IASP International Association of Science Parks and Areas of Innovation

35th IASP World Conference
on Science Parks and Areas of Innovation 2018
Isfahan, Iran

# Understanding of innovation performance in Palestine

*Parallel session 1:*

*Innovation through a prism*

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*Hosted by:*

ISFAHAN
SCIENCE & TECHNOLOGY TOWN
(ISTT)

ISBN: 978-84-09-17612-0

**PalestineUnderstanding of innovation performance in**

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**Key words:** National Innovation System of Palestine NIS, Research and Development (R&D), Public Private Partnership (PPP), Global Entrepreneurship Monitor (GEM), Triple Helix Model of Innovation, Private Sector Innovative Activities.

**Executive Summary**

After five years of establishment of HCIE, where many activities are conducted in collaboration with innovation ecosystem like; representing Palestine in regional and international organizations and institutions that work in innovation, building up effective communication channels with the Palestinian competencies in the Diaspora and working with the relevant national institutions to identify the national priorities in the field of innovation and excellence.

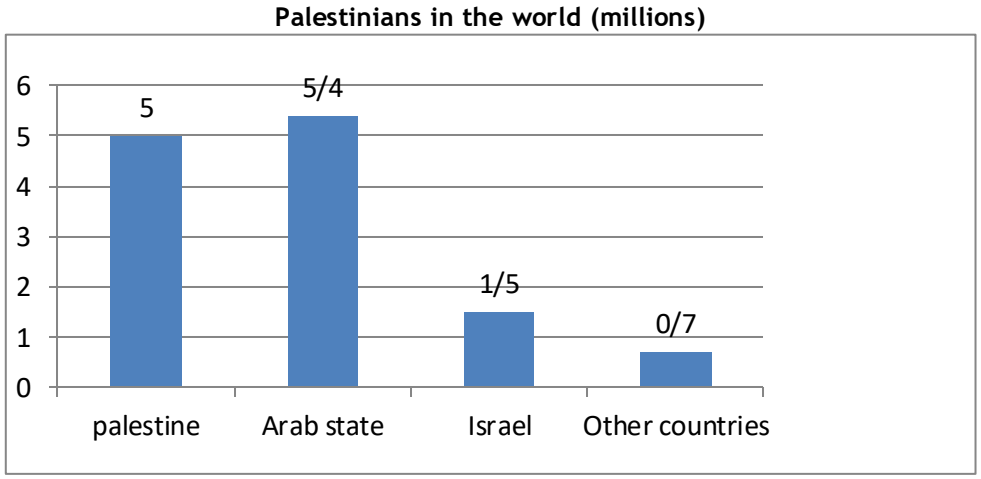
To a certain extent, NIS in Palestine is in the first stage and is ready to embark in the second stage. Regarding the substance of policy actions, policymakers will need to adopt a holistic approach to address a certain critical issues. Also analysis showed the necessity of adopting a set of policies for stimulating R&D and innovation and providing the necessary external and internal enabling environment; the international community and the government are call to holding partnership agreements between universities, civil society institutions and specialized institutions in research to support applied research in the universities.

Analysis showed that NIS in Palestine still needs to develop more effective and more efficient innovation system, including; improving its innovation infrastructure and climate, to augment its innovative outputs, enhance partnerships with international institutions and encourage exchange of expertise to support and develop the innovation spirit, breaking gaps between educational output and Palestinian market needs. And enact legislation necessary for the effective registration and protection of intellectual property and patents.

**Socioeconomic Indicators**

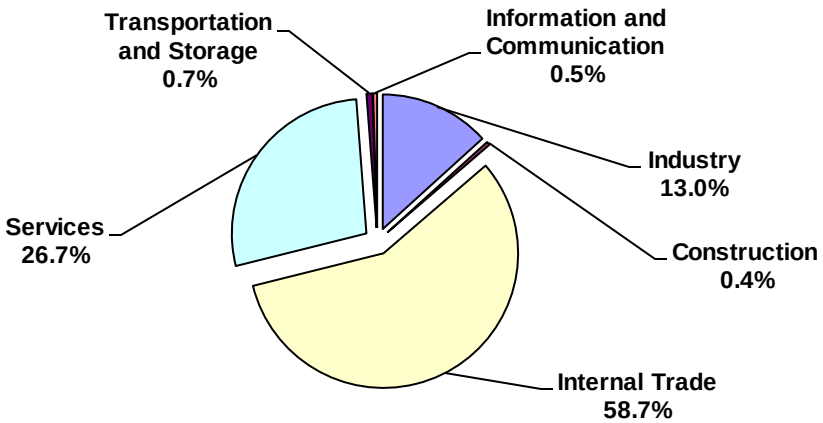
People of Palestine are rich with young educated people and their high capability to learn, and Diaspora with a lot of success stories; political support with some concrete financial aids and real technical assistance from international community able Palestinians to overcome with many challenges and build their own independently state.

