

ENI – CBC MED

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**Technological transfer and commercialization of public research results through
PPI in the Mediterranean region.**

Countries: Spain, Italy, Tunisia, Egypt, Jordan

**Precompetitive analysis of promising products and services for public procurement of
innovation - Jordan**

Final Report

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DEFINITIONS & ACRONYMS

Acronyms

ENI-CBC:	European Neighborhood Instrument – Cross Border Countries.
NCRD:	National Center for Research and Development.
PPI4MED:	Public Procurement of Innovation for the Mediterranean region.
WP5:	Work Package 5.
R&D:	Research and Development.
PM:	Prime Ministry
MoP:	Ministry of Planning
MoDEE:	Ministry of Digital Economy and Entrepreneurship
MoF:	Ministry of Finance
MoIT:	Ministry of Industry and Trade
MoL:	Ministry of Labor
JEDCO:	Jordan Enterprise Development Corporation
SME:	Small & Medium-Size Enterprise
HBB:	Home-Based Business
NGO:	Non-Governmental Organization
JE:	Jordan Export
CSO:	Civil Society Organization
STI:	Science, Technology & Innovation
PPI:	Public Procurement of Innovation

Definitions

ENI-CBC “Mediterranean Sea Basin Programme”, the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the European Neighborhood Instrument.

PPI4MED: Technological transfer and commercialization of public research results through PPI in the Mediterranean region.

Questionnaire: a method to collect feedback/opinions from key stakeholders about an important topic.

Method: a guide or a way of implementing a plan or doing something.

Project: a temporary endeavor to create a unique product or service.

Innovation: creating of something new: idea, method, product, services, or improvement of something.

CHAPTER ONE

1.1 Executive Summary

Promotion of innovation in public procurement is an important approach for economic development, creating opportunities, supporting local markets, and buying an innovative solution at proper cost and high efficiency.

ENI CBC “Mediterranean Sea Basin Programme” is currently funding a project titled PPI4MED in Jordan and other 4 countries aims to transfer the European model of public procurement of innovation to the Mediterranean region.

PPI4MED project has several work packages (from WP1 to WP6) to guide the project implementation in Jordan and facilitate the introduction of new Public Procurement of Innovation (PPI) concept in the country.

This report is mainly focusing on PPI4MED project work package 5 (WP5): “precompetitive analysis of promising products and services for public procurement of innovation in Jordan.”

The report will describe all the activities under WP5, and starts with:

- Conducting a baseline survey to cover main areas of concern in Public Procurement of Innovation.
- Creating SWOT analysis using the baseline survey results, highlighting the strengths, weaknesses, opportunities and threats in the existing governmental purchasing system, innovation in Jordan, research & development, and private sector participation.
- Preparing sector analysis (public needs) for five different sectors: health, energy, water, agriculture and transportation, analyzing their annual reports, strategic plans and procurement plans.
- Completing patents study to identify potential patents vs. public needs.

In June 2022, the baseline survey was designed and shared with more than 150 targeted project stakeholders in different sectors: public, private, universities, researchers, and NGOs. Only 57 responses were received and analyzed.

Five areas were covered in the baseline survey: Innovation Engagement, Research & Development challenges, Public Procurement of Innovation, Private Sector needs, and awareness of PPI4MED Project.

The main findings are:

- The current collaboration between public sector, private sector, universities, researchers, and NGOs is clearly weak. No centralization or a central unit to coordinate and communicate between key players, combine all efforts in one place, and establish a comprehensive database for the innovation ecosystem in Jordan.
- Improving access to funding: covering research and researchers’ expenses, increasing spending on R&D, incentives for SMEs and start-ups, improving access to information on funding availability, and creating environments that attracts foreign investors.
- There is a major need to create or update a legislative system that control the process and clarify the roles of the public sector, private sector, universities and researchers.
- A key requirement to simplify processes, regulations, and facilitate procedures and patents registration for researchers.

- Creating an e-learning system at national level for knowledge sharing, educating and promoting innovation & entrepreneurial.
- Activating knowledge transfer offices to build partnerships with national and international parties, building alliances of potential investors for the ease of commercialization.
- Identifying the governmental needs and communicating at early stage to private sector and researchers through a national dialogue, workshops, conferences or any proper channel. This will help the researchers to focus on national needs for the ease of commercialization.
- Building proper monitoring and evaluating framework to assess the feasibility of national needs, the potential researches and available patents, the research timing, budget, personnel capabilities, obstructions, opportunities and key performance indicators.
- Maintaining proper infrastructure & tools to facilitate researches and support researchers, including IT & technology.
- Innovation culture exists in Jordan at a wide scale and major players are currently contributing to the innovation development and enhancing the entrepreneurship eco-system in the country.

1.2 PPI4MED Project

ENI CBC “Mediterranean Sea Basin Programme”, is the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the European Neighbourhood Instrument (ENI). The programme comes under the Thematic Objectives A.2: Support to education, research, technological development and innovation (promote economic and social development).

One of the ENI-CBC MED funded projects is PPI4MED: “Technological transfer and commercialization of public research results through PPI in the Mediterranean region” which aims to transfer the model of Public Procurement of Innovation (PPI) to five countries: Spain, Italy, Jordan, Tunisia and Egypt. The duration of the project is 30 months from October 2020 to March 2023, and the National Center for Research and Development (NCRD) in Jordan is the implementing partner of this project.

PPI4MED addresses the regional needs for an organizational process and participatory approach in developing Innovation Procurement at the national and transnational level for the first time in the area. The project aims to enhance the aptitudes and competencies of the countries in the Innovation Procurement (InnP) processes by establishing transnational linkages and networks between public purchasers, research centers, private sector and NGOs.¹

The project aims to create and demonstrate a model to transfer results from National Research Centers (NRCs) to public buyers, industry, SMEs and people through the co-design of solutions in 5 national (1 in each country) and 1 cross-border living labs, and the implementation of 12 real PPI processes (2 in each country and 2 cross-border) to raise awareness of policymakers to include PPI as a strategic instrument to transfer results as part of the science policy in each concerned country.²

The project will lead to innovative results by establishing the living labs where research centers, public buyers and private sector sellers are brought together for the creation of new products and co-patents applied to the needs of the Mediterranean society. The project partners will develop a platform and tools where the research centers and public bodies can be put together their patents and their needs in order to analyze the opportunities and challenges, share knowledge and foster innovative processes. The PPI4MED model is represented in graph 1.

1: (ref. project document: ENI-CBC MED Programme, call for strategic projects.)

2: (ref. project document: ENI-CBC MED Programme, call for strategic projects.)

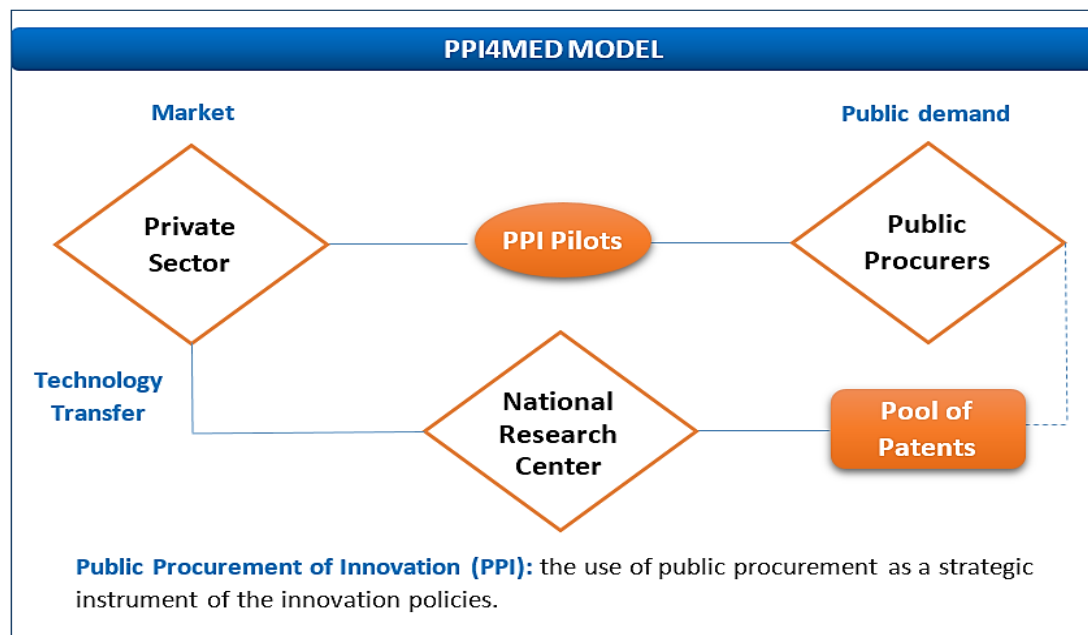


Figure 1: PPI4MED Project

In May 2021, NCRD, partner of PPI4MED, has launched the Innovation Procurement Living Lab in Jordan, a virtual platform for meeting and matching interests between public procurers, private companies (sellers) and NRC (patent owner) to generate concrete ideas that can be materialized in potential PPI projects.

40 participants in the living lab will be able to identify the national needs and challenges of public administrations in Jordan which can be covered by developing new products and solutions based on National Research Centers' patents and other scientific results. Private companies will be responsible for developing those solutions and building the bridge between science and markets.

The project will have tangible long-lasting impacts in the technical, socio-economic and policy-making fields. Commercialization of results will improve the focus of future research on tangible results for society. A better interaction between industry - academia and public sector, allowing market knowledge transfer to be fostered.

1.3 Public Procurement of Innovation

Public procurement is any purchase of goods, services and works by the government, expected to be carried out efficiently and with high standards to ensure quality results as per public interest and expectation. Well-designed public procurement system facilitates the process and contributes to achieving procurement goals in a smooth way.³

Innovation is defined as: "the implementation of a new or significantly improved product (or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations." (OECD/Eurostat (2005), OSLO Manual: Guidelines for collecting and interpreting innovation data, S. 46, Paris.)⁴

Today, public procurement is not only focusing on "how to buy"; but also on "what to buy". Spending the annual governmental budget is currently viewed in a wider approach than just satisfying the primary

3: European Commission. (2017). Guidance on Public Procurement of Innovation.

4: KOINNO. (2017). *Public Procurement of Innovation*. Guide. 2nd edition.

needs of public entities. With each public purchase, the interest is to know whether the procured solution or product brings the best value in terms of cost-efficiency, social impact and whether it opens opportunities for the suppliers' market.⁵

Public procurement of innovation addresses the above concerns. It opens the door to more efficient solutions, better cost-effectiveness; it values environmental and social benefits and it provides the suppliers' market with new business opportunities.

Public Procurement of Innovation can be one of the following:

- buying the process of innovation;
- buying the outcomes of innovation.

Under the first type, the public procurement contract starts with the research and development of products, services or processes, which do not exist yet. The public procurer effectively becomes part of the innovation from the very beginning. It describes its need with little to no concrete idea of the solution and supports innovative businesses and researchers in finding the perfectly-suited product, service or process.

While under the second type, the public procurer, selects an existing product, service or process that is new to the market or simply new to the public procurer. An innovative solution becomes interesting for public procurers when it enables better results at optimized cost.

The key players in Public Procurement of Innovation (PPI) process as shown in graph 2 are: public procurers, private companies (sellers) and NRC (patent owner).



Figure 2: Public Procurement of Innovation Process ⁶

Public procurement of innovation is an opportunity for public procurers, citizens and businesses. It therefore deserves close attention of all the public authorities involved in procurement at various levels. It needs a policy framework that provides a vision, a strategy and appropriate means to deliver.

However, despite the considerable advantages of innovation-oriented procurement, most public sector procurers are unaware of this fact due to several reasons such as lack of information, and weaknesses of existing communication and coordination process between the key players.

The innovation procurement can be adopted in the public sector at national level, if a framework is designed and used as a guidance for the public sector. Such a framework may include the following elements used at each public entity or at a wider range:

5: European Commission. (2017). *Guidance on Public Procurement of Innovation*.

6: PPI4MED- JOR Living Lab on PPI, 31.03.2021.

Elements of innovative procurement				
Innovative culture and processes	Procurement strategy	Communication	Methods and instruments	Personnel and qualifications
Promoting culture of innovation provides the basis for the successful establishment of innovative procurement.	Targets? Way to get there? What tools to use? Roles & Responsibilities	Communicate public needs early to NRCs and private sector Market survey and research Procurement plans	Guides, checklists, tender templates, proposals, award criteria, legal terms.	Well-trained personnel in legal, innovation, and procurement principles

Table 1: innovation procurement framework in public sector

1.4 Pre-competitive analysis of products & services approach

PPI4MED project aims to boost commercialization of research results from public research institutions through innovation procurement projects and private/public commercialization partnerships.

The project consists of six work packages (WPs):

- **WP1:** is management; including monitoring project progress, tracking deliverables and reporting back to the partnership.
- **WP2:** is communication; including internal and external communication, knowledge sharing and marketing strategy.
- **WP3:** is national living lab on innovation procurement to foster the use of innovation procurement among public buyers, and the commercialisation of research results.
- **WP4:** is capacitation programme; for the buyers and the sellers to facilitate the use of innovation procurement.
- **WP5:** is precompetitive analysis of promising products and services for Public Procurement of Innovation (PPI.)
- **WP6:** is Public Procurement of Innovation (PPI) pilots.

For PPI4MED successful implementation, a precompetitive analysis platform at a national and a cross-national level establishes the creation of a common space where public authorities and public procurers are able to expose their needs, and companies show their capacity to respond to those needs with the technology offered from the research centers.

The tool will also permit the creation of a common space where ministries and public authorities will be able to expose their needs and the research centers will present the patents that may cover those needs from the public sector.

The objective of the partners is to develop precompetitive analyses for the concrete use of some already existing patents to resolve societal problems, a demand driven by the public sector. Each platform enables the possibility of analyzing and diagnosing the patent and other scientific results portfolio based on the level of innovation, impact, and efficiency in facing the challenges at the national, regional and local level.

The work package 5 (**WP5**) will lead to new and concrete opportunities, which will be materialized through the living lab and its activities (WP3) and then PPI pilots will develop these innovative products and solutions under the WP6. Thus, it concludes by a pipeline of viable potential solutions to be developed in future through Innovation Procurement tenders.

There are seven activities under **WP5**:

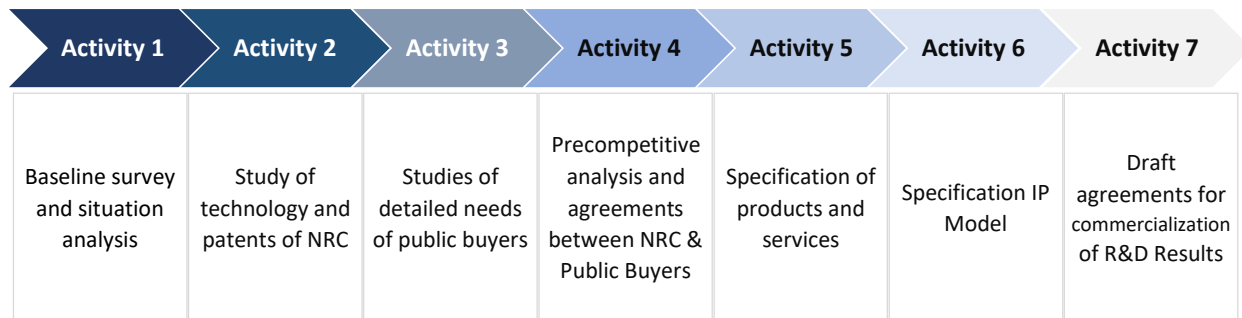


Figure 3: WP5 activities

- 1. Baseline Survey and situation analysis:** analyze the internal and external environment of the project stakeholders understanding the different sectors needs and competitive environment. Different techniques are used in the situation analysis (SWOT) and in the baseline survey (questionnaires).

The objectives of the baseline survey and situation analysis are: assess the current situation of Public Procurement of Innovation (PPI) in each partner country; identify stakeholder barriers and needs for PPIs opportunities; and define common stakeholder needs and challenges at cross-border level.
- 2. Study of technology and patents of NRC:** an in-depth diagnosis and analysis of existing and in development patents must be undertaken.
- 3. Studies of detailed needs of public buyers:** develop an in-depth diagnosis of the needs of public procurers. This will make it possible to link the needs of public procurers with the technological offerings of national research centers.
- 4. Precompetitive analysis and agreements between NRC & Public Buyers:** will be implemented for each opportunity to match a public need or procurement and the scientific result of the NRC.
- 5. Specification of products and services:** drafting the technical specification and requirements for the services and products to be developed under the PPI, and define the selection criterion required in the products/services to carry out PPI.
- 6. Specification IP Model:** each NRC aims to develop two pilot public innovation contracts based on overlapping technology and needs, and protected under a specific Intellectual Property model transferred under PPI contracts.
- 7. Draft agreements for commercialization of R&D Results:** each viable opportunity of PPI pilots will require the formalization of agreement for commercialization of R&D results between the procurer and the NRC prior to the PPI implementation phase under the WP6. The agreement establishes the details of the procurer's needs and the rights of the NRC, as well as the roadmap to implement the innovation procurement in the next phase and/or after the end of the project and its financial terms.

The results to be achieved within the pre-competitive analysis of promising products and services is twofold: national and cross-border precompetitive analysis. On the one side, the development of two marketable PPI opportunities, putting together companies' capacity, national research center technology offer and public procurers' needs. On the other hand, the establishment of a favorable environment where Mediterranean public procurers might have common needs that can be addressed through innovative products and solutions to be developed based on NRCs' technology.

1.5 Country Background

Jordan offers an active environment for innovation, research, and development due to the availability of qualified personnel, organizations, and society which promote new technologies, fresh ideas and cultural support. Jordan ranked 81 globally and 9 regionally on the 2021 edition of the Global Innovation Index (GII)⁷.

Jordan's innovation system is driven by a modern ICT infrastructure with reliable uninterrupted communication solutions. The Ministry of Digital Economy and Entrepreneurship is playing a major role in enhancing the capabilities of governmental entities.

Many programmes have been launched by the government, with the assistance of different valuable partners, to promote innovation for economic growth and creating more jobs.

The Jordanian government issued the Jordanian Artificial Intelligence Policy in 2020 to enable artificial intelligence technologies applications in digital government services and create suitable opportunities for innovation and entrepreneurship.

The country launched the REACH2025 initiative in 2016 to streamline the digital transformation of the Jordanian economy. In addition, the government of Jordan has been enhancing e-government services to transform the way stakeholders interact with and participate in the government.

The entrepreneurship ecosystem in Jordan includes a large number of stakeholders within the governmental sector, the private sector, the research centers/universities and NGOs.

The key players within the governmental sector are: The Prime Ministry (PM), Ministry of Planning (MoP), Ministry of Digital Economy and Entrepreneurship (MoDEE), Ministry of Finance (MoF), Ministry of Industry and Trade (MoIT), Ministry of Labor (MoL) and Jordan Enterprise Development Corporation (JEDCO).

The private sector contribution in innovation & entrepreneurship through the SMEs and start-up companies, home-based businesses (HBBs), commercial banks, micro-finance institutions, business associations, investment companies, multinational companies, and consulting firms (service providers).

In the research sector, there are: universities and incubators, scientific research deanships and innovation & entrepreneurship centers.

In the NGOs side, there are: Jordan Export (JE), Chamber of Industry, Civil Society Organizations (CSOs), worker representatives, local communities & social leaders with influence through mass media (including social media) and associated interest groups.

One of the key contributors to the innovation & entrepreneurship in Jordan are the development partners (different donor- countries) who provides support in different sectors.

Other important players who are trying to link between key innovation stakeholders are: The National Center for Research and Development, The National Center for Innovation and The Higher Council for Science and Technology.

1.5.1 The Ecosystem of R&D, innovation and entrepreneurship in Jordan

An entrepreneurship ecosystem is a system of interdependent actors and relations directly or indirectly supporting the creation and growth of new ventures.

An entrepreneurship ecosystem refers to the elements, individuals, organizations, or institutions that support entrepreneurs and their success all the way.

⁷: The Jordan Times: <https://www.jordantimes.com/news/local/jordan-ranks-81-global-innovation-index>

The ecosystem normally has a set of interconnected entrepreneurial actors (both potential and existing), organizations (firms, venture capitalists, business angels and banks), institutions (universities, public sector agencies and financial bodies), and processes. (According to Mason and Brown 2014).

The Entrepreneurship Ecosystem has a great impact on the growth of any business and makes it easy to get funding and technical guidance.

In Jordan, the entrepreneurship ecosystem consists of 6 pillars:

Policy & Regulations	Innovation & Growth	Human Capital	Business Support	Community Building	Money Capital
Policy	Science & Business Park	Entrepreneurial Universities	Business Service	Media	Venture Capital
Accessibility & Easiness	Social Innovation	Training Programs	Accelerators	Educational Platforms	Seed Funding
Regulations	Intellectual Properties	Recruiting Agencies	Consulting	Networking Events	Credit Financing
	R&D Labs	Educational Institutions	Co-Working Spaces	Conferences & Forums	Grants & Donors
			Incubators	Business Associations	Private Equity
					Crowd Funding
					Angel Investor

Table 2: entrepreneurship ecosystem in Jordan

Under **Policy & Regulations** pillar, there are three elements: policy; accessibility & easiness; and regulation. Taking one of them, as an example, shown below:

- **Policy:** roughly some of the key players are:
 - Ministry of Social Development
 - Ministry of Labor
 - Ministry of Industry & Trade

A complete list of the entrepreneurship ecosystem key players in Jordan is found at [Appendix 1](#).

In recent years, there were several success stories within the Jordanian entrepreneurial ecosystem such as Maktoob, Souq.com, Arabia Weather, Mawdoo3, Ureed and Abwab who have placed Jordan and Jordanian founders as pioneers of innovation in the region.

The ecosystem development in Jordan is working towards creating new resources for entrepreneurs, in the areas of funding, incubation or mentoring, and new initiatives across Jordan.

1.5.2 Jordan Science, Technology & Innovation (STI) Map

Jordan Science, Technology & Innovation (STI) is the network of institutions in the universities, public and private sectors whose activities and interaction could results in producing national products or services.

The academic units produce scientific researches in different fields to address certain issues, where funding is then required through R&D funding sources to produce potential patents for commercialization.

When a scientific research reaches its final phase, it will require going through patent registration process, following a set of regulations and policies to protect the rights of the researchers and universities.

The next phase is networking and linkage with the private sector through an important assistance from innovation centers and incubators in order to adopt such patents and develop further as a proto-type through a start-up organization or an existing one with proper financial capabilities. The entrepreneurship & innovation centers may provide capacity building and assist in patents registration as well.

Once the product is ready, the next phase is marketing to the public or private procurers at national and international levels. For the ease of commercialization, the final product should address one of the governmental needs and challenges identified earlier at a national level.

The key players in Jordan Science, Technology and Innovation (STI) has been analyzed. According to the STI map prepared by UN ESCWA Technology Center in September 2015, the STI ecosystem players are classified into 4 major groups and 10 major players. **The four groups are:**

- **Science:** Technology Transfer Offices, Research and Development Institutions, Science Clusters and Academia.
- **Industry:** Industrial Sector and Business Sector.
- **Government:** Policies, Strategies and Legislations and STI Related Ministries.
- **Financial** Organizations: STI Financial Support and STI Support: Organizations, Programs and Initiatives.

