

# MÜHENDİSLİKTE İNOVASYON ve GİRİŞİMCİLİK

**Yunus Çengel**

Adnan Menderes Üniversitesi, Mühendislik Fakültesi, Aydın  
(Professor Emeritus, University of Nevada, Reno, USA)



22 Nisan 2016

**MÜHENDİSLİK NEDİR?**

# MÜHENDİSLİK = İnovasyon (Yenilik)



# MÜHENDİSLİK: DEĞİŞİM ve GELİŞİM

- **Dünya hızla değişiyor.** İnsanlar daha iyisini istiyor. Bu değişimin motoru bilim ve teknolojidir.
- Dünyada **dinamizm** esastır, ve değişmiyecek tek şey değişimdir.
- Değişen bir ortamda **yerinde duran geride kalır** ve geriye gider.
- **Değişim durdurulamaz**, ancak yönlendirilebilir.



# DEĞİŞİM: TEMEL BİR İNSANLIK HASİYETİ

- İnsan **DEĞİŞEN** bir varlıktır.
- Değişime itiraz, insanlığa itiraz ve **insanlığı inkardır.**



**İNSAN**

- Akıllı
- Konuşan
- Sosyal
- Ekonomik
- **DEĞİŞEN**

**BİR VARLIKTIR.**

**(İNSAN-HAYVAN FARKI)**



**Mühendislik:** Zevkli bir meslek

# HAYAL GÜCÜ: DEĞİŞİMİN ATÖLYESİ

- İnsan **HAYAL EDEN** bir varlıktır.
- İnsan, hayalleri kadar büyüktür.
- İnsanın özelliği, olmayan şeyleri **hayal aleminde** var etmektir.
- Hayal gücü veya **yaratıcılık**, inovasyonun temelini oluşturur.
- Hayal alemindeki şeyleri **fizik** (madde) aleminde var etmek, **bilgi ve beceri** ile olur.



- Hayvanlar içgüdüleri, insanlar ise hayalleri ile hareket ederler.

**Einstein:**

“Hayal etme, bilgiden daha önemlidir.”



# MÜHENDİS, TEKNOLOJİST, TEKNİSYEN

## Mühendis, Mimar, Sanatkar:

- **Bilgi-hayal-ilham** (6. his) ile yapma (CD, çizim)
  - Maddesiz inşaat, hayal-bilgi-zihin becerisi (yaratıcılık).
- (Basic Science + Applied Science + Design)



Beyaz Yakalı Mühendis

## Teknolojist (Teknoloji Mühendisi)

- Tasarım mühendisi ile teknisyen arasındaki köprü;
- Üretim alanında **uygulama mühendisi**.

Mavi Yakalı Mühendis

(Basic Science + Applied Science+ Eng. Applications)



## Teknisyen, Usta:

- **El becerisi** ile malzemeyi istenilen şekle sokma
- Madde ile yapma, ruha uygun beden giydirme (Beceri, sanat, otomasyon, - robot). (Skill)



# BİLGİ ÇAĞI ve BİLGİ TOPLUMU

**TARIM Toplumu:** (... – 1712, Buhar Makinesinin icadı, Newcomen)

- Meslekler (ziraat, sanatlar) çıraklıkla babadan oğula geçerdi.
- **Değişim hızı:** Düşük.
- **Gerekli beceriler:** Basit

**SANAYİ Toplumu:** (1712 – 1948, Tranzistörün icadı, Bell Labs)

- Tarım kalkmadı, ancak makineleşti. Tarımda rekabetin ölçüsü makineleşme oldu. İşçi sınıfı doğdu, ve çok sayıda meslek türedi.
- **Değişim hızı:** Orta
- **Gerekli Beceriler:** Mekanik (robotluk)

**BİLGİ Toplumu** (1948 – ...)

- Sanayi kalkmadı, ancak bilgiye dayalı hale geldi. Rutin işler robotlara bırakılmakta. Sanayide rekabetin ölçüsü, geliştirilen yeni bilgi ve teknoloji.
- **Değişim hızı:** Yüksek; **Ürün ömrü:** Kısa; **Meslek ömrü:** Kısa
- **Gerekli Beceriler:** Karmaşık ve değişken

# Teknolojik Gelişmişliğin Ölçüsü: PATENT

## Ülkelerce verilen patent sayısı (2011)

| Rank ↕ | Country ↕   | No. of Patents Granted |
|--------|---|------------------------|
| 1      |  Japan         | 238,323                |
| 2      |  United States | 224,505                |
| 3      |  China         | 172,113                |
| 4      |  South Korea   | 94,720                 |
| 5      | European Patent Office  | 62,112                 |
| 6      |  Russia        | 29,999                 |
| 7      |  Canada        | 20,762                 |
| 8      |  Australia     | 17,877                 |
| 9      |  Germany      | 11,719                 |
| 10     |  Mexico      | 11,485                 |

|    |  |        |
|----|--|--------|
| 11 |  France         | 10,213 |
| 12 |  United Kingdom | 7,173  |
| 13 |  Italy          | 6,380  |
| 14 |  North Korea    | 6,290  |
| 15 |  Singapore      | 5,949  |
| 16 |  South Africa   | 5,296  |
| 17 |  India          | 5,168  |
| 18 |  Israel         | 5,104  |
| 19 |  Hong Kong     | 5,050  |
| 20 |  New Zealand  | 4,710  |

**Türk Patent Enstitüsü'nün verdiği yerli patent sayısı:**

**2006'da 122; 2007'de 317; 2008'de 337; 2009'da 456; 2010'da 642, 2011'de 847.**

2011'de yabancılara verilen patent sayısı: 5720 (%87)

Kaynak: [http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_patents](http://en.wikipedia.org/wiki/List_of_countries_by_patents) ve Türk Patent Enstitüsü

# En Çok ABD Patentli Firmalar, 2012 (ilk 25)

| No. | No. Patents | Firm                                      | Country       |
|-----|-------------|---|---------------|
| 1   | <b>6478</b> | International Business Machines Corp, IBM | United States |
| 2   | <b>5081</b> | Samsung Electronics Co Ltd KR             | Korea         |
| 3   | <b>3174</b> | Canon K K JP                              | Japan         |
| 4   | <b>3032</b> | Sony Corp JP                              | Japan         |
| 5   | <b>2769</b> | Panasonic Corp JP                         | Japan         |
| 6   | <b>2613</b> | Microsoft Corp                            | United States |
| 7   | <b>2447</b> | Toshiba Corp JP                           | Japan         |
| 8   | <b>2013</b> | Hon Hai Precision Industry Co Ltd TW      | Taiwan        |
| 9   | <b>1652</b> | General Electric Co                       | United States |
| 10  | <b>1624</b> | LG Electronics Inc KR                     | Korea         |
| 11  | <b>1535</b> | Fujitsu Ltd JP                            | Japan         |
| 12  | <b>1461</b> | Seiko Epson Corp JP                       | Japan         |
| 13  | <b>1436</b> | Hitachi Ltd JP                            | Japan         |
| 14  | <b>1410</b> | Ricoh Co Ltd JP                           | Japan         |
| 15  | <b>1394</b> | Hewlett-Packard Development Co L P        | United States |
| 16  | <b>1377</b> | GM Global Technology Operations LLC       | United States |
| 17  | <b>1292</b> | QUALCOMM Inc                              | United States |
| 18  | <b>1290</b> | Intel Corp                                | United States |
| 19  | <b>1285</b> | Toyota Jidosha K K JP                     | Japan         |
| 20  | <b>1157</b> | Broadcom Corp                             | United States |
| 21  | <b>1151</b> | Google Inc                                | United States |
| 22  | <b>1136</b> | Apple Inc                                 | United States |
| 23  | <b>1132</b> | Honda Motor Co Ltd JP                     | Japan         |
| 24  | <b>1118</b> | Sharp K K JP                              | Japan         |
| 25  | <b>1050</b> | Xerox Corp                                | United States |

# Yüksek Katmadeğerli Teknoloji Ürünleri



**Araba: \$20/kg**

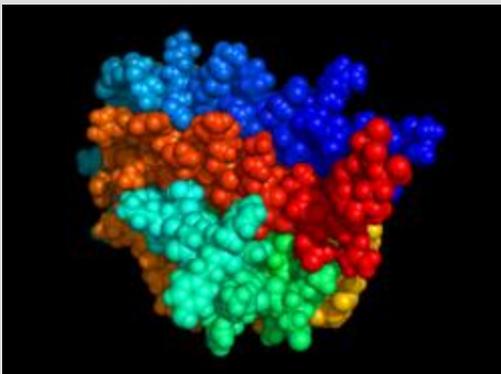


**Tablet: \$1000/kg**

**Erythropoietin**

(Alyuvar üretimini control eden bir hormon;  
kan kanseri tedavisinde kullanılan bir

biyoteknoloji ürünü) **\$27 milyar/kg**



**Neye Yatırım Yapmalı?**

Kaynak: Prof. Cezmi Akdis, *Director of Swiss Institute of Allergy and Asthma Research (SIAF)*;

# BİR MÜHENDİSLİK HARİKASI

**UYDU = Madde** {bakır, demir, plastik, ...} + **Madde-dışı** {hayal gücü (yaratıcılık), bilgi (teknoloji), beceri, ...}



**ALTIN:**  
**\$45,000/kg**

**TURKSAT 4A ve 4B**  
Mitsubishi Electric, Japonya

**Toplam ağırlık ve fiyat:**  
**7700 kg**  
**\$571 milyon**

**Birim fiyat:**  
**\$74,000/kg**

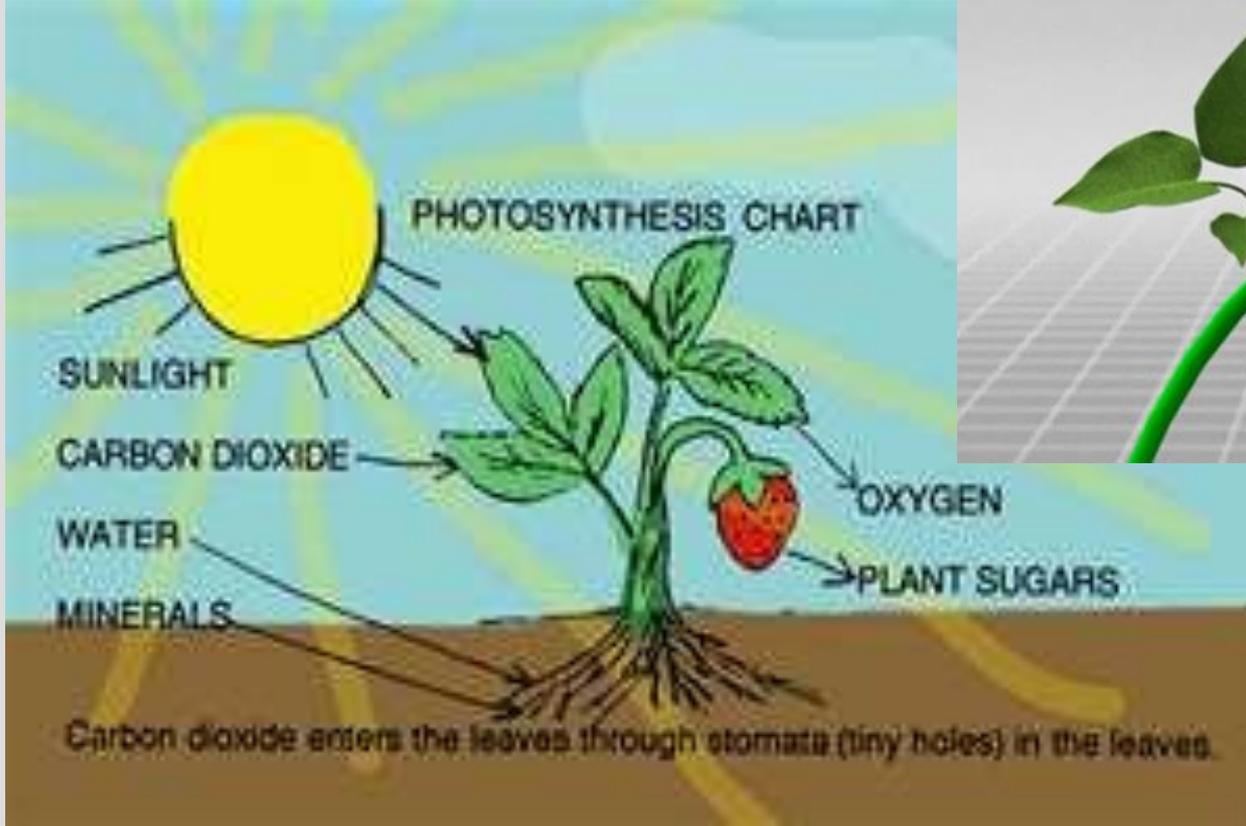
**Hammadde değeri:**  
**\$10/kg?**

**İNOVASYON:**

**Yeni bir ÜRÜN,**  
Yeni bir PROSES,  
Yeni bir İŞ MODELİ (Business Model),  
Yeni bir HİZMET

# Yapay Fotosentez ile Güneş enerjisinden Sıvı Yakıt

**BİLİM:** Doğal Yaprak (Fotosentez)  
Güneş+CO<sub>2</sub>+H<sub>2</sub>O → Enerji (şeker) + O<sub>2</sub>



MENU

TIME

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Scientists Have  
Figured Out a Way to  
Convert Solar Energy  
Into Liquid Fuel

