

ÜNİVERSİTE-SANAYİ YENİLEŞİM İŞBİRLİĞİ

YENİLİKÇİ TEKNOLOJİ AKTARIMI

{ULUSLARARASI BİR BAKIŞ}

7. ÜSİMP KONGRESİ

22-23 MAYIS 2014

ERCİYES ÜNİVERSİTESİ, KAYSERİ, TÜRKİYE

BANU ONARAL, PH.D.
H. H. SUN KÜRSÜ PROFESSÖRÜ VE KURUCU DEKAN
BİYOMEDİKAL MÜHENDİSLİĞİ, BİYOMEDİKAL BİLİMLER VE SAĞLIK SİSTEMLERİ FAKÜLTESİ
DREXEL ÜNİVERSİTESİ, PHILADELPHIA, PA, ABD
&
BAŞDANIŞMAN - STRATEJİK ORTAKLIKLAR
TEKNOPARK İSTANBUL,
PENDİK, İSTANBUL, TÜRKİYE



UZGÖRÜ > STRATEJİ > EYLEM

Philadelphia...



Franklin Institute

YENİLİKCİ TEKNOLOJİ AKTARIMI

■ TÜRKİYE & YENİLEŞİM

- GENÇ NESİL VE YÜKSELEN EKONOMİ
- BİLİM VE TEKNOLOJİYE DAYALI KALKINMA

■ DENEYİM, DERSLER...ÖRNEKLEME

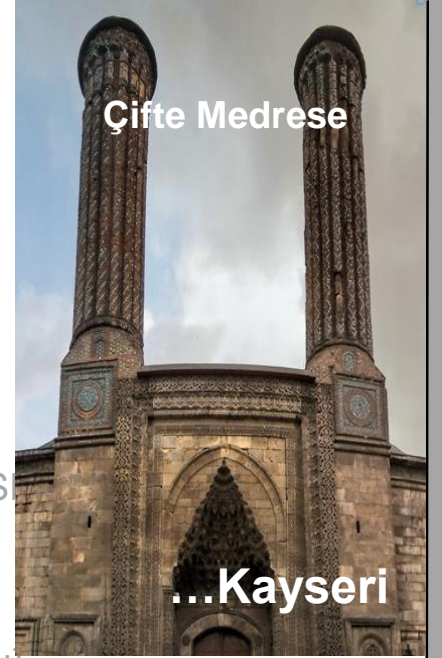
- FARKLI DÜNYALARIN BULUŞMASI
- OKULDAKİ PAZARLIĞIN ÇARŞIYA UYMAMAS
- ◆ COULTER TRANSLATIONAL RESEARCH PARTNERSHIP

[Ürüne Dönüşüm Araştırma Ortaklığı]

- İLKELER, YÖNTEMLER, SÜREÇLER
- TİCARETLEŞEN ARAŞTIRMA ÖRNEKLERİ

■ YENİLEŞİM & TÜRKİYE'2023

- BİLİM, TEKNOLOJİ VE YENİLİK EKOSİSTEMİ
- KÜRESEL REKABETE HAZIRLIK...



Çifte Medrese

...Kayseri



BİLGİ VE BİLİMİN TOPLUMA YARARA DÖNÜŞMESİ

SNAPSHOT

DEMOCRATIC, SECULAR, UNITARY, CONSTITUTIONAL REPUBLIC

~74 MILLION; ~300 000 SQ MILES

CRADLE OF CIVILIZATIONS AND CROSSROADS OF CULTURES

CREATIVE TENSION THAT BRIDGES AND BLENDS

EAST & WEST

ASIA & EUROPE

ANCIENT & MODERN

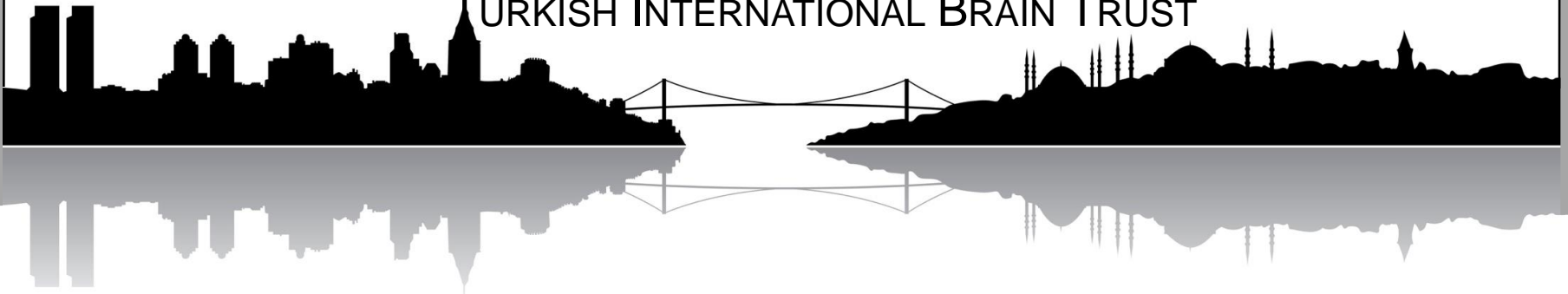
PAST & FUTURE

HISTORICAL ENDOWMENT & DIVERSE CULTURAL LEGACY

RISING GENERATION:

