Fact Finding Mission of a German Delegation from Universities in Bremen and Hamburg to ENIT, Tunis

Members of the Delegation: Professors Hans Heinrich Bass, Achim Gutowski, Cordula Weisskoeppel, Karl Wohlmuth

Terms of Reference: Consultations on Master Programme Engineering and Technology Policy/ETP, on the strengths and weaknesses of the national innovation system/NIS of Tunisia, on the reform needs of the tertiary education system in Tunisia, and on cooperation programmes between ENIT, Tunis and Universities in Bremen and Hamburg

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1. List of Abbreviations:

ADEA	-	Association for the Development of Education in Africa
AfDB	-	African Development Bank
BMBF	-	Bundesministerium für Bildung und Forschung
CERS	-	Centre d´Etudes et Recherches Sociales
CNEARS	-	Comité National de l´Evaluation des Activités de la Recherche Scientifique
DAAD	-	Deutscher Akademischer Austauschdienst
EIB	-	European Investment Bank
ENIT	-	École Nationale d´Ingénieurs de Tunis
ETP	-	Master degree project “Engineering and Technology Policy”
FDI	-	Foreign direct investment
ICT	-	Information and communication technology
INNORPI	-	Institute National de la Normalisation et de la Propriété Industrielle
IPR	-	Intellectual property rights
MHESR	-	Ministry for Higher Education and Scientific Research
MOOCs		Massive Open Online Classes
NEPAD	-	New partnership for African development
NIS	-	National innovation system
PIRD	-	Programme Industrielle de la Recherche et du Developpement
PNRI	-	Programme Nationale de la Recherche et de l´Innovation
R&D	-	Research and development
RIS	-	Regional innovation system
STIIP	-	Science, technology, industrial, and innovation policy
TAASTI	-	Tunisian Association for the Advancement of Science, Technology and Innovation
TVSD	-	Technical and vocational skills and development
UNECA	-	United Nations Economic Commission for Africa
VRR	-	Programme de Valorisation de Resultats de Recherche
WIPO	-	World intellectual property organization

2. Introduction

The following examination is a report based on the Fact Finding Mission to Tunis done in November 2014 by a group of German professors with the aim of examining the Tunisian national innovation system (NIS) and identifying bottlenecks and possibilities for improvement. Special attention has been devoted to the tertiary education sector, and the newly planned Master programme at ENIT titled “Engineering and Technology Policy”.

The German delegation consisted of (1) Prof. Dr. Hans-Heinrich Bass from UAS Bremen; (2) Prof. Dr. Achim Gutowski, Innovation and Change Management at International Business School of Service Management, Hamburg; (3) PD Dr. Cordula Weißköppel, Cultural Anthropologist at University of Bremen; and (4) Prof. (em.) Dr. Karl Wohlmuth from the University Bremen.

During the stay different governmental institutions, faculties and agencies were visited for meetings (see page 45 for an extensive list of participants of the meetings). The fruitful discussions yielded various insights. For the full report of the meetings, please see pages 9-44. In the interest of a better understanding, a brief overview on the four major topics will be given prior to the extensive minutes of the meetings. The four topics are (1) the assessment of the Tunisian NIS in its current state and the identification of constraints and needs for improvement; (2) the planned Engineering and Technology Policy/ETP-master programme at ENIT; (3) the role of international organizations in supporting the STI and ICT policy reforms; and (4) the scope of future cooperation between ENIT and Bremen as agreed upon during the meetings.

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3. Assessment of the Tunisian national innovation system

Since January 2011, Tunisia finds itself in a phase of political transition. The economy is in dire straits, unemployment is soaring, especially for young people. Tertiary education does not seem to help increasing to employability. The founding of new companies remains at a low level. The domestic production realizes little value adding.

The national innovation system/NIS approach has not been extensively used in Tunisia yet and the system as such is rather rudimentary. Nonetheless, it provides valuable insights. When looking at indicators, one finds ambiguous results. The input indicators reveal encouraging figures on the scope of activities. As stated by the CNEARS, Tunisia spends about 1% of its GDP on R&D. There are

special governmental funds implemented to encourage more R&D expenditures. There are various programmes to enhance innovation activity. These programmes either aim at subsidizing the initial costs of an innovation investment, also aiming at increased cooperation between science and businesses, or at increasing the number of start-ups.

The government spends large sums of money on techno-parks that shall enhance the emergence of clusters. Each park is dedicated to a specific sector. Altogether, there are 10 techno-parks, most of which are not yet finished in their development, and the parks wait for more innovative enterprises to produce competitive products and services. Financial support for these parks comes from the Tunisian government, the EIB and the Japanese Development Bank.

Universities (incl. ENIT) further host business incubators that shall encourage students and graduates to found start-ups. Besides, the Ministry of Industry has established eight technical support centres that are supposed to enhance technological progress.

The intermediary indicators show disappointing figures. The number of patents remains low at 1.7 patents per year in Tunisia for the years 2001-2010. Still, it is doubtful whether patents are an adequate measure for innovation activity in developing countries, since, historically, economic development always comes prior to innovative activity formalized through patents.

Further progress has to be made at the level of output indicators as well. The share of high technology exports is very low. Tunisian manufacturing largely resides to assembling. Consequently, there is little value added in the production, which puts pressure on wages. FDI did not prove helpful in changing this situation. The investment code as used in Tunisia does not reflect the needs of today´s economy. It appears as if FDI is made in a “hit-and-run strategy” making use of tax exemptions and subsidies, but at the same time reducing the interaction with the local economy to a minimum. Spill-overs and other benefits usually associated with FDI seemingly do not occur in Tunisia. Within the Tunisian companies, innovation does not take place due to a lack of competition on the domestic market as well as due to a shortage of investment due to high initial costs. Revenues from Tunisian licenses or trademarks are low.

One recurring answer has been given throughout the meetings on the question of why the Tunisian NIS is underperforming: There is a lack of a holistic policy approach. There are no common guidelines set by the government. The NIS is there in its parts, but it is organizationally dispersed. The cooperation between enterprises and science is too low; there is virtually no knowledge exchange between the stakeholders. The educational sector does not eliminate the disparity

between the labour market´s needs and the available human resources. This is especially true for the tertiary education system.

4. The Engineering and Technology Policy/ETP master programme

Tunisia is lacking the human resources to envision a STI strategy. Policy gaps throughout the value chain cannot be identified and politically tackled. Tunisia´s current situation demands human resources skilled in STI policy analysis, design and assessment. One attempt to provide these skills is the establishment of a new master's degree programme "Engineering and Technology Policy"/ ETP at ENIT.

The programme comprises five basic pillars: (1) the operational level of innovation and the innovation ecosystem; (2) STI policies and assessment (providing as system approach); (3) collaborative STI (such as through benchmarking); (4) strategic STI aspects; and (5) the STI expertise project (please refer to page 47 for the detailed module structure and page 33 for the further discussion).

The programme should be in general open to any students from Africa. The first cohort will be admitted in September 2015. About 10-20 students will take part in the classes. There will be guest lectures from members of the German delegation as well as a special course ("summer school") of about 1-2 weeks at UAS Bremen. For that purpose, to prepare all these actions in 2015, there will be another FFM from Tunis to Bremen in March 2015. The master degree will further be accompanied by bi-annual conferences on "African Industry and STI development" and by publishing periodical policy briefs to present project results and major findings on African STI developments and policies to policymakers.

5. The role of international organizations in supporting STI, tertiary sector education and socio-economic policy reforms

Tunisia today receives aid from numerous international organizations. States and interest groups from all over the world have entered the country by establishing subsidiaries of their developmental offices. Tunisia is envisaged as an anchor of stability in the North African region and therefore receives special attention.

The World Bank currently increases the conditionality it exerts on the government to increase its reform efforts. One means of pressurizing is the control of capital flows of developmental aid into the country. On the other hand, there are international organizations such as the ADEA which try to give consultancy services to the African states on the way of reforming their educational systems. This happens in the form of a consultative process as the regional officers in charge - in this case the African education ministers - are integrated in the decision-making process. State-near development cooperation institutions such as the GIZ from Germany have increased their staff in Tunisia. They try to counter the Tunisian educational mismatch problem by, for example, by teaching young people the German language so that they can become employed by German companies. There seems not to be sufficient coordination between the development cooperation agencies working in Tunisia.

6. Scope of future cooperation between ENIT and Bremen

The participants of the FFM agreed together with their Tunisian partners on the following actions (see page 39 for extensive discussion on cooperation):

(1) The implementation of a special course (Fachkurs) at the UAS/Hochschule Bremen on comparative approaches to innovation systems. The special course should take place annually within the first two weeks of December for one week of lecture (plus weekends for extra-curricular activities). The course is linked to the lecture "Economics of Innovation" of for the 7th semester students of International Economics (ISVW) at UAS Bremen. The preparation for the special course starts in 2015. A short term funding at DAAD shall be applied for the first year, and then one should consider long term funding.

