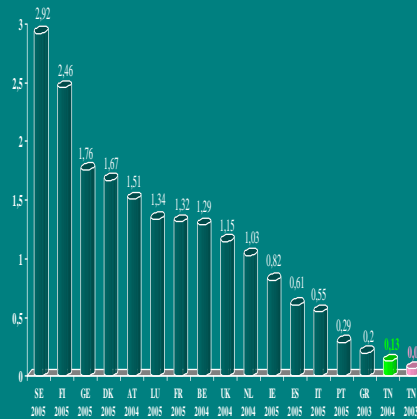
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Public expenditures on R&D/GDP



Business expenditures on R&D/GDP



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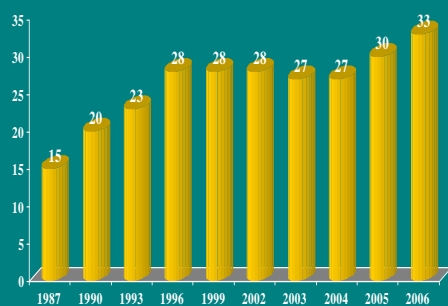
Infrastructure indicators:

- Evolution of the number of research centers and their distribution by field
- Evolution of the number of laboratories and research units
- Distribution of laboratories and research units by discipline
- Evolution of the number of laboratories and research units by region
- Business incubators
- Technoparks

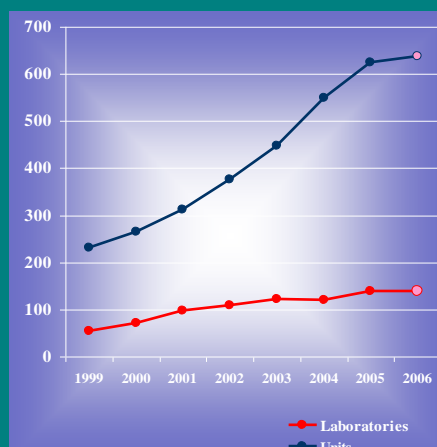
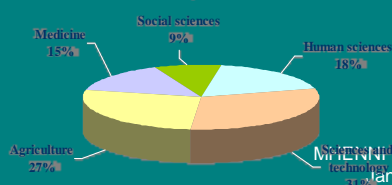
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Evolution of the number of research centers, laboratories and units :



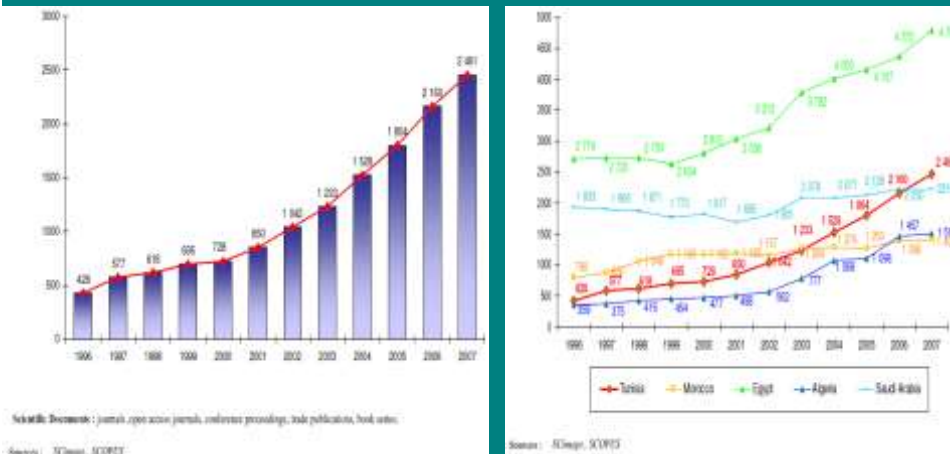
Distribution by field in 2006



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Evolution of the scientific publications:



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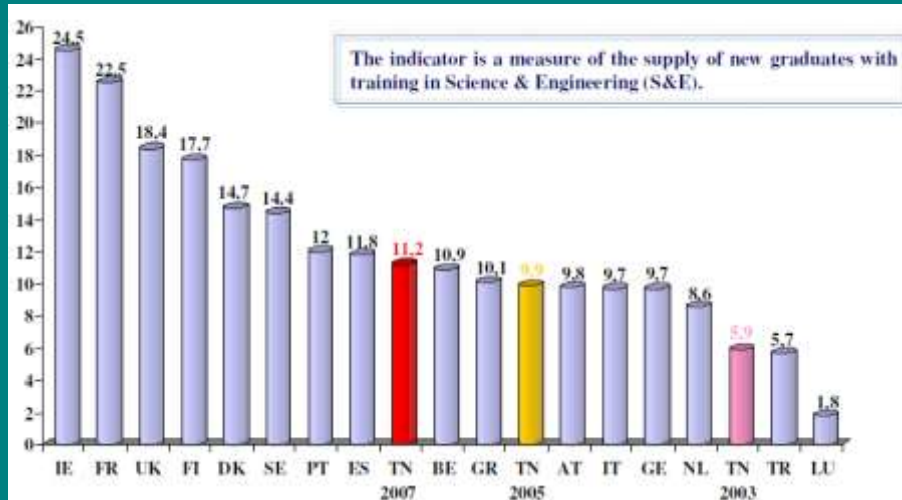
Technological indicators:

