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Relevant Policies for Establishing an Effective System of Strategic Innovation and Technology Transfer in Tunisia

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Pr Taieb HADHRI

Presentation Plan

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I- Introduction and Methodology

- Under the Development Account Project "Establishment NTTO in 5 ESCWA Countries (Egypt, Lebanon, Morocco, Tunisia and Oman).
- Part of the project piloted by the ETC in cooperation with ANPR, aiming the establishment of a NTTO in Tunisia.
- Updating related policies facilitating the partnership between the research community and economic development sector.

Introduction and Methodology

- We present the national devices of assistance for TTI in Tunisia classified in 5 classes
- Make a SWOT analysis of the Tunisian NIS : Principal strengths and weaknesses; Principal opportunities to seize and threats to avoid.
- Then we propose and discuss how to update the related public policies with the aim of encouraging stakeholders to effectively build or rebuild a NIS

Introduction and Methodology

- In the present study we start essentially from:
  - The study realized by Mondher Khanfir entitled “How to harness the NIS in Tunisia. To enable Technology Transfer and strengthen the Innovation capacity”;
  - The report entitled "A New Vision of the Engineers Training National System”, presented in October 2015 by the Studies Group on Engineers Training (GEFI);
  - The report presented by the Ministry of Higher Education and Scientific Research as a contribution to the Tunisian Development Plan (2016 - 2020) .

II- Existing Public devices for TTI in Tunisia

- The national devices of assistance for Technology Transfer and Innovation in Tunisia can be classified according to the primary objective of each device at the moment of its creation into five classes:
  - 1- Increase R & D capabilities of enterprises;
  - 2- Increase the economic impact of R & D activities of the Research Centers and Higher Education Institutions;
  - 3- Develop collaborative projects between the actors of the NIS;
  - 4- Promote the creation of innovative companies;
  - 5- Support the development of innovative projects within existing companies.

Existing Public devices for TTI in Tunisia

- **Increase R & D capabilities of enterprises**
  - **PIRD**
- Grant for Investment in Research and Development; by the Ministry of Industry to private and public Entreprises .
- Up to 50% of the total cost of studies with a ceiling at 25,000 Dinars and 50% of the cost of experiments and equipments needed with a ceiling at 100,000 Dinars.
  - **MOBIDOC**
- Managed by the ANPR, it aims to develop research on issues from companies and socio-economic organizations.
- MOBIDOC funds allocations in favor of PhD students.
- A second one, MOBIDOC-Postdoc, aims to help to solve shorter-term problems for the benefit of a business by a young PhD titular.
- Perpetuation in the frame of the Development Plan 2016-2020 (?).

Existing Public devices for TTI in Tunisia

- **Increase the economic impact of R & D activities of the Research Centers and Higher Education Institutions**
  - **VRR**
- The Valuation of Search's Results Program VRR was launched in 1992 , it was the first attempt of promoting the commercialization and the application of research's results to the socioeconomic environment. VRR projects are funded by the Ministry of Higher Education and Scientific Research MESRS following an open Call for Proposals. The beneficiaries are public research organizations (research centers, research laboratories, research units) with the possibility of partnership with economic enterprises. The duration of realization of a project VRR is 3 years. Up to 2012, it supported around 90 projects with a total value of about 5 million $, where Agriculture represented 25 % of this investment, Information Technology 21%, Energy 15% and Biotechnologies 11%.
  - **Supporting the costs of IP Patents in Tunisia and abroad**.
- The Ministry of Higher Education and Scientific Research covers protection fees of Intellectual Property at INNORPI in the case of Industrial Property, or at the Tunisian Office of Authors' Rights and Related Rights (OTDAV) in the case of Authors' Rights and Related Rights, or with the General Directorate of Protection and Control of the Quality of Agricultural Products (Ministry of Agriculture), if it is a Vegetal Obtaining.
- The institution supervising the inventor has one year from the date of first filing of the patent application to request the extension of the protection abroad
- Before starting any national or international cooperation, an agreement have to be drawn up specifying the owners of the invention and practical conditions specifying the management costs supported by the MESRS, up to its share in the invention. The agreement is necessarily signed by the three parties, namely the concerned institution, the co-owner partner of the invention and the ministry.
  - **BuTT**
- The Office of Technology Transfer called BuTT is an interfacing structure within public research and higher education institutions. It is a skills center helping public researchers, serving the exploitation of research results, transfer and partnership between supply and technology demand. Up today 13 universities and research centers have been selected for the pilot phase of the implementation of the first generation of BuTT. Their main role is to set up a structured process of IP management in support to the Technology Transfer between the Academic environment and the Enterprise world. According to the strategy of the ANPR, the BuTT will be established in all research institutions, which will benefit from the ANPR financial support in the frame of agreements between the two parties.
  - **Training on IP and TT**.
- ANPR, in collaboration with the technology transfer offices of universities BuTT, launches training sessions for researchers, project leaders and PhD students on topics related to domestic Technology's Transfer and International Cooperation. :
  - Raise awareness of the actors about techniques for transfer of technology and innovation including intellectual property, the search of anteriority, drafting patent applications, commercialization of research results,
  - Mounting research projects: To train actors in research and innovation to construct projects.