YOUNG, ENERGETIC, EDUCATED, AMBITIOUS TECHNOLOGY & BUSINESS
LEADERS

TURKISH INTERNATIONAL BRAIN TRUST



HEIRS TO EMPIRES & GEOSTRATEGIC DESTINY
HISTORICAL & CULTURAL TIES

MIDDLE EAST, GULF, BALKANS, CAUCASUS, CENTRAL ASIA, NORTH AFRICA, EUROPE

15TH LARGEST GNP-PPP

\$1.1 TRILLION ECONOMY

GLOBAL COMPETITIVENESS INDEX: FROM EFFICIENCY DRIVEN → TO INNOVATION DRIVEN

RANK 2012: 59; 2013: 43

INDUSTRIAL PRODUCTION GROWTH RATE: 9.2%, RANK 15TH

FINANCIAL CAPITAL ISTANBUL

13TH LARGEST ECONOMY IN 2026

14TH MOST DYNAMIC CITY

GOLDMAN SACHS ESTIMATE

\$480BILLION IN 2025

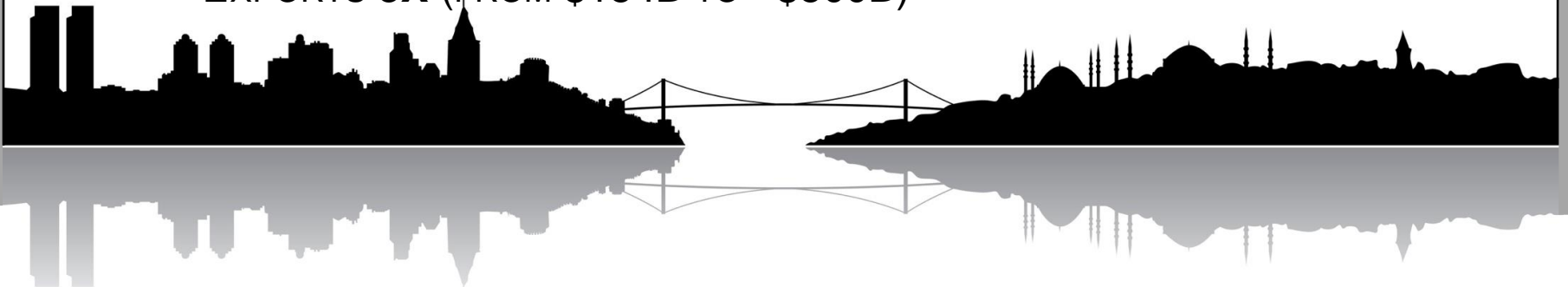
MCKINSEY GLOBAL INSTITUTE REPORT

VISION 2023 GOALS – CENTENNIAL OF THE TURKISH REPUBLIC

10TH LARGEST ECONOMY IN THE WORLD

GNP INVESTED IN R&D AND INNOVATION 3X (FROM 0.8 TO ~3%)

EXPORTS 3X (FROM \$154B TO ~\$500B)



HEIRS TO EMPIRES & GEOSTRATEGIC DESTINY

HISTORICAL & CULTURAL TIES

MIDDLE EAST, GULF, BALKANS, CAUCASUS, CENTRAL ASIA, NORTH AFRICA, EUROPE

45% Under Age 25
60% Under Age 35

Highest Growth Rate in Higher Education Institutions

15th STEM Doctoral Degrees

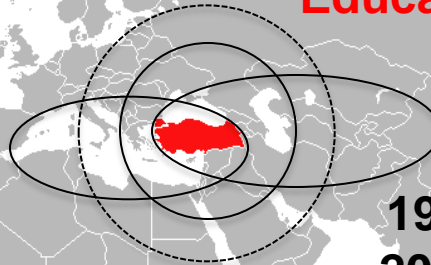
16th R&D Expenditures

20th Scientific Publications

SJR International Science Ranking 2012

59th Intellectual Property

Intellectual Property Rights Index 2012



1981: 27 Universities

2001: 76 Universities

~50 New Universities/2 Decades

2013: 174 Universities

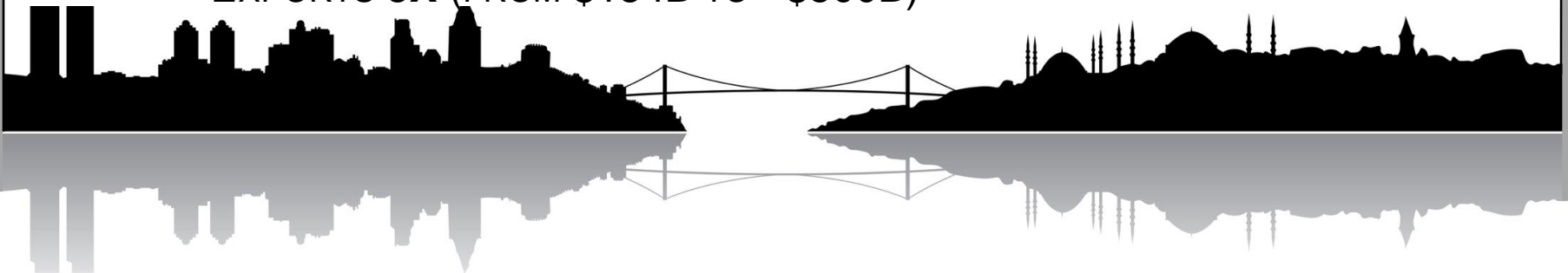
~100 New Universities/1 Decade

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- OKULDAKİ PAZARLIĞIN ÇARŞIYA UYMAMASI

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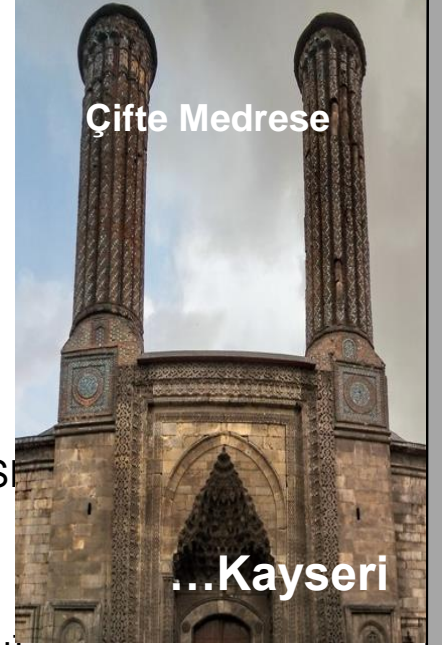
[Ürüne Dönüşüm Araştırma Ortaklığı]

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- TİCARETLEŞEN ARAŞTIRMA ÖRNEKLERİ