(2) A preparation visit of Tunisian professors to Bremen in order to explore the regional innovation system/RIS in March 2015. The application for funds should be included in the application for the Special Course (Fachkurs).

(3) The special course can further be accompanied by e-learning offers comparable to Massive Open Online Courses/MOOCs which can be used as pre-requisite or follow-up of the visit of Tunisian students to Bremen.

(4) A bi-annual conference titled "STI policy reforms for African industry growth" is planned to take place in Tunis. These conferences should be prepared by using the networks of researchers of

ENIT and Bremen universities, and by the issuing of special policy briefs. ETP lectures and projects will refer to the conferences, by giving inputs and by using the conference results for improving the ETP programme. The master students will take part.

(5) Guest lectures on the topic of "Comparative Approaches to National Innovation Systems and Innovation Policies in International Comparison" are to be implemented in the context of the ETP-master programme.

7. Conclusions

The FFM mission has proven valuable in many respects. The Tunisian NIS has been examined and major problems have been identified: First, the NIS is lacking a holistic policy approach that would be necessary to enhance communication and cooperation between the now largely disaggregated parts of the innovation system. Second, Tunisia lacks the human resources to tackle these policy gaps. The education system tends to contribute to the mismatch between supply of graduates and the demand of the labour market. Third, the planned ETP master programme of ENIT will address these problems as it aims at educating students in strategic STI policy fields. Fourth, the participants of the FFM have agreed on a number of cooperation projects with direct and indirect links to the planned ETP master-programme. The universities in Bremen and ENIT have the ability and the will to support the Tunisian transformation process.

8.1 Welcome meeting with ENIT

17.11.14, 1st meeting, 10.00h at ENIT

Present:

- Bahri Rezig
- German Delegation
- Hatem Zenzri
- Jelel Ezzine

1. Informal welcome note

2. Formal welcome note / introduction of ENIT and University El Manar

- ENIT est. in 1968, first engineering school in Tunisia
- One of 15 institutes of University of Tunis El Manar
- Mission: schooling of engineering graduates; educating Maste of Sciences, PhDs, being the interface to society
- Five departments for 9 different programs:
  - Civil engineering
  - Electrical engineering
  - Industrial engineering
  - Mechanical engineering
  - Information and Communication Technology
- Admission: usually, students go to preparatory classes for 2 years after they graduated from school before they sign up at university
- Studies follow the French model: As in Bologna, students complete 6 semesters for the Bachelor´s Degree, one of which is for the bachelor thesis.
- Students have to complete practical training in the first two years with one month of internship each year
- There is a double diploma program existing (which goes 2 years + 2 years(also possible

3y+3y)) with a French university; program is open only for students with highest academic results

- About 40% of all engineering students are female, there are some classes where there are more females than males
- ENIT students rank best among national rankings
- There are 6 master programs, 8 PhD programs and 7 university habilitation programs (post-doc)
- In partnership with German university in Leipzig (formerly, now only Tunisian): a Management of Innovation programme
- 11 research labs, that cover all departments (there are 171 research labs in Tunisia altogether)
- 7 research units (pre-lab)
- Current international cooperation comprises:
  - International training programs for students
  - International graduation projects
  - Double diplomas
  - Master of Science with co-diploma
  - Research and education projects
- Since 2002, there are "business incubators" linked to specific departments

3. Introductory Words for the German delegation (by Prof. Wohlmuth)

4. Open discussion:

- *To what extent are industry networks present? To what degree does ENIT work together with industry networks and other research labs? With regards to the World Bank report (2014), what are the possibilities to strengthen links with the industry?*
- *Zenzri*: Graduates are the first link to the industry. There is a special graduates´ association that helps to keep the contact. The technical link is made through graduation projects. Research labs and units have contractual projects with companies. Further, students are trained in companies as a part of their studies.

- *Ezzine*: Students work on problems suggested by the industry. The follow-up, the valorisation of these projects did not yet meet the expectations; the process needs to be updated, strengthened. The analysis of the World Bank is correct and should indeed have come much earlier. ENIT university can become main force in proposing strategic impulses to increase network benefits.

- *Rezig*: The core of the problem lies in the interface between the technical side and the management. There is a need to shift policies towards a National Innovation System (NIS) approach. Links are difficult to create, though. There has been no culture of cooperation between the different stakeholders in Tunisia. However, there is currently a EUR 12 million European program underway that shall put technical links between academia and economy into place. Moreover, tools to support mobility shall be implemented for students, for researchers. Special scholarships are implemented for PhDs ("MobiDoc") for subjects chosen by the industry. Especially in medicine, ICT and the industrial field, this opportunity has been used. Policies should focus on the implementation of permanent mechanisms related to this field.

The NIS in Tunisia is there in its components. It lacks a shared goal and policy. It further lacks specified agencies to build synergies between stakeholders. The Master programme *(to be introduced later)* will prepare experts in this field.

Prof. Rezig has been doing research in this field and went to 200 enterprises to gain insight into their innovation processes. The project is now being worked out. It has been tried to put a Technology-Transfer-Office (TTO-model) into place. The German Cooperative University Leipzig has helped in this endeavour. Cooperation between the public and private sector has been recognized as important. The level of cooperation remains low due to the fact that Tunisia is currently undergoing a process of transition.

- *How is the university linked to the high school system in Tunisia? How is the interest in technical studies evoked, esp. for females? And, further, are there formalized links between ENIT and innovative enterprises / start-ups?*

- *Zenzri:* The Tunisian high school systems end with one exam that is similar for all students. The scores in this particular test will decide about the students´ career opportunities. Those who score best will usually go to medical schools, while the second best will enrol in engineering classes. Behind this decision lies the fear of unemployment. In general, females tend to score better in high school. There is no pro-active policy by the university to attract students.

- *Ezzine:* The social background of females tends to create a bias towards medical studies, and this is not so much the case for engineering. The gender gap is reversing: Students and faculty staff is going to be majorly female. This “Tunisian singularity” is directly related to the centralized and computerized orientation system for students who graduated from high school. This evaluation is compulsory and is based purely on performance. Whereas boys in high school age help the families (by providing additional income) or engage in extra-curricular activities (like soccer), the traditional activities for girls do not exceed household chores and schooling. Changes are needed here; both in the admission system as well as in the societal situation of families in rural areas.

- *Rezig:* As to what concerns the formalization of links between the public and private sectors, one sees that there lacks an adequate governmental policy. “The maestro to play the right melody is missing – each part of the orchestra itself is present”.

- *Does ENIT want to spearhead the process of reform of the innovation system? If so, how can the system be changed from below?*

- *Ezzine:* ENIT can be the “mover and shaker” of the system. It has been established as a classical engineering school but has always been a source of new ideas, sometimes even having a lead over French universities. ENIT needs to find new answers to the NIS in Tunisia. It then could launch ways to master policy approaches – not only in Tunisia, but also for the whole MENA and African region. The idea is to bring engineers to do policy analysis. Examples from other major institutions from all around the world have been encouraging.

- *Rezig:* There has been no continuous programme by the government. The Ministry of Industry hosts the Institute for Industrial Property and Standardization. It is here, that patents in the industrial field are registered. The ministry tries to disseminate IPR in universities and the industry. There are Research and Development (R&D) funds put in place by the ministry that should facilitate the cooperation between the technical support centres (of which there are eight in the Ministry of Industry, each dedicated to a specific sector). The number of projects actually conducted is “not so high”, though. Another programme has been established to fund valorisation. The fund is managed by faculty staff belonging to the Ministry of Higher Education and Research and is accompanied by industrial partnerships. Nonetheless, the number of projects in this programme is low as well, probably due to a lack of communication.

There is a weakness at the level of strategic guidance of the government: There is no national

programme, there is no vision and neither is there a strategy. Economic growth is not lead by innovation. Furthermore, there are problems at the level of enterprises. Businesses have no "place" for knowledge or innovation. There is no sufficient knowledge-management at the level of R&D-projects. There are technical centres, but the administrative status acts as barrier against innovation. The programmes that there are in place are largely isolated. They do not converge, there is no global approach. The aim should be to build synergies through joint projects but different cultures between institutions prevent this.

There should be other synergetic institutions put into place, other communication platforms. Research has to be put in "natural space". No human resources have been trained for tools for innovation system management, spin-offs and transformation management yet. Tunisian universities have been too conservative: In these fields there have been no speciality programmes. The greatest weakness is the lack of a "roadmap", everything else is consequential. However, there is the hope that with the beginning of democracy, the awareness about this subject will rise and hopefully the fund provided by the parliament will do so as well.

- *To what extent are regional innovation systems developed? What role do SMEs and techno-parks play?*

- *Ezzine:* The regional innovation system (RIS) is "missing and not missing" in a sense that the parts are present but to a large degree dislocated. Techno-parks and other parts of the RIS are there, but the parts are not in synergy. Top-down guidelines are missing. The "musical partition" lacks – and this is precisely the motivation behind the new master´s degree.