Existing Public devices for TTI in Tunisia

- **Develop collaborative projects between the actors of the NIS**
  - **Federated Search Program (PRF)**
- PRF permitted to take a substantial step towards the organization of activities of the national R & D system, through the mobilization of expertise and the creation of synergies between public or private partners concerned with the development of the sector of scientific research and technology.
- These programs are funded under multi-year agreements that define the supporting structure of the project and associated partners, the objectives and expected results, the human and material resources to mobilize and the monitoring and evaluation procedures.
- This device addresses national priority themes defined in consultation with the various operators in the concerned sector
  - **National Program of Research and Innovation (PNRI)**
- PNRI is a program that finances R&D, innovation projects, improvement of industrial capacities and modernization of production processes, through the consolidation of the cooperation and the partnership between industrial companies, the research structures and the technical centers. The program is under the supervision of the Ministry in charge of Industry.
- To be eligible for funding, a project must associate with the industrial company at least a technical center and a public research organization (center, laboratory or research unit) during a maximum of two years
- It must also demonstrate significant innovation and proove a minimum contribution of the industrial partner of 20% of the project cost.
  - **Digital Tunisia 2018**
- The National Strategic Program of Digital Economy, under the supervision of the Ministry of Technology and Digital Economy. This project aims to move towards a new development model which favors the shift to a digital economy. This program is built around several pillars notably: enhancing the network communication technology infrastructure through enabling all Tunisian families to have access to internet services and to reach 80% of the Tunisian families by 2018; providing students with computer tablets to replace books and school supplies; in parallel with the development of digital public services and e-payment facilitation for all citizens specifically though post offices.
- The success of this project will have very important positive impact on all economic activities in the country thanks to the acceleration of the Technology Transfer and Innovation in all areas of activities.
  - **Technoparcks,**
- Since the end of the 90s, to host in the same area different actors from the Universities, R&D institutions and the Companies, (Pôle de Compétitivité).
- This was supposed to enhance a better cooperation in some targeted strategic sectors in order to stimulate the transfer of knowledge and technology and strengthen collaboration across clustering initiatives. With a specific sectorial focus, each Technopark was supposed to leverage the development of the region where it is located. The management of each Technopark is generally ensured by a management company created under the umbrella of a public-private partnership, positioned on a promising sector of value chain, in the fields of ICT, Environment, Water Resources, Renewable Energy, Textiles, Mecatronics, Agribusiness and Biotechnologies.

Existing Public devices for TTI in Tunisia

- **Promote the creation of innovative companies**
  - **FOPRODI**

- This is the Fund for Promotion and Decentralization for Industry (FOPRODI: Fonds de Promotion et de Décentralisation Industrielle). It aims to the creation of a new generation of entrepreneurs, to the promotion and the development of the small and medium-sized enterprises in the different fields of industry and services for industry and the implementation of incentive measures for the regional development.

