

TECHNOLOGY TRANSFER: PRINCIPLES AND THE SITUATION IN THE ARAB STATES

Water-Energy Nexus Operational Toolkit : Technology Transfer

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Economic and Social Commission for Western Asia

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Outline

Technology Transfer Principles

Technology Transfer and the Arab Countries

Key messages

Technology Transfer Principles

Technology Transfer Pathways



From the public to the private sector

From a big firm to a smaller one

Between universities or countries (e.g., from developed to technologically less developed countries)

The conversion of research output into products on the market

Technology Transfer Pathways



International trade can be used to import technology.

FDI can be used through which foreign component manufacturers may set up subsidies in the host country.

Joint ventures can be used in which a local and a foreign companies form a business association through which they would share equity, profits, risks, etc.

Licensing in which a local company is given IP rights for the technology due to the legal contract it has signed with the foreign company.

Technology Transfer - Classification

Vertical

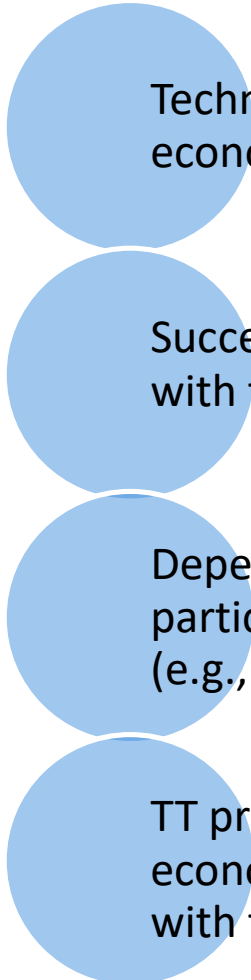
- Occurs when information is transmitted from basic research to applied research, from applied research to development, and from development to production. Such transfers occur in both directions and the form of the information changes as it moves along this dimension.

Horizontal

- Occurs when technology used in one place, organization, or context is transferred and used in another place, organization, or context.

TT can also be either formal or informal with reference to the channels used.

Technology Transfer - Background



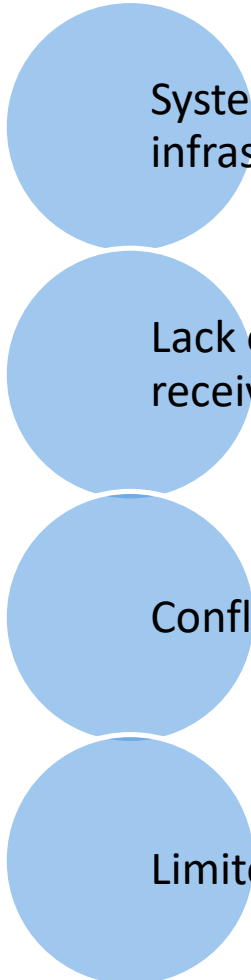
Technology transfer is an integral part of increasing innovation in an economy to achieve economic development.

Successful TT requires a certain environment which is only possible with the support and cooperation of local governments.

Depending on the nature of the entities involved, and the particulars of the type of TT, the arrangement can take various forms (e.g., public-private partnerships, joint ventures).

TT projects that fail tend to do so due to barriers and gaps related to economic and institutional factors; rarely does the failure have to do with the specific technology being transferred itself.

