MOSAIC

Cooperation with Mediterranean Partners to build Opportunities around ICT and Societal And Industrial Challenges of Horizon 2020

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Abstract	This document is the analysis of the ICT sector for Palestine.

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Section 1 - Introduction

1.1 Purpose

This document compiles the analysis of the ICT sector in Palestine.

The objective is to identify in Palestine the critical mass per specific Information and Communication Technology where it is suitable to create Working Groups within the future Technology Platform of Mashriq.

1.2 Scope of the document

This document is produced as part of WP2 - Information and data intelligence analysis and identification of MED key stakeholders.

This document is produced as an outcome of:

- Task 2.1 Definition of methodology for the study and interviews
- Task 2.2 Collection of country information and analysis of collected data
- Task 2.3 Consolidation and harmonisation of the analysis

1.3 Structure of the document

The document is stcrutures as follows:

- Overview of the ICT Sector in the country.
- Analysis per Technologies following the ETP model.
- List of contributors / stakeholders.

Section 2 - Palestine

2.1 Situation for ICT

2.1.1 General overview

The Palestinian economy has been facing obstacles for its development; however, the Palestinians have shown great resilience and perseverance to continue thriving and advancing their economy. Specifically, ICT is one of the main sectors powering the Palestinian economy, with an estimated gross revenue generation of $600 million in 2013. It employs close to 5,000 employees, with a strong focus and interest towards the application and usage of ICT for solving societal challenges. In addition, there is a thriving startup community, and there are established VC (Venture Capital) companies and incubators/accelerators that aid in supporting this new ecosystem.

However, the ICT industry remains focused on outsourcing, whether related to BPO (Business Process Outsourcing) or software development outsourcing. The majority of the companies interviewed indicated that outsourcing is their main activity, with reputable international companies such as Cisco, Intel and HP as their clients. In this area, Palestine's strengths lie in having a good base of IT resources available, with strong demand from international and regional clients. Another area that has a strong demand is Arabic content generation, due to Arabic being the native language, coupled with a large educated population and a strong regional demand.

Generally, Palestine has some issues to address in regards to improving the ICT sector, and these include: the perception of insecurity and instability, its captive economy which isolates it from competition, and a lack of capital to drive investment. However, with proper marketing and positioning, which is being mainly carried out by the Ministry of Telecommunication and IT, PITA (Palestinian IT Association) and PalTrade (Palestine Trade Center), Palestine is on the right track to become an IT hub for advanced technologies.

Other ways to further improve the Palestinian ICT sector include:
- IT dissemination and application in all public sectors
- Improvement of law and identity protection
- The introduction of 3G/4G bandwidth for mobile phones
- Improvement in online banking

The Palestinian ICT sector relies on innovation to grow, and companies know that. For example, they host brown bag sessions to stir innovation, and encourage employees to learn and research new technologies. They also give support for developing new ideas, and nurture those ideas into startups. In addition, there are many hackathons, and tech talks with awards for innovative ideas.

2.2 Sectorial analysis and indicators

2.2.1 Software & Services

PALESTINE – SOFTWARE AND SERVICES (NESSI)

Cloud Computing

There is great awareness about cloud computing and its benefits, and many companies and organizations are shifting their business-model towards that, or at least have it in their roadmap. For instance, there is focus on e-learning, and how to better facilitate the educational process between students and teachers. To that end, a couple of cloud-based educational platforms have

been created, with a focus on selling the services to local and regional clients.

Some organizations are starting a new trend of creating their own private clouds. It's not clear on whether the idea behind it is just a cool thing to have, or whether there is additional benefit to be had. This is the case since creating a private cloud is a rather expensive endeavor, and it doesn't necessarily achieve more security and stability, compared to established giants such as Microsoft Azure and Amazon EC2.

Yamsafer is a great example of a startup that made use of available VC funds to utilize the cloud. It's a hotel booking startup with a focus on Middle Eastern region. They developed a solution that sits on Amazon EC2, and provide reliable and fast service to its clients.

Big Data

Business Intelligence is an area that is gaining traction amongst Palestinian businesses. There are many who are researching how to benefit from it and how to monetize it. However, others have already deployed analytics solutions that range from Google Analytics to Zoho CRM, and Kissmetrics to try to make the most of the data they collect. Large companies tend to have more sophisticated solutions such as SAP and Oracle, to deal with the wealth of data that they have. In addition, some companies develop their own methods of data manipulation through linear regression and data modeling. This has proved to be a very useful and cost-efficient solution.

Lastly, new software is being developed to make the most out of data in hospitals. They are accumulating a lot of info on their patients, without the ability to make predictive decisions that are meant to further help the patients.

