The State and Outcomes of Higher Education in the Arab World with a Focus on TIES Partner Countries

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Outline:

1. General description of the higher education scene in the Arab World as shown by performance indicators of Arab universities and research centers.
2. Roadmap for improving the quality of higher education provision as well as its economic feasibility is in making proper use of blended/hybrid education.
3. Survey and analysis of both e-learning and blended education.
4. Success stories and relevant data and examples.

Higher Education & Scientific Research:

HE in the Arab World:

- Number of HE institutes increased from 10 in 1940 to 260 in 2007 (Now about 450).
- Number of Students increased from 137000 in 1960 to about 7 million in 2007 (Now 8.1 million).
- Only 2.4% attending HEIs compared with:

Country	Attendance %
USA	5.6%
S. Korea	5%
UK, Israel	3.6%
France	3.4%
Jordan	3.0%
Lebanon	2.8%
Saudi Arabia	1.4%

According to published statistics:

- Only 2.4% attending HEIs.
- To accommodate the growing number of students:
  - New Universities,
  - Increase capacity in universities, or
  - Using e-learning and blended education.
- Arab Universities are still below the required level.!!!
- Six indicators are used for assessing our universities:

1. No. of Registered Patents.
2. University Ranking.
3. Published Scientific Papers.
4. Expenditure on Research & Development.
5. Arab participation in the European Programs.
6. World Intellectual Property Indicators

1. Patents & Arab World:

Number of Patents Granted as Distributed by Year of Patent Grant Breakout by U.S. State and Foreign Country of Origin (U.S. Patent, 2011)

Origin	Pre 1998	1998-2009	2010	2011	All Years
-- Subtotal -- U.S. Origin	1055217	1135878	121179	121261	2433535
JAPAN	331801	424994	46977	48256	852028
GERMANY	143462	128572	13633	12968	298635
TAIWAN	16320	78262	9636	9907	114125
UNITED KINGDOM	55725	47913	5038	4924	113600
FRANCE	55952	47250	5100	5022	113324
KOREA, SOUTH	8584	63748	12508	13239	98079
ITALY	23501	2241	2254	2333	50549
ISRAEL	5407	13296	1917	2108	22728
FINLAND	5306	10100	1232	1023	17661
CHINA, PEOPLE'S REPUBLIC OF	554	8938	3303	3786	16581
CHINA, HONG KONG S.A.R.	2587	7272	716	658	11233
SAUDI ARABIA	110	214	58	61	443
TURKEY	49	225	45	52	371
KUWAIT	26	100	14	24	164
EGYPT	36	61	20	21	138
UNITED ARAB EMIRATES	18	58	9	13	98

Patents & Arab World:

Origin	Pre 1998	1998-2009	2010	2011	All Years
LEBANON	20	38	5	21	84
IRAN	29	17	8	17	71
MOROCCO	21	21	1	4	47
JORDAN	9	15	1	5	30
TUNISIA	11	7	2	3	23
SYRIA	5	13	0	1	19
OMAN	1	7	2	3	13
IRAQ	9	1	0	0	10
QATAR	0	8	0	1	9
BAHRAIN	2	3	1	0	6
YEMEN	2	1	0	0	3

IP Filings (Resident and abroad) for 2011.

(www.wipo.int/ipstats/en/statistics/country_profile(2012)

Country	Patents	Trademarks	Industrial design
Israel	10,821	14,671	4,845
Jordan	15	2,988	12
Bahrain	09	706	-
Canada	24,528	59,616	7,442
Egypt	727	-	-
Finland	11,516	34,124	7,131
Japan	472,417	196,843	71,986
Denmark	11,565	43,421	12,550
Morocco	191	7,299	1,004
Norway	5,325	15,552	2,787
Republic of Korea	187,454	149,818	70,754
Saudi Arabia	1,067	-	251
Singapore	4,529	18,928	2,127
Sweden	21,480	78,066	17,431
Switzerland	37,477	153,946	38,572
Turkey	5,265	126,001	11,787
UK	49,938	322,633	52,874
USA	432,298	789,800	83,222
Yemen	09	2,210	18
France	65,340	335,504	60,949