- New science and engineering graduates (% of 20-29 years age class)
- National and International Patents
- Employment in medium-high-tech and high-tech manufacturing (% of total workforce)
- Employment in high-tech services (% of total workforce)
- Exports of high technology products (% of total merchandise exports)
- New community trademarks per million people
- New community industrial designs per million people

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New science and engineering graduates (% of 20-29 years age class)



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National and International patents:

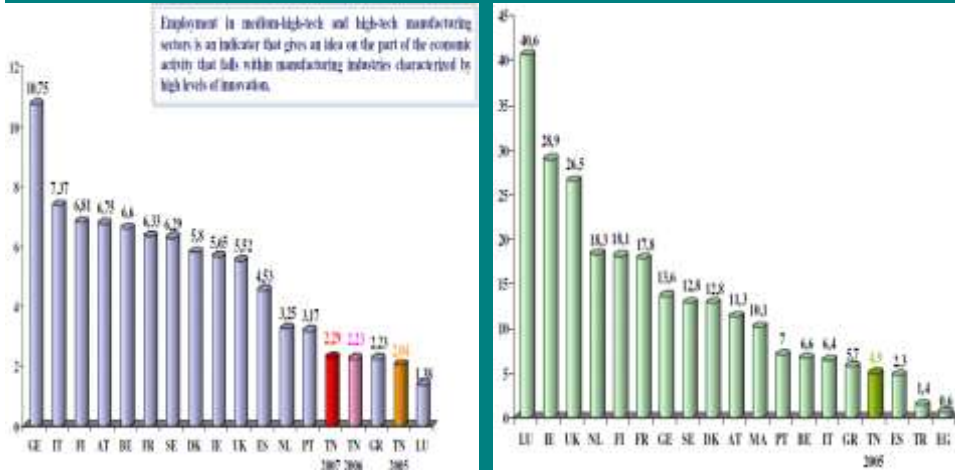
Country	Number of registered patents	
	US Patent (2007)	EPO (2007)
France	4 315	3 980
Italy	2 093	1 960
Spain	461	334
Norway	330	170
Brazil	152	83
South Africa	127	58
Greece	42	18
Turkey	38	39
Chile	32	3
Portugal	24	22
Saudi Arabia	22	10
Egypt	22	-
Kuwait	8	-
Pakistan	7	-
Tunisia	3	2
Jordan	2	3
Morocco	1	2

Categories	2000	2001	2002	2003	2004	2005	2006	2007	Total
Company	10	5	2	3	2	7	7	13	49
Individual	9	12	21	19	26	22	44	33	186
Research structure	9	5	6	12	18	27	22	30	129
Total	28	22	29	34	46	56	73	76	364

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Technological indicators:(continued)



An “European Innovation Scoreboard” for Tunisia:

N	Indicators	Unit	Average of EU(27)	Most performing countries	Least performing countries	Tunisia	Ref. Year for Tunisia
1.1	New S&E graduates (% of 20-29 years age class)	%	12.9	24.5	1.8	11.2	2007
1.2	Population with tertiary education per 100 population aged 25-64	%	23	35.1	11.7	12.2	2007
1.4	Participation in life-long learning per 100 population aged 25-64	%	9.6	32.1	1.3	na	
4.5	Employment in medium-high-tech and high-tech manufacturing (% of total workforce)	%	6.63	10.75	0.98	2.29	2007
4.1	Employment in high-tech sectors (% of total workforce)	%	3.26	5.06	1.43	1.14	2007
2.1	Public R&D expenditures (% of GDP)	%	0.65	0.99	0.17	0.78	2004
2.2	Business R&D expenditures (% of GDP)	%	1.17	2.92	0.09	0.13	2004
5.1	New EPO patents per million population		128	311.7	1.2	0.5	2007
5.2	New USPTO patents per million population		52.2	274.4	0	0.3	2007
3.1	SMEs innovating in-house (% of SMEs)	%	21.6	47.2	2.9	4.75	2004
3.2	Innovative SMEs co-operating with others (% of SMEs)	%	9.1	20.8	2.8	3.71	2004
3.3	Innovation expenditures (% of turnover)	%	2.15	3.47	0.73	0.52	2004
3.4	High-tech venture capital investment (% of total venture capital)	%	50.8	69.8	6.6	20	2002-2003
4.3	Sales of new-to-market products (% of turnover)	%	7.3	13.6	1.9	na	
1.5	Broadband penetration rate (number of broadband lines per 100 population)	%	14.8	29.6	2.7	0.93	2007
3.5	ICT expenditures (% of GDP)	%	6.4	9.9	4.9	2.73	2007
5.4	New community trademarks per million population		108.2	902	5.6	1.1	2007
5.5	New community industrial designs per million population		109.4	240.5	0.9	1.3	2006