Successful Technology Transfer - Barriers



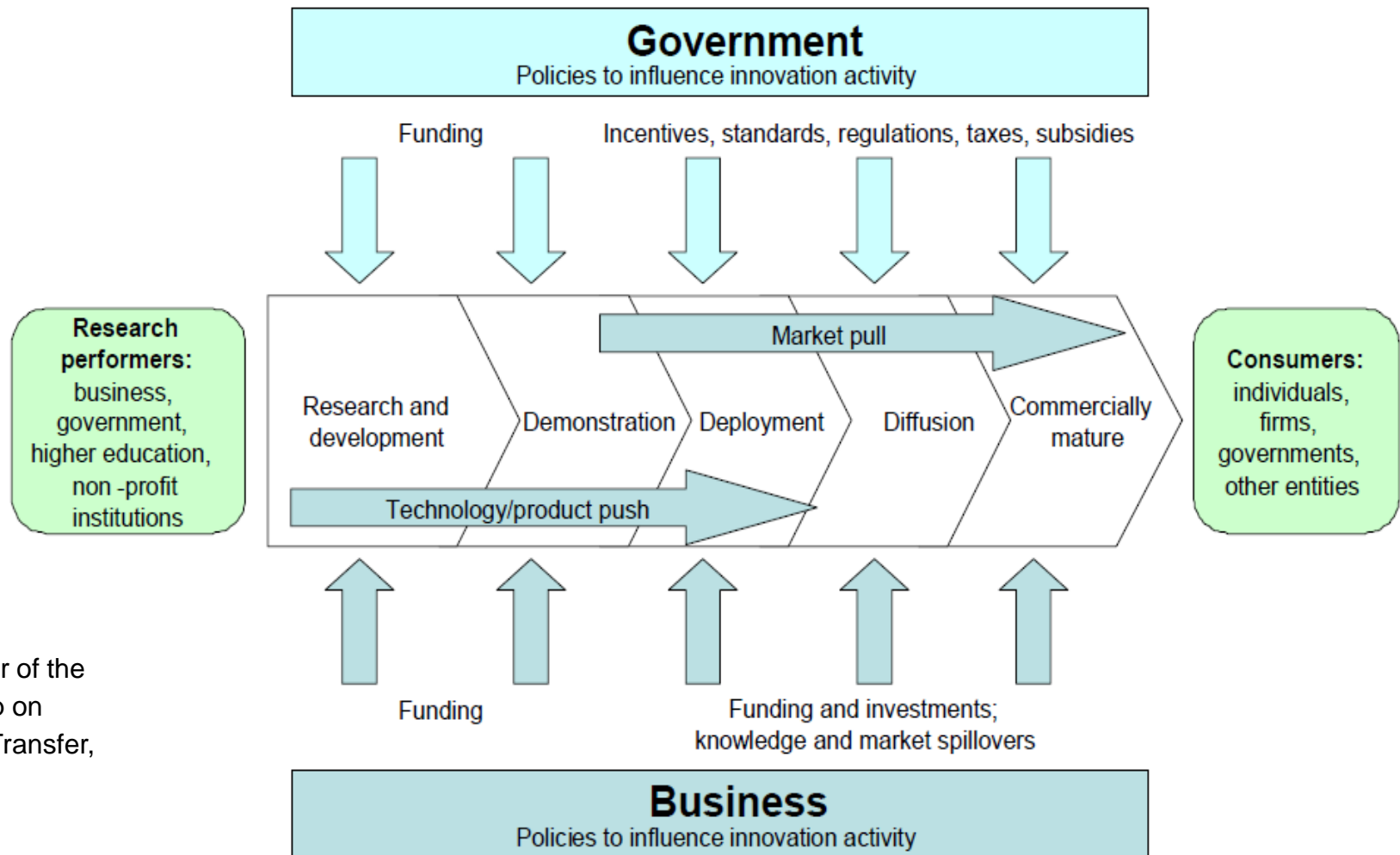
System barriers such as the unavailability of the required infrastructure, public incentives or market.

Lack of a technological development plan on the part of the receiving country.

Conflict between countries.

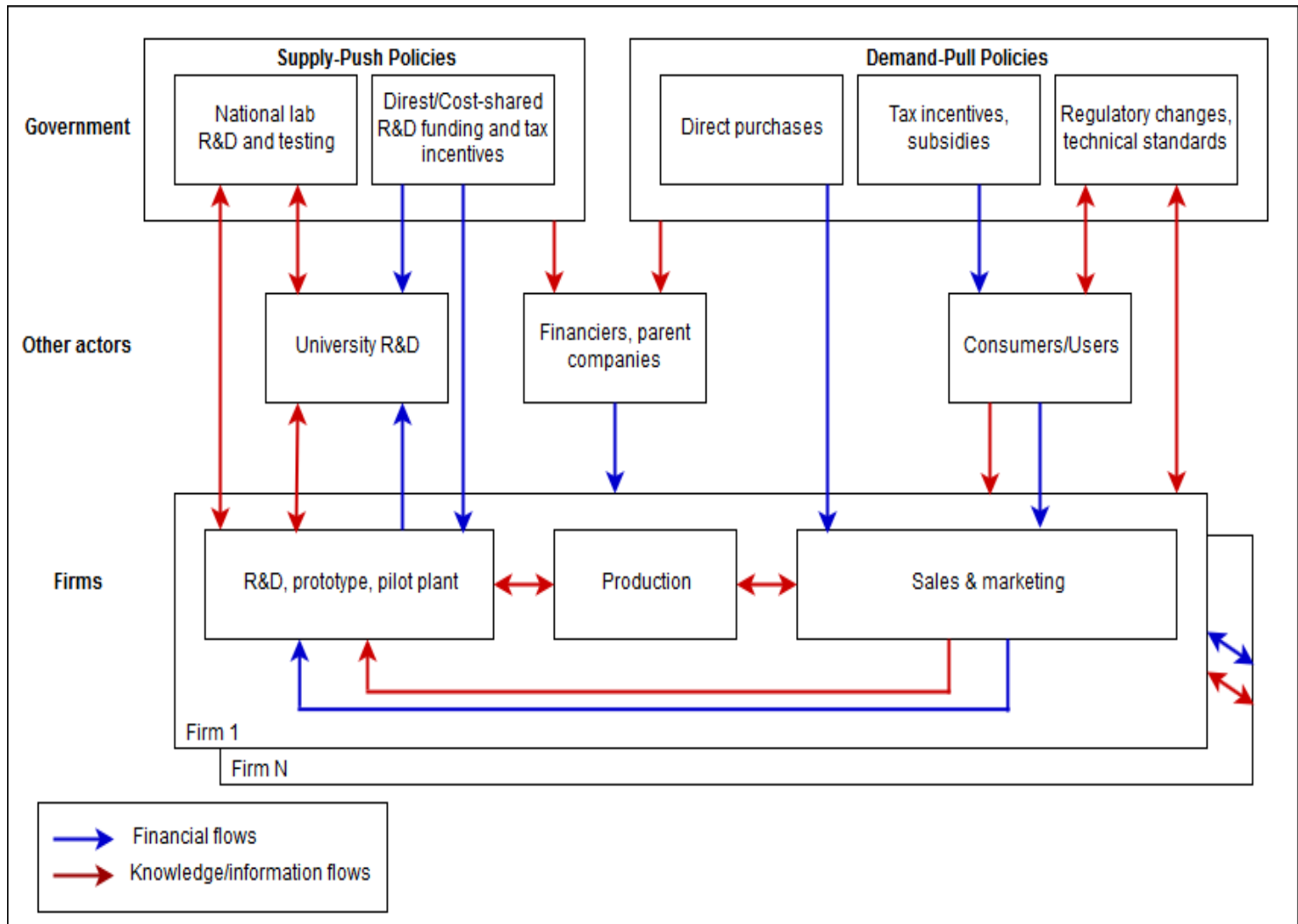
Limited financial options for the developing countries.

