

## Investigating the Role of Academics in the Algerian National Innovation System

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### Abstract:

The increasing role of innovation, in generating revenues and enhancing competitiveness, was capitalised by the emergence of the National Innovation System theory. The theory stresses on the role of an interactive network among distinct institutions and elements, in the public and private sectors, to determine the innovative performance within the borders of a country. Various models that emerged addressed the changing role of universities. Modern universities participate in the creation of talented workforce and generate new enterprises. Researchers at universities, in addition to their mission of education, lead programs of various kinds for various entities or start their own projects. This means that university goes beyond the 'Ivory Tower' and becomes a pivotal actor in the innovation system and economic and social development.

The lagging Algerian universities, with their limited relationship with their environment, constitute the focal point for this study by addressing the role of academics in innovation network. The primary results showed tendencies of academics to collaborate with their faculty's mate or local colleagues with the same scientific background; fewer of them cooperate with colleagues from research institutes, while most of them denied co-authoring from the industrial or governmental sector. Furthermore, results show that only associate professors tend to accentuate their research activities.

**Keywords:** National Innovation System, Linked Ecologies, Innovation Ecosystem, Collaboration, Academics, Triple Helix.

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### **Introduction:**

The National Innovation System describes the network of interaction that emerged between heterogeneous institutions and elements, in the public and private sectors, to determine the innovative performance within the borders of a country. Various models that arose to deal with the changing role of universities. Contemporary universities engage in the formation of skilful workforce and create new enterprises. Researchers at universities, in addition to their mission of education, lead programs of various kinds for various entities or start their own projects. This means that university goes beyond the 'Ivory Tower' and becomes a crucial player in the innovation system and a corner stone for economic and social development.

### **Structure of the study:**

The Algerian universities constitute the main point for this article. The study tries to investigate the role of academics in the Algerian innovation system. To do so, we introduce the concept of National Innovation System, first, and then we determine this framework in Algeria. The third section presents and analyses the questionnaire results. The conclusion summarizes the main findings.

#### **1- The Innovation Systems and the Rise of Academic Role:**

The concept of innovation system can be understood as a framework gathering various types of interactions between heterogenous institutions, whose aim is to enhance their status through the flow of knowledge and innovation. Since the emergence of the term, numerous researches had been conducted to introduce it within economic analysis. This is because, since Schumpeter, efforts focused on understanding how innovation implements and arises to enhance social and economic growth ([Carlsson, 2003](#); [2006](#)); therefore, the level of analysis varied in accordance to research questions. In general, studies on innovation systems are classified under three categories: geographical, sectoral and technological.

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Technological innovation system refers to an active network of interlinked elements operating within an economic or industry which is determined within a particular institutional structure, whose primary activity is the generation, diffusion and use of technology ([Carlsson & Stankiewicz, 1991](#); [Suurs, 2009](#)). Sectoral innovation system, according to ([Malerba, 2005](#)) consists of a grouping of agents that carry out market and non-market relations for the creation, development and dissemination of new sectoral products. Finally, geographical approach of innovation system was the subject of endless researches, due to the vast meaning of boundaries and the origin of the term itself. Yet, a conventional definition of innovation system from a geographical point of view is that it refers to a set of market and non-market institutions collaborating for the purpose of creation, production and dissemination of unprecedented product and/or process within a very specific geographical area. More precisely this area could be local ([Mytelka, 2000](#); [Rantisi, 2002](#)), regional ([Cooke, 1992](#); [Cooke et al, 1998](#)), national ([Freeman, 1995](#); [Lundvall, 1992](#)) or global ([Carlsson, 2006](#); [Spencer, 2000](#)). However, national innovation system was the most used term since the “naissance” era. In general, the model describes the decentralised and dynamic approach to knowledge creation, which involves the contribution of academe, governmental, public and economic actors. Accordingly, various conceptions had emerged to describe the way(s) that facilitate the interaction among these heterogeneous strands. *Mode 2* of knowledge production ([Gibbons et al, 1994](#)) was the first to emerged, approximately at the same period with NIS. The approach made a clear distinction between traditional and novel ways in creating knowledge. While traditional mode focused on scientific disciplines as a doctrinal reference to carrying researches, mode 2 expands scientific research to overcome disciplinary base and focused on context-driven, problem-focused and interdisciplinary view. This means that university was obliged to reshape its learning policies according to real world problems where obstacles against external influences are weaker than in

