



Road Map Towards a Knowledge-Based Economy

Khalid A. Al-Dakkan

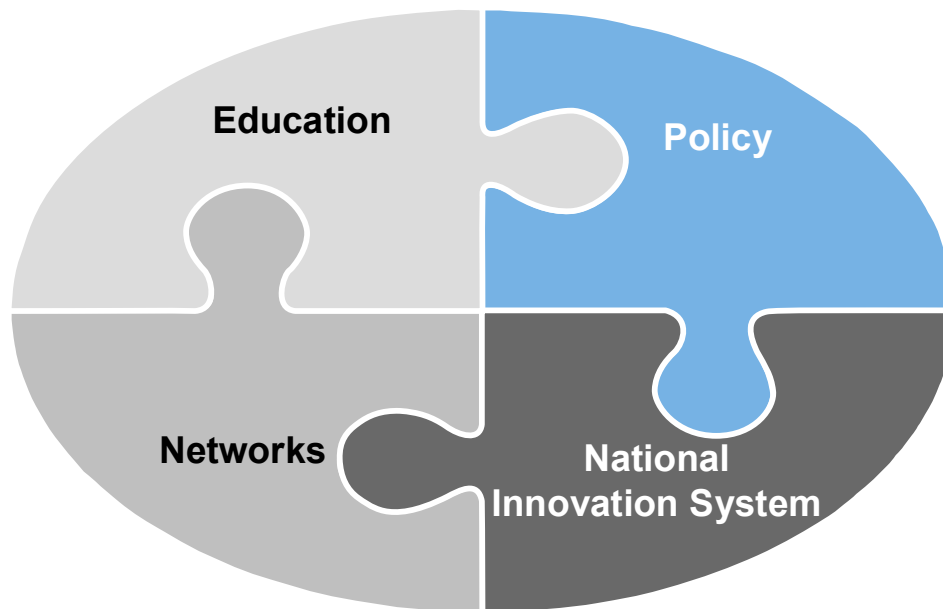
Director of Innovation and Commercialization Sector

Director of the National Technology Development Center

Knowledge-based economies rely heavily on the production and management of knowledge, rather than simply physical products

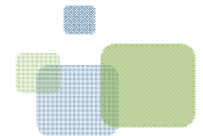
Knowledge-Based Economies (KBE)

Four Pillars of KBE

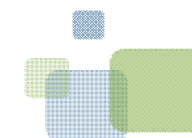
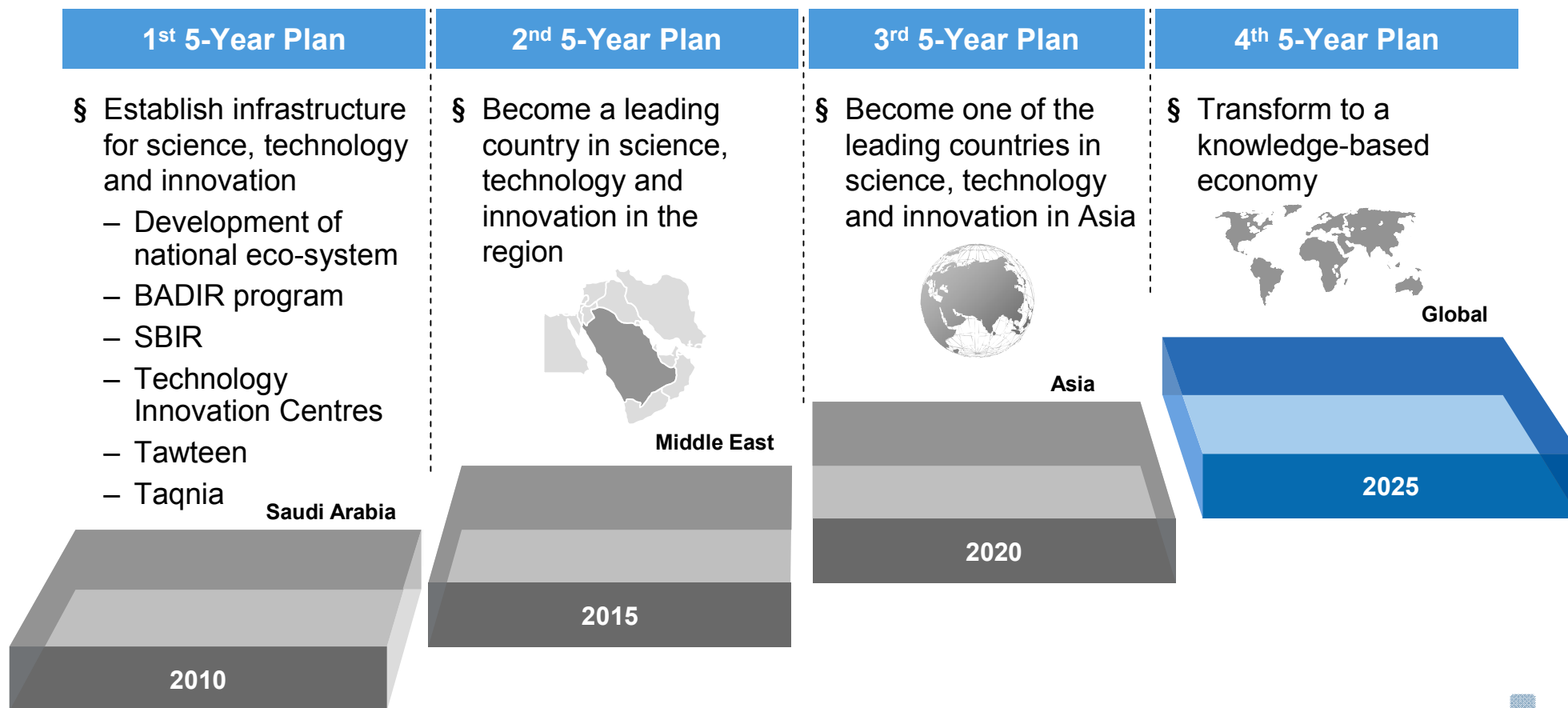


Benefits of KBE

- 1 Drive Economic Growth
- 2 Create New High Value Jobs
- 3 Globalize Local Economy
- 4 Facilitate Knowledge Transfer
- 5 Foster Innovation & Entrepreneurship

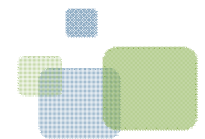
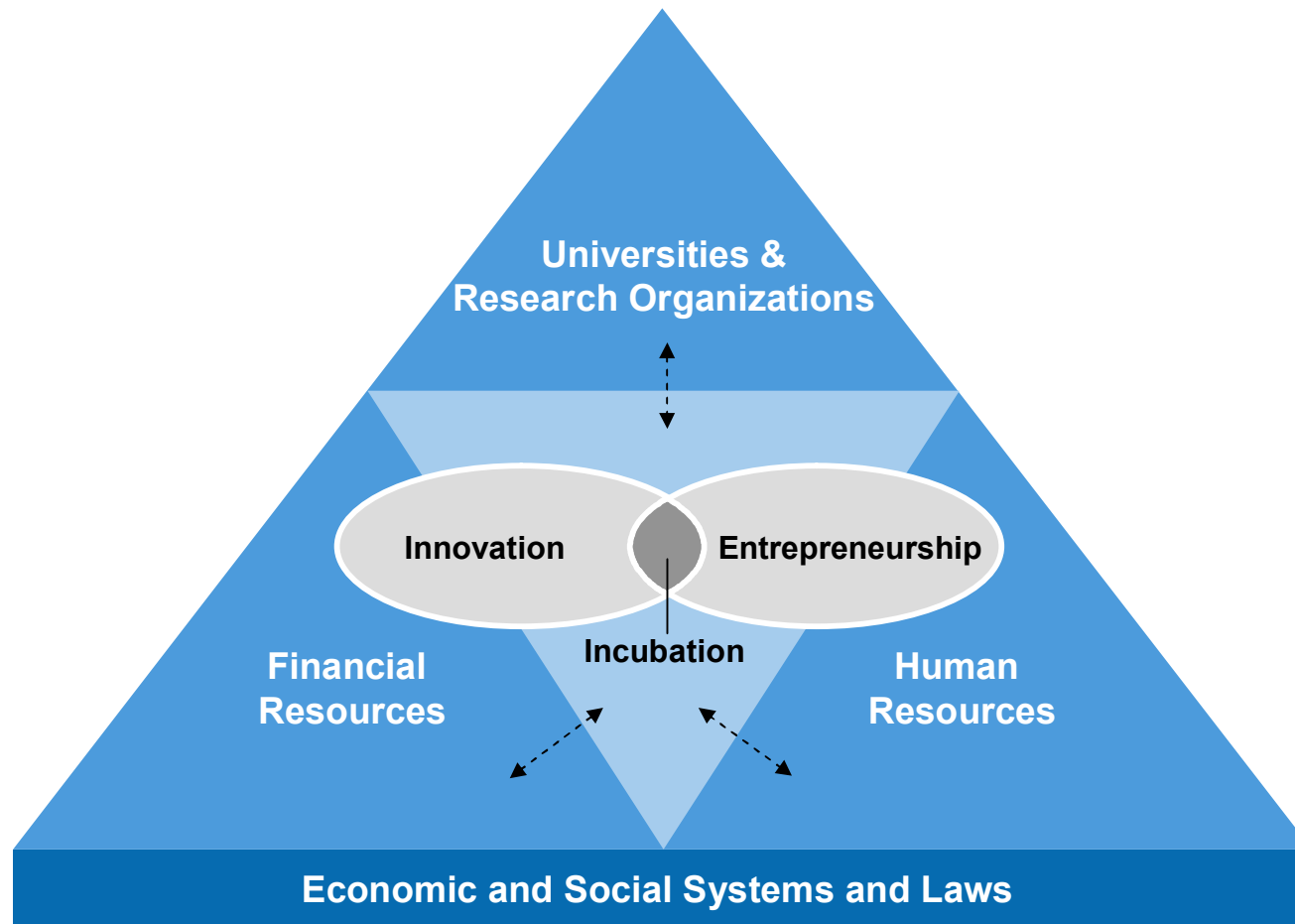


The National Science, Technology and Innovation Plan provides KSA with the strategic vision to join knowledge-based economies ...