5. Expectations for the further discussion

- *Ezzine:* The North African realm has to find and implement new STI policy initiatives. They need experience and know-how so that the region can pick up the level of development. Tunisia has the chance to become a hub for STI policy design for Northern and Sub-Saharan Africa. UNESCO and other partners have already expressed their interest in the idea of developing a new master programme. This degree could become a launching pad of new policies that help the emergence of a Pan-African innovation system. This is why he looked for professors interested in both Africa as well as innovation. It might be questionable whether policy schemes from Europe are transferable to Africa but an exchange of ideas will create complementary knowledge. People need to invest time in big ideas!

- *Wohlmuth:* How can NIS, STIIP and ICT support measures be brought under a new frame of

industrial policies? Selected cases from other African countries may yield insights. South Africa, Mauritius and Tunisia are currently said to be the major destinations of investment by the European Bank of Development. How can opportunities be transferred into reality? In order to answer this question, one needs policy analysis. The question remains whether universities are able to spearhead the development. Advances made in the health sector are encouraging.

- *Bass:* NIS cannot be seen isolated. How does the Tunisian NIS interrelate with global markets? Following a global value chain argument, one has to look ahead of the region in order to spur development. Universities can be the main drivers behind this kind of development. Do democratic systems even produce sub-optimal outputs as conflicts of interest and short-term thinking prevail?

8.2 Meeting with DG Research, DG Innovation, and DG Higher Education

17.11.14, 2nd meeting, 15.00h at Ministry of Higher Education and Scientific Research (MHESR)

Present:

- Abdellatif Boudabous
- Awatef Soltane
- Bahri Rezig
- German delegation
- Jelel Ezzine
- Khemaus Zayani

1. Introduction / Welcome note

2. Discussion

- *Ezzine:* ENIT invited Bremen delegation to explore the Tunisian innovation system in a German-Tunisian cooperation framework and to understand the concept of the Tunisian NIS. Special attention shall be devoted throughout this meeting to the “upper stream side” of innovation systems.

Through a policy implemented in 1996 and put into effect by 1999, research was structured in

research units and laboratories. This policy has proven successful as Tunisia is today first in scientific publications per inhabitant in Africa.

- *Wohlmuth:* the Global Innovation Index (GII) ranks South Africa, Mauritius and Tunisia first in Africa. The input into the innovation system is large, the output, however, is rather poor. How can efficiency be increased in innovation? What can be changed so that the economic activity moves away from assembling towards production? How can the ranking in the Global Competitiveness Index (GCI) be improved?

- *Zayani:* In 2010, before the revolution, Tunisia ranked 34th in the afore-mentioned ranking globally. After the revolution (and 2 years with no rankings), Tunisia now ranks 80th. This shows that Tunisia is in a transition period that affects social progress. Now, Tunisia is in a phase of normalization. Once this normalization is completed, there will surely be an impact on the ranking.

There are heavy programs put in place. 10 techno-parks will be established in Tunisia. The development of these parks has not yet been finished. Financial support comes from the Tunisian state, the European Investment Bank and the Japanese Development Agency. Once these parks are all completed, they will have a positive impact on the Tunisian innovation activity.

- *Wohlmuth:* Techno-parks need growing firms with their own R&D in order to operate. How shall these techno-parks be filled with growing firms? What are the growth stimulating policies?

- *Zayani:* This kind of activity is already there. There are start-ups that export worldwide. Some parks even need to increase their area. Furthermore, new legal regulation shall enhance start-ups, esp. those that engage in product innovation. Currently, the unemployment of university graduates is seen as a major problem. The private sector must be encouraged to be more active and to hire more graduates. On the other hand, the university graduates must also be encouraged to start their own businesses. This can be done through incentives or business incubators (such as the ones present at ENIT). For all these endeavours, people need a mentality for change. The profile of entrepreneurship has to be acquired first, as there is currently a lack thereof in Tunisia.

- *Bass:* Tunisia concentrates its innovation policy on a limited number of sectors. What is the reason for the selection of these sectors? What are the achievements in adjusting the universities to these sectors? How are these sectors related to the global value chain?

- *Zayani:* The decisions are based on the human potential and the financial capacity. In what concerns the human resources, one finds a very good potential in university graduates, admittedly with an excess of graduates in some sectors. The sectors that shall be enhanced through

governmental policies are chosen by the government for different reasons. One of them is their potential for production following an import-substitution-policy-argument. The sector potential is then exploited through techno-parks. There are techno parks for textiles as well as for computer and media. In South Tunisia, there is one for the valorisation of desert products. Each region has its own specialities such as a differentiated human potential. Techno parks create structures to bridge the development.

- *Boudabous:* Major problems for Tunisia's innovation activity are its small R&D expenditures (ca. 1% of GDP) and the bureaucracy. There is no common strategy and little cooperation between the different interest groups. There is yet no facility for the transfer of research. 10%-20% of labs are good and have established good communication to the industry. The research is controlled by bureaucracy. This may further fuel the brain drain from which Tunisia severely suffers. Tunisia would have the capability to stimulate the generation of start-ups if the human resource is there. How can Tunisia benefit from German experience? How do others stimulate this interaction with dynamics and without bureaucracy?

- *Soltane:* How can Tunisia enhance the contribution of its scientific and research sector? They try to increase the mobility of people and knowledge as well as their budget. There is urgent demand to involve the private sector into these projects. In 2012, there have been 69 proposals of which 6 projects were financed in the end. The BMBF has co-hosted a joint workshop on energy efficiency.

- *Ezzine:* The attitude has changed towards bilateral cooperation. Industry and SMEs are increasingly involved in projects. One big problem lies in the dispersion of competences along different ministries. In order to involve SME entrepreneurs, one needs the Ministry of Industry´s consent.

There are no priorities in the development of different sectors. The largest imbalances in the research system lie between the macro- and micro-level. Before priorities can be found, one has to make out industrial niches in which Tunisia can flourish. Again, the systemic view has to be found first before one can get into the operative level.

- *Bass:* Would it not be wiser to single out for each project if it is necessary or a waste of time to increase investment there?

- *Zayani:* The need for action is now biggest at the macro-level. There needs to be a common agreement on the strategy pursued by all stakeholders. This strategy is subject to change however,

but it must not change too fast. To this day, there are only “embryos of strategy” in Tunisia. In some fields, actually, there is no research on finding the correct priority.

The government has taken a specific approach through different programs: (1) there is the Programme Nationale de la Recherche et de l´Innovation (PNRI), a program that features free partnerships between entrepreneurs and technicians. Moreover, the (2) Programme Industrielle de la Recherche et du Development (PIRD), given by the Ministry of Industry, aims at helping small firms to do innovation. Further financial tools to do innovation are provided through the Valorisation de Resultates de Recherche (VRR) programme. It aims at accumulating knowledge and know-how. This program is hosted by the Ministry of Higher Education. Furthermore, there are two other programs which are considered to be “not too efficient”, one of which is a mobility programme for researchers to move to SMEs or to create their own. This is not too attractive as these people tend to continue to have university lectures. The program needs to be revised.

- *Weißköppel:* How are processes of change being followed up by the educational sector? How does Tunisian research adapt to social streams and progress (as it has happened in the EU with alternative energy)? How do state institutions follow up these movements?

- *Zayani:* There are in fact good specialists in the field of social sciences in Tunisia nowadays. Up until recently, these sciences have not really been considered. The budget used to be allocated towards scientific and technologic branches. After the revolution, the research centre Centre d´Etudes Recherche Sociales (CERS) was established. The political attitude has shifted towards a participatory approach. All stakeholders shall be involved in a decision-making process and suppression shall be abolished. Also, the civil society is very dynamic; it has got the will to reclaim things.

- *Boudabous:* Still, there is no transfer of policy and research yet. Old priorities (energy, technology, agriculture) are still valid today. New incentives to reflect societal movements will come out of the political parties that take part in the democratic process.

- *Gutwoski:* What is the importance of FDI in larger corporations for the Tunisian economy? How is FDI regulated?

- *Jelel:* In 1972, there was a new policy launched. This policy does not tackle much of today´s problems, though. There is no positive spill-over with FDI. A know-how transfer, a transfer in knowledge or managerial skills does not take place in Tunisia through FDI. Foreign companies only take advantage of subsidies. In fact, they actually create a negative impact.

- *Wohlmuth:* According to the World Bank report of 2014 on Tunisia, there is much too little competition in the Tunisian market as there is a heavy state influence. Do new laws create an even heavier burden for enterprises?

- *Boudabous:* This is a complex system: One has to simplify the existing laws and create clear new ones. Therefore, it needs a policy with a strategy that envisions the next generation.

- *Zayani:* Tunisia has to try to strengthen the scientific cooperation with Germany. The German model of research and education is interesting for Tunisia. In research and education, there is a good relationship existing, but there can be done more such as special training programs etc.. It is Tunisia´s conviction to work more on a bilateral level. Germany´s tertiary education system is appealing for many young Tunisians. Financial aids to realize these projects can be provided.

- *Boudabous:* Tunisia needs more interaction with other countries. Only then, the system can be transformed.

