

Regional Forum

“National Knowledge and Technology Development and Transfer Systems.”

- The forum falls under UN Development Account (DA) project on “Establishment of National Technology Transfer Offices (NTTO) in Arab Countries (Egypt, Lebanon, Mauritania Morocco, Oman and Tunisia).

Expected accomplishments

- Enhanced capacity of selected countries in the region to identify innovation and technology transfer policy gaps and develop action plans to address them
- Enhanced capacity of selected countries in the region to create NTTOs that guide the policy environment for research and development, and the commercialization of research results



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"National Knowledge and Technology Development and Transfer Systems."

Science, Technology and Innovation Landscape Analysis in Tunisia

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based on the report

<https://www.slideshare.net/MondherKhanfir/report-on-the-tunisian-national-innovation-system>

Tunisian STI Landscape

Tunisia Science, Technology, and Innovation Map

Academia

- Private Universities**
- Ecole polytechnique internationale privée de Tunis (PolytechIntl), Tunis
 - Ecole polytechnique privée, Sousse
 - Ecole privée d'ingénieurs, Sousse
 - Ecole privée de technologies de l'information et de management de l'entreprise (Tims Université), Tunis
 - Université de Gabès
 - Université de Jendouba
 - Université de Monastir
 - Université de Sfax
 - Université de Sousse
 - Université de La Manouba
 - Université de Tunis - El Manar
 - Université virtuelle de Tunis
 - Université Zitouna
 - Université de Kairouan
- Public Universities**
- Université de Carthage
 - Université de Gabès
 - Université de Jendouba
 - Université de Monastir
 - Université de Sfax
 - Université de Sousse
 - Université de La Manouba
 - Université de Tunis - El Manar
 - Université virtuelle de Tunis
 - Université Zitouna
 - Université de Kairouan

- Mediterranean School of Business, Tunis
- Université arabe des sciences, Tunis
- Université privée Tunis Carthage, Tunis
- Université centrale, Tunis
- Université Ibn Khaldoun, Tunis
- Université internationale de Tunis, Tunis
- Université méditerranéenne privée de Tunis
- Université Monastir, Tunis
- Université privée d'enseignement supérieur El Amel, Tunis
- Université privée de l'aéronautique et des technologies, Tunis
- Université privée de Sciences, Sousse
- Université privée de technologie, Tunis
- Université privée des arts et du design, Tunis
- Université privée des sciences, arts et techniques de Sfax, Sfax
- Université privée des sciences, arts et techniques de Sousse, Sousse
- Université internationale de technologie, Sfax
- Institut supérieur des sciences infirmières ELAMD, Tunis
- Institut supérieur des sciences infirmières de Sousse, Sousse
- Institut supérieur privé des sciences infirmières Ecole de formation, Tunis
- Institut Tunis-Dauphine, Tunis (filiale de l'Université Paris-Dauphine)

Research and Development institutions

- Institut National Zouhair Kallal de Nutrition et de Technologie Alimentaire
- Institut Pasteur de Tunis
- Centre International des Technologies de l'Environnement de Tunis
- Centre d'Etudes et de Recherches en Télécommunications
- Institut National de la Recherche Agronomique de Tunisie
- Centre d'Etudes et de Recherches Economiques et Sociales
- Institut de l'Olivier
- Centre National de la Cartographie et de la Télédétection
- Centre de Recherches, d'Etudes, de Documentation et d'Innovation sur la Femme
- Centre de Santé et de Sécurité au Travail
- Institut National de Recherches en Génie Rural, Eaux et Forêts
- Centre de Recherches et d'Etudes de Sécurité Sociale
- Centre National des Sciences des Matériaux au Technopôle de Borj Cedria
- Centre de recherches en Microélectronique et Nanotechnologie au Technopôle de Sousse
- Centre de recherche en Economie Numérique au Technopôle de Sfax
- Institut National du Patrimoine
- Institut National de la Recherche Agronomique de Tunisie
- Institut National Zouhair Kallal de Nutrition et de Technologie Alimentaire
- Institut Pasteur de Tunis
- Centre International des Technologies de l'Environnement de Tunis
- Centre d'Etudes et de Recherches en Télécommunications
- Institut National de la Recherche Agronomique de Tunisie
- Centre d'Etudes et de Recherches Economiques et Sociales
- Institut de l'Olivier
- Centre National de la Cartographie et de la Télédétection
- Centre de Recherches, d'Etudes, de Documentation et d'Innovation sur la Femme
- Centre de Santé et de Sécurité au Travail
- Institut National de Recherches en Génie Rural, Eaux et Forêts
- Centre de Recherches et d'Etudes de Sécurité Sociale
- Centre National des Sciences des Matériaux au Technopôle de Borj Cedria
- Centre de recherches en Microélectronique et Nanotechnologie au Technopôle de Sousse
- Centre de recherche en Economie Numérique au Technopôle de Sfax
- Institut National du Patrimoine
- Institut National de la Recherche Agronomique de Tunisie

