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JORDAN'S ACCESSION TO THE PATENT COOPERATION TREATY (PCT)

IMPACT ASSESSMENT

AUGUST 2016

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Jordan Accession to the Patent Cooperation Treaty (PCT)

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Interview list with IP Community

Institution	Name	Expertise
The Jordanian Association of Pharmaceutical Manufacturers (JAPM)	Hanan Sboul	Pharmaceuticals
Oasis 500	LaithShukriv&LumaFawaz	Venture Fund for Information and Communications Technology (ICT)
iPark	Mohammed Aljafari	Commercialization of IP
Saba IP	GhaidaAla'Eddin	IP Agent
Intellectual Property Matters Co. Ltd	Maha A. Majeed	IP Agent
SMAS – IP	JehadAl Kharouf	IP Agent
University of Jordan	DrMohammad H.Kailani	Chemical IP
University of Jordan	Prof.Ameen Khraisat	Dental IP
National Centre for Agricultural Research and Extension (NCARE)	DrMuienQaryouti, Eng. Emad Kar'an& Eng. Ammar Hattar	Agriculture IP
Registration of new plant varieties / Ministry of Agriculture	Eng Rima Mouhed&EngNourHabahbeh	Agriculture IP
Eskadenia	Doha Abdelkhaleq	Information Technology

Abbreviations

CRO	Contract Research Organizations
FTA	Free Trade Agreement
GCI	Global Competitiveness Index
GCR	Global Competitiveness Report
HCST	Higher Council for Science and Technology
IP	Intellectual Property
IPPD	Industrial Property Protection Directorate
ISC	International System of Cooperation
JAPM	The Jordanian Association of Pharmaceutical Manufacturers
JIS	Jordan Innovation Strategy
JV 2025	Jordan Vision 2025
MIT	Massachusetts Institute of Technology
MoH	Ministry of Health
NCARE	National Centre for Agricultural Research and Extension
PCT	Patent Cooperation Treaty
PRO	Patent Registration Office
PVP	Plant Variety Protection
R&D	Research and Development
SRS	Scientific Research Support fund
UPOV	Union for the Protection of New Varieties of Plants

1 EXECUTIVE SUMMARY

The Patent Cooperation Treaty (PCT) is an international agreement that is administered by WIPO to facilitate the acquisition of patent rights in 151 member states while streamlining the process for patent applications. The decision to grant patent protection remains exclusively under the authority of the national office or the regional office acting for that State. **Thus the PCT is not a patent granting system, but a patent filing system.**

Jordan is an important destination country for patent protection. Patents granted in Jordan are mostly concentrated in the pharmaceutical industry, organic chemistry, civil engineering, chemical engineering, and biotechnology. Moreover, top patent applications and patents granted in Jordan are of Jordanian origin.

Jordan is an active member in global innovation; a total of 148 national phase applications were filed by Jordanian nationals in 29 PCT member states using the PCT route. Most of patent published by Jordanian nationals abroad are concentrated in pharmaceutical industry, organic fine chemistry, analysis of biological material, transport, and biotechnology. If Jordan was a PCT member state, some of these applications might have been processed through the Jordan Patent Registration Office (PRO).

Most of the individuals/institutions that were interviewed during the course of this study were in favor of PCT accession, a few were neutral, and only the pharmaceutical sector had objections towards Jordan's PCT accession. As such, the objections raised by the pharmaceutical sector guided the study to help validate their concern and provide the necessary arguments to whether Jordan should, or should not accede to the PCT agreement.

The pharmaceutical sector represented by JAPM presented two arguments:

1. The PCT will increase patent applications in Jordan, thus the number of granted patents will automatically increase in proportion. This will eventually harm the pharmaceutical industry and prevent the development of new generics by the domestic industry;

2. Assuming that the above statement is correct, the weakening of domestic production of generics will decrease domestic competition, and will force the Ministry of Health (MoH) to purchase originator drugs at higher prices, thus increase the health bill of the Government.

Moreover, when discussing PCT accession, JAPM also discussed data exclusivity, though data exclusivity is irrelevant to any discussion related to PCT accession as elaborated in the report (section 4.2, p.15).

IP agents presented a counter argument to that proposed by pharmaceutical sector; they explained that Jordan's PCT accession might increase the overall number of applications that express interest in registering their patents in Jordan. However, based on the results of the international search reports, IP agents believe that most PCT applications for Jordan will be dropped, resulting in a reduced number of PCT national filing in Jordan. Hence the reduction in national filing will reduce government revenue resulting from patent registrations in the country.

To this end, this report analyzed current Arab PCT member states to assess whether a similar scenario of increased PCT applications and patent registration has occurred in these countries. The report focused mainly on two Arab countries: Algeria and Saudi Arabia. Algeria, since the Jordanian pharmaceutical industry has investments in this country. Saudi Arabia, since it was recommended by JAPM as a case study.

The analysis of Arab PCT member states demonstrated that **being a PCT member state does not necessarily mean that patent applications will inundate the national patent office**; **this is an inaccurate perception.** The only countries that witnessed immediate national phase entry of PCT applications post accession were: Egypt, Algeria and Qatar. Morocco that acceded to the PCT in October 1999, did not receive any national phase filing until 2004 (5 gap years). The United Arab Emirates received national phase filing after 10 years, Tunisia after 10 years, Bahrain after 4 years, and Sudan only received national phase PCT applications after 30 years. **Oman, Libya, Syria and Saudi Arabia did not receive any PCT national phase entries until 2014.**

Moreover, the trend for national phase PCT applications is not on a continuous upward cycle, but fluctuates between the years. Tunisia for example had a drop in PCT national phase applications immediately after 2011, whereas Algeria and Morocco's applications peaked in 2008 but dropped in 2014.

The case of Algeria demonstrates that despite being a PCT member, the majority of patents published through the receiving office in Algeria were processed through the direct route rather than the PCT route. For example, total patents published in the pharmaceutical industry in Algeria were undertaken using the direct route (total of 341 publications) as opposed to the PCT route (10 publications) during 2000-2014. Moreover, the data shows that the Jordanian Pharmaceutical Industry has managed to grow its pharmaceutical business in Algeria though Algeria has been a PCT Member State since March 2000.

The analysis on PCT applications in Saudi Arabia post accession demonstrated that Saudi Arabia did not receive any PCT applications post accession from 3 August 2013– December 2014. However in 2015, Saudi Arabia received 22 PCT applications, while in 2016 they received only 4 applications to date. Despite the weak trend in PCT patent applications, Saudi Arabia has a very active patent portfolio; between the years 1997-1999 Saudi Arabia received the highest number of direct patent applications that peaked in 1998 with 1,331 applications. In 2006, Saudi Arabia granted the highest number of patents using the direct route which reached 1,044 patents.

Conclusion and recommendations of the study:

Our conclusion is that patent applications submitted using the PCT route will not necessarily result in an immediate hike in national phase entries, nor will they encourage or discourage corporations or inventors from registering a patent. The decision guiding patent registration is governed by deliberate business decisions: such as market location, market size, presence or absence of competitors. As well as legal issues such as: the status of patent application in target countries, the level of patent protection (both law and enforcement in foreign countries) and novelty requirements as set under national laws. Accordingly we were unable to provide sufficient proof to support JAPM's argument.

Accession to the PCT agreement will not cancel the direct application route offered under the Paris Convention. As illustrated in the case studies for Algeria and Saudi Arabia, most of the patents were processed through the direct route rather than the PCT route due to the fact that patent registration as discussed above, is governed by a business decision, hence in some cases, the direct route might be more cost-effective than the PCT route if the applicant is seeking to protect the invention in three countries or less (see5.1.2, p. 29). This fact further nullifies the argument presented by IP agents; PCT accession will not result in an increase or reduction in patent registration revenue for the government.

Moreover our findings show that accession to the PCT will not have a negative or positive impact on Jordan's economy. The PCT accession will have a neutral impact on the Jordanian industry and Jordan's innovation environment. However, to leverage and enhance the existing innovation environment and to maximize the benefit from PCT accession, we recommend the following:

1. The innovation environment in Jordan is in need of support. This support should start with building awareness on innovation as well as developing a collaborative platform between industry and academia to jump-start innovation and create new spin-off start-ups that can contribute to the economic growth of the Kingdom. An example of this productive collaboration is the spin-offs created by the Massachusetts Institute of Technology (MIT) whereby the Bank of Boston in 1989 estimated MIT spin-offs to contribute to $10 billion annually and 300,000 jobs to the Massachusetts economy. A similar example is the Stanford University which fueled the growth of many companies in California's Silicon Valley[1].
2. Jordan should develop the capacity needed to enhance IP awareness and IP technical expertise in information technology.
3. Research funding mechanisms should be directed towards creating economic value rather than provide support solely for academic research. For example, the Moroccan Foundation

[1]"Policies and Structures for Spinning Off New Companies from Research and Development Organizations" available online: http://dspace.mit.edu/bitstream/handle/1721.1/2569/SWP-3804-32616509.pdf

for Advanced Science, Innovation and Research (mascir.com) provides innovation solutions to market needs in the wide fields of environment, energy & health.

4. IP enforcement should be enhanced in the judicial system.
5. New financing instruments to include direct government grants should be considered to support innovation and joint Research & Development (R&D) between academia and private sector enterprises. For example, the JV 2025 includes a provision for exempting R&D expenses from taxable income (see table 3, p. 32).
6. Jordan innovation strategy (JIS) will end in 2017. It is recommended that a new strategy is developed to support innovation in Jordan focusing on priority innovative industries that have already been identified in this report (pharmaceutical industry, organic fine chemistry, analysis of biological material, transport, and biotechnology), new and emerging technologies such as solar & photovoltaic, stem cell, ICT, nanotechnology , agriculture technologies, robotics, as well as innovation that acts as a problem-solving platform to the domestic industry. It is recommended that the strategy is developed by a senior committee that is headed by the HCST with partners from Academia, inventors, private sector companies, venture capital investors as well as IP related organizations such as the IPPD, NCARE and entrepreneurship support institutions such as iPark and Oasis.
7. Lastly, undertaking the above reforms will enhance Jordan's performance in the Global Competitiveness Index (GCI)[2] in the innovation pillar. In 2015/2016 Jordan's GCI remained somehow stagnant compared to the year before and scored 4.2 out of 7, and ranked number 64 out of 140 economies. Indicators in the innovation improved faintly (3.67 to 3.7) some innovation indicators performed better than others as shown below:
    - University - industry collaboration in R&D indicators ⇩
    - Government procurement of advanced technology products ⇩
    - Availability of scientists and engineers ⇩
    - Company spending on R&D ⇩
    - Capacity for innovation ⇧

[2] http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#indexId=GCI&economy=JOR

- Quality of Scientific Research institutions 
- PCT Patent Applications (applications/million population) 

2 INTRODUCTION

The World Intellectual Property Organization (WIPO) describes a patentas a document issued by a government office (or a regional office acting for several countries)that describes an invention and creates a legal situation in which the patented invention can be exploited (manufactured, used, sold, imported) with the authorization of the owner of the patent for a limited time (generally 20 years)[3]. The effects of the grant of a patent are that **the patented inventionmay not be exploited in the country by persons other than the owner of the patent unless the owner agrees to such exploitation.** Thus, while the owner is given a statutory right to practice his invention, **he is given a statutory right to prevent others from commercially exploiting his invention,** which is frequently referred to as a right to exclude others from making, using or selling the invention.