8.3 Meeting with GIZ and German-Tunisian Chamber of Commerce (scheduled)

18.11.14, 3rd meeting, scheduled: 10.00 h at ENIT

Present:

Scheduled:

- representatives from GIZ (did not attend the meeting)
- German-Tunisian Chamber of Commerce (did not attend the meeting)

- Bahri Rezig
- Jelel Ezzine,
- German delegation

1. Informal discussion

- *Bass:* Is there empirical evidence for the claim that FDI have been following “hit-and-run strategies”?

- *Ezzine:* FDI are considered an important factor in the development of Tunisia as (1) the

country currently lacks a sufficient capital base and (2) it needs to jump-start development right now. However, the assumption that FDI follows a “hit-and-run strategy” in Tunisia is supported by scientific literature. Most notably, a research project in 2009 conducted by Tunisian scientists sent surveys to Tunisian SMEs with the result that the more FDI there is in a SME, the less innovative it tends to be and the less spill-overs there are in the sector. Based one econometric models, the results yielded an inverse relationship between nationality of ownership and innovation activity.

The reason for this lies in adverse regulation: Companies using FDI are free from taxes for 5-10 years. Additionally, there are other incentives they are granted. They usually seek access only to low-skilled labour and their manufacturing is on low-tech products only. Multinational Companies (MNCs) are only relocating their manufacturing to Tunisia; there is little interaction with the Tunisian system.

- *Bass:* There has been a new off-shore / on-shore regulation in 2009 which aims at attracting FDI to target the external market only and not the internal market. This policy did not favour Tunisian companies as they do not fulfil quality standards of MNCs. So the newly created companies are only platforms for exporting. Isn´t there now the time for reformulating these rules?

- *Ezzine:* Indeed, the legislation is disadvantageous. But a change of it needs extensive time and resources as Tunisia is in a period of transition right now.

- *Bass:* What rationale has there been for the previous legislation? Was it aimed at protecting the internal market? Was it influenced by interest groups? As to what concerns a new promotion code: How do Tunisian entrepreneurs react to the plan of opening the internal market?

- *Ezzine:* The papers on new legislation that are present right now do not go deep into analysis. Further research is needed in this area.

- *Wohlmuth:* There is a situation quite similar in other countries as there as well the investment code appears to be biased. In 2014, there has been no change of the investment code in Tunisia. Have French and Italian companies with assembling activities in Tunisia an interest in the reform of the investment code as the documents are presented today?

- *Ezzine:* Yes, this may be a source of a bias. Tunisia actually has got the capabilities to do research by itself. The investment code does not reflect this capability; maybe due to foreign vested interest. Another reason for the inadequate Tunisian investment code may lie in the insufficient knowledge of policy makers. There may be a lack of maturity and understanding in

Tunisia´s institutions.

- *Wohlmuth:* Other countries have implemented investment codes that have proven to be successful. As examples serve Malaysia, China, Korea, and the like. Can Tunisia take their investment codes as a model?

- *Ezzine:* The Tunisian ministries do not have the know-how and the capacity to benchmark. There is a top-down problem in the policy-making. The previous government imperative has been to fight unemployment. This was the first-degree problem, or put differently, the short-term need. This policy has turned out to be a simplistic approach.

- *Wohlmuth:* Sectors that can be the source of innovation and growth are identified for Tunisia. Why are those sectors which are promising not strengthened by policy action?

- *Ezzine:* Currently, the struggle for power in Tunisia overrides the struggle for beneficial policies. Once this transition period is over, things may be changed.

- *Gutowski:* Are lobbying actions by interested groups a potential threat to the Tunisian economic development?

- *Ezzine:* There is a similar situation in other African countries: There is a bulk of reports but the research findings are not transferred into policies because of vested interest groups and their lobbying. Tunisia has what it needs to become economically developed but it lacks the right form of leadership and vision. To overcome this situation, efforts should be made to start the innovation process from the bottom at university level.

- *Bass:* With the first imperative being fighting unemployment and the second being the protection of the internal market, there are two classes with vested interest in the current investment code. Where should actually the social and political basis / support come from for a new long-term vision?

- *Ezzine:* One needs to be optimistic in this context: It needs the intelligence of the politicians to sell their ideas of their long-term vision to the people. The post-revolution phase is a “window of opportunity” in this context. One needs to implement a new FDI policy without challenging the status quo too much. Change shall be made “little by little”, this is what engineers call “incipient dynamic”.

A first step can be the benchmarking of investment approaches done by students. Then, one needs to implement the right institutional structures for Tunisian engineers and researchers to sell their

knowledge whilst benefitting from their competitive advantage. As a spill-over, there might be even a better teaching. From a political viewpoint, one has to spot niches where resistance to change is smallest.

- *Gutowski:* There is a focus on ICT in investment parks. However, large ICT companies leave out Tunisia as a production base. Why is that the case?

- *Ezzine:* There has been success in the ICT sector. A small number of SMEs driven by Tunisian entrepreneurs is competitive. The government does not aid these companies, though. There is a lack of priority. The country needs to find out where its competitive advantages lie and boost these sectors.

- *Wohlmuth:* Is the optimism of reforming in a gradual way adequate? Does not Tunisia rather need a "big-bang" style of reforms? At least so it was noted by many observers of Tunisia's economic problems.

- *Ezzine:* At the operational level, there needs to be gradual improvement. The big bang is needed on the non-operational level, the vision level. One needs a wholly new conceptual framework here. It is important, though, not to push the Tunisian society too heavily in a forced path. The actual development model has shown its limitations, for example a tendency to fall for greed and a general failure of economic theory (he refers to a Stiglitz paper on macroeconomic theory and reforms). The narrow focus on GDP growth is not sufficient, which has been shown also by the 1972 study "The limitations of growth". The historical juncture in Tunisia today is to find a new growth model.

- *Wohlmuth:* What are the initiatives to assemble all the key Tunisian stakeholders for deep reform? Who would be in charge of bringing together a national economic conference as a permanent economic forum?

- *Ezzine:* It was tried to do this kind of an assembly but it was "more for the show". The World Bank report 2014 demands immediate short-term actions.

- *Wohlmuth:* There is a Planning Commission approving a 5 year plan. Who does the work on this, and can there be a revitalisation of the Planning Commission?

- *Ezzine:* This can only be done by the government. The idea is that ENIT can, in their own frame, initiate dynamics. Parties seem to be more interested in power than in politics. Tunisia has to adopt a long-term vision and at ENIT they can develop the launching pad for that.

- *Bass:* There is a dichotomy between science and politics. Science perceives progress as clear, easily to distinguish between right and wrong. Democratic politics, on the other hand, is made of compromises. This actually enabled China, for example, to quickly adopt a coherent strategy.

- *Ezzine:* This dichotomy exists in Tunisia as well. The fundamental ground of democracy is trust. The people do not have trust in politics today. There is a situation in Tunisia right now that one could describe as “explosive”. Trust is formed by giving a believable and doable vision of economic development. This is what needs to be done by academia. The politics will follow subsequently.

- *Wohlmuth:* What are the economic positions of the different interest groups? Who could organize a dialogue? Maybe media personalities?

- *Ezzine:* This could be feasible. But the debate needs to be structured. One´s own vision of things should be made prior to the meeting. Perhaps one could structure the progress in periodic meetings: First, there would be the formation of a vision (with amendments from all sides); second, there would be the appropriation and engagement.

- *Wohlmuth:* Who could be partners?

- *Ezzine:* ENIT wants to go ahead. The scientific bit must almost be finalized, then it goes into the political arena.

- *Rezig:* The discussion deepens. The professional associations in Tunisia do have strategic visions - but each has its own. Third parties have made many analyses and recommendations; each lobby group has made its own reflections. NIS is an instrument in the hands of the government. The development of a NIS, however, needs to be organic, not top-down. There has to be a vision on NIS for the governments to interact with NIS. Models for this are not far. There also is an Association of Economists in Tunisia. But a strategic dialogue between the actors is missing. When it comes to the dialogue, two things have to be ensured: First, the interest of Tunisia as a country is paramount; second, one has to clarify the economic model. There is positive economics needed for the long-term approach / vision. On the other hand there are short-term approaches needed by the government. The government is pressurized by interest groups in the short term, and one has to take this into account. The government is yet not aware of NIS as an instrument of development. There are six pillars of NIS that have to be explained to the governments. Tunisia finds itself in a learning phase right now. Whilst the political system as a whole will stabilize, one is

obliged to envision a long-term thinking and a strategic programme, as it is now that strategic decisions have to be made. In order to do so, one needs the proper human resources, this is imperative. Between the universities and the socio-economic spheres, there is no-man's land today. The universities´ role lies in finding the systemic approach.

Diagnostics should go along four axes: First, this is regional; second, it is the industrial development, third, it is the development in research and fourth, it should go along the medical and agricultural sector. The research system in Tunisia is currently blocked by bureaucracy.

There is yet no law that encourages public-private cooperation. Potential partners have not yet joined common discourse.