  - **IKDAM**

- IKDAM is a public seed fund that aims to strengthen the innovative activities of startups at the early stage. The fund operates mainly for exploiting patents, drafting technical and economic studies for projects, developing manufacturing processes, before the commercialization phase and completing the financing scheme at the early stage of the company.

  - **SAGES**

- It is a Society for Assistance and Asset Management of Spin-Off Funds (SAGES Capital, Société d'Assistance et de Gestion des Fonds d'Essaimage). It is a public venture capital firm specialized in investments in early seed/startups, in growth capital and in leveraged buyouts, turnaround, and restructuring transactions. It invests in small and medium sized companies operating in all business sectors with a focus on biotechnology, agri-food, solar energy and technology sectors.

  - **Accommodations in Public Startups Nurseries**

- Public Startups Nurseries are infrastructure spaces generally dependent to the public agency APII and equipped to host entrepreneurs when they start launching a promising business. They constitute now a network of 30 nurseries distributed throughout all the territory. Public Startups Nurseries host for a limited period, generally one or two years, and help to relocate outside the nursery after the incubation period. With a capacity of 250 startups, this device represents an important component of the national innovation system. The national program for the establishment of Startups nurseries incubators started in 2001. Since 2011, we saw the establishment in the ecosystem of private Business Nurseries with different business models.

  - **Leave to start a business**

- The status of the civil service permits to an employee to benefit from a granted leave to start a business during one renewable year and conserves during this period the half of his salary. The researcher and higher education teacher conserve their whole salary.

Existing Public devices for TTI in Tunisia

- **Support the development of innovative companies**
  - **PMN**
- It is an upgrading industrial capacity program. Two phases: one triggered by the business demand leading to the approval of its upgrade investment plan; a second phase for the release of investment grant after complying with some governance rules.
- At the end of January 2016: Number of applications to join the PMN: 6229. Approved Applications: 5370. Total approved investments: 9321 MD. Total premiums approved 1234 MD. Total premiums distributed: 584 MD
  - **ITP**
- In addition to the PMN Grant, the "Priority Technological Investment" (ITP) is a grant that insures the financial support of intangible investments, as the implementation of quality management system and also to certification. To be eligible to this program, the industrial companies, and those acting in the field of services to industry, have to be working for at least one year with no economic difficulties. Since its launch up to January 2016, ITP approved 8166 requests for a total investment of 417.2 Million TND including 176 Million TND of Grants and 84.7 Million TND of distributed premiums.
  - **PCAM**
- Program for the Competitiveness of enterprises and the improvement of Access to Markets, under the supervision of the Ministry in charge of Industry., with a budget of 23 million Euros.
- It is a program of technical assistance, training and awareness for industrial businesses and industry-related service providers. It revolves around coaching services on strategic corporate functions: Quality, R & D, marketing, production, information systems, business intelligence…in close collaboration with concerned technical centers.
  - **IN'TECH (Innovation & Technological development)**
- It is a mutual investment fund giving an Investment Grant intended to support the investment, the innovation creation and the technology development. This fund is managed by SAGES Capital, a public asset management company.
  - **RIICTIC**
- It is an Incentive Regime for Creativity and Innovation in the field of Information and Communications Technology. RIICTIC (Régime d'Incitation à l'Innovation et à la Créativité dans le domaine des Technologies de l'Information et de la Communication) supports projects in the innovative and high added value activities based on e-business.

Existing Public devices for TTI in Tunisia

N°	Main objective referred	Devices
1	Increase R & D capabilities of enterprises	a. PIRD b. MOBIDOC
2	Increase the economic impact of R & D activities of the Research Centers and Higher Education institutions	a. VRR exploitation of research results b. Supporting the costs of IP Patents in Tunisia and abroad c. BuTT d. Training on IP and TT
3	Develop collaborative projects between the actors of NIS	a. Federated Search Programs b. PNRI c. Digital Tunisia 2018 d. Technoparcks
4	Promote the creation of innovative companies	a. FOPRODI b. IKDAM c. SAGES d. Accommodations in Public Startups Nurseries e. Leave to start a business
5	Support the development of innovative companies	a. PMN b. ITP c. PCAM d. IN'TECH e. RIICTIC

III- SWOT Analysis of the Tunisian NIS

- Despite efforts by the national community for the promotion of scientific research and the considerable efforts made by the Tunisian scientists and engineers to sit efficient and modern Universities, Research Institutes and Technical Centers, results in the science and technology sector are relatively modest, since the direct or indirect impact of scientific research on the development of the economy and the Tunisian society still remain without significant real substance.