Disclosure is a prerequisite for patent granting that allows others to gain the benefit of the invention; thereby advance innovation through knowledge sharing. For the invention to become patentable, it should meet several criteria, most significantly that the invention must consist of patentable subject matter, the invention must be industrially applicable (useful), it must be new (novel), it must exhibit sufficient "inventive step" (be non-obvious), and the disclosure of the invention in the patent application must meet certain technical standards[4].

2.1 The Patent Cooperation Treaty (PCT):

The PCT is an international agreement administered by WIPO that aims to facilitate the acquisition of patent rights in a large number of countries (151contracting States)[5]. This international agreement streamlines the process of securing patents for an invention in multiple countries. **However, the decision of whether to grant patent rights remains under the jurisdiction of national and regional patent offices.** Thus the decision to grant protection for

[3]Patents registered in Jordan are protected for a period of 20 years beginning from the date of filing the application for registration (Article 17 of the Jordan Patent Law No (32) Year 1999)
[4]http://www.wipo.int/about-ip/en/iprm/
[5] During the course of writing this report, two new countries joined the PCT; Kuwait and Djibouti thus the total number of contracting states has now reached 150 members. See http://www.wipo.int/pct/en/pct_contracting_states.html

the invention is the task of the national office or the regional office acting for that State (the "designated Office") as hereby explained by WIPO[6]:

> ***What is the effect of the PCT on the substantive conditions of patentability applied in the national phase?*** *The PCT leaves each Contracting State free to determine substantive conditions of patentability. This is particularly true for what constitutes "prior art." However, since the requirements of prior art as defined in the PCT and its regulations for the purposes of the international phase are generally as strict as, or stricter than, those defined in any national law, the chances of unpleasant surprises by way of previously uncited prior art references being raised during the national phase are substantially reduced. On the other hand, the PCT does not prevent any national law from requiring the applicant to furnish, in the national phase, evidence in respect of any substantive condition of patentability in that law.*
>
> *WIPO (2016) PCT Application Guide, p. 15*

While the PCT does not alter the substantive requirements of patentability in each country, it eliminates duplications in filing separate patent applications for the same invention in several countries. As such, an inventor who wishes to use the PCT route first files an application in his or her home patent office. The home office conducts an initial prior art search and gives the applicant the opportunity to request an international preliminary examination. This preliminary examination, while not binding, indicates the patentability of the invention which may assist the applicant in deciding whether to commit to an expensive filing in multiple national offices. Once the patentability of the invention is verified, the applicant can then proceed to the national phase, where an applicant has 30 months from the priority date to convert the PCT application into parallel patent applications in the countries in which he or she desires patent protection. From there, the patent application is processed according to the procedures established by each designated country.

Accordingly, the PCT provides the inventor with the flexibility to defer most foreign filing costs for up to 30 months after the priority data; instead of 12 months as provided under the Paris Convention (direct route) i.e. the PCT gives additional 18 months to the applicant to decide on the countries in which he can seekfurther patent protection. The(30) months or (31 months in some countries) gives the applicant sufficient time to refine his/her invention and research the patentability of his/her invention in designated PCT member states. If the inventions or the

[6] http://www.wipo.int/pct/guide/en/gdvol2/pdf/gdvol2.pdf

international search reports return negative results, the application can be abandoned without incurring additional costs of paying multiple foreign filing fees for an un-patentable invention.

Based on the above, the PCT is divided into two main phases: International phase, and National or Regional phase.

2.1.1 International Phase[7]:

The international phase consists of five steps; the first three are part of the standard processing procedure, while the last two are optional.

Step 1: Filing of the international application using a PCT filing office;

Step 2: Establishment of the international search report and the non-binding written opinion by one of the "International Searching Authority (ISA)";

Step 3: The publication of the international application on PATENTSCOPE together with the international search report by the International Bureau of WIPO after the expiration of the 18[8] months from priority date; which represents the international disclosure of the invention in the public domain(Chapter I of the PCT);

Step 4 (optional): Establishment of a supplementary international search report (SIS) which may be carried out by one or more ISAs; other than the ISA which has performed the main international search. The SIS may enhance the search and reveal new patent documents and other technical literature on new patent documents, thus gives the applicant an opportunity to further refine his invention(Chapter II of the PCT);

Step 5 (optional): A non-binding international preliminary examination on patentability is communicated to the assigned national and/or regional office for processing

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[7] http://www.wipo.int/pct/guide/en/gdvol1/pdf/gdvol1.pdf

[8] Under the Jordanian Patent Law No (32), year 1999, patent applications are not published in the Official Gazette until a patent is officially granted to the applicant (Article 13) and for an unlimited period of time from patent application. This limits that ability of other inventors to conduct prior art search to benefit from existing inventions. Whereas in PCT applications disclosure occurs after the expiry of 18 months during which the invention and the preliminary search report is made available in the public domain using PATENTSCOPE.

the national phase of patent registration; during this stage the applicant has the possibility to make further amendments to all, or parts of the application prior to examination by the selected national receiving offices(Chapter II of the PCT).

2.1.2 National/Regional Phase[9]:

Prior to the expiry of 30 months of the PCT application, the applicant can proceed by processing his application in the designated countries. The processing, in many cases, requires hiring a national IP agent, filing a national application, paying national patent application fees and translation costs when needed. Each PCT member state or regional office has a national chapter which identifies the procedures needed for processing patent applications in the selected country/region.Moreover the receiving office can request additional evidence in respect of the substantive conditions of patentability as identified under national laws.

2.2 PCT ADVANTAGES:

The advantages of PCT application process can be summarized in the following points:

1. The PCT application process removes duplication associated with filing multiple patent applications in different PCT member states.
2. The PCT provides the applicant with the opportunity to request an international preliminary examination report which indicates the patentability of the invention prior to committing to an expensive filing process in multiple national offices. Thus the PCT route gives the applicant time to refine his invention prior to incurring additional costs.
3. The PCT provides the applicant with 30 months (as opposed to 12 months under Paris Convention) from the priority date to convert the PCT application into parallel patent applications in countries in which he/she is seeking patent protection.

[9] http://www.wipo.int/pct/guide/en/gdvol2/pdf/gdvol2.pdf

4. The PCT provides the applicant with the opportunity to request a supplementary search report (SIS) which enhances the search for new patent documents which gives the applicant an opportunity to further refine his invention before incurring additional costs.
5. If the invention is not patentable at the end of the international search, the applicantcan abandon his applicationwithout incurring additional costs forfiling multiple applications in foreign countries, appointing local patent agents in each foreign country, and preparing translations and paying the national fees in each designated countries.
6. Under the PCT route, the invention is published using the PATENTSCOPE after the expiration of 18 months from the earliest filing date, whereas under the current Jordan Patent Regulation No (32) year 1999, the patent application is not published until the initial approval to the patent is issued, and this could take more than two years.
7. Moreover, the publication of a patent using the PATENTSCOPE puts the invention in the global patent landscape. The inventor can choose to highlight his/her interest in concluding licensing agreements which can be an effective mean of globally advertising and identifying potential licensees for the invention.
8. The PCT gives the IPPD Directorate the opportunity to speed-up patent search using the International Search Authority (ISA), thus enhance patent processing efficiency at the IPPD.
9. The PCT does not eliminate the option of patent filing using the Paris Convention (direct route). Inventors who are only seeking to protect a patent in one or two countries can continue to do so using the direct route.
10. Moreover PCT applications can be filed electronically using the ePCT system.

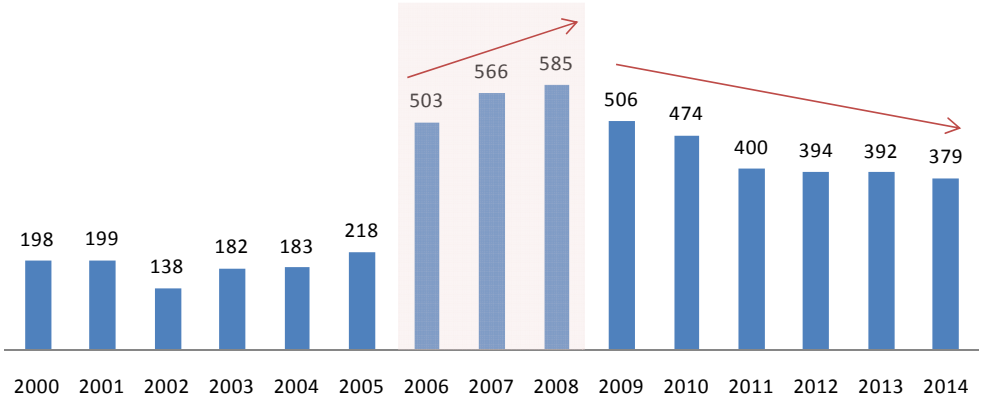
3 PATENTING TRENDS IN JORDAN

This section of the report will analyze patent applications and patents granted through the JordanPatent Registration Office (PRO), as well as analyze PCT applications submitted by Jordanian nationals abroad as well as present concluding remarks on patenting trends in Jordan.

3.1 Patent applications in Jordan (2000-2014)

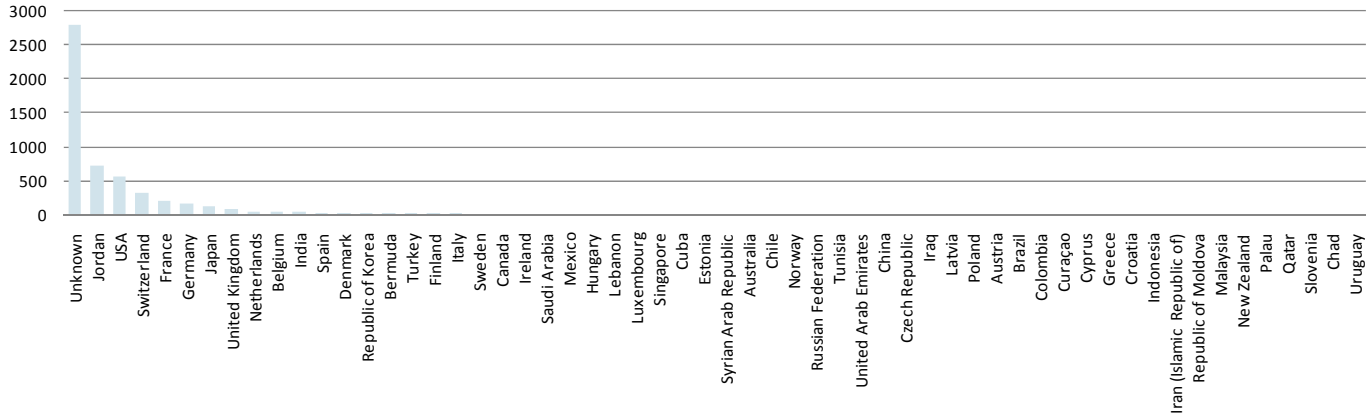
Total patents applications submitted to the PRO in Jordan for the period 2000-2014 reached 5,317 applications. As shown in figure (1), patent applications in 2006 have more than doubled compared to the previous year reaching a total of 503 applications as opposed to 218 applications. This upward cycle in patent applications continued from 2006 to 2008; while in 2009 applications for patents started to decline to reach 379 patents by 2014 (see figure 1).