The estimated population of Palestinians over the world is more than 12 million, about 5 million in the occupied Palestinian territory; 1.5 millions in the land occupied in the year 1948 and about 5.5 million the Diaspora, almost of them in the Arab states.




More than One Fourth of participants in the labour force were unemployed; most of unemployment is among graduates. About half of the Palestinians are youth. The Gross Domestic Product is about 13 Billion USD. The Exports of goods and services as percentage out of GDP is about 19%. The Foreign Direct investment 100 million USD composed less than 1% out of GDP. Concerning the distribution of economic enterprises, the figure below shows that the Palestinian economy is service oriented, with 130 thousand enterprises 95% are small and medium (less than 10 employees). Still there is an opportunity in technology sector; which represent about 7% out of GDP.

**Distribution of Economic Enterprises by Economic Activity**



**Education:** One million students in Palestine, represent 20% of the population. The number of higher education institutions in Palestine reached 50 universities and colleges, one of which is the Open Education System, most of them are non profit. These institutions include 14 traditional universities and 17 university colleges: 18 middle schools.

Currently, 200 thousands students are enrolled in these institutions; the number of employees in institutions of higher education is 16 thousand, of which 7 thousand are academic.

Regarding to the cost of spending on Palestinian students; there is a gap in which is range (1,000-2000 USD per year), the government in the year 2016 allocated a budget amount of 700 million USD to spend on the Ministry of Education and Higher Education, but most of them go as salaries and operating expenses, not exceeding the proportion of development expenditures 1.8% of the budget allocated to the Ministry. This means that the government allocated 0.3% of the budget for the year to develop the education sector and higher education.

This is accompanied by the necessity to determining the type of education that the educational system seeks to consolidate: Is it seeking research or educational universities, open or regular, governmental or private?. And giving priority to develop vocational and technical education system; where 3.5% of the graduates are technicians, while the proportion of vocational graduates is required to be at least 20%; the challenge behind this is the most of Palestinian vocational workers are working in Israeli market in instable atmosphere.

**Palestinians Entrepreneurs**: The opportunity still big to invest in people; The Global Entrepreneurship Monitor (GEM) conducted a survey in Palestine for people in the working age (18-64), the results demonstrate that the rate of early-stage (less than 42 days) entrepreneurship among young people (18-34 years) in Palestine is slightly above the MENA average which reached 9%. In terms of established business rate (1.3%), however, Palestine marks 2.4 percentage points below the MENA average. In terms of early-stage young entrepreneurship, Palestine ranks 38th out of 67 countries and 58th in terms of established businesses.

The study examines the characteristics of entrepreneurship among young Palestinians, aged 18-34 years. The results suggest that the rate of established entrepreneurial activity for adults (aged 35-64 years) is roughly 4 percentage points higher than among young entrepreneurs. Early-stage adult entrepreneurs marginally outperform young entrepreneurs by only 0.8 percentage points. In terms of motivation, 46% of youth projects in the Palestine were necessity-driven, a much higher rate than among Palestinian adult entrepreneurs (37%) and the MENA average (36%).

The Study shows significant entrepreneurship differences with regards to gender. Primarily, the early-stage entrepreneurial activity rate among young males ranges to roughly 4 times that among young females (14.9% versus 3.9%). In terms of economic activity, the study finds that 53% of projects are consumer related (retail and social services), while manufacturing, wholesale and construction businesses together account for 30% of total entrepreneurial projects.

The main obstacles that affect entrepreneurship among young Palestinians are: political impediments resulting from the occupation and its development-crippling policies; gaps between educational output and Palestinian market needs; credit availability issues; legal and regulatory environment barriers; socio-cultural challenges; and barriers to market entrance.