The innovation process



Source: Chair of the Expert Group on Technology Transfer, 2009.

Supply-push and demand-pull policies in energy innovation



Source: Margolis, 2002.

Source:
Chair of the
Expert
Group on
Technology
Transfer,
2009.

Technology Transfer Principles

Criteria used for selection and assessment of options for an integrated TT framework

Potential for large-scale resource efficiency improvement and RE deployment worldwide

Relevance and flexibility regarding needs of countries at different development stages

Effectiveness across sectors and consistency with sectoral strategies

Ability to mobilize and leverage private investment

Potential to be self-sustaining and replicated

Cost-effectiveness

Ease of implementation

Effective governance structure to inspire trust and cooperation

Advancement of use of indigenous technologies

Sustainability

Ability to monitor, report and verify

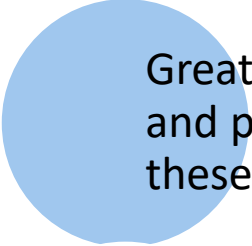
Types of intervention required to address specific local barriers to TT




Source: United Nations Department of Economic and Social Affairs (UNDESA), 2008.

Technology Transfer and the Arab Countries

Currently observed trends



Greater funding for RE and resource efficiency related businesses and products as well as funding for the environment which supports these new technologies.



Greater amounts of research being done in local institutions on topics related to RE technologies and resource efficiency which focus on the local situation.



Greater research funds available to researchers outside the country .

