Information and Communication Technology (ICT) in industrial valorization and/or Marketing

Exploitation in the Evaluation Programs of Local Products in the Maghreb Region
Opuntia Ficus Indica and Opuntia Ficus Carica.

Bouzidi Madjid
Patent and trademarks agent

Introduction

After decolonization, the countries of the Maghreb started their technology quest (1). They multiplied the strategies to grow as a country. The government elaborated ambitious policies to close the economic gap between them and the western countries.

During the nineties, they incorporated the information and communication technologies in their development strategy and invested in basic infrastructures and created institutions in order to integrate the "Knowledge Economy era" and take part in the globalization. These experiments were inconclusive.

The technology transfer failure can be attributed to both users and providers but the arrival of the ICT breathed new life into knowledge transfer (2).

The second period where the knowledge represented the source of growth, competitiveness and innovation also didn't lead to the creation of an innovative ecosystem that helps make progress.

For example, the evaluation process of local products in the three Maghreb countries such as the Opuntia Ficus Indica and the Opuntia Ficus Carica is the illustration of a moderated success. The absence of the ICT justifies partly this result.(3)

The ICT covers a large database for the execution of innovative projects. Patents' cartography (done by us) of the Opuntia Ficus Indica reveal a range of technologies that can receive application in the whole chain. (4)

An opportunity fortuitously appeared to use both the FAO and WIPO tools for purpose of development. In addition, the facilities that we need are already established. (5)

Finally, thanks to the ICT, we notice that the developing countries in general and the Maghreb countries overcame the "third world approach" of the 60s and 70s, they now on consider the possession of knowledge and technology is not reserved to the western world only. They aspire to create their own technologies; they are increasingly filing patent

applications and trademarks registrations all over the countries that are members of the PCT and Madrid Agreement. They are patent owners in multiple technology domains including the Opuntia Ficus Indica.

An agreement between Algeria and the FAO has been signed on January 17th 2019 via INRAA, one of the statements (1) indicates the following: «Launch of the strategy formulation for the prickly pear sector".

The statement also precise the goals and expectations such as : " Implementation of a guidance committee and a business plan to execute the activities in one hand and in the other hand elaborate a strategy to promote cactus culture, marketing research, value chain...etc

The following paper will try to show the pragmatic approach of the ICT working concerning the patents and the geographical indications (GI) can contribute to the development of one or several industrial and agricultural sectors. It is about using the ICT that can help access the patents and use them as a source of information.

Our statement will be illustrated through the industrial/marketing evaluation of two related products: the prickly pear and the Opuntia Ficus Carica, both present in multiple projects in Algeria, Tunisia and Morroco.

1-Industrial Strategies and the Quest for Development in the Maghreb Countries

Algeria committed to a vast program of industrialization and access of technologies in the 60s and 70s using a strategy called "industrialization of the industry" to achieve its economic goals and close the technological gap. In the 90s they decided to add the ICT to its new strategy.

Today, the countries of the Maghreb are still big importers of technologies and technical assistance.(2)

Their recent strategies are full of references to knowledge and new technologies of information to enhance their performance and competitiveness. These ICT are more oriented towards the diversification and innovation in the rural development and the agribusiness.

Production devices and knowledge acquiring centers are progressively added in the three countries (national programs of research, competitiveness centers..etc). The three countries are filing for patents applications mainly from universities and research centers.

Using this strategy, Algeria is projected to add a 10% value by 2030.

However, the institutions representatives are signalling the absence of innovation in the companies and are drawing attention to the gap between the scientific researches and the socioeconomic result.

2-Knowledge disclosure and renewal in the technology transfer

After decolonization, the Maghreb countries took advantage of the technology transfer to rebuild their budding industry. Algeria being wealthier than its neighbours made huge investments in ambitious industrialization programs. Few years later, results did not reach neither political nor economic expectations.

This failure was attributed to both sides, the providers blame the users that have poor skills to take advantage of the technology and the users blame the suppliers for disclosing the technical information.

At that time, in addition to the international transfer agreements the dissemination of technologies was performed via libraries, special journals, seminars and even scientific colloquium. The documentation services had the OBIP (Official Bulletin of Intellectual Property) that contains patent, trademark and industrial designs information The OBIP is the main way to share knowledge.

The organization and the processing of the information was so complex that the users could not take advantage of it and the technological capabilities stood the same.

The advent of the ICT gave a second breath to the transfer of technology, they give access to the large and free database of the WIPO that contains patents, trademarks, research services…etc

The Maghreb's universities use a good amount of those technologies for their scientific publications.