Policies, Strategies and legislations

- Support program**
- PNM: Programme de mise à niveau
 - PCAR: Programme d'appui à la compétitivité des entreprises et à la facilitation de l'accès au marché - Coopération UE-Tunis
 - PASRE: Projet d'appui au Système de recherche et d'innovation
 - PICS: Programme d'Amélioration de la Compétitivité des Services
 - Tunisie Digitale 2018 (a national strategy for economic transformation)
 - Loi d'orientation n°96-6 du 31/01/1996, (Law related to STI).

STI Financial Support

- Incentives for cooperation between companies and research structures**
- Programme National de la Recherche et de l'Innovation (PNRI)
 - Projets de valorisation des résultats de recherche (VBR)
- Incentives for the creation of innovative enterprises**
- Fonds de Promotion de la Décentralisation Industrielle
 - Régime d'Incitation à la Créativité et à l'Innovation dans le domaine des Technologies de l'Information et de la Communication (IRICTIC)
 - CapitalEase Seed Funds (promoted by Carthage Business Angels and managed by UGFS-NA)
 - InitiaQ for Growth Fund (promoted by OFF and managed by UGFS-NA)

Industrial Sector

- Business Representatives**
- INFOTICA: The National Federation of Technologies of Information and Communication
 - CONECT: Confederation of Tunisian Citizen Enterprises
 - CJD: Centre des Jeunes Dirigeants
 - CJE: Centre des Jeunes Entrepreneurs (ACE)
 - CBA: Carthage Business Angels

Science Clusters

- Cluster Dattes: Pôle Djaïd
- Cluster huile d'olive: Complexe industriel et technologique du Kaf
- Cluster Géothermie: Pôle Industriel et Technologique de Gabès
- Cluster Mécatronique: Pôle de compétitivité de Sousse Scientific Society
- Association Tunisienne pour l'Information Scientifique
- Association Tunisienne de Biotechnologie
- Association pour le Développement de la Recherche et de l'Innovation
- Tunisian Association for the Advancement of Science, Technology and Innovation
- Association Tunisienne des professionnels en Marketing
- Association Tunisienne pour la communication et la technologie (TACT)

STI Support: Organizations, Programs and Initiatives, Calibrations and Certifications Bodies

- Technical Centers**
- Centre Technique de l'Industrie du Bois et de l'Assemblage
 - Centre Technique des Industries Mécaniques et Electrique
 - Centre Technique de la Chimie
 - Centre Technique du textile
 - Centre National du Cuir et de la Chaussure
 - Centre Technique de l'Agroalimentaire
 - Centre Technique des Matériaux de Construction, de la Céramique et du verre
 - Centre Technique de l'Emballage et du Conditionnement
 - Centre Technique des Céréaliers
 - Centre technique de pomme de terre
 - Centre Technique d'Aquaculture
 - Centre Technique des Textiles et habillement
 - Eco-Industries/EcoTechnologies
 - Chimie Verte et Traitement des eaux.
 - Technologies de la communication
 - Biotechnologie appliquée à la santé et industries Pharmaceutiques
 - Eco-Industries/EcoTechnologies
 - Chimie Verte et Traitement des eaux.
 - Technologies de la communication
 - Biotechnologie appliquée à la santé et industries Pharmaceutiques
 - Eco-Industries/EcoTechnologies
 - Industrie Agro-alimentaire
 - Mécanique, électronique et informatique
 - TIC et Multimédias
- Calibration & Certification bodies**
- TUNAC: The National Board of Accreditation:
 - ANN: National Metrology Agency
 - LCAE: Laboratoire Central des Analyses et Essais (LCAE)
 - DGPQA: Direction Générale de la Protection et Contrôle de la Qualité des Produits Agricoles