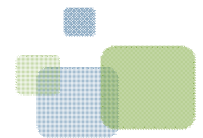
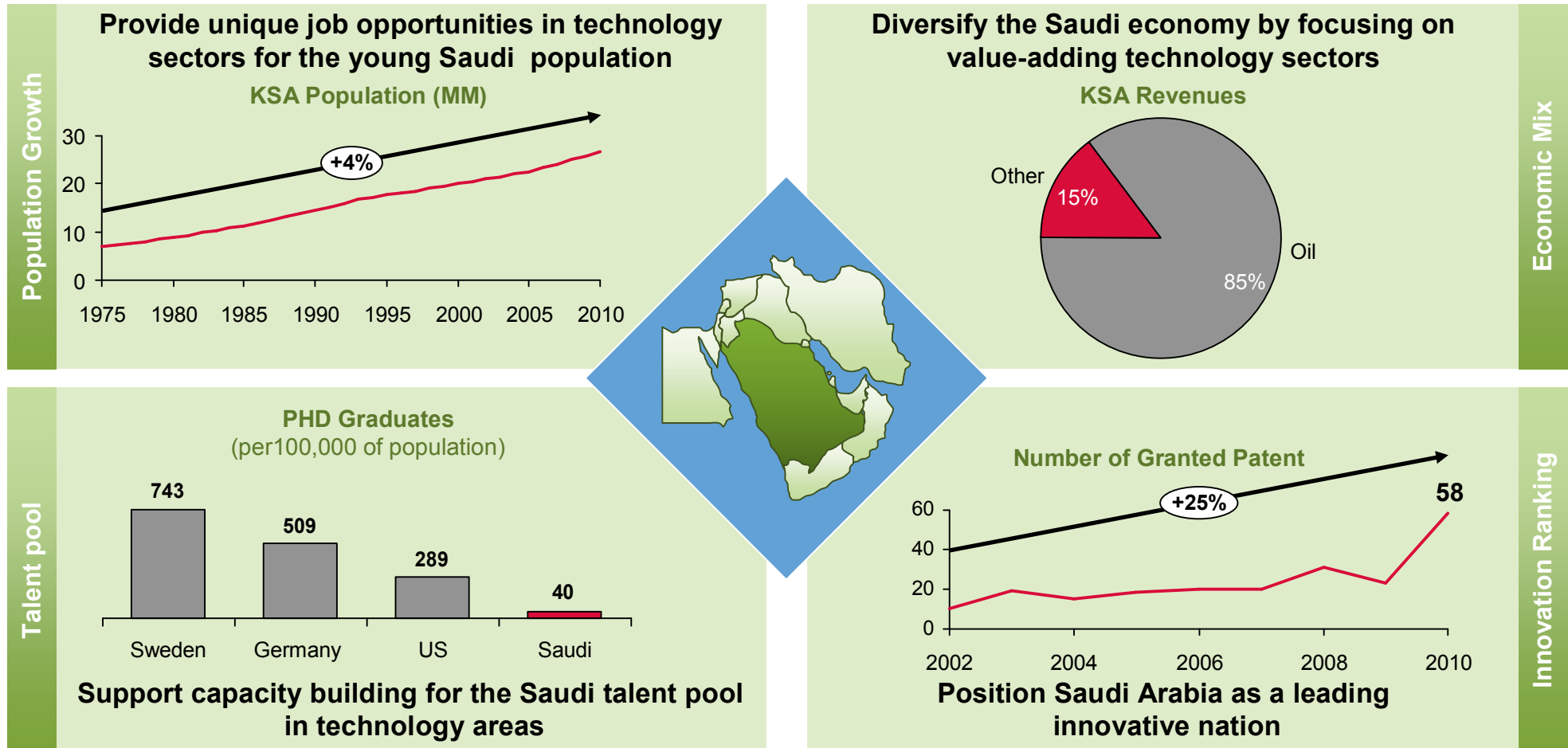
...and regroups all key elements necessary to achieve the transition

Technology Innovation, Entrepreneurship and Incubation



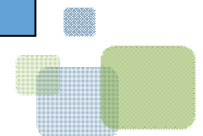
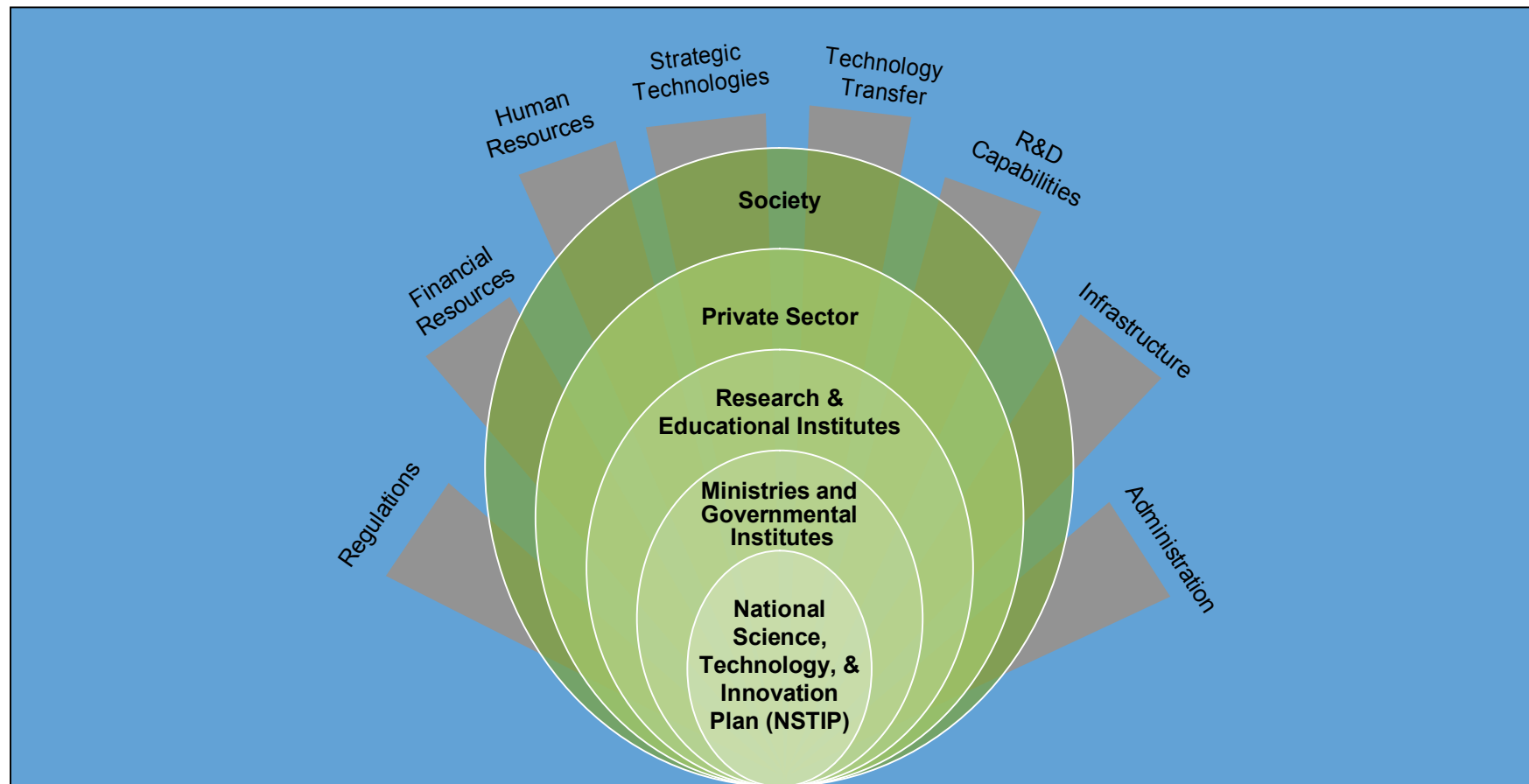
The plan will enable Saudi Arabia to address its most pressing socio-economic issues today

Socio-Economic Challenges in Saudi Arabia



NSTIP implementation throughout the Kingdom Institutions....