**Research and Development (R&D)**

About 5000 Researchers in Palestine, most of them in the universities, distributed as 3,500 males and 1,500 female researchers. Only 2500 were Full Time Equivalent FTE researchers. The major outputs of R&D in the year 2015 were 70 international awards and 116 local awards, 149 international standard book numbers (ISBN), and nine patents. The total expenditure on R&D was USD 60 million, representing less than 1% out of GDP. The governmental sector contributed 56% of all R&D expenditures, non-governmental organizations contributed to 21%, and higher education contributed 23% of total expenditure on Research and Development.

Here are some other indicators might help to give more clear picture regarding how much the R&D in Palestine is, from economical point of view:

| Indicators | Value |
|---|---|
| New enterprises | 2% |
| No. of Patent | 11 |
| Revenue from patent | 0.6 million USD |
| Registered Trademarks | 1684 |
| Renew Trademarks | 738 |
| % of R&D expenditures out of GDP | 0.52% |
| Resident patent applications | 18 |
| Resident Trademarks registrations | 915 |
| Industrial design registrations | 37 |

Concerning the R&D activities among private sector the table below that 5.8% of establishments in Palestine performed R&D activities. This percentage ranges from 1.6 to 31.7 according to classification of economic activity. It is worthy to note that R&D activities more in ICT sector, something else Gaza Strip reached to 7.7% emphasizing the assay " Necessity is the mother of invention ", other thing which is also interesting is R&D activities reach to 25.1% among establishments with ten employees and more.

**R&D activities among private sector**

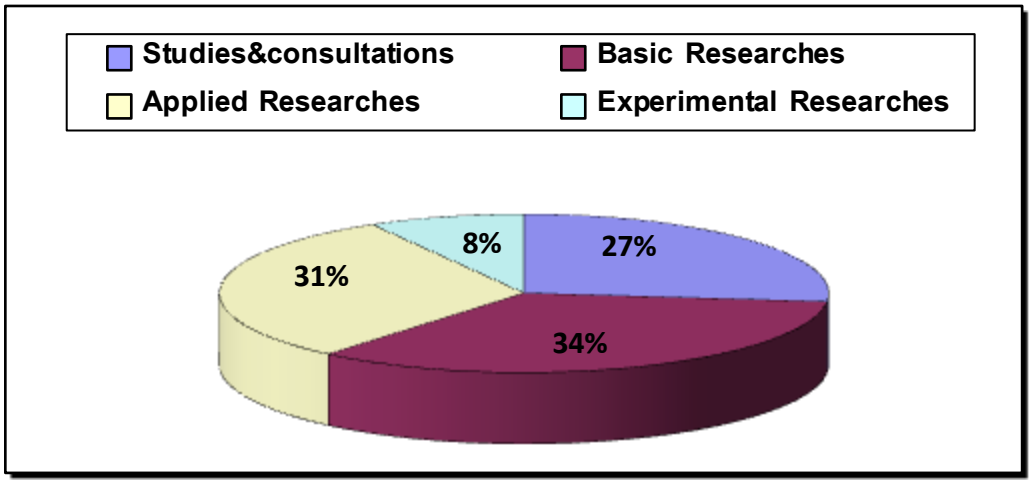
| Selected Variables | Percentage |
|---|---|
| **Region** | |
| **Palestine** | 5.8 |
| West Bank | 5.0 |
| Gaza Strip | 7.7 |
| **Employment Size** | |
| 0-4 | 3.5 |
| ٩-٥ | 7.7 |
| 10+ | 25.1 |
| **Economic Activity** | |
| Industrial | 1.6 |
| Constructions | 8.5 |
| Internal Trade | 3.9 |
| Services | 11.6 |
| Transportation and Storage | 3.3 |
| Information and Communication | 31.7 |
| Financial Intermediation | 21.1 |

So, we expect that the collaboration with universities might provide the needed knowledge and technologies for the industrial firms through some types of collaborative arrangements protected and organized by laws and regulations provided by public bodies.

**Occupation and Qualification of R&D personnel:** Results showed that about half of R&D personnel are researchers and about one fourth are administrators and less than one fifth are technicians and less than one tenth are supporters like services and security.
While data showed distribution of R&D personnel according to educational attainment that most of R&D staff have a bachelor degree or above, about one third have a PhD and about one fifth have a master degree.