The ten key players in Jordan STI are:

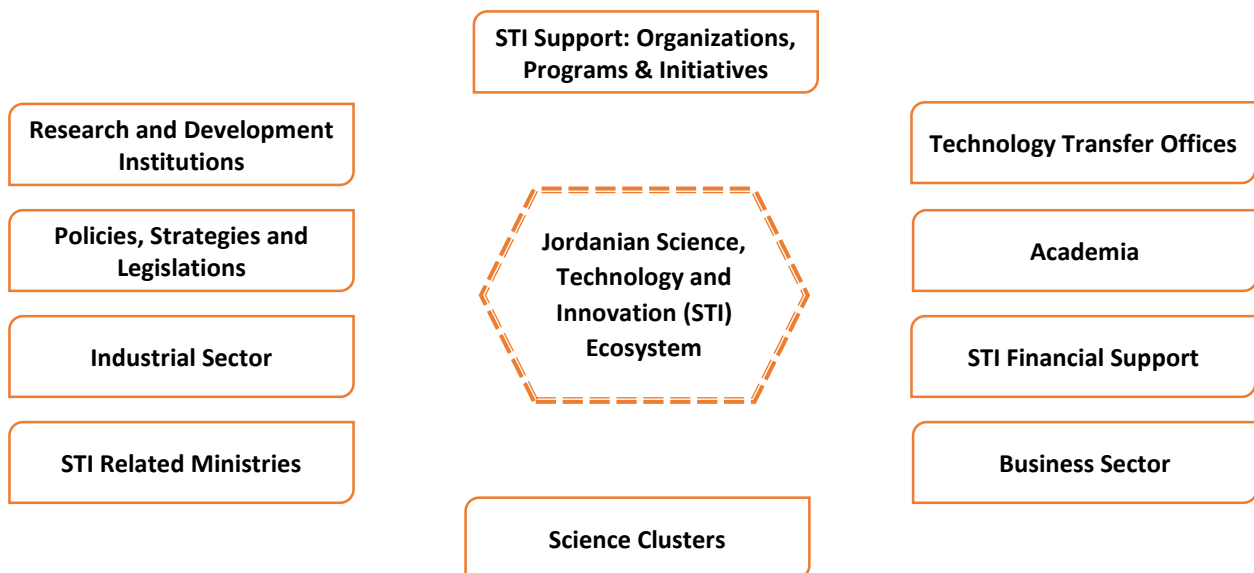


Figure 4: STI Map Jordan

Taking one example: some of the **Research and Development Institutions** are represented, below:

- Higher Council for Science and Technology
- National Energy Research Center
- National Center for Agricultural Research and Extension
- Queen Rania Center for Jordanian Studies & Community Services, Yarmouk University
- National Center for Research and Development

- King Hussein Cancer Center

A complete list of the STI groups and key players in Jordan is found at [Appendix 2](#).

The four groups form a comprehensive system of sources and stakeholders, however, all the players in the STI eco-system in Jordan are working as standalone centers with no interaction, no shared mission, and no coordination between them.

1.5.3 Level of compliance with PPI model in Jordan

The level of compliance with PPI in Jordan varies from one organization to another, depending on previous experience, financial resources, policies & internal regulations, strategic planning and similar activities.

The compliance is at high level at NRCs and universities, but at low level at public sector. NRCs and universities policies and strategies are about scientific researches, innovation, producing potential patents, IP registration at national and international level, commercialization, networking with private sector, funding and capacity building.

While at public sector, it is all about budget limitation, basic procurement plans, lack of proper capacity building, weak linkages with NRCS and universities, lack of strategic planning and future considerations.

However, based on NCRD regular communications with public and private sectors under PPI4MED project, it is noticed that there is a wide area for improvement in Jordan, and enthusiastic personnel ready to adapt the new PPI model within a clear framework and financial support.

The current level of compliance with PPI model in Jordan is represented in the following groups:

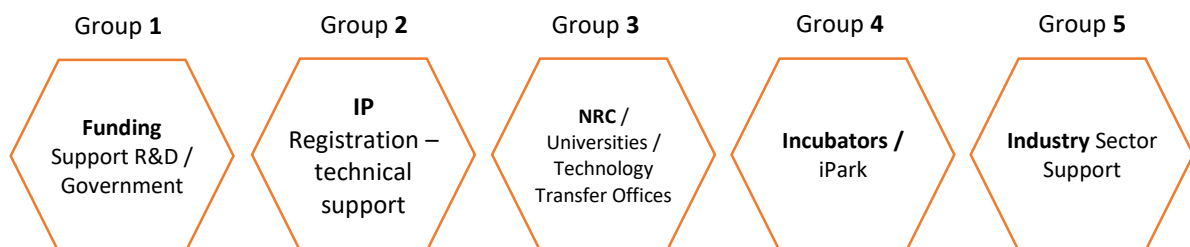


Figure 5: level of compliance with PPI in Jordan

Group 1: Funding Support R&D / Government: entities providing funding support to researchers:

- **NCRD:** The National Center for Research and Development (NCRD) is a public entity established in 2010 under bylaw number (72), the center is the legal successor for the "Badia Research Center" which was established in 1992. NCRD is mandated to develop scientific capacity and capabilities in the field of energy, biotechnology, Badia research, and other research of interest.

In order to achieve a tangible thrust in research and development, it is important to delineate priorities that respond to the urgent current needs of the country. NCRD identified food security and health as priority areas for research and development over the coming 6-7 years (2021-2028). It is anticipated that the research and development programs in these areas will enhance availability and access to nutritional food and help maintain a healthy vibrant population that can effectively participate in the socio-economic activities of the society.

NCRD through its research stations based in Amman, Safawi, and Ma'an continues to perform its responsibilities and duties towards the Badia local community through the implementation of various successful projects, applied research, outreach activities and providing continuous

capacity-building programs, and entrepreneurial projects support to youth and women to start their own business.

The **NCRD** is responsible of:

- Identify and coordinate the national activities and capabilities, and develop research topics in educational institutions, scientific centers and the establishment of information database for this purpose;
- Support applied scientific research; promote invention and innovation in the Center's fields of work;
- Encourage the establishment of productive companies, based upon research and development outputs which the center performs;
- To hold and participate in workshops, conferences and specialized training courses in the research and development fields inside and outside Jordan;
- Development of human resources in the field of research and development and, cooperation with experts, scientists, centers, establishments, commissions and relevant domestic, regional and international organizations;
- Establish research networks between Jordanian researchers and their counterparts outside Jordan in fields that fall within the scope of work of the Center;
- NCRD is currently supporting **19** research projects financially (totally or partially). Total completed projects since 2010 are around 24.

A list of NCRD current supported researches is listed at [Appendix 6](#).

- **SRISF:** Scientific Research & Innovation Support Fund is:

- Supporting scientific research submitted by Jordanian researchers;
- Encouraging scientific and research participation in higher education institutions;
- Directing researchers towards the most useful scientific researches that meet the needs of the Jordanian society;
- Providing financial support to scientific research projects submitted by Jordanian universities and relevant private and public institutions;
- Granting distinguished researchers in higher education institutions awards for their distinguished scientific researches;
- Supporting the issuance of Jordanian specialized refereed journals;
- Contribution in supporting refereed scientific conferences held by Jordanian universities and institutions concerned in scientific research in the Kingdom;
- Concerning about problem solutions that Jordanian companies and institutions face in developing their industry, products and services as well as enabling them to enhance their competitive capabilities by coordination with Jordanian universities and these companies to overcome these problems;
- Cooperating with local and Arabic bodies, and international and universal organizations in supporting scientific research and technical development field;
- Providing financial support with what serves in utilizing science and knowledge in scientific research to develop technology and direct it to solve problems that face research centers and entrepreneurs' incubators capable of developing creativity and marketing scientific research consequences including constructing capabilities in intellectual property protection and patent registration;
- Providing financial support to build abilities in different scientific research fields related to intellectual property protection and patent registration;

- Contribution in funding scientific research programs and projects implemented under cooperative, scientific and technical agreements with countries, international organizations, Arabic, Islamic and foreign institutions.
- During the period of **2008 – 2022**, SRISF has supported around **514** research and innovation projects in different sectors as shown below:

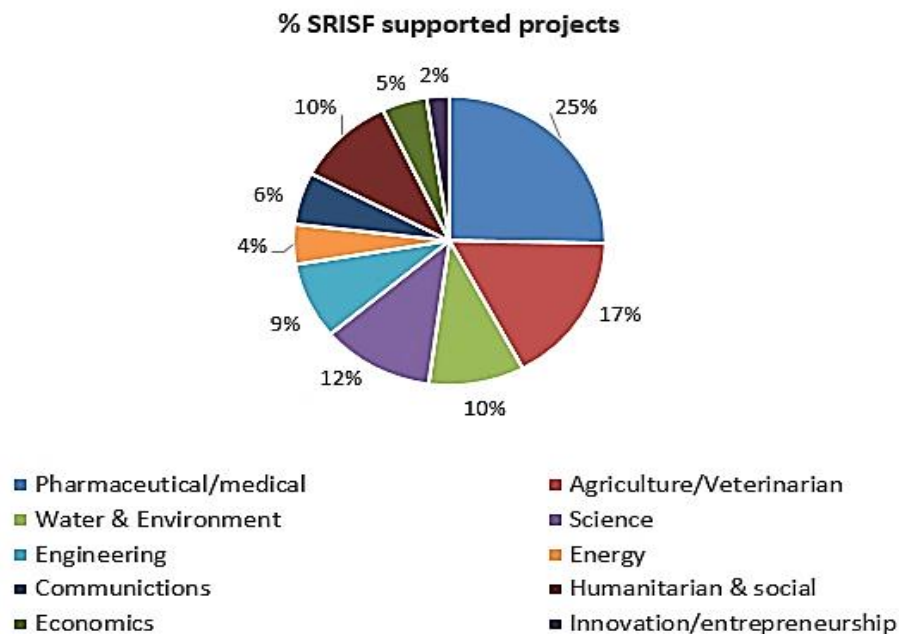


Figure 6: SRISF supported projects

A list of SRISF supported researches is listed at [Appendix 6](#).

- **NARC:** The National Agricultural Research Center(NARC) is considered as the scientific arm of the Ministry of Agriculture and the only specialized governmental agricultural research institution at the national level, to constitute a national umbrella for applied agricultural research and governmental agricultural consultations.

Since its early beginnings, NARC aimed at utilizing the outcomes of agricultural research that are developed locally or devised from other sources for the purposes of increasing agricultural production, both plant and animal, while improving its efficiency and quality and conserving the agricultural natural resources and optimizing their use, serving the purposes of agricultural development and ecological balance.

The National Agricultural Research Center launched the initiative “Incubator of innovation and agricultural entrepreneurship” on February 26, 2019 which aims to transform ideas of entrepreneurship and creativity to real projects that enhance and contribute to the national economy and sustainable development, creating job opportunities and produce success stories.

To date, the Incubator of innovation and agricultural entrepreneurship has:

- Total project applications: 150
- Total projects (startup companies) in the incubator = 39
- Current projects = 36
- Completed projects = 3

The 39 projects (start-up companies) are provided with funding and incubation services such as: networking & marketing, facilitating access to funding sources, product development, capacity building, office space & IT technology and legal support.

A list of NARC supported researches is listed at [Appendix 6](#).

Group 2: IP Registration – technical support: entities IP registration assistance to researchers:

➤ **Government:**

- ***The Directorate of Industrial Property Protection*** at the Ministry of Industry & Trade (MIT): The Industrial Property Protection Directorate takes on the supervisory role of all matters related to the registration of trademarks, patents, industrial designs and models and integrated circuits as well as indexing them in an effort to provide the adequate protection in accordance with the current laws. The Directorate also handles all cooperation efforts with international organizations dealing with Intellectual Property.

Directorate Departments: Trademark Registration Section; Patent Registration Section; Industrial Designs & Models; Post Registration Section; Cases Section; Supportive Section.

An example: a list of patents in water sector registered at MIT is listed at [Appendix 6](#).

- ***JEDCO IPMED***: “Intellectual Properties Capacities for Smart, Sustainable and Inclusive Growth in the Mediterranean Region” Project (IPMED) was launched in February 2020 to build Intellectual Properties capacities and entrepreneurship with a total of 1.194 million Euros funded by the European Union through the Cross-Border Cooperation Programme for the Mediterranean Basin within the European Neighborhood Instrument (ENI CBCMED).

Jordan is leading the implementation of IPMED through Jordan Enterprise Development Corporation (JEDCO) in partnership with organizations in Greece, Italy, Spain and Tunisia.

➤ **Private:**

- ***IPCO***: The Intellectual Property Commercialization Office (IPCO) provides expert advisory services to investors, innovators, universities, donors, and government agencies. These services include patenting, matchmaking, governance, deal-structuring, brokerage, program development, and technology audits.

IPCO can help institutions identify and protect their IP assets which include: IP strategy formulation, patentability check, patent drafting, IP filing locally and internationally, IP prosecution, IP management, legal representation, IP awareness, commercialization support, IP policy and regulation development, technology transfer support and capacity building.

- ***Baianat IP***: Baianat Intellectual Property has an extensive experience and a long history in the field of intellectual property. The firm is operating in the Middle East and North Africa via more than 25 offices in more than 15 different countries. Baianat IP services includes: IP related services, IP legal services, IP rights registration & maintenance, patents related services, corporate & commercial law, trademarks related services.

Group 3: NRC / Universities / Technology Transfer Offices:

University technology transfer offices (TTOs) are responsible for technology transfer and commercialization of researches in a university. TTOs engage in a variety of commercial activities that are meant to facilitate the process of bringing research developments to market, often acting as a channel between academia and industry.

Some of the major functions of TTOs are:

- Industry partnerships: create and maintain industry partnerships that may be crucial for collaboration and bringing technologies to market. TTOs often engage with industry partners when receiving interest from industry partners in bringing specific technologies at the university to market, or when TTOs actively seek industry partners for this purpose.
- Intellectual property: TTOs/universities support patent registration and assist through the whole process, in addition to protecting the confidentiality of patent information.
- Counseling and incubation for startups: TTOs often provide general business and legal counseling, resources, funding, and connections, to increase the chances of startup success. Hence, many TTOs establish business incubators and programs for faculty and students in an attempt to enhance the entrepreneurial atmosphere among researchers at the university.
- More than 20 TTOs currently exist in Jordan as shown at [Appendix 2](#).

Group 4: Incubators: provide support to develop businesses:

Incubators help startup companies and individual entrepreneurs to develop their businesses by providing a full-scale range of services starting with management training and office space and ending with venture capital financing.

Since startup companies lack many resources, experience and networks, incubators provide services which help them get through initial obstructions in starting up a business. These include: space, funding, legal, accounting, computer services and other requirements for running the business.

The current **Incubators and Accelerators** in Jordan include, but not limited to:

- *iPark*: enables and supports innovative ventures through effective programs, dedicated facilities, and expert advisory services:
 - iPark supports entrepreneurs through matchmaking, advisory, legal support, and capacity building through multiple incubators across Jordan. iPark also provides services to institutions and donors seeking to establish impactful entrepreneurship support and enablement programs.
 - For investors, innovators, and innovative institutions, iPark provides expert commercialization and intellectual property services including patenting, matchmaking, governance, deal-structuring, brokerage, and technology audits through the Intellectual Property Commercialization Office (IPCO).
 - Graduated companies have grown to become market leaders, generate millions in revenues and investments and create thousands of value jobs.
- *ibda3: Zain*
- *Oasis 500*
- *Young Entrepreneurs Association*
- *Jordan Innovation Center at Philadelphia*
- *Wamda Capital*
- *Al Urdonia Lil Ebda*
- *South Business Incubator Center*
- *Jordan Forum for Business & Professional Women*
- *The Tank O Umniah – KHBP*
- *MENA Apps*
- *The Technological Incubator (JUST)*
- *Agro Industry Business Incubator*
- *Copiatec / Biotechnology Incubator at Mafraq Development Company*

The incubator services generally cover:

- Help with business basics
- Networking activities
- Marketing assistance
- Market Research
- High-speed Internet access
- Help with accounting/financial management
- Access to bank loans, loan funds and guarantee programs
- Help with presentation skills
- Links to higher education resources
- Links to strategic partners
- Access to angel investors or venture capital
- Comprehensive business training programs
- Advisory boards and mentors
- Management team identification
- Help with business etiquette
- Technology commercialization assistance
- Help with regulatory compliance
- Intellectual property management

Group 5: Industry Sector Support: provide support and linkage with the industrial sector:

The industrial sector plays a major role through its active contributions as one of the main pillars in driving economic growth, in addition to its great role in employment, attracting investments, accessing global markets and showing the image and identity of Jordanian products. Some of the initiatives in the industry sector are:

- **Industrial R & D Fund (IRDF):** this fund, which is affiliated to the Higher Council for Science and Technology, was established in 1994 with the objective of increasing the competitiveness of Jordanian industries through the utilization of science and technology.

The main functions of the Industrial Scientific Research and Development Fund:

- Supporting Jordanian industries to invest in science and technology to achieve a remarkable development in terms of production processes and industrial management, product quality and development, as well as to improve the competitiveness of Jordanian industries.
- Encourage Jordanian industries to support research and development and to benefit from the thereof.
- Finding suitable opportunities for universities, scientific research centers and consulting firms to link their research activities to the needs of industry.
- Identifying the problems that face different industries and guiding them on how to solve these problems.
- Bridging the gap between research institutions, scientific research centers and industry and linking them together.
- Getting Jordanian industries aware of the importance of research and development to improve productivity and thus improve competitiveness.
- **Amman Chamber of Industry:** continued since its establishment in 1962 to keeping up with all local and international developments, dealing effectively with them in order to serve its progress and increase its ability to serve the national economy in general and the industrial sector in particular. The

Chamber has provided all possible support to the national industry to become a pioneer and ranks first among other economic sectors in terms of its importance to the Jordanian economy and its contribution to reducing the problems of poverty and unemployment, increasing exports and encouraging business environment. Some of the support and linkage with the industrial sector is represented through:

- **Graduation projects program:** Amman Chamber of Industry has launched the “Competition of Engineering Graduation Projects” implemented in the Industrial Sector since 2013 to connect the academic and industrial sectors and bridge the gap between them, increase the interest of the professors and students of engineering faculties in implementing graduation projects in the industrial sector which simulate the reality and needs of this sector.
- **Incentives:** there is a prize for the graduation project winners if their projects are adopted by the industry sector. In addition, a priority is given to employing recently graduated engineers who have previously implemented graduation projects in the industrial sector and competed for the prizes of the competition.
- **Investors agencies:** Access to funding sources for micro, small and medium enterprises; Access to Markets. Launching new programs with a possibility for local investors to join.

CHAPTER TWO

2.1 Work Methodology

A precompetitive analysis establishes the creation of a common space where public authorities and public procurers are able to expose their needs, and companies show their capacity to respond to those needs with the technology offered from the research centers.

The objective of each project partner is to develop precompetitive analyses for the concrete use of some already existing patents to resolve public sector needs, and enables the possibility of analyzing and diagnosing the patent and other scientific results portfolio based on the level of innovation, impact, and efficiency in facing the challenges at national level.

The work package 5 (WP5) is strongly linked to the living lab activities under WP3 and potential pilot projects under WP6.

The actual linkage between WP3 and WP5 in Jordan is illustrated in the following diagram:

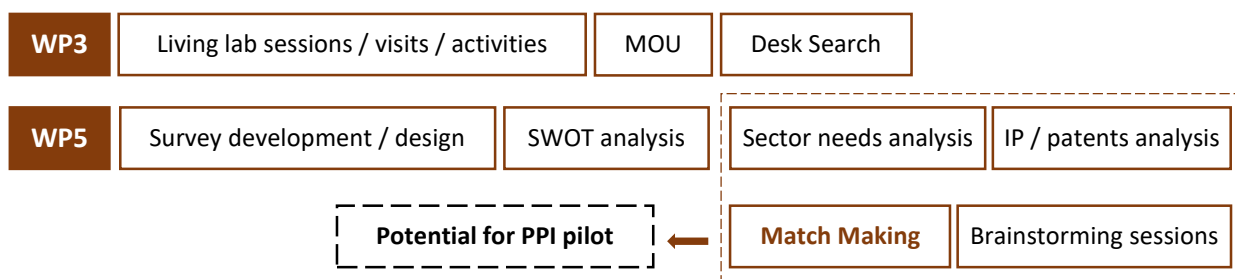


Figure 7: WP3 & WP5 linkage

The living lab activities under WP3 contributed in developing and distributing the baseline survey to participants in different sectors. The feedback received during the stakeholders' visits has a great input while designing the questionnaire under WP5.

The living lab activities also contributed in conducting five brainstorming sessions to discuss the needs & challenges of different stakeholders, the survey results and SWOT analysis, in addition to obtaining full patents list under WP5. The desk search help in analyzing the needs in different sectors and the governmental annual procurement plans.

2.2 Survey Design & Development

2.2.1 Survey Development

The baseline survey is an important tool under PPI4MED project work package 5 (WP5), to analyze the internal and external environment of the project stakeholders, understanding the different sectors needs and competitive environment. A questionnaire was designed and developed to approach key players in different sectors to gather accurate information about the innovation atmosphere in Jordan.

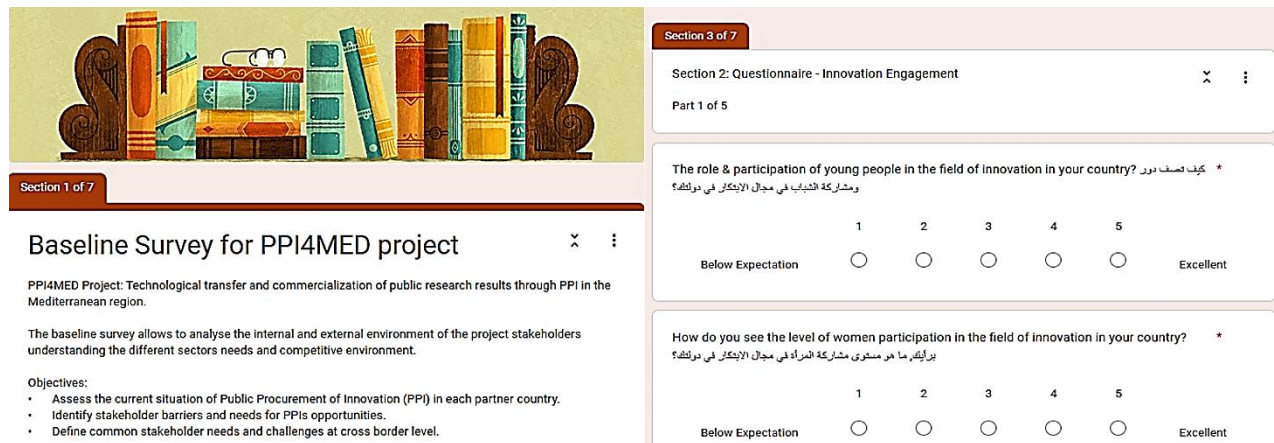
The objectives of the survey are:

- Assess the current situation of Public Procurement of Innovation (PPI) in the country.
- Identify stakeholder barriers and needs for PPIs opportunities.
- Define common stakeholders' needs and challenges at national level.

The survey was created using “google forms” to cover innovation and procurement in Jordan. The survey aimed to collect information from different sectors, different backgrounds, ages, genders, educational degrees, job titles, and other related data.

The survey was conducted **over a period of two months** due to summer holiday, to allow enough time for participants to contribute. An email was shared with participants with a clickable link to an online survey, in addition to phone calls, online post, and face-to-face requests.

The online questionnaire example is illustrated below:



Section 1 of 7

Baseline Survey for PPI4MED project

PPI4MED Project: Technological transfer and commercialization of public research results through PPI in the Mediterranean region.

The baseline survey allows to analyse the internal and external environment of the project stakeholders understanding the different sectors needs and competitive environment.

Objectives:

- Assess the current situation of Public Procurement of Innovation (PPI) in each partner country.
- Identify stakeholder barriers and needs for PPIs opportunities.
- Define common stakeholder needs and challenges at cross border level.

Section 3 of 7

Section 2: Questionnaire - Innovation Engagement

Part 1 of 5

The role & participation of young people in the field of innovation in your country? *
ومشاركة الشباب في مجال الابتكار في دولتك؟

	1	2	3	4	5	
Below Expectation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Excellent

How do you see the level of women participation in the field of innovation in your country? *
يرأيكم ما هو مستوى مشاركة المرأة في مجال الابتكار في دولتك؟

	1	2	3	4	5	
Below Expectation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Excellent

Figure 8: Baseline survey questionnaire sample

A complete questionnaire is shown in [Appendix 3](#).

2.2.2 Design Criteria

The baseline survey covers **five categories**:

1. Innovation Engagement: how the project is received by the innovation community in Jordan?
2. Research & Development: challenges and obstructions universities and researchers face.
3. Public Procurement of Innovation: strengths & weaknesses in the governmental procurement system.
4. Private Sector: needs of the SMEs and startup organizations.
5. PPI4MED Project: the opportunity for the project to succeed in Jordan.

Using different types of questions: Open-ended question; Closed-ended question; Numerical rating scale question; Linkert-type scale question; Multiple-choice question; and Dropdown question.

The target sectors are: public sector, private sector, universities, research centers, researchers, NGOs, individuals.

Survey sample: invitation was shared with more than 150 participants.

Actual no. of participants: 57 (over a period of 60 days).

Type: online questionnaire (google forms).

2.3 Survey Results

For the purpose of obtaining views from different PPI4MED stakeholders in Jordan, different sectors were invited to participate in the baseline survey: public, private, universities, research centers, researchers,

NGOs and individuals. Out of 57 participants, more than 50% were from the public sector, 30% from universities and 10% only were from the private sector.