SWOT Analysis of the Tunisian NIS

- **Strengths**
- 1-Mobilization of the national community for the promotion of knowledge society and considerable efforts made by Tunisian scientists and engineers to promote scientific research.
- 2-Relatively strong performances on all the education indicators as evaluated by the World Bank Knowledge Economy Index WB-KEI 2012 Ranking, with a rank at 80/145, improved since 2000 by 9 positions.
- 3-A national public structure of research centers and academic laboratories encouraging research activities.
- 4-Strong performances in the field of research production measured by scientific publications.

SWOT Analysis of the Tunisian NIS

- **Weaknesses**
- 1-Insufficient organic relations between the scientific and the economical communities and a Tunisian scientific production which is not followed by industrial and commercial innovations.
- 2-Lack of a clear strategy, known by stakeholders in the technological development of the country, resulting from a lack of professionalism and lack of “return on investment approach” in the field of scientific research and innovation.
- 3-Lack of a forward-looking vision and a national project crystallizing a broad national adhesion on the model of economic and social development to be built for the country.
- 4- A high unemployment rate especially among the graduates threatening social sustainability of the gains recorded in the register of human development since the country's independence

SWOT Analysis of the Tunisian NIS

- **Opportunities**
- 1- An open economy that is naturally led to constantly follow global technological developments enabling it to consolidate and develop its external markets.
- 2-A community of Tunisian competencies abroad enthusiastic to contribute to the technological development of the country by building on its acknowledged strengths.
- 3-A great geographic and cultural proximity to a large center of scientific and technological development in the world, namely the European Union, and a strong partnership with it.
- 4- The effective possibility of adopting governance rules based on a participatory approach, ensuring wider engagement and support of stakeholders to a national strategy for technological development leading to economic and social development.

SWOT Analysis of the Tunisian NIS

- **Threats**
- 1-The strong international competition in several foreign markets where Tunisia lost positions following the unrest and excessive claims that characterized the country during the last 5 years (phosphates & derivatives, textiles, leather and footwear, tourism, fisheries and aquaculture ...)
- 2- A commercial aggressiveness of Foreign companies on the local market, following the free trade agreement for industrial products with the European Union.
- 3-The depletion of fossil energy resources and the weakness of development of renewable resources in Tunisia.
- 4-Climate changes which are likely to put Tunisia under the threat of water stress.

SWOT Analysis of the Tunisian NIS

- Two decades after the famous Orientation Law of 1996, the inevitable conclusion is that there is an absolute necessity to intervene quickly, not only at the governmental institutions level, but also by associating private initiatives, in order to drive the needed change in the mentalities and:
- - Limit the lack of professionalism and the weak efficiency and effectiveness of scientific and technological development process,
- - Introduce new administrative and financial management rules that facilitate the development and commercialization of research results,
- - Motivate engineers and scientists to the successful transfer of advanced technology to the application sectors,
- - Motivate companies to the exploitation of research results and appropriation of technology transfer,
- - Induce new international partnerships in technology development and transfer of know-how.

VI- Relevant policies for a renewed NIS

- Following the report of the National Stakeholders Workshop organized by the ETC and ANPR, our proposals will be presented under the following headings:
- 1- A global Governance with a formal Innovation Policy;
- 2- A readable STI strategy;
- 3- Adapting the regulatory for a more efficient and effective Governance;
- 4- Placing the IP Value Stream in the core process of the NIS;
- 5- Nurturing the Technology Transfer as an Industry;
- 6- Easing the access to R&D funds and Innovation financing.