traditional academic research, as Ziman ([2000](#)) wrote. Within a systemic consideration, mode2 refers to the step-forward the innovation system had taken, by mean of abandoning the ivory tower's image that was sticked to academia. The *triple helix* model ([Etzkowitz & Leydesdorff, 2000](#)) stated that university, in addition to sever changes in its missions, reshaped its roles to include entrepreneurial activities. The term, borrowed from biological jargon, designates the alliance of three strand rotating around promoting the status of innovation and knowledge through further focus on the role of academic milieu, in parallel to the hybrid institutional formats, during the generation, dissemination, transfer and application of knowledge. The university in this model leads innovation programs and may involve in industrial activities; it overpasses its traditional missions to undertake novel missions that fit better with its external environment. The emergence of "*third mission*" or "*second generation university*" summarizes these transformations from institutional and evolutionary perspectives. Such important role of universities in the innovation systems mobilizes government to plan for numerous policies that facilitate the academic insertion within industrial and societal system ([Ricciardelli, 2017](#)). This is because the knowledge produced within universities is networked to government and industrial spheres through patenting, spin-off or licensing.

Reviewing the role played by a university as a source of development and sustainability is itself a practical usage of the term '*university*' since this later means a "*whole*"; therefore, this institutional entity should be implied in every single aspect of local, national and international aspects. Indeed, at local and national level, there is no doubt that university has a prominent role in the dynamic of entrepreneurial activities and by turn be considered as a stimulus of economic activities ([Davey et al, 2016](#)); further, economic change in some Asian economies is measured by the link that universities generate with its surroundings, since this linkage is frequently transformed to economic goods ([Singh et al, 2015](#)). At global level, universities play a leading role by training valuable human capital with essential skills and competencies

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that are necessary for the fourth industrial revolution. In this regard, Schwab ([2017](#)) stressed that this revolution is launched and supported by the rapid expansion of technologies through cooperation among world leading organizations in industrial, governmental and education sectors. He noticed that: *“when firms share resources through collaborative innovation, significant value can be created for both parties as well as for the economies in which such collaborations take place”*. This is the case, for example, of Uber Technologies Inc, which hired 40 researchers from Carnegie Mellon University, in 2015, and the contract signed between Siemens, Ayasdi and Stanford University, in 2008 ([Schwab, 2017](#)).

Aside from the shift in leading actor of NIS, a second change, we believe, has emerged. In effect, the inclusion of additional spheres to the system results in reviewing the meaning of the NIS concept. The extension of the triple helix to quadruple helix ([Carayannis & Campbell, 2009](#)) implies rethinking the market powers, which were for long time monopolized by the supply side. The role of media or civil society within the innovation system is to guide the product from very early stage of existence to commercialisation. This means that demand reshapes the product even before its final stage of consumption (we are here talking about democracy both of innovation and competitiveness); the process of production is mutually devised between supply and demand where the product reflects what the consumers really need or want, and not what the product may present to them. In the same way, the addition of environment to the scene-to form the quintuple helix ([Carayannis et al, 2012](#))- obliges all participants to undertake a global vision by aligning their policies to meet global environmental awareness such as the blue, and the green growth, as well as the participation in the inclusive growth. Yet, both quadruple and quintuple helix of innovation open doors to replace the *“system”* by a wider understanding that encompasses the concept of *“ecology”* or *“ecosystems”*. In this regard, university, industry or government act, react and behave as separate ecologies with and within

their environment. Each of them has its own substructure that insures its continuity, while on the other side, cannot stand alone since its constraints and its independence are considered partial ([Abbott, 2005](#)). In addition, each ecology tries to create a copy (avatars) in another in the same way that each actor within the triple helix model fulfills the mission of the other. Therefore, one can consider the entrepreneurial activities fulfilled by the university as a copy of industrial sector that is printed in academic ecology; the same, training that is insured by firms may be viewed as an avatar of academia within the industrial logic. Thus, by the inclusion of “*hinges*” to the overall discussion, it seems that participant parties of innovation systems may be thought as ecologies, which are interlinked by various types of connection and thus, form a complete ecosystem. An ecosystem that is properly designed to “*accelerate innovation across scientific and technological disciplines* [in form of innovation networks and clusters among] *public and private sectors, and in a top-down, policy-driven as well as bottom-up, entrepreneurship empowered fashion*”, according to Carayannis & Campbell ([2009](#)). In such way, we agree with these authors to use the term “ecosystem” as an update for NIS. The resulting National Innovation Ecosystem refers to the overall ecology that governs the innovative performances within a country. Limiting the Ecosystem to a country level reflects the characteristics and specificity of each society in designing their innovation policies that are the basic of country’s economic performance and competitiveness at the global level.