Educational programmes can be organized either in top-down or down-top manner. This has to be debated in a first approach. The second approach then has to be programs of mobility, the support of concrete projects and research. There has to be a concrete and simultaneous exchange between economics and development. Different modes of participation are sought by different actors: Political parties play an instrumental role here as they can share ideas and strategies on NIS.

- *Wohlmuth:* There is a tendency from the government to protect certain sectors. How can there be a NIS when some sectors are heavily protected? Who is exerting power to the political sphere? Why are some sectors protected from international competition?

- *Ezzine:* There is a shift towards more and more opening the economy to globalization. It is the government´s duty to make people aware of the benefits of gains from this process. The language of NIS is not being shared with people. Tunisia has indeed to open towards global value chains. Even in the internal markets, there is a lack of competition. During the next 5 years, Tunisia needs a phase of restructuring. In this time, many operational hurdles need to be removed. This will help people to start thinking about a new development model.

8.4 Meeting with DG MIse á Niveau, INNORPI, APII, and UTICA

18.11.14, 4th meeting, 15.00h at ENIT

Present:

- Adel Chouari
- Bahri Rezig
- German delegation
- Isabella Pimentel

- Jelel Ezzine
- Laurent Manderieux
- Mustapha Baccouche
- Riadh Soussi

1. Introduction

2. Discussion

- *Ezzine:* ENIT is planning to establish the ETP master degree course which should be open to Africa as a whole. Tunisia is lacking capacity in policy research.

- *Soussi (gives a resume of the Mise à Niveau programme):* The Bureau de Mise à Niveau acts under the umbrella of the Tunisian Ministry of Industry. There has been a deep cut in the Tunisian economic policy in 1995. The 1995 crisis brought competitiveness to Tunisian companies which had actually helped them. The FODEC fund has been implemented which compels enterprises that participate to pay 1% of their revenue into it (which effectively works as a tax). The objectives of this fund are to enable companies to buy new equipment, to make new material investments, to invest in quality management, training marketing and the like. Participating companies got relatively competitive. Since 1996, there have been around 5,000 enterprises in that programme. The revolution did not change this, and the rate of new participants is even increasing. The programme is open for any private SME.

In most SMEs, the R&D expenditures are rather low, innovation is basically absent. Two years ago, there was a new programme launched to boost innovation. Innovation is a key factor for future development as the return on investment is potentially large. Nonetheless, there is the problem of money and time for most companies. They seek fast return on investments.

- *Adel:* Innovation can be managed through patents, and Intellectual Property Rights (IPR) can be used as a tool. For that matter, a new academy shall be established, with training sessions and assisted learning schemes to be offered. This can also be included in the newly planned master degree.

- *Ezzine:* One major problem of Tunisia´s economy is that actually only little value adding takes places in the Tunisian production. The kind of products Tunisia produces does not need much R&D. As another point, there is little competition on the internal market.

- *Soussi:* The structure of the Tunisian economy is re-arranged through techno-parks each of which is dedicated to a specific field. The are two speeds in the Tunisian economy: (1) The traditional Tunisian enterprises are busy on their day-to-day work, they do not plan strategically. (2) The non-typical Tunisian enterprises, typically exporting to Europe, are reflecting the outlooks. There needs to be established more engineering and research in all enterprises. There is a changing way of thinking within the enterprises: Managers are increasingly willing to pay for R&D – however, they need initial funding to boost their expenditures.

- *Wohlmuth:* It is recognized that the innovation input is not too bad in Tunisia – the innovation output as measured in brands, patents, trademarks etc. remains poor. How is it possible to transform from assembling to producing?

- *Soussi:* Tunisia needs to integrate into global value chains. Growth can be achieved if research and industrial enterprises are linked – this happens through the techno-parks. The main question remains: How to boost enterprises? For that purpose, an awareness campaign has been launched on IPR, patents and related matters. Companies are further encouraged to build up trademarks through Mise à Niveau programmes. The funding pools cover prototyping, experimentation and the first phase of innovation. It runs parallel to the upgrading programme.

- *Bass:* How are enterprises for these programmes selected?

- *Soussi:* For the upgrade programme, enterprises compete. They have to submit a diagnosis of the current situation, a description of all activities in the enterprise and a strategic plan. Further, they have to write an investment plan and a proposal of needed instruments. The report is then assessed by the Ministry of Industry. For the other programme, firms have to submit an application. They then receive an invitation to come personally and convince the ministry to fund the project.

- *Soussi:* The upgrade programme needs an application of two years in advance. The R&D premium programme gives immediate help – this makes it especially suitable for start-ups. The R&D premium programme has been established in 2010 and has had 200 applicants of which 76 were accepted since.

Cooperation with INNORPI is sought for the master programme. One has to put forth efforts in IPR awareness. The Tunisian IP diagnosis is based on the French model. The finding of the diagnosis is that often Tunisian trademarks are not protected – this has to be changed and the master´s degree can be a step towards that.

- *Ezzine:* In 2001-2010, there have been 1.7 patents per year in Tunisia. This is far too low after all the efforts and the economic restructuring of 1995. ENIT produced zero patents. The system is clogged – not on a financial level but elsewhere!

- *Manderieux:* As it has been the case in the European history, also for today´s developing countries, economic take-off comes before the rise in patent figures. These may not be an adequate indicator of innovation activity.

- *Baccouche:* There are two main problems: A problem of culture and a problem of motivation. There is no motivation in companies to do innovation; bosses just do not see the need to innovate. The internal market in Tunisia is very small. Moreover, most businesses are family-owned. Public market demand is based on a lowest-price regime. Innovation is perceived as a costly investment only. Tunisian companies also suffer heavily from competition from the Far East. There needs to be found a way to motivate firms to overcome the obstacle of high initial investments.

In the Tunisian industry there are around 2-3% of sufficiently successful companies. They usually have strategic partners. The capital stock of the rest of the firms is too old. Innovation investment has an amortisation time of around 20 years. Often it comes to conflict within the families – with the conclusion that companies rather do not invest. In order to start a system that leads to innovation, one has to go in stages: 10-20% innovative enterprises would be a good start. The state should take the most innovative enterprise, not the cheapest at public tenders.

- *Rezig:* What are the main needs of SMEs for human capital? What qualifications do graduates need and what would be a fruitful relation towards the university?

- *Baccouche :* The innovation process in completely spontaneous. One needs competition. The role of the experts is to transform “le soucis au succès” - and these experts need to be educated at ENIT.

- *Rezig:* There are enterprises that protect their interests. They need competence in terms of valorisation.

- *Baccouche:* How can we push Tunisian enterprises? They are free to compete in the European market if they wish to. Protection shall be reduced but in the end there also has to be more awareness on the need of competition.

- *Adel:* One has to think in global terms and global markets. IPR output needs to be measured but first there needs to be found an indicator. For each measure taken in the Tunisian

economy, one has to reflect if it was made as an act of protection. INNORPI can actually become a part of the innovation chain through competent IPR management.

- *Wohlmuth:* What is the developmental role of INNORPI? Do they get pro-active, do they become initiative?

- *Adel:* Together with GIZ, INNORPI has conducted a study on how to alter the Tunisian IPR patterns in the next 5 years. INNORPI is now opening regional offices.

- *Soussi:* There has been encouraging progress in many initiatives. However, one must not forget the traditional industries. Handcrafts have largely been stolen by Japan, later by China. Protection needs a joint approach but Tunisia is currently a "start-up democracy". Different economic sectors are attached to different ministries.

- *Ezzine:* The modes of innovation that have been discussed here so far are based on the push-model of innovation, a model adequate for developed states. Tunisia should rather focus on the pull-model in innovation. One should go to business people and find out what they need. The idea is to get at the lower levels first and then proceed upstream. 80% pull and 20% push model would be ideal. INNORPI / WIPO should make a switch in models now! The bias towards the push model stems from the European domination of academic discourse.

- *Rezig:* Demand is not well expressed in SMEs. They simply do not know their needs for technical problems. Growth by innovation is a concept new to most of them. Moreover, the government is not sharing the risk adequately with enterprises.

- *Soussi:* Key performance indicators (KPI) should be used for that end.

- *Gutowski:* As changing the culture / the mind-set does not appear feasible – is it possible to change people´s motivation?

- *Soussi.* One has to invite the people to engage in innovation – that is all one can do. Three years ago, there was no innovation management system in Tunisia, now this is quite successful. One has to alter people´s way to think about innovation!

- *Bass:* To what extent can there be discriminated between innovations? How can structural changes be accompanied? How are employment effects taken into account?

- *Soussi:* The Ministry of Industry distinguishes between 3-4 types of innovation: (1) product innovation, (2) process innovation, (3) entrepreneurial management, (4) marketing innovation. The ICT sector is quite innovative without much of technological innovation. One has to give the tools

to be innovative to the enterprises themselves. Innovation does not only stem from universities but also from enterprises. The upgrading programme can provide key skills directly to the employers. It pays the 70% of the salary for 2 years in upgrading programme for three people with specialized skills. Tunisia tries to adopt innovation in the larger definition: Huge success has been made in the marketing sector.