Content & User Experience

Many organizations are focusing on high-quality content creation to drive traffic to their websites, and to increase awareness about their brands and products. Several institutions already have newsletters with content created from employees. In addition, they create and maintain blog entries and social media accounts to engage with customers. Wataniya, a telecom operator has developed "Wataniya Space", a Facebook application to enable its customers to interact together and with the company.

On the other hand, others are focused on research related to social media impact and localization. The premise is that some people choose to hide their identity online, and there is a need to tackle this issue, to create a better ROI on marketing campaigns.

There is also a focus on the user experience, and its relation to cultural sites. A startup created an augmented reality app to be used in heritage sites, to give more info and details about them. Also, student architects are helping to preserve old cities such as Hebron, while utilizing the latest technologies.

Health

Health is an area of great focus from the Palestinian companies. There are several companies with strong expertise in the health sector, who provide outsourcing services for health care providers in the USA and who comply with US standards related to patient privacy. For example, customer names must be hidden, and all essential data must be encrypted and protected. Similarly, some companies are doing research related to improving the link and relationship between patients and doctors. This includes better management of patient's records, and better algorithms to be able to prevent diseases. Lastly, there is more interest in HL7 (Health Level Seven International), which seeks to develop standards for a framework to exchange, integrate, share, and retrieve electronic health information.

Other areas of health are related to mHealth, where there is research and prototypes for mobile app platforms that check the user's readings, monitor health and provide feedback. In addition, "Fadfid", is a new startup that allows stressed individuals to speak to doctors on the go, which assists in preventing further psychological issues. Lastly, more work is being carried out to release a service that provides doctor consultations via SMS.

Another new area of health is related to interactive touch-based solutions, and Iris is a company that specializes in that. They build sensory rooms that provide a full immersive experience for their inhabitants. These rooms are currently targeted towards children with autism and disabilities. Similarly, Academic institutions such as Najah University are running research on children with disabilities, and how to help them live better. They also have plans to open up a lab dedicated to that.

Smart Cities & Clean Energy

A startup that specializes in transforming sun energy directly into steam, is also specialized in demand site management, which tailors the supply based on demand. This reduces waste and increases efficiency. On the other hand, Bisan is a company that creates financial software. They recycle the heat from their data centres into their office, to be as efficient as possible.

Rawabi is an example of a smart city, where services and residents will be connected and synced. There will be implementation of kiosks for maps, with info related to tourism. In addition, they are currently developing a smart transportation architecture, which will link transportation shuttles within the city, and make it more efficient to find a ride.

Natural computer interaction

Currently, there is basic but promising research in relation to "machine to machine" and "machine to human" interaction, which will open up new boundaries in the natural computer interaction realm. In addition, there is more interest in the NLP domain, and the application of that in the statistics sector. Lastly, an academic institution has embarked on a huge project to build the Arabic ontology, with direct benefit for the NLP, big data and Arabic content fields.

Education

Education has been brought up many times as an area that needs more focus, in terms of modernizing the curriculum and strengthening the link between academic institutions and private companies. To tackle such issues, some companies have developed e-learning platforms and school management systems to better coordinate the internal school and university activities. These systems are already spread within Palestine, with high hopes to also spread within the region. In addition, research in regards to e-learning and better exam correction mechanisms is being done at universities.

Future ICT Research

There are many areas within the ICT industry that are in early stages of development, and require more R&D. These include cloud computing, internet of things, and big data. The industry players are slowly shifting to SaaS (Software as a Service) solutions, and given that cloud and "everything connected" is the next big thing in the ICT industry, it's very promising that many companies are focusing on these areas. However, they require additional time, investment and know-how to be able to excel at it. In addition, there is a growing interest in areas such as agriculture and clean energy.

Below are more examples about future societal issues, and how ICT can aid in solving them:

Future issues	Future ICT Research
Agriculture, as it is now, can't support the growing population	There are many areas for improvement related to better management of irrigation, green houses, etc…
High unemployment could become the most important topic	By increasing R&D and innovation in ICT, this will provide more jobs that will aid in reducing unemployment. Also, it will enable women to work from home
The banking sector is not modern, and can't keep up with the needs of a generation that is tech-savvy	Through ICT, better software can be built to improve this sector. There are many areas of improvement, including better online access, and mobile banking
slow implementation of e-Government; given that many services are still paper-based. In addition, ministries have some resources that are not digitized yet.	Through ICT, more research can be conducted to increase the adoption of e-Government resources. This will have a significant impact on improving the lives of citizens especially that most Palestinians (+ 75%) are either refugees or living abroad.
With a growing population, comes increased road traffic and congestion	Development of systems that will improve traffic patterns
City planning, as it's a must with a growing population	How to better plan cites, related to more research on proximity of people and shops, in addition to usage of maps and GPS data