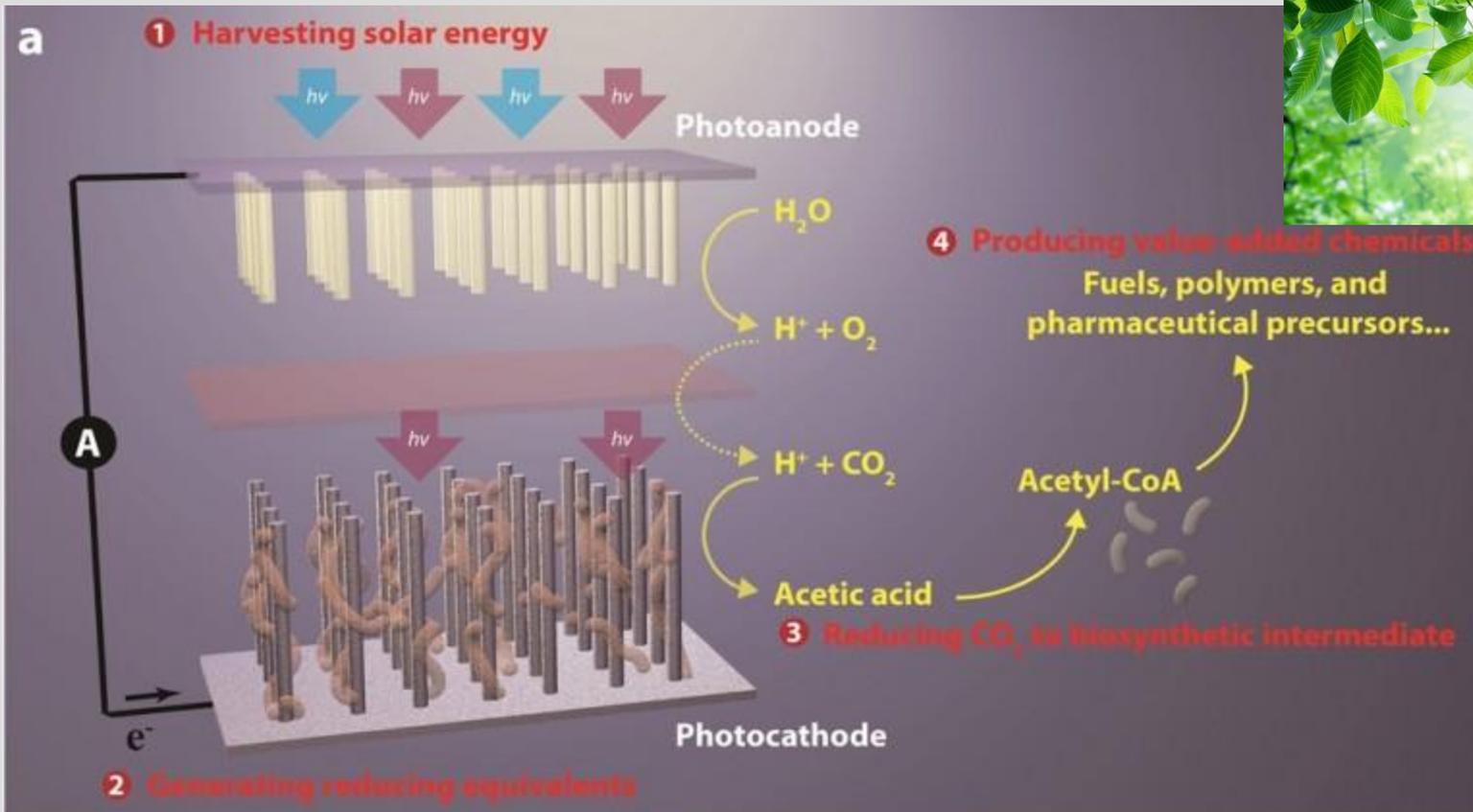
12 Feb 2015

**TEKNOLOJİ:** Suni yaprak

Güneş+CO<sub>2</sub>+H<sub>2</sub>O → Enerji (sıvı yakıt) + O<sub>2</sub>

# Yapay fotosentez: CO2 Emisyonları Biyoyakıt ve Plastiğe Çevrildi

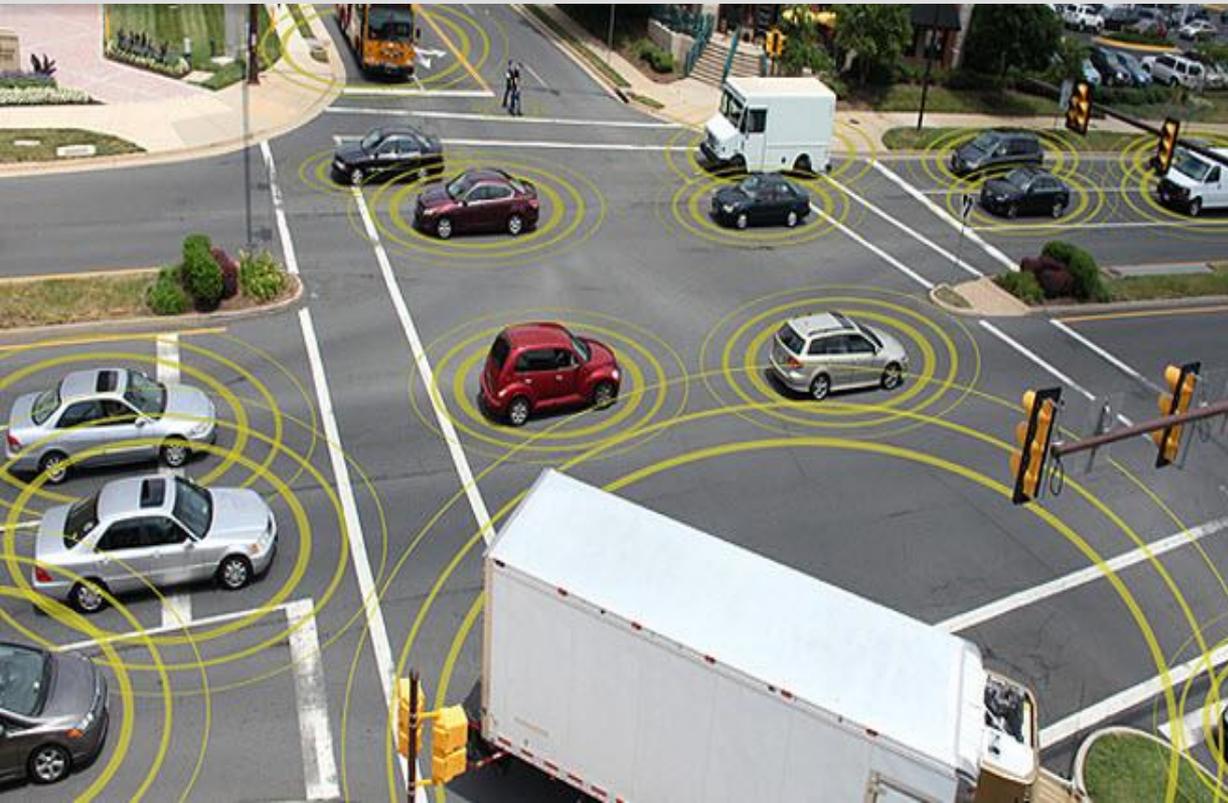
- Taking inspiration from Mother Nature, scientists devised a system that uses **sunlight** and H<sub>2</sub>O to convert CO<sub>2</sub> into a wide range of useful chemicals.
- New approach could be a **game changer** because of its versatility and the **high yields** it produces.



(23 April 2015)

# IEEE: 2040'da Araçların %75'i Söförsüz Olacak

- General Motors' Cadillac division predicts it will have fully autonomous cars available by 2020.
- The Institute of Electrical and Electronics Engineers recently released predictions that autonomous cars will account for up to 75 percent of vehicles on the road by 2040.
- IEEE went even further, forecasting how infrastructure, society and attitudes could change when self-driving cars become the norm around the middle of the century."



Source:

<http://www.wired.com/autopia/2012/09/ieee-autonomous-2040/>

18 Eylül 2012

# Google'dan Sürücüsüz Araç:

(5 Ekim 2015)



## Google'ın sürücüsüz otomobili tanıtıldı

Teknoloji devi Google tüm dünyanın merakla beklediği sürücüsüz otomobini görücüye çıkarttı



Google, 6 yıldır üzerinde çalıştığı ve gelişim süreci devam eden sürücüsüz Otomobil projesi kapsamında üretilen prototip aracı gazetecilere tanıttı.

## 25 prototip araçla test sürüşleri yapıyor.

- GPS ile 200 m çaplı bir alanı 360° tarama.
- Trafikte ambulans, kamyon, otomobil, bisikletli ve yayalar arasında ayırım yapma.
- Trafığı öngörme.
- 90 yıla denk sürüş tecrübesi data bankası

## Yan Aynalar 'out'; Kameralalar 'in'

- **Side mirrors** create drag (2 to 7%), increase fuel consumption, cause blind spots and generate noise.
- Auto parts supplier 'Continental' developed **digital mirrors** (video systems) with **significant noise reduction** and **reduced fuel consumption**.
- There is also **increased field of view**.
- Interior screens on the left- and right side of dashboard show side and rear views. Makes parking easier.



4 Subat 2016)

# Araçlarda 'Kablosuz' şarj olan Telefonlar

- Qualcomm ve Daimler, otomobiller için akıllı telefonların kablosuz olarak şarj edilebileceği yeni bir teknoloji üzerine çalışıyor.
- Yakında sonuçlanması beklenen bu teknoloji ile, kablosuz şarj ünitesi araçta belli bir noktaya yerleştiriliyor ve telefon otomatik olarak şarj olmaya başlıyor.



# AUDI: Elektrikli Araçlarda Oyun Değiştirici



**Range:** 500+ km per charge.

**Charge time:** Less than 1 h

**Motor:** All wheel drive.

**Mass production:** 2018

**Acceleration** from 0 to 100 km/h: 4.6 s.

**Capacity:** 95 kWh

(19 September 2015)

**Chevrolet BOLT EV** : 350 km range (in 2017)

**BMW i3 EMiniCar**: Extended range (in 2017)

**Nissan (ve Renault) LEAF**: 350 km (in 2018)

# Elektrikli Araç Geliştirmede Global Yarış:

## FORD Elektrikli Araçlara \$4.5 Milyar Yatıracak (5 yıl)

- Focus will be on **plug-in hybrid systems** - which allow drivers to operate part of the time on batteries recharged from the grid, and part of the time on gasoline.
- The batteries for plug-in hybrids are not as heavy or expensive as those required to deliver 200-mile or more range in an all-electric vehicle.
- All new vehicle platforms will come equipped with **engine- and battery-powered** capabilities.

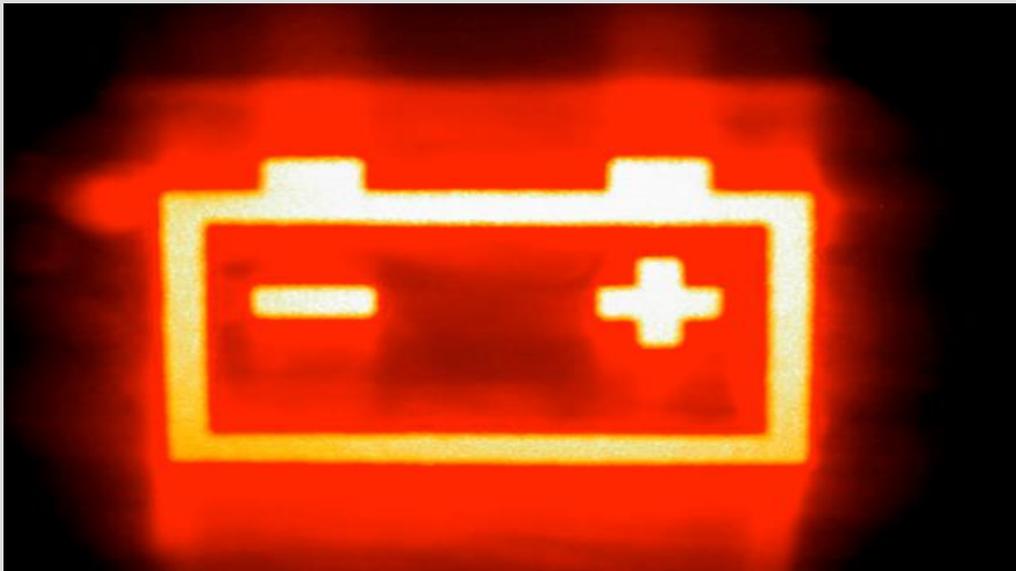


- FORD plans to add 13 electric, plug-in models in 5 years.
- The plan includes an electric Ford Focus with a 160-km range and **30 minute battery recharge**.
- Such vehicles to rise to 40% of lineup from 13% now.

**(Dec. 12, 2015)**

# Kobalt Ekleyerek Akülerde 7 kat Kapasite Artırımı

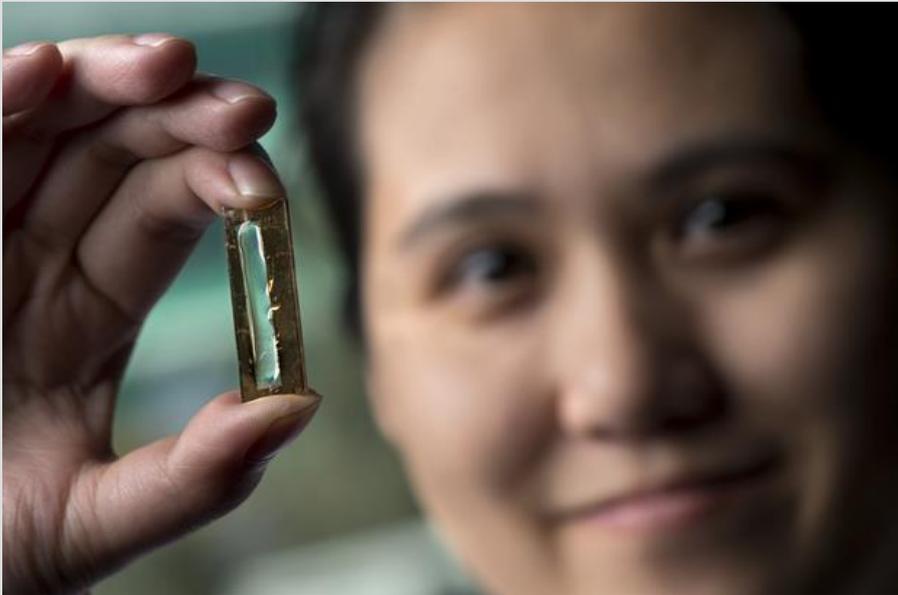
- Researchers from the **University of Tokyo** have found a way to develop a lithium-based battery with **7 times the energy density** of current lithium-ion batteries, according to [Nikkei Technology](#).
- It also has each of the major benefits — **lower cost, greater capacity and increased safety**.
- The team have used a **new material** on the positive electrode in the battery, formed by **adding cobalt to the lithium oxide crystal structure**. This aids an oxidation-reduction reaction during which peroxides are produced, and electrical energy is generated.