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Çifte Medrese



...Kayseri

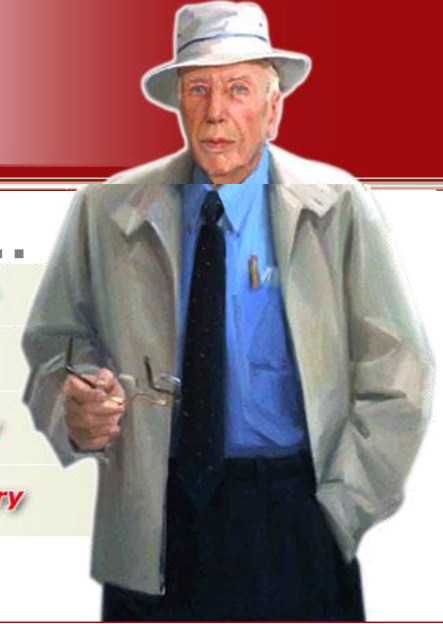


BİLGİ VE BİLİMİN TOPLUMA YARARA DÖNÜŞMESİ

Ürüne Dönüşüm Araştırma Ortaklığı

Wallace H. Coulter Vakfı

Ulusal İyi Uygulama (ABD)



Akademik ve İş Dünyasının Kaynaşması...

- Boston Üniversitesi
- Case Western Reserve Üniversitesi
- **Drexel Üniversitesi**
- **Duke Üniversitesi**
- Georgia Teknoloji Enstitüsü
- **Michigan Üniversitesi**
- **Stanford Üniversitesi**
- **Virginia Üniversitesi**
- Washington Üniversitesi
- Wisconsin Üniversitesi

Engineer

Inventor

Entrepreneur

Visionary

“Bilim İnsanlığın Hizmetindedir”

“Mükemmeliyet & Sürdürülebilirlik”

Ürüne Dönüşüm Araştırma Ortaklığı

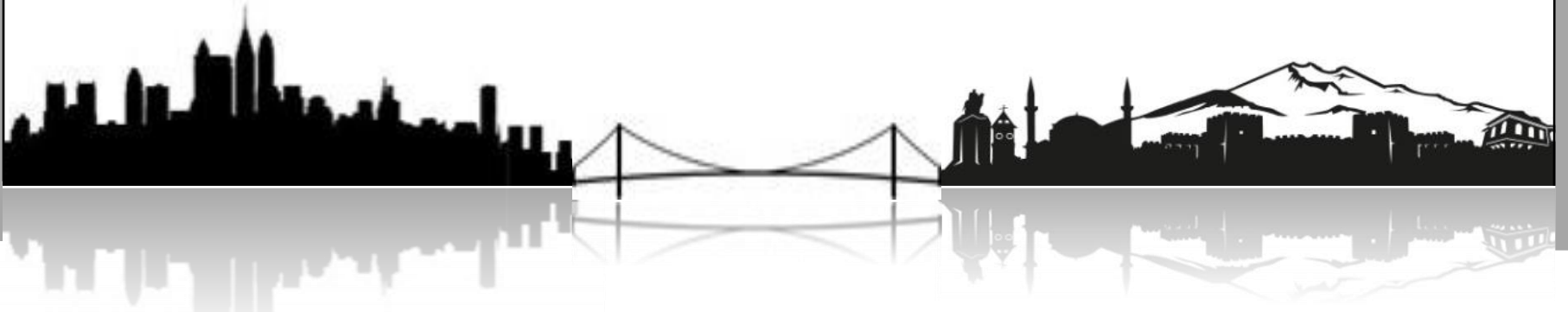
► İLKE **Sağlık Gereksinimleri > Birlikte Çözüm Üretmek**

► NİTELİK **Kuruluş > Uygulama > Kanıtlama**
> Birlikte Kurumsallaştırmak

- Fikir Madenciliği ve Proje Tanımlama; Ön Tarama ve Derin Değerlendirme
 - Piyasa Koşullarına Uygun Seçim Destek; Sonrası Proje Yönetimi

► NİCELİK **Nicelikli ölçüt > Somut Sonuçlar**
> Riski Birlikte Azaltmak

- Öz-disiplin ve Öz-değerlendirme Kültürünü Benimsemek
 - İşletimsel ve Gözetim Süreç ve Yöntemlerini Kurumsallaştırmak



Yenilikçi Teknoloji Aktarımı

Okuldaki Pazarlığa Uymayan Çarşı...



Yenilikçi Teknoloji Aktarımı....Çelişki ve Gerilim



Akademik Girişimciler... Uyar-Gezer Firmalar... İki Dünya Aracıları

Drexel Üniversitesi Yenileşim Ekosistemi

RETHINKING PHILADELPHIA ✓

REINVENTING PHILADELPHIA ✓

ACTION PHILADELPHIA

NOW!

◆ Drexel İçi Paydaşlar

Medicine; Public Health; Nursing and Health Professions; Arts and Science; Engineering; Information Science; Media Arts and Design Business and Law

◆ Bölgesel Ortaklar

Children's Hospital of Philadelphia (CHOP), Coriell Institute for Medical Research, Fox Chase Cancer Research Institute, Good Shepherd Rehabilitation Network, Inglis Foundation, Lankenau Hospital, Monell Chemical Senses, Shriners Hospitals for Children, Thomas Jefferson University, University of Pennsylvania, Wistar Institute...

◆ Ekonomik Kalkınma Ajansları

Ben Franklin Technology Partners, BioAdvance, Keystone Innovation Zone, Philadelphia Industrial Development Corporation, Select Greater Philadelphia, University City Science Center...

◆ Sanayi Ortakları

Becton Dickinson, Boston Scientific, Exponent, Hospira, Integra Life Sciences, Johnson and Johnson, Medtronic...