NSTIP Framework



In regards to innovation, KACST will keep on focusing on 15 technological areas that have been identified as critical for KSA



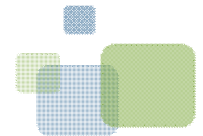
Advanced Technologies Program

Technology Priorities for KSA

Examples of KACST R&D Achievements

KACST Technology Priorities	Water	
	Oil and Gas	
	Petrochemicals	
	Nanotechnology	
	Biotechnology	
	Information Technology	
	Electronics and Communications	
	Space and Aeronautics	
	Energy	
	Environment	
	Advanced Materials	
	Mathematics And Physics	
	Medical and Health	
	Agriculture Technology	
	Building and Construction	

- King Abdullah Initiative for Water Desalination
- King Abdullah Initiative for Arabic Content
- Design of Next Generation Electronic Chips
- Date Palm and Camel Genome Projects
- Gravity Probe - B Space Experiment



KACST established Joint International Centers of Excellence with World Leading R&D Organizations



KACST Joint Centers of Excellence

International Universities and Institutes

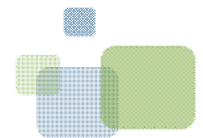
International Companies

Universities Joint Centers of Excellence

MIT (USA)
Stanford (USA)
Oxford (UK)
Cambridge (UK)
UCLA (USA)
UCSD (2) (USA)
Northwestern (USA)
Chinese Academy of Sciences
Belarus Academy of Sciences
CSIR (South Africa)
C-DAC (India)
NASA (USA)
Fraunhofer (Germany)
EMPA (Switzerland)

Companies Joint Centers of Excellence

IBM (2) (USA)
Intel (3) (USA)
Boeing(2) (USA)
Clariant (Germany)
Selex (UK)
Synopsys (USA)

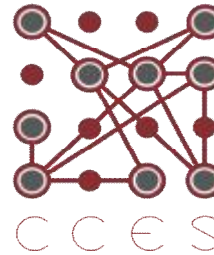


Example: KACST-MIT Joint Center of Excellence



CCES Vision

CENTER FOR COMPLEX ENGINEERING SYSTEMS (CCES)
At KACST & MIT



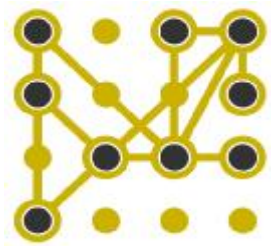
The Center for Complex Engineering Systems (CCES) at KACST and MIT is intended to be a world-class international research program that will uncover fundamental principles and will develop new methods and tools such that complex systems can be modeled, designed, and managed more effectively than is possible today.

40 researchers from both sides.



CCES Domains & Projects

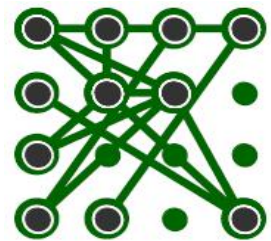
CCES Projects



Urban Traffic System (UTS)



Integrated Energy Decision Support System (IEDDS)



Sustainable Infrastructure Rating System (SISRS)

CCES Domains

The problems addressed by CCES will touch on several *domains* as well as on the interactions amongst those domains.

Transportation

Energy

Urbanism

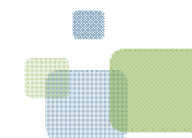
Water

ICT



R&D Funding - 706 Projects

Funded Projects 2011 -2008 based on Technologies				
ratio to the total budget (%)	Budget (SR)	Ratio to the total (%)	Number of funded projects	Technologies
4.1	51,867,936.00	4.5	32	Water
1.8	22,400,580.00	1.8	13	Oil & Gas
1.2	15,174,700.00	2.0	14	Petrochemicals
11.7	147,184,765.00	13.7	97	Nanotechnology
8.0	100,481,372.00	8.1	57	Advanced Materials
3.9	49,044,485.00	4.8	34	Electronics & Communication & Photonics
20.9	261,854,306.00	20.7	146	Biotechnology
6.3	78,697,429.00	8.4	59	Information
2.1	25,732,250.00	2.4	17	Space & Aeronautics
6.4	80,908,698.00	7.9	56	Energy
8.5	106,098,258.00	9.9	70	Environment
1.9	23,363,320.00	2.0	14	Agricultural
0.2	2,406,000.00	0.3	2	Building
1.2	15,131,671.00	1.7	12	Mathematics and Physics
21.9	274,492,506.00	11.8	83	Medical & Health
100%	1,254,838,276.00	100%	706	Grand total

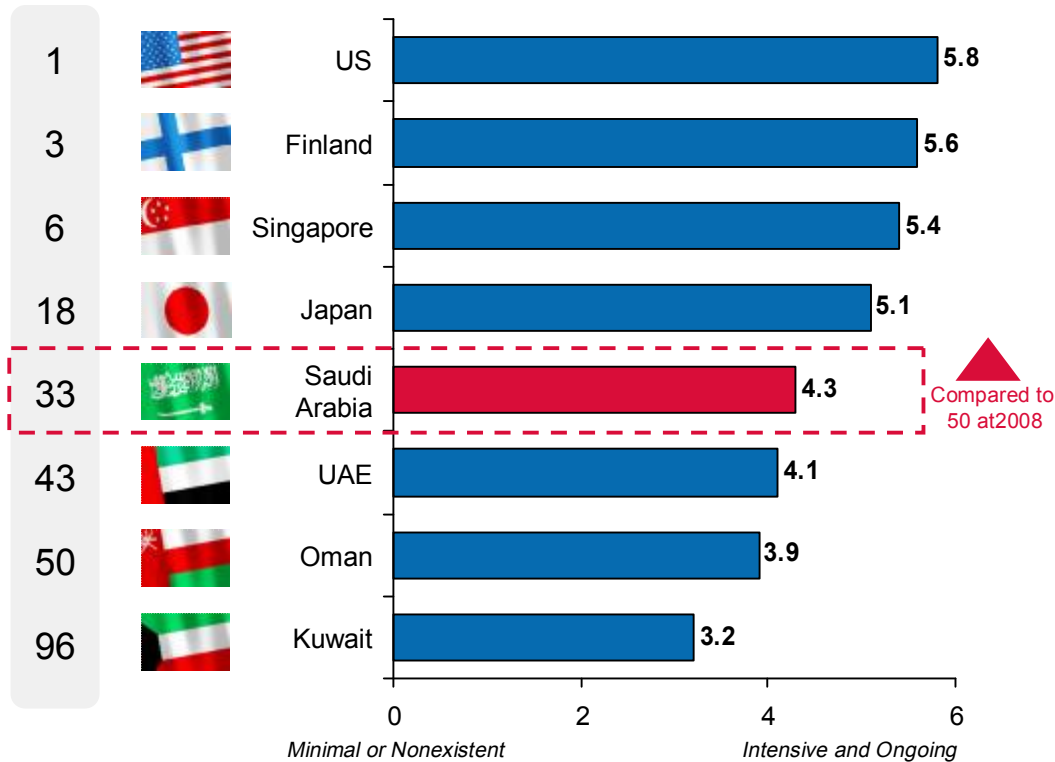


Innovation in Saudi Arabia has begun to show early signs of success – a momentum that we aim to further boost

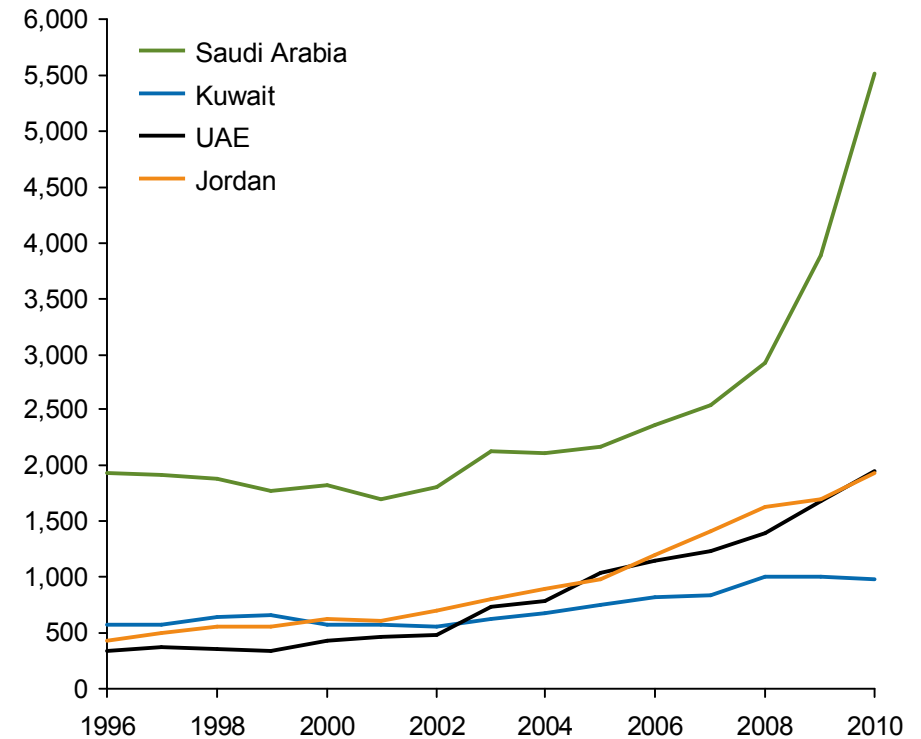


Extent of University-Industry Research Collaboration (2010)

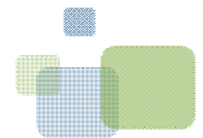
Ranking
(Out of 139)



Research Papers Published Regionally (1996 to 2010)



Source: The Global Competitiveness Report (2010-2011), WEF; SCImago. SJR SCImago Journal & Country Rank ;Booz & Company analysis




Via BADIR, KACST will setup 80 incubators in the Kingdom by 2025 to create over 20,000 jobs...