Relevant policies for a renewed NIS

- **A global Governance with a formal Innovation Policy**

- Essentially by merging the current four governing structures, 3 councils and 1 committee, namely:
  - The High-level Committee for Science and Technology,
  - The High Council for Scientific Research and Technological Innovation,
  - The Strategic Council for the Digital Economy,
  - The National Advisory Council for Scientific Research and Technology,

  in an unique committee that can be called the Knowledge Based Economy Advisory Committee to the Head of the Government.
- This new committee will be composed by 1/3 of academic members and 2/3 of members representing the socio-economic world and will have the following missions:

Relevant policies for a renewed NIS

- - Follow the building of the Knowledge Society for all in the world and make argued proposals and give the general guidelines of the national policy of scientific research and technological development as needed for the country;
- - Propose measures for the ownership of technology in different sectors and propose strategies to promote science and develop technology transforming Tunisia in a modern technology platform;
- - Promote training and research in promising sectors and support innovative projects with high technological value, particularly in the areas of information and communication technology, electronics, biotechnology, health, renewable energy, water, agriculture and food industry;
- - Identify mechanisms to ensure coordination between different stakeholders in the fields of science and technology;

Relevant policies for a renewed NIS

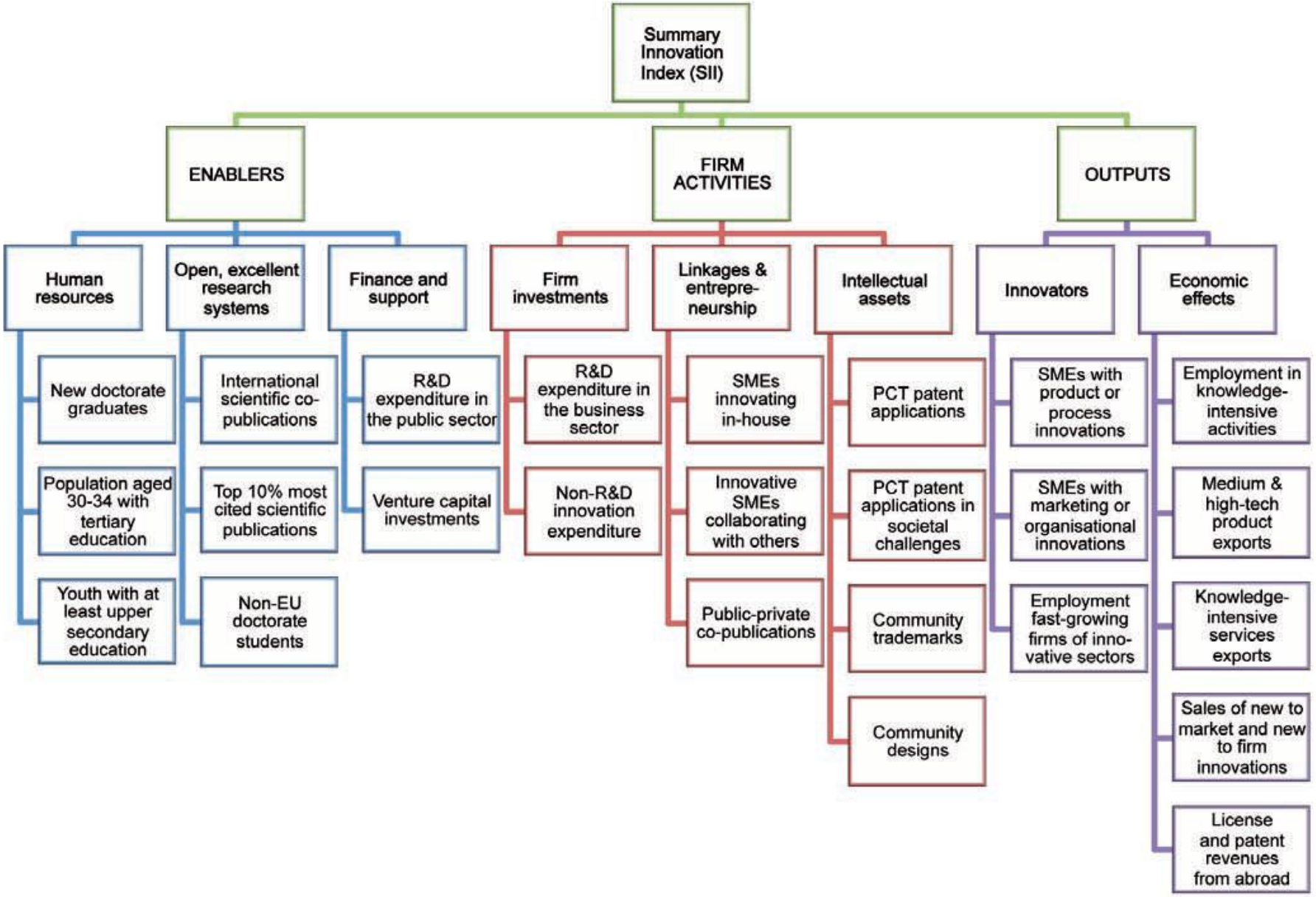
- Overseeing the definition of the national strategy for digital economy , approve and monitor its implementation, validate proposals for its updating and improvement, on the basis of quantified Key Performance Indicators;
- - The development of partnership with the developed countries and the Maghreb, African, Arab and Euro-Mediterranean countries, in science and technology;
- - The establishment of a mixed network of national skills resident in Tunisia and abroad to support the promotion of high value scientific and technological activities;
- - Give its opinion on all matters submitted to it by the Head of Government, especially in connection with the building of the knowledge society for all at the national level.