İş Geliştirme, Hukuk ve Yatırım Ortakları... Mezunlar ve Dostlar.....Şehir, Eyalet and Federal Kurumlar



Yönetim Kurulu

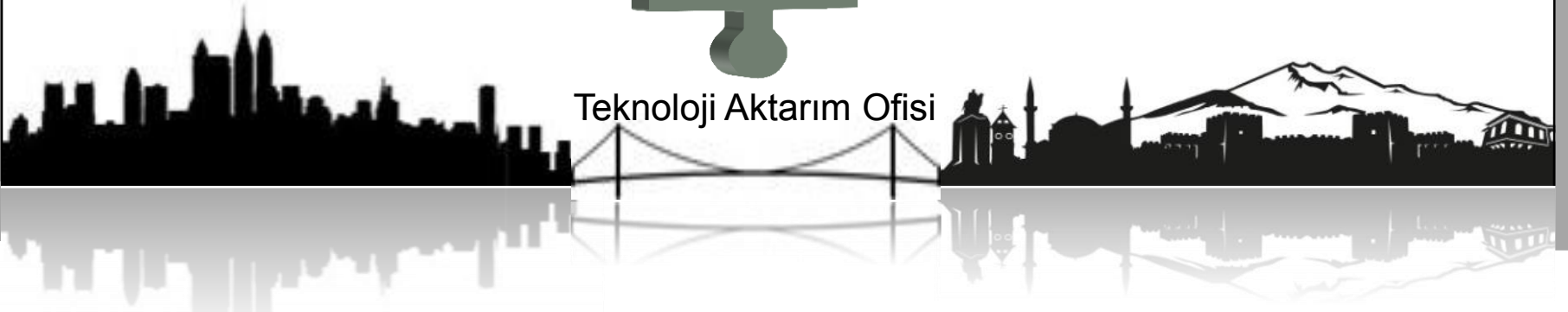
Biomedikal Mühendisliği ve Tıp Fakültesi Temsilcileri