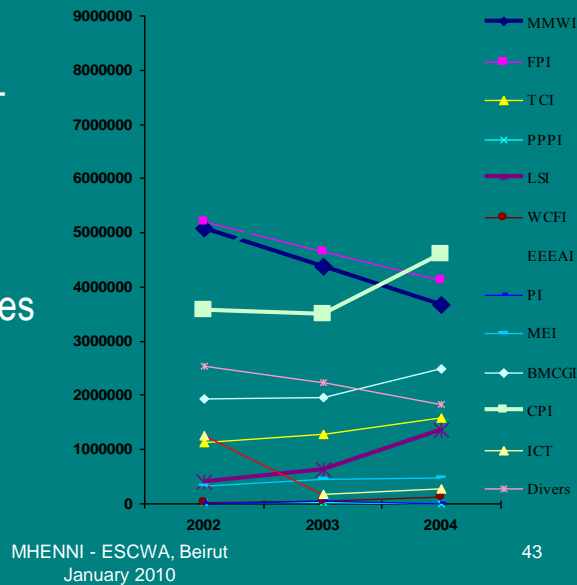
Main qualitative outputs

R&D activities:

- 92, had an identified budget dedicated to R&D activities
- 202, had a structure which could be dedicated...
- 248, had a circumstantial innovation activities (R&D)
- 2330 employees in innovation structures and 835 researchers,
- 5 employees by R&D formal structure (4 technicians, 1 administrative)

R&D sectoral expenditures

- Electronic industry, Chemistry and Agro-food are the most dynamic innovative sectors
- Average expenditures in R&D projects are:
144 mDT for CI
83 mDT for EEEAI
40mDT for FPI



Innovation activities:

Of the 586 surveyed firms:

- 51% declared having been involved in product innovation in the period 2002-2004 and
- 49% in process innovation, whereas
- 34% claim to have abandoned innovation projects or left them unfinished.

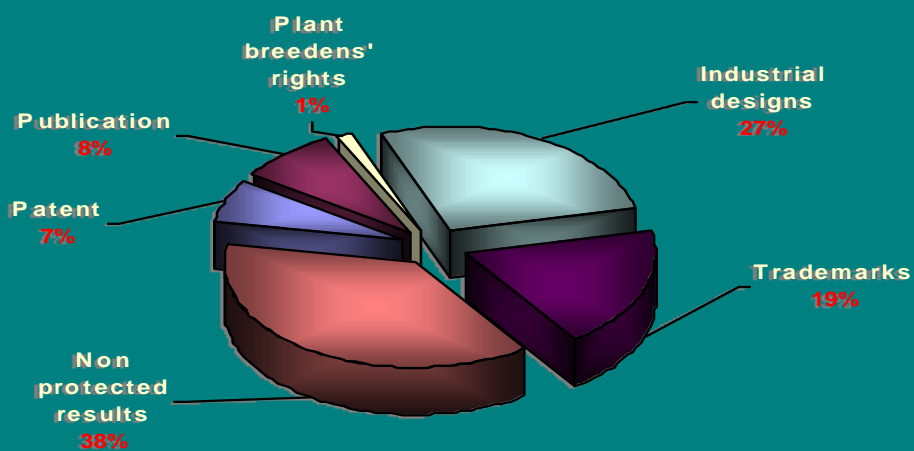
Determinants of innovation:

- **Positively:**
 - product differentiation
 - Competition
 - Demand Pull from International markets
- **Negatively:**
 - Risk aversion
 - Cost of innovation
 - Lack of skills

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Innovations outputs:



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Government supports:

- **Ministry supports to innovation:**
 - 25% for the PIRD
 - 18% for the PNRI
 - 13% for the VRR
- **Technoparks:**
 - 235 firms have some informations about this project
 - 92 firms may demand to be established

Constraints:

- ▶ Systemic
 - Governance;
 - Coordination;
 - Cultural
- ▶ Technical
 - Vis à vis in the other ministries;
 - Scarcity of meetings and workshops dealing with S&T indicators;
- ▶ Financial

Looking forward, what's next?

Strategy:

- Quality;
- New indicators;

Short term:

- Technology balance of Payments
- Economic effects of R&D investments (productivity (FTP), international competition, development, ...)
- Life-long learning
- private non-profit sector.

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