- *Wohlmuth:* The report of the European Investment Bank and the WB report both give direct investment recommendations.

- *Baccouche:* ITC, electronics, textiles and the medical sector deserve special attention. There is no national strategy, though. There are 4 national federations. The sectors are torn apart. There is no inter-sectoral strategy at UTICA. Every sector corresponds with the government separately. There is no national strategy. UTICA encourages SMEs to meet with European SMEs and engage in off-shoring. The problem here is that many of the Tunisian SMEs rather export their engineers than their products. European enterprises, by contrast, have well established in Tunisia, they are for example represented by the Société Franco-Tunesienne. About 250 German enterprises are present in Tunisia. The exchange can lead to an improvement of the Tunisian resources, as examples form the textiles sector and ICT show. FDI, however, is virtually only export-orientated.

A strategy for the policy of the Ministry of Industry until 2015 has been conducted by Ernst and Young. The Ernst & Young Report identifies key sectors which techno-parks are dedicated to. The improvement of performance is currently challenged by the transition in the country. In order to boost the identified sectors, one might also alter the investment code. A total-value-chain approach has to be used.

- *Wohlmuth:* They should try to make a trademark out of Tunisia. The country can become a hub in several aspects. This would also improve the quality of FDI.

- *Soussi:* The transition process in Tunisia is however not over, neither in political terms, nor in implementing a new approach in innovation policies. The ministry is ready to collaborate with universities. There is a two-level approach: (1) go and approach enterprises, (2) get environment of enterprises right (which includes universities to open their doors). There has been successful experience with the R&D premium programme.

- *Rezig:* Universities also need support from the Ministry. The planned master should meet the demand of the enterprises.

- *Baccouche:* Businesses need graduates that are adequate for the top-management.

- *Soussi:* Managers said they need coaching for innovation and foresight and related matters. Maybe a workshop or something similar could be feasible.

8.5 Meeting with ADEA

19.11.14, 5th meeting, 10.30h at Association for the Development of Education in Africa (ADEA)

Present:

- German delegation
- Jelel Ezzine
- Raky Gassama-Coly
- Tarek Chehidi

1. Introduction

2. Discussion

- *ADEA presentation:* ADEA is an IO that has been established in in Washington in 1988 by the World Bank with the purpose of bringing together donors to African education as well as to build a platform for to share knowledge. In 1992, the organization was moved to UNESCO and with it, representatives of African education ministers became part of the organization. Currently, ADEA hosts different working groups such as non-formal education, early childhood education, higher education. In 2008, the need was seen to "Africanize" ADEA. All African states have been asked to become a part of ADEA. Other donors (such as GIZ and European Union) were welcomed. There are three permanent African members in the secretary. The Bureau of Ministers has an advisory function and consists of ten African educational ministers. ADEA both offers research or analytical work as well as strategic policy framework studies. They develop plans of what skills countries need to develop for their own sustainable development. Backed with this policy advice, ADEA lobbies at a continental level and national level. The AfDB joins the Board of Directors, but organizationally, the ADEA is an independent organization.

- *Wohlmuth:* The World Bank recognizes the transformative role of ICT in Africa´s development. What is the role of the ADEA in the development?

- *Chehidi*: Mostly, it is the dissemination of knowledge. ADEA is part of different committees. They support the African Union (AU) and its commissions with technical advisory for HR, science and more. ADEA is taking part in an annual committee on higher education, science and technology. A working group (in Harare) will develop indicators in these fields for the AU. Also, ADEA will be part of a joint forum of UNESCO, AU and UNECA.

- *Wohlmuth*: Given that ICT platforms strongly support informal sector development (as found by the WB), what is ADEA´s strategy for STI and ICT?

- *Chehidi*: ADEA has committed itself to this topic a long time ago. They found that in these sectors, there is a gap of adequate teachers. The formalizing of the sectors and the education therein will take too long to be effective. By conclusion, formal education is not enough for the development of Africa. Encouraging progress has been made in Kenia: Young people were trained with PCs for about three months, now they are exporting entertaining content to Ireland. Without these trainings they would probably have been unemployed. The training systems outside of the formal education especially aim at women (esp. for commerce) and youth. The training provides these people with income and skills.

- *Wohlmuth*: There is the problem of graduate unemployment. What is the contribution of the ICT sector in solving the problem of graduate youth unemployment?

- *Chehidi*: Currently, a study is conducted. It was commissioned by UNESCO and will report data from 7 countries. When it will be ready (expected by 20.12.14) he will send this to the delegation.

- *Bass*: What is the organizational structure of the ADEA?

- *Chehidi*: The secretariat is the structuring organ that organizes, gives recommendations and concludes findings with a report. It sets the guidelines and receives country-specific reports from its members. ADEA´s strategic development plan comprises (1) common communication skills, (2) technical and vocational skills and development (TVSD) and (3) higher education. Each of the topics has working groups attached.

- *Bass*: There is a mismatch on the African education system. Are there special systems against this and are there mechanisms that favour this mismatch?

- *Chehidi:* The key to the problem is the adequacy between supply and demand. ADEA focuses on STEM education (science, technology, engineering and maths), with a special focus on the inclusion of girls and women. They lobby and advocate through the institutions that are of

relevance. Large demand for educated human resources comes from the medical and mineral industry.

ADEA then passes an inter-quality note on the educational system in the countries. For example, for the TVSD project, ADEA has asked all African education ministers to write a report on what they do against youth unemployment. After receiving these notes, ADEA will find out best practices.

- *Wohlmuth:* Can online courses be a part of the solution? Can ICT education lead to self-employment? How can there be an "Africanisation" of the process?

- *Chehidi:* Special focus is devoted to locally produced contents. All technologies are useful (including online courses). There should be no emphasis on any particular technique. Together with the ministries, ADEA tries to implement a demand-based model of education. ADEA only provides technical support and knowledge, while it does not get involved in the choice of any particular medium. Actually, there have been bad experiences as well, such as in Kenya, where the government sponsored a laptop for every student. ADEA can help by picking out best practices and worst practices. The decision stays at the national level, though. And there, the policy-makers are locked in between the ministries and the parliamentary groups.

The educational systems are resilient to change. ICT causes pedagogic resistance. The educational system defines the cultural identity. Educators are even stronger engaged in politics: They have got strong unions and they are usually sceptic about imports. If schools are localizing their content, however, they will have a greater impact and better educational outcomes.

- *Gutowski:* Is it possible to cooperate with NEPAD?

- *Chehidi:* There has hitherto been no cooperation with NEPAD. There will be a dialogue soon. The public-private communication in Tunisia is insufficient. The private level should be included in the development process, though. ADEA has successfully brought together the Tunisian Telecom (Telcos) and the Tunisian administration to jointly hosting an online store for educational content. Synergies have been used. If pedagogically accepted by the ministry, parents will be more willing to accept new products.

- *Bass:* What is the relation between the production of local content and globalization? The standardization of content as well as a lack of opportunities may contribute to a brain drain. In the EU, the university system is harmonized, is there a movement towards harmonization in Africa as well?

- *Chehidi:* There has been a meeting on that particular issue last week in Tangier. Supply and

demand do not match in terms of skills – universities can improve the quality of their education. Different institutions should learn to work together (within the nation and beyond). They should pool resources, share knowledge and built triangular systems. ADEA needs to work on the harmonization of the African system. *(He promises to share the document passed at the meeting a week ago)*.

There is an active working group on higher education. They have been trying to set up a Pan-African University. Now the group is "rather dormant". ADEA needs to re-engage the partners now. Suggestions are there already: the initiatives of the ENIT master programme ETP on STI policy are fully approved by ADEA. The link to STI policy in the ETP Master and to the market demand for skills is considered especially important.

How to bring TVSD to post-secondary level? First, one has to work on the image, and then one might even have to redefine the educational system as such. In January 2015, there will be a "go ahead" meeting. ADEA will be setting up the technical support. From the World Bank, they inherited many experts and linkages.

- *Bass:* There is a bad image of technical education. Is it possible to change this perception?

- *Chehidi:* From 2002-2010, he has been the advisor of the Tunisian Ministry of Education. Numbers on job opportunities for graduates were always published – but parents do not make their children find a rational choice based on job opportunities. At the 9th grade (at the age of 13-14) the students have to decide between math / tech., literature, etc. Especially middle class families do not accept that their kids are at that time not at a general grade school. Enrolment in a technical school equals failure. Money needs to be invested to change the image. For this purpose, Centres de Formations Professionelles have been established, which ADEA advises.

- *Wohlmuth:* Is the ETP master planned by ENIT complementary to the work of ADEA?

- *Chehidi:* Yes, indeed. Expertise in the kind that the ETP master programme would provide is a scarce resource. Cooperation is on the agenda.