Figure 1- Jordan Direct Patent Applications (2000-2014)
Source: WIPO



The top patent applications were submitted by nationals from Jordan, USA, Switzerland, France, Germany, Japan and the United Kingdom (see figure 2)

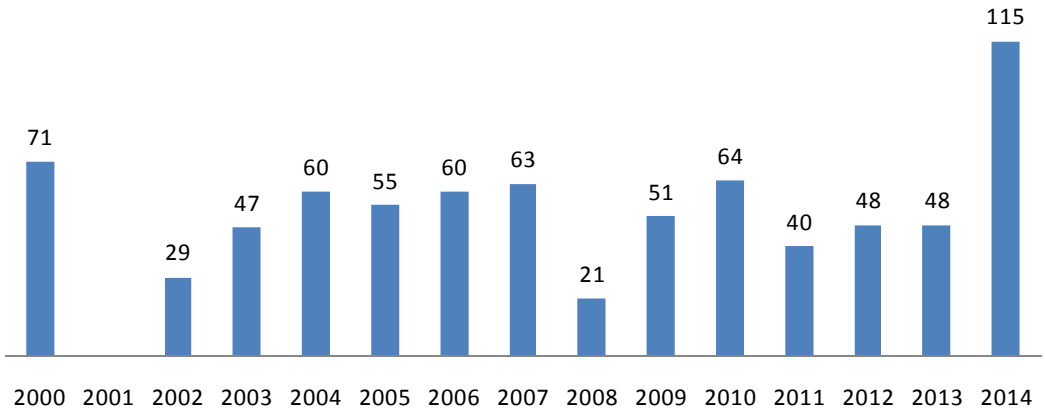
Figure 2- Jordan Direct Patent Applications; by Origin (2000-2014)
Source: WIPO



3.2 Patent Grants in Jordan (2000-2014)

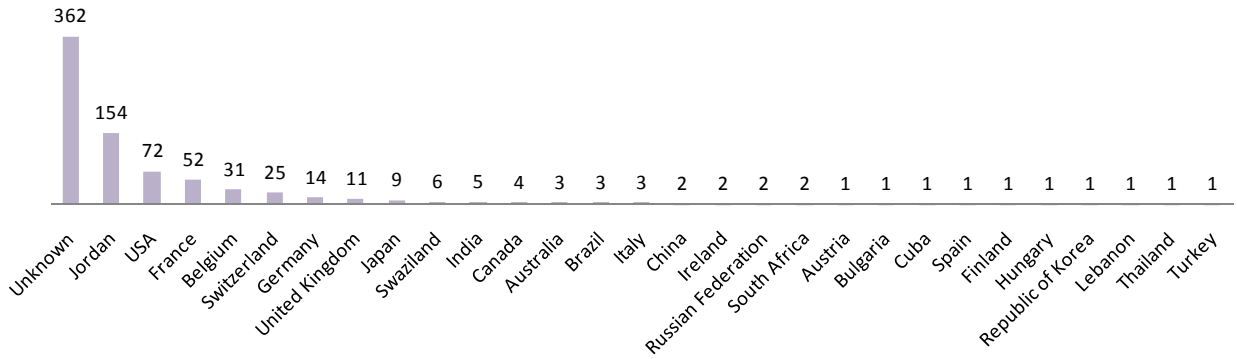
Total patents granted by the PRO in Jordan reached a total of 772 patents for the period 2000-2014 (figure 3).

Figure 3- Patent Grants in Jordan (2000-2014)
Source: WIPO



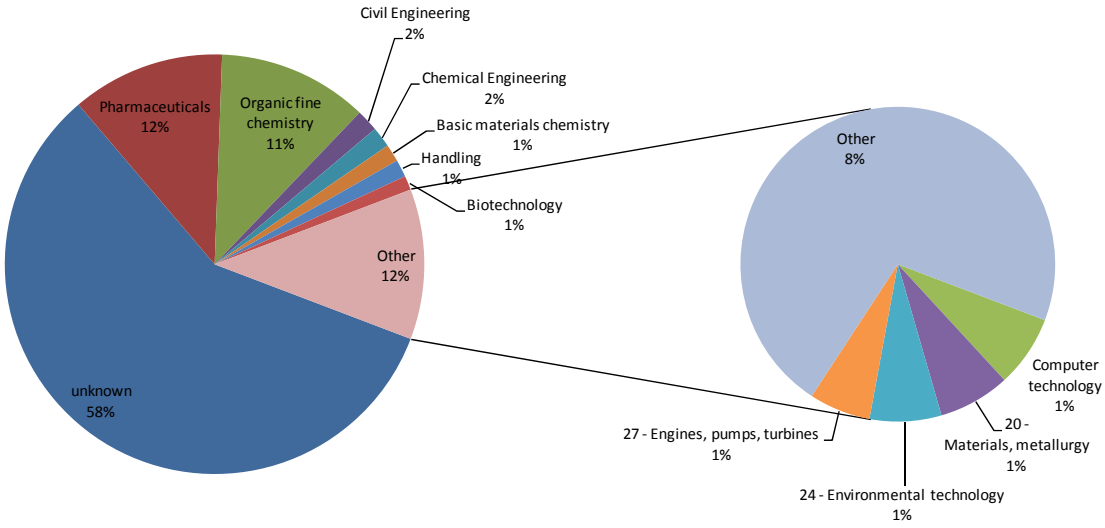
The majority of patents were granted to nationals from Jordan, USA, France, Belgium, Switzerland, Germany and the United Kingdom (see figure 4).

Figure 4- Patent Grants in Jordan; by origin (2000-2014)
Source: WIPO



Patents granted by the PRO are mostly concentrated in pharmaceuticals, organic fine chemistry, civil engineering and chemical engineering (see figure 5).

Figure 5- Jordan Patent Grants; by technology (2000-2014)
Source: WIPO



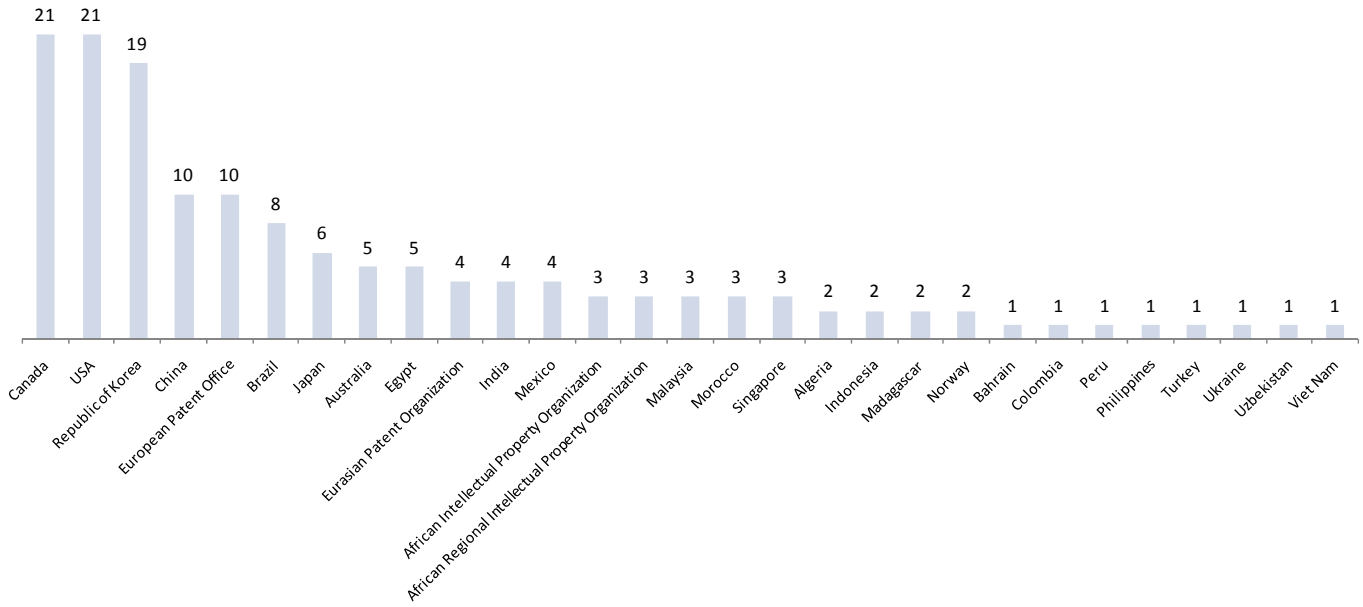
3.3 PCT Applications national phase entry by Jordanian Origin (2000-2014)

Though Jordan is not yet a member of the PCT, Jordanian nationals are already submitting PCT application using PCT member states in which they have established formal residency.

Moreover, by being Jordanian nationals, these applicants obtain a 90 percent reduction on PCT application fees.

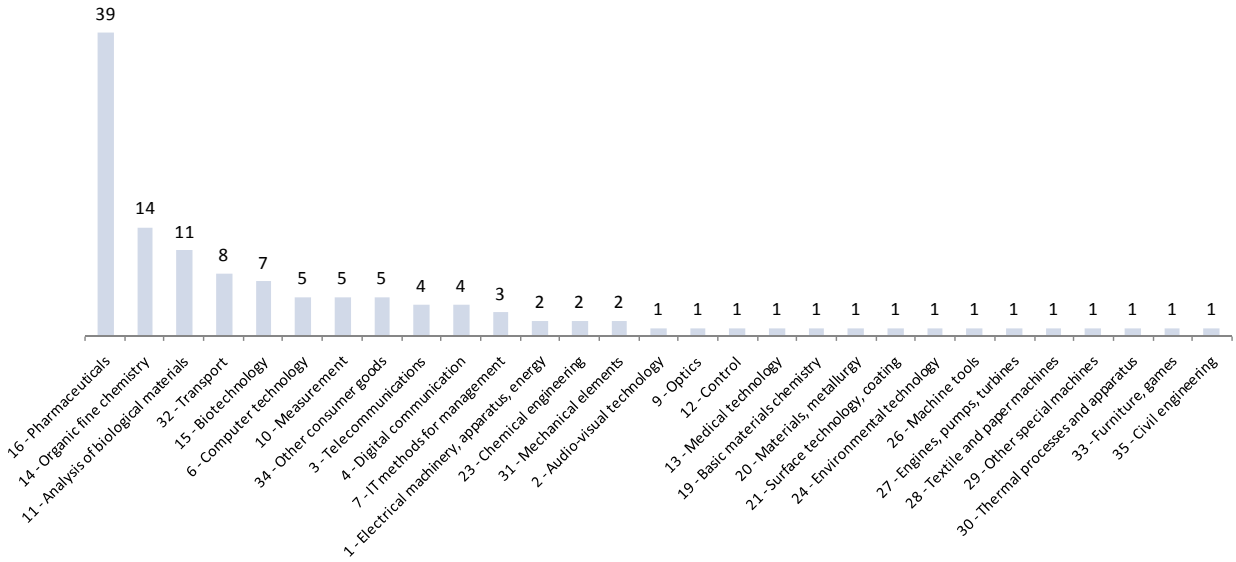
There are a total of 148 applications submitted by Jordanian nationals in 29 PCT member states during the period 2000-2014; priority national phase entry for Jordanian PCT applications were Canada, USA, Korea, China, and the European Patent Office (EPO)(see figure 6).