**Research and Development Outputs:** Research was distributed by field of research as follows: 26.7% studies and consultations, 34.4% basic research, 30.6% applied research, and 8.3% experimental research.

**Research and Development Outputs**




**Main challenges for R&D in Palestine:** the R&D sector in Palestine suffering from; first the lack specialized journals and, the lack of coordination between libraries and universities to provide the necessary resources for research. The second is the administrative practices of universities in terms of non-allocation of budgets that encourage scientific research and the lack of openness to local and international institutions to support scientific research. The third is the publication of the law on the protection of copyright in Palestine, and the weakness of the follow-up procedures for arbitration and publication by scientific researches. The most recent of which concerns the members of the faculty in terms of lack of scientific research skill and preoccupation with the teaching burdens placed on it, in addition to lack of motivation due to the absence of publication and literary appreciation.

Also the presence of independent and independent research institutions should contributed to the orientation of academics, graduate students and university professors to carry out their research under the umbrella of these institutions, which provide support and funding for research and studies at the expense of working under universities. it needs to be converted into an academic environment attractive to researchers and interested in scientific research.

It is possible to overcome these challenges by providing a government budget for applied and scientific research. Holding partnership agreements between universities, civil society institutions and specialized institutions in research and studies to support scientific research in universities; which started in Palestine where there is some experience we can build on. Also intensify the efforts of the universities to seek external funding from national and international sources and build strong relationships to carry out specialized projects to support scientific research, which is related directly to the political situation where the fund in general for Palestine decreased to 70% during the last five years!

**Public Private Partnership**

The national innovation system in Palestine consists of about seventy institutions are working directly in innovation, in addition to many other organizations providing some services for innovation and innovators. Public Private Partnership (PPP) starts working slowly in Palestine, the innovation ecosystem aware well the importance of such partnership.

A new study based on a Triple Helix Model (Industry, University, Government, and Non-governmental organization NGOs). The model tries to clarify university, industry and government collaboration relationships. The contribution of the industrial sector to the gross domestic production (GDP) is only14.1%.

Due to the weak of research and development (R&D) and the shortage of technological innovations; Palestinian industrial firms leaded to find innovative solutions to bridge the knowledge gap for better product development. Moreover, the industrial firms, with their own capabilities, are not able to fulfill their needs for knowledge and technology. The triple model estimates the relationship between obstacles of innovation (internal and external) and the tendency of the industrial firms to collaborate with other triple helix actors (government, NGOs, and university).

**The impact of innovation obstacles on the industrial firms, and probability of collaborating with the government institution:** The results show that the weak competition in the market between the firms' innovative products motivates the firms to collaborate with public institutions or governments. Also, the lack of technological platforms pushes the industrial firms in Palestine to collaborate with the government to facilitate the access for external knowledge through agreements between Palestinian and foreign public institutions so as to gain the technological infrastructure needed for innovation through facilitating the ICT infrastructure, intellectual property right for new technologies, etc.

Moreover, the weak of knowledge on innovation decreases the collaboration tendency with public institutions, because of the weak knowledge production or creation in the Palestinian public institutions as well. Most universities and research centers are the main source of knowledge. Therefore, it is more important for the industrial firms to collaborate with universities and NGOs rather than the public institutions.

The lack of internal funds for innovation inside the firm, forces it to search for sources of funding sources other than government institutions as NGOs, or other private institutions like banks. This explained by; in the last decade, Palestine suffered from a sharp financial crisis, due to decrease in the international financial aids to 70%, where the government concern is to offer salaries for public employees and not to support science and technology and knowledge production for innovation.

**The impact of innovation obstacles on the industrial firms' probability of collaborating with universities**: The results show that none of the innovation obstacles indexes has a significant impact on the probability of firms to collaborate with universities. This is consistent with previous findings which show that there is no significant relation between firms' collaboration with universities and any type of innovation. This result refers to a number of factors. First, what universities produce is basic research, while industrial firms need applied researches. Second, the industrial sectors do not trust universities, also universities almost are a school of theoretical education, and what they are seeking is practical education.

During the last five years, some initiatives started in Palestine to break these challenges and strengthening university-enterprise linkages, basically, building five "Knowledge offices transfer" within the universities. And there is successful stories we can build on.