Risk
Yatırımcıları &
Sanayi

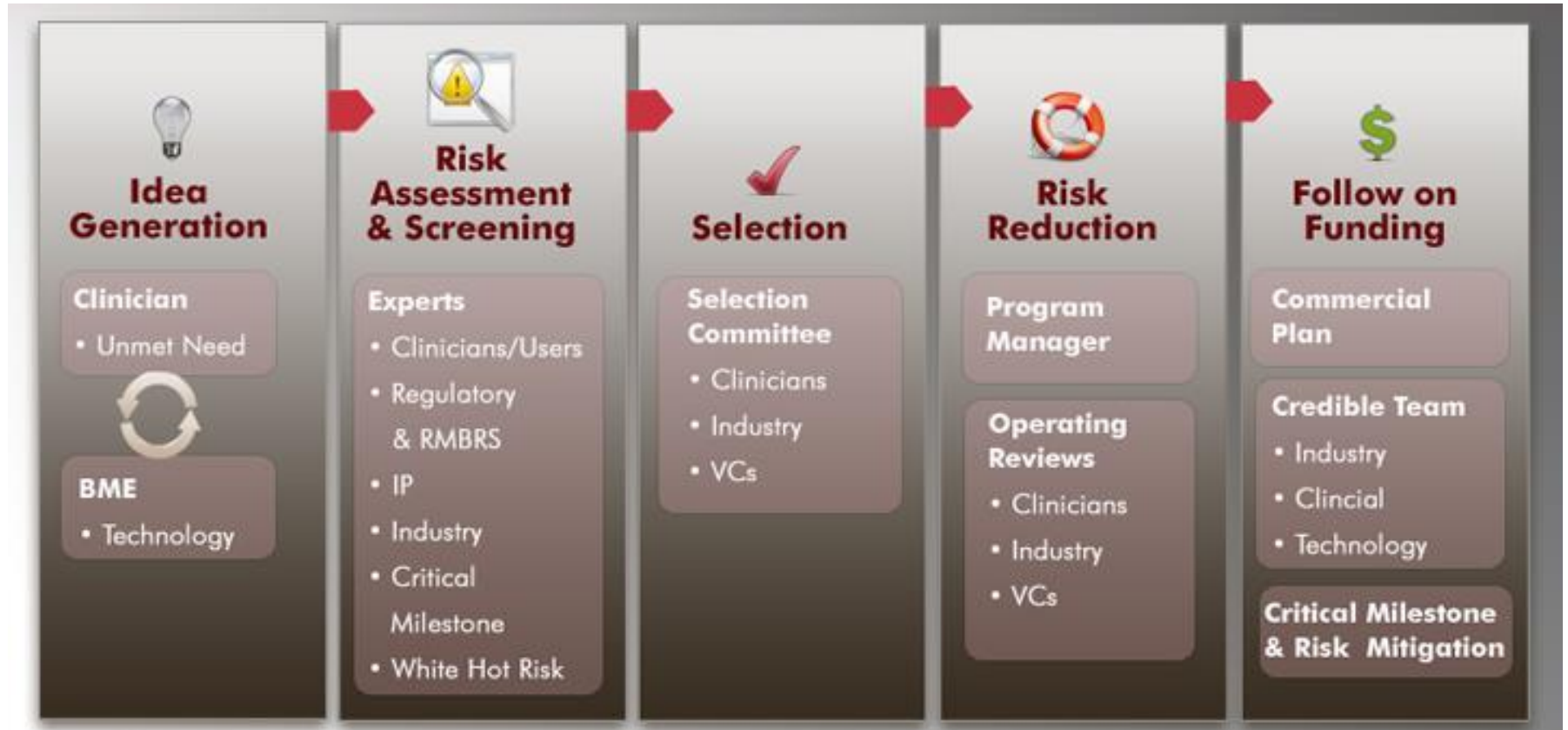


Klinik
Araştırmacılar

Teknoloji Aktarım Ofisi



Coulter Süreci



						STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6
AR	Post-Coulter IP:	(\$000) Amount of Coulter Funding Received	(\$000) Amount for funding received for the purpose of advancing the project through the Coulter Continuum	Funding Source: VC = Venture Capital, A= Angel funding, I= Industry, S= Startup, O=Other	PROJECT NAME	IN VITRO OR FEASIBILITY	ANIMAL TESTING SAFETY	ANIMAL TESTING EFFICACY & USABILITY	FIRST IN HUMANS	AT REGULATORY AGENCY FOR MARKET APPROVAL	IN PATIENTS or MARKET
006	1FPA	100	6,600	VC	1		1	3			
006	2FPA	100	1,610	S, O	2	1	3				
006	2FPA	100	2,056	VC, I	3	1	2	3			
006	10FPA	100	3,465	S, O	4	1			3		
007	-	262	-	-	5	1			2		
007	-	75	75,9	I	6				1		
007	-	200	429	O	7	2					
007	-	260	1,893	O	8	0.5	1.5	2.5			
008	-	255	-	-	9	1.5					
008	-	106	3,398	VC, A	10	0.5			1.5		
008	-	61	1,800	O	11	1	1	1.5			
008	2D	40.5	-	-	12	1					
009	-	162	1,600	O	13	0.25	FOF secured for animal safety and efficacy				
009	2D	326	14,697	O	14	0.25			0.5		
009	2D	140	-	-	15	0.5					

Ulusal Coulter Program Sonuçları

İlk 4 yıl

	Proje Sayısı	ABD \$ (milyon)
Desteklenmiş projeler	200	40
Hayvan veya ilk insan çalışmalarına ulaşmış/geçerliliği kanıtlanmış projeler	100+	
Risk yatırımcı desteği	28	152.9
Sanayi lisanslama	24	
Başlangıç firmaları	17	5+
Kamu proje destekleri		150+
Toplam Yatırım Fonları	69	308+

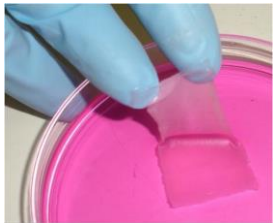
Yatırım Çarpanı = \$308M / \$40M = 7x

Drexel Program Çıktıları:

Lisanslanan Teknolojiler

• **VEUSim:** A Virtual Endovaginal Ultrasound Simulator for Physician Training

• **LCL Grafts:** Innovative Small Caliber Vascular Grafts for Coronary Bypass



- **Optical Diagnosis and Treatment Optimization in Chronic Diabetic Wounds:** A Pilot Clinical Study
- **Living Tissue Sterilization** by the Dielectric Barrier Discharge Plasma
- **Cardiac Biomarker Detection** using Q-DOT Immunoassay QLIDA

• **Electronic Blood Pressure Wristwatch**

• **Portable Breast Elasticity and Mobility Measurement** for Tumor Location and Malignancy Screening

• Functional Near-infrared Spectroscopy as a **Monitor for Depth of Anesthesia**

• Syk Kinase as a **Biomarker of Skin UV** Damage and Photocarcinogenesis



OPTIONED

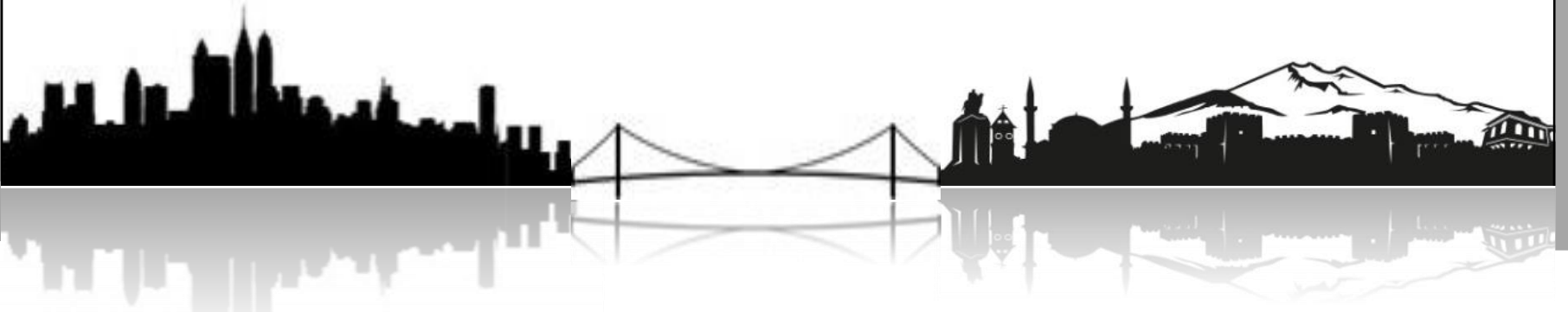


Drexel Program Çıktıları

İlk 4 Yıl

- \$4M
- 21 teknoloji desteklendi
- 40 patent başvurusu
- 9 teknoloji ön-klinik çalışmasına başladı
- 7 teknoloji lisanslandı
- \$27M tutarında takip fonu alındı

Yatırım Çarpanı = \$27M / \$4M ~ 7X



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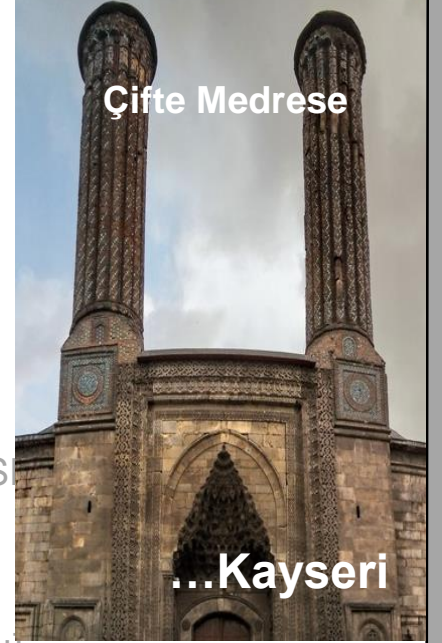
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Çifte Medrese



...Kayseri



BİLGİ VE BİLİMİN TOPLUMA YARARA DÖNÜŞMESİ

TANGIBLES

LEADING INDUSTRIES AND BURGEONING R&D

AGRICULTURAL PRODUCTS, TEXTILES, MOTOR VEHICLES, SHIP BUILDING,
TRANSPORTATION EQUIPMENT, CONSTRUCTION MATERIALS, CONSUMER ELECTRONICS,
HOME APPLIANCES...