## **2- The National Innovation System in Algeria:**

It is argued that the Middle East and North Africa region (MENA) undergoes profound changes at various levels. In addition to restoring or maintaining political stability, there is an urgent need to undertake long-term development programs to deal with numerous challenges, especially dealing with youth population, which recognizes a sharp increase every year. This challenge is associate with analogous development trajectory of most MENA states. The post-colonial development landscape is littered with uncoordinated development programs, insufficient funding in some countries,

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corruption, undemocratic authority and lack of monitoring and evaluation of programs to ascertain their impact. However, many options are available for the region to overpass these issues due to the important stock of economic, human and cultural capabilities. The best choice that encompasses all these competencies is to plug-in to the world economy through the establishment and the enhancement of knowledge economy ([Andersson & Djeflat, 2013](#)). Unfortunately, the MENA countries' overall knowledge economy position is not in line with their level of economic development; the overall ranking is mainly explained by weakness in the MENA region's incentive and institutional framework. In addition, the region shows a relative deterioration in terms of Innovation, due to the low level of scientific culture, brain drain and increasing lack of risk capital and finance for innovation ([Aubert & Reiffers, 2003](#)). As a result, hard is to argue the presence of real innovation system that is built on extensive collaboration between research, production, and training. Algeria, as a member in the region, has further negative conduct in terms of the knowledge economy and innovation system among MENA members. As shown in table 1 below, Algeria occupies the last position against its neighbors, especially in terms of the ranking and index of the knowledge economy.

**Table 1: Innovation and Knowledge Economy Data of Selected Maghreb Countries**

|         |                          | 1995   | 2000 | 2012 |
|---------|--------------------------|--------|------|------|
| Algeria | Knowledge Economy Index* | 3.50   | 2.85 | 3.79 |
|         | Knowledge economy rank** | 108.00 | 110  | 96   |
|         | Innovation Index*        | 3.41   | 3.25 | 3.54 |
| Morocco | Knowledge Economy Index  | 4.17   | 3.74 | 3.61 |
|         | Knowledge economy rank   | 96     | 92   | 102  |
|         | Innovation Index         | 4.79   | 4.04 | 3.67 |
| Tunisia | Knowledge Economy Index  | 4.54   | 4.15 | 4.56 |
|         | Knowledge economy rank   | 89     | 89   | 80   |
|         | Innovation Index         | 4.29   | 4.24 | 4.97 |

\*0=lowest; 10=highest; \*\*1= the best

Source: <https://knoema.com/WBKEI2013/knowledge-economy-index-world-bank-2012> (accessed 17 December 2017 at 20:00 local time)

Further, despite a slight improvement in comparison to Morocco in 2012, the innovation-lagging gap of Algeria is obvious, reflecting weaker innovation system. Indeed, reports from international organisations, such as World Economic Forum and World Intellectual Property Organization, stress on the very limited interaction between universities and industrial sector in research collaboration. Such finding nourished the conduct of various researches that try to shed light on the importance of implementing the triple helix culture on innovation system ([Saad et al, 2017](#); [Saad & Zawdie, 2011](#)), the prominent role fulfilled by universities in the innovation system ([Djefflat, 2008](#); [2009](#); [Saad et al, 2010](#)), and some researches that tried to identify hindering factors ([Amdaoud, 2017](#); [Djefflat, 2008](#)). Yet, to our best knowledge, few researches examine the problem from within; that is to say from how actors perform their role within the innovation system in Algeria? This study contributes to this end by focusing on the role played by academics in the Algerian innovation system.

### **3- Research Methodology and Results:**

In order to understand the factors that influence the Innovation System of Algeria, from an academic point of view, a survey was conducted in form of a questionnaire distributed among academics. In order to reach a significant number of answers, we used Google Forms application that helps to create fast and efficient questionnaires, guarantees an instant diffusion of the survey to a wider community, and insures rapid answers. The tool allows accessing random samples and thus raising the chance of collecting representative answers. In addition, we relied on our own professional and personal ties to the distribution of the questionnaires. Data, then, was then analyzed using R package.

The questionnaire contains two chapters. The first comprises nine questions covering the academic degree, geographical location of the home university, specialty, administrative tasks and their nature, belonging to a research laboratory and the implication in research projects. The second chapter focuses mainly on collaboration

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in scientific productions by asking three simple questions: self-production, collaboration with other lecturers, or with other researchers from other sectors.