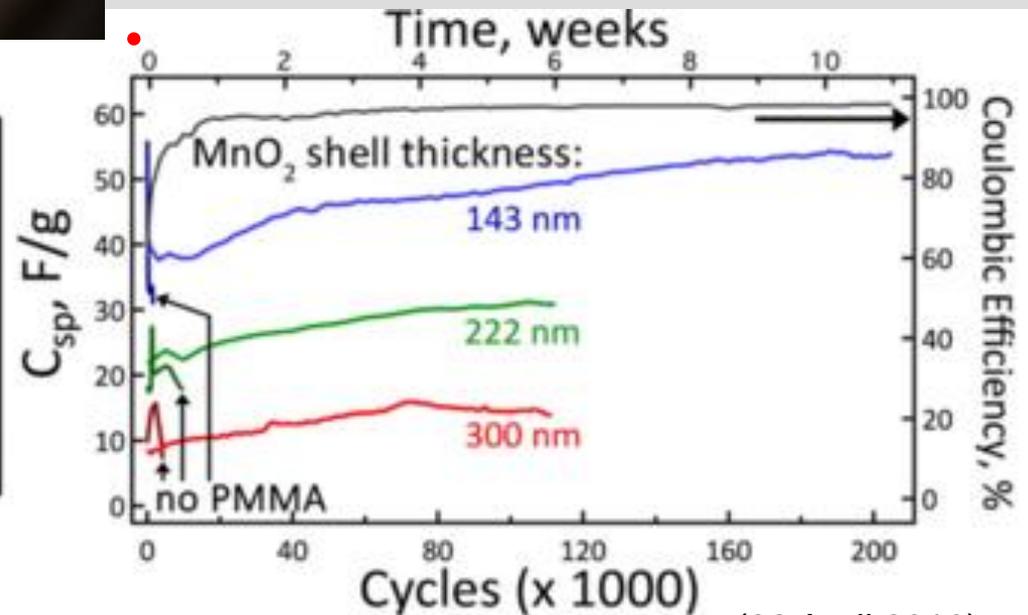
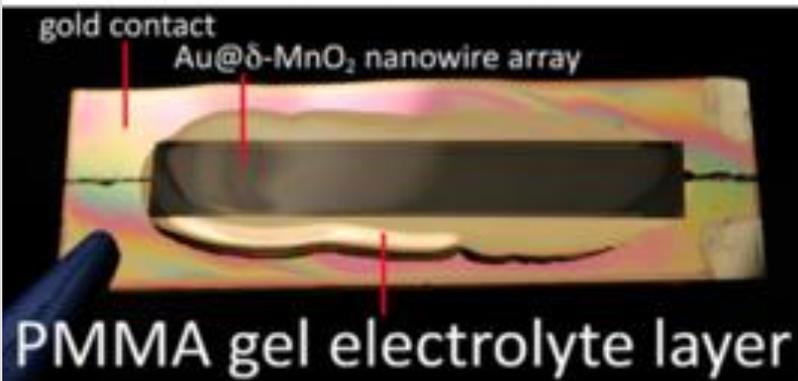
The researchers claim energy density of 2,570 Wh/kg. (The theoretical density of lithium-air technology is 3,460 Wh/kg.) But as a sealed design it's more stable (and thus safer) than lithium-air.

(27 Temmuz 2014)

# Lityum-İon Pillerinin Ömrünü Uzatma



- Brittleness is solved by coating a gold nanowire in a  $\text{MnO}_2$  shell and encasing it in an electrolyte made of a plexiglas-like gel.
- The combination is reliable and resistant to failure, lasting 100,000+ cycles instead of just 5000 without losing any capacity.



(22 April 2016)

# Çinli Araştırmacılar Beyin-Kontrollü Araba Geliştirdi

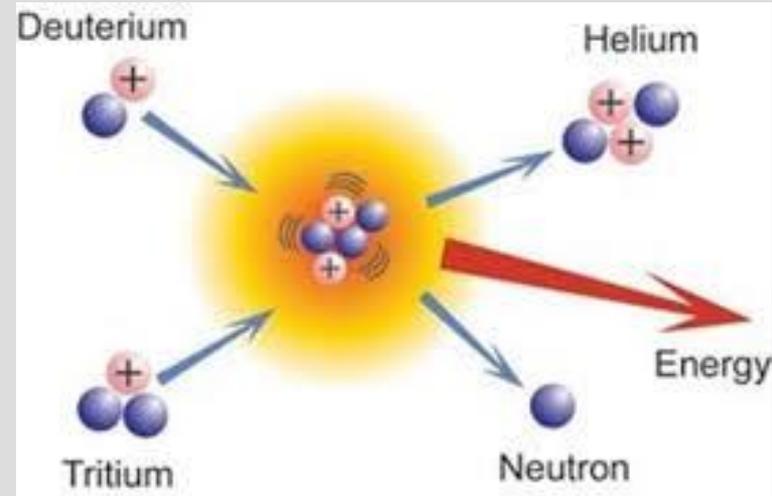
- Researchers at China's Nankai University have developed the country's first entirely mind-controlled car.
- It uses equipment that reads brain signals to allow the driver to move the car forward, reverse, stop, and activate the door locks.
- The technology developed can eventually be combined with self-driving car technology.



(Dec. 7, 2015)

# Nükleer Füzyon: Lockheed Martin'den Çığır Açıcı Yenilik İddiası

- Although nuclear fusion has been studied for decades, Lockheed is hoping to build a reactor **small enough to fit on the back of a truck within 10 years.**



Superconducting magnetic coils inside a compact fusion reactor.

Source: Lockheed Martin

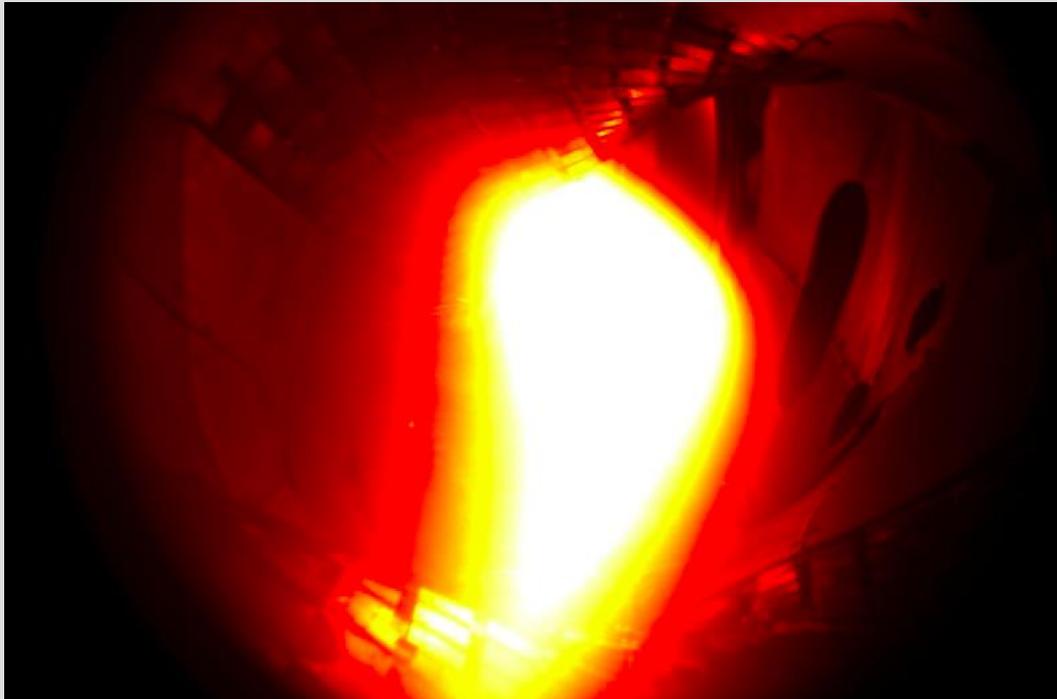
**The Washington Post**

[http://www.washingtonpost.com/business/economy/lockheed-martin-is-building-a-compact-nuclear-fusion-reactor/2014/10/15/c2b13ff4-540e-11e4-892e-602188e70e9c\\_story.html?wprss=rss\\_national;](http://www.washingtonpost.com/business/economy/lockheed-martin-is-building-a-compact-nuclear-fusion-reactor/2014/10/15/c2b13ff4-540e-11e4-892e-602188e70e9c_story.html?wprss=rss_national;)

**(15 October 2014)**

## Almanya'dan Füzyon Gücünde Kritik Başarı

- Researchers at **Max Planck Institute** in Greifswald switched on the **Wendelstein 7-X stellarator** for the very first time.
- With temperatures reaching **80 million degrees C**, the stellarator successfully generated its first hydrogen plasma.



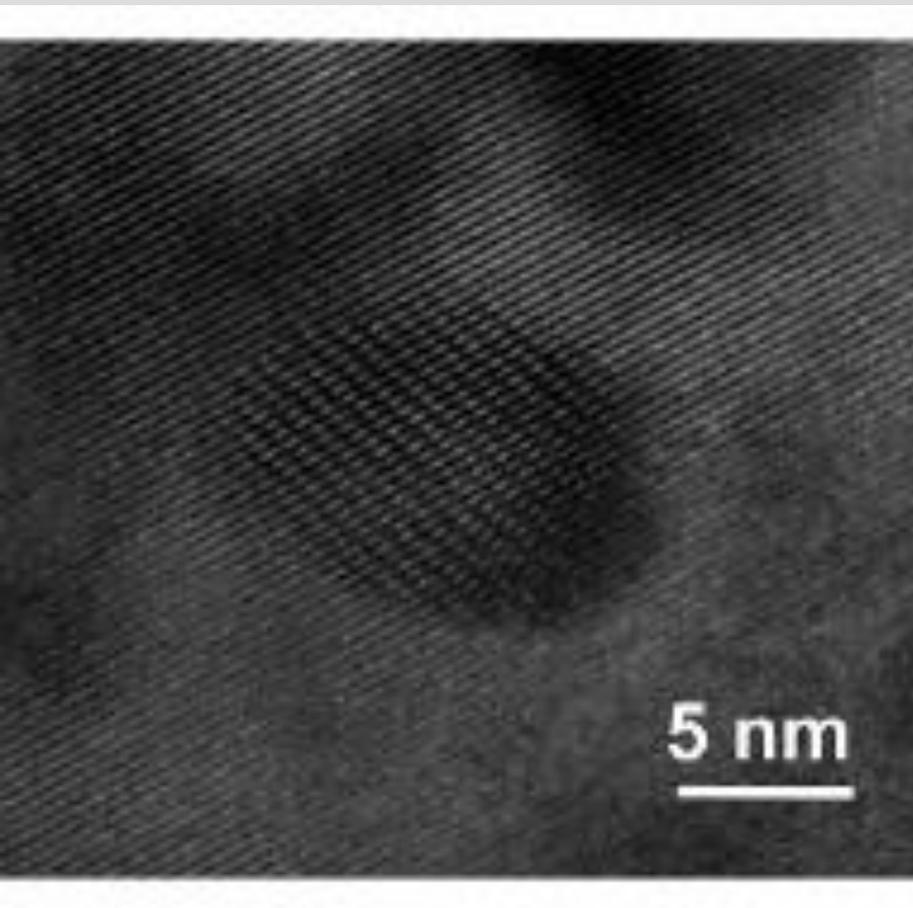
The European Commission announced in October 2014 a \$1 billion initiative to develop nuclear fusion as an energy source by 2020.

# Termo-elektrik Üretiminde Yeni Malzeme

Researchers at the U. of Houston created a new thermoelectric material: **germanium-doped magnesium stannide**,  $\text{Mg}_2\text{Sn}_{0.75}\text{Ge}_{0.25}$



4 March 2015



- It is to be used to generate **electric power from waste heat** - from a vehicle tailpipe, for example, or an industrial smokestack - with greater efficiency.
- The new material has a peak power factor (or output power density) of 55, with a figure of merit (or efficiency) of **1.4**.

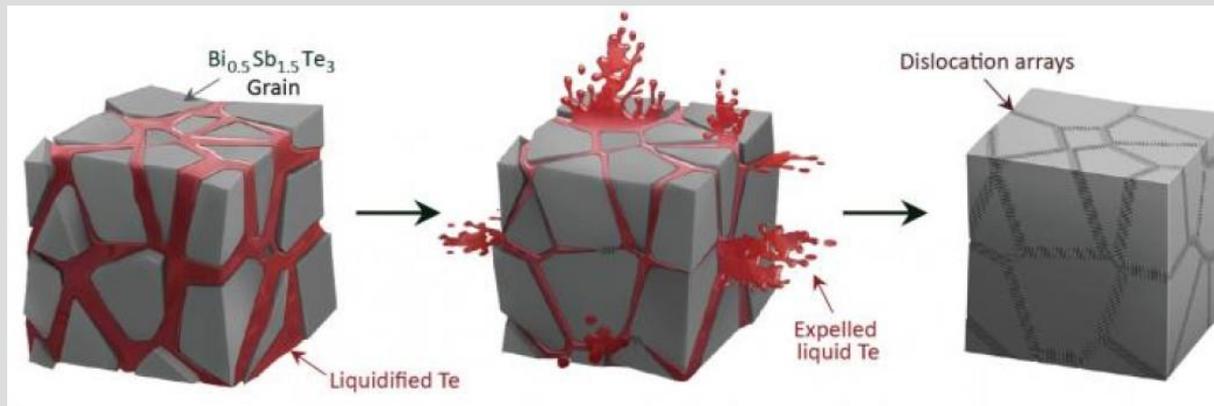
# Termo-elektrik Buzdolabı Verimini İkiye Katlama

**ScienceDaily**<sup>®</sup>

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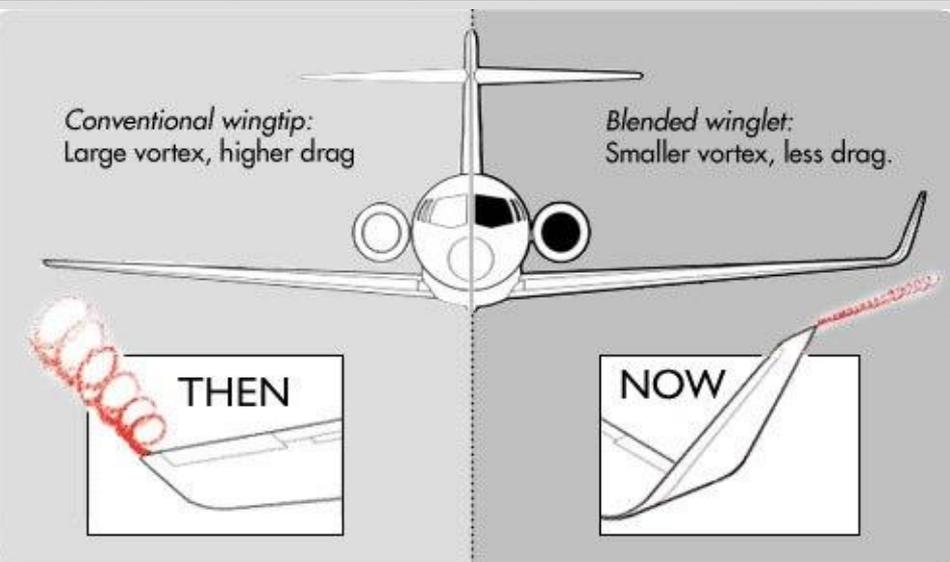
2 Nisan 2015

The efficiency reached 2.01 at 320 K, nearly **doubling** the industry standard. The new material was able to achieve a **temperature change of 81 K** at room temperature.



- Researchers in **South Korea** at IBS Center for Integrated Nanostructure Physics, Samsung Advanced Institute of Technology, Kangwon National University, Sungkyunkwan University, and California Institute of Technology, **USA** developed a new method for a much more efficient TE alloy.
- This new alloy is **nearly twice as efficient** as existing materials (2.0 vs. 1.1). Uses include refrigeration, consumer electronics, transportation, etc.
- These dislocation arrays **greatly reduce their thermal conduction**, leading to an enhancement of their thermoelectric conversion efficiency.

# 'Kanatçık' ile %3.5 Yakıt Tasarrufu



**Winglets** are small aerodynamic surfaces mounted almost vertically at the wingtips. Inspiration for the design came from **birds observed to curl their wingtip feathers upward** when in need of high lift. A well designed winglet rises vertically and is swept back such that it significantly reduces the size of the wingtip vortex thus reducing induced drag.