3- ICT and Marketing Innovation

Agrifood businesses of the Maghreb rapidly understood the Internet's impact on marketing and started using this platform as way to exchange with clients and promote their products. Large and medium-sized companies all have websites and use social media (Facebook, LinkedIn,..) and videos for promotion.

The ICT are of a great help to the Maghreb's companies that did not lose time in incorporating these free tools to their arsenal since they had a real aversion to the traditional media advertising due to its high cost considering it more a charge than an investment.

The three countries are increasingly filing Intellectual Property applications mainly trademarks and particularly in the processed food sector. Since filing can be done online, the applicants look up databases and can do an anterior research for themselves in their respective local offices or in the international offices websites such as WIPO (World Intellectual Property Office) . That database records and receives numerous trademarks registrations from the Maghreb covering a large number of countries members of the Madrid Agreement (System that grants trademark protection in multiple countries with filing in the local office only). Geographical Indications are also registered in it.

Geographical Indications: an instrument of rural development, quality control and recognition by the origin.

Labelling programs of local products in the Maghreb countries all aim to develop the agricultural and rural world; they succeeded in setting certain branches and intend to have more success in the international trade using this system. These programs are driven by the UNIDO (United Nations Industrial Development Organization) in Tunisia and Morocco and by a consortium of EU (European Union) experts in Algeria (3). Amongst the products registered in the projects we have:

- Opuntia Ficus Indica of Ait Baamrane (Morocco)
- Opuntia Ficus Indica of Kasserine (Tunisia)
- Opuntia Ficus Carica of Beni Maouche (Algeria)
- Fig of Djebba (Tunisia)

Algeria followed close on its neighbours heels and registered the evaluation of a related product: Opuntia Ficus Indica

Geographical Indications: a competitiveness tool in the national and international market

In the three countries, using distinctive signs of quality is a way to challenge or integrate a globalized economy which caused markets' loss and competitiveness in certain products to countries like France, Spain or Italy that were traditionally in a good position.

To do so, they use an identification and quality recognition by the origin system as a focal point to their strategy of differentiation and market penetration. Thanks to the geographical indications, they aspire to enter the food international market of the EU, USA or Asia.

ICT contribution in the strategic choice of quality signalling

The ICT will open the door to understand the current technologies which helps build the innovative ones that will lead to marketing innovations as well as social advancements and grow as a country.

The ICT represent an opportunity for the Maghreb countries to materialize their desire to take part in the globalization and realize their diversification strategy and contribute to the international markets like America or Asia.

Knowing no borders, the ICT allows to breeze past the “geographical and cultural barriers” of the traditional markets that countries like Algeria, Tunisia or Morocco confined themselves to.

The ICT help examine new markets, notice consumers’ tendencies, typology, regulation and quality control systems. Thereupon, the Anglo-Saxon model stands itself from the European model and should not be discounted for any reason.

Both of these models should be examined closely to understand the economic and commercial implications and their institutional and strategic stakes concerning the system of regulation and quality control by origin. One of them is based on the official quality mark (geographical indication in the EU model) and the other is based on the traditional trademark (in the Anglo-Saxon model). These two models cause an asymmetry of information which in turn distort competitiveness and prevent the Geographical Indication of the Maghreb to fulfil its function properly.

Geographical Indications were born in unusual circumstances and evolved tremendously in decades, a recent study conducted on the sectors that rely heavily on the Intellectual Property laws and economic results in the EU showed that the trademark are in 1st place in the rankings and the GI is 3rd .(4)

Algeria: GI, a counterproductive signalling system

The promotion and marketing plans of Opuntia Ficus Carica were done via labelling and it ended up being counterproductive in Algeria. It led to a significant increase in prices of the labelled products; the farmers justified it by the high cost of production. The label did not give the desired effect on the consumers and we are far from export orders.

4- Patent landscaping of Opuntia Ficus Indica and the technology scope

The upgrading of the Opuntia Ficus Indica sector in Algeria is one of the strategic goals to battle food insecurity, malnutrition and prosper the agricultural activity. The marketing and technological innovations can form an answer to these major issues. For this purpose, the ICT and precisely the patents databases constitute a key element for innovation, 70% of the people working in innovation fields use patents’ knowledge in their works (5).

Our simplified patent landscaping allowed us to discover a considerable state of art concerning this sector, a large number of patents cover the questions related to food safety, nutrition and health in general.

Key patents that can potentially be used in the Opuntia sector in the Maghreb have been identified which can reignite the fire of innovation. This landscaping can affect research institutions as well as politicians in their decision making. It goes without saying that the prior study concerning the freedom of using these technologies should not be neglected.