BADIR Program Long-Term Targets and Achievements

BADIR Program Long-Term Targets


	2015	2020	2025
Number of Incubators	20	40	80
Number of Clients	280	560	1,120
Employment in Client Companies	2,240	4,480	8,960
Number of Graduate Companies ¹	95	333	761
Graduate Employment ²	836	3,596	9,740
Total Employment	3,076	8,076	18,700

BADIR Supported Incubators







BADIR ICT




BADIR BIO




BADIR AMI




Om Al Qura




Yanbu




Taibah




Al Baha




King Khalid



Al Kharj



Princess Noura

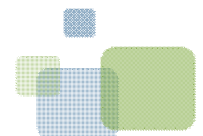


Al Qassim

1) Cumulative and 15% business failure

2) Cumulative and 5% annual growth

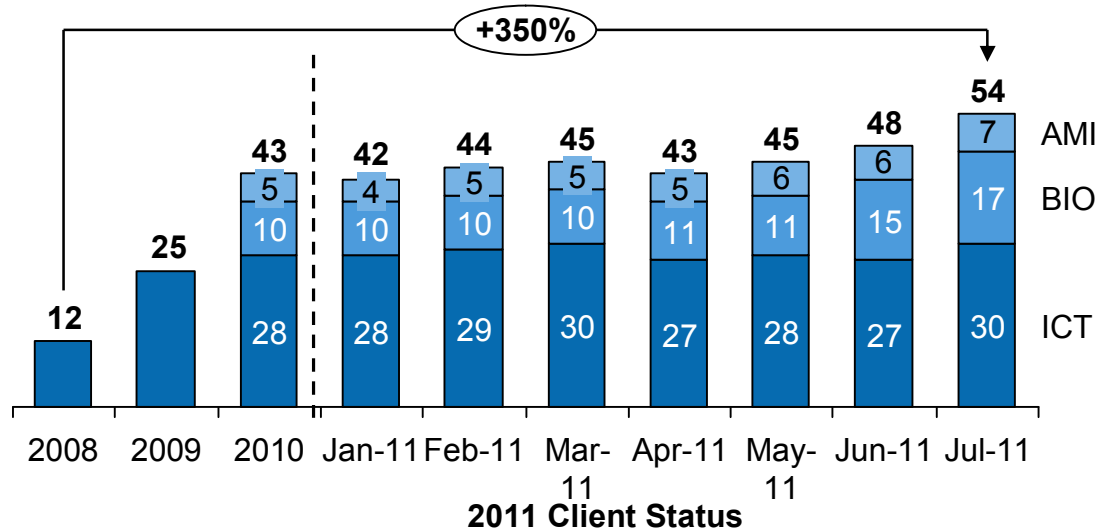
Source: NSTP Long Term Objectives



Currently, BADIR is supporting 54 clients– double the 2009 figure - resulting in over 112 new jobs created

BADIR Client Base

Clients and Affiliates by Incubator



Selected Success Stories



§ Atalam provides a learning environment, training virtual Women through virtual classrooms, and interactive whiteboards

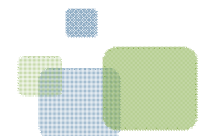


§ S-me is a highly successful SMS based social network for young Saudis boasting some **600,000 members**



§ AceBiotech aims to provide kits and reagent for PCR, DNA/RNA Isolation, Cloning, Electrophoresis and Buffers

	ICT	AMI	BIO	Total
Jobs Created	100	7	16	112
# Generating Revenues	9	0	0	9
# Generating Profits	2	0	0	2

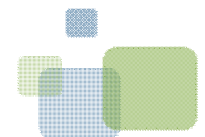
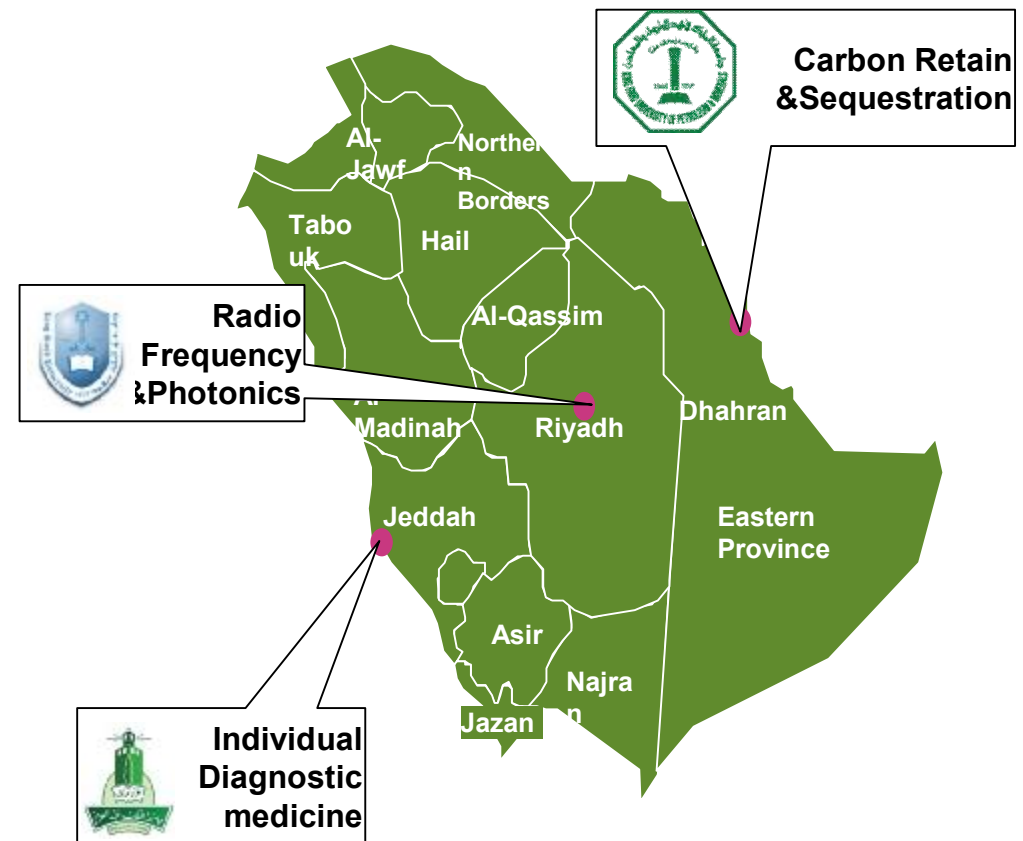


To produce a critical mass of high-quality patents , KACST launched the Technology Innovation Centers (TIC) program



Technology Innovation Centers (TIC)

Technology Innovation Centers	
Objectives	<ul style="list-style-type: none"> § Address economic and social goals of the Kingdom § Promote university industry research collaboration and technology transfer in the Kingdom § Strengthen university research and science and engineering education in KSA
Achievements	<ul style="list-style-type: none"> § Established 3 technology innovation centers in collaboration with Saudi universities with a cost of SAR 150 million



Through SBIR, KACST will support the development of Saudi businesses by funding innovative research

SBIR Program

SBIR Program Objectives

Encourage the foundation and growth of technology-based companies

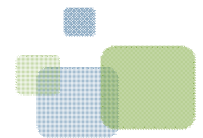
Commercialize promising technologies from universities and research centers