**The impact of innovation obstacles on the industrial firms' probability of collaborating with (NGOs):** Actually NGOs established in Palestine since the Israeli occupation started, focusing on emergency aids, due to absent of national authority NGOs did not put a strategy how to treat the modern challenges and how innovation helps in sustainable development.

The triple helix model showed the weak competition in the market for the firms' innovative products motivates firms to collaborate with NGOs. Also, the lack of technological knowledge inside the industrial firms pushes them to collaborate with NGOs to facilitate the access to external knowledge. More than 50%

of the industrial firms confirm that NGOs facilitate the transfer of knowledge from outside Palestine through experts.

Results also show that the uncertainty of the future of innovative products pushes firms to evade innovation because of its high costs and uncertainty. Firms are afraid of collaborating with NGOs in R&D and training their staff due to the uncertainty of the future of innovative products. However, lacking need for innovation due to lacking demand for innovative products in the market pushes firms to collaborate with NGOs to gain market shares, benefit from experts, and train their employees.

The link between industry and universities is weak which affects the innovation system in Palestine. Regardless of the low role that the Palestinian government plays in knowledge generation and transfer, the development of such knowledge and technology transfer collaboration will provide the environment needed to raise the level of innovation by providing the knowledge and technology

The industrial sector must be involved in knowledge and technology transfer collaboration, to help in providing necessary knowledge, technology and profit. Also it is important to build independent knowledge and technology centers inside universities to identify and coordinate knowledge and technology transfer process activities with the existence of the right structure and experts inside these centers.

Other point, Attracting Palestinian investors in the Diaspora to invest in the occupied Palestinian territories has a crucial role in saving the rest of the Palestinian economy freeing its dependency on the Israeli occupation economy and moving towards full liberation from occupation.

**The National Innovation System of Palestine (NIS)**

Developing a Palestinian Innovation Index is important to provide an initial database of private institutions, official bodies and researchers in Palestine. Palestine has not ranked on the Global Innovation Index (GII). In the meaning time Palestine is available in the Arab Innovation Scoreboard (annexed). While GII rankings should not be understood as an absolute indicator, note should be taken of year-on-year relative changes which should encourage a more proactive policy involvement.

The modest performance of the national innovation system in Palestine suggests the need for help from the international community through;

1. To remove all barriers that constrain freedom of movement of people and goods within the occupied Palestinian territories and opening the global market for the Palestinian goods and services products;
2. Also promote the boycott of the Israeli settlements products;
3. Bring to an end settler' and Israeli extremists' crimes of damaging the Palestinian economy;

Rather than international support; accelerating the national innovation system policy reform processes in the near future is needed; after five years of establishment of Higher Council for Innovation and Excellence (HCIE) by his Excellency the Mahmoud Abbas President of state of Palestine, HCIE considered as a higher and formal umbrella for the national innovation system. After start forming of the NIS, which represented within the HCIE board, where many activities are conducted in collaboration with innovation ecosystem, mainly;

1. Representing Palestine in regional and international organizations and institutions that work in innovation;
2. Building up effective communication channels with the Palestinian competencies in the Diaspora;
3. Working with the relevant national institutions to identify the national priorities in the field of innovation and excellence;
4. Strengthening the governance of NIS, effectively;

Currently, National Innovation System in Palestine starts;

1. Review the curriculum of the Palestinian educational system, in order to account for the knowledge and skills necessary for the development of innovators as well as to gradually instill innovation spirit, critical thinking, and risk management skills among graduates.
2. Recruitment Palestinian experts from Diaspora and trained educational supervisors who, depending on experiences, can advise students in the selection of academic and professional disciplines required in the market. Development of learning activities for students centered on teaching problem-solving skills.
3. Start of initiatives that bring innovators to talk about their experiences, Creation of business incubators in all Palestinian governorates to sponsor innovative ideas and develop innovation activities.
4. Designation of a public venture boxes for innovators.

NIS in Palestine still needs to develop more effective and more efficient innovation system, including;

1. Improving its innovation infrastructure and climate, to augment its innovative outputs,
2. Enhance partnerships with international institutions and encourage exchange of expertise to support and develop the innovation spirit.
3. Breaking gaps between educational output and Palestinian market needs; Streamline procedures for the establishment of micro, small and medium-sized enterprises.
4. Enact legislation necessary for the effective registration and protection of intellectual property and patents.
5. Provide tax-breaks that motivate project development of entrepreneurial business owners.