Business Sector

- Incubators and Accelerators**
- Mahdia Entreprendre
 - Pâpinière de Bizerte
 - Kébil Initiative Création
 - Zaghouan Terre d'entreprendre
 - Centre d'Innovation et de Développement
 - Carthage Innovation (EPT)
 - Sfax Innovation II
 - Manouba Tech
 - Pâpinière de Sidi Bouzid
 - Bâja Essor technologique
 - Siliana Innovation
 - Pâpinière de Kasserine
 - Tâoussine Innovation Technologique
 - Osez Entreprendre Djerid
 - Soft Tech
 - Pâpinière d'Entreprises de la Technopôle de Sfax
 - Wiki Start Up
 - Esprit Incubator
 - InitiaQ
 - Djerba Création et Innovation
 - BoosT
- Business Centers**
- Centre d'affaires de Tunis
 - Centre d'affaires de Ben Arous
 - Centre d'affaires de l'Ariana

Related Ministries

- Ministry of Industry, Mines and Energy
- Ministry of Higher Education & Scientific Research
- Ministry of Trade & Handicraft
- Ministry of Information Technologies and Digital Economy
- Ministry of Health
- Ministry of Environment and Sustainable Development
- Ministry of Vocational Training & employment
- Ministry of Agriculture
- Ministry of Transport
- Ministry of Development, International Cooperation & Investment
- Ministry of Finance
- Presidency of the Government (Primate)

Technology Transfer Offices

- University TTO (under the supervision of ANPR)**
- BuTT Université de Tunis
 - BuTT Université de Carthage
 - BuTT Université de Manouba
 - BuTT Université Tunis Manar
 - BuTT Université de Monastir
 - BuTT Université de Kairouan
 - BuTT Université de Jendouba
 - BuTT Université de Gabès
 - BuTT DGET
 - BuTT Université de Sousse
 - BuTT Université de Sfax
 - National TTO ANPR
- Independent TTO (Bureau de transfert de technologie)**
- BuTT Pôle de compétitivité de Bizerte.
 - BuTT Centre technique de la Chimie CTC.
 - BuTT Institut Pasteur de Tunis.
 - BuTT CBS, Centre de Biotechnologie de Sfax.
 - BuTT CRTN, Centre des Recherches et des Technologies de l'Energie.
 - BuTT CRTET, Centre International des Technologies de l'Environnement de Tunis.

Findings from the GC Index 2015

the New Normal: Findings from the Global Competitiveness Index 2015–2016

- ▶ Chapter 1.2 Drivers of Long-Run Prosperity: Laying the Foundations for an Updated Global Competitiveness Index
- ▶ Chapter 1.3 The Executive Opinion Survey: The Voice of the Business Community