Around 39% of the baseline survey participants have a master degree, 32% are PhD holders, while 28% have a bachelor degree, which gives a variety of perspectives among participants.

Participants' high level of experience provides deeper insights to the current situation in Jordan. Around 77% of participants have more than 10 years of experience, which is considered an added value to the survey while 14% have between 7-10 years of experience. Together, the two categories form the majority of participants.

The highest percentage of participants were from technology and engineering field with more than 47%, natural science with approximately 28%, and social science was around 23%.

More than 35% of participants were females while approximately 65% were males.

Gender: male vs. female

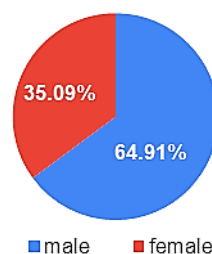


Figure 9: male & female participants

The following five categories are designed, developed and analyzed in the baseline survey questionnaire: Innovation Engagement, Research & Development, Public Procurement of Innovation, Private Sector and PPI4MED Project:

2.3.1 Innovation Engagement

Innovation engagement, the first category in the survey, was designed and developed to analyze how the PPI4MED project is received by the innovation community in Jordan; the role & participation of youth and women in the field of innovation; the national policy of innovation in Jordan; and the exiting capacity building program in innovation.

On a scale from 1 – 5, around 33% of participants picked level-3, as a sign of **youth** participation in the innovation field in Jordan, while approximately 25% have selected level-4. This gives an indication that there is proper participation of youth in innovation, and a wide space for future improvement.

Using the same scale from 1 – 5, more than 35% of participants picked level-3 of **women** participation in the field of innovation in Jordan, and around 21% selected level-4. This indicates that women participation is at an average level and still to be improved more.

More than 68% of survey participants ensured their organization's participation in the innovation process which can be noticed in different shapes: knowledge transfer, patents registration, financial assistance technical assistance, capacity building, business incubator and more.

One of the most important topic in the survey is about the availability of a **national policy** of innovation in Jordan as a strategic tool and guidance for all. Around 37% of participants believe there is a national innovation policy in Jordan, however, approximately 32% believes there is no policy at all, while around 32% are not sure, due to lack of knowledge.

Creating a clear innovation policy and communicate to everyone interested in innovation and entrepreneurship will make a big difference. The national innovation policy will draw a clear path to consider the scientific research results as a priority in governmental future procurement plans.

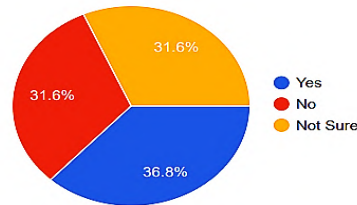


Figure 10: national policy

As large number of participants had no previous training in the field of innovation, participation in capacity building program becomes an important factor to raise the awareness of the community in different subjects such as: innovation, entrepreneurship, procurement, legal and other related topics.

2.3.2 Research & Development

Research & Development (R&D) is the set of innovative activities undertaken by corporations or governments in developing new services or products, and improving existing ones.

R&D activities differ from institution to institution and it is not intended to gain immediate profit. It generally carries greater risk and an uncertain return on investment, however R&D is crucial for satisfying certain national needs through the commercialization of new products or services.

The research and development centers, universities and researchers in Jordan are working and introducing different scientific results which can have positive impact at national levels. Most of these scientific research results are kept on shelves or inside closed drawers because researchers do not know exactly what to do with it.

Research & Development, the second category in the survey, was designed and developed to analyze the challenges and obstructions universities and researchers usually face during their researches and in commercializing the patents and the academic research results.

On a scale from 1-5, around 49% of participants have selected an average level (level-3) to indicate that the level of **academic results** is proper enough to match the national needs. Approximately 35% believes the results are less than average, and can definitely be improved more.

The **pandemic** effect on science and academic research results was also analyzed to measure the pandemic impact on researches. More than 45% of participants agree to the fact that the pandemic has impacted the research results, considering all the activities during the pandemic, focusing on the health sector which was a priority, while around 30% of participants considered the pandemic impact as neutral.

Analyzing the **current support** for academic researches and researchers to obtain practical results that can be commercialized and transformed into national products, more than 68% of participants confirmed there is no enough support to researchers to obtain practical results, while around 19% of participants are not sure, which again highlights the fact that there is lack of knowledge sharing at national level.

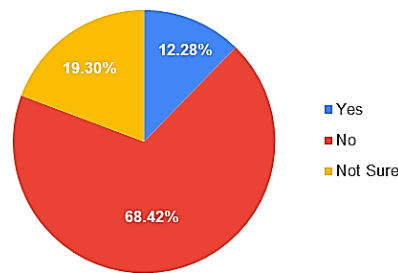


Figure 11: academic research support

Several **key barriers** to commercialization of public research results were analyzed in the survey including: financial, communication, capacity of stakeholders, lack of centralized coordination, patent registration, proper regulations, no match to public needs, private sector interests and others.

The main barrier to commercialization of public research results considered by more than 75% of participants was financial. This is expected as financial support is always required to assist the researchers in generating proper scientific results, and the SMEs & start-up organizations to adopt, and commercialize.

The second important barrier was lack of centralized coordination with more than 56% of participants, due to the urgent need of having a coordinating unit to link between key partners. Another key barrier with 44% was: no matching to public needs, which is a very important issue to analyze, as many research results do not address national challenges.

Lack of communication between key stakeholders, existing regulations and private sector interests were also noticed as major barriers to commercialization of research results.

Many possible **suggestions** to improve the process of commercialization of academic research were listed in the survey including: regular meetings, public & private funding, coordination between researchers & governmental entities on current & future needs, centralized entity for monitoring & evaluation of R&D results, technical assistance for patents registration and knowledge transfer, and knowledge transfer capabilities at institutional & national level.

Proper coordination between all interested parties was selected with more than 77% of participants. This indicates the huge needs of establishing one centralized unit to coordinate and link between key stakeholders.

Other key suggestion was the access to public & private funding according to 67% of participants, highlighting the major need of establishing a clear financing source for researchers and private companies, as well as, including purchasing of innovation and research results in the governmental yearly procurement plans.

The remaining suggestions with high percentage include: the need for regular and continuous meetings with 54%, monitoring & evaluation process with 54%, knowledge transfer capabilities with approximately 56%, while 40% of participants suggest the need for technical assistance for patents registration.

The current process of **patent registration** for organizations and researchers has several issues. More than 38% considered the process is complicated and long, while around 26% considered the process is long but not complicated. Combining both together: approximately 64% confirmed the process is lengthy. In addition, approximately 25% of participants are seeing the process vague and not clear. The patents registration process can be simplified and completed faster, with clear steps, duration, fees, approvals and else.

The main challenges and obstructions in registering the patent were: lack of fund with approximately 60%, while around 51% of participants considered lack of knowledge in IP/patent registration process is a key challenge they always face.

2.3.3 Public Procurement of Innovation

Public procurement of innovation is an opportunity for public procurers, community and private sector. Public procurer will get interested in buying an innovative solution when it provides better results at optimized cost. In some cases, public procurement of innovation responds to new needs which are not adequately met by the existing solutions on the market. Public procurer, once agrees to buy an innovative solution, will encourage private sector to participate.

Public procurement of innovation, the third category in the survey, was designed and developed to analyze the current governmental procurement process, strengths & weaknesses, challenges, and the existing collaboration between public sector and the research centers.

The **governmental needs** are included in the yearly purchasing plans as a normal practice, but according to 40% of the survey participants; the national allocated budget has a major impact on preparing the procurement plans and the needs it may cover, while 39% believed that the urgency of needs always affect the final plans. Only 25% of participants think the needs are determined according to the sector strategic goals.

The key **challenge** all governmental procurers face, according to 80% of the survey participants, is the budget limitation, while 49% believe there is no long-term plans, and lack of communication and coordination is noticed as a major challenge. Budget limitation is affecting the quality of services provided, result in modifying the yearly procurement plans, low budget for training and development, and difficulties in providing urgent needs.

A full assessment of governmental entities is required to identify patterns and similarity in these challenges, and provide valid solutions where possible with participation of concerned parties.

However, the current public procurement system has few **strengths** in general, such as: documentation of purchases & records as selected by more than 43% of participants while around 38% considered regulations, roles and responsibilities are clear enough. In addition, approximately 24% considered the IT system currently in place is good enough for the public procurement process.

It is clear that there are few strength areas to build on in the governmental procurement system, and there is a wide space for improvement.

The current **weaknesses** the governmental entities have in public procurement are mainly about lack of fund according to 65% of the survey participants, while 54% considered the procurement process is noticeably lengthy and should be simplified. Too many changes in regulations and procedures is considered a weakness point according to 44% of participants. In addition, approximately 40% of participants considered there is lack of specialized procurement individuals currently in place.

Lengthy procurement process and different specifications can cause repeated work and wasted efforts, while too many changes in regulations and procedures can cause major confusions to all involved parties.

One of the important areas the survey tried to highlight is the current experience and knowledge of the "public procurement of innovation - PPI" in Jordan. Approximately 64% of the survey participants confirmed a very little or no experience at all in the new PPI model.

It is clear that, some extra efforts in promoting the new PPI concept is required, with a proper capacity sharing system in place.

Participation of organizations and individuals in PPI4MED Project is expected to cover knowledge sharing and technical support according to 42% of the survey participants, while more than 33% will participate in the implementation stage as an active player. Approximately 30% considered their participation will be as an innovation policy maker, while around 30% will only be observers & assessors to the whole process. Some organizations will provide capacity building according to 24% of participants.

The existing **collaboration** between universities, research centers and the governmental sector, is considered at average level according to 36% of survey participants, while more than 50% considered the current collaboration is weak. Raising the collaboration percentage to an acceptable level is very important to ensure the PPI concept has a good chance for success.

2.3.4 Private Sector

The private sector is a key partner of the economic system in the country, run by individuals and companies, rather than a governmental entity with the intention of making profit.

Public procurers, by allocating a proper budget for innovation procurement on their yearly procurement plans, will encourage private investors such as SMEs or startups to invest in research results that have high potential marketing values.

Procuring innovation will require clear scope and specifications, simplified tendering procedures, communication and coordination system, in addition to, well-trained personnel in the innovation procurement process.

SMEs and start-up companies are facing several challenges towards commercialization of scientific research results to the public sector such as: the financial factor according to 77% of the survey participants, indicating the major need of a financial source and an incentive system to support these organizations. Another key challenge is the lack of communication between private sector and research centers according to 54%, showing a weak communication and coordination lines between both parties.

Approximately 44% of participants considered no clear regulations or policy, keeping the procurement process vague for many. Type of contract and legal terms included within the contract is seen as a challenge by more 42% of participants, which reflect the fear and uncertainty about what legal terms should be used to protect the rights of all parties.

The **existing collaboration** between universities, research centers and the private sector is considered weak according to 65% of the survey participants. Only 30% of participants are considering the collaboration is at an average level.

More than 40% are not sure if there is any existing collaboration between public, private and academia sectors to produce national products, while around 33% considered there is no collaboration at all. The result highlights the urgent need to have a knowledge sharing system between key stakeholders, and a central entity to coordinate and communicate, in order to introduce joint solutions and develop national products.

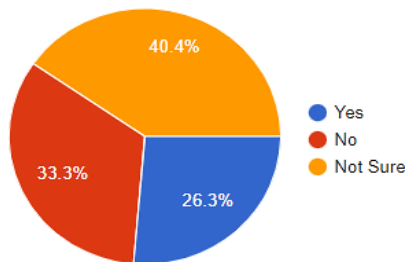


Figure 12: collaboration between all sectors

2.3.5 PPI4MED Project

The PPI4MED project will have tangible long-lasting impacts in the technical, socio-economic and policy-making fields. Commercialization of results will improve the focus of future research on tangible results for society.

Project details:

- **PPI4MED:** Public Procurement of Innovation for the Mediterranean Region.
- **Project title:** Technological transfer and commercialization of public research results through PPI in the Mediterranean region.
- **Thematic objective:** A.2 Support to education, research, technological development and innovation.
- **Priority:** A.2.1 Technological transfer and commercialization of research results.
- **Countries:** Spain, Italy, Tunisia, Egypt, Jordan

The Objective of the project is to boost the commercialization of research results from public research institutions through Public Procurement of Innovation, as well as private-public commercialization partnerships.

Participation in PPI4MED project by signing a non-binding Memorandum of Understanding (MOU) is considered an opportunity by more than 40% of the survey participants and approximately 23% might also get involved, while around 33% requires more information about the MOU before deciding to participate in order to avoid any legal or financial obligations.

PPI4MED Project is being received at an average level by the innovation community according to 60% of the survey participants which is considered a good indicator since the concept is still new and not very popular to many.

The Public Procurement of Innovation (PPI) model will increase the competitiveness between companies according to 54% of participants, while the other 46% are not sure about the outcome of the project. The good thing is that no one selected “no” as an option.

One of the major milestones of the PPI4MED project according to 75% of the participants is introducing a new concept for the future. Other milestones include increasing cooperation between key stakeholders according to 60% of participants, while creating a national database of all stakeholders in innovation and procurement is selected by 53% of the survey participants.

The major **problems** the PPI4MED project might face is being a new concept to all according to 61% of participants, while around 59% selected lack of fund to adopt any of the available patents as a key problem. At the current stage, there is no clear guidance or regulations to deal with the new concept according to 57% of the survey participants.

Complete survey results and analysis is found at [Appendix 4](#).

2.4 SWOT Analysis

SWOT is a tool to study the situation analysis in public procurement of innovation, analyzing the internal characteristics (**S**trengths and **W**eaknesses) and the external situation (**O**pportunities and **T**hreats) in a square matrix. It is a strategic planning and decision-making technique that helps any organization to assess its performance to shape a better future.

Designing and completing a proper SWOT analysis relies on collecting a reliable information from different sources. In **PPI4MED** project, visits & meetings within the living lab activities serve as an opportunity to collect the required data from different stakeholders to identify needs and challenges, technological solutions and potential patents for commercialization.

Another reliable source used to prepare the SWOT analysis for PPI4MED project was the desk search, using the governmental procurement department already-created SWOT analysis published at GPD website. All strengths & weaknesses in the public procurement process were highlighted, with recommendations for proper solutions.

The last source of information used to prepare the SWOT analysis was the design & development of the baseline survey (questionnaire) and distributing it to more than 150 participants in public, private, universities, research centers, researchers, NGOs, and individuals. The survey covered five main areas: the innovation environment and how the project is received in Jordan, research and development challenges, public procurement of innovation and the strengths & weaknesses in the public procurement process, the needs of the private sector, and finally the chance for PPI4MED project to success in Jordan.

Based on the information gathered from the sources mentioned above, the situation analysis (SWOT) was created using the matrix below, highlighting the strengths, weaknesses, opportunities and threats as shown in the table:

Strengths	Weaknesses
<ul style="list-style-type: none"> Jordan innovation system is driven by a modern ICT infrastructure with reliable uninterrupted communication solutions. Scientific Research & Innovation Support Fund (SRISF) currently exist within The Ministry of Higher Education (MoHE) to support researchers and provide fund to. Ministry of Industry and Trade is responsible for patents registration and IP protection. The experts provide assistance to researchers to go through the process and advise. Many programmes have been launched by public & private entities in Jordan, with the assistance of different internal & external partners, to promote innovation for economic growth and creating of jobs. The government of Jordan enhanced number of e-government services and processes. Government Procurement Department exists since 2019 for running public procurement process. 	<ul style="list-style-type: none"> Limited budget. No centralized unit at national level to manage and coordinate between all stakeholders. No clear strategy or roadmap at national level on procurement of innovation or commercialization of patents/research results. Lack of communication & coordination between public, private, universities and NRCs in Jordan. Lack of capacity development program in many organizations in innovation, entrepreneurship and other fields. No clear regulations to cover the overall process, contracts, stakeholders' rights, etc. Lengthy procurement process in most of the governmental entities. No incentives for SMEs and start-ups. No personal financial support for researchers. Too many changes within short time.

<ul style="list-style-type: none"> • SMEs and start-ups are always interested in PPI model if a financial support is available to assist in adopting potential patents. • Availability of qualified and skilled procurement staff. • Transparency in tendering and awarding. • Clear regulations, roles & responsibilities. • Documentation of purchases for transparency. 	<ul style="list-style-type: none"> • Lack of specialized procurement individuals. • Different specifications for same items in different entities.
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Opportunities	Threats
<ul style="list-style-type: none"> • Create one centralized unit to coordinate between relevant stakeholders is possible. • The capability to establish an online e-learning portal to share knowledge with governmental employees. • The willingness of SMEs/start-ups organization to be part of the PPI project. • STI and entrepreneurship eco-systems exist with all key players listed and can be updated to add others and work in focused-groups. • Technical assistance in innovation, procurement and entrepreneurship can be easily provided by existing experts. • Access to public & private funding is possible through incubators and facilitators. • Regular meetings between sectors can be organized better. • Line of communications between researchers and governmental entities on current & future needs can be easily established. • Technical assistance for patents registration is available by different organizations. • Knowledge transfer capabilities at institutional & national levels is suitable enough to assist in patents commercialization process. • Matching existing patents to public needs, will solve a critical issue at national level. • Unified all efforts is appreciated by many to avoid duplicating the same processes by different entities. 	<ul style="list-style-type: none"> • Lack of commitment. • Huge workload causing remarkable delays. • Available patents do not match governmental needs. • Public critical needs are not identified. • Lack of follow-up / coordination. • Electronic system shutdown or being hacked. • Losing of qualified and experienced personnel. • Pandemic effect / corona virus impact. • Weakness of governmental entities in planning their procurement plans. • Capacity of teams: lack of knowledge and skills. • Conflict of roles & responsibilities in many areas. • No long term business plans • Lengthy & vague patent registration process. • Right protection of key stakeholders. • Entities work separately from others. • Many high-value patents are not registered due to lack of fund, lack of knowledge about the process, fear of losing confidentiality.

Table 3: SWOT analysis

2.5 Sector Analysis

Moving in a sequence as mentioned in the work methodology earlier, and once the baseline survey and SWOT analysis are completed, the sector analysis was prepared using the feedback received from each stakeholder during the visits under the living lab activities, in addition to, the governmental annual reports and strategic plans published at different ministries' websites, and the procurement plans published usually at JONEPS system in Jordan.

Five sectors were covered: health; agriculture; water; energy and transportation. All strategic goals, challenges and obstructions were analyzed, the procurement items and allocated budgets were studied to highlight if the procurement plans would cover any of the governmental existing challenges or not.

It is clearly noticed that most of the items in the yearly procurement plans are purchased to cover daily routine work, nothing to cover any of the challenges due to limited budgets. Funding opportunities from external donors would help much to cover some of these challenges. The feedback received from different stakeholders in the public entities stated that budget limitation is a key factor when planning their yearly procurement plans.

The **sector analysis** for the five sector is shown below:

Governmental procurement plans, annual reports and strategic plans were analyzed. A comparison between the items listed in the procurement plans vs. the needs & challenges in the annual plans and strategic plans are represented in the tables for each sector:

Health sector analysis - potential for pilot and procurement of research results	
(Ministry of Health - strategic plan 2018-2022 & procurement plan 2022 analysis)	
Procurement plan 2022 - potential purchase for PPI project	Reference: strategic plan 2018-2022 - Ministry of Health
Purchase request	Areas of research, studies and patents that can be used in PPI4MED project
materials and tools of dental clinics and laboratories	distance training - transfer of knowledge and technology (practical methods + success stories) - simulation center
dental braces materials and tools	use of technology and digital transformation
dental implants	monitoring of communicable diseases
bone tools	weaknesses listed in the strategy: lack of applied studies and research
eye tools	Cancer detection program
trajectory speculum tools	Expansion of the Early Breast Cancer Detection Program
surgical endoscope tools	nursing services
nose, ear and throat tools	medical waste management
general surgical tools	blood test - clinical laboratory science
brain and nerve tools	laboratory services
hearing Aids	artificial limbs
medical furniture	

transplantation and microbiology	
virus detectors	
burns and beauty/plastic surgery	
medical sanitizers	

Table 4: health sector analysis

Full sector analysis for five sectors is found at [Appendix 5](#).

2.6 Patents and Research Projects

Once the sector analysis was completed for five key sectors, a full patents analysis was implemented to identify existing and developing patents in relation to public procurers' needs and challenges in Jordan.

The patents were collected from different universities and researchers with a valuable assistance from the Scientific Research & Innovation Support Fund (SRISF) in the Ministry of Higher Education (MoHE). A complete patents list was created from the collected data, categorized and sorted as per each university.

The patents were registered locally and internationally and will serve different sectors such as: food, agriculture, health, water, industry, energy, transportation and science.

A full study of the patents list shows the possibility to adopt and commercialize some of them. A total of 30 patents were analyzed, and around 10 were initially selected as potential pilot projects for commercializing as shown in the table below.

In addition to the patents received from the universities, the National Center for Research and Development (NCRD) is currently supporting 19 active projects, noting that around 24 projects were completed since 2010.

The Scientific Research & Innovation Support Fund (SRISF) has supported 514 projects in many sectors and spent around 31 million JOD (Jordan Dinar) from 2008-2022, while the National Agriculture Research Center (NARC) supports 39 projects in agriculture sector.

The **30 patents** received from the universities are:

Name of Patent	Patent Registration	University	Researcher	Date
Airborne microorganisms and viruses detection system and method	PCT/JO2022/050008	University of Jordan	Dr. Yazan Alzain Dr. Mohammad Bqoor Dr. Maha Bqoor	2022
Use of substituted quinolone derivatives for treating cancer	PCT/JO2022/050004	University of Jordan	Mohammed Ameen Dr. Rula darawsheh Dr. Yusuf Mohammad Al-Hiari Dr. Violet Najib Kasabri Fouad Salih	2022
Compounds of sulfonylurea-2-amino-2-deoxy-d-glucopyranose hybrids, their method of preparation, and a pharmaceutical composition thereof	In the process	University of Jordan	Dr. Ghadeer Isafaan	2021

Production of Nano-Basalt material to produce ultra-high performance concrete	PCT/JO2021/050014	University of Jordan	Dr. Rabab Allouzi Nayef Alsumir	2021
A vehicle charging station	PCT/JO2021/050009	University of Jordan	Dr. Mousa Omar Abdallah	2021
Novel substituted quinolones , methods of preparation thereof and their use for treating microbial infection	Pct./jo2020/050006	University of Jordan	Sumaya Abdallah Dr. Rula Darawsheh Dr. Yusuf Mohammad Al-Hiari Dr. Violet Najib Kasabri	2020
Ophthalmic Dosage Form Based Solid in Oil (S/O) Nano formulation of Vitamin C for Corneal Epithelial Wound Healing.	PCT/JO2021/050007	University of Jordan	Dr. Hatim Samir AlKhatib Dr. Bahaa Al Deen Jaber Dr. Mai Raed Jaber	2021
Regenerative vehicle suspension system	PCT/JO2020/050002 Wo2021/166007	University of Jordan	Dr. Nasser Shafea Dr. Salah Aldeen Al salti Jafaar Al Rashdan Dr. Laith Barghouth Dr. Malek Maen Dr. Mousa Omar Abdallah	2020
anti-microbial effect of new fluoroquinolones n clinically important microorganism	PCT/JO2020/050006	University of Jordan	Dr. Yusuf Mohammad Al-Hiari Dr. Rula Darawsheh	2020
Healing hand: A glove that protect eczema patients from night scratch	(PCT/JO2017/050001)	University of Jordan	Dr. Seif El-Din Saleh Al-Riyalat	2019
Design of super hydrophobic Nano-porous /micro-porous composite membranes and a device for membrane distillation	WO2019/119125	University of Jordan	Dr. Muhammad Rasoul Qutaishat	2019
Method for producing pure zeols from ZSM-5 raw kaolin	JO P/2017/0177	University of Jordan	Prof. Dr. Hamdallah Al-Hodali / Rasha Rawajfa / Abdel-Hadi Lafi	2020
Low protein flour	JO P/2018/0047	University of Jordan	Rima Tayyem	2019
Glycosylated 3-substituted fluoroquinolone derivatives, preparation methods thereof, and their use in the treatment of antimicrobial infections	JO P/2019/00240	University of Jordan	Dr. Ghadeer Isaifan Researcher Aya Muhammad Dr. Mayyada Shehadeh	2019
1,8-naphthyridine glucosamine derivatives, their use in the treatment of microbial infections, and a method for preparation	JO P/2019/0097 PCT/JO2019/050010	University of Jordan	Dr. Ghadeer Isaifan Researcher Aya Muhammad Dr. Mayyada Shehadeh	2019
The use of ionic liquids for stabilizing Insulin	JO-3253-B1	University of Jordan	Professor Dr. Al-Sayyid Al-Arabi Najiya Muhammad Abu Hishmeh Mahmoud Abdel Salam Al-Alawi	2018

Indirect heater for fresh air	-	Al-Balqa Applied University	Jamil Sami Haddad / Fouad Fakhri Al-Zayadin / Ayman Al-Alawin / Tayseer Abu Rahma / Tariq Al-Azab	2018
Device for separating olive peat components	-	Al-Balqa Applied University	Nizar Jamil Haddad / Jamil Sami Haddad / Tariq Al-Azab / Imad Haddad	2018
Portable device to convert gray water into drinkable water	-	Al-Balqa Applied University	Jamil Sami Haddad / Ayman Bassam Gamwah / Suhail Ahmed Naseer / Ayoub Muhammad Ghurair	2019
A New synchronous stream cipher design	-	Al-Balqa Applied University	Hatem Salem Abu Hamtah	2021
Disubstituted-thieno (2,3 - 2,4d) pyrimidine derivatives as anti-inflammatory agents	-	Philadelphia University	Dr. Pran Kishore (Principal Investigator) Inventors: Dr. Pran Kishore / Prof. Abdul Muttalib Jaber / Dr. Wafaa Al-Hourani / Ruba Anwar Selo	2020
Traffic notification system and method	-	Princess Sumaya University for Technology	Dr. Yazan Ahmed Qudah / Dr. Bilal Hussein Mohammed Sababha	2021
Substituted quinolone compounds, their use in the treatment of cancer, and a method for preparation	-	University of Petra	Ahmad Moh'd Kamal Al-Sheikh / Tawfiq Abdul Raheem Mohamed Arafat (The Jordan Center for Pharmaceutical Research (JCPR)) / Luay Fawzi Moh'd AbuQatouseh / Eyad Mazin Omar Mallah	2018
A Composition for treating anemone	-	University of Petra	Nidal Adel Mohammad Al-Qinna	2018
Composition for accelerating wound healing	-	University of Petra	Mayyas Mohammad Ahmad Al-Remawi / Faisal Tawfiq Al-Akayleh / Nidal Adel Mohammad Al-Qinna	2019
Coating method	-	Isra University	Dr. Iman Al-Zmaili Dahmash	2021
Pharmaceutical Aerogels for the preparation of "solid pediatric tablets"	-	Zarqa University	Dr. Jihad Nasir Al-Din	in progress
Newborn animal products	-	Zarqa University	Dr. Abdul Khaleq Dardas	in progress
Reducing blood sugar with nettle	-	Zarqa University	Dr. Kawthar Amawi	in progress
Treating breast cancer with lab-treated immune cells	-	Zarqa University	Dr. Ammar Ali Deeb	in progress

Table 5: patents list - universities

Patent lists from NCRD, SRISF & NARC are found at [Appendix 6](#).