Patents & Arab World:

According to the World Intellectual Property Organization's (WIPO) annual report (2011):		
	Country	**No. of Patents**
1	Saudi Arabia	147
2	UAE	39
3	Egypt	33
4	Morocco	17
5	Tunisia	8
6	Syria	5
7	Algeria, Kuwait	4 each
8	Jordan, Lebanon	1 each

According to the 2012 report of USA PATO:	
Country	**No. of Patents**
Arab World	1087
USA	2.5 million
Japan	849 467
South Korea	97 956
Finland	17661

2. Ranking of Arab Universities:

National Taiwan University Ranking 2012 (NTU Ranking, 2012).

Country	1 – 100	101 – 200	201 – 300	301 - 400	401 – 500	Total
U.S.A	54	31	25	27	19	156
Canada	5	4	4	5	4	22
Germany	3	10	15	5	12	45
U.K	8	12	6	6	—	32
Japan	4	4	3	7	5	23
France	2	4	3	6	5	20
Switzerland	2	5	—	—	1	8
Finland	1	—	1	3	1	5
Singapore	1	1	—	—	—	2
China	1	4	5	7	7	24
Italy	1	5	6	8	7	27
Israel	—	3	1	1	—	6

- **There are no Arab Universities among the top 500 universities according to NTU Ranking, 2012.**
- **According to Shanghai Academic Ranking, 2012; only THREE KSA universities, and ONE Egyptian university appear.**

Shanghai Academic Ranking of some World Universities. (Shanghai, 2012).

Country	1 – 100	101 – 200	201 – 300	301 - 400	401 – 500	Total
U.S.A	53	32	24	28	14	151
U.K	9	10	11	3	5	38
Japan	4	5	—	7	5	21
Switzerland	4	2	1	—	—	7
France	4	5	5	3	4	21
Germany	3	10	10	6	7	36
Israel	3	1	—	2	—	6
Canada	4	3	10	1	4	22
Finland	1	—	—	2	2	5
Italy	—	4	5	3	8	20
China	—	4	3	7	14	28
Singapore	—	1	1	—	—	2
Saudi Arabia	—	—	1	2	—	3
Brazil	—	—	1	—	—	1
Iran	—	—	—	1	—	1
Egypt	—	—	—	—	1	1
Turkey	—	—	—	—	1	1

3. Number of Scientific Published Papers:

Number of scientific articles published in the Arab world, 1998-2007

Country	Number of scientific articles published from					Total	Number of articles per one million inhabitants (2005)
	Environment and agriculture	Public health and biology	Basic sciences	Energy Sciences	Engineering and Industrial Sciences		
Egypt	827	205	720	2276	245	4273	50.9
Jordan	474	113	202	523	113	1425	177.3
Morocco	366	78	317	614	69	1444	39.1
Saudi Arabia	352	111	183	846	182	1674	72.3
Tunisia	264	95	179	622	56	1216	146.2
Kuwait	240	56	70	216	81	663	267.2
Algeria	206	20	190	737	67	1220	27.1
Syria	183	30	25	92	9	339	12.8
Lebanon	160	158	83	201	53	655	347.3

Ranking of countries by number of scientific papers:

Number of scientific publications in selected Arab Countries[16]

Country	Number of scientific publications, 2005[1]	Scientific publications per 1,000 global publications[2]
Egypt	1658	2.83
Saudi Arabia	575	..
Tunisia	571	0.80
Morocco	443	0.87
Algeria	350	0.49
Jordan	275	0.55
Lebanon	234	0.35
Kuwait	233	..
UAE	229	..
Oman	111	..
Syria	77	0.11
Sudan	43	..
Bahrain	29	..
Qatar	19	..
Yemen	10	..
Mauritania	2	..