8.6 Meeting with ENIT / Brainstorming

18.11.14, 6th meeting, ca. 15.30h at ENIT

Present:

- Jelel Ezzine
- Bahri Rezig
- German delegation

Presentation on the "Master Degree Project: Engineering and Technology Policy (ETP)"

- This type of master´s degree is new for the university as it for the first time combines policy analysis with strategic content. Graduates will be able to draw the link between the operational and strategic issues. The degree will be presented to the council of the university and to the Ministry. First application will be for three age-groups, then it has to be reviewed and renewed. It is planned to begin in September 2015.

- The context of the programme presents itself as follows: Tunisia, along with many other African states is in a phase of transition. There are 3 types of reforms currently on the agenda: First, there are global reforms of the state, the public service / administration and the local governance. Then there are deep reforms in the vertical / sectoral level, such as tax reforms or special aid for the health sector. Thirdly, deep reforms on the horizontal level have to be conducted (meaning education, employment, STI). For these matters, one needs new tools and skills.

- The focus on the NIS ecosystem demands STI policy analysis as well as STI policy and programme design and assessment. The policy skill framework shall be applied (which is a UK based model). The framework contains four competence groups (context understanding, option development, decision-making and implementation + monitoring) as well as four levels of mastering these skills (L1 – L4). The degree course should consider L3 policy skills. Industrial engineering is the starting block. L1 will be achieved through a short-training programme. L2 will be reached after the first year in master and L3 in the second year. L4 is PhD level, or expertise work. The curriculum comprises multiple teaching units: (1) innovation – innovation ecosystem (operational level), (2) STI policy analysis + assessment (system thinking), (3) collaborative STI (collective intelligence, international level: benchmarking with leading or emerging economies), (4) strategy and (5) the STI expertise project. Students will be advised by a multidisciplinary professor group in order to select their STI expertise project (see (5)).

- *Bass:* First, The title should contain the words "strategy" and "international". Second, soft skills need to be implemented into the programme – where are they in the outline? And third, what is the sequel of the modules – will they be taught in sequence or parallel?

- *Ezzine:* As to what concerns the title, it has been chosen because the university is a rather conservative, classic engineering school. In order to reduce resistance from the side of the university, the name has to be conservative, too. Further, the name should appeal to the engineering people. And it should be short and yield a good acronym. The name is still a matter of discussion, and “strategic” has not yet been taken into account as an addition.

- Soft skills are implemented in the pedagogical philosophy of teaching. Teachers will make use of these methods in their lectures. So, they are part of each module.

- Thirdly, there are sequences between the semesters, not between the modules. Students will be mature as they have completed (usually) 5 years of learning; they will bring with them their experiences and pre-conditions.

- *Rezig:* There will be a sequence within the semester – the first module will be taught in month one, the second will be taught in month two and so on and so forth.

- *Wohlmuth:* What is the engineering base in this degree course and where is engineering being reflected in the course outlines?

- *Rezig:* It is yet unknown how engineers will take this course. Nonetheless, the applicants will have a firm engineering background. Either they have done classical industrial engineering or they have taken a modelling / simulation branch.

- *Wohlmuth:* How can the STI education help to revitalise the industrial development?

- *Rezig:* The studies conducted during classes can help policy-makers in reaching their decisions. The first beneficial are the public authorities – it´s them who can bring a change.

- *Gutwoski:* Who will have demand for these degree holders, government institutions, or SMEs?

- *Ezzine:* This degree course is inspired by the great institutes like MIT etc. It will not only focus on industrialization, although this is an important part. Students will – after the completion of the course – have engineering skills and a “conception mind-set”. They can enhance and polarize, restructure the country, create interfaces – both at company level as well as at governmental level.

- *Wohlmuth:* Linkages in the supply chains carry massive policy gaps. Would the course provide the students with the ability to tackle these gaps?

- *Ezzine:* The ETP will use a holistic approach, will take an ecosystem view which enables

them to identify policy gaps.

- *Weißköppel:* What is the number of students? How can they be taught in their cultural dimension, their internal knowledge, and their analytical dimension?

- *Ezzine:* Cultural studies are part of module 4. They had to take into consideration the audience that will be interested in this class. “Culture” explicitly mentioned might side-track conservative engineers. Culture is part of many modules. Further, there will be many guest lecturers.

- *Wohlmuth:* There are four pillars that need to be implemented: (1) key economic sectors, (2) whole value chain approach, (3) the finding of STI policy deficits along the value chain, and (4) the policy context.

- *Ezzine:* It is important to find the unique selling point. Potential employers could be government institutions, so it is important to tell them about the quality of the programme. Also, one has to give them an argument, which could be the practical experience of the graduates. Are colleagues and donors contradictory? One should emphasise NIS stronger, in order to show the new approach.

- *Gutowski:* Maybe one could think about internships, although prolonged internships would be to long for the degree course.

- *Wohlmuth*: One should focus on the work with case studies to increase attractiveness and employability.

- *Bass:* One should not plan in a too detailed way as things constantly change. One should stay generic, stay flexible and be able to adapt to new environments.

- *Ezzine:* The context now is that people start to feel the need of these kinds of programmes. Saturation will not be very quickly reached. 54 governments are potential users. The 1st cohort will have 10 students (with scholarship), the 2nd cohort will host 20 students (of which 5-10 shall be African but non-Tunisian). Module four should be general but directed towards STI.

- *Weißköppel:* Maybe it would be advisable to create a pool with internship opportunities.

- *Gutowski:* One should also introduce this programme to Human Resources managers at AfDB, IMF, WB, etc.

- *Ezzine:* The AU, UNESCO and others have been very supportive already.

- *Weißköppel:* Furthermore, the programme should be designed under the consultancy of

students.

- *Ezzine:* This will happen tomorrow in a discussion with students.

8.7 Meeting with ENIT / Possible cooperation and action

20.11.14, 7th meeting, 10.00h at ENIT

Present:

- Bahri Rezig
- German delegation
- Jelel Ezzine

- *Plan:* Finish with work this morning. Be able to present a detailed programme to Beate Schindler-Kovats (DAAD) at this afternoon.

1. Discussion

- *Ezzine:* Possibilities of cooperation should be evaluated. All forms of cooperation within or besides the master programme are appreciated.

- *For a better understanding, forms of cooperation will be categorized in (1) cooperation independent from master, (2) cooperation with link to master, and (3) cooperation within the master.*

- *Wohlmuth:* Of course we will inform the Tunisian partners if there are any new publications, conferences etc. with any kind of links to what has been discussed. More concrete possibilities should be evaluated as well; the three German universities taking part in the FFM are all willing to offer help and advice.

- *Ezzine:* Tunisia needs support for the transformation. The master programme should be a "bold move" in this endeavour. As to what concerns the first point, he would appreciate to establish an outlet for research about Africa done by the delegation. This would help to use the knowledge that is gathered to transform the country. Tunisia can be a source of knowledge on how these findings can be adopted and turned into policies, which is of great use to German academia as well. A yearly or bi-annual conference would be good for this purpose (*later it was agreed to*

propose a bi-annual conference). A working title could be “Africa´s development through sound STI policies”. Institutions such as but not limited to UNESCO and AfDB should be linked to this project. The focus might be set on “pro-poor STI policies”. However, the AfDB should not be the host. Maybe the African Union would be an adequate host. On that platform, all the stakeholders should have the opportunity to meet face-to-face.

The Schumpetarian model is not really applicable for Africa. Instead, the pull-model of innovation should be in the focus; still, both models may coexist in Africa. If approached, UNESCO and WB are willing to give support to this conference. Furthermore, there should be a yearly publication on STI with the working title “Status of STI in Africa”. This publication serves as a monitoring instrument for the pan-African STI-ecosystem. In the medium term, one can also think about an African STI-institute. These ideas do not have a direct link to the master program; nonetheless, they will create spill-overs.

Concerning the third point, one should contemplate MOOCs (Massive Open Online Courses) for collaboration. These can be implemented into some modules. Further, there could be exchanges of lecturers, and students could intern in Bremen. Perhaps, there could even be a student´s exchange at pre-PhD level. There could further be a joint PhD programme with Tempus / DAAD. Master-theses could also be written with linkages to Germany. One could also think about technicalities such as double degree programmes, sandwich programs, and more.

- *Bass:* Possible constrains that have to be acknowledged can be time as this meeting might collide with the usual teaching and work of the participants.

The cooperation with respect to the program (2) should also contain a part dedicated to comparative analyses of innovation systems. It would be possible to link this to the Institute of Transport and Development (ITD) at the Hochschule Bremen. One could do teaching blocks which would either take place in Tunisia or Bremen, and Professor Bass could contribute to this. This block could also contain a reference to the German NIS. A summer school of maybe 11 days (one week for lectures and the weekends for visits) could be appropriate. There can be a link to German ISVW students at UAS Bremen who do Economics of Innovation in their 7th semester. The German delegation would further contribute to the bi-annual meetings. Possible financing from the German side can be discussed with Beate Schindler-Kovats from DAAD.