2.7 Brainstorming Sessions

The National Center for Research and Development held several online brainstorming sessions for PPI model in five sectors: health, agriculture, water, energy and transportation.

The objectives of these sessions were to discuss the challenges in research & development environment, the role of innovation and entrepreneurship centers, preparing procurement plans in public sector, relevant patents in each sector, the needs of private sector, the role of the Scientific Research & Innovation Support Fund, and current collaboration between the three key players in PPI4MED project, namely the government sector, the private sector, and universities/research centers/researchers.

The online brainstorming sessions were held via Zoom as shown below:

Sector	Date	Timing
Health	28/9/2022	10:00 – 12:46
Agriculture	10/10/2022	10:00 – 14:22
Water	26/10/2022	10:00 – 13:03
Energy and Transportation	3/11/2022	10:00 – 13:10

Table 6: online brainstorming sessions

The sessions were attended by representatives from different sectors: government sector, private sector, universities, research centers, researchers, NGOs, and individuals.

Some of the participants' **comments** in these sessions:

- A new "intellectual property policy" was recently published.
- It is not necessary to register patents internationally and pay a high cost, unless there is a possibility to commercialize them there in order to avoid any financial loss.
- There is a clear problem in marketing the patents.
- There is a real problem with the centralization of information and having it in one place.
- There is no organized process on supporting and commercializing patents and scientific researches.
- Multiple references and lack of clarity on how to communicate with various parties concerned with scientific researches and the adoption of patents.
- The right to access any necessary information about sectors is not effective.
- Bureaucracy in patent registration, lengthy process and multiplicity of procedures and instructions.
- Commercialization of intellectual property is a difficult task locally, regionally, or internationally, and can be facilitated through the work of a proper established eco-system for commercialization.
- Governmental procurement plans and challenges are always restricted to the allocated budget, and some balance is transferred from one item to another to cover emergencies.
- Patents are adopted in the private sector if there is an economic feasibility with it.
- There are an existing research centers and support institutions with services not many people know about proving a weak sharing of knowledge and information.
- Lack of confidence in the existing patents for adoption by the private sector.
- The success in commercializing patents locally will motivate other countries to consider adopting the national patents and researches.
- There is resistance in various forms to any kind of change within some universities.
- Patents have two aspects: moral and financial, which both the researcher and investor need.
- Patent registration may take 2-3 years between registration, amendment and communication process.
- The Scientific Research & Innovation Support Fund (SRISF) communicates with various government sectors at the beginning of each year to determine the needs of each sector in order to launch the research cycle at the beginning of next year.

The general **recommendations** in the five sessions are:

- Establishing a central body to bring all sectors together, coordinates and links them directly, and build a comprehensive database for all sectors.
- Incentives for researchers / prizes for invention.
- Developing a value-added product.
- Facilitating government procedures for registering start-up companies.
- Raising researchers' awareness on patent registration process, how to complete it, and its stages.
- The need for a permanent financial source to help in registering patents locally and internationally.
- The necessity of submitting a patent protection application to prevent the theft of its idea.
- Participation of local companies or an alliance of local and international companies in patents' adoption.
- Identifying national governmental needs and communicating to other sectors, so that researchers and the private sector can focus on those needs to facilitate the commercialization process.
- Linking university incentives and promotions to the extent of solutions offered by scientific research to address national challenges.
- A dialogue with the private sector through a national conference to clarify the importance of adopting scientific research and to dispel concerns, if any, about investment and the rights of all parties.
- Communicate with a number of existing national investment institutions, capable of providing support or adopting start-up companies interested in working with researchers on patents.
- Defining a clear role of each institution and sector during the scientific research process, all the way to the final commercialization.
- Establishing and activating a specialized eco-system for commercialization to enable researchers to market their researches and patents locally and abroad.
- Defining and clarifying the meaning of "right of access to information" and its limits for the government employees, researchers and owners of emerging projects, to obtain support without delay.
- Sharing information about services and tools available in every university research center for researchers and private sector to benefit from.
- Continuity of cooperation between public and private sectors with university students and help them to complete their researches, graduation and post-graduation projects.
- Periodic communication between researchers, research centers, owners of patents and scientific projects, with the government and private sectors to work on some existing challenges.
- Forming research teams and focusing on specialized research in one topic.
- Focusing on the private sector for commercializing the research outcomes, for its financial capabilities more than the government sector.

Full details about the five brainstorming sessions are found at [Appendix 7](#).

2.8 Potential for PPI pilot - match making

As a result of the previous steps in the work methodology, and once completing the sectors analysis, patents analysis and brainstorming sessions for five sectors, a precompetitive analysis was developed for each opportunity to match a public need under PPI model.

The precompetitive analysis was created based on the public needs in each sector, the challenges and the potential patents that are considered a solution to some of these needs.

The comparison is represented in the table below:

PATENTS VS. PUBLIC NEEDS: POTENTIAL PILOT PROJECTS

Sector	Key governmental needs	Available patents	Potential adoption	Potential use	Patent date	Private sector	Reference	Challenges	note
Water	Research projects in desalination	Portable device to convert grey water into potable water	Yes	Local / international	2019	SME, start-up will participate with fund assistance to create prototype	patent list - Al-Balqa Applied University	Financial, health check, contract terms, researcher and private company rights, agreement for funding assistance, agreement with public procurer, lengthy process, testing period of prototype, cost.	Al-Balqa Applied University
Agriculture	Veterinary Drugs/Veterinary Medicine.	Composition for accelerating wound healing	Yes	Local / international	2019	Veterinary	Petra University patents list, MoH Procurement plan 2022	Financial, health check, contract terms, researcher and private company rights, agreement for funding assistance, agreement with public procurer, lengthy process, testing period, cost.	Zarqa University
	Veterinary Drugs/Veterinary Medicine.	Preparations for newborn animals			recent	Veterinary	Agri-ministry yearly purchasing plan 2022, cost: JOD 500,000)		
	Vaccines and capacity building					Veterinary			
MIT/Food	Support innovation and SMEs, start-up	Low protein flour	Yes	Local / international	2019	JOSILOS, SMEs	UoJ patents list, MIT strategic plan 2020-2022		University of Jordan
Health	Expansion of the Early Breast Cancer Detection Program	Treatment of breast cancer by lab treated immune cells	Yes	Local / international	recent		Zarqa University patents list, MoH Strategic plan 2018-2020	high risk, large investment, lengthy process, lack of fund,	Zarqa University

	burns and beauty/plastic surgery	Healing hand: A glove that protect eczema patients from night scratch	Yes	Local / international	2019	budget: JOD 1,000,000	UoJ patents list, MoH procurement plan 2022, MoH strategic plan	lack of interest in private sector	University of Jordan
	Eyes protection & cure	Ophthalmic Dosage Form Based Solid in Oil (S/O) Nano formulation of Vitamin C for Corneal Epithelial Wound Healing.	Yes	Local / international	2021				University of Jordan
	Cancer treatment	Use of substituted quinolone derivatives for treating cancer	Yes	Local / international	2022				University of Jordan
Transportation	Tracking government vehicles	Traffic notification system and method	Yes	Local / international	2021	IT sector, transportation company	PSUT patents list	Financial, health check, contract terms, researcher and private company IP rights,	PSUT
	update transportation sector strategy for 2022-2027	A vehicle charging station	Yes	Local / international	2021	Electrical SME, batteries manufacturer, transportation company	UoJ patents list, MoT yearly report 2021, MoT procurement plan 2022	agreement for funding assistance, agreement with public procurer, lengthy process, testing period of prototype, cost.	University of Jordan
Energy	renewable energy	Currently, no patent available in the energy sector	No	No	-	-	Procurement plan 2022, yearly report 2020.	-	no patents in the energy sector
	exploitation of shale								
	weak movement / earthquake monitor								
	radiation hazards								

Table 7: potential for PPI pilot - match making

2.9 Recommendations

The key recommendations as a result of the work methodology are:

- Establishing a national centralized entity at prime-ministry level to coordinate between all key stakeholders. This will facilitate the communication, planning, and innovation adopting process, in addition to, having all concerned parties under one umbrella, including: patents list, patents registration, public needs and priorities, SMES/start-ups list, roadmaps to follow, assigned focal points, clear roles & responsibilities, challenges/weaknesses to overcome, etc.
- The government is required to review and update the legislative framework, creating a more innovation-friendly environment, simplifying regulations & procedures, creating clear policies, roles and responsibilities to facilitate R&D and participations of researchers and private sector.
- Shorten patents registration process time, creating clear and simple registration process.
- Proper funding: covering research and researchers' expenses and increasing spending on R&D.
- Provide incentives for SMEs and start-ups, improving access to information on funding availability.
- Creating proper environment that attracts foreign investors.
- The government should support creation of SMEs & start-ups, and encourage public-private partnerships and facilitate their market access.
- The government should act as a facilitator in the innovation and entrepreneurship ecosystem, and give the researchers and private sector sufficient space to act and guarantees to support them through the whole research and commercialization process.
- An important step for the future is investing in innovation & entrepreneurial education at school level and universities.
- Establishing a national e-learning system for capacity building, and knowledge sharing for all.
- Promotion of innovation and entrepreneurial to the society and highlighting the benefits of becoming an entrepreneur.
- The need to establish and activate knowledge transfer offices and exchange ideas locally and internationally.
- Improving coordination and cooperation between different innovation actors is required.
- Building proper line of communication between public, private and universities/researchers.
- Coordination between governmental requirements and researchers to focus on national needs in their researches, through a national dialogue, workshops, conferences or else.
- Establish monitoring and evaluating framework to assess the efficiency and effectiveness of innovation strategies, communication and coordination.
- Proper infrastructure & tools to facilitate researches and introducing innovated solutions.
- Modernized IT technology in place.
- Consider innovation procurement always in governmental yearly procurement plans, and give a priority to national products and national private sector.
- Update regularly the public needs and priorities list, and communicate to all.
- Provide special training in procurement of innovation and legal to all involved parties.

- Use the concept of “Start small, scale up fast” for public procurement of innovation. It is recommended to introduce the project as a step-by-step learning process. The many changes, from cultural to procedural required for public procurement of innovation need to start slowly and gain people willingness to participate through proper communication and pilot projects.

2.10 Conclusions

The PPI4MED project is a great opportunity for Jordan to adopt a new concept in procurement that can be used at a national level and boost the commercialization of research results from public research institutions through Public Procurement of Innovation.

The project will have tangible long-lasting impacts, link between national priorities and scientific research results.

Including private sector in the process and building national products will shape the future of research and development in Jordan.

APPENDICES

Appendix 1: entrepreneurship ecosystem in Jordan

The entrepreneurship ecosystem in Jordan consists of **6 pillars**:

Policy & Regulations	Innovation & Growth	Business Support	Human Capital	Money Capital	Community Building
Policy	Science & Business Park	Business Service	Entrepreneurial Universities	Venture Capital	Media
Accessibility & Easiness	Social Innovation	Accelerators	Training Programs	Seed Funding	Educational Platforms
Regulations	Intellectual Properties	Consulting	Recruiting Agencies	Credit Financing	Networking Events
	R&D Labs	Co-Working Spaces	Educational Institutions	Grants & Donors	Conferences & Forums
		Incubators		Private Equity	Business Associations
				Crowd Funding	
				Angel Investor	

Policy & Regulations	Innovation & Growth
Policy: <ul style="list-style-type: none"> Ministry of Social Development Ministry of Labor Ministry of Industry & Trade 	Science & Business Park: <ul style="list-style-type: none"> King Hussein Business Park (KHBP) Royal Scientific Society (RSS)
Accessibility & Easiness: <ul style="list-style-type: none"> Political Stability Access to Infrastructure Access to Investment Business - friendly Regulations Access to Bankruptcy Proceedings Access to Transportation & Logistics Access to Governmental & Public Data Enforcing Contracts Enforcements Access to Telecommunications & Broadband 	Social Innovation: <ul style="list-style-type: none"> Tech Tribes (TT) Amman Design Week The Social Innovation Labs initiated by Jordan River Foundation (JRF) & funded by UNICEF Shoman Foundation
Regulations: <ul style="list-style-type: none"> Greater Amman Municipality ASEZA Aqaba Chamber of Industry Chamber of Commerce Higher Council for Science and Technology The Food and Drug Administration (FDA) Jordan Standards and Metrology Organization (JSMO) 	Intellectual Properties: <ul style="list-style-type: none"> iPARK AI – Urdonia Lil Ebda Talal Abu-Ghazaleh Organization Jordan Enterprise Development Corporation (JEDCO)

	R&D Labs: <ul style="list-style-type: none"> • Royal Scientific Society (RSS) • National Energy Research Center (NERC) • Higher Council for Science & Technology (HCST) • Jordan Badia Research & Development Center (JBRDC) • Jordan Center for Public Policy Research & Dialogue (JCPPRD) • The National Center for Research & Development (NCRD)
Business Support	Human Capital
Business Service: <ul style="list-style-type: none"> • Irada • USAID - LENS • PrezLab • Wasseleh Creative Solutions • Kilograms Creative Tactics • Accounting House • Adel Habib & CO. • Insight Chartered Accountants • Al Wabel Recruitment Agency 	Entrepreneurial Universities: <ul style="list-style-type: none"> • GJU PIE • JUST - Center of Excellence & Innovative Projects • The University of Jordan Innovation & Entrepreneurship Center • The Queen Rania Center for Entrepreneurship (QRCE) at Princess Sumaya University for Technology (PSUT)
Accelerators: <ul style="list-style-type: none"> • Hassad • Oasis500 • EU Shamal Start • Arab Bank Accelerator • Ahli Fintech Seed Program & Acceleration 	Training Programs: <ul style="list-style-type: none"> • USAID LENS • USAID BEST • Injaz (CSP / EDP) • TAG Organization • Jordan Green Building Council (GBC) • Trip to Innovation (TTi) • Noor Al - Hussein Foundation Community Development Program • NHF's Capacity Building and Business Service Development (CBBDS) • Jordan12 Program by iPARK • Exceed IT Services
Consulting: <ul style="list-style-type: none"> • JEDCO • Eshraaq • El Urdonia Lil Ebda • Trip to Innovation TTI • Taqyim • Al Wabel Recruitment Agency 	Recruiting Agencies: <ul style="list-style-type: none"> • Migrate • Taqyim • Exceed it Services • Kawader for Recruitment • Al Wabel Recruitment Agency

Co-Working Spaces: <ul style="list-style-type: none"> • Oasis 500 • Zain - ZINC • Migrate Jordan • Studio - Be • The Tank by Umniah • VBC Co-Working Space • iPARK • V Business Center (VBC) 	Educational Institutions: <ul style="list-style-type: none"> • BDC - Sanad • Queen Rania Center for Entrepreneurship (QRCE)
Incubators: <ul style="list-style-type: none"> • iPARK • DeZain • Orange - BIG • The Tank by Umniah • Trip to Innovation (TTI) 	
Money Capital	Community Building
Venture Capital: <ul style="list-style-type: none"> • Oasis500 • Amwal Investment PLC • Al-Arabi Investment Group 	Media: <ul style="list-style-type: none"> • KAFD • Forsa • Wamda • Roya TV • Hashtag Arabi • Higher Council for Science and Technology
Seed Funding: <ul style="list-style-type: none"> • Oasis500 • Arabneuer • Shoman Foundation 	Educational Platforms: <ul style="list-style-type: none"> • Forsa • Edraak • Darsak • Jo Academy • The National Center for Innovation (NCI)
Credit Financing: <ul style="list-style-type: none"> • Arab Bank • Ahli Bank - Al Nashmiat • Ahli Microfinance Company • National Microfinance Bank 	Networking Events: <ul style="list-style-type: none"> • Edama • Forsa • Trip to Innovation (TTI) • Crown Prince Foundation (CPF) • King Abdullah Fund for Development (KAFD) • Ipark • Higher Council for Science and Technology • The National Center for Innovation (NCI) • GJU Program Innovation & Entrepreneurship (GJU PIE)
Grants & Donors: <ul style="list-style-type: none"> • GIZ • European Union (EU) • World Bank - MSMEs Development Project for Inclusive Growth 	Conferences & Forums: <ul style="list-style-type: none"> • Innovation & Entrepreneurship Conference (IEC) • International Conference on New Trends in Information Technology (NTIT)

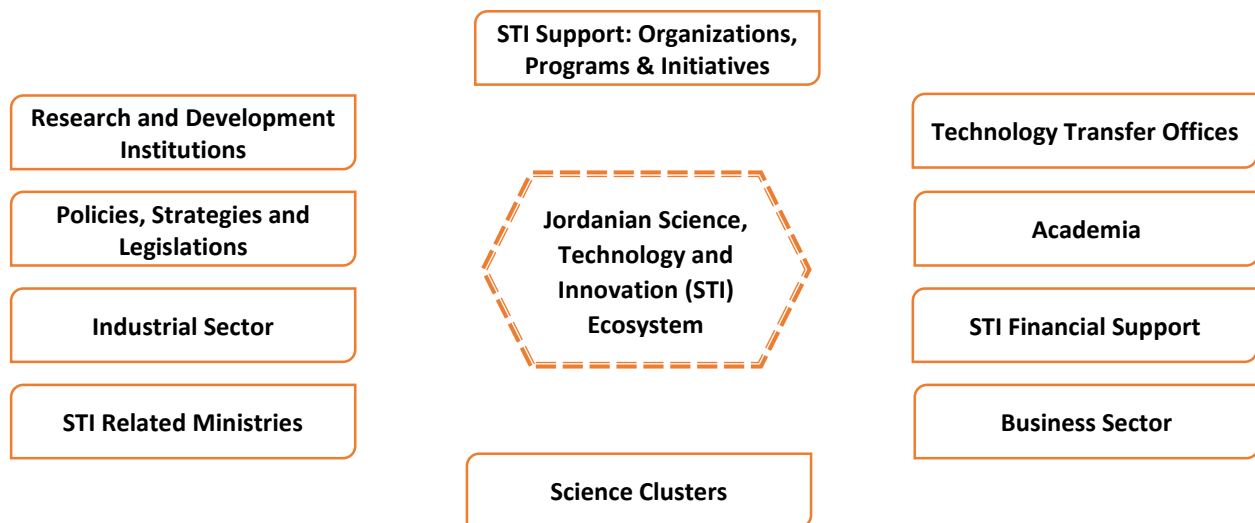
<ul style="list-style-type: none"> • Shoman Foundation • Jordan12 Program by iPARK 	<ul style="list-style-type: none"> • Jordan Economic Forum • Higher Council for Science and Technology
Private Equity: <ul style="list-style-type: none"> • Ruwwad MVF • Catalyst Private Equity • Foursan Capital Partners • Riyadh Enterprise Development 	Business Associations: <ul style="list-style-type: none"> • Jordan Society for Business • Bedaya Business Angel Network (El Hassan Science City) • Trip to Innovation (TTi) • Jordan Green Building Council (GBC) • Migrate
Crowd Funding: <ul style="list-style-type: none"> • LIWWA • Afkar MENA • Arab Crowd Funding 	
Angel Investor: <ul style="list-style-type: none"> • Beyond • Angel Investment Network 	

Appendix 2: Jordan Science, Technology & Innovation (STI) Map

The STI ecosystem players are classified into 4 major groups and 10 major players. The four groups are:

- **Science:** Technology Transfer Offices, Research and Development Institutions, Science Clusters and Academia.
- **Industry:** Industrial Sector and Business Sector.
- **Government:** Policies, Strategies and Legislations and STI Related Ministries.
- **Financial** Organizations: STI Financial Support and STI Support: Organizations, Programs and Initiatives.