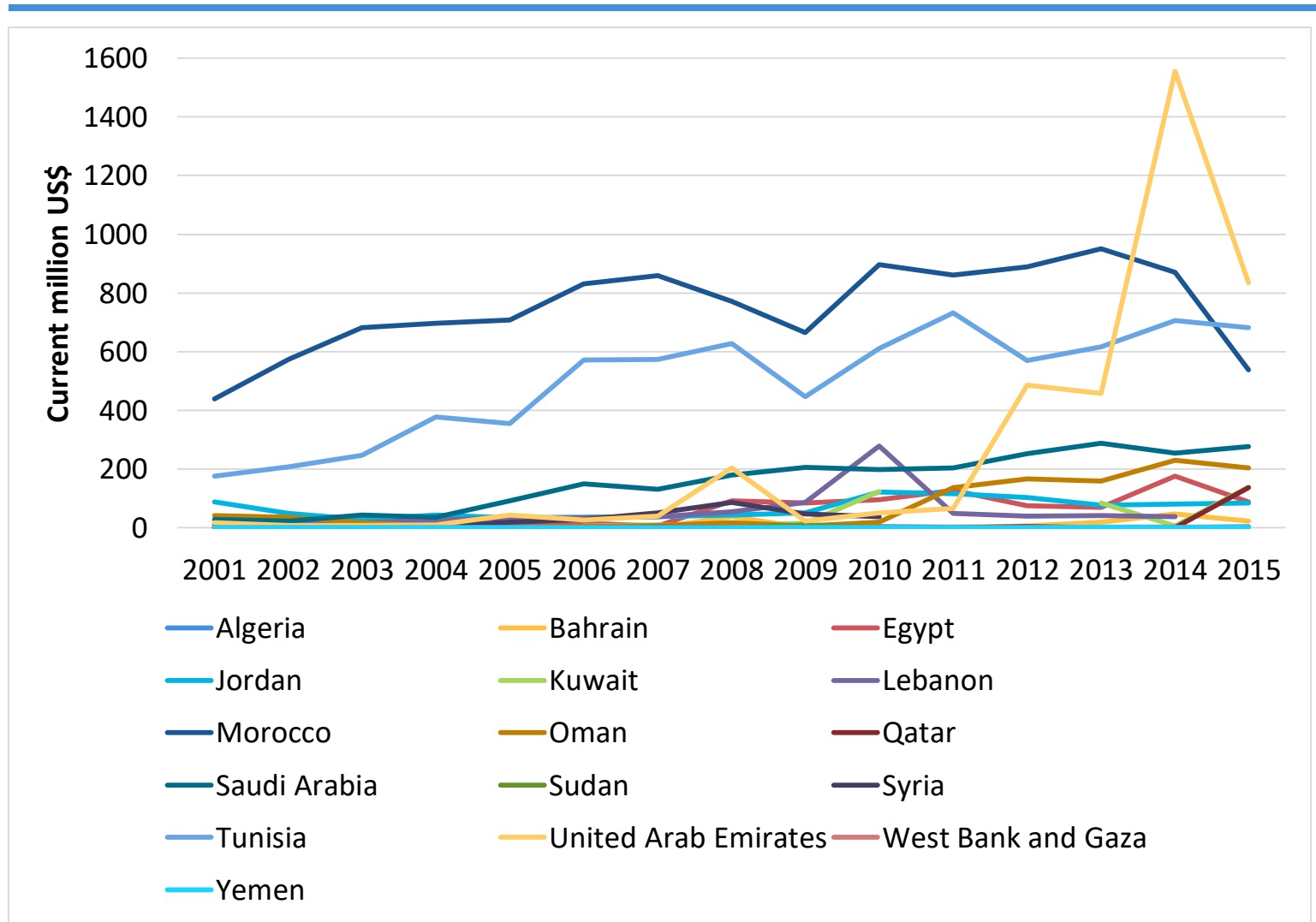


Being members of IRENA and participating in its initiatives.

Intuitive institutional models in Arab countries

Type	Countries	Main Features
The Gulf model	Gulf countries	Decentralized trade-oriented governance
		Public universities open to foreign teachers/researchers
		Research based on international collaborations
		Foundations for research
The Middle East model	Syria	Centralized type of governance
	Egypt	Research in large public research centers and universities, as well as in international and private universities.
	Iraq	Large public universities
The Mashreq model	Lebanon	Decentralized governance
	Jordan	Research concentrated in private universities
The Maghreb model	Algeria	Centralized governance
	Morocco	Large public universities
	Tunisia	Research mainly in universities and public research institutes

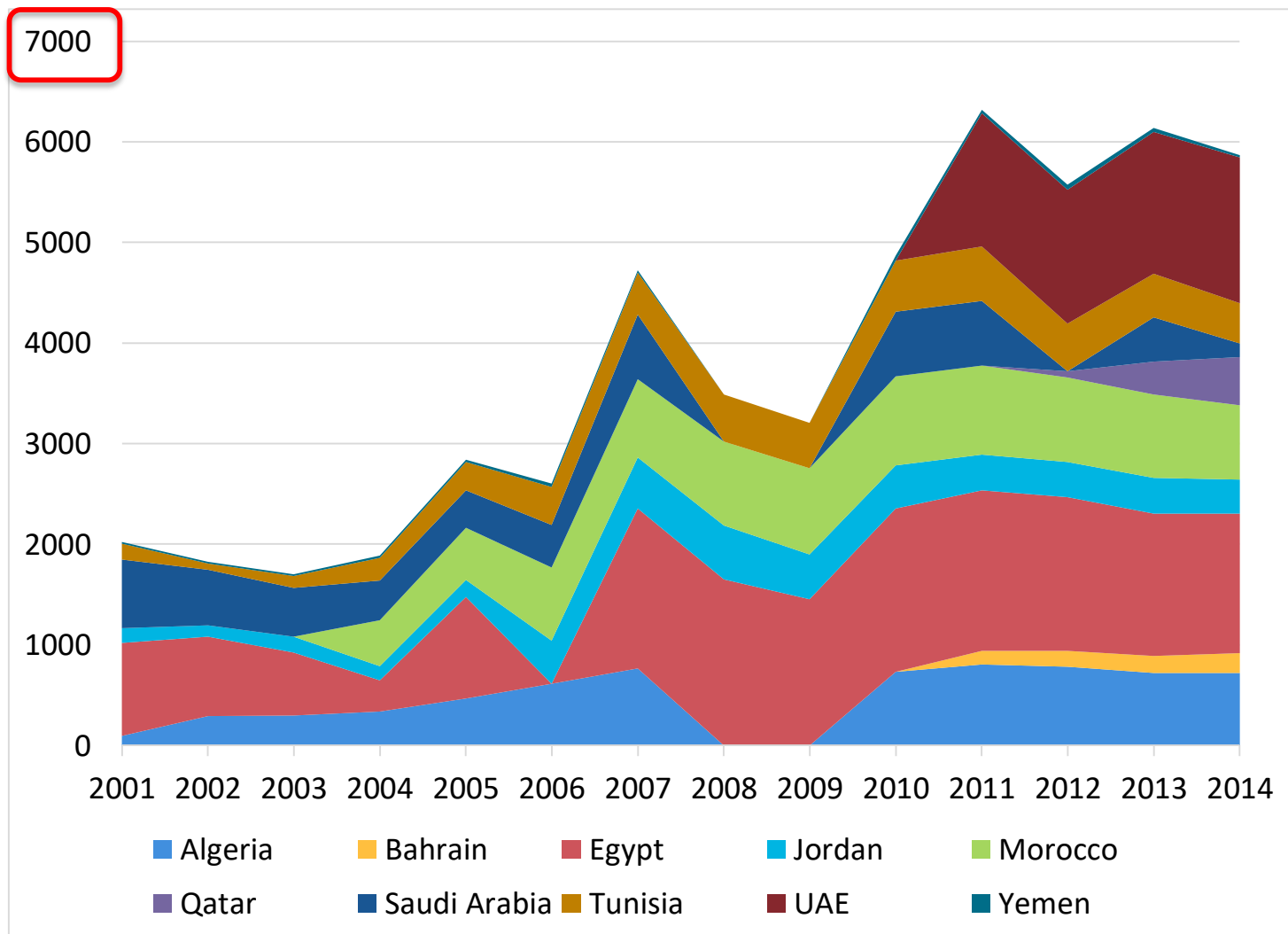
High-technology exports of the Arab countries