Figure 6- PCT National Phase Entry; applications submitted by Jordanians (2000-2014)
Source: WIPO



The fields of technology for Jordanian PCT applications that have entered the national phase are mostly undertaken in: pharmaceutical industry, organic fine chemistry, analysis of biological material, transport, and biotechnology. If Jordan was a PCT member state, some of these applications might have been processed through the Jordan Patent Registration Office (figure 7).

Figure 7- PCT publications by Technology, by Jordanian Origin (2000-2014)
Source: WIPO



3.4 CONCLUSION:

The analysis provided in this section of the report demonstrates that Jordan is an important destination country for patent protection. Patents granted in Jordan are mostly concentrated in the pharmaceutical industry, organic chemistry, civil engineering, chemical engineering, and biotechnology. Moreover, top patent applications and patents granted in Jordan are of Jordanian origin.

Jordan is an active member in global innovation; a total of 148 national phase applications were filed by Jordanian in 29 PCT member states using the PCT route. Most of the patents published by Jordanian nationals abroad are concentrated in pharmaceutical industry, organic fine chemistry, analysis of biological materials, transport, and biotechnology. If Jordan was a PCT member state, some of these applications might have been processed through the Jordan PRO.

4 PCT ACCESSION RISK ASSESSMENT

This section of the report will address the concerns raised by IP Community during the one-to-one interview undertaken during the period May-June 2016. The interviews were based on a questionnaire (see Annex I) that addresses patent registration, overall innovation environment in Jordan, and PCT accession; advantages and disadvantages.

4.1 Agricultural Sector:

The National Center for Agricultural Research and Extension (NCARE) is the research arm of the Ministry of Agriculture. Established in 1985, NCARE is mandated to conduct applied agricultural research and extension services to support Jordanian agricultural research focusing on soil, environment, horticulture, and animal and plant protection sciences.NCARE has a total of 3 patents registered in Jordan in the field of Mechanical (agricultural machinery) and nutrition.

4.1.1 NCARE's View on PCT Accession

One of the concerns raised by NCARE in relation to PCT accession was whether the PCT will affect the intellectual property system for plant variety protection (PVP) that is administered by the International Union for the Protection of New Varieties of Plants (UPOV) Act 1991 and governed by national law No 24 year 2000.

In response to this concern, the PCT route applies only to industrial property protection and does not affect the registration of new plant varieties under the UPOV Act 1991. However a similar instrument for a harmonized mechanism for filing, examination, and administration of applications for plant variety protection (PVP) is currently being discussed by UPOV members under the so called "International System of Cooperation" (ISC)[10].

[10] http://www.apbrebes.org/news/simple-%E2%80%9Cagreement%E2%80%9D-proposed-accommodate-industry%E2%80%99s-upov-plus-demands

4.1.2 NCARE's view on innovative environment in Jordan:

NCARE believes that inventors in Jordan require financial support to realize their inventions from conceptualization to patent registration, marketing and commercialization.

4.2 Pharmaceutical Sector:

The Jordanian Association of Pharmaceutical Manufacturers (JAPM) is an association dedicated to develop Jordanian pharmaceutical industry into world class competitive standards. JAPM membership includes 14 pharmaceutical manufactures, 6 Contract Research Organizations (CRO), 2 research and pharmaceutical services, 1nutrition and baby food manufacturer, and 1 medical appliances manufacturer.

The Jordanian pharmaceutical industry is an export-driven industry with products sold to more than 60 countries worldwide. The top five export markets for pharmaceutical products are: Saudi Arabia, Algeria, Sudan, Iraq, and UAE all of which are PCT member states except for Iraq.

Total pharmaceutical exports in 2014 reached JD 424.4 million representing the third largest export sector in Jordan. The sector is an employer of around 7,000 – 8,000 professionals, most of which are Jordanians and nearly one thirdare females.

Jordan is the only country in the MENA region where total sales of generic drugs are higher than patented drugs. Sales of generic drugs account for nearly 50 percent of total sales, whereas patented drugs account for about 33 percent[11]. One key aspect that alleviates pressure on the local industry is the Bolar exception which allows firms to develop and test a generic drug during the period of market exclusivity, and thus ensure timely delivery of a generic upon patent expiry[12]. Notwithstanding this benefit, Jordan has adopted data exclusivity since signing the U.S.-Jordan Free Trade Agreement (FTA) which included the TRIPS-Plus provisions. Data

[11] http://www.sabaip.com/en/News/MENA-Evaluating-Risks-and-Opportunities-for-Pharmaceutical-Patenting
[12] ibid

exclusivity requires a waiting period of at least five years before local pharmaceutical manufacturers can access valuable clinical trial data necessary to bring less expensive forms of generic drugs to market. JAPM Secretary General Ms Hanan Sboul stated that this period of data exclusivity that is currently being negotiated under the deep and comprehensive free trade agreement with the EU, is anticipated to increase data exclusivity from 5 to 10 years, and this will have a very severe impact on the pharmaceutical sector and will "kill the industry"; as it will delay market entry in the development of new generics and "put the Jordanian pharmaceutical industry at a competitive disadvantage compared to emerging generic industry in all Arab Countries". Many new medicines lacking a generic equivalent in Jordan from 2002-2006 were due to the imposition of data exclusivity (and not patent protection) as declared in an OXFAM empirical study[13]. Though assessing the impact of data exclusivity is not the objective of this study and is irrelevant to PCT accession, JAPM believes that both data exclusivity and PCT accession will harm the domestic pharmaceutical industry. As such, JAPM does not support Jordan's PCT accession.

4.2.1 JAPM View on PCT Accession:

There is a general perception that the manufacturing of generics is not an innovative industry, this perception is wrong as stated by Ms Sboul: "generic industry involves research and development because it entails development of new drug formulations, super and complex generics, new excipients and many others". However, since the "Jordanian pharmaceutical industry is branded generic, the PCT will increase the number of patent applications in Jordan and consequently, the number of granted patents which will damage the local pharmaceutical industry. Major impact will result from a decline in the number of products that can be developed by local companies, limiting their growth and expansion plans, decreasing jobs they can create, and decreasing sales locally and in export markets." Ms Sboul is of the opinion that the immobility of the pharmaceutical industry is the only obstacle that prevents the industry from

[13] https://www.msfaccess.org/sites/default/files/MSF_assets/Access/Docs/ACCESS_present_DataExclusivity_VervoortOxfam_ENG_2011.ppt

relocating to other countries “where IP environment is more conducive for generic pharmaceuticals”.

In addition to its negative impact on the generics, Ms Sboul believes that the PCT will also “increase the health bill of the government. Every year, Jordanian pharmaceutical companies reduce the government’s pharmaceutical bill in millions. A clear example is the drop in the price of an anticancer treatment; where in the first year, a Jordanian competitor provided the drug in a public tenders for JD 86, compared the originator’s price of JD 171 in the previous year. Further saving occurred the year after, when the same originator dropped his price to JD 56” for the same medicine. Thus without domestic competition, “the product would have been sold at the original price of JD 171 to Ministry of Health (MoH)”. Thus JAPM is of the opinion that “this is not the right time for Jordan to join the PCT. The decision to join the PCT, or not, can be revisited if the situation changes, but not earlier than 10 years from now” as stated by Ms Sboul.

In summary, the two arguments presented by the pharmaceutical industry against PCT accession are as follows:

1. The PCT will increase patent applications in Jordan, thus the number of granted patents will automatically increase in proportion. This will eventually harm the industry and prevent the development of new generics by the domestic industry;
2. Assuming that the above statement is correct, the weakening of domestic production of generics will decrease domestic competition, and will force the MoH to purchase originator drugs at higher prices, thus increase the health bill of the Government.

The above arguments, as presented by JAPM, are considered as assumptions because they are not based on a comprehensive study undertaken to assess the impact of the PCT on the pharmaceutical sector. Thus sufficient proof to confirm the above statements was not presented. Nonetheless, the arguments are serious and will be subject of further assessment under this report. Accordingly, this report will provide evidence on the practicality of the above assumptions focusing mainly on statement one which if it occurs, will result in an increase in the health bill of the government.

To achieve this objective, the report will undertake further analysis of current Arab PCT member states to assess whether a similar scenario of increased PCT applications and patent registration has occurred. The report will further focus on two Arab countries: Algeria and Saudi Arabia. Algeria, since the Jordanian pharmaceutical industry has investments in this country. Saudi Arabia, since it was recommended by JAPM as a case study.

4.3 Intellectual Property (IP) Agents:

A joint meeting was organized with the most prominent IP agents in Jordan that included: Saba Intellectual Property, SMAS Intellectual Property, and Intellectual Property Matters Co. LTD.

4.3.1 IP Agents' view on PCT accession:

The interviewed IP Agents believe that Jordan's PCT accession might increase the overall number of applications that express interest in registering their patents in Jordan. However based on the results of the international search reports, IP agents believe that most PCT applications for Jordan will be dropped; resulting in a reduced number of PCT national filing in Jordan. **As such, they anticipate that the PCT accession will decrease the number of patents seeking protection in Jordan, and this will have minimal impact on their businesses; since the overall patent business in Jordan is already small.** However, they believe that the reduction in national filing will reduce government revenue resulting from patent registrations in the country.

The interviewed IP Agents were surprised of the counter argument presented by the pharmaceutical sector, and were unable to justify this contradiction in opinion. Thus, by assessing PCT applications and national filing trends that have already occurred in PCT Arab member states in the subsequent sections of this report, further clarity might be provided on this subject to both IP Agents and the pharmaceutical sector.

4.3.2 IP Agents' view on innovation environment in Jordan:

All IP agents agreed that the general awareness on Intellectual Property Rights in Jordan is limited in the private sector. Jordan's IP law is considered to be good nonetheless, the penalty

for IP infringement fine is low (JD500)[14], the processing of IP cases within the Jordanian courts is slow, and this affects the overall speed of IP enforcement in the Kingdom.

Moreover, IP Agents explained that the most complex process in filing patent applications is in developing the patent technical file. As such, technical support should be provided in drafting patent technical files.

4.4 Eskadinia Software - Information Technology (IT)

Eskadinia is a world class software vendor in the fields of Telecommunications, Enterprise solutions, insurance, education and internet applications. The company employs nearly 200 information technology professionals and exports its products to many countries in the region.

Eskadinia has nearly 57 registered copyrights and is very keen on exploring opportunities for patent registration in the field software technology.

4.4.1 Eskadenia's view on PCT accession:

During the interview with the managing partner and co-founder of Eskadenia, Ms Doha Abdelkhaleq expressed great interest in Jordan's PCT accession since it would support innovation in Jordan, and allow Jordanian innovators to explore markets and licensing opportunities internationally.