Catalyze high tech employment in the kingdom

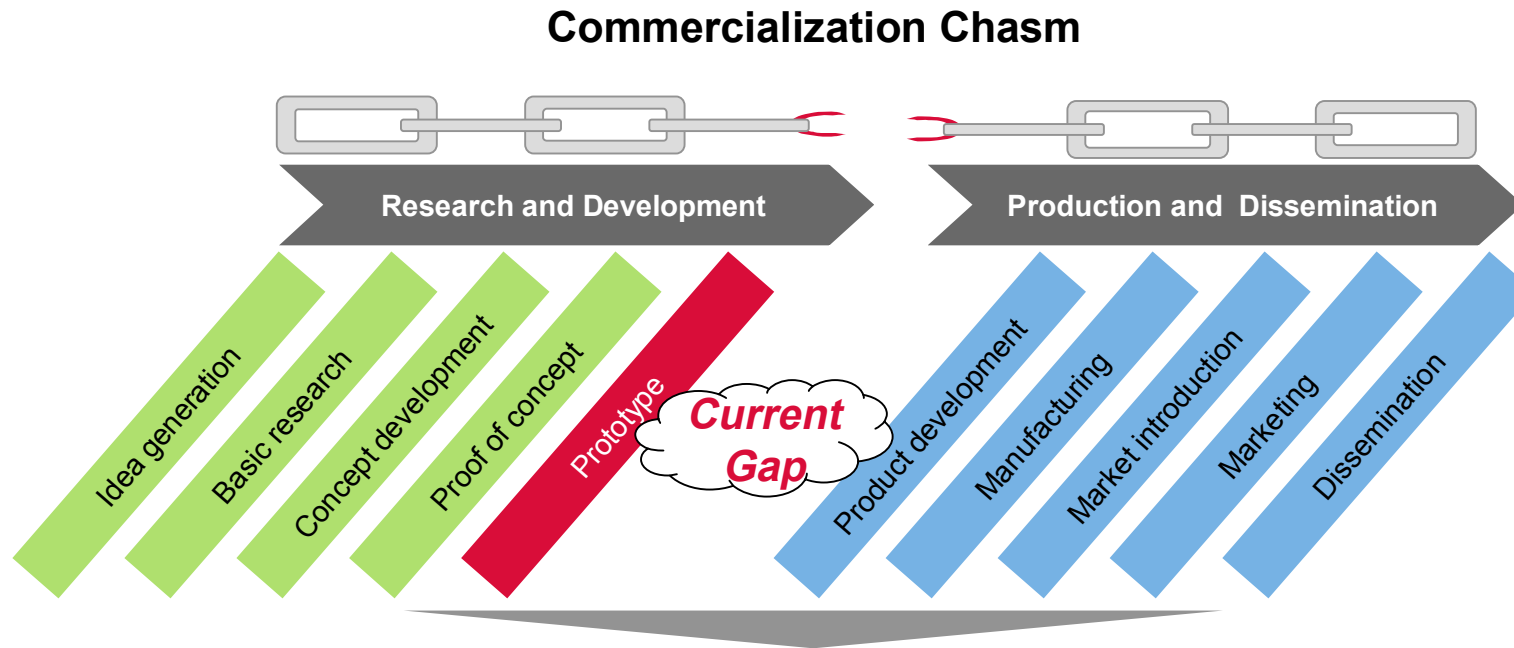
Ability to Produce Sustainable Jobs

SBIR Program Phases

	Activities
Phase I	§ Provides preliminary funding for feasibility studies
Phase II	§ Provides the core funding necessary to develop a prototype
Phase III	§ Supports the transition to private sector finance, and product development
Phase III	§ Graduation from the program



...that will significantly support in overcoming the commercialization chasm

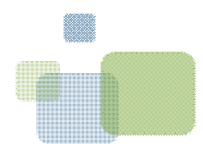
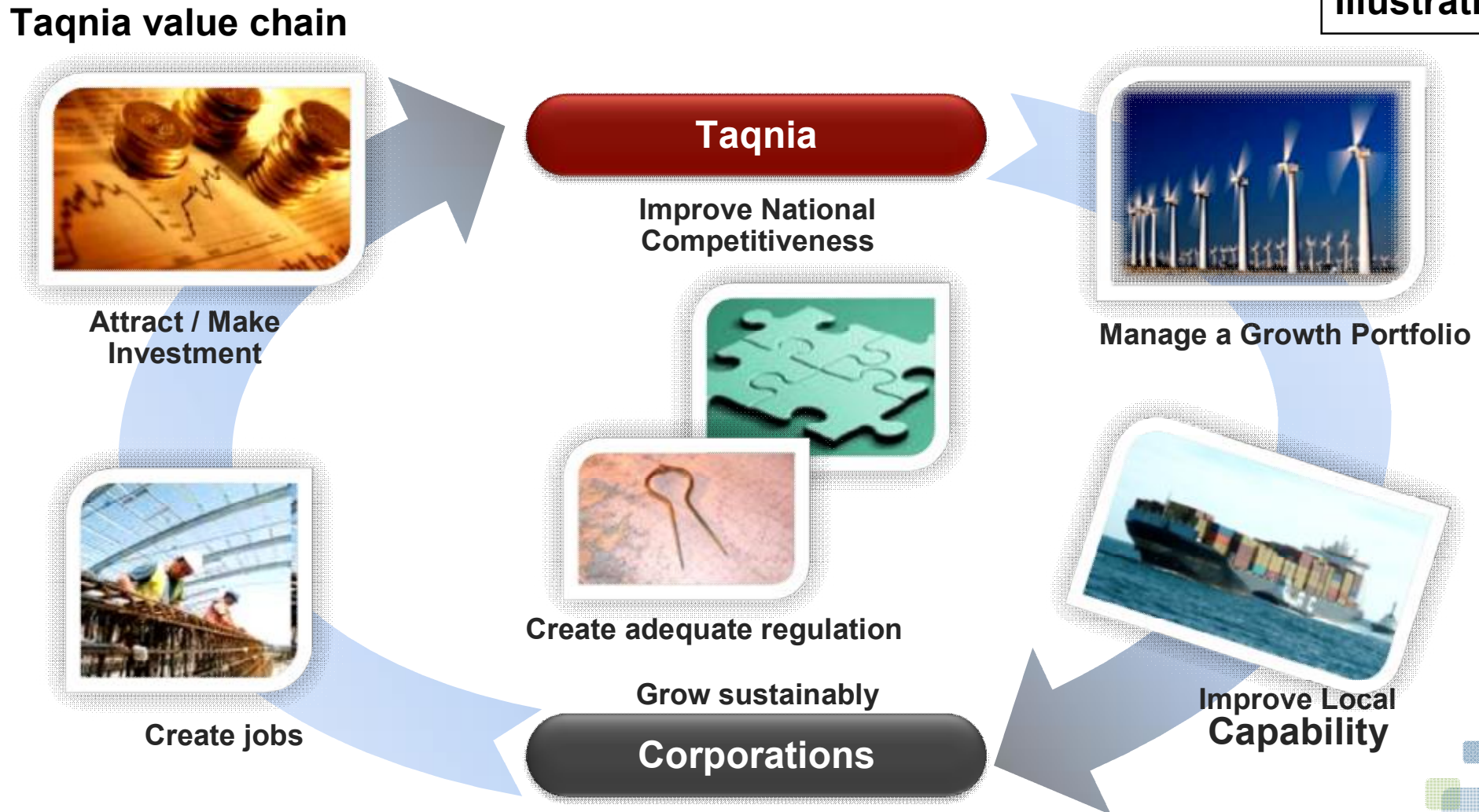


Value Add of Incubators in Addressing Commercialization Chasm

- § Incubator programs provide significant add-on funding to the commercialization initiatives, examples include
-  **Norway:** FORNY program designed to **commercialize research based business**; most of the FORNY supported spin-offs receive significant support from Innovation Norway through the **incubator grant scheme**
 -  **Canada:** The Industrial Research Assistance Program (IRAP) supports a significant share of spin-offs. In combination with tax deductions these funds can add up to 70% of the total project costs

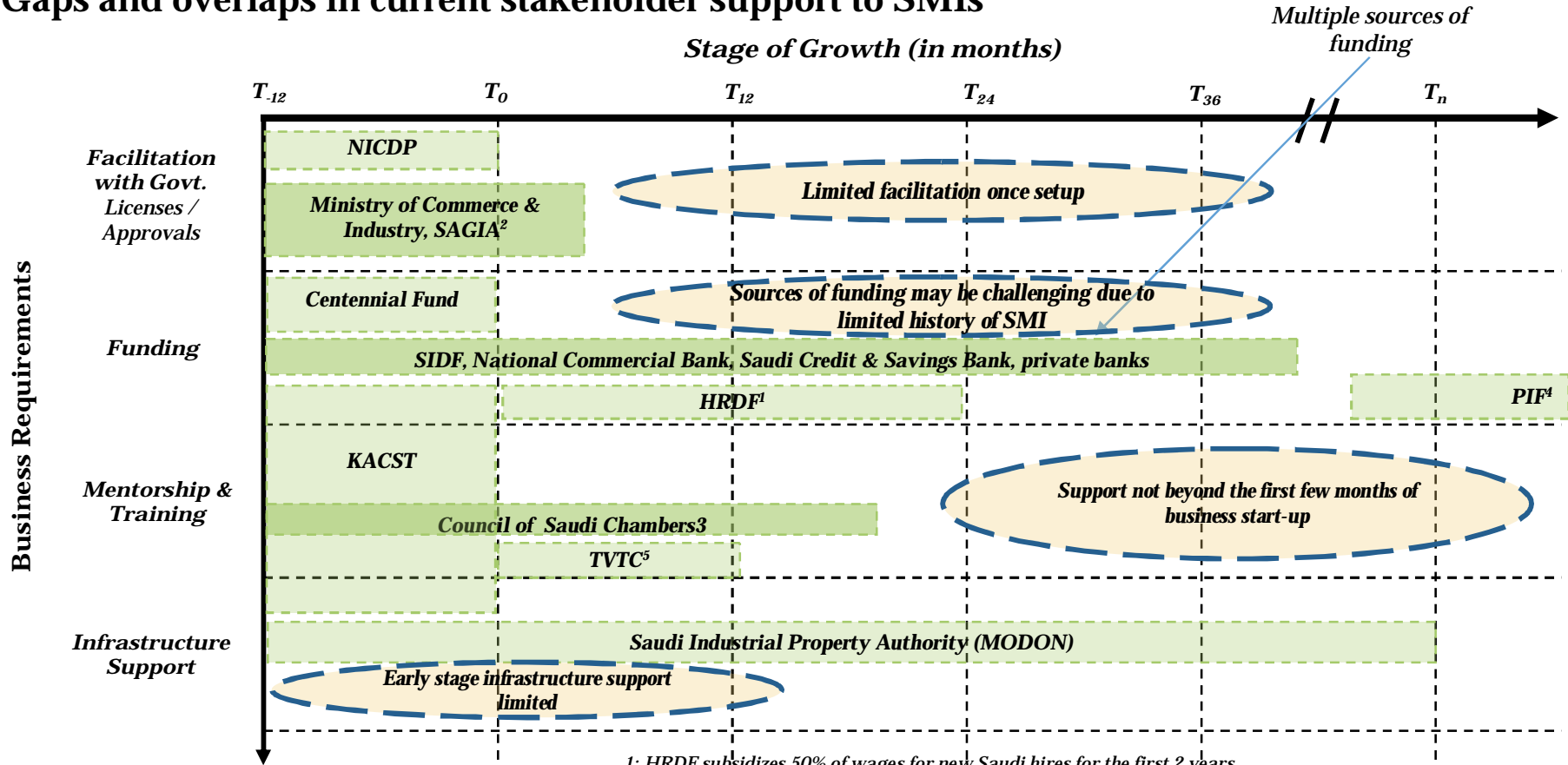
Taqnia will capture the potential of emerging technologies and support the national strategy to deliver impact