4-1 Food Safety and Nutrition

The Maghreb countries suffer from an increasing and chronic food dependency, Algeria is a large net importer of food, near 90% of its needs are covered by importation.

The industrial upgrading of the Opuntia Ficus is an efficient way to help fight food insecurity. Near the regions where the farming is intense and a bit more valued, there are large production areas that cover entire regions like Kabylia where the current state of farming does not benefit society. The upgrading will contribute to the rural development of the region that already has a strong appeal for emigration; job creation and living conditions improvements will help the community to settle down in their lands.

ICT are a precious source to create and develop the Opuntia Ficus Indica sector during the whole process from the first actor of the chain to the sales including the conversion phase.

Technologies related to Opuntia Ficus Indica offer multiple products and techniques from the harvesting to the processing of the product, they can bring a certain competitive edge in the sector. It should be recalled that the high cost of the Opuntia Ficus Carica from the BeniMaouche region is due to the high production cost (6). The Opuntia Ficus Indica is exposed to the same risk because of the strategy of non-price competitiveness that requires the consideration of production factors; the geographical indication is the icing of the cake only.

Awaiting the experts' opinions, the technologies are applicable to the Opuntia Ficus Carica in a few phases of the production and transformation. This duplication confers a double advantage, technological and economic.

Furthermore, thanks to these technologies the agrifood industry can renew what they offer by innovations and fix the obsolescence of the products that are hammered by the competitiveness of foreign products or local licensed products. In Algeria the sweets, chocolate and confectionary products for example are dominated by the Tunisian, Turkish and Western brands.

Here's an example of using ICT in innovation, a Tunisian company created a new product which was an Opuntia Ficus Indica juice sold under the name of NOPAL (7). Notwithstanding the commercial results, this innovation is a demonstration of the interest shown to these technologies by companies.

The innovations resulting from Opuntia Ficus Indica's upgrading can fix two issues: food security and nutrition and also market needs concerning competitiveness.

Concerning the nutritional aspect, recent studies showed (8) the prevalence of non-communicable diseases related to diet, they emphase by saying: "The nutrition transition relates to undernourishment, not to the lack of food but to the lack of high quality food, it means that the food that is rich in vitamins, minerals, micro-nutrients is substituted by processed food containing big quantities of refined sugar, fat and sodium"

In Algeria, the National Plan of Public Health-Care identified priorities such as the "food and nutrition" and aims to promote sane and safe food by inversing the tendency of obesity with kids and teenagers and so by reducing micro-nutrients deficiency (9).

The products derived from the Opuntia Ficus Indica are a beneficial source of nutrients, using them in the agrifood industry can significantly help fight this plague. Thanks to the ICT we know that scientific research is heavily invested in that subject, the Maghreb countries are not overlooking it and are giving it enough academic research.

Patent landscaping shows a few technology transfers to the industrial research that were applied to Opuntia Ficus Indica and resulted in patenting.

The landscaping elaborated on the national and international databases is impressive; it reveals a wide range of patented technologies that cover the food processing in general such as preparation, processing, nutritive qualities modifications..etc
Multiple groups of technology talk about:

- Composition of Opuntia Ficus Indica concentrate.
- Preparation of bakery's products that can diminish body mass, cholesterol, glucose and lipids
- Dietetic compositions based on vegetal fibres
- Supplements containing a mixture of antioxidants and energy boosters.

4-2 Health

The aforementioned study (10) underlines the damages provoked by bad eating habits concerning the people living in the MENA (Middle East and North Africa) region: cardiovascular diseases, diabetes and cancer.

In Algeria, the "national plan for cancer 2015/2019" (11) puts this disease as a national priority, a survey conducted on the risk factors of non-communicable diseases showed that two thirds (2/3) of women and half men are subject to diabetes. Obesity rate surpasses 50% for the people aged 18 to 69, arterial hypertension reached a level of prevalence exceeding 35% (12).

The products deriving from that plant represent pharmaceutical benefits confirmed by the academic and applied research; industrial usage of the patented technologies described on the databases can lead to remarkable innovations that contribute to inverse the prevalence of NCDs (Non-Communicable Diseases) signalled in the epidemiological reports.

Patent landscaping of the Opuntia Ficus Indica covers all the therapeutic classes, let's name few examples related to these technologies:

- Mixtures containing a fermented product derived from the Opuntia Ficus Indica, they are destined to prevent and deal with obesity and its complications.
- Slimness drink that can help losing weight and fits people suffering from obesity, diabetes and arterial hypertension
- A composition containing an extract from the Opuntia Ficus Indica roots, it is destined to the prevention of diabetes or diabetes related complications.
- Finally, a Korean invention about a process of production of a chocolate cake using Opuntia Ficus Indica that has multiple therapeutic aims, according to the abstract of the invention it can be efficient for: ant-inflammatory treatment, amelioration of blood flow, rheumatism, burn, coughing, fever, asthma, age related diseases..etc

4-3 Environmental Questions

The Maghreb region is characterized by large dry areas that are not suitable for agriculture development.