Competitiveness Practices

FAQs

Partner Institutes

Downloads

Competitiveness Library

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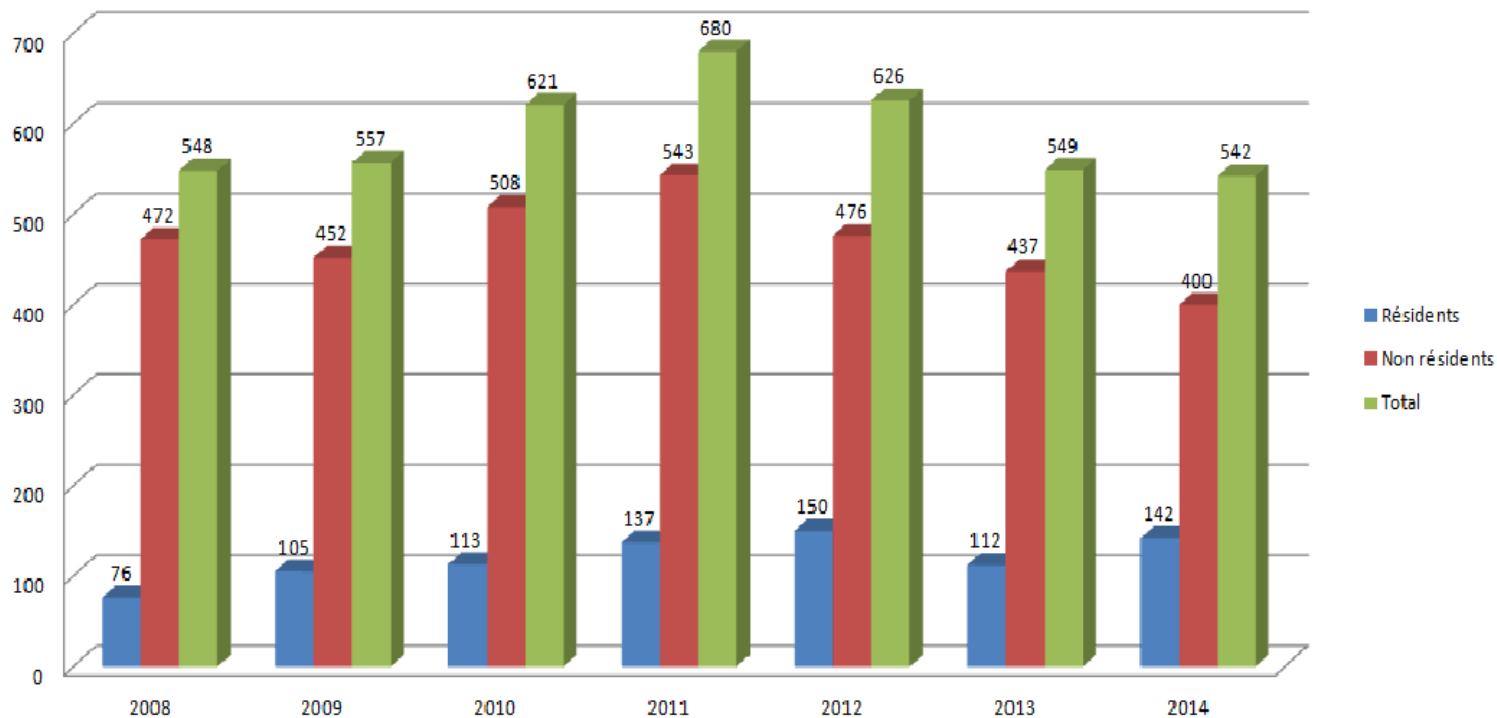
Performance Overview



Number of Patent claims per year

- <http://www.innorpi.tn/Fra/image.php?id=59>

Evaluation du nombre de demandes brevets déposés à l'INNORPI 2008 - 2014



A very low Return on Investment of R&D expenditures...



2015

States and Markets

5.13 World Development Indicators: Science and technology

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	Research and development (R&D)		Scientific and technical journal articles	Expenditures for R&D % of GDP	High-technology exports		Charges for the use of intellectual property		Patent applications filed		Trademark applications filed Total
	Researchers full-time equivalent per million people	Technicians full-time equivalent per million people			Receipts \$ millions	Payments \$ millions	Residents	Nonresidents			
	2005-12	2005-12							2013	2013	
Tonga	..	..	1	..	0	6.5	..	..	..	..	..
Trinidad and Tobago	..	..	60	0.04	3	0.1	..	..	..	..	..
Tunisia	1,837	43	1,016	1.10	616	4.9	28	19	112	437	4,408
Turkey	987	173	8,328	0.86	2,177	1.9	..	677	4,392	269	108,087
Turkmenistan	..	..	1	..	..	..	..	..	..	..	2,529
Turks and Caicos Islands	..	..	..	..	0	1.9	..	..	..	..	..
Tuvalu	..	..	0	..	..	..	0	..	..	..	..
Uganda	37	13	158	0.56	8	1.9	14	15	10	4	2,079
Ukraine	1,253	261	1,727	0.74	2,189	5.9	118	552	2,856	2,556	34,082
United Arab Emirates	..	..	324	0.49	67	..	..	..	18	1,408	18,747
United Kingdom	4,024	1,169	46,035	1.72	24,216	7.6	20,003	10,993	14,972	7,966	50,415
United States	3,979	..	208,601	2.79	147,833	17.8	130,361	42,124	287,831	283,781	342,287

Technology Transfer from Public R&D institution

Transferring research results to economic sectors is one of the missions of public research institutions.