Ranking of Countries by No. of Scientific Papers:

Expenditure on research in the Arab region

Country	Government spending as a percentage of 2006 GDP[1]	Private sector spending (scale of 1-7)[1]	Corporate spending on research (out of 134 states)[2]
Oman	..	3.9	44
Tunisia	1.3	3.8	38
Qatar	..	3.6	35
Saudi Arabia	..	3.5	43
UAE	..	3.3	50
Morocco	0.75	3.2	69
Egypt	0.2*	3.1	57
Kuwait	0.18	3.1	93
Jordan	0.34	3.1	79
Algeria	..	2.8	116
Syria	..	2.7	115
Bahrain	..	2.6	82
Libya	0.7*	..	124
Lebanon[3]	0.2	..	..
Sudan	0.3	..	..

Ranking of Countries by No. of Scientific Papers:

Expenditure on research and development and percentage contributions from private and public sectors in comparison countries

Country	Spending on research and development (percentage of GDP)	Percentage private sector contributions (percentage of GDP)	Percentage public sector contributions (percentage of GDP)
Sweden	3.73	2.79	0.94
Japan	3.39	2.62	0.77
Finland	3.37	2.46	0.91
United States	2.61	1.84	0.77
Germany	2.53	1.77	0.76
France	2.09	1.34	0.75
European Union (27 states)	1.84	1.11	0.73
China	1.42	1.01	0.41
Spain	1.20	0.67	0.53
Italy	1.09	0.54	0.55

Arab international cooperation in scientific publishing. (AKR, 2009)

Arab-international cooperation in scientific publishing

Rank	Tunisia Country	%	Egypt Country	%	Lebanon Country	%
1	France	77.0	United States	27.9	France	37.0
2	United States	5.7	Germany	14.9	United States	32.3
3	Germany	4.1	Saudi Arabia	12.4	United Kingdom	10.1
4	Italy	3.7	Japan	10.3	Canada	6.9
5	Belgium	3.6	United Kingdom	8.6	Bahrain	4.5
6	Canada	3.6	Canada	5.3	Italy	3.8
7	United Kingdom	3.1	Italy	4.1	Saudi Arabia	3.2
8	Morocco	2.2	Belgium	3.1	Germany	..
9	Spain	2.1	France	2.9	Australia	..
10	Algeria	1.5	Spain	2.2	Egypt	..

Top Ten Nations by Publications (2008)

Country	Rank	Publications	Relative impact	Publications per thousand population	Percentage produced by international collaboration
United States	1	340,493	1.44	1.12	27
China	2	103,780	0.79	0.08	22
United Kingdom	3	91,226	1.44	1.49	45
Germany	4	87,433	1.42	1.06	44
Japan	5	79,515	1.02	0.62	24
France	6	64,515	1.25	1.01	47
Canada	7	53,286	1.31	1.60	44
Italy	8	50,367	1.26	0.84	38
Spain	9	41,990	1.13	0.92	38
India	10	38,697	0.63	0.03	18
Top ten average	N/A	*95,130*	*1.17*	*0.88*	*35*

Source: Review Taskforce, 2011

Books Published per country per Year. (Wikipedia, the free encyclopedia, 2013)

Country	Rank	Years	No of books
USA	1	2010	328259
UK	2	2005	206,000
China	3	2010	189,295
Russian federation	4	2008	123,336
Germany	5	2009	93,124
Japan	8	2009	78,555
Finland	28	2006	13,656
Denmark	31	1996	12,352
Switzerland	33	2001	12,156
Egypt	38	2000	9022
Israel	42	2006	6866
Saudi Arabia	48	1996	3,900
Lebanon	50	2005	3,686
Syria	64	2004	1,138
Morocco	67	1996	918
Tunisia	68	1996	720
Algeria	70	1996	670
Jordan	75	1996	511
UAE	UAE	1993	293
Qatar	95	1996	209
Kuwait	96	1992	196
Palestine	103	1993	106
Bahrain	116	1996	040
Libya	118	1994	026