The ten key players are:



The four **groups** have the following players:

Group 1: Science	
Research and Development Institutions	Technology Transfer Offices
<ul style="list-style-type: none"> • Royal Scientific Society: Research Centers • Higher Council for Science and Technology • Synchrotron Light for Experimental Science and Applications in The Middle East Sesame • National Energy Research Center • Royal Botanical Garden • Water and Environmental Research and Study Center, UoJ • National Information Center • National Center for Agricultural Research and Extension • Queen Rania Center for Jordanian Studies & Community Services, Yarmouk University • Cell Therapy Center, UoJ • National Center for Human Resources Development • National Center for Diabetes, Endocrine and Inherited Diseases • Princess Haya Biotechnology Center at Just • National Center for Research and Development • Hamdi Mango Center for Scientific Research – UoJ 	<ul style="list-style-type: none"> • Public Universities: <ul style="list-style-type: none"> ➤ Hashmite University ➤ Mutah University ➤ Jordan University Of Science and Technology ➤ Yarmouk University ➤ University of Jordan ➤ Tafila Technical University ➤ German Jordanian University ➤ Al-Hussein Bin Talal University ➤ Al-Balqa' Applied University ➤ Al Al-Bayt University • Private Universities: <ul style="list-style-type: none"> ➤ Middle East University ➤ Jordan Academy of Music ➤ Jerash Private University ➤ Isra University ➤ Zarqa University ➤ Petra University ➤ Philadelphia University ➤ Jadara University

<ul style="list-style-type: none"> • Pharmaceutical Research Centre, Just • Al Urdun Al Jadid Research Center • National Resources Authority • Petra University Animal Care Unit • Petra University Pharmaceutical Center • Center of Excellence for Innovative Projects, JUST • King Hussein Institute for Biotechnology and Cancer • Center for Strategic Studies, UoJ • King Hussein Cancer Center 	<ul style="list-style-type: none"> ➤ Talal Abu-Ghazaleh University ➤ Princess Sumaya University for Technology ➤ Ajloun National Private University ➤ The World Islamic Science & Education University ➤ Irbid National University ➤ Amman Arab University ➤ Al-Zaytoonah University of Jordan ➤ Al-Ahliyya Amman University ➤ Aqaba University of Technology ➤ Columbia University Global Center ➤ Arab Open University ➤ Applied Science Private University <ul style="list-style-type: none"> • Colleges: <ul style="list-style-type: none"> ➤ Prince Faisal Technical College ➤ Khawarizmi College ➤ Arab Community College ➤ Alquds College ➤ Colleges at Al Balqa'a Universities
Science Clusters	Academia
<ul style="list-style-type: none"> • Associations of Arab Universities • Federation of Arab Scientific Research Councils • Jordan Medical Association • Jordan Pharmaceutical Association • Jordanian Geologists Association • Jordan Association for Pharmaceuticals Manufacturers • Jordan Engineers Association • Jordan Dental Association • Agricultural Engineers Association 	<ul style="list-style-type: none"> • National Center for Research & Development (NCRD) • Jordan University of Science & Technology • Philadelphia University • Petra University • Amman Chamber of Industry • Jordan Industrial Estate Company • Al Urdonia Lil Ebda • King Abdullah li Fund for Development • University of Jordan • Hashemite University • Al Balqa' Applied University • Princess Sumaya University for Technology • German Jordanian University • Jordan Enterprise Development Corporation • Yarmouk University • Jerash Private University • Mu'tah University • National Center For • Agricultural Research and Extension • Ajloun National University • Escwa Technology Center (ETC)
Group 2: Industry	
Industrial Sector	Business Sector

<ul style="list-style-type: none"> Industrial Representatives: <ul style="list-style-type: none"> Jordan Chamber of Industry Jordan Industrial Estates Corporation Industrial Clusters: <ul style="list-style-type: none"> KADDB Industrial Park ICT Cluster Pharmaceutical Cluster Fertilizer Chemical Cluster Health Care and Services Cluster King Abdullah Industrial Estate Health Care & Services Cluster 	<ul style="list-style-type: none"> Incubators and Accelerators <ul style="list-style-type: none"> iPARK ibda3: Zain Oasis 500 Young Entrepreneurs Association Jordan Innovation Center at Philadelphia Wamda Capital Al Urdonia Lil Ebda South Business Incubator Center Jordan Forum for Business & Professional Women The Tank 0 Umniah – KHBP MENA Apps The Technological Incubator (JUST) Agro Industry Business Incubator Copiatec / Biotechnology Incubator at Mafraq Development Company Business Representatives <ul style="list-style-type: none"> Jordan Chamber of Commerce Chamber(s) of Commerce Jordan Engineers Association Businessmen Society Jordan Enterprise Development Corporation Information Technology Association of Jordan (Int@J) Institute of Management Consultants and Trainers Architects and Engineers Business Council Business Clusters <ul style="list-style-type: none"> Cyber City Jordan King Hussain Business Park
Group 3: Government	
Policies, Strategies and Legislations	STI Related Ministries
<ul style="list-style-type: none"> Jordan 2025 Jordan National ICT Strategy 2013-2017 National Policy Strategy for STI 2013-2017 National Medical Biotechnology Strategy Master Strategy of Energy Sector in Jordan 2007-2020 Jordan Education Initiative 	<ul style="list-style-type: none"> Ministry of Education Ministry of Higher Education & Scientific Research Ministry of Information and Communication Technology Ministry of Energy and Mineral Resources Ministry of Health Ministry of Environment Ministry of Finance Ministry of Industry and Trade Ministry of Agriculture Ministry of Water & Irrigation Government Procurement Department(GPD): public entity Ministry of Education Ministry of Higher Education & Scientific Research Ministry of Information and Communication Technology Ministry of Energy and Mineral Resources Ministry of Health

	<ul style="list-style-type: none"> Ministry of Environment Ministry of Finance Ministry of Industry and Trade Ministry of Agriculture Ministry of Water & Irrigation Government Procurement Department(GPD): public entity
Group 4: Financial	
STI Financial Support	STI Support: Organizations, Programs and Initiatives
<ul style="list-style-type: none"> Awards <ul style="list-style-type: none"> King Abdullah II Award for Youth Innovation and Achievement Hijjawi Award for Applied R&D El Hassan Bin Talal Award or Scientific Excellence Queen Rania National Entrepreneurship Competition Bank Al Ethad SME Awards Investments <ul style="list-style-type: none"> Accelerator Technology Holdings (ATH) Catalyst Private Equity Foursan Equity iMENA Riyada Enterprise Development MENA Venture Investments Jabbar Internet Group Oasis 500 Silicon Badia Accelerator Management Company Interactive Ventures Holdings Endeavor Jordan Dash Ventures Funds <ul style="list-style-type: none"> Islamic Development Bank Industrial Research and Development Fund Scientific Research Support Fund EU + SRTD Endeavor Jordan Jordan Enterprise Development Corporation Middle East Partnership Initiative (MEPI) National Fund for Enterprise Support King Abdullah II Fund for Development Abdul Hameed Shoman Fund for Supporting Scientific Research Jordan Forum for Business and Professional Women Jordan Loan Guarantee Corporation Applied Scientific Research Fund Development & Employment Fund European Bank for Reconstruction & Development USAID Grants 	<ul style="list-style-type: none"> STI Support Organizations <ul style="list-style-type: none"> Royal Scientific Society Higher Council for Science & Technology Jordan Enterprise Development Corporation Jordan Society for Scientific Research Queen Rania Centre for Entrepreneurship King Abdullah II Design & Development Bureau KADDB National Center for Innovation UNIDO International Development Research Center Jordan Competitiveness Program - USAID Young Entrepreneurs Association Business Development Centre Engineers Training Center Islamic Development Bank Department of Statistics Jordan River Foundation UNESCO World Bank National Information Technology Center ESCWA Technology Center Orange Jordan Microsoft Innovation Center Intellectual Property Commercialization Office Robotics and Intelligent Automation Innovation Center of Excellence Certification and Calibration Bodies <ul style="list-style-type: none"> SGS LLOYDS Jordan Food & Drug Administration Jordan National Metrology Institute Jordan Institute for Standards & Metrology STI Support Programs & Initiatives <ul style="list-style-type: none"> USAID (JCP) Support to Research & Technological Development UNDP UNEP Jordan Forum for Business and Professional Women Education Reform for The Knowledge Economy (ERFKE) Programme European Enterprise Network Civilian Research & Development Foundation

<ul style="list-style-type: none"> ➤ Swiss Agency for Development and Cooperation (SDC) ➤ German Agency for Technical Cooperation (GIZ) ➤ European Bank for Reconstruction & Development ➤ Japan International Cooperation Agency 	<ul style="list-style-type: none"> ➤ Faculties for Factories Program ➤ Jordan Technology Transfer Offices Network ➤ Jordan Innovation Centers Network ➤ European Union (JUMP, JSMP, JordanNet) ➤ Bedaya Angel Network ➤ Jordan Education Initiative (JEI) ➤ Microsoft Bizspark ➤ Injaz ➤ Zee Lunch Pad
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In more details, the current key players in Jordan, in innovation & entrepreneurship with major impact and contributions, are:

Finance:

- Oasis500: invest in profitable business ideas in their early stages from the Tech and Creative Industries. So far they have launched over a 130 startups and trained 2,500 entrepreneurs with the help of \$8 million in investment, 100 mentors, and 100 angel investors.
- Dash Ventures (a private partnership of entrepreneurs and business experts): integrates startups into a global network of industries such as technology, healthcare, financial services, and government.
- MENA Apps: connect young entrepreneurs with innovations and creativity to the resources they need to reach consumers.

Accelerators/Incubators:

- The Queen Rania Center for Entrepreneurship (QRCE) opened in 2004 with a mission to help develop Technology Entrepreneurship in Jordan. Their focuses include networking, recognition and awareness, capacity building and support, and funding. Over the past years, roughly 30,000 people have participated in their general and special networking activities, 4,000 have participated in bootcamps, training workshops, and mentoring programs, 300 jobs have been created, 100 startup projects have been recognized, and they have hosted 10 conferences and national competitions.
- The Business Development Center (BDC) in Jordan has crafted extensive solutions for the needs of Jordanian SMEs, women, youth, entrepreneurs, and local economic development.
- ZINC – Zain Innovation Campus: provides Jordanian entrepreneurs and startups with the resources they need to take their businesses to the next levels. ZINC has expanded to include branches in the University of Jordan, Yarmouk University – Irbid, and ShamalStart Initiative – Luminus.
- Spark: is alleviating the unemployment issue in Jordan by building entrepreneurs. Spark has partnered with the University of Petra (UoP) to introduce entrepreneurship to the youth of Jordan. The youth are taught with interactive lessons, guest speakers, field visits, and one on one coaching for successful results.
- Shamal Start: is the leading business accelerator and seed investor in North of Jordan. They facilitate passionate entrepreneurs with ideas in manufacturing and service by providing support, mentorship, workspace, networking, seed funding, and access to a digital fabrication facility in Jordan. Shamal Start is known for FabLab, the first digital fabrication laboratory in Jordan.

Technological Development:

- Reboot Kamp (RBK) is a coding bootcamp in the Middle East which provides a 16-week program to turn students into software engineers in the programming language.

Events and communities:

- The MakerSpace in the Jordan Museum is the place for visitors to explore and interact with modern digital fabrication tools and innovative technologies. Some of these innovations include 3d printers, audio visual devices, and advanced robotics.
- Startup Grind Amman: One of the most active Startup Grind communities globally, Startup Grind Amman is an online community of startups, founders, innovators, and creators.
- King Hussein Business Park: a complex in Amman which hosts 75 global and local companies. It offers 120,000 square meters of ready-to-use office space in a central, easy to access location. The business center plans to accommodate more businesses, attract investors, and add recreational components to its space. Created to facilitate gatherings, the park has an auditorium with a capacity of 500 people, ideal for workshops, conferences, lectures, showings, and presentations.

Appendix 3: Baseline survey template

QUESTIONNAIRE

(إستبانة)

BASELINE SURVEY FOR PPI4MED PROJECT

- PPI4MED Project: Technological transfer and commercialization of public research results through PPI in the Mediterranean region.
- The baseline survey allows to analyse the internal and external environment of the project stakeholders understanding the different sectors needs and competitive environment.

Objectives:

- Assess the current situation of Public Procurement of Innovation (PPI) in each partner country.
- Identify stakeholder barriers and needs for PPIs opportunities.
- Define common stakeholder needs and challenges at cross border level.

This survey is designed to captures experts' opinions in understanding the challenges of commercialising the public research results, the opportunities and how to shape a better future.

The baseline survey questionnaire is a key tool in analysing the internal and external environment. It helps in identifying the strengths and weaknesses of the public procurement in your country.

SECTION 1: PARTICIPANT DETAILS

Name:

Name of the institution

Position at Institution

I represent a:

- ☐ Public Authority (Ministry, governmental entity, etc)
- ☐ University/research institution, private R&D institutions
- ☐ Financing actors (Venture capital firm, business angel, bank, other types of investor)
- ☐ Business organization (Start-up, SME, corporate)
- ☐ Business and entrepreneurship supporting organization (funding agency, industry association, accelerator, incubators, other types of support providers)
- ☐ NGO / civil society representative
- ☐ Policy maker

Other

Country:

University Degree:

- ☐ Bachelor Level
- ☐ Master
- ☐ PhD
- ☐ Other

Major

- ☐ Social science (business, economic, management, art, etc)
- ☐ Natural science (science, physics, chemistry, pharmacy, medicine, etc)
- ☐ Technology, engineering, mathematics
- ☐ Other

Your Experience

Gender:

Email

Questionnaire - Innovation Engagement - part 1 of 5

The role & participation of young people in the field of innovation?

كيف تصف دور ومشاركة الشباب في مجال الابتكار؟

Below Expectation 1 2 3 4 5 Excellent

How do you see the level of women participation in the field of innovation?

برأيك، ما هو مستوى مشاركة المرأة في مجال الابتكار؟

Below Expectation 1 2 3 4 5 Excellent

Is there any contribution of your organization in the innovation process? هل هناك

أي دور لمؤسستك في عملية الابتكار؟

Yes No Not Sure

If your answer is (yes) to the previous question, what is the role & contribution of your organization in the innovation process? إذا كانت إجابتك "نعم" للسؤال السابق، ما هي مساهمة مؤسستك في عملية الابتكار؟

- ☐ Technological / knowledge transfer office
- ☐ Patents registration / assistance office
- ☐ Financial assistance
- ☐ Technical assistance
- ☐ Consulting and capacity building
- ☐ Grant(s)
- ☐ Business incubator
- ☐ Other:

Is there a national policy in innovation? برأيك، هل هناك سياسة وطنية للابتكار؟

Yes No Not Sure

Did you ever participate in any training program in innovation? هل شاركت يوما في أي برنامج تدريبي عن موضوع الابتكار؟

أي برنامج تدريبي عن موضوع الابتكار؟

Yes No

Questionnaire - Research & Development - part 2 of 5

How do you see the level of academic research results from universities/research centers? برأيك, ما هو
مستوى مخرجات البحث العلمي من الجامعات والمراكز
البحثية؟

Below Expectation 1 2 3 4 5 Excellent

Is there enough support for academic researches/researchers to obtain practical results that can be
commercialized and transformed into national products? هل يتوفر دعم كاف للبحث العلمي / الباحثين من أجل
مخرجات علمية تطبيقية يمكن استغلالها
تجاريا" وتحويلها الى منتجات وطنية؟

Yes No Not Sure

What are the main barriers to commercialization of public research results? ما
هي أهم الحواجز والمعوقات أمام تسويق مخرجات البحث العلمي وتحويلها؟

- ☐ Financial
- ☐ Communication
- ☐ Capacity of stakeholders
- ☐ Lack of centralized coordination
- ☐ Patent registration
- ☐ Proper regulations
- ☐ No match to public needs
- ☐ Private sector is not interested
- ☐ Other:

What are your suggestions to improve the process of commercialization of academic research? ما هي
اقتراحاتك لتحسين عملية تسويق مخرجات البحث الأكاديمي

- ☐ Regular meetings with all stakeholders
- ☐ Public & private funding
- ☐ Coordination between researchers/governmental entities on current/future needs
- ☐ Centralized entity for monitoring & evaluation of R&D results
- ☐ Technical assistance for patents registration and knowledge transfer
- ☐ Knowledge transfer capabilities at institutional & national level
- ☐ Other:

How do you see the current process of dealing with patent & intellectual property and licensing issues for
organizations and researchers? كيف تصف التعامل
وتسجيل الملكية الفكرية وبراءات الاختراع للشركات والباحثين؟

- ☐ Complicated and long
- ☐ Long but not complicated
- ☐ Easy and fast
- ☐ Vague (not clear)

○ Other:

What are the main challenges and obstructions in registering the patent/IP for organizations and researchers? الملكية الفكرية / الاختراع / تسجيل براءات الاختراع / ما أهم المعوقات في تسجيل براءات الاختراع / الملكية الفكرية للشركات والباحثين؟

- ☐ Lack of fund
- ☐ Lack of knowledge & IP registration process/entities
- ☐ No clear regulations / process
- ☐ Lengthy process
- ☐ Lack of confidentiality
- ☐ Other:

Do you think the pandemic has any effect on science and academic research results? هل تعتقد أن حدوث الكوارث (مثل كورونا) أثرت على مخرجات وتوجهات البحث العلمي؟

Strongly Disagree Disagree Neutral Agree Strongly Agree

Questionnaire - Public Procurement of Innovation - part 3 of 5

Do you participate in creating the yearly procurement plans in your organization? هل تشارك بتحضير خطة المشتريات السنوية لمؤسستك؟

Yes No

Your previous experience or knowledge in public procurement process? كيف تقيم خبرتك ومعرفتك السابقة بإجراءات المشتريات الحكومية وكيفية عملها؟

- ☐ No Knowledge / Experience
- ☐ Some Knowledge / Experience
- ☐ Fair Knowledge
- ☐ Very Good Knowledge / Experience
- ☐ Full Knowledge / Experience

Do you know how the governmental needs are determined in the yearly purchasing plans? برأيك, كيف يتم تحديد إحتياجات المؤسسات الحكومية التي تنوي شراءها؟

- ☐ Regular meetings
- ☐ Through SWOT analysis
- ☐ According to sector strategic goals
- ☐ National allocated budget
- ☐ External donation(s)
- ☐ Urgency of needs
- ☐ Other:

What are the challenges the governmental procurer is currently facing in general? ما هي التحديات التي يواجهها المشتري الحكومي حاليا" بشكل عام؟

- ☐ Budget limitation
- ☐ Capacity of teams
- ☐ Clear regulations, roles & responsibilities
- ☐ No long term plans
- ☐ Coordination and communication
- ☐ Other:

What do you think are the current strengths in public procurement or procurement system in general?

كيف ترى مواطن القوة الحالية في نظام المشتريات الحكومي؟

- ☐ Clear regulations, roles & responsibilities
- ☐ IT system (technology) is used
- ☐ High level of coordination between governmental entities.
- ☐ Documentation of purchases
- ☐ Negotiation skills
- ☐ Teamwork
- ☐ E-procurement process is adopted
- ☐ Other:

What are the current weaknesses the governmental entities have in public procurement? ما هي مواطن

الضعف الحالية في نظام المشتريات الحكومية؟

- ☐ Lack of specialized procurement individuals
- ☐ Lack of fund
- ☐ Different specifications for same items in different entities.
- ☐ Lengthy process
- ☐ Too many changes
- ☐ Other:

Do you have any previous experience or knowledge in "public procurement of innovation - PPI"

(Definition: PPI model: matching the needs of government entities with the results and outputs of scientific research in universities and research centers, to be registered as patents, traded and developed in cooperation with private sector, and to be purchased after that by the government entities)? هل لديك

معرفة سابقة بالمشتريات الحكومية للإبتكار (تعريفها: هي مطابقة احتياجات المؤسسات الحكومية مع نتائج ومخرجات البحث العلمي في الجامعات والمراكز البحثية ليتم تسجيلها كبراءات اختراع وتجيرها وتطويرها بالتعاون مع مؤسسات القطاع الخاص ليتم شرائها من المؤسسات الحكومية)؟

No Knowledge/Experience 0 1 2 3 4 5 Full Knowledge/Experience

In your opinion, which sectors are most expected to use the new "Public Procurement of Innovation" model? برأيك, أي القطاعات يتوقع أن يكون أكثر من يستخدم نموذج "المشتريات الحكومية للإبتكار"؟

- ☐ Water
- ☐ Health
- ☐ Agriculture
- ☐ Energy

- ☐ IT
- ☐ Industry & Trade
- ☐ Environment
- ☐ Education
- ☐ Other:

What are the key public entities expected to participate in implementing the new model of "Public Procurement of Innovation"? ما هي الجهات الرئيسية المتوقعة مشاركتها بتنفيذ وتطبيق نموذج "المشتريات الحكومية للإبتكار"؟

- ☐ Prime Ministry
- ☐ Government Procurement Department
- ☐ Public entities
- ☐ Universities
- ☐ Research centers / researchers
- ☐ Private sector
- ☐ Donor(s)
- ☐ Other:

Do you think your organization is interested in participation and implementation of the new "Public Procurement of Innovation - PPI" concept? هل تتوقع إهتمام مؤسستك بالمشاركة وتطبيق مفهوم "المشتريات الحكومية للإبتكار"؟

Yes No Not Sure

How do you see your organization experience in innovation? كيف ترى خبرة مؤسستك في مجال الإبتكار؟

None Low Fair High Very High

How do you expect the participation of your organization in "Public Procurement of Innovation - PPI" Project will be? كيف تتوقع مشاركة مؤسستك في مشروع "المشتريات الحكومية للإبتكار"؟

- ☐ Innovation policy maker
- ☐ Participate in implementation stage
- ☐ Provide capacity building program(s)
- ☐ Fund assistance
- ☐ Knowledge sharing & technical support
- ☐ Observer / assessor
- ☐ No participation
- ☐ Other:

How do you see the existing collaboration between universities/research centers and the governmental sector? إلى أي مدى ترى التعاون القائم بين "الجامعات/مراكز البحوث" و "القطاع العام"؟

Below Expectation 1 2 3 4 5 Excellent

Questionnaire - Private Sector - part 4 of 5

What type of issues the SMEs and start-up companies are facing towards commercialization of scientific research results to the public sector? حدد المشاكل التي يمكن أن تواجهها المؤسسات الصغيرة والمتوسطة الحجم والشركات الناشئة عند تتجير مخرجات البحوث العلمية وتسويقها لمؤسسات القطاع العام؟ (تتجير: الاستغلال التجاري, التسويق التجاري, إضفاء الطابع التجاري)

- ☐ Financial
- ☐ Lack of communication with potential researchers/research centers
- ☐ Contract type / legal terms
- ☐ Growth opportunity
- ☐ No potential customer(s)
- ☐ Lengthy process of patent registration
- ☐ Technical experience in product development
- ☐ No clear policy / regulations as a guidance
- ☐ Other:

How do you see the existing collaboration between universities/research centers and the private sector? إلى أي مدى ترى التعاون القائم بين "الجامعات/مراكز البحوث" و القطاع الخاص "؟"

Below Expectation 1 2 3 4 5 Excellent

Is there any collaboration between sectors to introduce joint solutions and develop national products? هل هناك أي تعاون بين القطاعات المختلفة لتقديم حلول مشتركة وتطوير منتجات وطنية؟

Yes No Not Sure

What are the expectations of the private sector from the public sector and universities/research centers, to assist in development and growth of the private sector? ما هي توقعات القطاع الخاص من القطاع الحكومي والجامعات/مراكز البحوث والتي تساعد في النمو والتطور المستمر؟

- ☐ Technical assistance
- ☐ Financial assistance
- ☐ Close collaboration with universities/research centers on future opportunities
- ☐ Clear policy / legal terms to protect the interest of all parties
- ☐ Selecting SME/start-up companies is considered a priority
- ☐ Include purchasing of innovation / patents in the yearly governmental plans
- ☐ Participate in policy making and designing business plans
- ☐ Considering the private sector as a team member/partner while designing the plans
- ☐ Other:

Questionnaire - PPI4MED Project - part 5 of 5 - last section

Do you / does your organization participate in PPI4MED Project: Technological transfer and commercialization of public research results through PPI in the Mediterranean region? : هل تشارك أنت أو تشارك مؤسستك في مشروع "المشتريات الحكومية للإبتكار" : مشروع نقل التكنولوجيا وتنجير نتائج البحث العلمي من خلال المشتريات الحكومية للإبتكار في منطقة حوض المتوسط

Yes No

If your answer is "No" in the previous question, are you or your organization interested in participation in the project by signing a non-binding Memorandum of Understanding (MOU)? اذا كانت إجابتك "لا" للسؤال السابق, هل لديك أو لدى مؤسستك رغبة بالمشاركة في المشروع من خلال توقيع مذكرة تفاهم غير ملزمة؟

Yes No Maybe Will require more information about the MOU

In your opinion, how is PPI4MED Project being received by the innovation community? برأيك, كيف استقبل وتعامل مجتمع الابتكار المحلي مع مشروع "المشتريات الحكومية للإبتكار"؟

Below Expectation 1 2 3 4 5 Excellent

Will the "Public Procurement of Innovation - PPI" model increase the competitiveness between companies? هل سيزيد نموذج "المشتريات الحكومية للإبتكار" من القدرة التنافسية بين الشركات؟

Yes No Not Sure

What milestones can the PPI4MED Project achieve? ما هي الإنجازات التي يمكن تحقيقها من المشروع؟

- ☐ Introducing new concept for future
- ☐ Increase corporation between key stakeholders
- ☐ Establish a centralized entity(s) for better coordination between stakeholders
- ☐ Pilot project as a success story
- ☐ Database of key stakeholders in innovation and procurement
- ☐ Creating new policy and regulations to encourage similar activities.
- ☐ Other:

What major problems can the PPI4MED project face? ما هي المشاكل والمعوقات الرئيسية في تطبيق المشروع؟

- ☐ New concept to everyone
- ☐ No clear regulations / guidance to deal with it
- ☐ No clear roles & responsibilities
- ☐ Lack of fund
- ☐ Existing patents do not meet public needs
- ☐ No centralized process/entities to coordinate between all stakeholders
- ☐ No future growth
- ☐ Will require time to accept and adopt
- ☐ No specialized personnel - technical or legal
- ☐ Private sector is not interested in commercializing the research results
- ☐ Other:

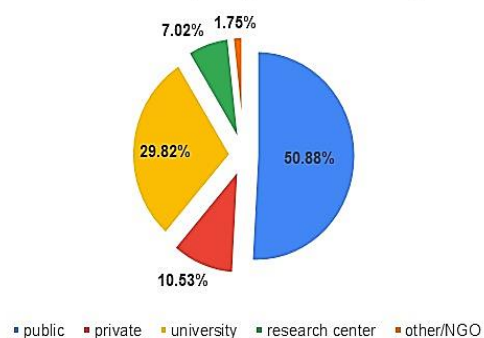
Appendix 4: Survey Analysis

Complete survey results are shown below:

General survey information:

Sector	No. of participants	% Participation
Public sector	29	50.88%
Universities	17	29.82%
Research center	4	7.02%
Private sector	6	10.53%
NGO	1	1.75%
Others	0	0
Total participants	57	1

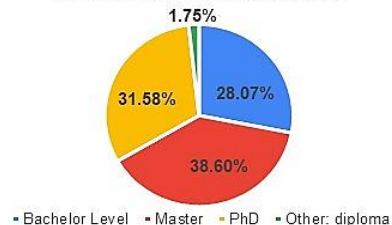
No. of sectors participated in the survey.