# Güneş Pili (PV) Veriminde %16'dan %22'ye Artış Daha Düşük Maliyetle %40 daha Yüksek Verim

The New York Times

(3 October 2015)

- **SolarCity** acquired:
  1. '**Silevo**' (a start-up technology company)
  2. '**Zep Solar**' (provider of solar panel mounting systems)
  3. '**Paramount Solar**' (a solar sales and marketing company)



# TAKIM ALIŐMASI

# Futbol Takımları: Milliyet Sınırları Yok



# Pil Geliştirme ArGe'sinde Geniş Tabanlı Ekip (ABD)

## Chicago Tribune CHICAGOLAND

December 1, 2012

Home | News | Business | Sports | A&E | Lifestyles | Opinion | Real

### Argonne National Laboratory selected to lead national research on super-efficient batteries



Share

<http://www.car-battery-research-20121130,0,7799993.storychicagotribune.com/news/local/sns-ap-il-->

By Associated Press

3:04 a.m. CST, December 1, 2012

The US Department of Energy chose Argonne to lead the effort after a national competition. The lab will receive up to **\$120 million over 5 years.**

Other members for the new 'Joint Center for Energy Storage' include:

- **5 universities** (Northwestern, U. Chicago, U. Illinois-Chicago, U. Illinois-Urbana Champaign, U. Michigan)
- **4 national labs** (Lawrence Berkeley, Pacific Northwest, Sandia, SLAC National Accelerator Lab)
- **4 industrial partners** (Dow Chemical, Applied Materials, Johnson Controls, Clean Energy Trust).
- **120 individuals** working on battery technology around the country will visit the Argonne hub on a regular basis.
- **Goal:** To **license the inventions** fostered there for commercialization.
- A breakthrough in battery technology would have **major implications for the auto, wind and solar** industries.

# Yeni Nesil Pil Geliştirmede TOYOTA – BMW İşbirliği



The image shows a screenshot of a Fox News website article. At the top left is the Fox News logo with the tagline 'Fair & Balanced'. A search bar is visible. The URL is <http://www.foxnews.com/leisure/2013/01/24/bmw-and-toyota-team-up-on-sports-cars-battery-development/>. The navigation menu includes Home, Video, Politics, U.S., Opinion, Entertainment, Tech, Science, Health, and Travel. The date is January 24, 2013. The article title is 'BMW and Toyota team up on sports cars, battery development'. Below the title is the byline 'Published January 24, 2013 / Associated Press'. The main image shows two men shaking hands in front of a backdrop with the Toyota, BMW Group, and MINI logos.

Toyota Motor Corp. and BMW Group are working together on **next-generation batteries** for green vehicles called **'lithium-air'** as their collaboration, first announced in late 2011, moves ahead in fuel cells, sports vehicles and other fields."

Toyota and BMW "aim to complete a **fuel-cell vehicle system by 2020**, and a concept for a mid-size sports vehicle by the end of this year. They will also work together on developing **lightweight technologies** such as composites, which will help make cars greener.

# Hidrojen Arabalarında Ford-Daimler-Nissan Ortak ArGe

San Francisco Chronicle  
Subscribe to the weekend  
Save 40%

January 28, 2013

SFGate

Tuesday Jan 29, 2013 5:50 AM PT

46 °F San Francisco, CA (change)  
Mostly Cloudy  
Today 48/61 Wed. 48/63 > 5 Day Forecast

sfgate.com Web Search by YAHOO! Businesses

Home News Sports Business Entertainment Food Living Travel Columns Shopping

## Ford, Daimler, Nissan to research hydrogen cars

By TOM KRISHER, AP Auto Writer  
Updated 6:57 am, Monday, January 28, 2013

0 0 0

Tweet Like +1 Share

Comments (0) Email This

DETROIT (AP) — Ford is joining with Daimler and Renault-Nissan to speed development of cars that run on hydrogen, with hopes of bringing a vehicle to market in as little as four years.

Ford is joining with Daimler and Renault-Nissan to speed development of cars that run on hydrogen, with hopes of bringing a vehicle to market in 4 years – by 2017.

- Each company will invest equally in the technology. The companies will use the common fuel cell system developed to power their own vehicles.
- Ford: "Working together will significantly help speed this technology to market at a more affordable cost to our customers."
- "We will all benefit from this relationship, as the resulting solution will be better than any one company working alone."

# İNOVASYON:

Yeni bir ÜRÜN,  
Yeni bir PROSES,  
Yeni bir İŞ MODELİ (Business Model),  
Yeni bir HİZMET

# SolarCity: Yeni bir İŞ MODELİ (Business Model)

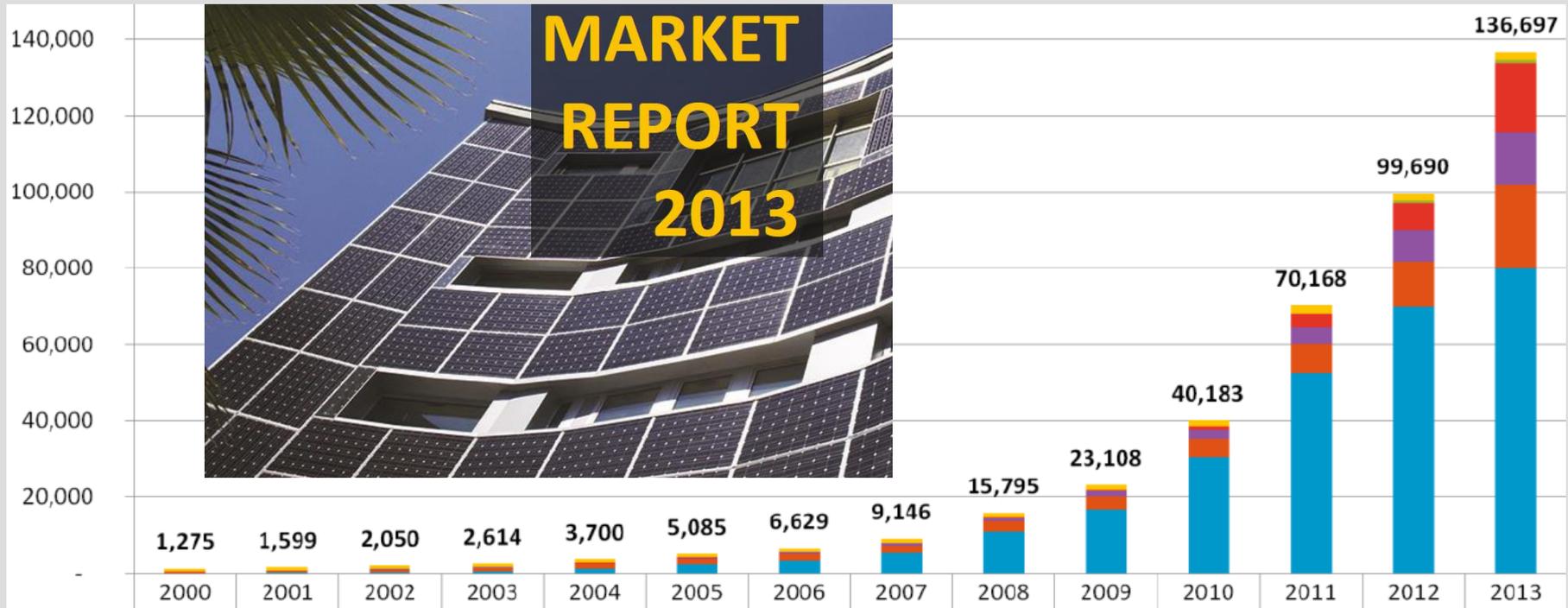
- There were more solar panels installed in the U.S. over the last 18 months than the last 30 years.
- NRG Energy wants to be as big or bigger than SolarCity in its residential solar financing and installation business, like that SolarCity founded in 2006.
- 2000 MW of solar power will be deployed by the end of 2014. SolarCity went public in 2012 at \$9.25 per share; now trading at about \$50 per share.



- SolarCity provides the upfront financing for the solar system; the customer doesn't have to put any money for the panels.
- Instead of paying 10s of thousands of dollars for a solar panel system, customer pays SolarCity for the cost of the solar energy monthly.

16 May 2014

# Güneş Pili (PV): Ekspansiyonel Büyüme (137,000 MW)



- Global solar PV capacity grew by 37,000 MW to **136,700 MW** at end of 2013 [Wind: 318,000 MW, (35,000 new). China: 91, US: 61, Germany: 34 GW]
- Japan (6,900 MW), **China (11,300 MW)**, **U.S. (4,700 MW)** lead the charge.
- PV produces 3% of electricity (wind 8%) in Europe and 6% of peak demand.
- **6 MW of PV = 1 MW of Nuclear or Coal plant ( = 3 MW of wind).**
- **1 kW of PV produces about 1100 kWh/year (1 kW of wind: 2200 kWh/year)**

## Ev Elektrik Depolayıcıları: TESLA Powerwall Pili

- **Backup power:** Store solar/wind/coal/nuclear electricity (on/off grid).
- **Load shifting:** Bank grid electricity from non-peak periods and use it during peak times to save money (California: \$0.35/kWh peak; \$0.08/kWh off-peak).
- **Balance grid load:** Charge up during non-peak energy usage hours, then provide energy during peak hours, serving as grid storage/balancing device.
- **Grid-independence:** Store excess solar power during daytime, use at night.
- **Emergencies:** Power homes during black-outs for a day or two.
- **GOAL:** To change the world (automotive industry, power sector, energy)
- **Energy storage industry:** Valued at \$200 million in 2012; expected to grow to \$19 billion by 2017.



### Rechargeable lithium-ion battery

**Size/weight:** 130x86x18 cm; 100 kg

**Storage:** 7-10 kWh

**Price:** \$3000-\$3500

(Industrial: 100 kWh for \$25,000)

**Installation:** On walls

(inside/outside)

**Charge/Discharge Efficiency:** 90%?

# GW-Seviyesi Olgun Enerji Depolama Teknolojisi: Pompa Hidroelektrik Güç Depolama

- **Over 98% of installed storage** capacity worldwide is pumped hydropower.
- A mature, reliable, proven, and commercially available large utility scale energy storage technology **for load shifting from peak to off-peak hours.**
- DOE Global Energy Storage Database: **292 pumped storage** hydropower facilities worldwide provide **142 gigawatts** of power.
- Pumped storage capacities: **Japan 27 GW**; China 22 GW; USA 21 GW.
- 46 projects capable of providing 34 GW are being developed.
- First used in the 1890s in the Swiss, Austrian, and Italian Alps.



## Challenges to Pumped Storage

- Improved battery technologies,
- inexpensive natural gas-fired 'peaker plants,'
- High construction costs/times (\$1-2 per W storage capacity)
- Environmental considerations.

(Dec. 12, 2015)

# HAYAL GÜCÜ+EKİP OLUŞTURMA+GİRİŞİMCİ RUH = BAŞARI

Game Boy (Nintendo, Japan)+Tetris (USSR)+H.Rogers = Success!



## THINKING BIG!

Game Boy w/Tetris sold 35 million units the 1<sup>st</sup> year (1989)

Un + Şeker + Yağ ≠ Helva.  
Malzemelerde HELVA'yı görecek bir HAYAL GÜCÜ, bu ürünü müşterileriyle ile buluşturacak bir GİRİŞİMCİ RUH lazımdır

- In 1984, [Soviet Academy of Sciences](#) ([Alexey Pajitnov](#) et al) developed [Tetris](#) out of a desire to create a two-player puzzle game. In 1988 computer game publisher [Henk Rogers](#) noticed the game at the [Las Vegas Consumer Electronics Show](#).
- Rogers pursued the rights for the game, and knowing Nintendo planned to release the Game Boy, approached [Nintendo of America](#) with the suggestion that *Tetris* was the perfect title to be packaged with the handheld as it would sell it to everyone, not just young boys.

# Video Oyunları ile Eğitim

Wednesday, January 18, 2012



## MIT to build educational video games with \$3M grant

By Michelle Lang

### Sponsored Video



[MSFT Wedding Tech?](#)

The MIT Education Arcade plans to create a massively multiplayer online game (MMOG) as a tool to help high school students learn math and biology. The game is funded by a \$3 million grant from the Bill & Melinda Gates Foundation.

The MMOG is expected to use task-based assessment strategies that will show teachers what kind of progress a student is making on a given subject.

"This genre of games is uniquely suited to teaching the nature of science inquiry because they provide collaborative, self-directed learning situations," Eric Klopfer, MIT associate professor and director of the Education Arcade and the Scheller Teacher Education Program, said in a statement. "Players take on the roles of scientists, engineers and mathematicians to explore and explain a robust virtual world."

Klopfer, the creator of the StarLogo TNG gaming education platform, and his team will work with Wisconsin games production studio Filament Games to create the game. Some Boston students and teachers will conduct pilot testing of the game this spring, MIT noted in a press release.

### Related News

[MIT Energy Lab founder David White dies](#) [January 19, 2012]

[Stryker Biotech agrees to pay \\$15M in federal lawsuit](#) [January 19, 2012]

# İNOVASYON:

Yeni bir ÜRÜN,  
Yeni bir PROSES,  
Yeni bir İŞ MODELİ (Business Model),  
Yeni bir HİZMET

# ABD Ekonomisi (Dünyada No. 1)

## Hizmet Sektörünün Ağırlığı

- **GDP** (2014): \$17.7 trillion (1<sup>st</sup> in the world).
- **GDP per capita** (2013): \$53,000; 9<sup>th</sup> (nominal), 10<sup>th</sup> (PPP)
- **Average gross salary** (2012): \$55,050
- **Labor force by occupation** (2012):
- Goods-producing (except agriculture): 12.6  
(Manufacturing: 8.2, Construction: 3.9, Mining: 0.6)
- Services-providing: **79.9** (Turkey: %51)
- Agriculture (+forestry, fishing, hunting): 1.5  
(Nonagriculture self-employed+unpaid family worker: 6.1)
- **Exports** (2014): \$2.34 trillion;
- **Imports** (2014): \$2.74 trillion
- US is the world's **2<sup>nd</sup> largest manufacturer.**
- Ease of doing business rank (2014): 7<sup>th</sup>  
(Turkey: 55<sup>th</sup>)

### USA: GDP by sector (2013):

- Agriculture: 1.1%,
- Industry: 19.5%,
- **Services: 79.4%**

### Turkey: GDP by sector (2014):

- Agriculture: 8.1%,
- Industry: 21.5%,
- **Services: 70.4%**

### Turkey: Labor force (2014):

- Agriculture: 21%,
- Industry: 28%.
- **Services: 51%**

**Service sector** or **service-providing industry**: All industries except those in the goods-producing sector like agriculture, mining, construction, and manufacturing.