Ranking of Countries by No. of Scientific Papers: (1998-2007)

Rank	Country	Papers	Citations	Citations per paper	Population	Papers per capita
1	USA	2,967,957	46,796,090	15.77	310,384	9.56
2	Japan	770,252	7,877,699	**10.23**	126,536	6.09
3	Germany	762,599	9,960,100	**13.06**	82,302	9.27
4	China	719,971	4,227,779	5.87	1,341,335	0.54
5	England	679,394	9,979,737	**14.69**	**62,036**	**10.95**
6	France	542,293	6,660,630	**12.28**	62,787	8.64
13	Korea	254,599	1,767,799	6.94	48,184	5.28
14	Netherlands	239,892	3,687,829	**15.37**	**16,613**	**14.44**
16	Sweden	174,052	2,548,046	**14.64**	**9,380**	**18.56**
17	Switzerland	172,904	2,873,881	16.62	7,664	22.56
20	Turkey	138,345	687,389	4.97	72,752	1.90
?	Arab World	13838	?	?	325,000	0.043

Top Ten Nations by Researchers (FTE) in 2008

Country	Rank	Researchers (FTE)	FTE per thousand labour force	Business Researchers (FTE)	Higher Education Researchers (FTE)	Government Researchers (FTE)
China	1	1,592,420	2.0	1,092,213	261,237	238,970
United States[23]	2	1,412,639	9.2	N/A	N/A	N/A
Japan	3	656,676	9.9	492,805	123,549	32,050
Russian Federation	4	451,213	6.0	226,534	76,797	145,988
Germany	5	302,467	7.3	180,295	76,831	45,342
United Kingdom	6	251,932	8.1	86,106	152,551	8,695
Korea	7	236,137	9.7	182,901	34,773	15,552
France	8	229,130	8.2	129,824	68,897	27,372
India[24]	9	154,827	N/A	N/A	N/A	N/A
Canada[23]	10	142,948	7.9	86,368	47,310	8,720
Top ten average	*N/A*	*N/A*	*7.6*	*N/A*	*N/A*	*N/A*

Source: Review Taskforce, 2011 [NOTE: Some fields have been left blank as an analysis was not considered appropriate].

4. Expenditure on Research & Development:

Expenditure on research and development and percentage contributions from private and public sectors in comparison countries

Country	Spending on research and development (percentage of GDP)	Percentage private sector contributions (percentage of GDP)	Percentage public sector contributions (percentage of GDP)
Sweden	3.73	2.79	0.94
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European Union (27 states)	1.84	1.11	0.73
China	1.42	1.01	0.41
Spain	1.20	0.67	0.53
Italy	1.09	0.54	0.55

Expenditure on Research & Development:

- The Arab World allocates less than 1% of the GDP for research and development .
- South Korea allocates 3.74%.
- The GDP for:
  - Jordan: 28 B$
  - Lebanon: 42 B$