The questionnaire starts by asking the academic rang of respondents by giving three possibilities: associate professor, assistant professor, and professor. The results showed that most of the respondents are associate professors, by 56.2% of the sample, while professors present roughly 8% of the total respondents; the frequency of assistant professors is 32 cases, about one third of the sample.

**Table 2: What is your Occupation at Higher Education**

|                     | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------|-----------|---------|---------------|--------------------|
| Professor           | 7         | 7.9     | 7.9           | 7.9                |
| Associate professor | 50        | 56.2    | 56.2          | 64.0               |
| Assistant professor | 32        | 36.0    | 36.0          | 100.0              |
| Total               | 89        | 100.0   | 100.0         |                    |

Source: questionnaire outputs

This distribution of respondents is worth enough; it gives analysis and results further robustness since associate professors tend to be active in doing researches, as they still need further efforts to ameliorate their academic career. Assistant professors are confronted by preparing their doctorate thesis; therefore, their contribution to research activities is less than of associate professors. Professors reach the highest grade and tend to limit their activities around supervising young doctors.

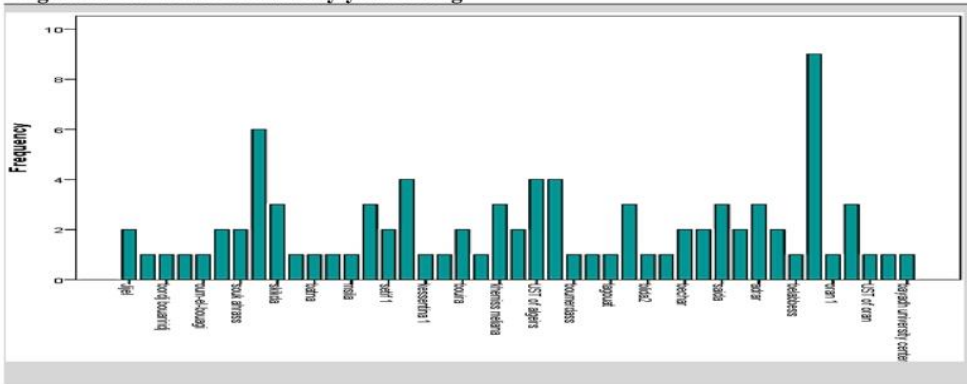
In addition, the respondents' geographic zones are divided into five groups, and are distributed as follow:

- Respondents from the same university with 6 to 9 responses: this group includes Mostaganem and Annaba universities. However, respondents from my home university were the most active vis-à-vis the questionnaire; this sound logic due to an active social network we have at the university. This group present about 17% of the sample, with 15 replies.

- University with 4 respondents: the group encompasses university of Setif 2, Chlef, and USTA. With 12 replies, the group occupies 13.5% of the sample.
- University with 3 responses: each university present 3.4% of the sample and includes Skikda, Ouerghla, Kmiss Meliana, Blida1, Saida, Adrar, and Oran2.
- With 2 respondents each, the university in this group occupies 2% of the sample. The group is composed of the universities of Jijel, El-Oued, Souk-Ahrass, Setif 1, Bouira, Media, Bechar, Mascara, Tlemcen, and Tiaret.
- The last group contains universities from which we received only one response and represent roughly 1% of the sample. The group contains 20 universities and university centres.

As shown in the figure below, the questionnaire was perfectly distributed among the academics and was received in 43 universities and university centres throughout the country. Indeed, among 53 universities and university centres that the ministry account, respondents belong to 43 different universities and university centres. This is a second positive point for the questionnaire that increases the confidence about the results we will extract. We stress on the fact that this geographic distribution of belonging is completely random since we distributed the questionnaire online.

**Figure 1: To Which University you Belong**



Source: questionnaire outputs

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After knowing the position and the location of the respondent, we want to know whether he/she occupies an administrative task. These tasks allow them to be informed about any activity within their institutions, at least within their faculty. Most of the respondents (78, 7%) appear to have not such tasks. The remaining (23. %) are either vice dean (1 observation), department head (3 observations), vice department head (7 observations) and 8 respondents prefer not to identify their task. Further, most of those having administrative tasks are associate professors (9 cases), professors (3 cases) are either leader of a doctoral project, chair the scientific council or committee, president of a university or a vice-rector; while most of assistant professors are vice-department head (4 respondents). However, what do these results reveal is so meaningful. Having no administrative functions liberates a considerable time for researchers, which may be invested in conducting researches unless they are belonging to a research laboratory or are actually engaged in research projects. These two concerns have been addressed to the sample whose responses give the following outputs.