TRADE IMBALANCE >>> INNOVATION IMPERATIVE

IMPORT \$225B <<< EXPORT \$154B

AEROSPACE, TELECOMMUNICATIONS, HEALTH AND ENERGY

EXAMPLE: HEALTH -PHARMACEUTICAL AND MEDICAL DEVICE MARKET X3 BY 2017
EXPORT DEPENDENCE TO REDUCE FROM 85% TO 50% OVER NEXT HALF DECADE

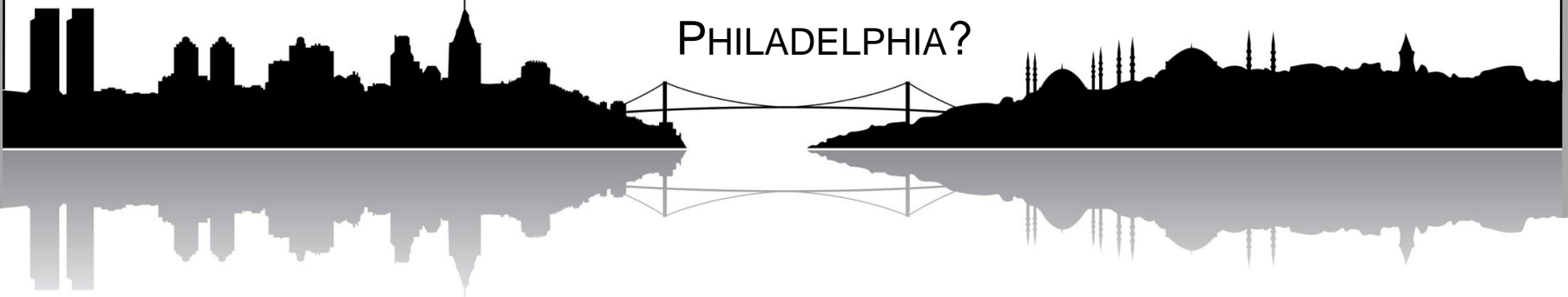
OPEN FOR BUSINESS &

SEARCHING FOR GLOBAL INNOVATION BEACH HEADS IN

US, EUROPE, ASIA PACIFIC, SOUTH AMERICA

US: SILICON VALLEY, NEW YORK, BOSTON, RESEARCH TRIANGLE...

PHILADELPHIA?



PRIVATE SECTOR

TOBB UNION OF CHAMBERS AND COMMODITY EXCHANGE

DEIK FOREIGN ECONOMIC RELATIONS BOARD

TACCI TURKISH AMERICAN CHAMBER OF COMMERCE

TURKISH AMERICAN BUSINESS CONNECTION...

PUBLIC SECTOR

SCIENCE, TECHNOLOGY, INDUSTRY MINISTRY;

ECONOMY MINISTRY;

FOREIGN MINISTRY – SCIENCE, TECHNOLOGY & TRADE ATTACHÉS...

DEVELOPMENT MINISTRY – 10TH DEVELOPMENT PLAN (2014–2018)

“R&D AND INNOVATION ECOSYSTEMS AND NETWORKS”

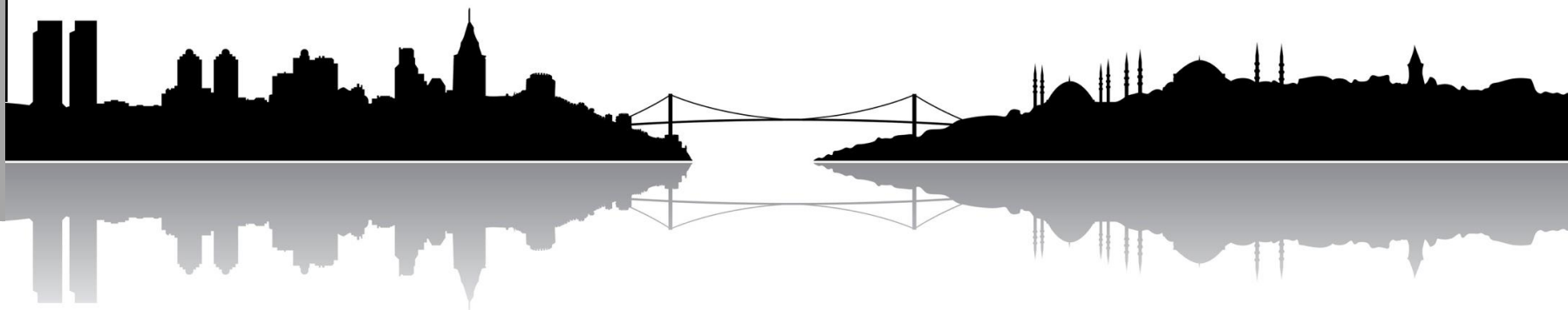
CIVIL SOCIETY, PROFESSIONAL, TRADE ORGANIZATIONS, FOUNDATIONS

TURKISH AMERICAN SCIENTISTS & SCHOLARS ASSOCIATION

YASED INTERNATIONAL INVESTORS ASSOCIATION

AMERICAN TURKISH SOCIETY

ASSEMBLIES AND FEDERATIONS OF TURKISH AMERICAN SOCIETIES...