Level of education of participants:

Bachelor Level	16	28.07%
Master	22	38.60%
PhD	18	31.58%
Other: Diploma	1	1.75%
Total	57	1

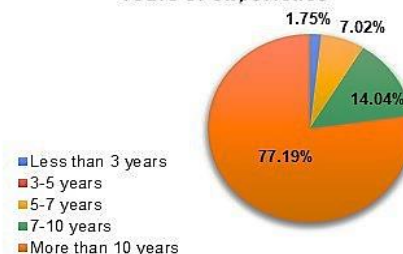
Level of education of participants



Years of experience of participants:

Less than 3 years	1	1.75%
3-5 years	0	0.00%
5-7 years	4	7.02%
7-10 years	8	14.04%
More than 10 years	44	77.19%
Total	57	1

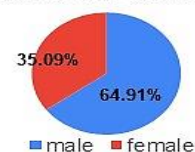
Years of experience



Gender: participants: % of female vs. % of male:

Male	37	64.91%
Female	20	35.09%
Total	57	1

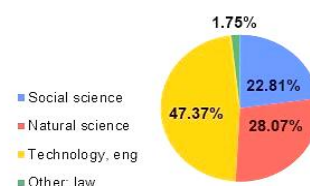
Gender: male vs. female



Field of specialty of participants:

Social science	13	22.81%
Natural science	16	28.07%
Technology, Eng.	27	47.37%
Other: law	1	1.75%
Total	57	1

Field of specialty

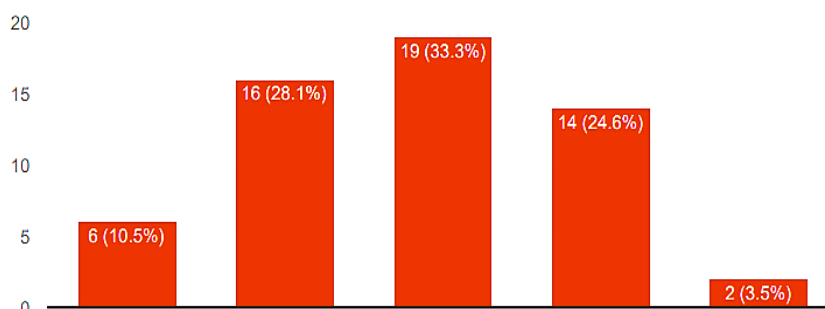


The five areas covered under the questionnaire are: Innovation Engagement, Research & Development, Public Procurement of Innovation, Private Sector and PPI4MED Project:

(a) Innovation Engagement

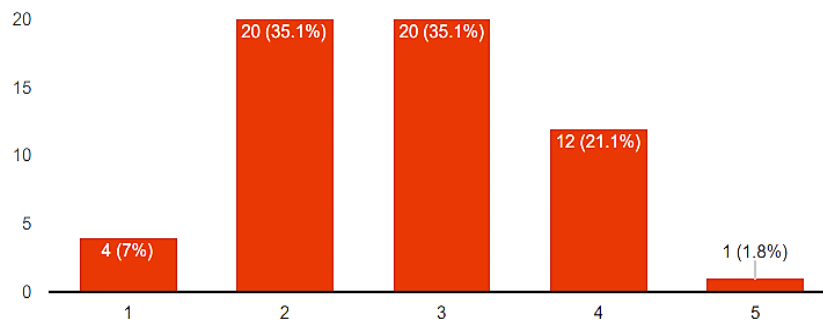
The role & participation of young people in the field of innovation:

1-below expectation	2	3	4	5-excellent	Total
6	16	19	14	2	57
10.53%	28.07%	33.33%	24.56%	3.51%	

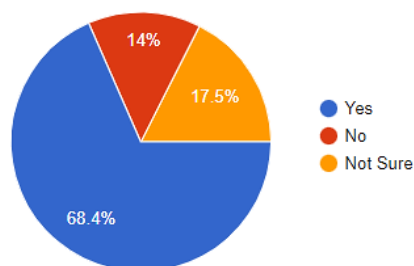


How do you see the level of women participation in the field of innovation?

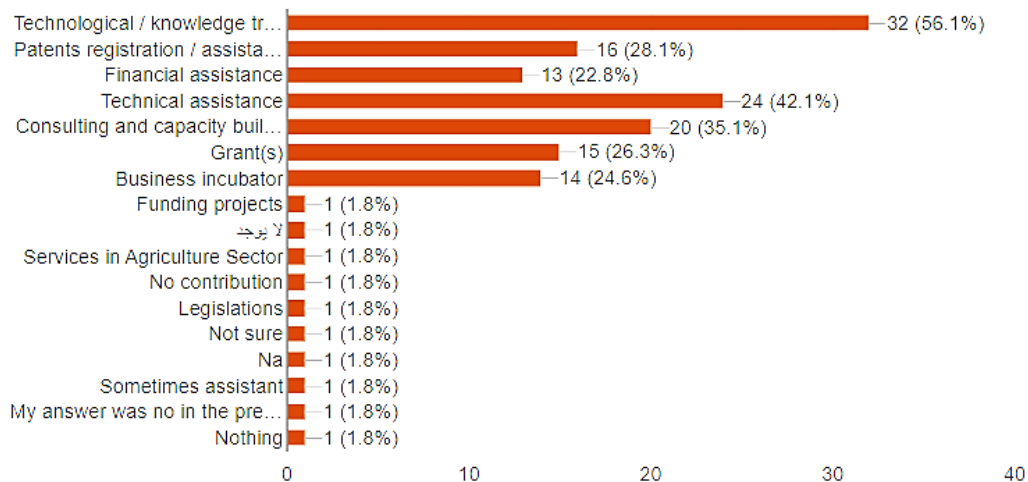
1-below expectation	2	3	4	5-excellent	Total
4	20	20	12	1	57
7.02%	35.09%	35.09%	21.05%	1.75%	



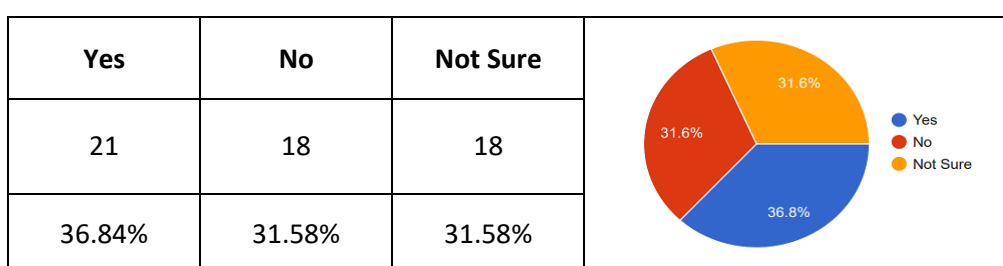
Is there any contribution of your organization in the innovation process?



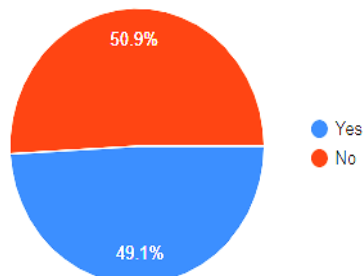
If your answer is (yes) to the previous question, what is the role & contribution of your organization in the innovation process?



National policy in innovation:



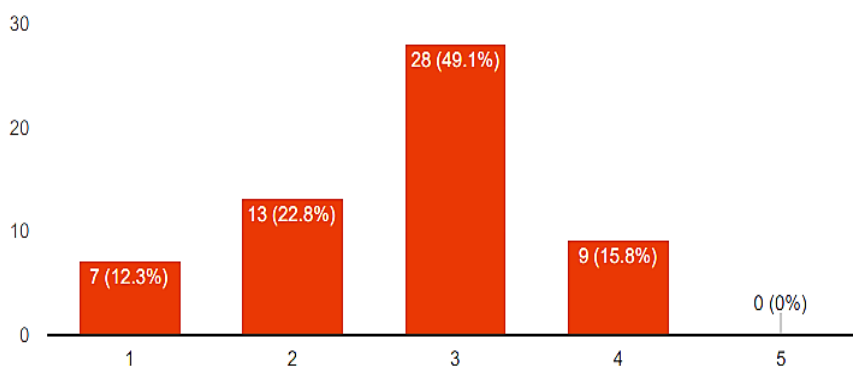
Did you ever participate in any training program in innovation?



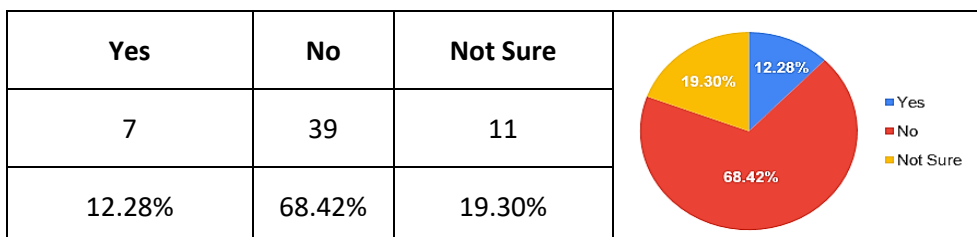
(b) Research & Development

The level of academic research results from universities/research centers:

1-below expectation	2	3	4	5-excellent	Total
7	13	28	9	0	57
12.28%	22.81%	49.12%	15.79%	0.00%	

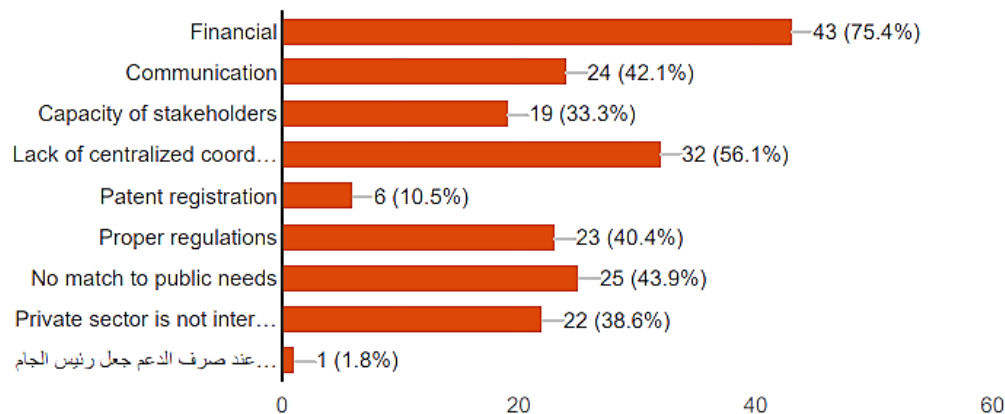


Support for academic researches/researchers to obtain practical results that can be commercialized and transformed into national products:



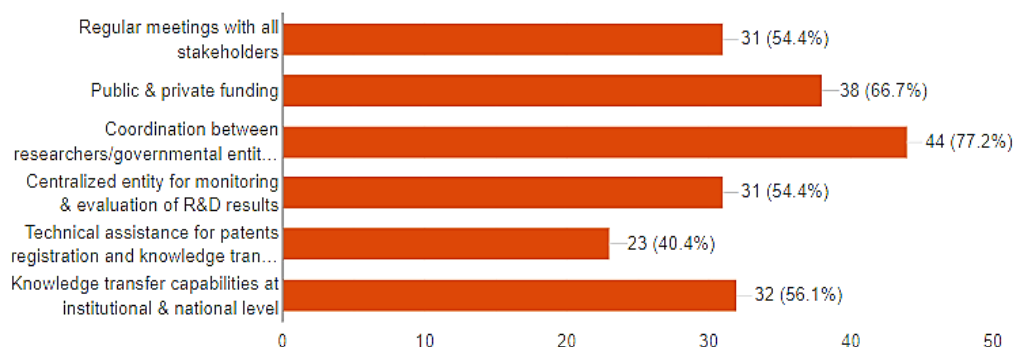
The main barriers to commercialization of public research results:

Financial	43	75.44%
Communication	24	42.11%
Capacity of stakeholders	19	33.33%
Lack of centralized coordination	32	56.14%
Patent registration	6	10.53%
Proper regulations	23	40.35%
No match to public needs	25	43.86%
Private sector is not interested	22	38.60%
Other:	1	1.75%



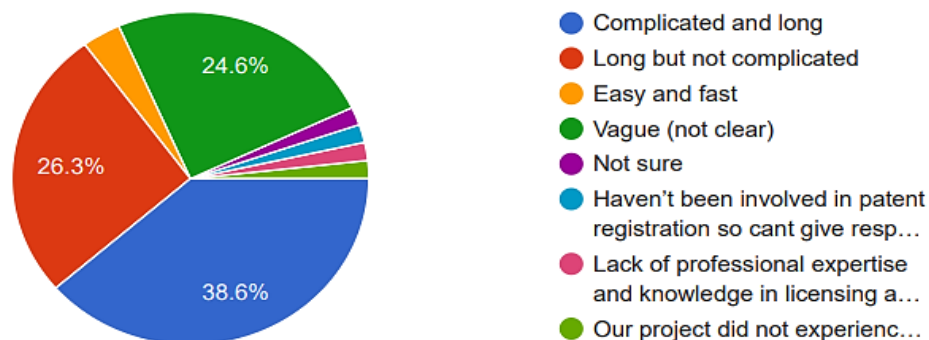
Suggestions to improve the process of commercialization of academic research:

Regular meetings with all stakeholders	31	54.39%
Public & private funding	38	66.67%
Coordination between researchers/governmental entities on current/future needs	44	77.19%
Centralized entity for monitoring & evaluation of R&D results	31	54.39%
Technical assistance for patents registration and knowledge transfer	23	40.35%
Knowledge transfer capabilities at institutional & national level	32	56.14%
Other:	0	0.00%



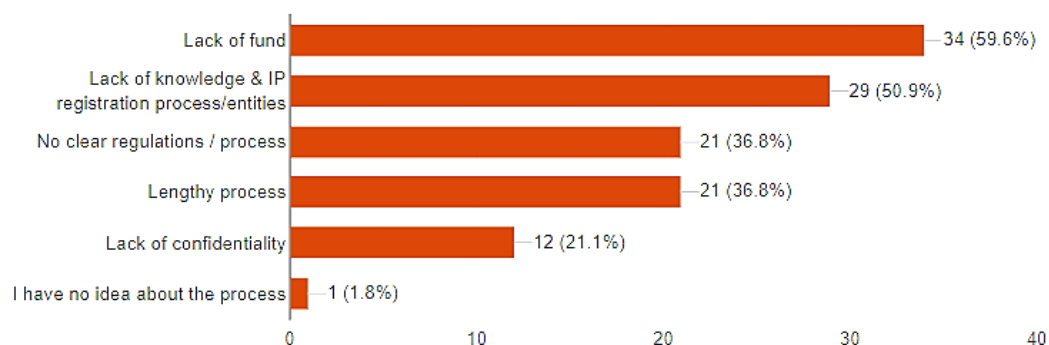
The current process of dealing with patent & intellectual property and licensing issues for organizations and researchers:

Complicated and long	22	38.60%
Long but not complicated	15	26.32%
Easy and fast	2	3.51%
Vague (not clear)	14	24.56%
Other:	4	7.02%
Total	57	1



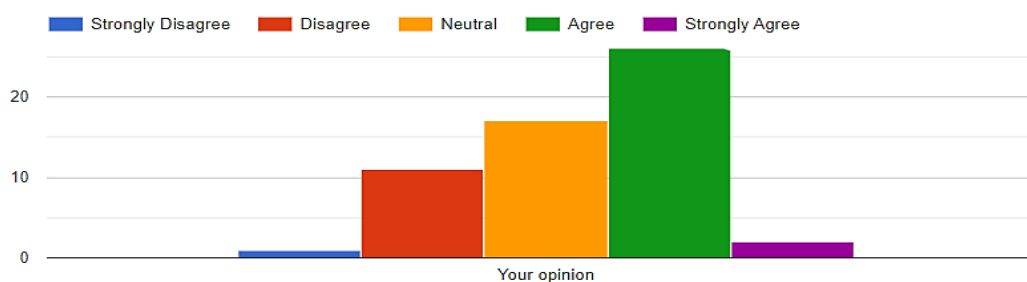
What are the main challenges and obstructions in registering the patent/IP for organizations and researchers?

Lack of fund	34	59.6%
Lack of knowledge & IP registration process/entities	29	50.9%
No clear regulations / process	21	36.8%
Lengthy process	21	36.8%
Lack of confidentiality	12	21.1%
Other:	1	1.75%



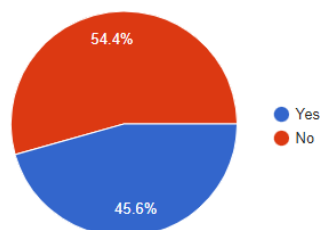
The pandemic has any effect on science and academic research results:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1	11	17	26	2	57
1.75%	19.30%	29.82%	45.61%	3.51%	

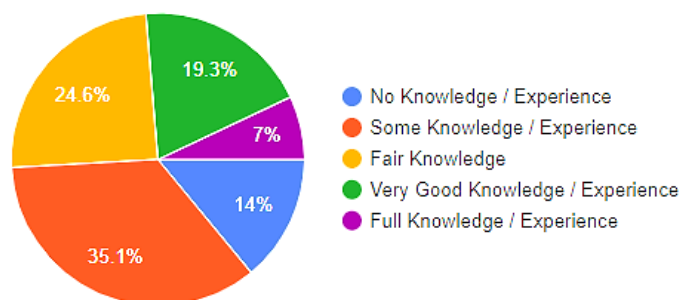


(c) Public Procurement of Innovation

Do you participate in creating the yearly procurement plans in your organization?



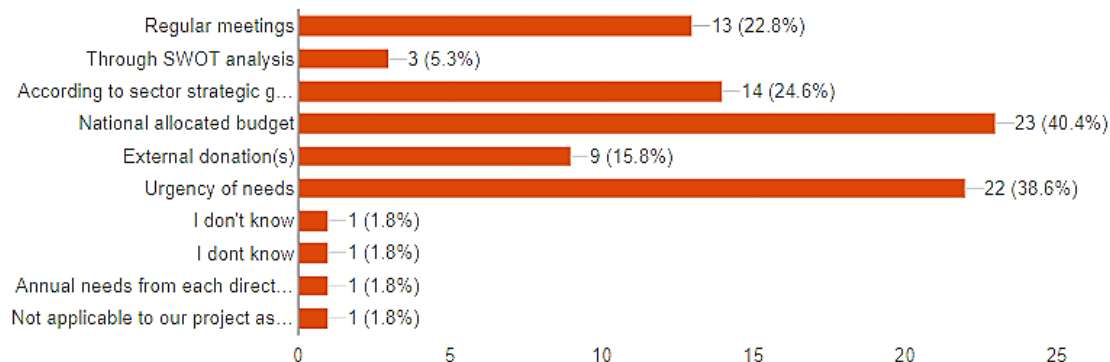
Your previous experience or knowledge in public procurement process?



The governmental needs are determined in the yearly purchasing plans:

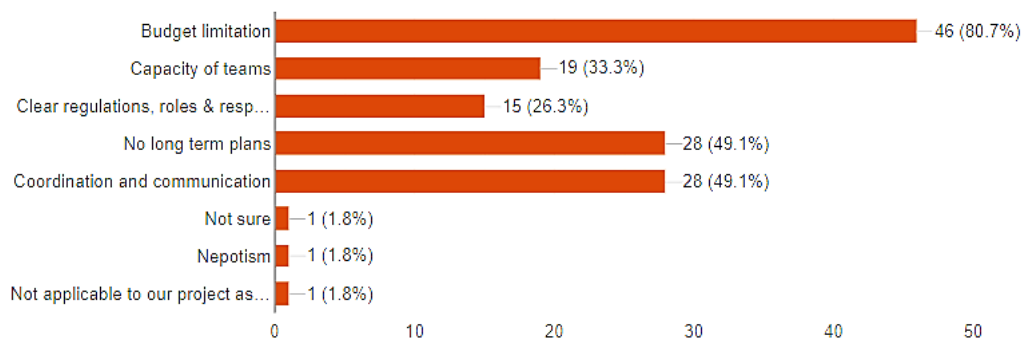
Regular meetings	13	22.81%
Through SWOT analysis	3	5.26%
According to sector strategic goals	14	24.56%
National allocated budget	23	40.35%

External donation(s)	9	15.79%
Urgency of needs	22	38.60%
Other:	4	7.02%



The challenges the governmental procurer is currently facing in general:

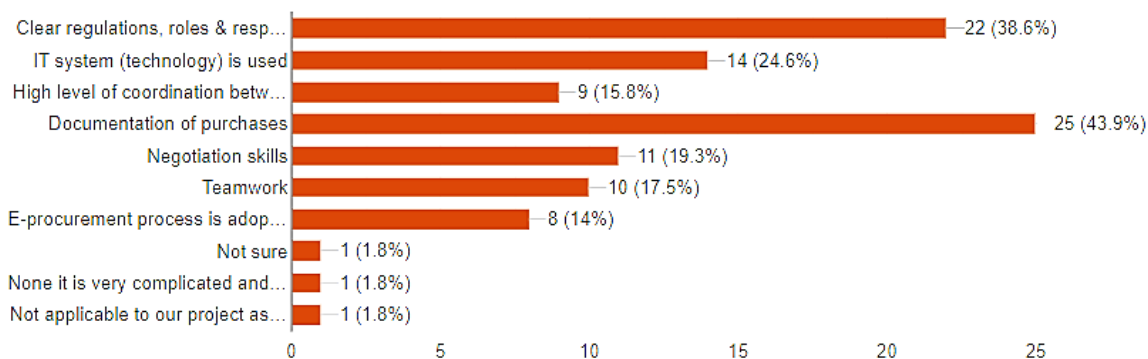
Budget limitation	46	80.70%
Capacity of teams	19	33.33%
Clear regulations, roles & responsibilities	15	26.32%
No long term plans	28	49.12%
Coordination and communication	28	49.12%
Others	3	5.26%



The current strengths in public procurement or procurement system in general:

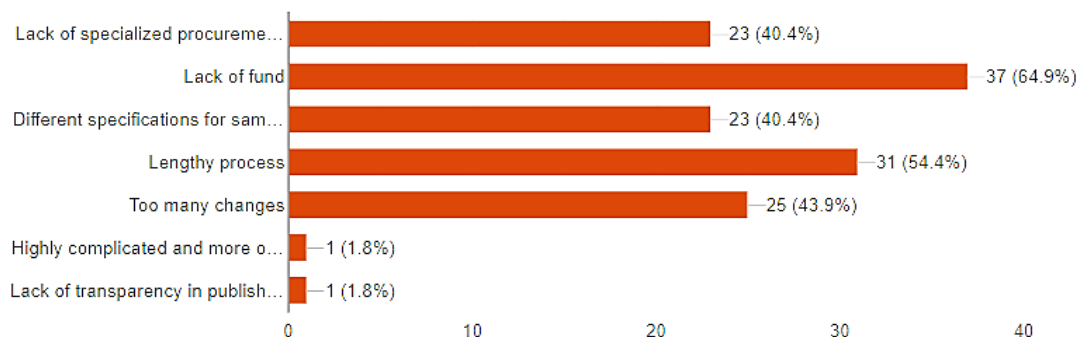
Clear regulations, roles & responsibilities	22	38.60%
IT system (technology) is used	14	24.56%
High level of coordination between governmental entities.	9	15.79%

Documentation of purchases	25	43.86%
Negotiation skills	11	19.30%
Teamwork	10	17.54%
E-procurement process is adopted	8	14.04%
Others	3	5.26%



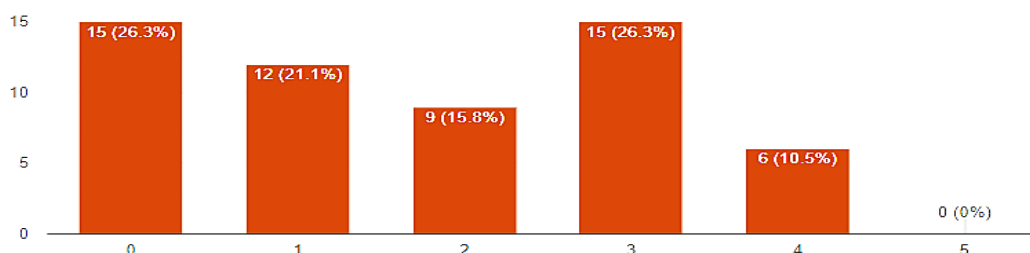
The current weaknesses the governmental entities have in public procurement:

Lack of specialized procurement individuals	23	40.35%
Lack of fund	37	64.91%
Different specifications for same items in different entities.	23	40.35%
Lengthy process	31	54.39%
Too many changes	25	43.86%
Other:	2	3.51%



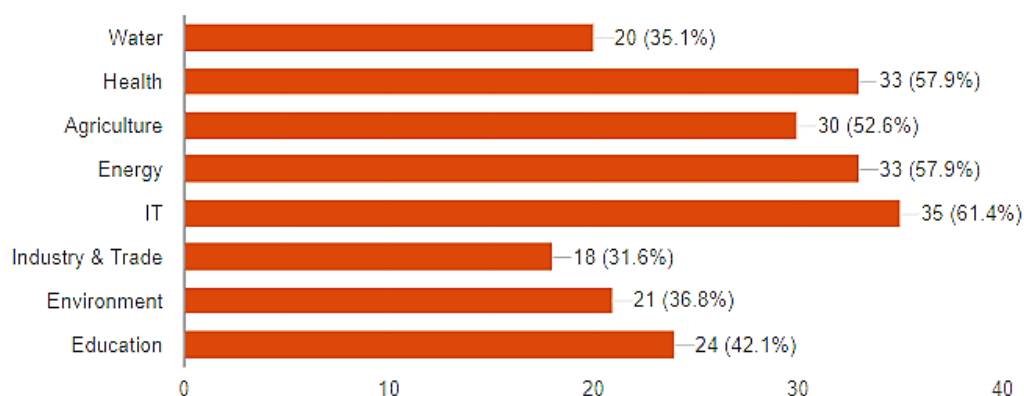
Do you have any previous experience or knowledge in "public procurement of innovation - PPI"
(Definition: PPI model: matching the needs of government entities with the results and outputs of scientific research in universities and research centers, to be registered as patents, traded and

developed in cooperation with private sector, and to be purchased after that by the government entities)?