High-level coordination must not be allowed to devolve into committees that become discussion clubs without sufficient ability or authority to implement horizontal and cross-sector programs to counteract fragmentation. To minimize this risk, the Palestinian innovation system is clearly in need of an entity entrusted with a mandate to actively initiate and coordinate cross-sector programs at the level of implementation, to complement the strategic orientation role of the higher body referred to above.

A stronger HCIE and NIS, with the status and capabilities that make it an effective counterpart to line ministries could play such a role. An important future activity for NIS may be to introduce policy training at a high level in order to build a corps of agents of change to ensure the sustainability of and commitment to agreed policies.

Regarding implementation, or the “how to”, international experience suggests that a pragmatic, gradual approach, with clearly defined policy stages, should be considered. In a first stage, the national innovation strategy would initiate well-targeted, micro and meso-level projects. When successful, they could help build credibility and stimulate changes in attitudes, including among policymakers. A second phase could follow, including developing a critical mass of projects, which would prepare the ground for a third phase, during which broad reforms could be implemented. This approach suggests a short-term agenda with rapidly achievable results mixed with a longer term agenda for deep transformations.

To a certain extent, Palestine is in the first stage and is ready to embark on the second stage. Regarding the substance of policy actions, policymakers will need to adopt a holistic approach and address four critical issues they are:

1. The provision of adequate financial, technical and other support;
2. The elimination of obstacles to innovation, including a cumbersome bureaucracy and anti competitive behaviors;
3. Increasing research efforts and technology and knowledge transfer from abroad; and
4. Strengthening the education system to provide needed technical and entrepreneurial competencies.

**Conclusions Recommendations**

People of Palestine are rich with young educated people and their high capability to learn, and Diaspora with a lot of success stories; political support with some concrete financial aids and real technical assistance from international community able Palestinians to overcome with many challenges and build their own independently state.

We can summarize conclusions and recommendations as follows:

1. **Applied research rather basic;** it is necessary to consider adopting a set of policies for stimulating R&D and innovation and providing the necessary external and internal enabling environment; the international community and the government are call to holding partnership agreements between universities, civil society institutions and specialized institutions in research and studies to support applied research in universities; which started in Palestine where there is some experience we can build on. Also intensify the efforts of the universities to seek external funding from national and international sources and build strong relationships to carry out specialized projects to support applied research.

2. **Strengthen of public private partnerships;** still need to improve the environment of those three parties through effective role for the national political system that should play in knowledge generation and transfer; the development of such knowledge and technology transfer collaboration will provide the environment needed to raise the level of innovation by providing the knowledge and technology, the private sector must be involved in knowledge and technology transfer collaboration, to help in providing necessary knowledge, technology and profit. Also it is important to build independent knowledge and technology centers inside universities to identify and coordinate knowledge and technology transfer process activities with the existence of the right structure and experts inside these centers. Other point, attracting Palestinian from Diaspora to invest in Palestinians living the occupied Palestinian territories has a crucial role in saving the rest of the Palestinian economy; through sharing knowledge, networking and technology transfer.

3. **Palestinian National Innovation System;** NIS still needs:
   A. Help from international community to; remove all barriers that constrain freedom of movement of people and goods within the occupied Palestinian territories and opening the global market for the Palestinian goods and services products, promote the boycott of the Israeli settlements products and bring to an end settler' and Israeli extremists' crimes of damaging the Palestinian economy.

   B. NIS components need to adopt a holistic approach and address critical issues like: provision of adequate financial, technical and other support, elimination of obstacles to innovation, including a cumbersome bureaucracy and anti competitive behaviors, increasing research efforts and technology and knowledge transfer from abroad, and strengthening the education system to provide needed technical and entrepreneurial competencies.

   C. Accelerating the national innovation system policy reform processes in the near future is needed through continue of previous initiatives like; reviewing the curriculum of the Palestinian educational system. Recurring of Palestinian experts from Diaspora and trained educational supervisors who, depending on experiences, can advise students in the selection of academic and professional disciplines required in the market, developing of learning activities for students centered on teaching problem-solving skills, bringing innovators to talk about their experiences, Creating more advanced business incubators in all Palestinian governorates to sponsor innovative ideas and develop innovation activities, and supporting of a public venture boxes for innovators.

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