4.4.2 Eskadenia's view on innovation environment in Jordan:

Innovation in software technology requires high technical expertise to identify whether the developed solutions contain inventive steps that can be considered as novel and non-obvious. For example, Uber has recently patented its solution for "enabling a user to verify a price change for an on-demand system."[15] This dynamic pricing permits hiking prices at peak demand for Uber users. Therefore the clarity of when a new mobile application becomes patentable requires

[14] Jordan Patent Law No (32) year 1999 states under Article (32) that patent infringement is subject to imprisonment for a period not less than 3 months and not more than 1 year, and/or a fine not less than JD100 and not more than JD 3,000.
[15] http://www.forbes.com/sites/briansolomon/2016/04/06/uber-granted-patent-for-surge-pricing-verification/#2d1d8b431d09

very careful study and needs experts' opinions on the subject matter. Hence the process of patenting is costly and requires expertise and technical training to identify the patentability of the new solutions offered by the technology sector in Jordan. Moreover, the lifecycle of inventions in the software industry is very short since software technology is constantly evolving. As such a utility patent model should also be considered for software technology companies.

In conclusion, Ms Doha Abdelkhaleq believes that sufficient awareness on intellectual property in general, and patentability of software applications in specific is lacking. Moreover, software companies need specific expertise and support to decide on whether a new software application offers inventive steps, and should thereby be subject to further patent protection. Since the lifecycle of software technology is short, Ms Abdelkhaleq believes that a utility patent model will be very useful for software technology companies.

4.5 Inventor Dr Mohammad H. Kailani

Dr Hussein Al Kailani is an inventor specialized in chemistry, polymer science and organic chemistry. He is also a professor at the Faculty of Science at the University of Jordan. Dr Kailani does not have any registered patents due to the high cost associated with registering and paying the annual maintenance fees for patents. However, he has invented many solutions to address problems related to the oil and gas industry. Dr Kailani is an avid researcher who continuously researches existing and expired patents to advance his scientific knowledge.

4.5.1 DrKailani's view on PCT accession:

Dr Kailani believes in innovation as a key driver for economic prosperity. Accordingly, accession to the PCT will help Jordanian inventors explore new markets and new licensing opportunities for their inventions especially when the PCT allows inventors to highlight their interest to conclude licensing agreements using WIPO PATENTSCOPE; even at an early stage of a patent application. Moreover, the PCT permits inventors to defer payment fees for international patent registration for 30 months or more, and gives sufficient time for the inventor to refine the invention based on feedback received from the PCT international patent search. Hence the PCT provides a cost-saving tool for internationalizing Jordanian inventions.

4.5.2 Dr Kailani's view on innovation environment in Jordan:

The innovation environment requires a large amount of support in Jordan. Patents are not considered of economic value unless they are developed into a final useable product. As such Jordanian inventors usually avoid patenting their inventions due to the high cost associated with the patenting process, and developing the prototypes needed for commercializing the invention. The Jordan German University and the Jordan University provide funding for innovators; however Jordan should consider other mechanisms for supporting innovation so that inventions can contribute to the development of the national economy, and act as a problem-solving platform for the domestic industry. Example of such tools is the creation of spin-off companies that result from collaborative research between academia and the private sector. Such spin-offs will create new start-up companies with shared ownership that can seek further funding from equity and angel investors. This step represents the conversion needed to transfer a patent from scientific research labs, to an end product that provides useful solutions to end-users.

4.6 Inventor Professor Ameen S. Khraisat

Professor Ameen Khraisat is a consultant in Prosthodontics, Implantology, and Tissue Regeneration. He is a professor at the University of Jordan and is also an inventor who has registered one patent in dentistry in Moscow using the PCT route. Prof. Khraisat intended to resume national filing in the USA using the PCT system, however due to the high legal and technical costs associated with filing a US patent, he had to abandon the process and publish his findings in a scientific journal after two years of paying patent maintenance fees in Moscow. Prof. Khraisat also has a valid patent application that is under processing in Jordan.

4.6.1 Professor Khraisat view on PCT accession:

Having already used the PCT route for filing a patent application in Moscow, Prof. Khraisat is of the opinion that the PCT system will offer an advantage to inventors to explore new markets for their inventions. However this does not eliminate the costs associated with patent registration in the selected national offices. His case represents a good example of how the extra costs associated with proving the novelty of his invention in the USA, and the high legal costs for patent filing and registration forced him to abandon his patent application in the USA.

Accordingly the PCT route is a great system, but it remains to be a costly process when pursuing registration in subsequent national offices.

4.7 Support Institution (iPARK)

The iPARK was established in 2003 and is considered as the supporting arm of the Royal Scientific Society in fostering innovation and entrepreneurship. The iPARK incubator enables and supports entrepreneurship and growth of startup companies. The iPARK's Intellectual Property Commercialization Office (IPCO) is an advisory office that assists Jordanian innovators to realize the potential rewards of their innovations through IP, networking, partnership and investment. IPCO is the central office of the Jordan Technology Transfer network.

4.7.1 iPARK/IPC Oview on PCT accession:

In an interview conducted with iPARK's Intellectual Property Commercialization Office (IPCO), Mr Mohammed Aljafari, noted that "In general, the Jordan Patent law has limited impact on innovators since the real economic value in patent registration and commercialization is not in Jordan". Accordingly PCT accession will have limited advantages/disadvantages on Jordan. Accordingly Mr Aljafari presented a neutral opinion on Jordan's PCT accession.

4.7.2 iPARK/IPCO's view on innovation environment in Jordan:

The Scientific Research Support fund (SRSF) is an important instrument for providing financial support to Jordanian innovators. However Mr Aljafari believes that the overall research funding mechanisms as stipulated under the SRSF should be reviewed since the fund is directed towards academic research and sets ownership restrictions that prevent the inventor from reaping the economic benefits from his invention. Moreover, Mr Aljafari recommends improving existing access to finance instruments to include direct government grants to private sector innovators.

4.8 Support Institutions (Oasis 500)

Oasis 500 is a leading early stage and seed investment company that helps existing entrepreneurs grow their companies using the Oasis' angel investors and mentor networks. Oasis aims to nurture creative ideas in Information Technology (IT), Mobile and Digital Media, as well as

ideas in the Cultural and Creative Industries sector, transforming them into startup companies. Moreover, Oasis offers training in entrepreneurship, mentorship guidance, business incubation and acceleration, and additional follow-on investment and funding. Unlike iPARK, Oasis does not provide its clients with support in IP Registration and Commercialization; however they have invited a leading US-based intellectual property firm "Finnegan" to speak to existing clients to create awareness on patents in the field of information technology. They also have their own network of IP Agents to support their clients.

4.8.1 Oasis 500 view on PCT accession:

Oasis had limited information on the PCT, however based on the explanation provided during the interview, Ms Luma Fawaz and Mr Laith Shukri did not express any concern in relation to the PCT accession; since it only offers an option for innovators to seek the international route for patent protection.

4.8.2 Oasis 500 view on innovation environment:

Oasis expressed their concern over the lack of qualified IP Agents in Jordan who are technically knowledgeable of patent protection in the field of information technology. For this reason, they have invited the US-based intellectual property firm "Finnegan" to deliver IP training to their clients.

4.9 Conclusion:

Most of the individuals/institutions that were interviewed were in favor of PCT accession, a few were neutral, and only the pharmaceutical sector had a serious objection towards Jordan's PCT accession. As such the objections raised by the pharmaceutical sector will guide this study to validate their concerns.

The pharmaceutical sector represented by JAPM presented two arguments:

1. The PCT will increase patent applications in Jordan, thus the number of granted patents will automatically increase in proportion. This will eventually harm the pharmaceutical industry and prevent the development of new generics by the domestic industry;

2. Assuming that the above statement is correct, the weakening of domestic production of generics will decrease domestic competition, and will force the Ministry of Health (MoH) to purchase originator drugs at higher prices, thus increase the health bill of the Government.

Moreover, when discussing PCT accession, JAPM also discussed data exclusivity, though data exclusivity is irrelevant to any discussion related to PCT accession as elaborated earlier in the report (section 4.2, p.15).

IP agents presented a counter argument to that proposed by pharmaceutical sector; they explained that Jordan's PCT accession might increase the overall number of applications that express interest in registering their patents in Jordan. However, based on the results of the international search reports, IP agents believe that most PCT applications for Jordan will be dropped, resulting in a reduced number of PCT national filing in Jordan. Hence the reduction in national filing will reduce government revenue resulting from patent registrations in the country.

The agricultural research center (NCARE) assumed that the PCT agreement will have an impact on the intellectual property system for plant variety protection (PVP). We explained that the PCT applies only to industrial property protection; as such it is irrelevant to PVP.

The IT sector company Eskadenia was very enthusiastic about PCT accession since it would support innovation in Jordan, and allow Jordanian innovators to explore markets and licensing opportunities internationally. Moreover she believed that sufficient awareness on intellectual property in general, and patentability of software applications in specific is lacking.

Innovators such as Dr Kailani and Prof. Khraisat are supportive of PCT accession. Dr Kailani however believes that the innovation industry in Jordan requires much support.

Mr Aljafari from iPark had a neutral opinion on Jordan's PCT accession since the real economic value in patent registration and commercialization is outside Jordan. On the other hand, Oasis had a positive view on Jordan's PCT accession. Both institutions also believe that Jordan's innovation environment requires further support. iPark believes that overall research funding mechanisms in Jordan are weak hence they agree with the opinion of Dr Kailani and NCARE,

while Oasis believes that technical knowledge in the field of information technology is weak in Jordan, hence they agree with the statement provided by Eskadenia.

5 PCT ARAB MEMBER STATES

The majority of Arab States are members in the PCT. Kuwait and Djibouti joined the PCT agreement during the implementation of the study to become the 149th and 150th PCT member states[16].