# 'Hizmet' İnovasyonu (Albüm satmaya alternatif): iTunes Müzik Dükkanı (Steve Jobs, 28 Nisan 2003)

## iTunes Store, 2003 - 2013:

- 25 billion songs sold
- 40 billion downloads



- In 2003, the shift to digital music had started. But no solutions existed for users to drop their **CDs** and **pay for mp3s**. It was a complex world of **digital right management** and **limited online music portfolios**.
- **28 April 2003** – Apple launches the iTunes Music Store with **200,000 songs** at **99¢** each (after 1 year, it offered **over 1 million songs**).
- Over **1 million songs** are sold the first week.
- It changed the music industry and the way people get their music forever.

# Yazılımda İnovasyon: Facebook (Yeni bir Servis)

## 'Facebook Sınıfı' ile Yeni bir Start-up Modeli

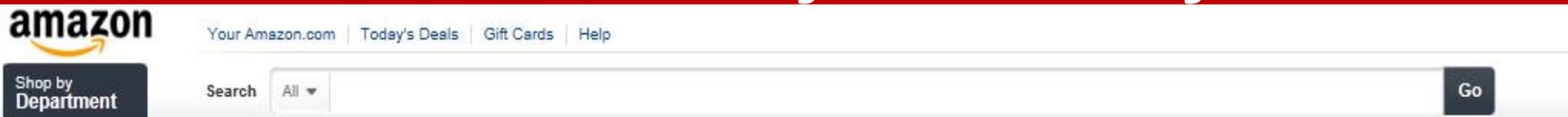
- [New York Times](#) (May 7, 2011) reported on the "Facebook Class," a class of Stanford students in 2007 who were asked to design and market a Facebook app.
- Some of the projects were wildly successful and "almost overnight, the Facebook Class fired up the careers and fortunes of more than two dozen students and teachers."
- Working in teams of three, the 75 students created apps that collectively had 16 million users in just 10 weeks.
- During the term, the apps, free for users, generated roughly \$1 million in advertising revenue.
- Students learned, among other things, to keep their ideas simple and expedient, while venture capitalists began designing funds designed for this low-cost approach.

# UBER (vs Taksi): Müsteri ile Sürücüyü 'Apps' yoluyla Bağlama



- **Founded: 2009 in San Francisco (USA)**
- **Service: 60+ countries, 404 cities**
- **Value: \$62.5 billion (2015)**
- **Product: Apps for smartphones**
- **Rank: 48<sup>th</sup> Most Powerful company (2014)**
- **Revenues (in \$billions): 0.7b (2013), 2.9b (2014), 10b (2015)**

# 'Dükkan'ı yeniden tanımlamak (Yeni bir İŞ MODELİ): Amazon.com - Dünyanın en büyük AVM'si



## (E-commerce)

- **Founded:** 1994 (Seattle, USA)
- **Products:** Online retailing, Kindle, ...
- **Revenue (2013):** \$75 billion
- **Employees:** 117,000
- **Sales:** The World



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kindle  
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The world's most advanced e-reader \$119 > [Order now](#)

## What Other Customers Are Looking At Right Now



# Türkiye'nin En Büyük 'Çiçeksiz' Çiçekçisi: Çiçek Sepeti



En Hızlı Çiçekçi Çiçek Sepeti

**mizu**  
Artık Sizlerle...

Sipariş Takip

Üye Girişi

Üye Ol

İletişim



Facebook ile Bağlan

Arama



Gönderime Göre

Çiçek

Gurme

Hediye

Meyve

Takı

Şehir Seçiniz



**Biricik Aşkıınıza  
Romantik Bir Sürpriz Yapın!**

**Yazın Neşesi Kırmızı Gül**



Kurumsal siparişleriniz



# Yemekte İnovatif İş Modeli: Türkiye'nin En Büyük Mutfağı 'Yemeksepeti'



Dünyanın en büyük online yemek sipariş platformu **Delivery Hero**, 2000'de kurulan **Yemeksepeti**'ni **\$589 milyona** satın aldı.

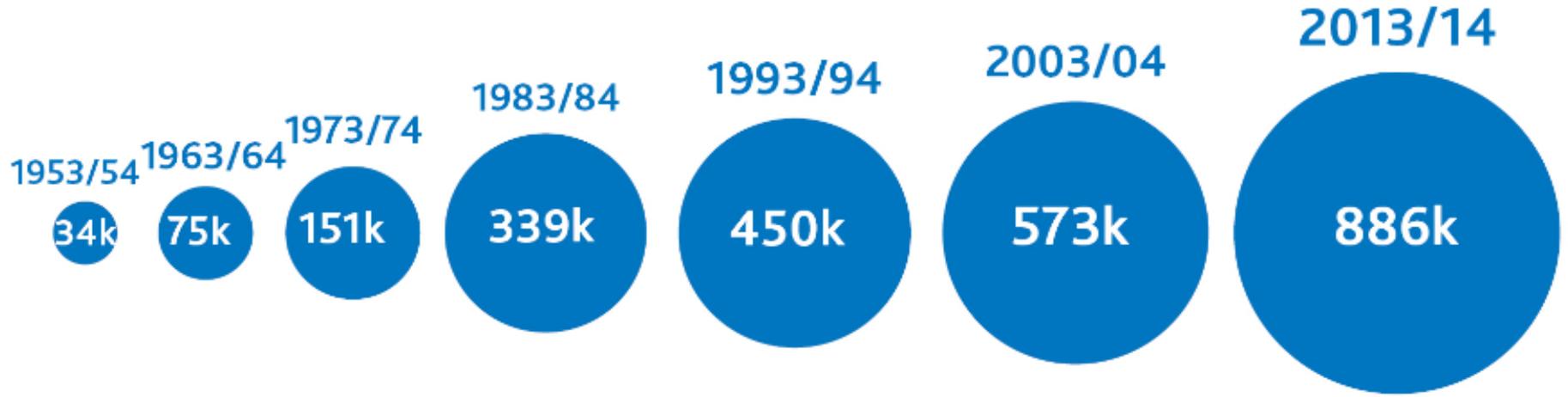
**Delivery Hero** (3 milyon euro sermaye ile 2001'de Berlin'de kuruldu):

- 28 ülkede faaliyet
- 100.000+ restoran network
- 1.500 çalışan

5 Mayıs 2015



# İhrac Ürünü Olarak Eğitim-1 (ABD)



## ABD, 2014-2015 Akademik yılı:

1 milyon 130 bin yabancı öğrenci  
(toplam üniversite öğrencilerin %4'ü)  
\$35 milyar/yıl

## Türkiye'de:

70,000 yabancı öğrenci

- China (%31), India (%12) and S. Korea (%8) account for over half of foreign students.
- Univ. Southern California, Colombia U, New York U each had over 10,000 students.
- Americans studying abroad was 289,000. Most popular destinations: UK, Italy, Spain, France, China.
- US is the #1 choice of the world's 4.5 million international students (twice that of UK).

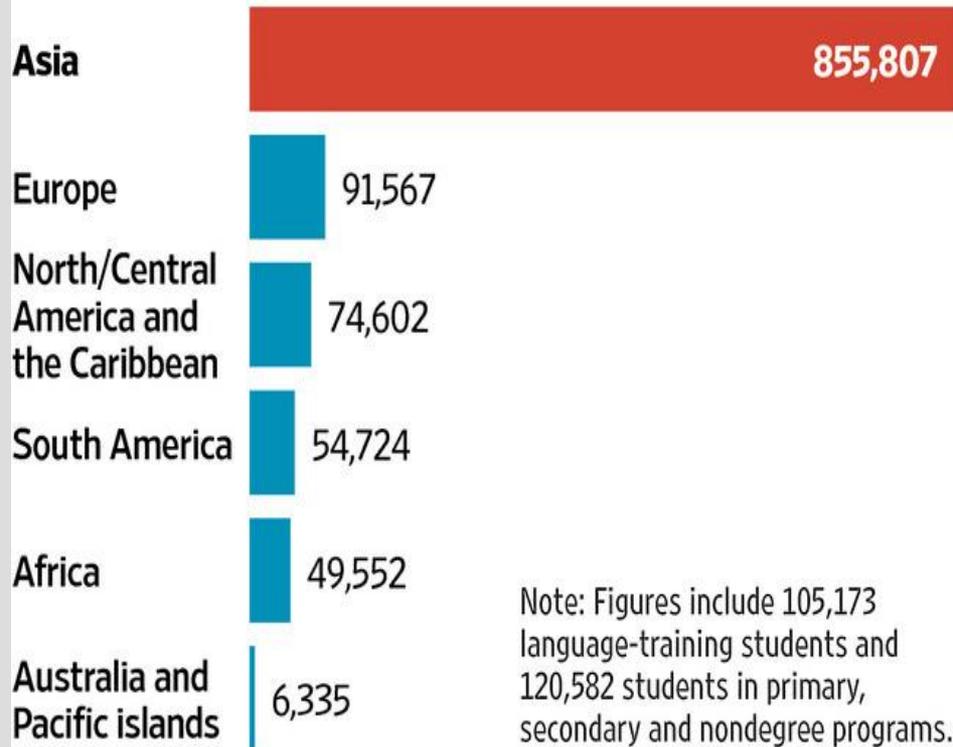
# İhrac Ürünü Olarak Eğitim-2 (ABD, 2015)

## Studying Abroad

Most foreign students in the U.S. come from Asia, and most of those students come from India and China.

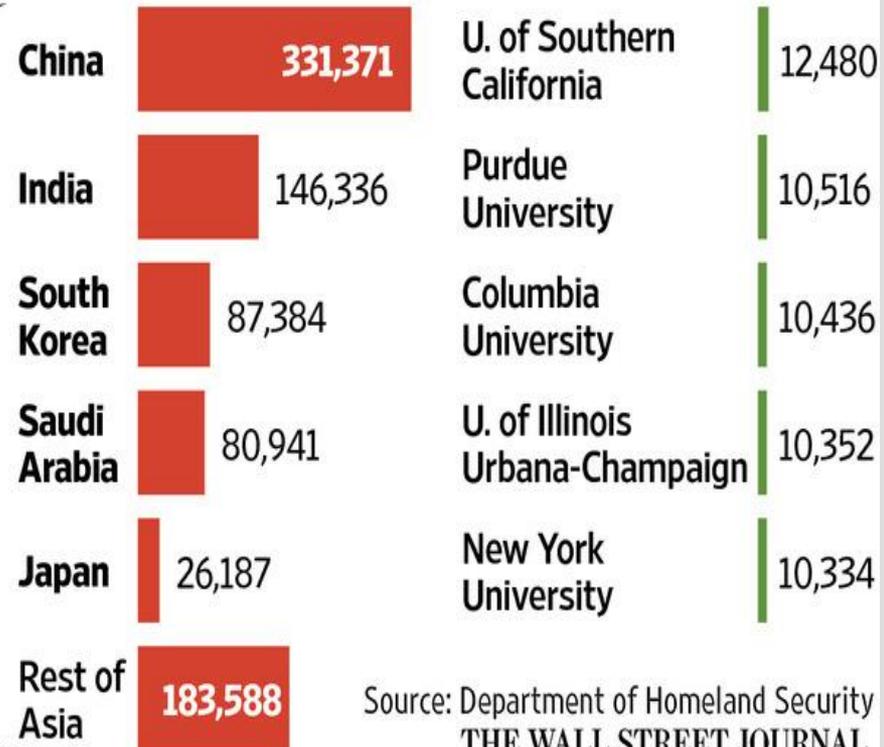
### Foreign students in the U.S. on student visas, all grade levels and programs, as of February 2015

#### By region of origin



Note: Figures include 105,173 language-training students and 120,582 students in primary, secondary and nondegree programs.

#### By school of study



Source: Department of Homeland Security  
THE WALL STREET JOURNAL.

**2014-2015 Akademik yılı: 1.13 milyon yabancı öğrenci**

<http://www.wsj.com/articles/international-students-stream-into-u-s-colleges-1427248801>

# EdX: Top Üniversitelerden Ücretsiz Dersler



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HARVARD  
UNIVERSITY

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UNIVERSITY OF CALIFORNIA



THE UNIVERSITY  
of TEXAS SYSTEM

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March 15, 2014  
MITx | 15.390x

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101: Who is your  
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<https://www.edx.org/>

30 Nov 2013

# İhrac Ürünü Olarak Sağlık: \$20 milyar/yıl (2023)

Kaynak: <http://www.aksam.com.tr/yabancilar-sifa-icin-geliyor-yilda-1-milyar-lira-birakiyor--146684h.html>

29 Ekim 2012 Pazartesi - Akşam | EKONOMİ



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Digg

Favorilerime Ekle

Yazdır

E-mail olarak gönder



## Yabancılar 'şifa' için geliyor yılda 1 milyar lira bırakıyor

**Sağlık** Bakanlığı verilerine göre, Türkiye'ye gelen hasta sayısı 150 bine yükseldi, bunlardan yıllık elde edilen gelir, 1 milyar liranın üstüne çıktı. Türkiye'nin 2023 vizyonundaki hedef 1 milyon sağlık turisti ve 20 milyar dolar gelir...

# YİYECEKTE İNOVASYON: KFC



- World's largest chain of fried chicken restaurants. 2<sup>nd</sup> largest restaurant chain after McDonalds's.
- Founder Colonel Harland Sanders first gave the world a taste of his most famous creation, Original Recipe Kentucky Fried Chicken, featuring a secret blend of 11 herbs and spices.
- After a lot of experimenting in 1939 with a pressure cooker by varying cooking time, pressure, shortening temperature and level, he developed a process to fry chicken quickly under pressure with great taste.