Which sectors are most expected to use the new "Public Procurement of Innovation" model:

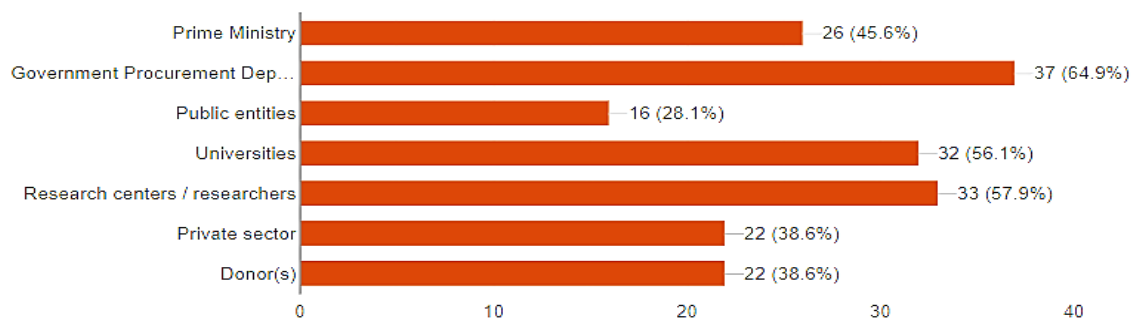
Water	20	35.09%
Health	33	57.89%
Agriculture	30	52.63%
Energy	33	57.89%
IT	35	61.40%
Industry & Trade	18	31.58%
Environment	21	36.84%
Education	24	42.11%



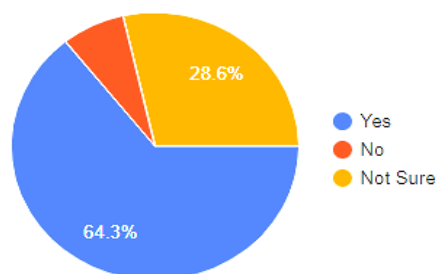
The key public entities expected to participate in implementing the new model of "Public Procurement of Innovation:

Prime Ministry	26	45.61%
Government Procurement Department	37	64.91%
Public entities	16	28.07%
Universities	32	56.14%
Research centers / researchers	33	57.89%

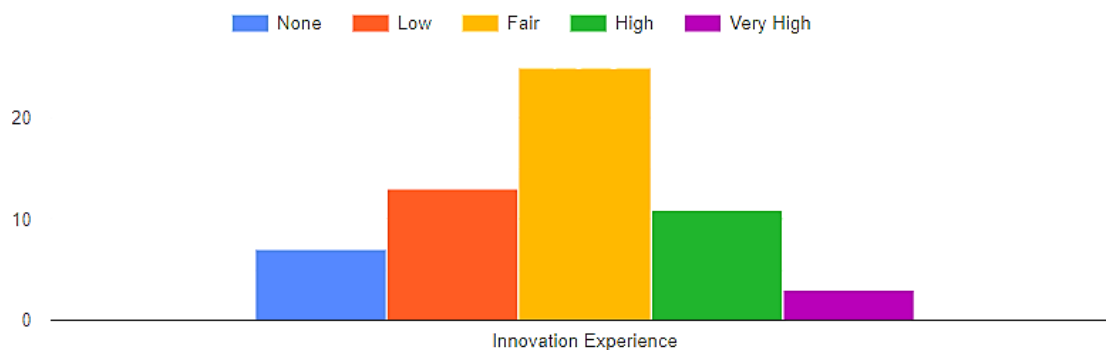
Private sector	22	38.60%
Donor(s)	22	38.60%



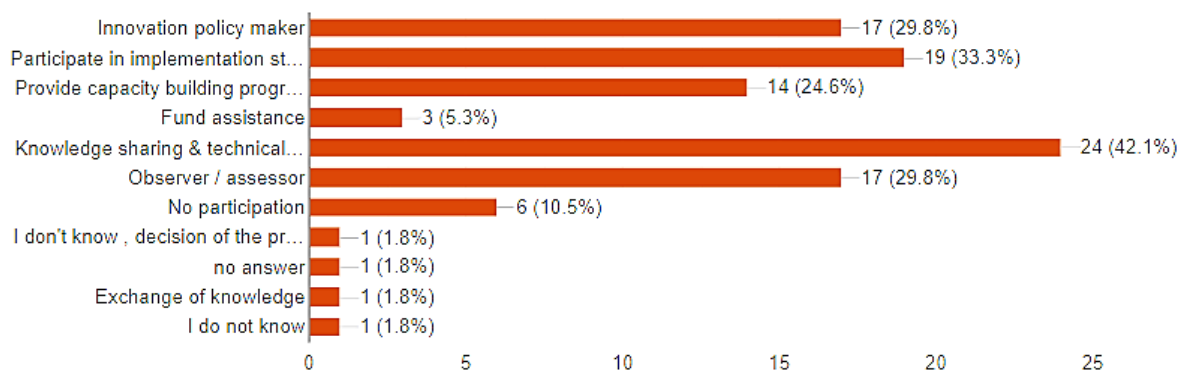
Do you think your organization is interested in participation and implementation of the new "Public Procurement of Innovation - PPI" concept?



How do you see your organization experience in innovation?

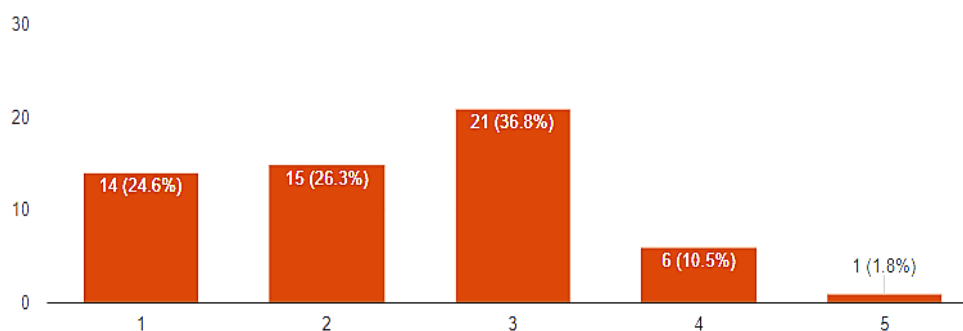


How do you expect the participation of your organization in "Public Procurement of Innovation - PPI" Project will be?



The existing collaboration between universities/research centers and the governmental sector:

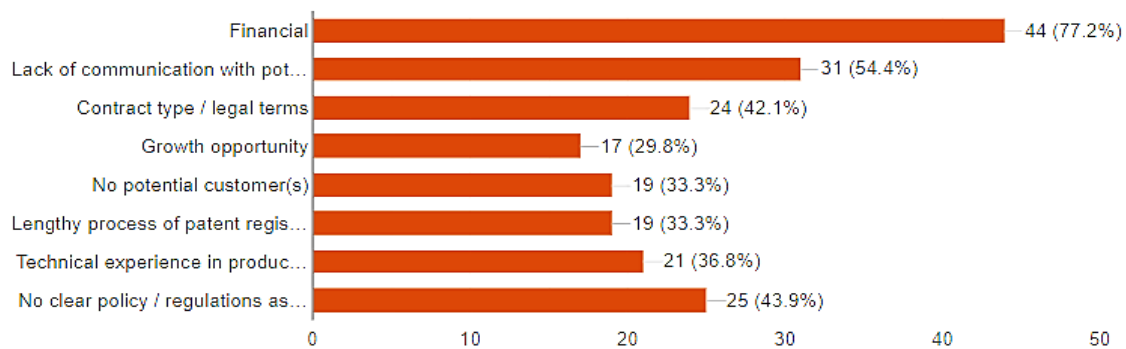
1-below expectation	2	3	4	5-excellent	Total
14	15	21	6	1	57
24.56%	26.32%	36.84%	10.53%	1.75%	



(d) Private Sector

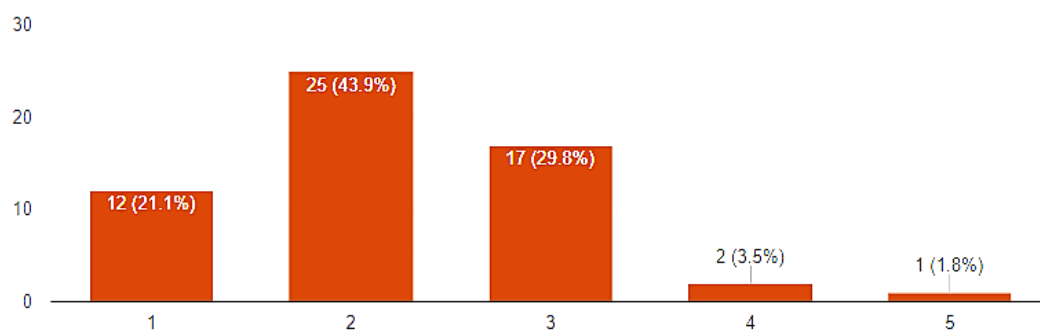
Type of issues the SMEs and start-up companies are facing towards commercialization of scientific research results to the public sector:

Financial	44	77.19%
Lack of communication with potential researchers/research centers	31	54.39%
Contract type / legal terms	24	42.11%
Growth opportunity	17	29.82%
No potential customer(s)	19	33.33%
Lengthy process of patent registration	19	33.33%
Technical experience in product development	21	36.84%
No clear policy / regulations as a guidance	25	43.86%



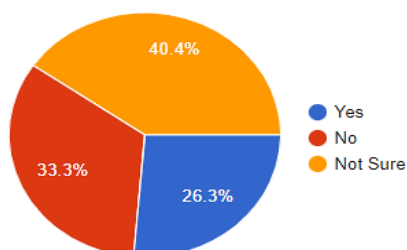
The existing collaboration between universities/research centers and the private sector:

1-below expectation	2	3	4	5-excellent	Total
12	25	17	2	1	57
21.05%	43.86%	29.82%	3.51%	1.75%	



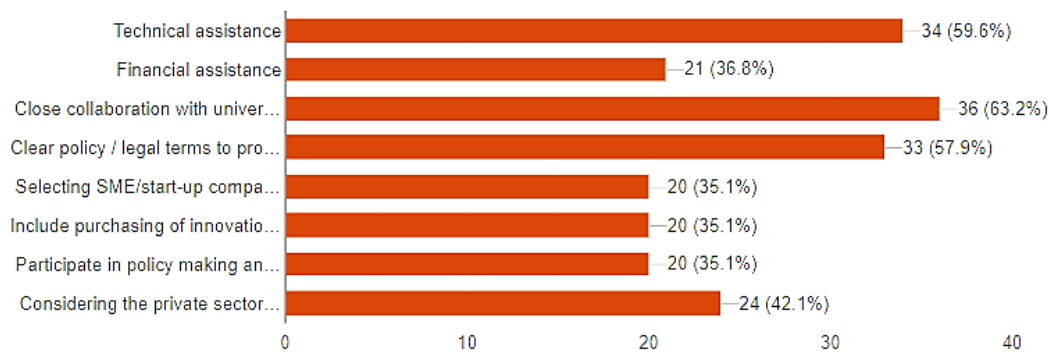
Collaboration between sectors to introduce joint solutions and develop national products:

Yes	No	Not Sure
15	19	23
26.32%	33.33%	40.35%



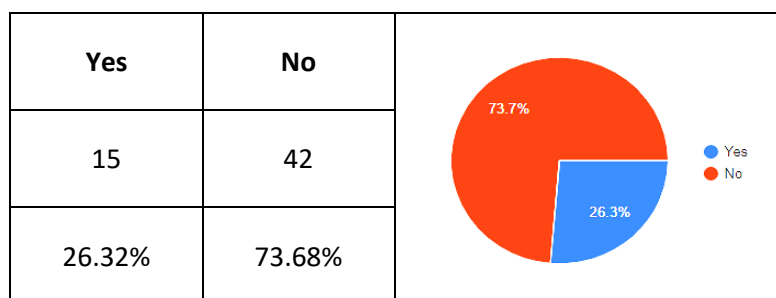
The expectations of the private sector from the public sector and universities/research centers, to assist in development and growth of the private sector:

Technical assistance	34	59.65%
Financial assistance	21	36.84%
Close collaboration with universities/research centers on future opportunities	36	63.16%
Clear policy / legal terms to protect the interest of all parties	33	57.89%
Selecting SME/start-up companies is considered a priority	20	35.09%
Include purchasing of innovation / patents in the yearly governmental plans	20	35.09%
Participate in policy making and designing business plans	20	35.09%
Considering the private sector as a team member/partner while designing the plans	24	42.11%
Other:	0	0.00%



(e) PPI4MED Project

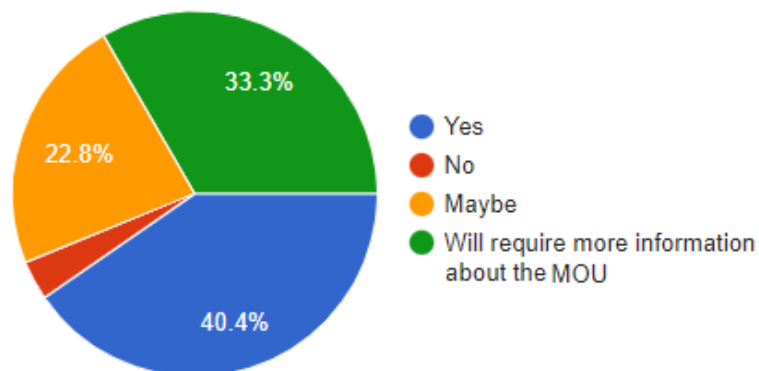
Survey participant's organizations involves in PPI4MED Project: Technological transfer and commercialization of public research results through PPI in the Mediterranean region:



If the answer is "No" in the previous question, are you or your organization interested in participation in the project by signing a non-binding Memorandum of Understanding (MOU)?

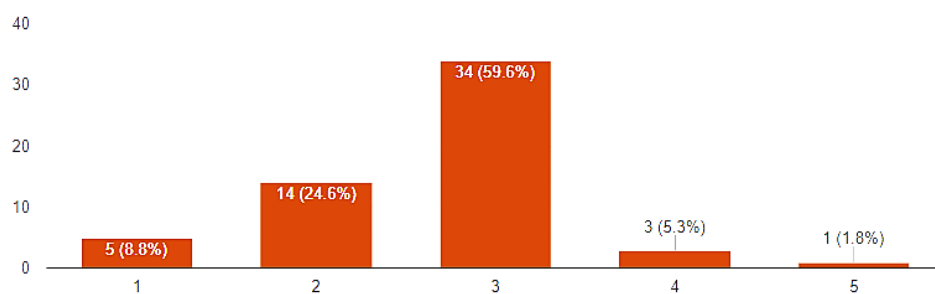
Yes	No	Maybe	Will require more information about the MOU	
23	2	13	19	57

40.35%	3.51%	22.81%	33.33%	1
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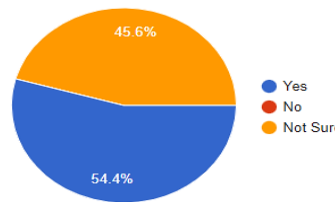


How is PPI4MED Project being received by the innovation community?

1-below expectation	2	3	4	5-excellent	Total
5	14	34	3	1	57
8.77%	24.56%	59.65%	5.26%	1.75%	



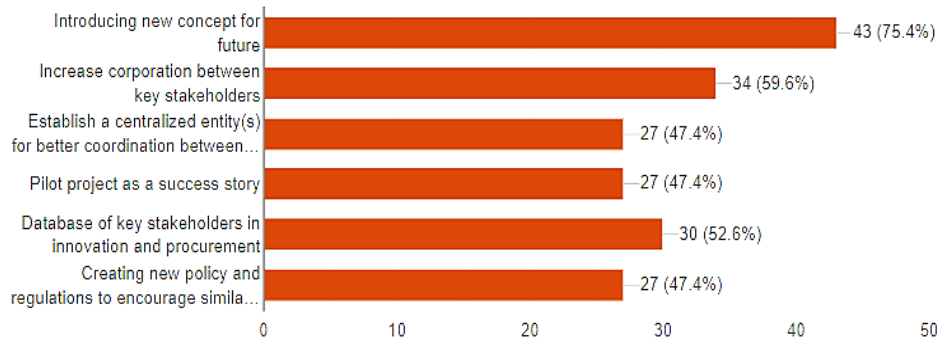
Will the "Public Procurement of Innovation - PPI" model increase the competitiveness between companies?

Yes	No	Not Sure	
31	0	26	
54.39%	0%	45.61%	

Milestones can the PPI4MED Project achieve:

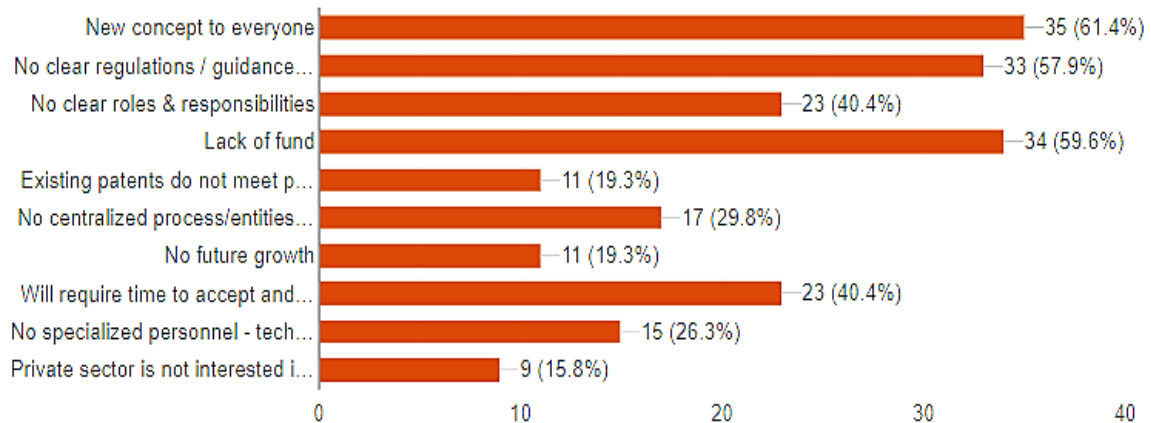
Introducing new concept for future	43	75.44%
Increase corporation between key stakeholders	34	59.65%
Establish a centralized entity(s) for better coordination between stakeholders	27	47.37%
Pilot project as a success story	27	47.37%

Database of key stakeholders in innovation and procurement	30	52.63%
Creating new policy and regulations to encourage similar activities.	27	47.37%



Major problems can the PPI4MED project face:

New concept to everyone	35	61.40%
No clear regulations / guidance to deal with it	33	57.89%
No clear roles & responsibilities	23	40.35%
Lack of fund	34	59.65%
Existing patents do not meet public needs	11	19.30%
No centralized process/entities to coordinate between all stakeholders	17	29.82%
No future growth	11	19.30%
Will require time to accept and adopt	23	40.35%
No specialized personnel - technical or legal	15	26.32%
Private sector is not interested in commercializing the research results	9	15.79%



Appendix 5: Sector Analysis

Five sectors were covered: Health, Water, Agriculture, Energy and Transportation.

Governmental procurement plans, annual reports and strategic plans were analyzed. A comparison between the items listed in the procurement plans vs. the needs & challenges in the annual plans and strategic plans.

HEALTH SECTOR

Health sector analysis (desk search) - potential for pilot and procurement of research results		
(Ministry of Health - strategic plan 2018-2022 & procurement plan 2022 analysis)		
Procurement plan 2022 - potential purchase for PPI project		
Date	Value -JOD	Purchase request
1-Jun-22	800,000	materials and tools of dental clinics and laboratories
1-May-22	286000	dental braces materials and tools
1-May-22	70000	dental implants
1-May-22	1600000	bone tools
1-May-22	250000	eye tools
1-May-22	250000	trajectory speculum tools
1-May-22	730000	surgical endoscope tools
1-May-22	250000	nose, ear and throat tools
1-May-22	920000	general surgical tools
1-May-22	560000	brain and nerve tools
1-May-22	175000	hearing Aids
1-May-22	600500	medical furniture
1-Aug-22	250000	transplantation and microbiology
1-Jun-22	500000	virus detectors
1-Jun-22	1000000	burns and beauty/plastic surgery
1-Jun-22	1200000	medical sanitizers
Reference: strategic plan 2018-2022 - Ministry of Health		
Areas of research, studies and patents that can be used in PPI4MED project		
distance training - transfer of knowledge and technology (practical methods + success stories) - simulation center		
use of technology and digital transformation		
monitoring of communicable diseases		
weaknesses mentioned in the strategy: Lack of applied studies and research		
Cancer detection program		
Expansion of the Early Breast Cancer Detection Program		
nursing services		
medical waste management		
blood test - clinical laboratory science		
laboratory services		
artificial limbs		

WATER SECTOR

Water sector analysis (desk search) - potential for pilot and procurement of research results.