PALESTINE – Software and Services indicators

Id. code	Indicator	
PO-01	National or State Policies	General ICT research policy exists
PO-02	Funding mechanism to support ICT research	Funding related to this area is foreseen, and cooperation with the EU is possible within national funding schemes
PO-03	Future plans, priorities and strategies in ICT R&D	1
PO-04	Support to MED-TPs	1
IN-01	Presence of Large ICT Industry doing Research and Innovation	0
IN-02	Presence of Research and Innovation Intensive SMEs	6
IN-03	Involvement in European funded projects	2
IN-04	Independence of local industry	3
IN-05	Foreign Direct Investment (FDI) and presence of development centres	8
IN-06	Market Demand	1

IN-07	Number of Patents	7
IN-08	Support to MED-TPs	1
IN-09	Already existing commercial cooperation with European industries	3
AC-01	Number of Universities and Research Centres	9
AC-02	Researchers operating in the targeted field	Insufficient Data
AC-03	Number of yearly scientific publications	0
AC-04	Previous participations in FP6-FP7 R&D projects	0
AC-05	Existing cooperation with EU countries	3
AC-06	Support to MED-TPs	1

2.2.2   Telecommunications

PALESTINE – MOBILE AND WIRELESS COMMUNICATIONS (Net!Works)

There are only two Palestinian mobile companies operating in Palestine, Jawwal and Wataniya. They directly compete in the West Bank market (in addition with Israeli operators who have access through towers installed in Israeli settlements), but so far Jawwal is the only operator in Gaza Strip, since the Israeli authorities have denied Wataniya from operating in it. They offer voice and data using 2G technology, in addition to a multiple of value added services.

The Palestinian mobile and wireless sector has been growing, but it will reach the limit to the services it can offer very soon. The reason is related to frequencies for the third and fourth generation (3G and 4G) technologies and WiMAX, which the Palestinian government can't obtain from the Israeli authorities. This will have dire consequences on the economy, and its growth, as the usage of advanced and fast mobile technologies opens up many frontiers in R&D, with a direct impact on the economy and citizens.

There aren't any official statistics, but smartphone adoption is experiencing fast growth. This is fueling many young entrepreneurs and established companies to create services and solutions that are tailored to these mobile devices. In addition, there is a strong demand for Arabic based apps from the Arab world, and companies and entrepreneurs alike are working on meeting that demand.

Next Generation Networks

Some companies provide wireless testing services for next generation wireless networks, such as gigabit wireless networks. At the same time, they also provide services on how to reduce the power consumption of wireless devices. They calculate how much electricity each component in a board draws, to determine the best components to achieve a very low-power computing.

On the other hand, some institutions are conducting research related to wireless sensor networks, with utilization of mobile devices. The objectives are still broad, but the focus is on the future, and the benefits this research would bring to the consumer applications.

PALESTINE – Mobile and Wireless Communications indicators

Id. code	Indicator	
PO-01	National or State Policies	General ICT research policy exists
PO-02	Funding mechanism to support ICT research	Funding related to this area is foreseen, and cooperation with the EU is possible within national funding schemes
PO-03	Future plans, priorities and strategies in ICT R&D	3
PO-04	Support to MED-TPs	1
IN-01	Presence of Large ICT Industry doing Research and Innovation	3
IN-02	Presence of Research and Innovation Intensive SMEs	0
IN-03	Involvement in European funded projects	0
IN-04	Independence of local industry	5
IN-05	Foreign Direct Investment (FDI) and presence of development centres	1
IN-06	Market Demand	1
IN-07	Number of Patents	0
IN-08	Support to MED-TPs	1
IN-09	Already existing commercial cooperation with European industries	1
AC-01	Number of Universities and Research Centres	5
AC-02	Researchers operating in the targeted field	Insufficient Data
AC-03	Number of yearly scientific publications	0
AC-04	Previous participations in FP6-FP7 R&D projects	0
AC-05	Existing cooperation with EU countries	3
AC-06	Support to MED-TPs	1

2.2.3 High Performance Computing

PALESTINE – HIGH PERFORMANCE COMPUTING (ETP4HPC)

Research is being carried out on creating optimized and efficient grids that will help in advancing HPC. Also, an HPC hub is in the making, to be used by all institutions and companies in Palestine. On the other hand, more research is being carried out related to computer clusters, their relation with cloud computing, and how to increase their efficiency and further optimize their energy usage.