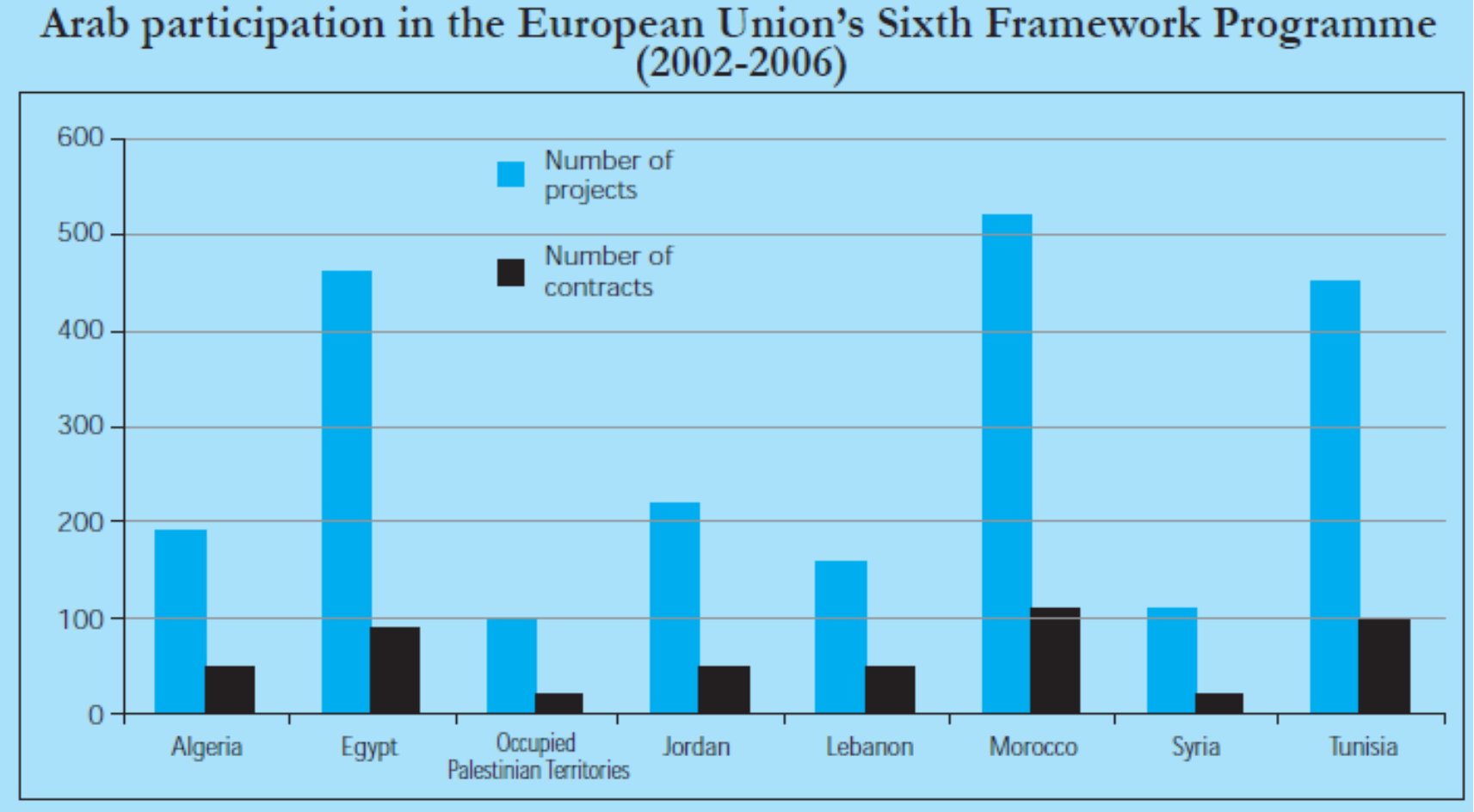
Country	Spending on RD as % of GDP	GDP (USD)
South Korea	3.74%	1.12T
Japan	3.67%	5.87T
USA	2.7%	15T
Germany	2.3%	3.57T
EU (27 states)	1.84%	13.38T
China	1.97%	7.3T
Denmark	2.4%	332B
Egypt	0.23% (2007)	229.5B
Saudi Arabia	0.05% (2007)	576.8B
Tunisia	0.86% (2007)	45.86B