Source: The World Bank, 2017.

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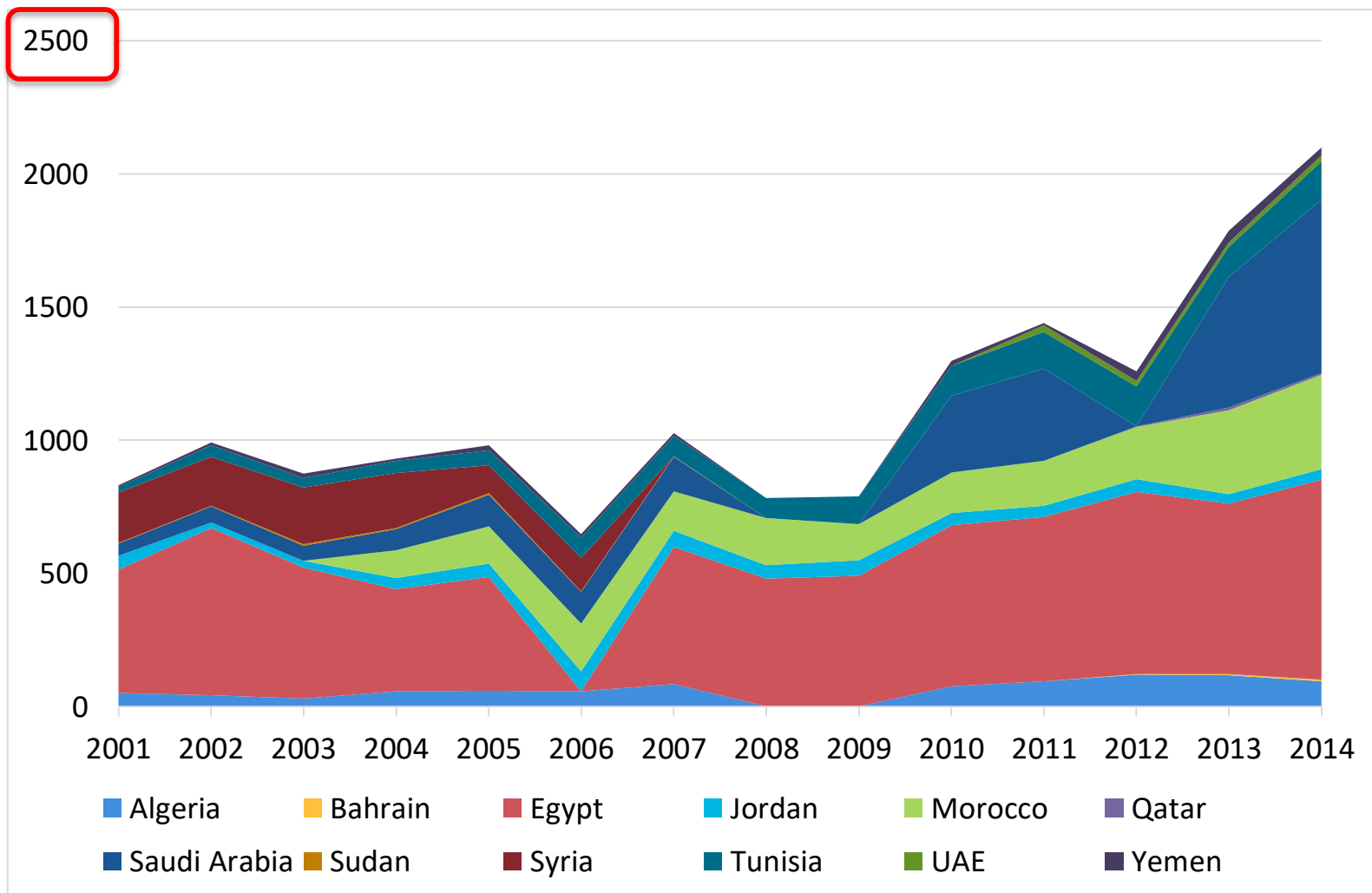
Patent applications by nonresidents in the Arab countries