(Ministry of Water ,Water Authority, Jordan Valley Authority - yearly report 2020 & procurement plans 2022 analysis)

Procurement plan 2022 - potential purchase for PPI project

Date	Value -JOD	Purchase request
1-Jan-22	122,000	Field instruments
31-Jan-22	472,000,000	water/waste water networks
2-Feb-22	Water quality control project agreement in the Jordan Valley Region	
2-Jan-22	Dam maintenance work and supplies	
1-Feb-22	Capacity building - human resources development	
12-Dec-21	Tender of water loss reduction activities and enhancement of monitoring and control systems in the Jordan Valley	

Reference: Yearly report 2020 - Ministry of Water - Water Authority - Jordan Valley Authority

Areas of research, studies and patents that can be used in PPI4MED project

Ministry of Water & Irrigation

Preparation of mathematical models to simulate aquifers to determine the safe quantities of extraction and optimal use and identify promising areas for water projects

Preparing surface modelling to estimate runoff volume contributing to flood risk management

Study to reduce water loss in dams and aqueducts

Study of water desalination in Aqaba

Maintenance of excavator and dam sites for durability and efficient storage of maximum quantity in the Badia areas

Monitoring and connecting the government and private well network to an electronic system

Online Training Programs

Water Authority

Research projects in desalination

Consolidation of existing water projects database

Development of project follow-up and evaluation mechanism

Scientific research in: laboratories - samples - analyses - laboratory information - safety

Scientific Research in: Wastewater Treatment

Jordan Valley Authority

Dam support projects in the Jordan Valley: maintenance and sustainability

Preparation and rehabilitation of Jordan River - qualitative and quantitative

Updating a database serving the development of the Jordan River and its basin

2-Jan-22	Tender of water loss reduction activities and enhancement of monitoring and control systems in the Jordan Valley/implementation studies of a parallel line of the Djanya carrier line	
5-Mar-22	Establishment and maintenance of desert excavators	
2-Jan-22	Dam and facilities maintenance	

AGRICULTURE SECTOR

Agriculture sector analysis (desk search) - potential for pilot and procurement of research results

(Ministry of Agriculture - yearly report 2021 & procurement plan 2022 analysis)

Procurement plan 2022 - potential purchase for PPI project			Reference: yearly report 2021 - Ministry of Agriculture
Date	Value -JOD	Purchase request	Areas of research, studies and patents that can be used in PPI4MED project
	123119	integrated electronic disease monitoring system project	Rehabilitation of agricultural land
	500000	Vaccines and capacity building	Bee-keeping
	75000	medical supplies and inspection systems	Irrigation Canals Lining Project
	100000	electronic system for registering veterinary medicines and vaccines	Country Agricultural Map
	250065	agricultural supplies, fertilizers and pesticides	Agricultural Sector Investment Map
			Production Chain Studies for Plant and Animal Agricultural Products
			Application of genetic improvement programmes
			Climate change and its implications on the agricultural sector
			organic agriculture/farming
			Forest Fire Protection System
			forest recovery period after previous fire
			Vegetation Monitoring
			Protection and sustainability of pastures and upgrading of livestock production in Badia
			Pesticide Residual Analysis

Date	Value -JOD	Purchase request
3-Feb-22	125,000	X-ray device XRF for laboratories
15-Apr-22	180000	Gold Lab Processing (Analysis Device/Standard Material/Acids/Suctions/R refrigerator)
1-Jul-22	15000	portable gamma spectrometer/natural source studies
1-May-22	30000	weak movement/earthquake monitor
28-Feb-22	299,000	legal counselling

- renewable energy
- exploitation of shale
- new exploration areas for conventional and non-conventional oil and gas exploration
- earthquake monitoring
- electricity generation
- geology and mining - national geological map
- saving household energy consumption

Energy and Minerals Regulatory Commission

- nuclear technology

28-Feb-22	29000	Laboratory supplies	radiation hazards
28-Feb-22	118000	upgrading of equipment and hardware	

TRANSPORTATION SECTOR

Transportation sector analysis (desk search) - potential for pilot and procurement of research results

(Ministry of Transportation - yearly report 2021 & procurement plan 2022 analysis)

Procurement plan 2022 - potential purchase for PPI project			Reference: yearly report 2021 - Ministry of Transportation
Date	Value -JOD	Purchase request	Areas of research, studies and patents that can be used in PPI4MED project
1-Aug-2022	50000	consultancy services / develop data bank system	update transportation sector strategy for 2022-2027
1-Jun-2022	39000	services to change automatic station system	rail transport
1-Jun-2022	100000	technical services - tools & equipment	road transport
			air transport
			Tracking government vehicles
			meteorology
			capacity building
			communication systems

Appendix 6: Patents and Research Projects

(a) Research projects supported by NCRD = 24 completed, 19 active.

#	Project/activity	The executing agency	Starting date
1	Collection, Extraction and Preservation of Immunoproteins in Blood Plasma from Clinically Grade SARS-COV2 Patients for Clinical Use.	The executing agency Stem Cell Center, University of Jordan Dr. Abdullah Al-Abadi	2021
2	Replacing the cotton cloth with an industrial microfilter to separate the whey during the manufacture of traditional labneh and jameed.	The University of Jordan and the National Research and Development Center Dr. Ghadeer Mahyar	2021
3	A project to extract oil from Jordanian oil shale in sustainable ways	University of Jordan Dr. Mohamed Amer	2021
4	Whole Genome Sequencing of the Arabian Camel in Jordan: Towards Genotyping, Conservation and Improving Agricultural Production for Food Security	National Center for Agricultural Research Dr. Hussain Miqdadi	2021
5	Effect of zinc from an organic source on the productive performance and intestinal permeability and on the growth of follicles in sheep's ovaries in vivo and in vitro.	University of Jordan Dr. Mohamed Ayoub Abdel Meguid	2021
6	Conservation and dissemination of the use of wild parents of endemic vegetable crops in Jordan	National Center for Agricultural Research Dr. Khaled Abu Laila	2021
7	Innovative diet/pharmaceutical as adjuvant therapy for cancer: breast cancer and doxorubicin as a model	University of Jordan Dr. Hamed Takruri	2021
8	A smart robotic arm for picking olives	University of Jordan Dr. Osama Al-Hababah	2021
9	Anaerobic-Aerobic Serial Hybrid System Wastewater Treatment Project Using UASB Bioreactors	Philadelphia University Dr. Mohamed Younes	2021
10	The project to study genetic diversity in the communities of olive trees Olea europaea. L) perennial and endemic to Jordan	University of Jordan Dr. Ayed Al Abdallat	2021
11	Improving the productivity of Awassi sheep among young breeders	Jordan University of Science and Technology Dr. Khalil Jawasreh	2019
12	Smart vertical farming system using renewable energy and water systems	Al-Isra University Dr. Yassin Al-Husban	2019
13	Biodegradable insecticide formulation from medicinal plants grown in the northern Jordanian Badia	University of Jordan Dr. Talal Abu Ergee Dr. Luhan Al Shaer	2021
14	Preparation and description of an innovative and bio-identical topical preparation for the treatment of wounds	Jordan University of Science and Technology Dr. Tammam Al-Olaimat	2021
15	A biocide for weed control, a study of safety and efficacy	University of Jordan Dr. Safwan Sheyab	2021
16	Using hydroponics through different food media to increase and achieve food security for sustainable agricultural transformation	Royal Scientific Society Dr. Ghadeer Al-Zogoul	2021
17	Development of an examination method based on viral culture to study the effect of wormwood on enteroviruses.	National Center for Agricultural Research Dr. Iyad Muslim	2022

18	Developing effective methods for the propagation of Capparis sp. to be used in the development of rangelands in the Jordanian Badia.	University of Jordan Dr. Hisham Younes Dr. Asma Al-Basha	2022
19	The next step after the discovery of the Chlamydia-like bacterium Symcania nigvensis in the female genitalia: the investigation of its exposed role in vaginitis.		2022

(b) Research projects supported by The National Agriculture Research Center (NARC) = 39

# Completed projects = 3			
1	BookAgri		
2	MORINGA Jordan		
3	Biosphere		
# Active projects = 36			
1	e-fresco	19	Recycling waste to produce organic fertilizer
2	solvillion	20	Stevia Jo – Royal Agriculture
3	Decapolis	21	Mushroom cultivation
4	Fayrooz be care	22	Ibda'a Al-Balqa
5	Mayyas for hydroponic systems	23	Nano consulting
6	Jordan Saffron	24	Lezzab Nature Inclusive Farm
7	Agri Invest	25	Blessed Land Agricultural Cooperative Society
8	Goorcom	26	Twigs and Vine Cooperative Association
9	DMDT	27	Shahd Al-Khateeb for software development
10	Plant sensors	28	Zero West Garden
11	Palm protect	29	Gracia jam
12	Agro-united engineering	30	Wadi-Khuzami vegetable oil production
13	Echo farm	31	Carob house
14	Smart green	32	Gracia jam
15	Tiny gardens	33	Wadi-Khuzami vegetable oil production
16	Fish farming	34	Carob house
17	SILA DST for climate change	35	Abdulsalam Al-majali farm
18	Green On	36	Phytobase

(c) Research projects supported by SRISF

Total of 514 projects: between year 2008 – 2022. With total expenditure of JOD 31 million.

Sector	No. of Projects	% Projects
Pharmaceutical/medical	130	%25
Agriculture/Veterinarian	87	%17
Environment & Water	51	%10
Science	60	%12
Engineering	44	%9
Energy	23	%4
Communications	30	%6
Social & Humanitarian	53	%10
Economics	24	%5
Innovation/entrepreneurship	12	%2
	514	%100

Patents in water sector - the list from the Ministry of Industry & Trade

Patent title	File id	Inventor names	Owners names	Owner name (eng)	Application title (Ar)
Boiler for hot water heating and hot air powered by magnetism	JO/P/ 2014/ 00024	فايز محمد عبود ضمرة	فايز محمد عبود ضمرة	Fayez Mohamed Aboud Damra	بويلر للتدفئة بالماء الساخن والهواء الساخن يعمل بالطاقة المغناطيسية
Integrated Sprinkler System For Irrigation And Frost Protection	JO/P/ 2009/ 00311	محمد ابراهيم محمود الزرقان ; عبد الرحمن ابراهيم محمود الزرقان	الجمعية العلمية الملكية	Royal Scientific Society	نظام متكامل للري بالرش و الحماية من الصقيع
Novel reverse osmosis water treatment system that rationalizes the wasted water as a result of water treatment	JO/P/ 2013/ 00051	محسن حسين محمود ابو هيفا	محسن حسين محمود ابو هيفا	Muhsen Hussein Mahmoud Abu Haifa	نظام تناضح عكسي جديد لمعالجة المياه يقوم بترشيد المياه المهدورة نتيجة عملية المعالجة
A Portable Device for Converting Grey Water to Potable Water	JO/P/ 2013/ 00187	سهيل أحمد سعيد نصير ; جميل سامي حداد ; أيمن بسام أيوب قموه ; أيوب محمد علي غريز	الجمعية العلمية الملكية	Royal Scientific Society	جهاز محمول لتحويل المياه الرمادية إلى مياه قابلة للشرب
FLECKING TANK, FOR IRRIGATED AGRICULTURE	JO/P/ 2002/ 00110	-	0	0	حوض تنقيط للري الزراعي
Household Greywater Treatment Using a Natural Multistage Filtration Method	JO/P/ 2018/ 00013	عبيد محمد عبد البلاونة ; هبة حماد أمين الشوابكة	المركز الوطني للبحوث الزراعية	National Agricultural Research Center	معالجة المياه الرمادية المنزلية طبيعيا بنظام فلتر متعدد المراحل

Appendix 7: Brainstorming Sessions

Brainstorming session report - the application of Public Procurement of Innovation model in the Jordanian health sector - PPI4MED

The National Center for Research and Development held an online brainstorming session for PPI model in the health sector on Wednesday 28/9/2022 via Zoom from 10 am -12:30 pm.

The session was attended by representatives from different sectors: government sector, private sector, universities, research centers, researchers in the health sector, Amman Chamber of Industry, King Hussein Cancer Center, the National Center for Innovation, and others:

Event title	Date	Attendees/organization
Brainstorming session - health sector	28-9-2022	University of Jordan
		NCRD
		Amman Chamber of Industry
		Ministry of Industry, Trade and Supply
		SRISF-MoHE
		Ministry of Health
		King Hussein Cancer Center
		University of Jordan
		National Center of Innovation NCI
		Zarqa University
		Jordan University for Science & Technology (JUST)

The health sector session covered: the results of the baseline survey, SWOT analysis, patents study, sector analysis, challenges, recommendations and planning the way forward.

The following patents were presented

Patent	Description	Researcher
Ophthalmic Dosage Form Based Solid in Oil (S/O) Nano formulation of Vitamin C for Corneal Epithelial Wound Healing	Eye drops - new product Ascorbic acid eye drop: Effect of ascorbic acid eye drop on Secreted Mucins on the Ocular Surface	Dr. Bahaa El Din Gaber University of Jordan
Use of substituted quinolone derivatives for treating cancer	A completely new drug product: Using antibiotics against bacteria to treat cancer after adding certain drug groups to them and examining their effect against 6 types of cancer	Dr. Yusuf Al-Hiari University of Jordan
Dietary supplement for cancer patients	A supportive diet for chemotherapy to increase its effectiveness, and the application of some diets in a specific way	Dr. Hamed Takrouiri University of Jordan

Treating breast cancer with lab-treated immune cells	Research the possibility of increasing the ability of anti-cancer immune cells to evade the counterattack of cancer cells	Dr Ammar A. Deeb Zarqa University
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The main topics discussed in the session were: the challenges in R&D, the role of innovation and entrepreneurship centers, purchasing plans in the Ministry of Health, presentation of few patents in the health sector, the role of the Scientific Research Support Fund / Ministry of Higher Education, and current cooperation between the three main parties in the project, namely the government sector, the private sector, and universities/research centers/researchers.

Participants' recommendations:

- Establishing a central entity that brings together all sectors under it, coordinates and links them directly, and has a comprehensive database for all.
- Defining the role of each party clearly.
- A clear policy and roadmap to support and commercialize scientific researches.
- Incentives for small and start-up companies, tax incentives / special incentives.
- The necessity of a legal framework to protect the confidentiality of information.
- Finding partnerships with companies and institutions outside Jordan.
- Activate technology transfer offices to transfer scientific research outputs from researchers and universities to the government and private sectors.
- Determining governmental national needs and communicating through a national conference to all so that researchers can focus on national needs for ease of commercialization.
- Personal financial support for the researcher throughout the research period.
- The necessity of unifying efforts and not scattering them among many institutions.
- Permanent and regular communication between sectors.
- Finding solutions to the challenges in the health sector, especially "the long period of scientific research, the high cost and the high risk."
- Designing marketing plans, and establishing a marketing team capable of commercializing and marketing success stories and designing effective advertisements to attract attention.
- Capacity building through an online e-learning system in innovation, entrepreneurship and other topics.

Brainstorming sessions - the application of Public Procurement of Innovation model in **agriculture, water, energy and transportation** sectors in Jordan - PPI4MED

The National Center for Research and Development has conducted several brainstorming sessions for Public Procurement of Innovation (PPI) model as part of the living lab activities for PPI4MED project. The sessions were held online via zoom program at 10:00 am for more than two hours each.

Session date	Sector
10/10/2022	Agriculture
26/10/2022	Water
3/11/2022	Energy & Transportation

The sessions were attended by representatives from different sectors: government sector, private sector, universities, research centers, researchers in different sectors, and other interested stakeholders.

The discussions focused on: the challenges faced by researchers, the role of innovation and entrepreneurship centers, government purchasing plans, related patents, the role of the Scientific Research & Innovation Support Fund (SRISF), and ways of cooperation between the key players: the government sector, the private sector, and universities/research centers/ researchers.

Recommendations and Notes

Agriculture Sector

The presented patents during the session:

Low protein flour	Dr. Rima Tayyem / University of Jordan
Newborn animal products	Dr. Abdelkhaleq Dardas / Zarqa University
Success story: composition for accelerating wound healing	Dr. Mayyas Al-Remawi / UoP
Artificial intelligence in the agricultural sector	Dr. Abdallah Alqammaz / Private Sector
Smart hydroponics	Dr. Yaseen Al-Husban / Mutah University

Participants comments:

- A new "intellectual property policy" was recently adopted.
- Not all scientific researches and patents were included in the main list of patents currently exist in the MoHE-SRISF with a need to be updated.
- Patents remain in the drawers and no one knows about them.
- Specialists are required to assist the researchers in their patents registration.
- It is necessary to follow up on periodic announcements from everyone to know the latest developments or requests and stay informed.
- It is not necessary to register patents in Europe or America and pay a high cost, unless there is a possibility to commercialize them there in order to avoid any financial loss.
- Current cooperation with a new consultancy firm to register international patents PCT for a period of 30 months.
- There are 10 grants for patents registration provided by a consulting company to JEDCO to help those who wish.
- There is a wide range for improvement in Jordan in more than one aspect and record success stories.
- There is a clear problem in marketing the patents, and the private sector does not accept to deal with auditors from universities.
- The possibility of a direct contract between the researcher and the private sector without the intervention of universities.
- There is a real problem with the centralization of information and having it in one place.
- There is no organized process on supporting and commercializing patents and scientific researches.
- There are patents already registered locally, from which the researchers have not benefited, while the international registration is costly.

- Multiple references and lack of clarity on how to communicate with various parties concerned with scientific researches and the adoption of patents.

Recommendations:

- Establishing a central body that brings all sectors together, coordinates and links them directly, and has a comprehensive up-to-date database for all sectors, needs, patents, financial resources, plans and more.
- Incentives for researchers / prizes for invention.
- Developing a value-added product and marketing it locally and internationally.
- Facilitating government procedures for registering start-up companies wishing to adopt value-added products and patents.
- Reducing taxes for, at least, 3 years on each value-added product resulting from a joint research cooperation with the academic sector to motivate the private sector to cooperate with researchers.
- Communicate with the private sector, agricultural and veterinary companies to understand their needs in order to focus on those needs and build the relationship between the two parties on this basis.
- Raising researchers' awareness on the patent registration process and how to complete it, and its necessary stages.
- The need for a known and permanent financial source to help in registering patents locally and internationally.
- The necessity of submitting a patent protection application to prevent the theft of its idea.
- The necessity of participation of local agricultural and veterinary companies or an alliance of local and international companies in the adoption of patents.
- Identifying national governmental needs and communicating to other sectors, so that researchers and the private sector can focus on those needs to facilitate their commercialization.
- Collecting data related to society and sectors in a single database and linking them through the establishment of a network of communication between all.
- Linking university incentives and promotions to the extent of solutions offered by scientific research to address national challenges.
- A dialogue with the private sector through a national conference to clarify the importance of adopting scientific research and to dispel concerns, if any, about investment and the rights of all parties, in which representatives of the government sector shall participate in providing support.
- Finding an appropriate mechanism to communicate with a number of existing national investment institutions, capable of providing support or adopting start-up companies interested in working with researchers on patents.

Water Sector

The presented patents/projects during the session:

Environmental, Water and Energy Research Center and the researches and projects it supports	Dr. Mohanad Husien Masad / Center Director (Al al-Bayt University)
Success story – SOLVillion project Innovative engineering solutions for water and wastewater systems	Eng. Eng. Zain Abulhaj (Private Sector)

The reality of wastewater tank management

Abdullateef Abu-Hussein / CEO of Makaseb
(Private Sector)

Participants comments:

- The right to access any necessary information about sectors is not effective.
- There is a need for any startup company to reach and attract ready and qualified teams, to help any entrepreneurial project in achieving its planned results and become successful.
- Bureaucracy in patent registration, lengthy process and multiplicity of procedures and instructions.
- Commercialization of intellectual property is a difficult task locally, regionally, or internationally, and can be facilitated through the work of a proper established eco-system for commercialization.
- Providing opportunities for university students to conduct researches in the water sector within the governmental entities to solve some of the existing problems, especially desalination projects.
- Governmental procurement plans and challenges are always restricted to the allocated budget, and some balance is transferred from one item to another to cover emergencies.
- Communicating with universities to open the door for students and graduates to work with the private sector to gain experience and develop capabilities.
- Patents are adopted in the private sector if there is an economic feasibility with it.
- The Water, Environment and Energy Research Center is fully prepared to cooperate with any party to use its laboratories in their projects for a specified fee.
- There is a problem with the centralization of information and getting all the information in one place.
- There are an existing research centers and support institutions with services not many people know about proving a weak sharing of knowledge and information.
- The desire of some participants to sign memoranda of understanding with the National Center for Research and Development within the PPI4MED project.

Recommendations:

- Defining a clear role for each institution and sector during the scientific research process, all the way to the final commercialization.
- Establishing and activating a specialized eco-system for commercialization to enable researchers to market their researches and patents locally and abroad.
- Defining and clarifying the meaning of “right of access to information” and its limits for the government employees, researchers and owners of emerging projects, in order to facilitate communication and obtain support without delay.
- Sharing information about services and tools available in the university research centers for researchers and private sector to benefit from.
- Building ready and efficient teams for the success of any potential pilot project.
- Continuity of cooperation between the public and private sectors with university students to carry out their researches in the water sector, graduation projects or postgraduate research, in order to solve some existing problems, especially desalination and water purification projects.
- Periodic communication between researchers, research centers, owners of patents and scientific projects, with the government and private sectors to work on challenges in the water sector.
- Researchers should analyze the feasibility of any patent and scientific research from the beginning to facilitate its commercialization later in the private sector.
- Develop clear plans to meet the challenges in the water sector.

- Facilitate and simplify government procedures in patent registration and shorten time.
- Researchers' need for proper marketing plans to help in commercializing their patents.
- The needs for various incentives for researchers, small and start-up companies, tax waiving, technical and financial support.
- An effective participation of the government sector in adoption of the scientific research results within a clear national policy.
- The necessity of unifying efforts and databases in a clear and easy system, linking and updating constantly.
- Communicate with existing investment institutions capable of providing support or adopting start-up companies interested in working with researchers on patents.

Energy and Transportation Sector

The presented patents/projects during the session:

Feasibility and Operational Challenges of Using Electric Public Transit Buses in Jordan	Dr. Mohammad Naser Jordanian Engineers Association / Head of Roads and Traffic Committee
Production of Nano-Basalt material to produce ultra-high performance concrete	Dr. Rabab Al-louzi University of Jordan
A vehicle charging station	Dr. Mousa Omar University of Jordan
Case Studies: Royal Scientific Society / National Energy Research Center	Eng. Nedal Abdallah
Challenges in energy private sector Sunray-solutions	Eng. Moath Aamar

Participants comments:

- Lack of confidence in the existing patents for adoption by the private sector.
- The complexities and lengthy process of registering patents locally.
- Researchers' preference for registering patents internationally due to the possibility of commercializing them better than locally where lack of national investment capabilities is noticed.
- The success in commercializing patents locally will motivate other countries to consider adopting the national patents and researches.
- There is huge potential in Jordan in the field of energy and transportation.
- Most universities suffer financially, which makes investing in the existing patents very difficult.
- There is resistance in various forms to any kind of change within some universities.
- Forming research teams between Mutah University, Jordanian researchers and institutions, and researchers from outside Jordan to work on a research idea in a specific field.
- Formation of 3 partnership committees between the Ministry of Energy with the academic sector, but still inactive, in: renewable energy, energy efficiency and the electrical system.
- The strategy of the Ministry of Energy includes strengthening the partnership with the universities and scientific research centers.

- Signing an agreement to establish a network of technology centers support between the Ministry of Energy and the Ministry of Industry and Trade.
- Government procurement plans and challenges are always restricted to the allocated budget.
- Patents have two aspects: moral and financial, which both the researcher and investor need.
- Patent registration may take 2-3 years between registration, amendment and communication process.
- The Scientific Research & Innovation Support Fund (SRISF) communicates with various government sectors at the beginning of each year to determine the needs of each sector in order to launch the research cycle at the beginning of next year.
- Commercialization of patents and the results of scientific research should target both: public and private sectors.

Recommendations:

- A request from the National Center for Research and Development to conduct continuous and periodic discussion sessions, and coordinate between all parties for its great benefit in communication and knowledge sharing of the latest developments, scientific researches and challenges.
- Raising awareness of entrepreneurship and innovation in universities by creating a proper entrepreneurial environment.
- Forming research teams and focusing on specialized research in one topic.
- Optimizing technology transfer centers for their great role in coordination and networking between sectors.
- Raising the marketing capabilities of teams in technology transfer centers, in addition to their abilities to estimate the return on investments.
- Focusing on the private sector for commercializing the research outcomes, for its financial capabilities more than the government sector.
- Finding a systematic way to communicate with the industrial sector in particular, to promote the existing patents and the extent to which the industrial sector benefits from them, and to create a database in which patents and the results of scientific research are recorded, as well as the challenges of the industrial sector.
- Directing researchers to conduct a market study (before starting the research) for the ease of its future commercialization.
- Various incentives and facilities for researchers and startups.
- Facilitating government procedures in patent registration by simplifying procedures and ways of communicating with various government agencies.
- Identification of government needs and challenges and allocating a clear budget for these needs so that researchers and private sector can focus on them.
- Developing and updating databases for various sectors and placing them in one place and facilitating access to information.
- Follow up on registration of patents and the required amendments through a legal expert or entity to shorten the registration time.
- Activating the work of joint committees between the Ministry of Energy and the academic sector due to their positive impact.

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