Relevant policies for a renewed NIS

- Since the Knowledge Based Economy Advisory Committee will have to ensure coordination between different stakeholders of the NIS, the future NTTO will be a worthy working tool permitting to the Committee to fulfill its assignments.
- In this connection, NTTO can usefully be attached to an operational transverse structure in charge of the promotion of knowledge, science and technology and we propose that ANPR will be the coordinator of the Tunisian NTTO.
- Every stakeholder of the technology transfer process may receive the label of NTTO-Partner after presenting to the Knowledge Based Economy Advisory Committee a multiannual strategy and an action program.
- This label will allow the access to certain financial and technical assistance and helps for the realization of transfer of technology programs, but the concerned stakeholder will keep the benefit of this label only if it presents annually a new program of actions and a balance sheet over the past year about the previously adopted program.

Relevant policies for a renewed NIS

- **A readable STI strategy**
- This new governance will permit to adopt a national Science and Technology Innovation strategy which will be clearly formulated and communicated to all stakeholders.
- STI strategy will be driven by the tool of a scoreboard consisting of key performance indicators, KPIs.
- For this end we can use the Arab Innovation Scoreboard to be adopted by ETC and Arab countries.
- We can also define a scoreboard inspired from the Innovation Scoreboard adopted by the European Union, with 3 main types of indicators – Enablers, Firm activities and Outputs – and 8 innovation dimensions, capturing in total 25 indicators:


Summary Innovation Index (SII)
ENABLERS
FIRM ACTIVITIES
OUTPUTS
Human resources
Open, excellent research systems
Finance and support
Firm investments
Linkages & entrepre-neurship
Intellectual assets
Innovators
Economic effects
New doctorate graduates
Population aged 30-34 with tertiary education
Youth with at least upper secondary education
International scientific co-publications
Top 10% most cited scientific publications
Non-EU doctorate students
R&D expenditure in the public sector
Venture capital investments
R&D expenditure in the business sector
Non-R&D innovation expenditure
SMEs innovating in-house
Innovative SMEs collaborating with others
Public-private co-publications
PCT patent applications
PCT patent applications in societal challenges
Community trademarks
Community designs
SMEs with product or process innovations
SMEs with marketing or organisational innovations
Employment fast-growing firms of inno-vative sectors
Employment in knowledge-intensive activities
Medium & high-tech product exports
Knowledge-intensive services exports
Sales of new to market and new to firm innovations
License and patent revenues from abroad