ACADEMIA

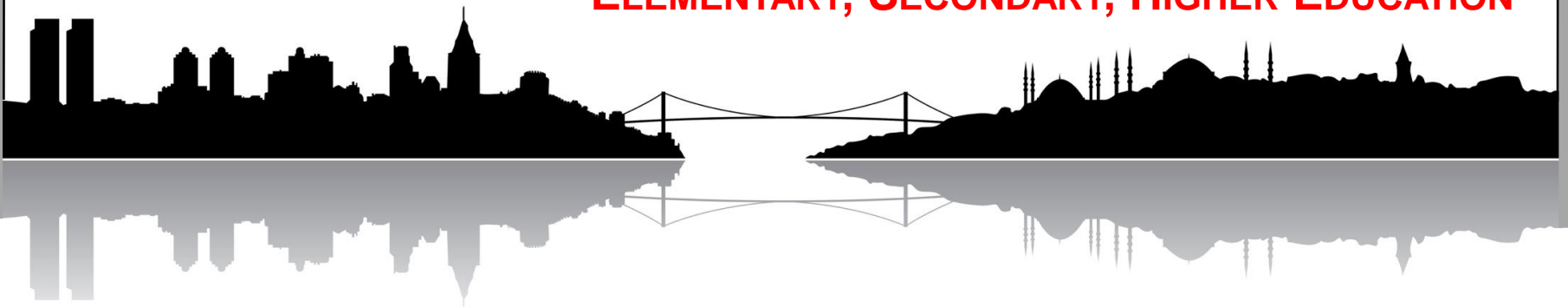
GROWTH SPURT IN NEW UNIVERSITIES (174) ~ 100 IN THE LAST DECADE
~ 50 IN PREVIOUS TWO DECADES
~ 100 IN THE NEXT DECADE?

SWEEPING NATIONAL MOVEMENTS

NATIONAL INNOVATION INITIATIVE (UIG)
NATIONAL NANOTECHNOLOGY INITIATIVE (UNG)
WIND ENERGY TECHNOLOGY PLATFORM (RETEP)

INTELLECTUAL PROPERTY PROTECTION
TRANSLATIONAL RESEARCH
TECHNOLOGY TRANSFER AND COMMERCIALIZATION
UNIVERSITY-INDUSTRY COLLABORATIONS
OPEN INNOVATION
CROWD FUNDING

**INNOVATION AND ENTREPRENEURSHIP IN
ELEMENTARY, SECONDARY, HIGHER EDUCATION**



TURKISH SCIENCE, TECHNOLOGY & INNOVATION ECOSYSTEM

UNIVERSITY SCIENCE AND TECHNOPARKS, INDEPENDENT AND TOPICAL TECHNOPARKS,
TECHNOLOGY DEVELOPMENT ZONES, FREE ZONES, ORGANIZED INDUSTRY REGIONS,
INDUSTRY PARKS

REGIONAL INNOVATION MOVEMENTS

UNIVERSITY BASED TECHNOPARKS

ORGANIZED INDUSTRY REGIONS AND FREE ZONES

TECHNOPARK OF TECHNOPARKS



REGIONAL INNOVATION MOVEMENTS... GRASSROOTS INITIATIVES

INOVIZ: IZMIR FOR HEALTH CLUSTER

INOVA: ANKARA HEALTH INNOVATION MOVEMENT



DEPARK

Dokuz Eylül Teknoloji Geliştirme A.Ş.



YAŞAM BİLİMLERİ VE TEKNOLOJİLERİ
İSTANBUL İŞBİRLİĞİ PLATFORMU
ISTANBUL HEALTH SCIENCE & TECHNOLOGY PLATFORM



TURKEY'S GATEWAY TO INNOVATION ... "INNOVATION HUB"

INNOVATION HEADQUARTERS = PUBLIC-PRIVATE PARTNERSHIPS, COMPETENCE CENTERS, CENTERS OF EXCELLENCE, SECTOR CLUSTERS, SHARED INFRASTRUCTURE, SHARED LABORATORIES, SERVICE PROVIDERS, REFERENCE, TEST AND ACCREDITATION LABS, UNDERWRITERS LABS, TECHNOLOGY TRANSFER, STARTUP INCUBATION, ACCELERATION, VENTURE CAPITAL, HI-TECH INDUSTRIES, GRASSROOTS MOVEMENTS, SCIENCE & SOCIETY... A PLACE FOR INNOVATION CONVERGENCE

SHARED HUMAN AND PHYSICAL INFRASTRUCTURE

- ELECTRO-OPTO-PHOTONICS
- MECHATRONICS & ROBOTICS
- AVIONICS & PROPULSION
- INFORMATION TECHNOLOGY & TELECOM
- INFORMATICS, ANALYTICS & BIG DATA
- BIOINFORMATICS
- NANOTECH & ADVANCED MATERIALS
- CHEMISTRY & BIOCHEMISTRY
- MOLECULAR BIOLOGY & MICROBIOLOGY
- BIONANOTECHNOLOGY
- ADVANCED MANUFACTURING



ACADEMIC RESEARCH

INTEGRATED WITH

INDUSTRIAL PRODUCT

DEVELOPMENT



teknoparkistanbul

STRATEGIC PRIORITIES

- DEFENSE /AEROSPACE
- TRANSPORTATION
- ENERGY
- HEALTH...



... EUROPE, BALKANS, NORTH AFRICA, MIDDLE EAST, GULF, CAUCASUS, CENTRAL ASIA

HIGH PRIORITY, BROAD SCOPE STRATEGIC R&D PROGRAMS



ACADEMIC PLATFORM

CONSORTIUM OF UNIVERSITIES

- BOĞAZIÇI UNIVERSITY
- FATİH UNIVERSITY
- GEBZE HIGH TECH INSTITUTE
- ISTANBUL TECHNICAL UNIVERSITY
- KOÇ UNIVERSITY
- ÖZYEĞİN UNIVERSITY
- SABANCI UNIVERSITY
- YILDIZ TECHNICAL UNIVERSITY
- OTHER REGIONAL UNIVERSITIES...