**Founded:** 1930 in Kentucky by Harland Sanders

**Franchise:** 1952, Utah

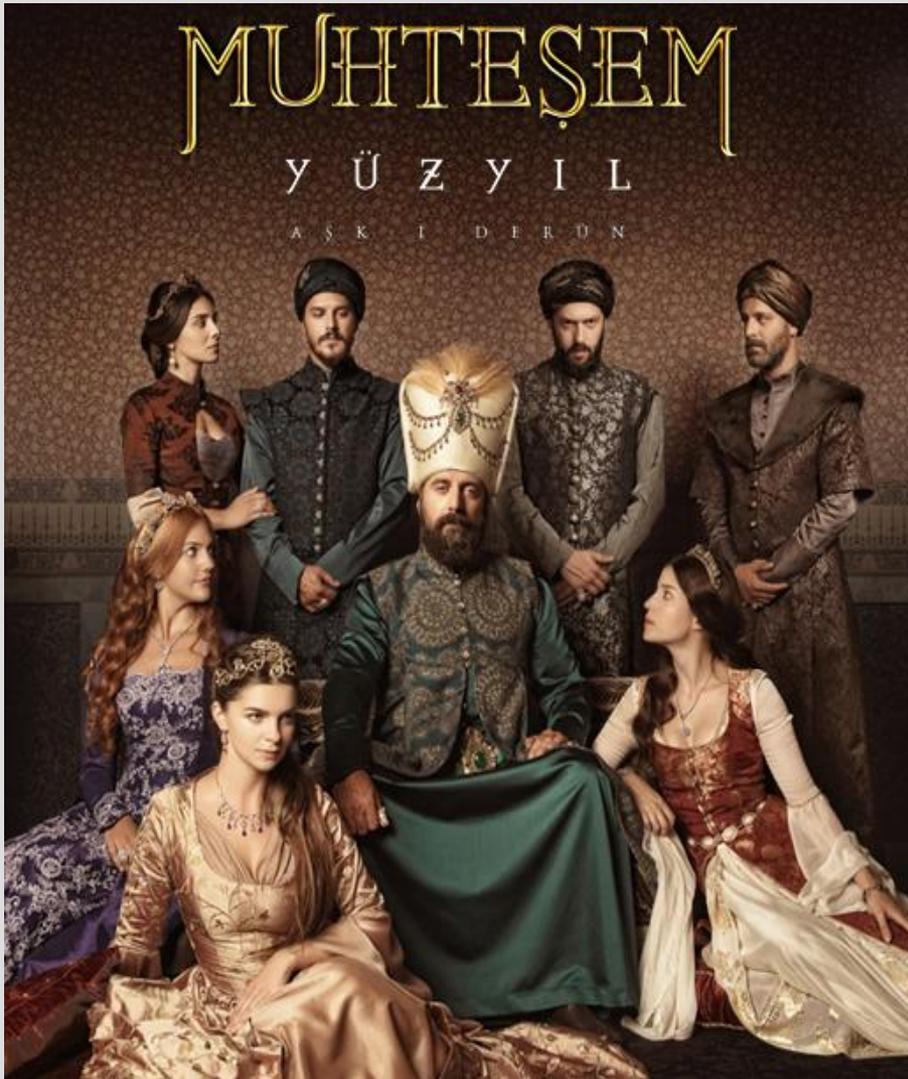
**Number of locations:** 17,000 in 105 countries

**Employees:** 455,000 (2010)

**Revenue:** US\$ 9.2 billion (2011)



# Hayal Gücü ve Yaratici Düşünce (Hayal Alemi): Bilim-Kurgu, TV Dizileri (ihrac ürünü, \$200 milyon/yıl)



## Lost

TV series

Lost is an American television series that was originally aired on the American Broadcasting Company from September 22, 2004 to May 23, 2010, consisting of six seasons. [Wikipedia](#)

**First episode:** September 22, 2004

**Final episode:** May 23, 2010

**Theme songs:** Lost Theme Song, Here I Am, Losin', Lonely Girl

**Writers:** [J.J. Abrams](#), [Damon Lindelof](#), [Carlton Cuse](#), [Adam Horowitz](#), [Paul Dini](#), [More](#)

**Program creators:** [Jeffrey Lieber](#), [J.J. Abrams](#), [Damon Lindelof](#)



## Cast



**Evangeline Lilly**

Kate Austen



**Matthew Fox**

Jack Shephard



**Ian Somerhalder**



**Josh Holloway**

James "Sawyer" Ford



**Jorge Garcia**

Hugo "Hurley" Reyes

# ALTERNATİF İNOVASYON

# En İyi Beyinler İçin Global Rekabet

## Foreign tech companies woo USA's best, brightest

By Jon Swartz, USA TODAY

Updated 18h 53m ago

Comment 78

Recommend 43

Tweet 50



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SAN FRANCISCO – While politicians and tech leaders decry a lack of engineering talent in the USA, and college graduates struggle to find work, a growing number of tech companies overseas are swooping in and recruiting some of America's best and brightest.

The catch is that many of the recruiters are foreign-born tech workers who left the U.S. because of visa issues and now plan to take Americans back home with them as employees.

Kunal Bahl, CEO of Snapdeal, one of India's fastest-growing tech companies, visited four top U.S. universities this month in hopes of snagging 20 to 30 engineers, product managers and marketers. The recruiting trip had stops at Columbia University, University of Pennsylvania, Northwestern University and Stanford University.



Tobias Hase

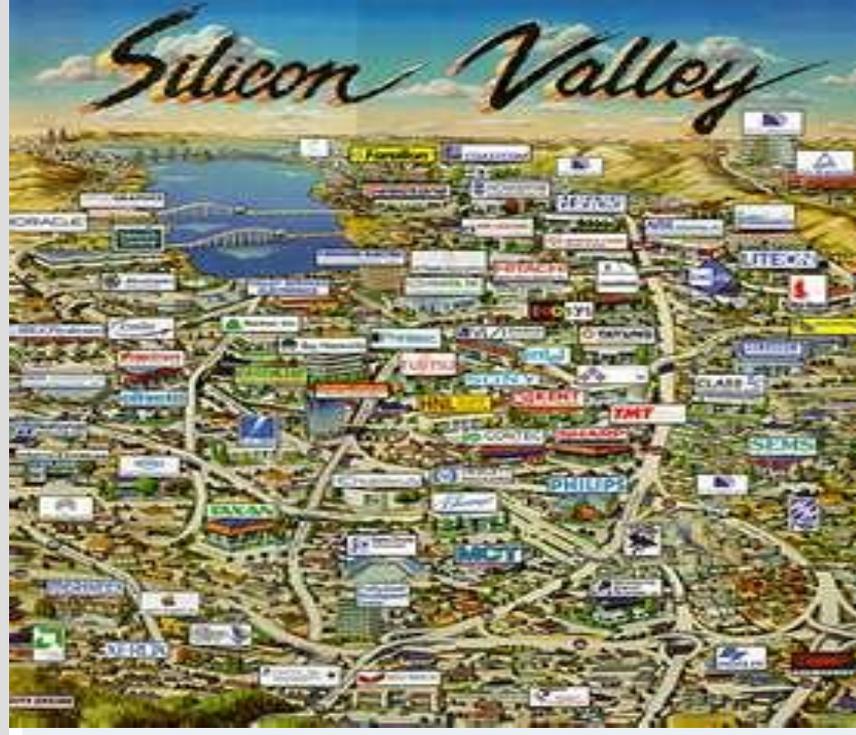
SnapDeal, founded by Kunal Bahl, is one of India's fastest-growing tech companies..

# Yabancı Beyinlere Kucak Açmak:

## SILICON VALLEY

The Washington Post

### Innovations



Vivek Wadhwa

Columnist

**Silikon Vadisi**, beyin gücü ve yaratıcı düşüncenin kaynağı değil sadece zarfıdır. Silikon vadisi, evlerin garajlarında yeşeren yaratıcılık fidanlarının dikildiği tarladan ibarettir.

“Günümüzde bilgi ve beceri, izafi avantaj sağlamanın yegane kaynağı olarak durmaktadır. **Silikon Vadisi ve Hat 128’in bugün oldukları yerde olmalarını sebebi, beyin gücünün orada olmasıdır.**” Lester Thurow, MIT Economist

“ABD’de yabancı göçmenler Silikon Vadisi’ndeki firmaların **%52’sini** kurdular, ve **milyonlarca istihdam** yarattılar.” [Vivek Wadhwa](#), *Washington Post*, Oct. 4, 2011.

YÖK: Üniversitelerde yabancı öğretim oranı %2’yi geçemez.

**We need to stop America’s brain drain**

# Beyinlerin/Hareketin Olduğu Yerde Dükkan Açmak: Samsung'dan Silicon Valley'de Kuluçka Merkezi



<http://venturebeat.com/2013/07/12/samsung-launches-silicon-valley-incubator/>

July 11, 2013

- Samsung opened the doors of a **startup** and **entrepreneurship incubator/accelerator** nestled in the heart of **Silicon Valley**.
- Samsung will also open a new **Samsung Strategy and Innovation Center** in Palo Alto, and **incubators** in other **tech hubs such as New York, Austin, Boston, Russia, and Israel**. Samsung Ventures America is a \$1 billion fund.

# Start-Up Firmalarına Yatırım Yapmak

## Samsung'dan Hızlı-Şarj Pil Start-Up'a \$18M Yatırım

Aug 19, 2015



- [StoreDot](#), an Israeli startup that makes ultra-fast charging batteries using bio-organic technology, has raised \$18 million for electric car batteries.
- StoreDot's goal is to build the "first ever instantly-charging car prototype" (charging in 5 minutes).
- Another goal: to fully charge a smartphone in 30 seconds.
- Samsung and LC Chem ARE EV Battery manufacturers.

# Yatırımları Beyinlerin Olduğu Yerde Yapmak: Çin Firmaları, ABD ArGe Lab'lerine Yatırım Yapıyor



**HUAWEI**

**ZTE** TECHNOLOGIES



**Humanwell**

- In the US, there are over **800,000 people** with research doctoral degrees in science, engineering, and health.
- Annual flows of Chinese FDI into US was **\$14.3 billion in 2013** and **\$11.9 billion in 2014**,
- **Huawei** is a world leader in producing telecommunications equipment and has **6 U.S. research centers**.
- **German** companies extracted 1,416 patents in 2014 using U.S. researchers.
- Investment by Chinese companies in U.S. research labs is yielding a fast-growing trove of patents, part of a push to **mine America for ideas** to help China shift from being the **world's factory floor** to a **driver of innovation**.

June 22, 2015

# Dünya Markası Olmaya Kestirme Yol: Dünya Markası ol (IBM); Dünya markası ol (LENOVO)



- Founded (as Legend): 1984 (Beijing)
- Headquarters: Morrisvill, NC (USA)
- Products: PC, Notebook, Tablet, ...
- Revenue (2013): **\$34 billion**
- Employees: 35,000
- Operations: 60+ countries
- Sales: 160 countries

- In 2013, Lenovo was the **World's largest PC vendor** by unit sales.
- Lenovo acquired **IBM's Personal computer business in 2005 for \$1.8 billion**; instantly became the world's 3<sup>rd</sup> largest computer maker.
- Entered the **smartphone** market in 2012; the largest vendor in China.
- Acquired the mobile phone maker Motorola Mobility from Google in 2014.
- 58% of Lenovo stock is held by the general public (2011).
- **Lenovo's official language: English**

# Firma/Patent Satın almak (Çin): Teknolojiye Sahip olmada Kestirme Yol

## Microsoft to acquire Nokia's device and services division

As part of \$7.2 billion deal, Nokia CEO Stephen Elop will step down to become an executive vice president of the division.



by Steven Musil | September 2, 2013 8:25 PM PDT

 Follow



- Microsoft will acquire Nokia's devices and services unit and license the company's mapping services in a deal worth \$7.2 billion in a bid to bolster the company's position in the smartphone market.
- The software giant will pay **\$5 billion** for "substantially all" of Nokia's phone unit and another **\$2.2 billion** to license its patents.

# 'Gelişen Teknolojiler'de Yatırımcılara Katılmak: Kuantum Bilgisayarları ile Bilişimde Devrim Potansiyeli



- The quantum computers that can be bought today are made by **D-Wave Systems Inc.**(Canada).
- D-Wave has raised US\$130 million from Goldman Sachs and others.
- Quantum computers use **qubits** as their most basic element. Instead of **zero-or-one bits**, a qubit can be 0, 1 or in between.

- Quantum computers, an **emerging technology** that aims to exploit the properties of subatomic particles to make **extremely complex calculations at unprecedented speeds**, attract the attention of major investors.
- **Goldman Sachs Group Inc.**, **Royal Bank of Scotland Group Plc**, **CME Group Inc.** and **Guggenheim Partners** are evaluating quantum computing.
- **Microsoft and IBM** are developing quantum technologies to speed up software. **China's Alibaba** is forming a quantum computing lab.

# İngilizce: Mühendisler için olmazsa olmaz

- İngilizce artık yabancı bir dil değil, global ortak dildir.
- Bir dersi İngilizce olarak takip edemeyen ve bir konuyu İngilizce bir kitap, makale veya internetten öğrenemeyen bir kişinin İngilizcesi yetersizdir (hazırlığı geçmiş olsa bile).
- Mühendislik ürünlerinin pazarı tüm dünyadır.
- **Soru 1:** Hangi mühendis daha çok tercih edilir?  
Teknik bilgisi çok iyi, İngilizcesi vasat bir mühendis  
Teknik bilgisi vasat, İngilizcesi çok iyi bir mühendis
- **Soru 2:** Büyük şirketlerin iş ilanlarında 'çok iyi İngilizce bilme' şartı ne kadar yaygındır?

# ABD Üniversitelerinde Ar-Ge Tabanı Oluşturma

## Soförsüz Araçlarda Toyota–Stanford, MIT, UM İşbirliği



Nisan 2016

- In 2015 Toyota announced a **\$1 billion Advanced Projects Lab** in Silicon Valley to expand its research in autonomous driving and AI.
- **Univ of Michigan** is Toyota's 3<sup>rd</sup> university collaboration in the US after **Stanford** and **MIT** to try to advance its efforts in autonomous driving.
- Toyota also bought the **entire staff of Jaybridge Robotics** in Cambridge.

# Start-Up'ta Herkesi İşe Alarak Teknolojiyi Yakalama Toyota'dan Şoförsüz Araç Firmasındaki Herkesi İşe Alma

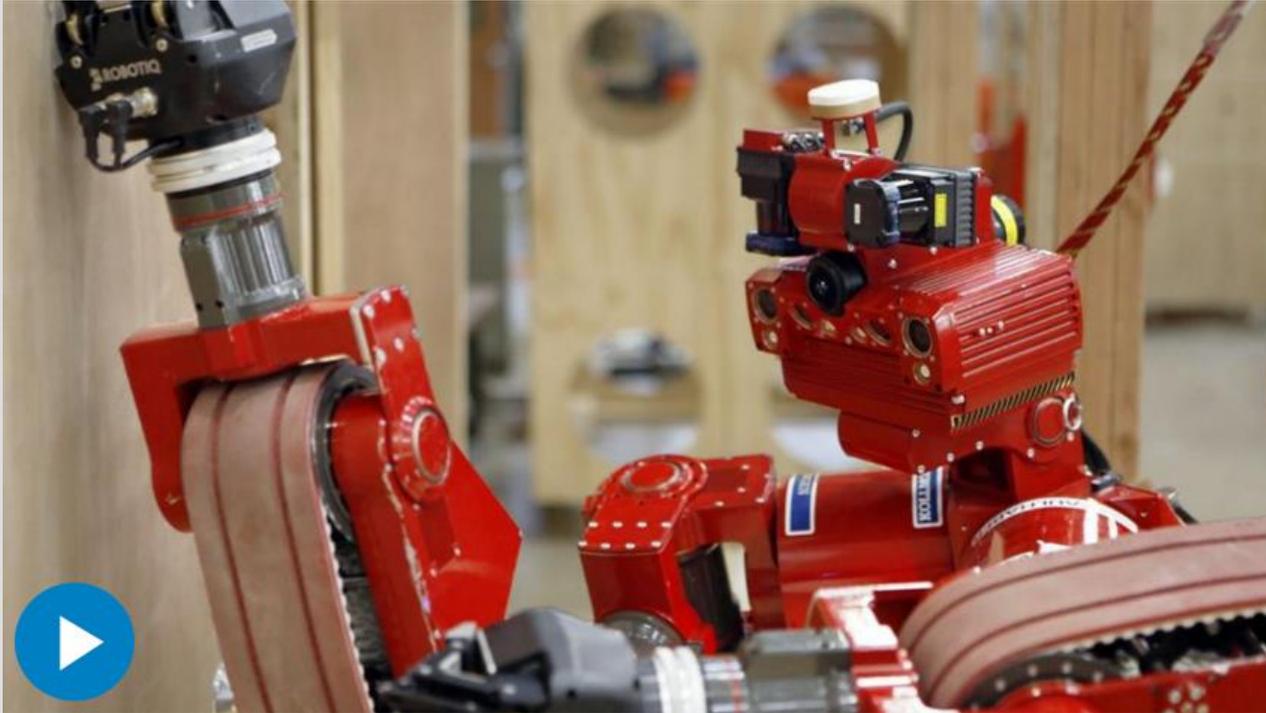
Mart 2016



- Toyota brought onboard the 16-person team of **Jaybridge Robotics**, an artificial intelligence firm in Cambridge – an MIT spin-off started in 2009.
- Gill Pratt, head of Toyota institute: 'Jaybridge's staff brings **decades of experience developing, testing, and supporting** autonomous vehicle products.'