Four main ways to transfer research findings co-exist:

- Assignment of rights through licensing**
- Collaborative research projects**
- Through spin-out (or spin-off)**
- By technological integration (or spin-in)**

Tunisia is ranked 92 in the GCI with 3.9 score in 2015 (87 – 4 in 2014)

6 over 12 pillars of the Global innovation Index are directly depending or influencing the knowledge and Technology Transfer capability

- Innovation,
- Business sophistication
- Technological readiness
- Higher education and training
- Health and primary education
- Infrastructure

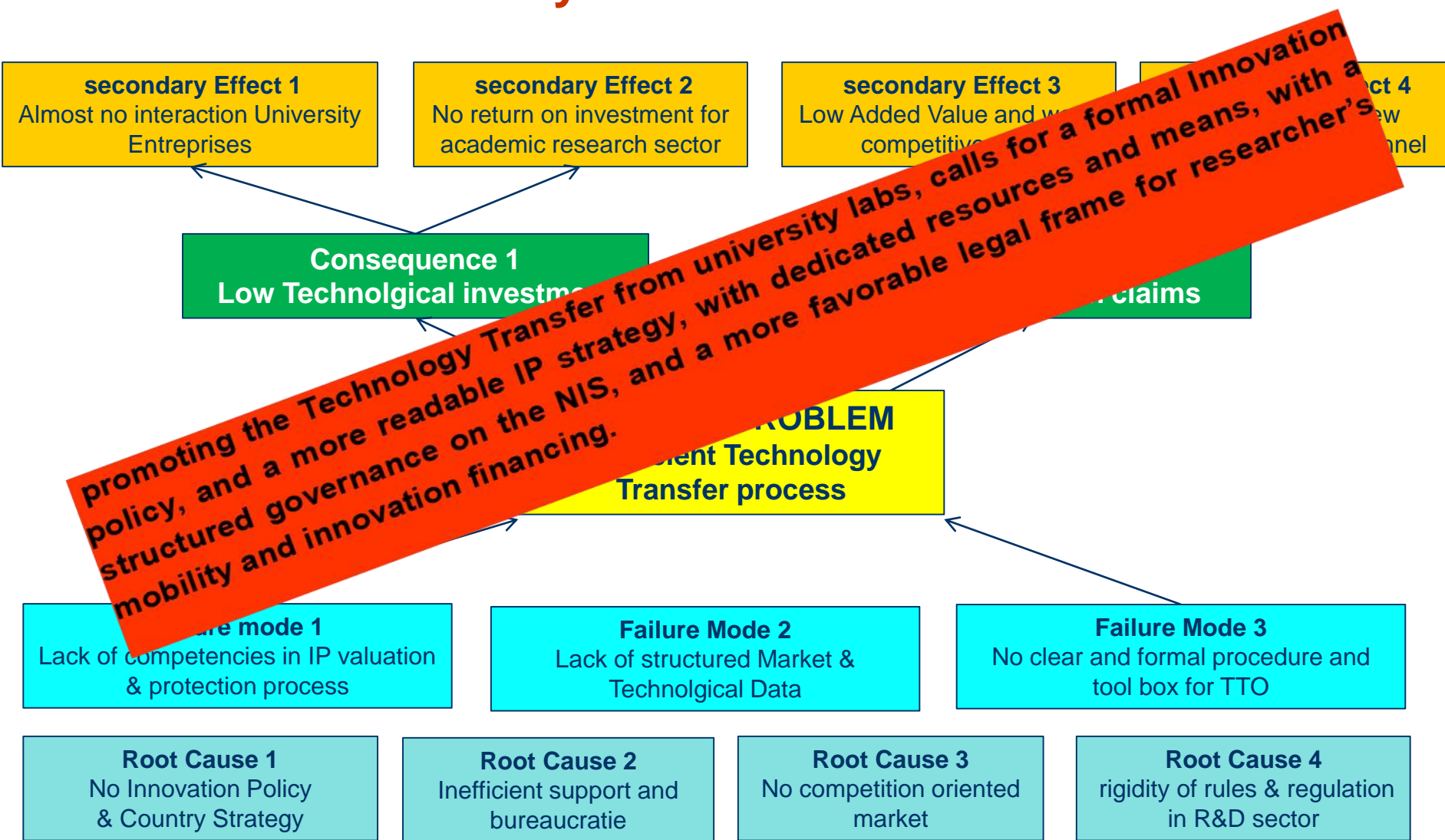
Subindex A: Basic requirements 1-7 (best)	(i)	78	4.4		
 1st pillar: Institutions 1-7 (best)	(i)	79	3.8		
 2nd pillar: Infrastructure 1-7 (best)	(i)	80	3.7		
 3rd pillar: Macroeconomic environment 1-7 (best)	(i)	97	4.3		
 4th pillar: Health and primary education 1-7 (best)	(i)	58	5.9		
Subindex B: Efficiency enhancers 1-7 (best)	(i)	98	3.7		
 5th pillar: Higher education and training 1-7 (best)	(i)	76	4.1		
 6th pillar: Goods market efficiency 1-7 (best)	(i)	118	3.9		
 7th pillar: Labor market efficiency 1-7 (best)	(i)	133	3.3		
 8th pillar: Financial market development 1-7 (best)	(i)	122	3.1		