Illustrative

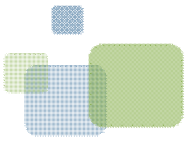


....Tawteen is KACST-MCI Initiative helps in Supporting Small, Medium Industries (SMIs) in KSA

Gaps and overlaps in current stakeholder support to SMIs

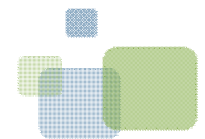
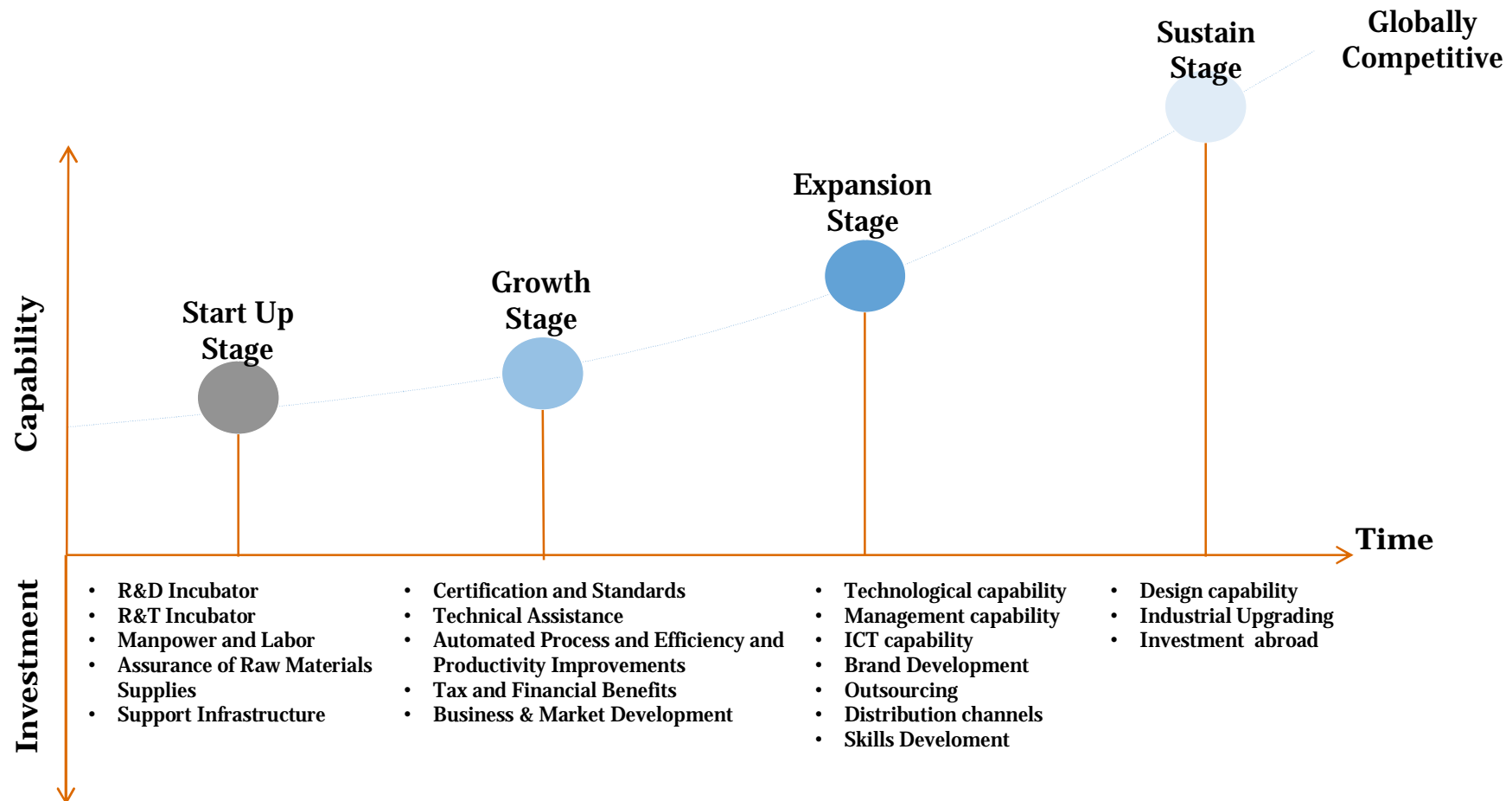


1: HRDF subsidizes 50% of wages for new Saudi hires for the first 2 years
 2: SAGIA's focus is FDI (with or without local partners)
 3: CSC also facilitates financing for SMIs
 4: PIF primarily focuses on large scale investments
 5: Provides skilled graduates based on the needs of the market
 6: Research grants, incubation support, office space
 7: KACST provides incubator support through the Badir program














.....deciding where Tawteen could and should play is a key strategic question

SMI maturity curve



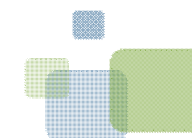
Global SMI agencies overview

Characteristics												
Header	Name of SMI support agency	MEP	EC	IRAP	SC	PITRI	MAS	INTI	FFG	Inno.	SMBA	FEDIT
	Centres / Regional Offices	60	12	150	750	262	9	87	1	-	11	67
	Total Staff	1,300+	250	220	4,600	6,000+	150	2,000	-	-	-	5,500
Funding	Funding for R&D and innovation		✓	✓	✓	✓			✓	✓	✓	
	Funding for manufacturing					✓			✓	✓	✓	
	Funding joint research program				✓							
Training	Innovation & product development skills	✓		✓		✓	✓	✓			✓	✓
	Manufacturing & process improvement	✓	✓			✓	✓	✓				✓
	Energy efficient manufacturing	✓	✓	✓	✓	✓	✓					
	Design to commercialization			✓			✓					
	Perform R&D in direct partnership with SMIs					✓						
Infra. Supp.	Access to research labs and prototyping	✓				✓		✓			✓	✓
	Factory audit for improvements	✓	✓	✓		✓	✓					
Facilitator	Integration point for all SMI support	✓	✓	✓		✓	✓					✓
	Assistance with standards	✓		✓				✓			✓	✓
	Get SMIs to manufacturing consortiums				✓			✓	✓			

MEP: Manufacturing Extension Partnership
EC: Enterprise Connect
IRAP: Industrial Research Assistance Program

SC: Steinbeis Centre
PITRI: Public Industrial Technology Research Institute
MAS: Manufacturing Advisory Service
INTI: Instituto Nacional de Tecnología Industrial