# Top Ar-Ge Üniversitelerinden Beyin Aşırma UBER'den 40 Carnegie Mellon U Araştırmacı Transferi

May 2015



- Carnegie Mellon's **National Robotics Engineering Center NREC** is in crisis after 40 of its researchers and scientists have left to join Uber, as the car-hailing service aims to develop **driverless car technology**.
- **With no in-house capability**, the \$62-billion San Francisco company UBER went to the one place with enough talent **to build a team instantly**: NREC.
- Offered **double salaries** and **hundreds of thousands \$ in bonuses**.

# Otomotivde Bir Anda Dünya Markası Olma:

## Geely (Çin) 2010'da VOLVO'yu \$1.9b Satın Aldı

- By acquiring Volvo, China's Geely got **instant presence in the U.S. market** as well as **decades' worth of engineering and manufacturing expertise** to use in its own cars.
- Geely focused on **increasing Volvo sales in China**, doubling them to 61,146 by last year.
- It aims to sell 800,000 vehicles in 2020 (200,000 in China, 120,000 in US, and the rest in Sweden and Europe).
- Geely **invests \$11 billion** for **3 new factories in China**, U.S. marketing campaign, and **SUV designed for US**.

**1927** Founded

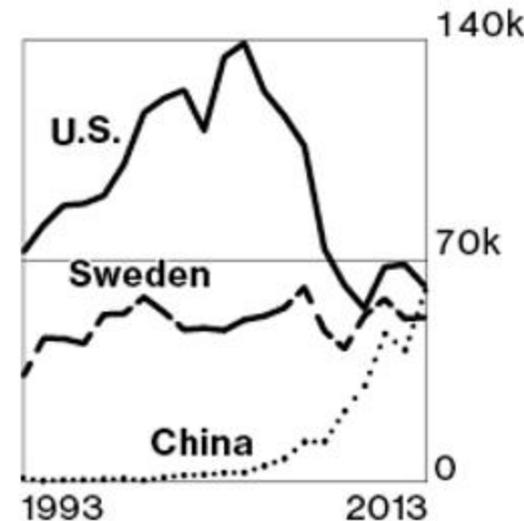
**1999** Car division purchased by FORD for 6.45 billion USD.

**2010** Purchased by Geely Automobile of China for \$1.8 billion

**Headquarters:** Gothenberg, Sweden

**No. Employees:** 110,000

### Volvo sales



# Global bilek gresi/yarışı: Bkemediđin eli SATIN AL



Chemson  
Group



DNYA

12 Kasım 2013 Salı

## OYAK, Avusturya merkezli kimya řirketi Chemson AG'nin hisselerini satın aldı

- OYAK Grubu, 2012 yılında aynı alanlarda faaliyet gösteren Akdeniz Kimya'yı da satın almıřtı.
- Açıklamada "OYAK, Akdeniz Kimya ve Chemson AG řirketleri ile polimer katkı maddeleri arasında önemli bir yer tutan ve PVC mamul üretiminde vazgeçilmez unsur olan PVC stabilizatörleri alanında dünya lideri konumuna ulaşmıřtır" denildi.
- Avusturya'daki tesislerine ilaveten İngiltere, ABD, Brezilya, Çin ve Avustralya'da üretim tesisleri bulunan Chemson'un Almanya, Hollanda ve Singapur'da satış ofisleri bulunuyor.

# Beyin Göçünü Tersine Çevirmek: Yurtdışındaki Yerli Beyinlerden Yararlanmak

The New York Times

Asia Pacific

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION  
AFRICA AMERICAS ASIA PACIFIC EUROPE MIDDLE EAST

There's plenty of winter fun in Massachusetts.



## Chinese Universities Send Big Signals to Foreigners

By LIZ GOOCH

Published: March 11, 2012

In the 1990s, Jeffrey S. Lehman, then the dean of the University of Michigan Law School, began visiting Beijing to help open a program for members of his faculty to teach at Peking University's law school during the summer.

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Given [China](#)'s rising influence, he thought it would be beneficial for his colleagues to learn about legal education in China at one of the country's most prestigious institutions.

But Mr. Lehman, who is also a former president of Cornell University, did not

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# YERLİ ÜRÜN-FİRMA-PROJE TANIMINDA PARADİGMA KAYMASI

# Niçin yerli ürün? Neden yerli üretim?

**Cevap:** Ülkeye/halka sağladığı faydalar için.

- Milli gelir/zenginleşmeye katkı,
- İhracat/döviz girdisi (cari açığı azaltma),
- İstihdam sağlama,
- Beceri/knowhow birikimi,
- Prestij/moral üstünlük,
- Kontrol edebilme/hakimiyet,
- Milli güvenlik/gizlilik,
- Kendi kendine yeterlik/dıştan bağımsızlık,
- Teknolojik gelişim,
- Güçlü ekosisteme/bilişim iklimine/inovasyon zincirine katkı,
- Türev ürünler potansiyeli,
- ...



# Apple, iPhone 5s'in hangi parçalarını yapıyor?

## Cevap: Hiçbirini (Entegrasyon)

| Manufacturer          | Part Number      | Description  |
|-----------------------|------------------|--|
|                       |                  | Display / Touch Screen Module - 4.0" Diagonal, 16.7M Color TFT, 1136 x 640 Pixels, 800:1 Contrast Ratio, 500cd/m2 Brightness, w/ In-Cell Multi-Touch |
| Toshiba Semiconductor | THGBX2G7B2JLA01  | Flash - NAND, 16GB, MLC  |
| Samsung Semiconductor | APL0898          | A7 Application Processor - Dual-Core 64-Bit ARM Cortex CPU, Quad-Core GPU, PoP   |
| Qualcomm              | MDM9615M         | Baseband Processor - Multi-Mode, Multi-Band, GSM/CDMA/EVDO RevB/HSPA+/LTE, 28nm  |
|                       |                  | Primary Camera Module - 8MP, 1.5-micron BSI CMOS, Auto Focus Lens  |
| Elpida (Micron)       | EDF8184A1PD-GD-F | SDRAM - Mobile DDR3  |
|                       |                  | Fingerprint Sensor Module  |
| Murata                |                  | BT / WLAN Module   |
|                       |                  | Battery - Li-Polymer   |
| AT&S                  |                  | 10-Layer - FR4/RCP   |
| Qualcomm              | WTR1805L         | RF Transceiver - Multi-Band, GPS, GLONASS  |
| Dialog Semiconductor  |                  | Power Management IC  |
|                       |                  | Secondary Camera Module  |
| Cirrus Logic          |                  | Audio Codec  |
| Qualcomm              | PM8018           | Power Management IC  |
| NXP                   | LPC18            | Co-Processor   |
| STMicroelectronics    |                  | Gyroscope - 3-Axis, Digital  |
| Broadcom              | BCM5976          | Touchscreen Controller   |
| Skyworks              | SKY77572-18      | Transmit Module  |
| Avago                 | A792503          | Transmit Module - Band 3/25, w/ Duplexer   |

### Total cost for Parts&Manufacturing

32-GB: **Cost: \$208; Price \$749**

64-GB : **Cost: \$218; Price: \$849**

**Profit: Over 50%** (S&P 500 Automotive: 4%)

2013 revenue: \$171 billion

**CPU (A7): SAMSUNG**

**DISPLAY: JAPAN DISPLAY, LG, SHARP**

**BATTERY: SONY**

**CHIPS: TOSHIBA, SanDisk, ELPIDA,..**

**RF TRANSCEIVER: QUALCOMM**

**iOS (Software): APPLE**

**MAKER of iPhone: FOXCONN (China)**

# APPLE: ABD için milli/yerli bir firma mı? Diğer ülkelere iyi bir model oluşturuyor mu?

## Çok uluslu bir ABD teknoloji firması olan APPLE (Temmuz 2015 itibariyle):

- **Piyasa değeri:** \$700+ milyar (dünyada 1nci)
- **Marka değeri:** \$119 milyar (dünyada 1nci)
- **2014 satışları:** \$184 milyar (Samsung'dan sonra 2nci en büyük IT firması. Türkiye'nin yıllık ihracatı \$150 milyar)
- **Kasasındaki nakit:** \$203 milyar (Türkiye Merkez bankası rezervleri: \$100 milyar)
- **İstihdam:** 115 bin (dünya)
- **Kendi parça üretimi:** %0 (sadece yazılım).
- **Tasarım yeri:** California, ABD
- **Üretim yeri:** Çin (Foxconn)
- **Satış ağı:** 456 dükkan (16 ülkede); online Apple store; App Store; iTunes (en büyük müzik satıcısı)



# En Millî Ürün (Yerli Malı) Nedir?

En **millî ürün**, çıktıları itibariyle millete **en yüksek fayda** sağlayan üründür.

En **millî firma**, çıktıları itibariyle millete **en yüksek fayda** sağlayan firmadır.

En **millî proje**, çıktıları itibariyle millete **en yüksek fayda** sağlayan projedir.

**Yüksek fayda:** ‘Yerli parça kullanım oranı’ ve ‘gelişim/üretim ülkesi’ne bakılmaksızın

- Yüksek milli gelir üretme; kamuya düşük maliyet,
- Yüksek ‘ileri teknoloji’ gelişimi ve kullanımı,
- Yüksek katma değer sağlama,
- Yüksek prestij sağlama, global cazibe ve talep oluşturma
- Yüksek kalitede/miktarda istihdam sağlama (direk/dolaylı),
- Cari açığı azaltıcı etki,
- Beceri/knowhow gelişimi, birikimi
- İnovasyon zincirine katkı
- Türev ürün potansiyeli,
- Milli güvenliği arttırma ve Dışa bağımlılığı azaltma potansiyeli.

# Türkiye'de Apple Modeli Örneği: **AirTies**



DSL Modemler



Kablosuz Ağ Geniştiriciler



Kablosuz ve Powerline Adaptörler

*'DESIGNED IN  
TURKEY,  
MANUFACTURED  
IN CHINA'*



Set-Top Boxlar



Ethernet Switchler

Bilim ve Sanayi Bakanlığı Ar-Ge merkezi  
2012 yılı performans Endeksi Değerlendirme  
sonuçlarına göre sektör bazında;

**En Başarılı Ar-Ge Merkezi**

ödülünü almaktan gurur duyuyoruz.



- R&D and Design in Turkey,
- Patents from US,
- Manufacturing in China,
- Worldwide sales (%50+ export)

**Takdir mi edilmeli, takdir mi?**



**Bülent Çelebi, Kurucu  
(Kuruş: 2004)**

# AirTies'tan ABD'ye Teknoloji İhracatı

5 Aralık 2015



- Ev içi kablosuz internet sistemleri sağlayıcısı AirTies, ABD'ye ev-içi kablosuz internet teknolojisi satmaya başladı.
- ABD'de 300 bini aşkın abonesi olan Midcontinent Communications, AirTies çözümlerini kullanacak.
- AirTies bu işbirliğini Silikon Vadisi'nde kurduğu şirketle yürütecek.
- 2004 yılında kurdukları şirketin bugüne kadar 15 milyon cihaz sattı. Cirolarının %90'ını ihracattan sağlıyor.

# Milli Gelir Üretiminde BİR ÜLKE ve BİR KİŞİ



## Syria

(185,200 km<sup>2</sup>; 23 million)

GDP in 2010: **\$60 billion**

(\$2800 per capita)

<http://en.wikipedia.org/wiki/Syria>



## Steve Jobs (1955-2011)

(Son of a Syrian father + US mother)

Apple: **\$183 billion revenue in 2014)**

Apple is the most valuable publicly traded firm in the world (\$617 billion)

**Question:** What if Steve Jobs were raised in Syria instead of the US?

# Japonya'nın 30-yıllık 'Yerli Uçak' Serüveni: Dikkatle Çalışılması Gereken Öğretici bir Süreç



- The Development of **HondaJet** started **30 years ago** by the Japan-based Honda, by sending an engineer to US to design an experimental aircraft.
- Being tested for **12+ years**.
- **FAA approval** is expected and the delivery of aircraft will start immediately.

- Full production will begin at its manufacturing hub and **headquarters in Greensboro, NC, USA**, where it employs more than 1,000.
- The business jet can seat up to **7 people** and lists for about **\$4.5 million**. Honda already received **100+ orders**, primarily from customers in North America and Europe.
- Competition: U.S.-based **Cessna**, **Embraer** of Brazil, and others.

## Global Piyasada Rekabetçi bir Ürün

- **Competitive edge:** Lighter, faster and more fuel-efficient than competitors. Quality-conscious, price-competitive Honda is expected to be a serious player in aviation and to grab a significant market share fairly quickly.
- Up to 9,200 new business jets worth **\$270 billion** will be delivered worldwide in the next decade, according to Honeywell International, which produces aerospace components and an annual industry forecast.
- About **a quarter of those sales will be small-cabin aircraft** like HondaJet, and about **60% of demand in next 5 years will be in North America**.
- Honda formed a joint venture with **GE Aviation to build the engines** in nearby Burlington. Those engines also are being sold to retrofit jets by other aircraft-makers.
- The **typical buyer is likely to be an entrepreneur** who sees the jet as an expression of innovation.
- **"I think it's a flying piece of art.** It's the revolutionary plane that they promised when they first announced it." (Whalen).

# Fransa-Doğumlu Girişimciden ABD'de Özel Uçak: Silikon Vadisinin Yeni Özel Uçağı \$595 bin



- The plane has a cruising range of **1,050 miles** and a price tag of **\$595,000**.
- **\$50 million in pre-orders** were acquired in just 90 days following the aircraft's launch on November 12, 2015.
- **Among buyers:** Silicon Valley entrepreneurs from **both Google and Apple** were among the first to order, as well as top-level executives from **Canada, the United Kingdom, Germany**, and around the globe.