Findings and field observations

- A country with low productivity, low private investment, low openness to the global economy and low technology integration
- No clear Public policy on Innovation, with no readable strategy for all stakeholders
- A Governance structure per sector with a separation between Hard and Soft Sciences, ICT & Agriculture affecting the formulation of a coherent and consistent national RDI strategy
- Difficulty to import technology at the R&D stage
- Difficulty to assign IP for the benefit of Startups
- Few structures dedicated to applied research or prototyping
- Overlapping roles between research centers and technical centers
- IP policy is rarely formalized in universities
- R&D Databases are rudimentary and fragmented
- Poor maintenance and under use of heavy scientific equipment
- R&D costs and intangibles are usually not accounted by companies
- Bureaucracy is dominating the decision making processes



Inefficiency of the Tech Transfer Analysis of the root causes



promoting the Technology Transfer from university labs, calls for a formal Innovation policy, and a more readable IP strategy, with dedicated resources and means, with a structured governance on the NIS, and a more favorable legal frame for researcher's mobility and innovation financing.

Innovation is determined by Technology Transfer Process

- The transformation of discoveries and data and resources (“Intellectual Property”) into new products or services which will enhance economic development
- Technology Transfer is a Research to Business (RtoB) industry that requires mastering three businesses: finance and venture capital, engineering innovation projects, enhancement and protection of intellectual property

Key drivers for Technology Transfer

In a classical industrial economies, these are generally large companies or Governments that determine the main axes of R&D (the major trends).

In a Knowledge Based Economy, Technology transfer is the Business. It requires collaboration of different entities around specific processes of IP production, valuation, protection and valorization.

The STI system is lacking actionable processes:

- Innovation Policy formulation and assessment
- Opportunity identification and business intelligence
- Investing in IP value stream in parallel with the IP rights protection procedure
- Local Technology acquisition by public procurement
- Industrializing Technology Transfer (through RBSO and Collaborative Projects)



Where to fix objectives & metrics for the NIS performance?

- 1) Interactions among enterprises, primarily joint research activities and other technical collaborations;**
- 2) interactions among enterprises, universities and public research institutes, including joint research, co-patenting, co-publications and more informal linkages;**
- 3) diffusion of knowledge and technology to enterprises, including industry adoption rates for new technologies and diffusion through machinery and equipment;**
- 4) personnel mobility, focusing on the movement of technical personnel within and between the public and private sectors.**

In conclusion

STI ecosystem is part of the NIS. There is a need of a deep reengineering of its architecture and Governance to play a key role in setting up a knowledge based Economy, ...

- **A formal Innovation Policy**
- **A readable R&D strategy**
- **Adapting the regulatory for a more efficient and effective Governance**
- **Placing the IP Value Stream in the core process of the NIS**
- **Nurturing the Technology Transfer as an Industry**
- **Easing the access to R&D funds and Innovation financing**

Thank you for your attention!