**Table 3: Membership in Laboratories or Research Programs**

|              | Do you Belong to a Research Laboratory |                | Are (were) you a Member of a Research Project |                |
|--------------|----------------------------------------|----------------|-----------------------------------------------|----------------|
|              | <i>Frequency</i>                       | <i>Percent</i> | <i>Frequency</i>                              | <i>Percent</i> |
| <i>No</i>    | 27                                     | 30.3           | 23                                            | 25.8           |
| <i>Yes</i>   | 62                                     | 69.7           | 66                                            | 74.2           |
| <i>Total</i> | 89                                     | 100.0          | 89                                            | 100.0          |

Source: questionnaire outputs

Although most lecturers from different rang belong to laboratories and are (were) involved in doing research, approximately one third of our sample neither they belong to a laboratory, nor they conduct researches. That is to say, between 15000 and 20000 lecturers are properly teachers. Further, among 66 who said having implied in research, 53 lecturers are (were) members of CNEPRU, approximately 80% of the sample, while 11 were members of PNR. The others did not reveal their membership.

The tendency to choose CNEPRU projects for most lecturers is that this kind of projects is

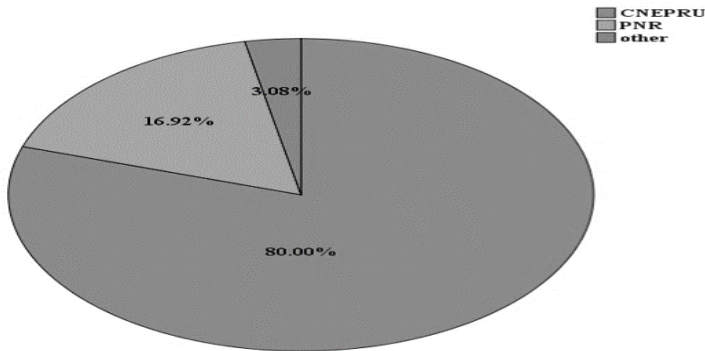
- The most known type among researchers' community;
- Annually opened by the ministry;
- The oldest type of research projects insured by the ministry.

However, these research projects are not "*effective research projects*" in the proper term of the world. Some lecturers consider them as a supplementary revenue given to researchers. In effect, the financial recompense of the researcher is carried out through an annual report summarizing scientific activities, often limited to a communication or an article. Therefore, this recompense is annually paid and is subject to insurance and social security deductions; the researcher receives 300 to 600 euros according to his/her research grade.

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**Figure 3: Lecturers' Membership in Research Projects.**

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Source: questionnaire outputs

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Yet, for PNR projects, this type was a temporary solution for absorbing pressures that occurred in the Algerian universities at that period, in addition to its inclusion as an important element in the five-year program to support economic growth during 2009-2014. At the national level, 5200 projects had been submitted in 2010, and only 2842 were definitively admitted in 2011. After two years, 2732 projects were evaluated, then reduced to 2497 by 2013. However, most of the project's promoters considered that their contribution was theoretical and did not contribute to ameliorating the

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socioeconomic situation of the country. This result in reducing the final admitted projects to 312 carried out in multi-sectoral perspective, having a possible impact on socioeconomic dimensions<sup>†</sup>.

This showing considers that researchers, as well universities, are far away from engaging in a third mission that international universities undergo. That is to say, higher education institutes, as well as the ministry in charge, are still living in the *Ivory Tower* era. In this case, universities stay outside its surrounding and behave like a deaf and blind man. Its presence is therefore classified to be passive, even negative. In such a case, the innovative capacity of this organization is reduced to the level of negligence, while the role within the innovation system is much more limited or unfortunate.

The first seven questions of the questionnaire give us a general look at the distributional level of respondents around the country, their academic background, and occupation. However, they clearly draw up a preliminary image on the cooperative efforts done by lecturers-researchers team. For further insights, the questionnaire investigates whether respondents have coauthor in their scientific activities and how this partnership is distributed among fellows from different sectors. The following questions constitute a background to testify the level of cooperation between the university and the outside environment, namely the industrial sector.