Relevant policies for a renewed NIS

- **Adapting the regulatory for a more efficient and effective Governance**

- Some improvements of the regulatory rules are urgent to adopt even before the adoption of the new governance rules. Here we can mention:
- A teacher who benefits from a leave for the creation of a company should be exempted from his teaching load; otherwise it's not a leave!
- A clear legal framework for public and private incubators, for technology resource centers and platforms and for the BuTT is urgent to be created;
- The financial amount of the Grant for the PIRD should be increased;
- Create a new breed of Laboratories and Research Units, which can be called Innovation Laboratories and Units, by adopting new criteria in which IP patents and Technology Transfer have more importance;
- The statutes of higher education teachers have to mention explicitly the valorization's mission of research results and not to be limited to the finalization;
- Introduce in the general status of the civil service, the PhD Degree as a recruitment level, in order to facilitate the recruitment of PhD's in Public Administrations.

Relevant policies for a renewed NIS

- **Placing the IP Value Stream in the core process of the NIS**
- More coaching aiming the improvement of the level of awareness of intellectual property among researchers;
- The establishment of a reference system for the disposal process and intellectual property acquisition;
- The definition of a legal framework to develop commercial intermediaries to ensure IP protection services;
- Introducing a rule of substantive investigation on novelty, to be done by the National Institute of Standardization and Industrial Property (INNORPI, Institut National de la Normalisation et de la Propriété Industrielle), before agreeing a patent of IP;
- Granting of financial incentives to authors of patents and / or plant varieties.

Relevant policies for a renewed NIS

- In this connection we propose to take inspiration from the helping system managed by Innovate-UK, which is the British agency managing "Innovation Vouchers", and to put in place a system permitting to help Tunisian innovator startups, to find and choose an expert from one of the following:
  - universities and further education institutions,
  - research centers,
  - technical centers,
  - technology resource centers and platforms,
  - “ intellectual property advisers”.

Relevant policies for a renewed NIS

- **Nurturing the Technology Transfer as an Industry**
- We propose to develop a greater use of compensation clauses in public contracts with foreign companies, by:
  - increasing the rate of local integration,
  - requiring the association of a local team which have to be trained to lead the future similar projects and,
  - introducing a clause of sub-contracting of Research and Development, through contracts with Tunisian Research and/or Innovation Laboratories.
- It is also urgent to transform the National Observatory of Science and Technology in a more important structure with greater resources, radiant throughout the Tunisian NIS by its data and by its activities.

Relevant policies for a renewed NIS

- **Easing the access to R&D funds and Innovation financing**
- The current behavior of Investment Companies in Risk Capital (SICAR) calls for a thorough reform of the system of financial support to innovative companies and more generally Small and Medium Enterprises (SME).
- Tunisian law has to recognize the status of Business Angel and the shareholder agreement.
- Some specific public financial and technical help have to be developed targeting Small and Medium Enterprises (SME) and we propose here to establish a mechanism similar to the British "Innovation Vouchers" permitting to British SMEs to consult a public research institution and to ask for advice on an innovative project.

Conclusion

- In fact there is a real need to clarify innovation policy, to break down barriers in the governance of the Tunisian NIS, and distinguish the functions of policy orientation, programming and execution.
- Multiple structures for cross global national orientation and Governance of Research activities exist in Tunisia, but they are mostly not operational; some of them had not met for over than 2 years. In addition the prerogatives of these structures intersect and are neither well defined nor well coordinated.

Conclusion

- Here, it is important to note that it is not by bringing together the best components from the "best" NISs in the world that we will succeed in building a renovated NIS that will lead the country to the best results. In fact in our approach we have ensured to secure two necessary conditions for this: the overall consistency and appropriateness to the national context.
- This workshop is a real opportunity to remobilize the actors involved and to adopt and add proposals integrating the different points of view, encouraging stakeholders to effectively build or rebuild a NIS, aiming to permit to them to benefit collectively and each for his own account from the renewed NIS.

END