>> HIGH TECH INSTITUTE

~ 1 MILLION M² BUILT SPACE; 1000 HIGH TECH COMPANIES; 30 000 R&D PERSONNEL



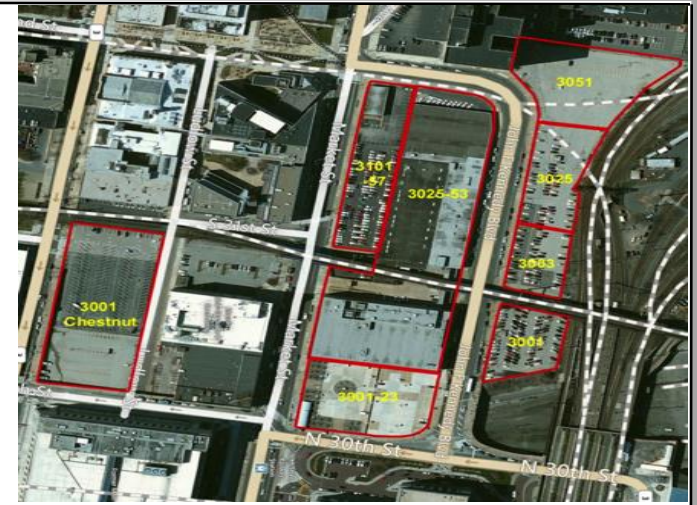
teknoparkistanbul

CIVILIAN INDUSTRIES BASED ON
DUAL-USE AND MULTIPLE-USE TECHNOLOGIES

A JOINT VENTURE OF
DEFENSE INDUSTRY UNDERSECRETARIAT [SSM] &
ISTANBUL CHAMBER OF COMMERCE



INTERNATIONAL AIRPORT... HIGH SPEED RAIL... SEA PORT

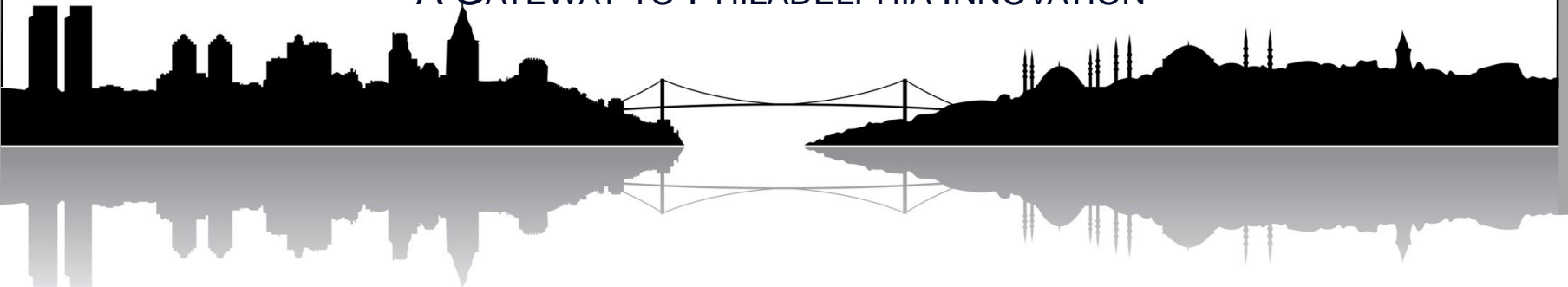


INNOVATION NEXUS
FOR
RESEARCH, TECHNOLOGY TRANSFER,
AND ECONOMIC DEVELOPMENT

“HOME-AWAY-FROM-HOME FOR NATIONAL & GLOBAL INNOVATION PARTNERS”

DREXEL INNOVATION NEIGHBORHOOD

A GATEWAY TO PHILADELPHIA INNOVATION



YENİLEŞİM & TÜRKİYE'2013

➤ KÜRESEL REKABETE HAZIR MIYIZ?

➤ YENİLİKÇİ TEKNOLOJİ AKTARIMI İLE KALKINABİLİR MİYİZ?

➤ BİLGİ VE BİLİMİ EKONOMİK DEĞERE DÖNÜŞTÜREBİLİR MİYİZ?

❖ **TEMEL BİLİME YATIRIM?**

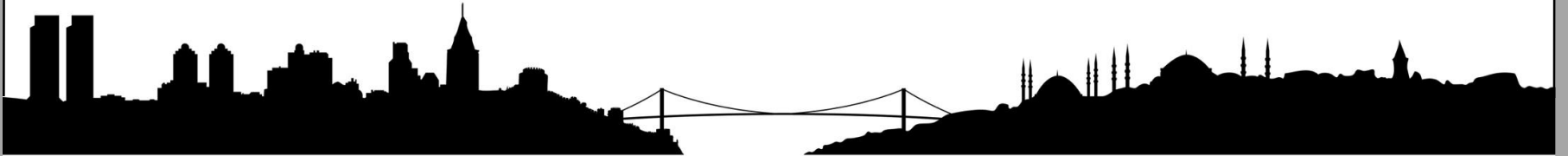
❖ **YENİLEŞİM HUKUKU** >> FİKİR HAKLARI...DÜZENLEYİCİ VE DENETLEYİCİ KURUMLAR... ÜÇÜNCÜ ÖDEYENLER... GİRİŞİMCİ VE RİSK SERMAYE HUKUKU?

❖ **ÖZENDİRİCİLER VE ÖDÜLENDİRİCİLER** >> HİBELER VE RİSK YATIRIMLARI ✓

❖ **BİRİKİM** >> KALKINMA ALTYAPISI: İNSAN, FİZİKSEL VE FİNANS ALTYAPISI ✓

❖ **YAŞAM VE YÖNETİŞİM TARZI** >> HAKKANİYET VE ŞEFFAFLIK...BÜROKRASI VE HİYERARŞİ? İŞE KALKIŞMAK...YENİLGİDEN BAŞARIYA KOŞMAK... GÜÇBİRLİĞİ VE ORTAK HAREKET? STRATEJİK DÜŞÜNME?

❖ **KÜRESEL BEYİN GÜCÜMÜZ** >> ULUSLARARASI YENİLEŞİM ORTAKLIKLARI?



BİRLİKTEN DİRLİK...**GÜVEN KÖPRÜLERİ**...7den 70e KATILIM

DAVET

GLOBAL INNOVATION PARTNERSHIP FORUM - KASIM'15



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