Source: The World Bank, 2017.

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Patent applications by residents in the Arab countries

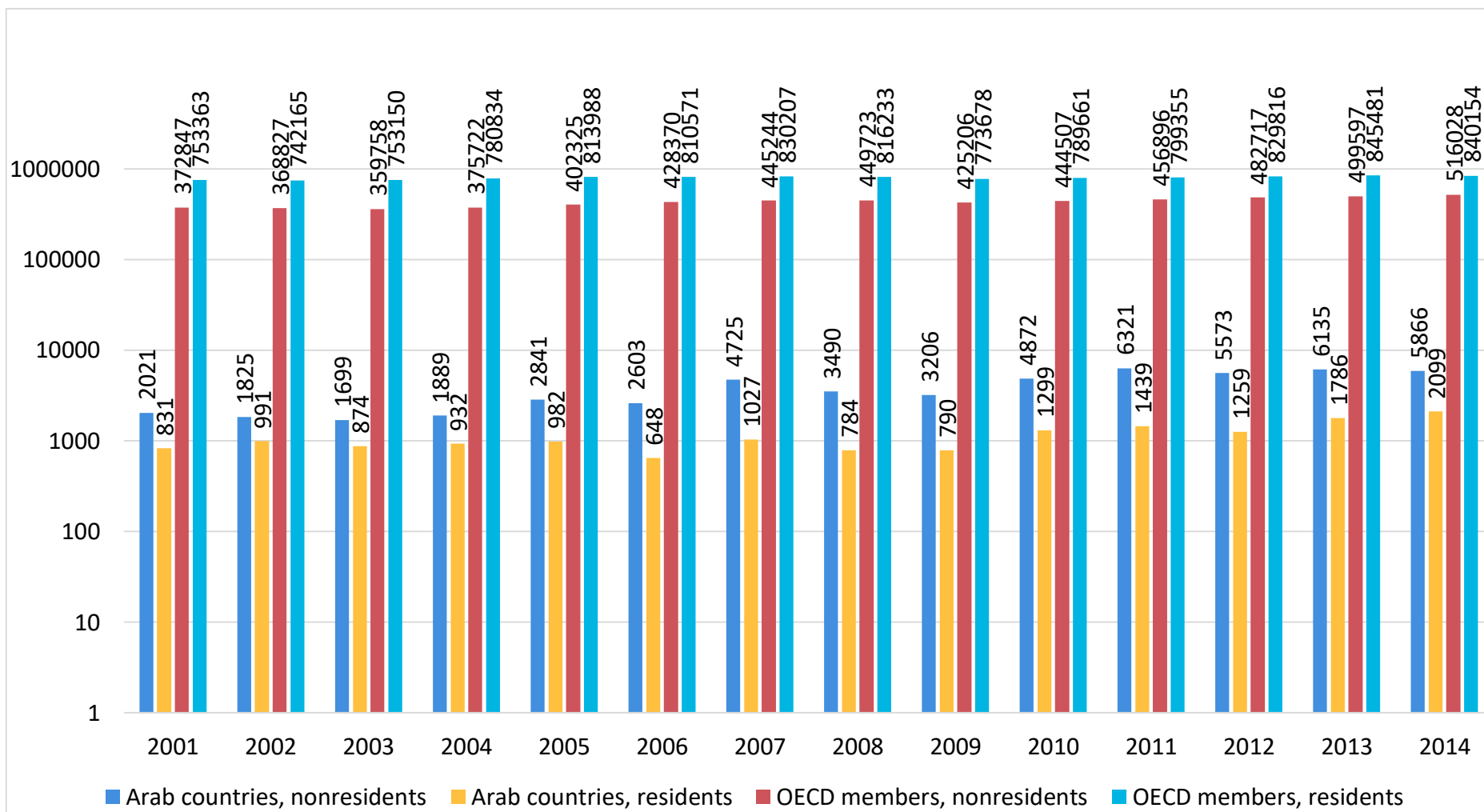


Source: The World Bank, 2017.