Asking them to whether or not they have co-author(s) when preparing their papers (communication or article), all respondents selected the positive answer and argue they have co-authorship with other colleagues. Regardless of degree they hold,

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<sup>†</sup> Data are from the DGRSDT web link: <http://www.dgrsdt.dz/Fr/?fc=PSE>. Accessed on 01/12/2017

at 08:00 local time.

academics tend to involve other associates from the same milieu in performing their researches. Such behavior allows for the exchange and development of ideas among participating authors, as well the improvement of their scientific level. For authorship distribution, we gave them four possibilities as shown in table 4.

**Table 4: Academics Co-Authorship.**

|       | <i>Same Faculty of my University</i> |             | <i>Colleagues from other Faculties of my University</i> |             | <i>Colleagues from other National Universities</i> |             | <i>Colleagues from Foreign Universities</i> |             |
|-------|--------------------------------------|-------------|---------------------------------------------------------|-------------|----------------------------------------------------|-------------|---------------------------------------------|-------------|
|       | Frequency                            | Percent     | Frequency                                               | Percent     | Frequency                                          | Percent     | Frequency                                   | Percent     |
| No    | 20                                   | 22,5        | 85                                                      | <u>95,5</u> | 33                                                 | 37,1        | 73                                          | <u>82,0</u> |
| Yes   | 69                                   | <u>77,5</u> | 4                                                       | 4,5         | 56                                                 | <u>62,9</u> | 16                                          | 18,0        |
| Total | 89                                   | 100,0       | 89                                                      | 100,0       | 89                                                 | 100,0       | 89                                          | 100,0       |

Source : questionnaire outputs.

According to the outputs, most of the academics prefer to collaborate with colleagues from the same faculty they work. The instant availability and the geographical closeness of co-authors are the prime criteria of the cooperation selection process. Researchers from the same body knew each other well enough to engage in a similar work that improves their career; this is why 77.5% of the sample agree on this option. Neighbouring colleagues from other faculties of the home university are less preferred as an associate in scientific activities considering that 95.5% of the sample denies having such co-authorship. The proximity of the associate is further based on the scientific background rather than geographic criterion. The underlying meaning is that academic research in Algeria does not have a multidisciplinary aspect or interdisciplinary collaboration. Indeed, even among disciplines with an apparent link, such as economics and sociology; economics and psychology; physics and medicine, few are the articles that combine different approaches. That is to say, knowledge production of the Algerian universities is at lowest level due to the absence of multidisciplinary understanding of the research. We believe this is due to the lack of scientific background on the interdependence between various scientific disciplines

and result from the lack of prerequisite knowledge about the history of sciences, a material completely absents from the education curriculum. On the other hand, colleagues from other national universities appear as a second-best preference for co-authorship of academics; among 89 cases, 63% of them affirm having co-author(s) outside the home university. However, we believe according to the previous analysis that the co-author(s) are of the same disciplines. Finally, less than one fifth of the sample has scientific activities with associate outside the country. Those who said having foreign co-author(s) are either implied in cooperative research programs, under the supervision of the ministry, doctorate students benefited from scholarships or the co-authors being Algerians working abroad; further, co-authorship tend to be French-oriented preference due to various criteria. Thus, it is clear that there is an increasing fear to conduct research whenever the co-author is far away, especially from a different scientific discipline; further, academics tend to create a narrow network, as will be discussed later. The outputs suggest that professor affirm having co-authorship with colleagues of the same faculty; this is normal since most of them supervise assistant professors who are preparing their doctorate thesis; further, they (associate professors too) tend to participate in collaborative works with foreigner researchers in comparison to assistant professors who deny completely such association.

In addition, the tendency of academics to establish connections with fellows of different sectors in terms of scientific production has given unlike results of the previous one. The results show a feeble association between academics and participants from other sectors. For both, industrial and governmental sector, there is a quasi-absence of cooperation between them, with roughly 98% of the sample denies the existence of participation in the completion of researches; this outcome documents the similar findings of international reports. Out of 86 responses, 87 cases did not share their articles with members of the industrial sector, while 88 of the total

responses deny the preparation of scientific activities with parties from public administrations. However, despite the domination of the negative answers of 79.8%, 20% of the sample prepares articles with colleagues from different research institutes. These double outputs have two different comprehensions. First, we recognize the lack and weakness of cooperation between