Table 1- PCT Arab Member States
Source: WIPO

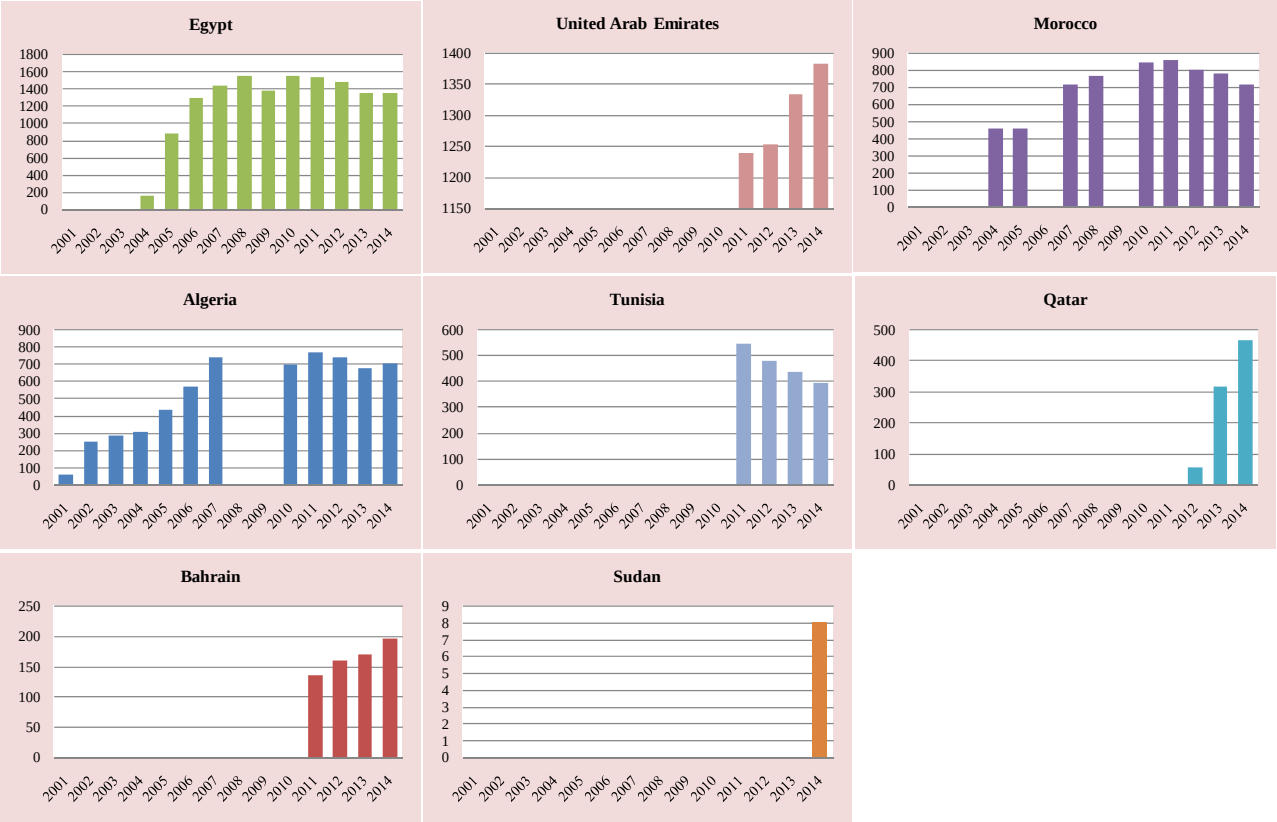
Country	PCT Accession Date	Country	PCT Accession Date
Mauritania	13 Apr 1983	Comoros	03 Apr 2005
Sudan	16 Apr 1984	Libya	15 Sep 2005
United Arab Emirates	10 Mar 1999	Bahrain[2]	18 Mar 2007
Morocco	08 Oct 1999	Qatar[2]	03 Aug 2011
Algeria[2]	08 Mar 2000	Saudi Arabia	03 Aug 2013
Oman[2]	26 Oct 2001	Kuwait	09 Jun 2016
Tunisia[2]	10 Dec 2001	Djibouti	23 Jun 2016
Syrian Arab Republic	26 Jun 2003		
Egypt	06 Sep 2003		

[2] *With the declaration provided for in PCT Article 64(5).*

Becoming a PCT member State does not necessarily mean that patent applications will inundate the national patent office; this is an inaccurate perception. The only countries that witnessed immediate national phase entry of PCT applications post accession were: Egypt, Algeria and Qatar (see table 2). Morocco that acceded to the PCT in October 1999, did not receive any national phase PCT applications until 2004 (5 gap years). The United Arab Emirates received national phase applications after 10 years, Tunisia after 10 years, Bahrain after 4 years, and Sudan only received national phase PCT applications after 30 years. **Oman, Libya, Syria and Saudi Arabia did not receive any PCT national phase entries until 2014.**Moreover, the trend for national phase PCT applications is not on a continuous upward cycle, but fluctuates between the years. Tunisia for example had a drop in PCT national phase applications immediately after 2011, whereas Algeria and Morocco's applications peaked in 2008 but dropped in 2014 (table 2).

[16] http://www.wipo.int/pct/en/pct_contracting_states.html

Table 2- PCT National Phase Entries in Arab Member States (2001-2014)[17]
Source: WIPO



As such, patent applications submitted using the PCT route will not necessarily result in an immediate hike in national phase entries, nor will they encourage or discourage cooperates or inventors from registering a patent. The decision guiding patent registration is governed by deliberate business decisions: such as market location, market size, presence or absence of competitors. As well as legal issues such as: the status of patent application in target countries, the level of patent protection (both law and enforcement in foreign countries)and novelty requirements as set under national laws. Furthermore, whether through the Paris route or the PCT route, patent applications will remain to be governed by national laws. For example, a company seeking to register a patent in Jordan using the PCT route will have to comply with national laws

[17] The PCT data search using WIPO database covered the years 1983 – 2014; due to lack of PCT national phase entries prior to 2001, the data reflected in table 2 only include the period 2001 – 2014 for better visual presentation.

governing patent protection. Jordan is not party to any bilateral validation system, hence the granting of patents is only governed by national laws[18].

5.1 The Case of Algeria

Algeria has been a member in the PCT since March 2000. It has a well-established Pharmaceutical industry, and has managed to attract FDI from various countries to include Jordan. For this reason, Algeria will be used a benchmark country for the purpose of this study.

5.1.1 Pharmaceutical Sector in Algeria

With a population exceeding 40 million, Algeria is considered as the 2nd largest Pharmaceutical market in Africa with an annual sustained growth of 10%. Due to the high import bill of branded drugs[19] and a generous social security system that reimburses 80% of drugs[20]. The Algerian Government adopted new polices to increase local drug manufacturing by encouraging joint ventures and licensing deals with multinational pharmaceutical companies to increase domestic production capacity. As such, the Algerian market presents itself as a lucrative market for manufacturing and selling pharmaceutical products.

Being an export-oriented sector and to further enhance and protect their market presence in Algeria, the Jordanian pharmaceutical industry established itsown manufacturing and subsidiary facilities in Algeria. The second largest multinational firm to invest in Algeria is the Jordanian Hikma Pharmaceutical[21] with a total value of investment reaching 164.8 million dollars[22]. Moreover, Jordan Pharmaceutical Company Dar Al Dawa has also entered into manufacturing agreement and a strategic R&D cooperative agreement with the Algerian Saidal Group (80% share owned by the State) to develop and manufacture new drugs[23]. As such, the Jordanian

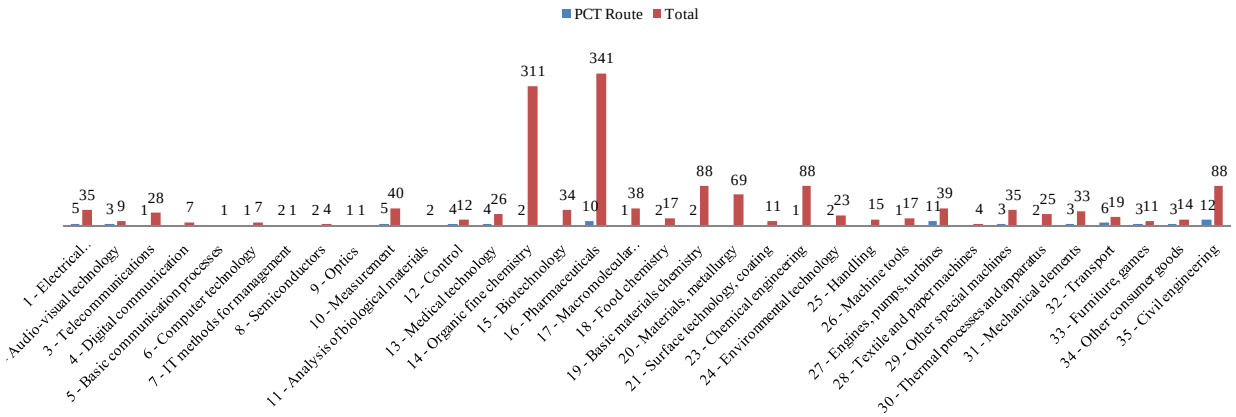
[18] Morocco for example has entered in a bilateral validation agreement with the European Patent Office (EPO) https://www.epo.org/about-us/organisation/validation-states.html
[19] Close to 85% of the total revenues are derived from branded generics
[20] http://airpharma.com/algeria-the-place-to-be-in-africa/
[21] Hikma Pharmaceutical is a Jordanian Pharmaceutical Company that is publicly listed in the London Stock Exchange
[22] http://ipco-co.com/IJBES_Journal/Papers/1.pdf
[23] Ibid

Pharmaceutical Industry has managed to grow its pharmaceutical business in Algeria though Algeria is a PCT Member State.

5.1.2 Pharmaceutical Patent Publications in Algeria

Despite being a PCT member, the majority of patents published through the receiving office in Algeria were processed through the direct route rather than the PCT route (figure 8). For example, total patents published in the pharmaceutical industry in Algeria were undertaken using the direct route (total of 341 publications) as opposed to the PCT route (10 publications) during 2000-2014. This demonstrates that the PCT filing route may not be the most viable and the most cost-effective mode for filing patent applications especially if a patent owner has a strategy in mind that targets a specific country rather than a group of countries as demonstrated in the case of patent applications in Algeria.

Figure 8- Algeria Patent Publications PCT Route (200-2016) and Total (2000-2014)
Source: WIPO



Moreover, due to the high filing fee of PCT applications[24] that could exceed US$3,000[25] in total, there is a breakeven point for filing patent applications as explained by the Chicago-based patent firm Miller, Matthias & Hull LLP; the PCT route becomes more cost-effective than direct route

[24] http://www.uspto.gov/patents-getting-started/international-protection/patent-cooperation-treaty/pct-fees-us-dollars
[25] A 90% reduction is eligible on certain PCT Fees for applications filed by an applicant who is a natural person and who is a national of and resides in specific PCT member and non-member States to include Jordanian Nationals (see http://www.wipo.int/export/sites/www/pct/en/fees/fee_reduction.pdf

if there is a need to file in three or more countries, while the direct route is more cost-effective if you need to file in three or less countries[26].

5.1.3 PCT Filing National Chapter Algeria[27]

Each PCT Member State has a National Phase Chapter which summarizes the requirements for national phase entry to include; procedures, fees and documentation needed for filing national phase entry.

The PCT fees for filing PCT applications in Algeria are summarized here below[28]:

Fee Description	National fee in Algeria Dinar (DZD)	Converted to US$[29]
Filing and maintenance fees for the first year[1]:	7,500	67.98
Fee per priority claim, per priority	2,000	18.13
Publication Fee[1]:	5,000	45.32
o Surcharge for each set of 5 pages in excess of 10: o Small format drawings in excess of 3	1,200 400	10.88
Maintenance fee: o from the 2nd to the 5th year, per year: o from the 6th to the 10th year, per year o from the 11th to the 15th year, per year. o From the 16th to the 20th year, per year	 5,000 8,000 12,000 18,000	 45.32 72.51 108.76 163.14
[1] Must be furnished or paid within the time limit applicable under PCT Article 22 or 39(1).		