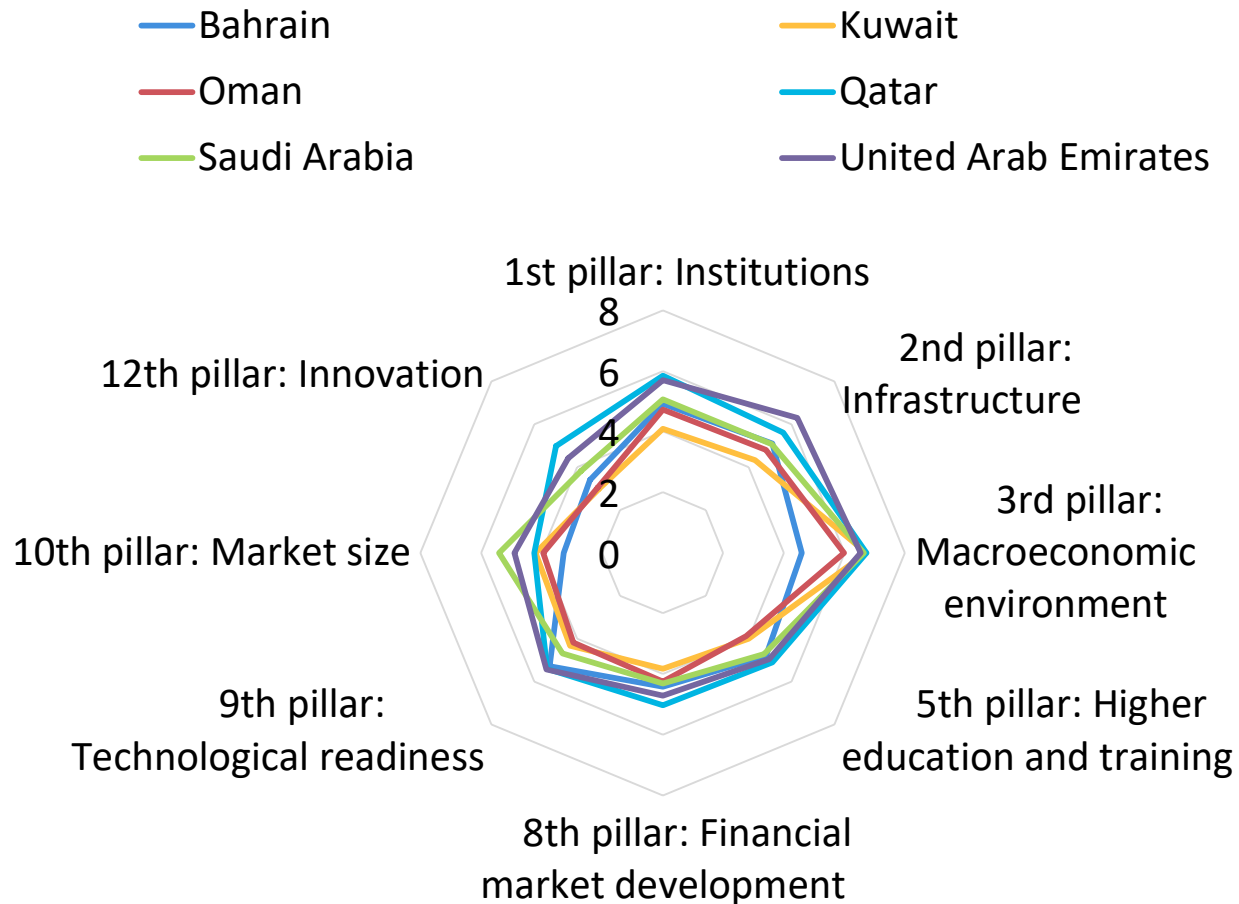
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Patent applications in OECD and non-OECD countries

Source: The World Bank, 2017.