The study (13) underlined the difficulties that the sustainable development agenda faces by 2030, aiming to erase hunger, assure food security, improve nutrition and promote sustainable agriculture in the MENA region. The impact of climate change is accentuated by the shortage of water, the Opuntia Ficus Indica cultivation participates in the challenge. Notwithstanding the social and organisational innovations that the government should look at, the ICT offers a panorama of patents that interest multiple technological sectors amongst the innovative agricultural biotechnologies that represent an opportunity that can contribute to the development of sustainable agricultural production in arid zones. (14)

Agricultural technology transfer is an opportunity to showcase cultivation activity in such challenging areas.

4-Potential Technology Users

Industrial Sectors

Patent databases in this technological sector reveal a state of art both rich and diversified at the same time which is a potential answer to the pharmaceutical and to the agrifood production needs. Large companies that have R&D (Research and Development) divisions, SMEs (Small and Medium-sized Enterprises) that have structures playing the role of research

laboratories can develop technological capabilities using patents. The economic and social impact of using ICT is certain in all the chain.

Opuntia Ficus Indica cultivation is done in a traditional way that does not benefit the society currently. This sector can be built thanks to the ICT in general and particularly the patents knowledge from the upstream farming to the commercialization including the design phase of new products.

The traditional production methods used currently must be replaced by modern powerful equipment that can be used by the local communities, these technologies are recognizable.

The Political Decision-Makers

Patent landscaping interests first the political decision-makers and major economic administrations of for example health, industry, and agriculture ministries. It represents a precious source of information to nourish the debates in the orientation of their strategies. It responds to the problems related to public health-care, food security and environmental questions.

Academic and Industrial Research

The number of scientific publications and patent filing applications is increasing in the Maghreb region. Patents landscaping can serve as an indicator to develop a plan of oriented research for socioeconomic concerns.

Joint Execution of WIPO and FAO Development Instruments via the INRAA agreement

The execution of the common development instruments of the FAO and WIPO through Opuntia Ficus Indica that is registered in the development projects in the three countries can answer the national concerns related to health, nutrition and environment.

The patents panorama of Opuntia Ficus Indica provides a wide range of technologies going from the simplest to the most sophisticated , a lot of them corresponds to the local capabilities, knowing that it’s an advanced technology the exploitation can be considered in a partnership framework.

The agreement signed between Algeria and the FAO via the INRAA is an opportunity to showcase the development instruments through the facilities set in the universities of the Maghreb, in this situation the TISCs (Technology and Information Support Center) in the science of nature branch. This initiative will result in using different programs of scientific publications planned in favour of development and innovation: HINARI (OMS), AGORA (FAO), OARE (PNUE), ARDI (OMPI), programs devoted respectively to the domains of health, agriculture, environment and access to research of development and innovation.

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(1) https://www.inraa.dz,National Institute of Agricultural Research in Algeria (INRAA)
(2) www.agroligne.com, French export of IAA equipment: very high towards North Africa: Algeria (+16,1%) and Morocco (+44.2%).2011, http://www.drome.cci.fr, French exports of machines for the agrifood industry in Algeria in 2013 represented 34 M€ with an increase of +26 %.)
(3) (www.https://pampat.ma/fr/) Tunisia (www.pampat.tn) and combining with Algeria (http://www.adecia.org/cloture-jumelage-europeen-igao-profit-ministere-de-lagriculture-algerien/)
(4)www.epo.org/service-support/publications_fr
(5) (http://www.epo.org/servicesupport/publications_fr.html#tab1Patent Information News 2/2017, the role of (patent) information in the innovation process)
(6) https://www.youtube.com/watch?v=_fBdBTm_MtA
(7) http://nopalnutra-nopal.com/site2016/fruits-de-nopal-nopal-nutra/
(8) (FAO, regional preview of food insecurity in North Africa, 2016)
(9) (The current national strategic plan to fight against the risk factors of non-communicable diseases (NCD) 2014-2018)
(10) (FAO, regional preview of food insecurity in North Africa, 2016)
(11) http://www.sante.gov.dz/
(12) https://www.elwatan.com, National survey with the support of the (WHO)on the non-communicable diseases, launched in 2016
(13) FAO, regional preview of food insecurity in North Africa, 2016