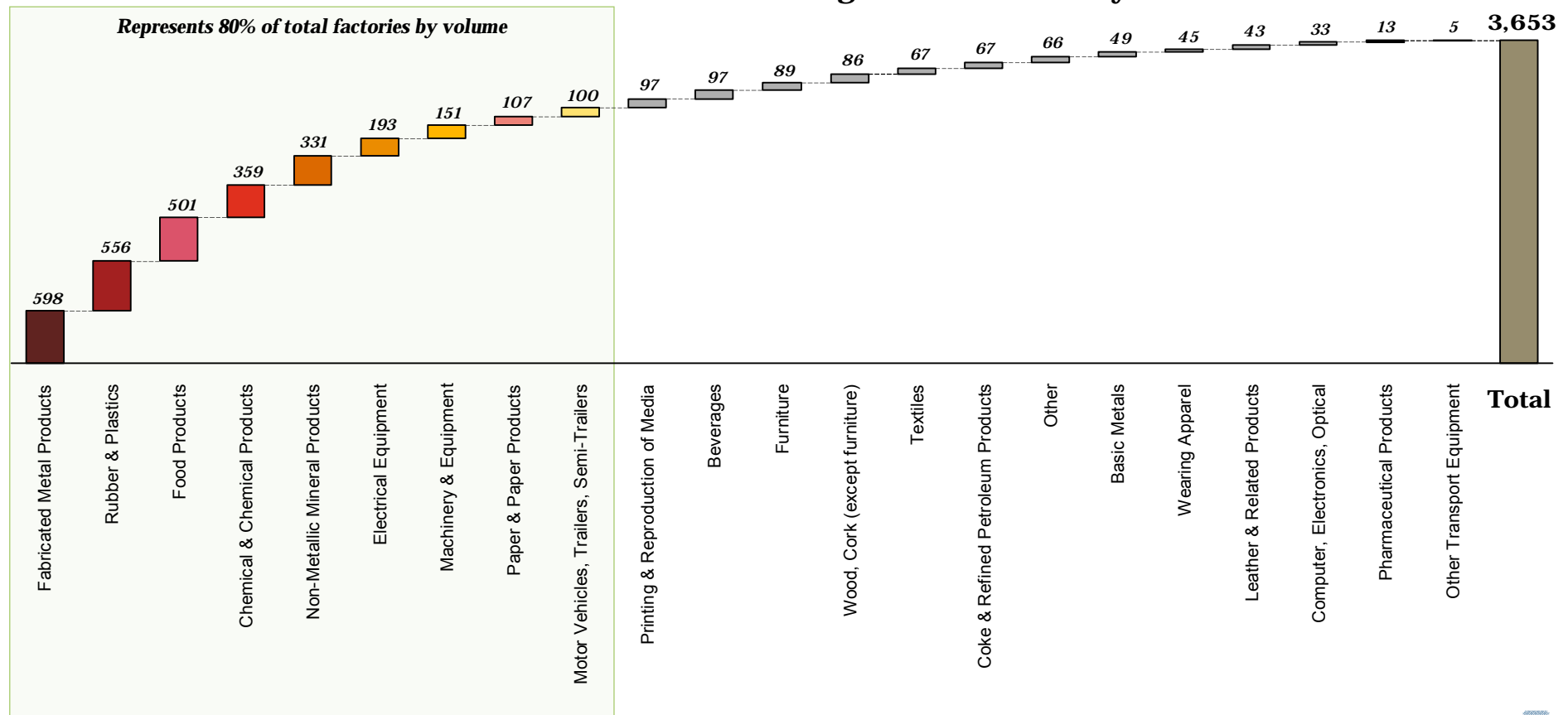
FFG: Austrian Research Promotion Agency
Inno.: Innovation Fund for Small Technology-based Firms
FEDIT: Federación Española de Entidades de Innovación



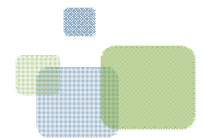
Analysis of current industry concentration in the kingdom

....Fabricated metal products, rubber & plastics, food products and chemical & chemical products were the top 4 sectors by number of factories

Number of Factories in the Kingdom classified by LO industries

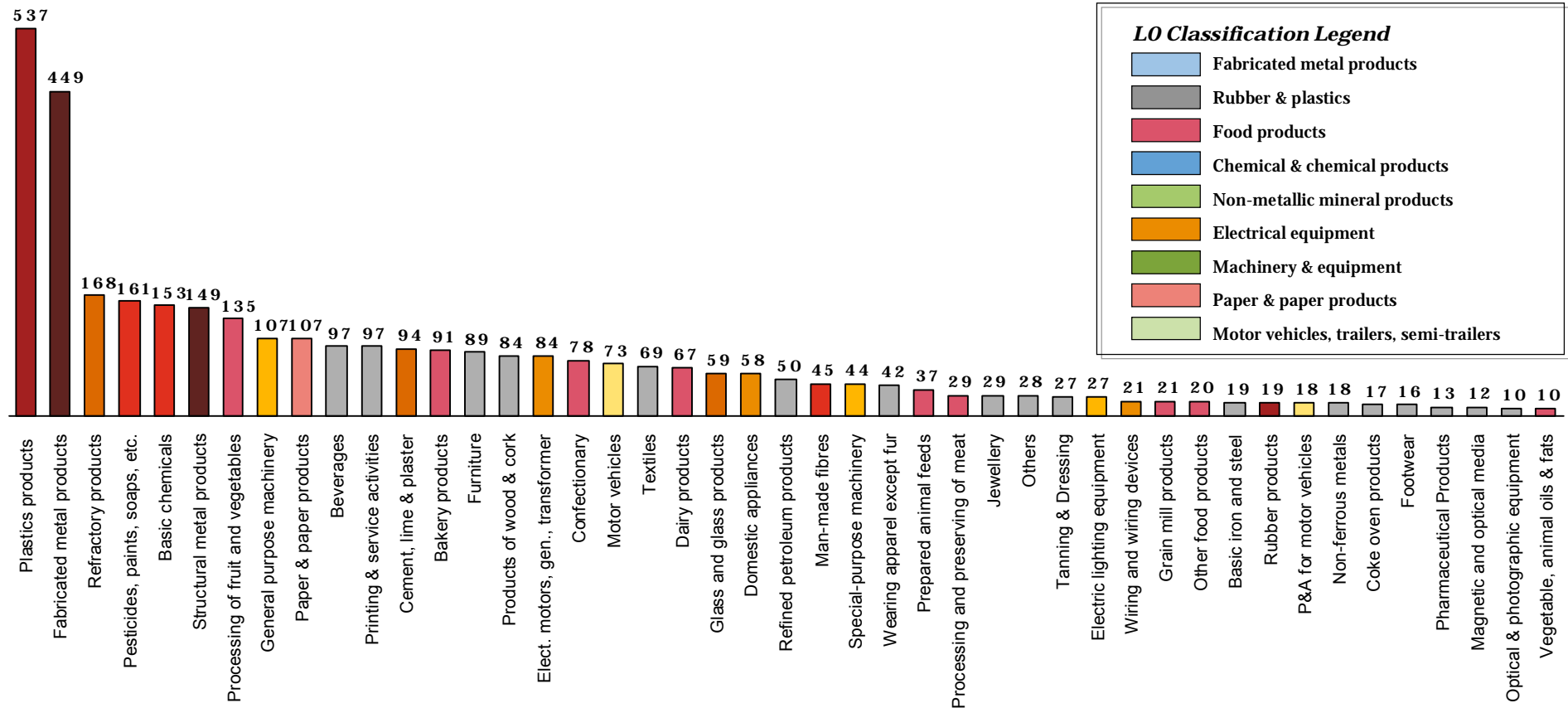


Source: National Factories Database 2010, Saudi Industrial Development Fund
Classification based on International Standard Industrial Classification (ISIC) codes

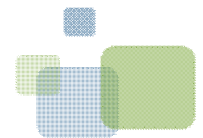


.....Top 25% industries represent 70% of all factories by volume

Number of Factories in the Kingdom classified by L1 industries

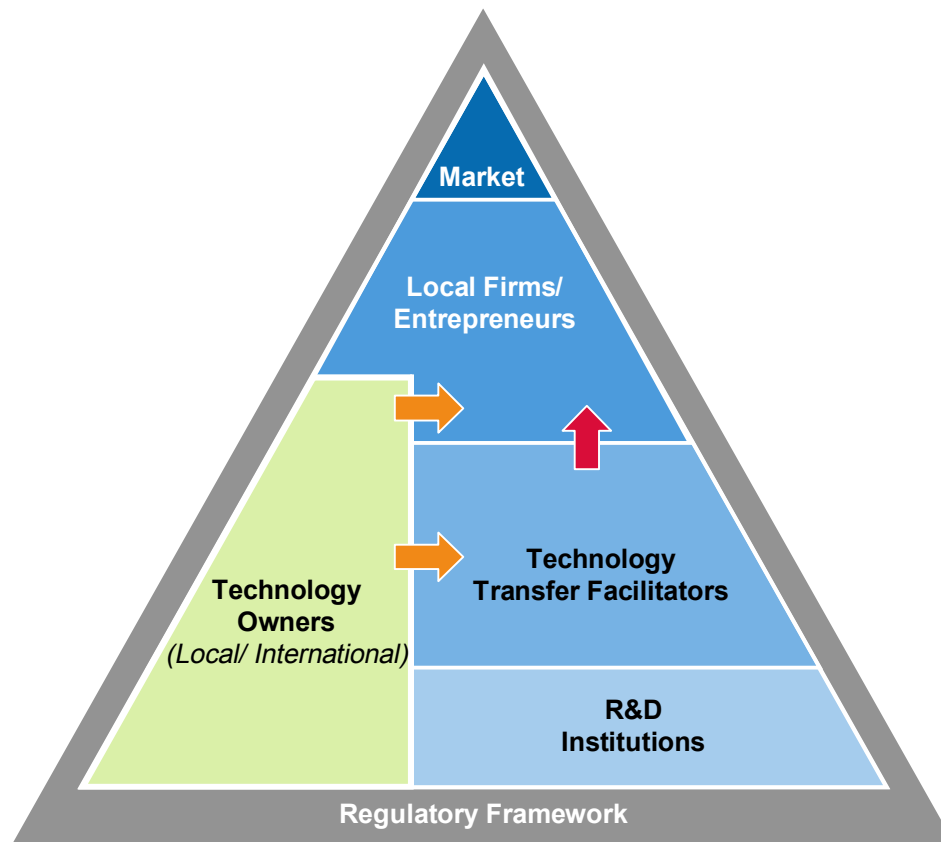



Source: National Factories Database 2010, Saudi Industrial Development Fund
Classification based on International Standard Industrial Classification (ISIC) codes