**Table 5: Academics' Collaboration Outside Universities**

|       | <i>Industrial Sector</i> |                | <i>Governmental Sector<br/>(Excluding Universities)</i> |                | <i>Permanent Researchers<br/>from National Research<br/>Institutes</i> |                |
|-------|--------------------------|----------------|---------------------------------------------------------|----------------|------------------------------------------------------------------------|----------------|
|       | <i>Frequency</i>         | <i>Percent</i> | <i>Frequency</i>                                        | <i>Percent</i> | <i>Frequency</i>                                                       | <i>Percent</i> |
| No    | 87                       | <u>97,8</u>    | 88                                                      | <u>98,9</u>    | 71                                                                     | <u>79,8</u>    |
| Yes   | 2                        | 2,2            | 1                                                       | 1,1            | 18                                                                     | 20,2           |
| Total | 89                       | 100,0          | 89                                                      | 100,0          | 89                                                                     | 100,0          |

Source : questionnaire outputs.

universities and other research institutes in Algeria, which is the same conclusion reached by Benouar ([2013](#)) and Ghalamallah ([2006](#)) who raises the problem of interconnection between universities and other research institutions of the same ministry. Combining this result with the previous one about academic co-authorship, the questionnaire identifies a very limited activity of cooperation by academics who prefer collaborate with closer colleagues. The concept of proximity is delicate in this regards since academics refer, when using the term, to discipline belonging, while this belonging is more closely related to geographical proximity. Second, academics' understanding of the proximity is further conditioned by the nature of conducted activities. Indeed, among the three proposals, we noticed that academics have actual (relative) cooperation with researchers from national research institutes, in comparison to the industrial sector or other economic entities. We believe that the existing cooperation between academics and researchers focuses on researches of the same scientific discipline.

The picture that can be drawn from the data is the low level of cooperation between the university and the different actors within the environment in which it lives.

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Respondents' reaction to direct questions about university-industry linkage and university-government cooperation has been affirmative to the near-absence of such connectedness. This absence seems to be almost total with government units, with 94.4% of respondents believe there is no relationship between the university and the governmental entities in Algeria. For the existence of liaison between the university and the industrial sector, 85.4% of the sample believes in its presence.

### **4 - Conclusion:**

The National Innovation (Eco) System is a practical proxy that reflects the implementation degree of knowledge economy within a nation. However, it is in itself a replication of network's strength among various implicated actors, especially the university. Indeed, universities are more competitive in innovation due to the constant renewal of the human capital, which gives them the right to lead the innovation system. The degree of academics' mobility affects the extent to which universities contribute to the dynamics of the national system of innovation. Yet, Algerian universities, as the results shown, still live in the Ivory Tower paradigm, since academics tend to restrain their collaborative networks with local firms and other national economic units. As the study has demonstrated, most of the respondents did not have any relation with industrial sector; even, they reduce their collaboration with researchers from other research institutes and colleagues outside their home university. In addition, they prefer work at a thin network, relating colleagues from the same university with same study's background. Reasons for this abstinence vary to encompass poor communication among actors, lack of trust, in addition to the weakness of the institutional aspect, as well as the nature of the Algerian economy.

**References List:**

- Abbott, A. (2005) Linked ecologies: States and universities as environments for professions. *Sociological theory*, 23(3), 245-274.
- Amdaoud, M. (2017) The National Innovation System in Algeria: Between Institutional Inertia and Under-Learning. *Innovations*, 53(2), 69-104.
- Andersson, T. & Djeflat, A. (2013) The real issues of the Middle East and the Arab Spring *New York: Springer*.
- Aubert, J.-E. & Reiffers, J.-L. (2003) Knowledge economies in the Middle East and North Africa: Toward new development strategies. *World Bank Publications*.
- Benouar, D. (2013) Algerian Experience in Education, Research and Practice. *Procedia-Social and Behavioral Sciences*, 102, 361-367.
- Bok, D. C. & Bok, D. C. (2009) Beyond the ivory tower: Social responsibilities of the modern university. *Harvard University Press*.
- Carayannis, E. G., Barth, T. D. & Campbell, D. F. (2012) The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. *Journal of Innovation and Entrepreneurship*, 1(1), 1-12.
- Carayannis, E. G. & Campbell, D. F. (2009) 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management*, 46(3-4), 201-234.
- Carlsson, B. (2003) Innovation systems: a survey of the literature from a Schumpeterian perspective. *Paper for the Elgar Companion to Neo-Schumpeterian Economics*, June.
- Carlsson, B. (2006) Internationalization of innovation systems: A survey of the literature. *Research Policy*, 35(1), 56-67.
- Carlsson, B. & Stankiewicz, R. (1991) On the nature, function, and composition of technological systems. *Journal of evolutionary economics*, 1(2), 93-118.
- Cooke, P. (1992) Regional innovation systems: competitive regulation in the new Europe. *Geoforum*, 23(3), 365-382.