PALESTINE – High Performance Computing indicators

Id. code	Indicator	
PO-01	National or State Policies	General ICT research policy

		exists
PO-02	Funding mechanism to support ICT research	Funding related to this area is foreseen, and cooperation with the EU is possible within national funding schemes
PO-03	Future plans, priorities and strategies in ICT R&D	1
PO-04	Support to MED-TPs	1
IN-01	Presence of Large ICT Industry doing Research and Innovation	0
IN-02	Presence of Research and Innovation Intensive SMEs	0
IN-03	Involvement in European funded projects	0
IN-04	Independence of local industry	0
IN-05	Foreign Direct Investment (FDI) and presence of development centres	0
IN-06	Market Demand	3
IN-07	Number of Patents	0
IN-08	Support to MED-TPs	1
IN-09	Already existing commercial cooperation with European industries	1
AC-01	Number of Universities and Research Centres	5
AC-02	Researchers operating in the targeted field	Insufficient Data
AC-03	Number of yearly scientific publications	0
AC-04	Previous participations in FP6-FP7 R&D projects	0
AC-05	Existing cooperation with EU countries	3
AC-06	Support to MED-TPs	1

2.3 List of contributors

The following table compiles the list of contributors to the analysis (data collected by interviews or by email campaign).

Nº	E-MAIL	Organization	Type (*)
1	abudaka@pita.ps	PITA	Association of ICT Companies
2	info@picti.ps	PICTI	Industry (SME)
3	info@sadaravc.com	Sadara	Industry (SME)
4	mtahboub@asaltech.com	ASAL Technologies	Industry (SME)
5	omar.kilani@exalt.ps	EXALT	Industry (SME)
6	shatha.barghouthi@experts.ps	Experts	Industry (SME)
7	info@gsofttech.com	Gsoft	Industry (SME)
8	gmustafa@2isoftware.com	2i Software	Industry (SME)
9	majed@galaxy.ps	Galaxy	Industry (SME)
10	ahanaysheh@iconnecths.com	iConnect	Industry (SME)
11	info@yamsafer.me	Yamsafer	Industry (SME)
12	omar.kamal@progineer.net	ProGineer	Industry (SME)
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14	obarkawi@infinitetiers.com	Infinite Tiers	Industry (SME)
15	info@iscosoft.com	Isra	Industry (SME)
16	ali.taha@arttech.ps	Art Technologies	Industry (SME)
17	mewaida@asd.ps	Al-andalus Software Development	Industry (SME)
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20	bashar.hlayel@paltel.net	Paltel	Industry (large)
21	info@bisan.com	Bisan	Industry (SME)
22	alsalqan@i-jaffa.net	Jaffa.Net	Industry (SME)
23	ayman@iris.ps	Iris	Industry (SME)
24	info@pmtit.ps	NMTIT	Government
25	info@najah.edu	An-Najah National university	Academic
26	alsaheb@ppu.edu	Palestinian polytechnic university	Academic
27	yamro@qou.edu	Al-Quds Open University	Academic
28	admin@aauj.edu	Arab American University Jenin	Academic
29	info@bethlehem.edu	Bethlehem University	Academic
30	webmaster@alquds.edu	Al-Quds University	Academic

(*) Industry (large), Industry (SME), Academic, Government

Section 3 - Conclusions

The critical mass in Palestine to create a Working Group in the future Technology Platform:

- ➢ **Software and services**
  Software development, Digital Arabic content including Arabic language processing, Mobile applications and e-services.

- ➢ **Technologies for better human learning and teaching (Contents)**
  Innovative learning systems using modern technologies, Introducing mobile-learning to the field of Education in Palestine.

- ➢ **Telecommunications**
  Development and Design of advanced cellular networks.

- ➢ **Cloud computing**
  infrustructure building and development of data centres, mobile cloud computing.

- ➢ **e-government and smart cities**
  e-government service bus, interoperability framework, open government, smart citites, e-tourism, services of local governments, e-democracy.

- ➢ **Health**
  data centre for the management and monitoring of patients' medical recorder, diagnosis of disease in short time for a patient using modern technologies.

- ➢ **Transport**
  Green Transport, Smart management of road traffic.

- ➢ **Environment**
  Management of solid, liquid waste, water consumption.

Annex I - Acronyms

Term / expression	Description
ETP	European Technology Platform
ICT	Information and Communication Technology
LatAm	Latin America
LATP	Latin America Technology Platform
SRIA	Strategic Research and Innovation Agenda
TP	Technology Platform