- *Weißköppel:* Maybe one should think about taking the summer school part out of the master programme so as to not be obliged to take any student. Instead, one should call it a “start-

up summer school", which is open for students from different summer schools. Some kind of funding might demand open calls for participants. There should be at least two partners, better three. Are there other faculties willing to participate from Tunisia?

- Ezzine: There is interest from other universities in Tunis to participate at the summer school. Interested could be: Dr. Sherak from University of Manouba, or Prof. Mheni.

- *Ezzine:* Concerning participation of students, flexibility is needed. One has to do a compromise: There are logistic and investment problems if admission is too loose.

- *Bass:* One should call it "Fachkurs" as this would be in line with the DAAD-guidelines. It would be best to offer the "Fachkurs" as an option, not compulsory.

- *Weißköppel:* Further, one should think about doing it as a joint module with students from the University of Bremen participating as well.

- *Gutowski:* Myself, I would be willing to participate at the master programme as a lecturer, based on the DAAD – short time lecturer model. A possible title of the lecture could be "enterprises and innovation / change management". He further expresses interest in taking part in the conference.

- *Wohlmuth:* As to what concerns point 3, one could do weekly block of lectures instead of parallel ones. He expresses interest in giving a lecture with the title "NIS / Strengthening Technical Policies in Africa", which is based on selected case studies. With regards to point 2, he admits that there are huge amounts of reports already. The project should focus on the policy reform dimension. One should get less descriptive. Possibly, briefings would be more adequate than yearbooks only. Concerning point one, the general conferences should relate to STI and should involve young scientists. For the conference, existing networks from all over the world should be used. The focus should be policy reforms to strengthen STI. A "pro-poor" focus may be limiting.

- *Ezzine:* the idea of briefings is well received. Studies conducted should seek to find out how STI can be leveraged.

- *Wohlmuth:* Study programmes, professors, students – all of them need to play a role in the conferences in order to get the DAAD funds.

- *Bass:* The DAAD is rather restrictive. A Memorandum of Understanding is needed between ENIT (represented by Jelel Ezzine) and the German delegation (represented by Prof. Bass). One should make use of transformation programmes. The short time lecturer programme is open to

any country. The framework would be that ENIT invites the German professor at the same rate as it is usual in Tunisia with a letter of invitation; the rest is covered by DAAD. For the conference participation, the DFG (German Research Society) might help, and for this to be organized, one also needs an invitation letter. For the German funds, only an application from the German side will be appreciated. All this is a one-point invitation and every new round needs a new application for the next period – and the funding is rather volatile, depending on the financial situation in Germany. The EU framework for funding as well as AfDB funding would be more long term orientated.

- *Gutowski:* Further, private funding should be considered (for example the Haniel Stiftung, a large industrial conglomerate).

2. Actions and cooperation

- Fachkurs (special course, quite equal to a summer school) should be implemented. The result of this FFM is to call it Fachkurs. Joint modules will be offered as a part of different programmes. One should cancel out the selection process. The preparation of the course may not be funded by the DAAD. The stay of the delegation from Tunis in Bremen will be termed a "preparation visit". The representative of the DAAD should be asked if there is funding for the joint module, if not one should call it "mutual fact finding mission". There should further be a seminar introducing Tunisian professors to the German NIS with special regards to the regional IS.

- *Bass:* Prof. Bass would be willing to contribute to the Fachkurs by giving a MOOC as a pre-requisite or a follow-up as e-learning. This would enhance the students´ interest and might also increase the willingness to fund the programme. Prof. Bass is willing to do the moderation and organization of these MOOCs.

- *Ezzine:* The title of the conference with emphasis on policy should be "STI policy reforms for African industry growth" (*agreed by everyone)*.

- The briefings mentioned would be the basis for the next years´ conferences. The conferences will be the basis for teaching. The students can contribute to it by evaluation or presentation of their master thesis.

- The preparatory meeting with the Tunisian professors in Germany should be by the end of February / beginning of March in 2015 already. The start of the master programme is due in September 2015. During the first two weeks of December, the Fachkurs in Bremen should take place. The bi-annual conferences should start in November 2016, and will be prepared by the policy briefings. Bremen students are as well invited to join the conference.

8.8 Meeting with DAAD and ENIT

20.11.14, 8th meeting, 14.30h at ENIT

Present:

- Bahri Rezig
- Beate Schindler-Kovats
- German delegation
- Jelel Ezzine

- *Jelel Ezzine introduces the work of the week to Mrs Schindler-Kovats and presents the contours of the master programme. He explains that the master programme will be a launching pad for all other activities. The joint module should be offered in the framework of a Fachkurs.*

1. Information on the different programmes

- *Schindler-Kovats:* There are different kinds of programmes at DAAD. Basically, there are two lines of programmes, (1) long term and (2) short term. Three long term programs would be relevant: First, the transformation programme. It currently focuses on the MENA region, but other countries can apply as well. It had been opened for three years, but now the funds are expired and it is not likely that they will be renewed. Second, there is the "Dialogue with the Arabic world" programme, which has got the main aim to enhance networking between the different participants. Thirdly, there is the TEMPUS / Erasmus prgoramme. Three or more countries are needed to take part in that particular programme.

Beside these programmes funding for a "Fachlektor", a long term teaching for the joint module, can be applied, or for a "Kurzzeitdozentur", which is the short term equivalent. An application for a "Kurzzeitdozentur" is possible for running programs at three times a year. ENIT needs to host the foreign lecturer, which includes giving accommodation, other support, etc. They need to show that they are committed. They need to publish a detailed job description to which the foreign lecturer might apply. There is no "Länderpauschale" or quota for particular countries. Applications will compete with applications from the the whole world.

- It is Mrs Schindler-Kovats´ personal opinion that this kind of a master programme is needed in Tunisia, as the existing master programmes make people jobless. Graduates lack soft skills, they lack innovative skills. Although their know-how is good, they are not able to work in a team and they lack leadership skills.

The concept of the Universities of Applied Sciences is not known in Tunisia. The DAAD would like to see more UAS participation in their programmes. In the long run, money for staff can also be included into the funding, so the programmes are more likely to be suitable for UAS.

2. Application Procedures

- Line 1 programmes would last for three years. Within this line, the whole package can be applied for at once. Line 2 programmes are short term and have to be renewed every year. It is recommended by Mrs Schindler-Kovats to apply for short term funding for the "pilot phase" for 2015 and then submit an application for long term funding in 2016.

The application deadlines are at the end of November for projects starting the following March and at end of January for projects starting by May.

It is not recommended to apply in a package as this would exceed the funds. Rather, one could submit applications with different deadlines so as to stay within the given budget for the period in question. The date of submission is not relevant, only the deadline for funding.

It is Mrs Schindler-Kovats´ advice to put the preparatory class into one budget with the Fachkurs. The upper limit is set at 30, 000 Euro per activity. The Fachkurs and its preparation can be regarded as one, single activity. If the Fachkurs is not too expensive, there would be enough money left to do the FFM to Bremen. The FFM would need to finance 4 professors from Tunisia, and the Fachkurs needs to provide funding for 10-15 students.

The FFM from Tunis to Bremen should be related to the building of the ETP master. Perhaps, other programs, such as from GIZ, could also be used for the second FFM.

A long-term cooperation (Line 1) would need more than a conference plus a Fachkurs. It needs a "reasonable cooperation programme". This does not mean to establish a new institute or a regular lecturer exchange. There should be either a joint double degree or a university-network type of cooperation at the end of the process. One needs to show a "permanent result".

8.9 Internal Discussion of the Draft of the Final Report

21.11.14, 9th meeting

Present:

- German delegation

The German delegation discusses the draft of the final report in an in-group debate.

8.10 Internal Discussion of the Draft of the Minutes

21.11.14, 10th meeting

Present:

- German delegation

The German delegation discusses the draft of the minutes in an in-group debate.

10.1 Annex 1

Table 1: Full List of Participants

Name	First Name	Institution / Function	Phone	Mobile	Fax	Mail
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10.2 Annex 2

Table 2: Module structure of ETP master programme

NR	UE	Sem 1	Sem 2	Sem 3	Sem 4
1	**Innovation and innovation ecosystems**	1. Knowledge and technology transfer	1. NIS govnernance I (institutional)	1. NIS governance II (networks)	
		2. Innovation value chain analysis	2. IPR and competition law	2. Engineering pro-poor NIS	
2	**STI policy analysis and assessment**	1. System thinking	1. System modelling	1. Advanced complex system simulation	
		2. Indicators for STI policy	2. Foresight and roadmapping	2. STI & human resources policy	
		3. policy rationale	3. Decision process	3. STI and energy policy	
3	**Collaborative STI policy**	Comparative STI policy I (leading countries)	Comparative STI policiy II (emerging countries)	Science diplomacy, cooperation and aid	
4	**Human, social, economic & political sciences for strategic decisions**	1. Political systems	1. Funding innovation	STI & society	
		2. leading changes	2. entrepreneurship and leadership development		
5	**STI expertise project**	Synthesis project 1	Synthesis project 2	Final project design and planning	ETP final project, expertise report