Moreover, each PCT Member State can also define any special requirements needed for filing PCT applications. In the case of Algeria, the special requirements are[30]:

o Appointment of an agent if the applicant is not resident in Algeria[2];
o Instrument of assignment of the international application if the applicant has changed after the international filing date;
o Document evidencing a change of name of the applicant if the change occurred after the international filing date and has not been reflected in a notification from the International Bureau (Form PCT/IB/306);
o Translation of the international application to be furnished in two copies.
[2]If not already complied with within the time limit applicable under PCT Article 22 or 39(1), the Office will invite the applicant to comply with the requirement within a time limit fixed in the invitation.

[26] http://www.millermatthiashull.com/what-are-the-break-even-points-for-pct-and-epo-applications-versus-paris-convention-applications/
[27] http://www.wipo.int/pct/guide/en/gdvol2/annexes/dz.pdf
[28] ibid
[29] Conversion based on 1 June 2016 rates 1 DZD = .0091 US$
[30] http://www.wipo.int/pct/guide/en/gdvol2/annexes/dz.pdf

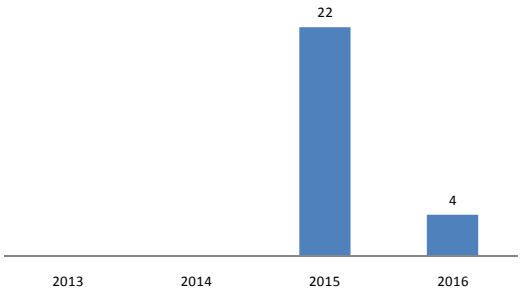
5.2 The Case of Saudi Arabia:

The case of Saudi Arabia will be studied further in this section due to the fact that JAPM believes that the situation of Saudi Arabia post PCT accession will be similar to Jordan's, if Jordan decides to join the PCT.

5.2.1 Patent Trends in Saudi Arabia

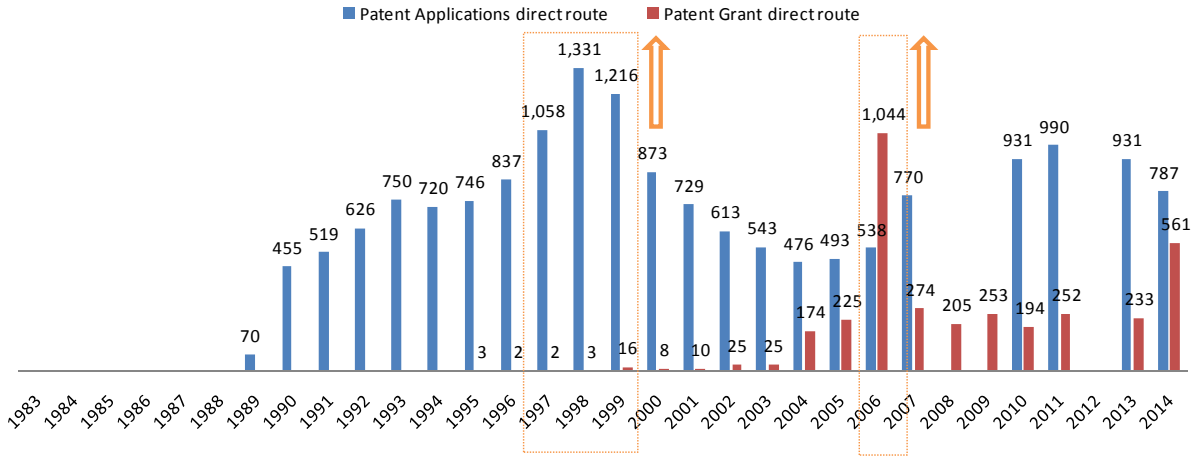
Based on the data provided at the beginning of section five of the report (PCT Arab Member States), Saudi Arabia did not receive any national phase entry of PCT applications post its accession (i.e. PCT applicants in PCT member states did not claim priority date for national phase entry into Saudi Arabia post accession for the period 3 August 2013 - December 2014). This however does not mean that Saudi Arabia did not receive any PCT applications post accession. In 2015 Saudi Arabia received 22 PCT applications, while in 2016 they received only 4 applications to date. Only one PCT application was submitted by a non-Saudi national from Rwanda in 2015 while the remaining 25 PCT application were submitted by Saudi nationals (figure 9).

Figure 9- Saudi Arabia PCT Applications by filing date
Source WIPO



Despite the weak trend in PCT patent applications, Saudi Arabia has a very active patent portfolio; between the years 1997-1999 Saudi Arabia received the highest number of direct patent applications that peaked in 1998 with 1,331 applications, and in 2006, Saudi Arabia granted the highest number of patents using the direct route which reached 1,044 patents (figure 10).

Figure 10- Saudi Arabia Patent Applications and Patent Grants Direct Route (1983-2014)
Source: WIPO



The trend of high patent applications using the direct route continued in Saudi Arabia even post PCT accession. This further confirms that that the PCT filing route may not be the most viable and the most cost-effective mode for filing patent applications, especially if a patent owner has a strategy in mind that targets a specific country rather than a group of countries as demonstrated in the case of patent applications in Algeria and now in Saudi Arabia.

5.2.2 PCT Filing National Chapter Saudi Arabia[31]

The PCT fees for filing PCT applications in Saudi are summarized here below[32]:

Fee Description	National fee in Saudi Riyal (SRI)	Converted to US$[33]
Filing fee:	800	213.29
Examination Fee	n/a	
Fee for amendment	200	53.32
Grant and Publication fee:	1000	266.61
Annual Fee: (maintenance fee) o Year 1 o Year 2 – Year 20	 500 +500 per annum	 133.31 +133.31 per annum

[31] http://www.wipo.int/pct/guide/en/gdvol2/annexes/sa.pdf
[32] ibid
[33] Conversion based on 14 June 2016 rates 1 SRI = 0.27 US$

The special requirements for filing a PCT application in Saudi Arabia are summarized here below:

o Name and address of the inventor if not indicated in the "Request" part of the international application [3,4]
o Declaration as to the applicant's entitlement to apply for and be granted a patent [3,4]
o Declaration as to the applicant's entitlement to claim priority of the earlier application [3,4]
o Document evidencing a change of name of the applicant if the change occurred after the international filing date and has not been reflected in a notification from the International Bureau (Form PCT/IB/306) [3]
o Representation by an agent if the applicant is not resident in Saudi Arabia[3]
o Instrument appointing the agent (authorization or power of attorney) [3]
o Furnishing, where applicable, of a nucleotide and/or amino acid sequence listing in electronic form.
[3] If not already complied with within the time limit applicable under PCT Article 22 or 39 (1) [4] This requirement may be satisfied if the corresponding declaration has been made in accordance with PCT rule 4.17.

6 JORDAN INNOVATION ENVIRONMENT

Innovation in Jordan is guided by the Jordan Innovation Strategy (JIS)[34] (2013-2017) which was developed by the Higher Council for Science and Technology (HCST) and prepared in collaboration with the Ministry of Planning and International Cooperation and with the support of the World Bank and the Korean Development Institute.

The Jordan Vision 2025 (JV 2025) also addressed innovation by promoting the concept of university- industry partnership in R&D, as well proposing subsidies to innovation by exempting R&D expenses from taxable income (table 3).

Table 3 - JV 2025 on Education
Ministry of Planning, p. 15

Raising the level of applied research at universities	**10.1 Support and encourage scientific research in accordance with the objectives of the Scientific Research Support, and collect unspent mandatory allocation for research form higher education institutions.** **10.2 Encourage investment form the private sector by exempting research and development expenses from taxable income.** **10.3 Increase university-industry partnerships to ensure consistency between research and the needs of the economy, including programs such as "from School (College)-to-factory".** **10.4 Encourage universities to enter into participatory agreements with prestigious international universities in technical programs.** **10.5 Increase partnerships between universities and the information technology sector, to ensure offering students courses that meet the needs of the market and technological development.**

A study conducted by the USAID[35] concluded that the "The IP Policy for [Jordan University for Science and Technology] JUST was inadequate while the [Jordan University] JU IP Policy was more substantial and if adequately reformed should also prove a useful platform for reforming the JUST IP Policy". Moreover the study further recommended the establishment of two separate Technology Transfer Offices (TTO) in each university (JUST & JU) to simulate innovation.

[34] http://inform.gov.jo/Portals/0/National%20Innovation%20Strategy%2012-2013%20with%20NCI.compressed.pdf
[35] "R&D Assessment at Jordanian Universities: Encouraging Transfer of Technology to Innovation stage" http://pdf.usaid.gov/pdf_docs/Pnadm953.pdf

6.1 The reality of innovation environment in Jordan as per the IP Community:

Based on the interviews undertaken with the IP Community, most of the institutions and individuals interviewed have identified weaknesses in the innovation environment summarized in the table 4 below:

Table 4- Reality of Innovation Environment and recommendations as per the interviews:

Awareness	• Awareness on intellectual Property Rights in Jordan is limited in the private sector.
Cost and financing of innovation	• Innovators are in need of financial support to realize their inventions. • Jordanian inventors avoid patenting their inventions due to the high cost of the patenting process: conceptualization, patent registration and legal fees, marketing and commercialization costs. • Research funding mechanisms (ex: SRSF) should be calibrated to focus on creating economic value rather than deliveringacademic research. • Research funding mechanisms (ex: universities) should reconsider patent ownership restrictions that prevent the inventor from reaping economic benefits from his invention. • Government should consider providing direct government grants to private sector innovators.
IP law and enforcement	• Penalty infringement fine is low (JD 500) as per IP Agents. • Processing of IP cases within the Jordanian courts is slow, and this affects the overall speed of IP enforcement in the Kingdom.
IP Expertise	• Jordan does not have expertise in drafting patents; mainly technical files related to patent filing for specific technologies. • Patent expertise in information technology and software applications is limited, or absent.
Creating economic value	• Innovation should act as a problem-solving platform for the domestic industry. • Inventions that result from collaborative research between academia and the private sector should create spin-offs startupsthat can grow using equity funds thereby contribute to the growth and added-valueof the local economy.

6.2 Jordan's Performance in the Global Competitiveness Report (GCR):

The Global Competitiveness Report (GCR) is a yearly report published by the World Economic Forum. The report assesses the ability of countries to provide high levels of prosperity to their citizens. This in turn depends on how productively a country uses available resources. As such,

the Global Competitiveness Index (GCI) measures the set of institutions, policies, and factors that set the sustainable current and medium-term levels of economic prosperity.

Jordan's performance in the Global Competitiveness Index (GCI)[36]in 2015/2016 remained somehow stagnant compared to the year before and scored 4.2 out of 7, and ranked number 64 out of 140 economies.

Indicators in the innovation improved slightly (3.67 to 3.7) some innovation indicators performed better than others as shown below:

- University - industry collaboration in R&D indicators ⇩
- Government procurement of advanced technology products ⇩
- Availability of scientists and engineers ⇩
- Company spending on R&D ⇩
- Capacity for innovation ⇧
- Quality of Scientific Research institutions ⇧
- PCT Patent Applications (applications/million population) ⇧

As such by improving the innovation environment and adopting appropriate strategies to enhance innovation, Jordan will be able to improve its global rating in the GCI.