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- Cooke, P., Uranga, M. G. & Etxebarria, G. (1998) Regional systems of innovation: an evolutionary perspective. *Environment and planning A*, 30(9), 1563-1584.
- Davey, T., Hannon, P. & Penaluna, A. (2016) Entrepreneurship education and the role of universities in entrepreneurship: introduction to the special issue. *SAGE Publications Sage UK: London, England*.
- Djefflat, A. (2008) Universities and scientific research in the Maghreb states: power politics and innovation systems. *International Journal of Technology Management*, 45(1-2), 102-113.
- Djefflat, A. (2009) Universities' contribution to the national innovation system in the Maghreb states. *Technology Management*, 45(1-2).
- Etzkowitz, H. & Leydesdorff, L. (1998) The Endless Transition: a "Triple Helix" of University-Industry-Government Relations: Introduction. *Minerva*, 203-208.
- Etzkowitz, H. & Leydesdorff, L. (2000) The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university-industry-government relations. *Research Policy*, 29(2), 109-123.
- Freeman, C. (1995) The 'National System of Innovation' in historical perspective. *Cambridge Journal of economics*, 19(1), 5-24.
- Ghalamallah, M. (2006) Université, Savoir et Société en Algérie. *CREAD*.
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. & Trow, M. (1994) The new production of knowledge: The dynamics of science and research in contemporary societies. *Sage*.
- Lundvall, B.-A. (1992) National innovation system: towards a theory of innovation and interactive learning. *Pinter, London*.
- Lundvall, B. A. (1998) Why study national systems and national styles of innovation? *Technology Analysis & Strategic Management*, 10(4), 407-421.

- Malerba, F. (2005) Sectoral systems of innovation: a framework for linking innovation to the knowledge base, structure and dynamics of sectors. *Economics of Innovation and New Technology*, 14(1-2), 63-82.
- Mytelka, L. K. (2000) Local systems of innovation in a globalized world economy. *Industry and innovation*, 7(1), 15-32.
- Nelson, R. R. (1993) National innovation systems: a comparative analysis. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.
- Rantisi, N. M. (2002) The local innovation system as a source of 'variety': openness and adaptability in New York City's garment district. *Regional Studies*, 36(6), 587-602.
- Ricciardelli, A. (2017) The Role of Universities in the Europe 2020 Strategy. *Springer International Publishing: Springer, Cham*.
- Saad, M., Datta, S. & Razak, A. A. (2017) University-industry relationships in developing countries: Opportunities and challenges in Algeria, Indonesia, Malaysia, and India. *International Journal of Technology Management & Sustainable Development*, 16(2).
- Saad, M., Mahdi, S., Abdrazak, A. & Datta, S. (2010) Mapping The Diverse Roles Of Universities In Supporting Innovation: Opportunities and Challenges for Algeria, Indonesia, Malaysia, and India. *Universities in Regional Innovation and Social Development*.
- Saad, M. & Zawdie, G. (2011) Theory and practice of the triple helix system in developing countries : issues and challenges. *New York: Routledge*.
- Schwab, K. (2017) *The Fourth Industrial Revolution*. *Penguin Books, Limited*.
- Singh, A., Wong, P.-K. & Ho, Y.-P. (2015) The role of universities in the national innovation systems of China and the East Asian NIEs: An exploratory analysis of publications and patenting data. *Asian Journal of Technology Innovation*, 23(2), 140-156.

## Investigating the Role of Academics in the Algerian National Innovation System

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- Spencer, J. W. (2000) Knowledge flows in the global innovation system: do US firms share more scientific knowledge than their Japanese rivals? *Journal of International Business Studies*, 31(3), 521-530.
- Suurs, R. A. (2009) Motors of sustainable innovation: Towards a theory on the dynamics of technological innovation systems.
- Teixeira, A. A. C. (2014) Evolution, roots, and influence of the literature on National Systems of Innovation: a bibliometric account. *Cambridge Journal of Economics*, 38(1), 181-214.
- Wissema, J. G. (2009) Towards the third generation university : managing the university in transition. *Northampton, MA: Edward Elgar*.
- Ziman, J. (2000) Real science: What it Is and What it Means. *Cambridge University Press*.