Technology Transfer Ecosystem

The technology transfer ecosystem includes different stakeholders, governed by a regulatory framework



 Horizontal Technology Transfer
  Vertical Technology Transfer

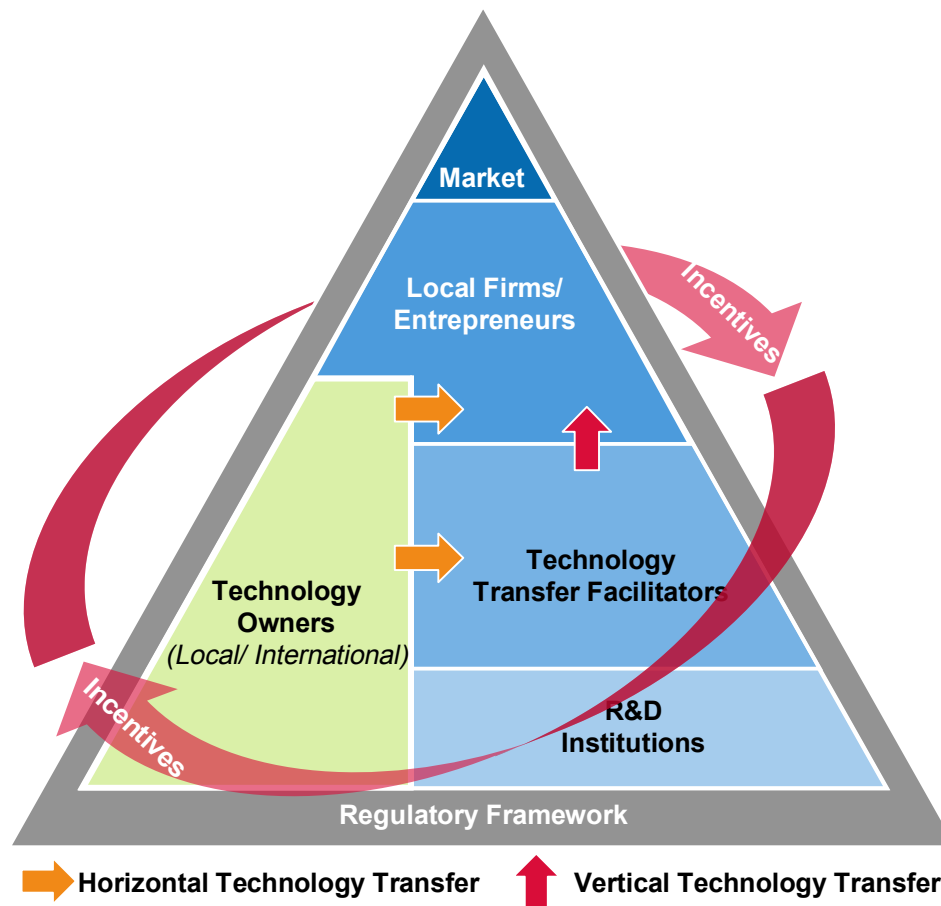
Source: Booz & Company analysis

Enabler	Impact
Regulatory Framework	<ul style="list-style-type: none"> § Govern the technology transfer ecosystem through public policies and regulations § Aim to ensure proper technology transfer
Technology Owners	<ul style="list-style-type: none"> § Own a technology in form of patented or non-patented innovation, intermediate good, machinery, etc. § Negotiate technology transfer agreement with technology acquirer
R&D Institutions	<ul style="list-style-type: none"> § Conduct research and development across sectors to develop innovation, in the form of concepts, prototypes, processes, formulas, etc.
Technology Transfer Facilitators	<ul style="list-style-type: none"> § Support R&D institutions and technology owners in transferring technology to local firms and entrepreneurs § Initiate marketing activities, support entrepreneurs/firms in technology transfer efforts
Local Firms/Entrepreneurs	<ul style="list-style-type: none"> § Evaluate technology potential for commercialization § Develop technology and disseminate product in the market
Market	<ul style="list-style-type: none"> § Constitute the technology demand market across all sectors § Drive the need for innovation

We will recommend enhancements to the interaction models and develop regulatory guidelines for the technology transfer in KSA

Interaction Models and Regulatory Framework

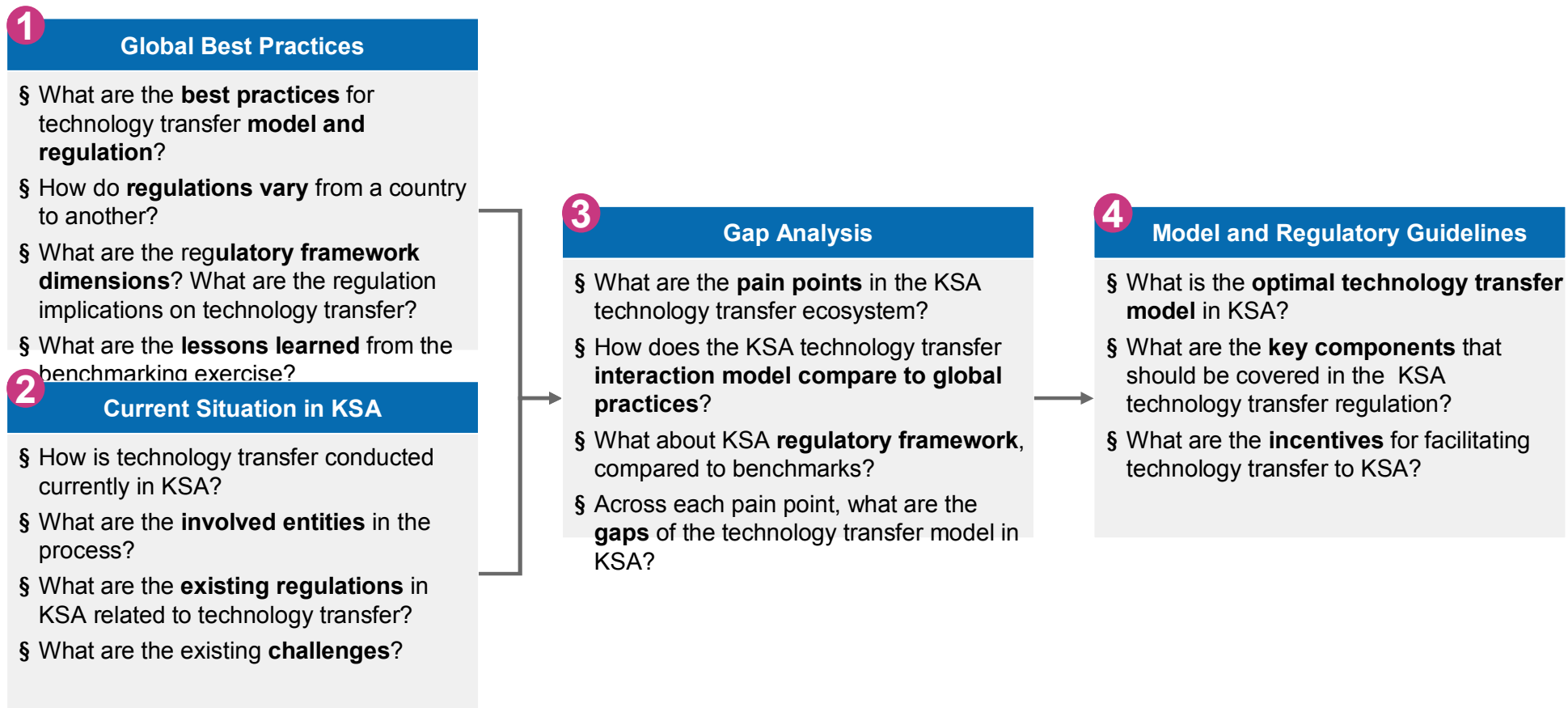
Regulatory Framework Categories



1	Technology Ownership	§ Define all objects eligible for the technology transfer , and indicate technology's ownership details
2	Technology Transfer Agreements	§ Include obligations for a complete transfer of technology , and provide incentives to attract foreign talents and entrepreneurs
3	Revenue Sharing	§ Include the rules regulating revenue distribution between all the technology transfer stakeholders
4	Dispute Resolution and Penalties	§ Define prohibited conducts during technology transfer activities, and set dispute resolution mechanisms
5	Taxation and Financial Support	§ Clarify taxation rules and provide incentives for facilitating technology transfer

Source: Booz & Company analysis

.....four step approach to develop KSA technology transfer interaction model and regulatory guidelines



Timeline

Source: Booz & Company analysis

5 weeks

7 weeks

9 weeks

The Way Forward ...



**... An Exciting and Challenging
Time for Technology, Innovation,
and Entrepreneurship**

THANK YOU