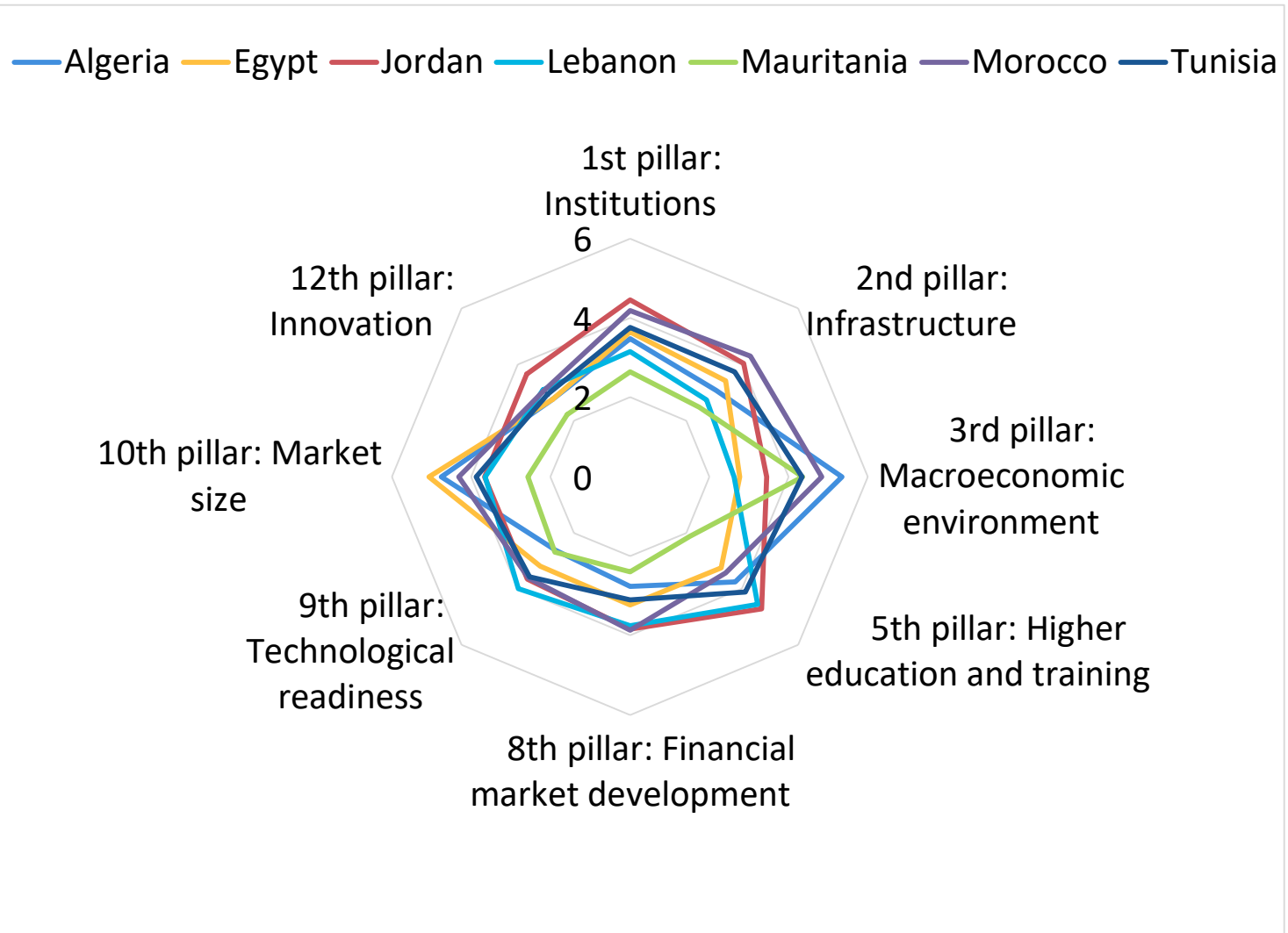


12 pillars of competitiveness for the GCC countries



Source:
Schwab, 2016.

12 pillars of competitiveness for the non-GCC Arab countries



Source:
Schwab, 2016.

Global Innovation Index values for some Arab countries

Country	2016		2017		Net Rank Change
	Ranking	Value	Ranking	Value	
UAE	41	39.4	35	43.2	+6
Saudi Arabia	49	37.8	55	36.2	-6
Qatar	50	37.5	49	37.9	+1
Bahrain	57	35.5	66	34.7	-9
Kuwait	67	33.6	56	36.1	+11
Lebanon	70	32.7	81	30.6	-11
Morocco	72	32.3	72	32.7	0
Oman	73	32.2	77	31.8	-4
Tunisia	77	30.6	74	32.3	+3
Jordan	82	30.0	83	30.5	-1
Egypt	107	26.0	105	26.0	+2
Algeria	113	24.5	108	24.3	+5
Yemen	128	14.6	127	15.6	+1
Average		31.28		31.68	

Source:
Cornell
INSEAD
WIPO,
2017.

Key messages

- TT provides a means through which the SDGs can be achieved, particularly:
 - Target 6.4 (increasing water-use efficiency across all sectors)
 - Target 7.3 (doubling the global rate of energy efficiency improvement by 2030)
- There are many options for TT: options for financing TT, different mechanisms for the TT implementation, options for governments with respect to setting policies and regulatory frameworks for an environment supportive of TT.
 - Actual options chosen must be unique for each country. .
- There are many ways in which the Arab countries can improve so that they are able to implement more effective and sustainable TT. Examples:
 - Programs can be designed to address the complete TT chain.
 - Requiring large businesses to contribute towards local research funds.
 - More transparency can be adopted throughout the TT process.
 - Collaboration must be facilitated between entities in different countries and within the same country which are working in the same area.

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