[36]http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#indexId=GCI&economy=JOR

7 CONCLUSIONS & RECOMMENDATIONS:

This study provided an introduction on the PCT agreement and PCT advantages. It further analyzed the impact of the PCT accession on the domestic industry using the information (advantages and disadvantages) identified by the IP community interviewed during the course of the study. The study further analyzed Jordan's patent trends and patent trends in PCT Arab member states with a focus on Algeria and Saudi Arabia. Moreover the study further assessed the innovation environment in Jordan as discussed by the IP community.

7.1 Conclusions from interviews with IP Community:

Most of the individuals/institutions that were interviewed were in favor of PCT accession, a few were neutral, and only the pharmaceutical sector had a serious objection towards Jordan's PCT accession. As such the objections raised by the pharmaceutical sector guided the study to help validate their concern and provide the arguments to whether Jordan should, or should not accede to the PCT agreement.

The pharmaceutical sector represented by JAPM presented two arguments:

1. The PCT will increase patent applications in Jordan, thus the number of granted patents will automatically increase in proportion. This will eventually harm the industry and prevent the development of new generics by the domestic industry;
2. Assuming that the above statement is correct, the weakening of domestic production of generics will decrease domestic competition, and will force the Ministry of Health (MoH) to purchase originator drugs at higher prices, thus increase the health bill of the Government.

Moreover, when discussing PCT accession, JAPM also discussed data exclusivity, though data exclusivity is irrelevant to any discussion related to PCT Accession as elaborated earlier in the report (see 4.2, p.12). In addition, IP agents presented a counter argument to that proposed by pharmaceutical sector; they stated that Jordan's PCT accession might increase the overall number of applications that express interest in registering their patents in Jordan. However based on the results of the international search reports, IP agents believed that most PCT applications for Jordan will be dropped; resulting in a reduced number of PCT national filing in

Jordan. Hence the reduction in national filing will reduce government revenue resulting from patent registrations in the country.

7.2 Conclusions from analyzing PCT trends in PCT Arab Member States:

1. The analysis of Arab PCT member states showed that **becoming a PCT member State does not necessarily mean that patent applications will inundate the national patent office**; **this is an inaccurate perception.** The only countries that witnessed immediate national phase entry of PCT applications post accession were: Egypt, Algeria and Qatar. Morocco that acceded to the PCT in October 1999, did not receive any national phase PCT applications until 2004 (5 gap years). The United Arab Emirates received national phase applications after 10 years, Tunisia after 10 years, Bahrain after 4 years, and Sudan only received national phase PCT applications after 30 years. **Oman, Libya, Syria and Saudi Arabia did not receive any PCT national phase entries until 2014.**
2. Moreover, the trend for national phase PCT applications is not on a continuous upward cycle, but fluctuates between the years. Tunisia for example had a drop in PCT national phase applications immediately after 2011, whereas Algeria and Morocco's applications peaked in 2008 but dropped in 2014.
3. The case of Algeria demonstrates that despite being a PCT member, the majority of patents published through the receiving office in Algeria were processed through the direct route rather than the PCT route. For example, total patents published in the pharmaceutical industry in Algeria were undertaken using the direct route (total of 341 publications) as opposed to the PCT route (10 publications) during 2000-2014. Moreover, the data shows that the Jordanian Pharmaceutical Industry has managed to grow its pharmaceutical business in Algeria though Algeria has been a PCT Member State since March 2000.
4. The analysis on PCT applications in Saudi Arabia post accession demonstrated that Saudi Arabia did not receive any PCT applications post accession from 3 August 2013 – December 2014. However in 2015, Saudi Arabia received 22 PCT applications, while in 2015 they received only 4 applications. Despite the weak trend in PCT patent applications, Saudi Arabia has a very active patent portfolio; between the years 1997-1999 Saudi Arabia received the highest number of direct patent applications that peaked in 1998 with 1,331

applications, and in 2006, Saudi Arabia granted the highest number of patents using the direct route which reached 1,044 patents.

7.3 Conclusion and recommendations of the study:

Our conclusion is that patent applications submitted using the PCT route will not necessarily result in an immediate hike in national phase entries, nor will they encourage or discourage cooperates or inventors from registering a patent. The decision guiding patent registration is governed by deliberate business decisions: such as market location, market size, presence or absence of competitors. As well as legal issues such as: the status of patent application in target countries, the level of patent protection (both law and enforcement in foreign countries) and novelty requirements as set under national laws. Accordingly we were unable to provide sufficient proof to support JAPM's argument.

Accession to the PCT agreement will not cancel the direct application route offered under the Paris Convention. As illustrated in the case studies for Algeria and Saudi Arabia, most of the patents were processed through the direct route rather than the PCT route due to the fact that patent registration as discussed above, is governed by a business decision, hence in some cases, the direct route might be more cost-effective than the PCT route if the applicant is seeking to protect the invention in three countries or less (see 5.1.2, p. 29). This fact further nullifies the argument presented by IP agents; PCT accession will not result in an increase or reduction in patent registration revenue for the government.

Moreover our findings show that accession to the PCT will not have a negative or positive impact on Jordan's economy. The PCT accession will have a neutral impact on the Jordanian industry and Jordan's innovation environment. However, to leverage and enhance the existing innovation environment and to maximize the benefit from PCT accession, we recommend the following:

1. The innovation environment in Jordan is in need of support. This support should start with building awareness on innovation as well as developing a collaborative platform between industry and academia to jump-start innovation and create new spin-off start-ups that can

contribute to the economic growth of the Kingdom. An example of this productive collaboration is the spin-offs created by the Massachusetts Institute of Technology (MIT) whereby the Bank of Boston in 1989 estimated MIT spin-offs to contribute to $10 billion annually and 300,000 jobs to the Massachusetts economy. A similar example is the Stanford University which fueled the growth of many companies in California's Silicon Valley[37].

2. Jordan should develop the capacity needed to enhance IP awareness and IP technical expertise in information technology.
3. Research funding mechanisms should be directed towards creating economic value rather than provide support solely for academic research. For example, the Moroccan Foundation for Advanced Science, Innovation and Research (mascir.com) provides innovation solutions to market needs in the wide fields of environment, energy & health.
4. The Scientific Research Support Fund (SRSF) should support filing fees and maintenance for such inventors. For example, the Moroccan Foundation for Advanced Science, Innovation and Research (mascir.com) provides small seedlings to inventors.
5. IP enforcement should be enhanced in the judicial system.
6. New financing instruments to include direct government grants should be considered to support innovation and joint Research & Development (R&D) between academia and private sector enterprises. For example, the JV 2025 includes a provision for exempting R&D expenses from taxable income (see table 3, p. 32).
7. Jordan innovation strategy will end in 2017. It is recommended that a new strategy is developed to support innovation in Jordan focusing on priority innovative industries that have already been identified in this report (pharmaceutical industry, organic fine chemistry, analysis of biological material, transport, and biotechnology), new and emerging technologies such as solar & photovoltaic, stem cell, ICT, nanotechnology , agriculture technologies, robotics, as well as innovation that acts as a problem-solving platform to the domestic industry. It is recommended that the strategy is developed by a senior committee that is headed by the HCST with partners from Academia, inventors, private sector

[37]"Policies and Structures for Spinning Off New Companies from Research and Development Organizations" available online: http://dspace.mit.edu/bitstream/handle/1721.1/2569/SWP-3804-32616509.pdf

companies, venture capital investors as well as IP related organizations such as the IPPD, NCARE and entrepreneurship support institutions such as iPark and Oasis.

8. Lastly, undertaking the above reforms will enhance Jordan's performance in the Global Competitiveness Index (GCI)[38] in the innovation pillar. In 2015/2016 Jordan's GCI remained somehow stagnant compared to the year before and scored 4.2 out of 7, and ranked number 64 out of 140 economies. Indicators in the innovation improved faintly (3.67 to 3.7) some innovation indicators performed better than others as shown below:
   - University - industry collaboration in R&D indicators ⇩
   - Government procurement of advanced technology products ⇩
   - Availability of scientists and engineers. ⇩
   - Company spending on R&D ⇩
   - Capacity for innovation ⇧
   - Quality of Scientific Research institutions ⇧
   - PCT Patent Applications (applications/million population) ⇧

[38] http://reports.weforum.org/global-competitiveness-report-2015-2016/economies/#indexId=GCI&economy=JOR

ANNEX I – INTERVIEW QUESTIONNAIRE

The questionnaire will be completed in one-to-one interviews. The results will be analyzed and incorporated in the PCT Accession Impact Assessment study.

Name of interviewee: _____

Name of Institution: _____

IP Expertise: _____

Date: _____

Inventor Questions		
1.	**Did you ever register for a patent?**	☐ Yes ☐ No
1.1	Around how many times did you register for a patent	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6-10 ☐ >10
1.2	In which country did you register your patents?	n/a
1.3	In which technology?	n/a
2.	**Did you use the PCT route to register for a patent?**	☐ Yes ☐ No
2.1	Through which PCT member country did you apply for a patent?	
2.2	In which national offices/countries did you seek patent protection?	
3.	**Were you granted the patents?**	☐ Yes ☐ No
3.1	How many patents were you granted?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6-10 ☐ >10
3.2	Have you commercialized or licensed your patents prior to expiry?	☐ Yes ☐ No
3.3	Have you sold your patent to other parties?	☐ Yes ☐ No
4.	**Have you ever researched expired patent publications?**	☐ Yes ☐ No
4.1	Have you ever exploited patents that have lapsed in Jordan due to the non-payment of maintenance fees?	☐ Yes ☐ No
5.	**Have you received any government funding to develop your invention?**	☐ Yes ☐ No
5.1	If yes, what was the name and nationality of the funding agency?	
5.2	How should Jordan encourage and promote innovation?	
Manufacturers Questions		

6.	**Do you manufacture under license?**	☐ **Yes** ☐ **No**
7.	**Do you manufacture generics?**	☐ **Yes** ☐ **No**
8.	**Did you acquire patents through the acquisition of international firms?**	☐ **Yes** ☐ **No**
8.1	If yes, in which industry/technology?	
8.2	In which country did you acquire patents?	
9.	**Do you undertake your own R&D?**	☐ **Yes** ☐ **No**
9.1	Have you registered a patent as a result of your own R&D?	☐ **Yes** ☐ **No**
9.2	Around how many times did you register for a patent?	☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5** ☐ **6-10** ☐ **>10**
9.3	Did you seek the PCT route or direct route for patent registration?	☐ **PCT ROUTE** ☐ **DIRECT ROUTE**
10.	**How many patents were you granted?**	☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5** ☐ **6-10** ☐ **>10**
10.1	In which countries did you seek patent protection?	
10.2	Have you commercialized your patent?	☐ **Yes** ☐ **No**
10.3	In which country?	
11.	**Have you received any government funding to develop your invention?**	☐ **Yes** ☐ **No**
11.1	If yes, what was the name and nationality of the funding agency?	
11.2	How should Jordan encourage and promote innovation?	
PCT Questions		
10.	**Should Jordan join the PCT?**	☐ **Yes** ☐ **No** ☐ **No Comment** ☐ **Not sure**
11.	**Do you have your own study on the impact of joining PCT on your sector?**	☐ **Yes** ☐ **No**
11.1	**If yes, can you summarize the outcome of the study?**	**What are the advantages?**
		What are the disadvantages?