Gross expenditure on R&D ($'000), by sector–by field of research, 2008–09

Field of research	Business	GOVERNMENT Total	Higher education	Private non-profit	TOTAL
Engineering	9,118,212	610,762	577,160		10,306,134
Information & computing sciences	4,407,485	290,518	218,206		4,916,209
Medical & health sciences	938,374	451,549	2,064,348	559,338	4,013,609
Biological sciences	73,342	311,136	688,892	117,259	1,190,629
Agricultural & veterinary sciences	361,604	544,992	278,811	961	1,186,367
Technology	807,491	127,107	170,261	6,214	1,111,073
Chemical sciences	273,379	132,025	252,727		658,132
Environmental sciences	171,767	277,706	191,111	6,578	647,162
Earth sciences	196,425	239,422	194,548		630,395
Physical sciences	19,221	211,215	224,415	0	454,852
Built environment & design	319,252	15,439	68,925		403,616
Studies in human society		49,716	326,775	5,462	381,954
Commerce, management, tourism & services	100,862	5,101	253,793		359,756
Education	12,768	13,935	210,112		236,816
Psychology & cognitive sciences	4,088	22,424	199,480	6,700	232,692
Economics	12,229	38,582	162,719		213,530
Mathematical sciences	24,327	55,817	132,378		212,522
Language, communication & culture	1,627	2,295	161,510		165,432
History & archaeology		6,364	118,763	0	125,127
Law & legal studies	5,199	12,483	85,502		103,184
Studies in creative arts & writing	9,448	1,682	82,681		93,811
Philosophy & religious studies	0	196	53,994		54,190
Total expenditure on R&D	**16,858,477**	**3,420,468**	**6,717,113**	**743,907**	**27,739,965**

Source: ABS 8112.0 (2010)

5. Arab participation in the European Programs:



Source: AKR, 2009

6. World Intellectual Property Indicators: (WIPO 2009)

Country	IPI
Sweden	94.2%
Japan	93.6%
USA	83.3%
UK	79.6%
Israel	72.5%
India	69.6%
China	68.6%
Spain	51.0%
Singapore	45.2%
Brazil	45.1%
South Africa	40.9%

On-line Learning:

- In 2002, the number of students enrolled in at least one online course was 1620970. In 2010, the number reached 6142280.
- 31% of HE Students take at least one course online.
- 65% of HE Academic Leaders say that online learning is a critical part of their long-term strategy.
- 51% of HE Academic Officers consider elearning and face-to-face outcomes the same.

Source: Allen & Seaman, 2011

On-line Learning:

- Prof. Andrew Ng. taught in 2011 online course to a class of 100000 students. (Ref: Friedman, 2012).
- Prof. Andrew Ng & Prof. Koller founded online environment (COURSERA) for bringing high quality online courses free of charg.
- High quality online courses are prepared by top universities in USA.
- Recently, MIT & Harvard University joined COURSERA through their joint venture (Edx). In March 2012, about 120000 students signed up for the 1st MIT course (Circuits & Electronics). (Ref: DeSantis, 2012).
- Prof. John Hennessy told his colleages «Tsunami is coming » ……. Harvard & MIT awarded their Edx first certificate 7000 students which is DOUBLE the number of degrees MIT awarded at this year (2011). (Ref: Savage, 2012).

E-Learning & Arab Universities:

Arab universities can face critical challenges and problems;

- The absence of any e-learning culture.
- Urgent need for responsible academic leadership that understand and appreciate e-learning and blended education.
- The need for an appropriate e-learning strategies that can over ride the challenges and accelerate the adaptation of e-learning in Arab educational systems.
- Present rules and regulations at Arab universities are not flexible to accommodate the application of e-learning.

With these challenges, e-learning and blended education can be considered as an important key to reduce these negative aspects and turn them in the proper directions.

Online Learning:

Online learning is an important engine for positive change in Higher Education especially that it provides lower-cost quality education. It requires, however, a technology friendly environment. Its major benefits and obstacles are as follows:

Benefits	Obstacles
• Widening participation with access to digital learning to any person across time and space	• Time and funds for creating the e-learning environment
• Promoting digital literacy	• Resistance by teachers and lack of motivation by students
• Enhancing interaction among students, and between students and teachers/ tutors	• Full access to technology at home and at the institution
• Creating and using networks with a focus on collaborative work	• Lack of training for both instructors and students
• Cost reduction through reducing teacher management and administrative time and increased organizational efficiency	
• Promotion of blended learning strategies in the classroom	

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Thank You

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