**16 Subat 2016**

# Yerli Uçak Potansiyeli: ABD'de 2 Türk'ün Firması SNC



- **Fatih Özmen** 1981'de University of Nevada, Reno'dan (ABD) Yüksek Elektrik Mühendisi olarak mezun oldu ve 20 kişilik SNC'ye katıldı.
- 1994'de eşi Eren Özmen ile SNC'yi satın aldı.
- ABD'de **17 eyalette 32 işyeri**.
- ABD'de en hızlı büyüyen ilk 10 özel firma ödülü.
- Çoğu mühendis **2300 çalışan**.
- Yılda **\$2 milyar** ciro.

# GLOBAL İNOVASYON İNDEKSİ (2015)

- **Innovation**: A key driver of **economic growth** and **well-being**.
- **GII**: Indicates the **multi-dimensional facets** of innovation (based on **79 indicators**) among 141 countries.
- GII helps policy makers and business leaders move beyond one-dimensional innovation metrics towards a more **holistic analysis of innovation drivers** and outcomes.

Full report (453 pp): [http://www.wipo.int/edocs/pubdocs/en/wipo\\_gii\\_2015.pdf](http://www.wipo.int/edocs/pubdocs/en/wipo_gii_2015.pdf)



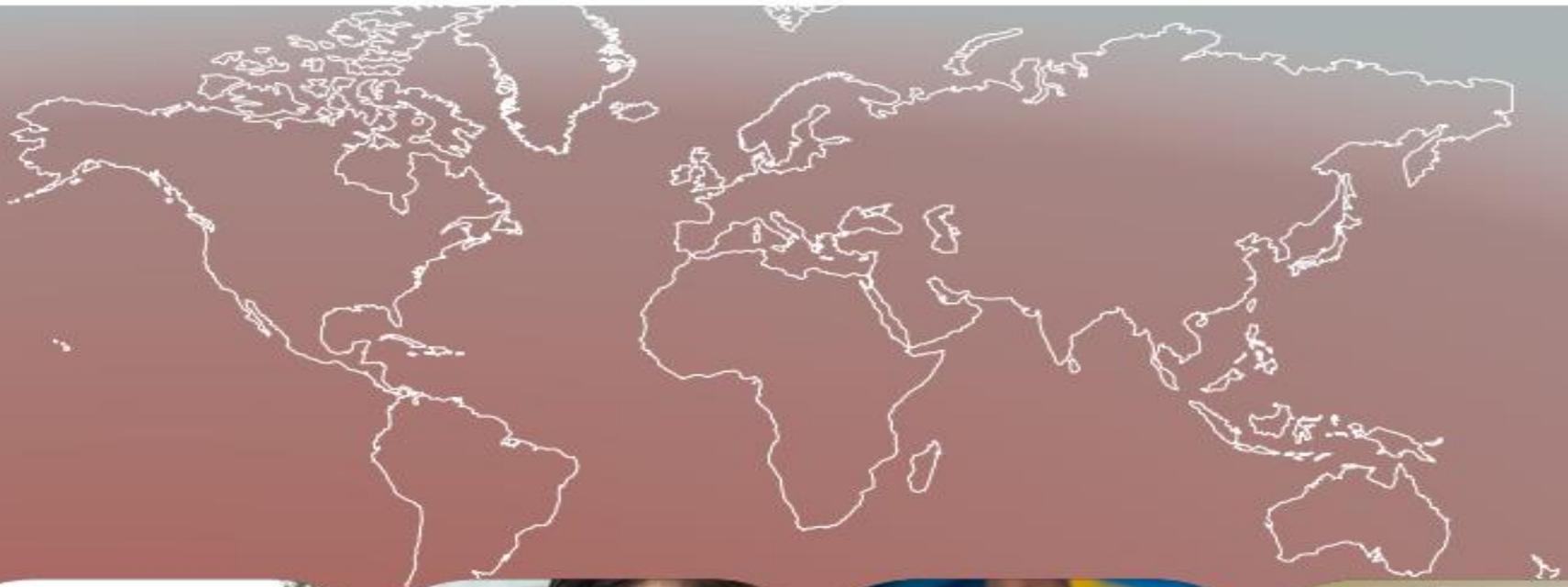
JOHNSON  
Cornell University

INSEAD  
The Business School  
for the World®

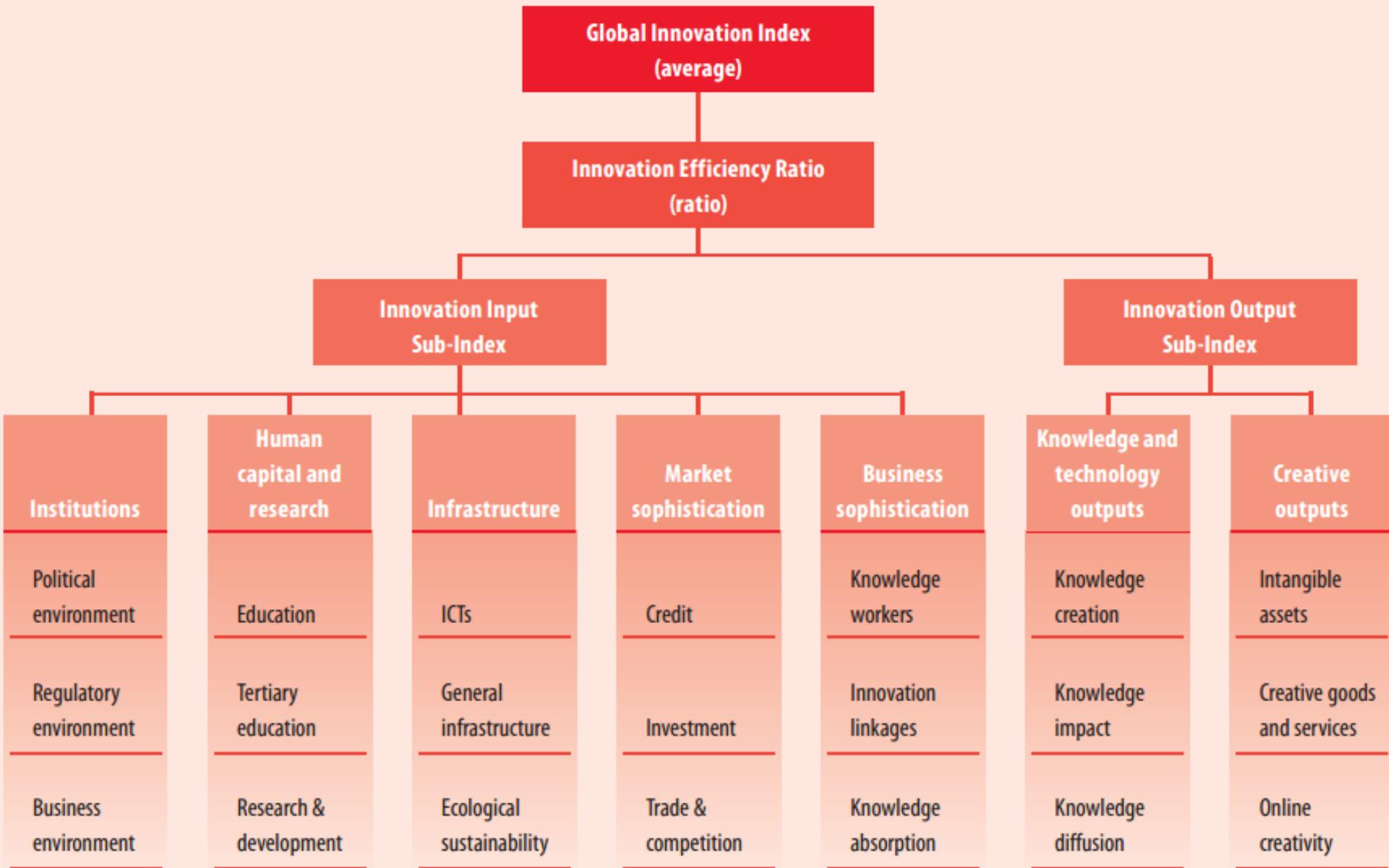


# The Global Innovation Index 2015

## Effective Innovation Policies for Development



# Global Inovasyon İndeksi (GII)



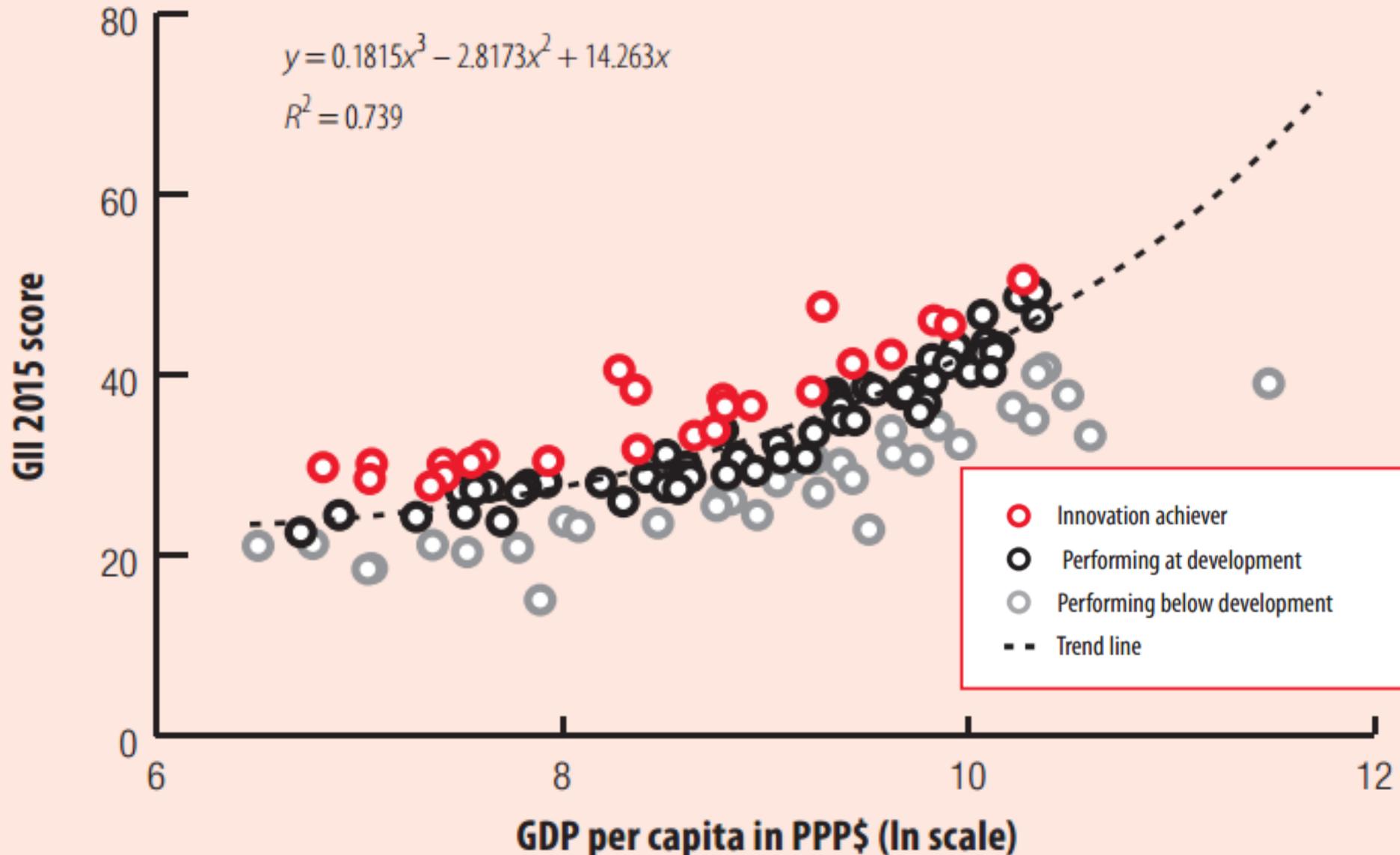
# Global İnovasyon İndeksi Sıralaması-2015 (141 ülke)

| Country/Economy          | Score (0–100) | Rank | Income | Rank | Region |
|--------------------------|---------------|------|--------|------|--------|
| Switzerland              | 68.30         | 1    | HI     | 1    | EUR    |
| United Kingdom           | 62.42         | 2    | HI     | 2    | EUR    |
| Sweden                   | 62.40         | 3    | HI     | 3    | EUR    |
| Netherlands              | 61.58         | 4    | HI     | 4    | EUR    |
| United States of America | 60.10         | 5    | HI     | 5    | NAC    |
| Finland                  | 59.97         | 6    | HI     | 6    | EUR    |
| Singapore                | 59.36         | 7    | HI     | 7    | SEAO   |
| Ireland                  | 59.13         | 8    | HI     | 8    | EUR    |
| Luxembourg               | 59.02         | 9    | HI     | 9    | EUR    |
| Denmark                  | 57.70         | 10   | HI     | 10   | EUR    |
| Hong Kong (China)        | 57.23         | 11   | HI     | 11   | SEAO   |
| Germany                  | 57.05         | 12   | HI     | 12   | EUR    |
| Iceland                  | 57.02         | 13   | HI     | 13   | EUR    |
| Korea, Republic of       | 56.26         | 14   | HI     | 14   | SEAO   |
| New Zealand              | 55.92         | 15   | HI     | 15   | SEAO   |
| Canada                   | 55.73         | 16   | HI     | 16   | NAC    |
| Australia                | 55.22         | 17   | HI     | 17   | SEAO   |
| Austria                  | 54.07         | 18   | HI     | 18   | EUR    |
| Japan                    | 53.97         | 19   | HI     | 19   | SEAO   |
| Norway                   | 53.80         | 20   | HI     | 20   | EUR    |

|         |                               |       |    |    |      |      |
|---------|-------------------------------|-------|----|----|------|------|
| Mexico  | 38.03                         | 57    | UM | 12 | LCN  |      |
| Turkey  | <b>Rank: 58 (in 2014: 54)</b> | 37.81 | 58 | UM | 13   | NAWA |
| Bahrain | 37.67                         | 59    | HI | 44 | NAWA |      |

# İnovasyon Puanı – Kişibaşı Milli Gelir İlişkisi:

Distribution of innovation performance in the GII 2015



# Ulusal İnovasyon Başarı Prensipleri

1: Innovation policy should focus on maximizing innovation in all industries

2: Innovation policy should support all types and phases of innovation

3: Enable labor mobility and destructive innovation

4: Keep the price of capital goods imports, especially ICT imports, low

5: Support the creation of key innovation inputs

6: Develop a national innovation & productivity strategy and organizations to support it

## INNOVATION AND PRODUCTIVITY POLICIES

(e.g., R&D tax credits, support for regional clusters, ICT policies to support e-government)

## KEY FACTOR INPUTS

(e.g., robust physical and digital infrastructures, a skilled workforce, investment in knowledge creation)

## EFFECTIVE TAX, TRADE, AND INVESTMENT ENVIRONMENT

(e.g., competitive tax policies, open trade and investment policies)

## KEY FRAMEWORK CONDITIONS

(e.g., rule of law, competitive markets, fluid labour markets, protection of intellectual property, culture of trust)

# Ülke Profilleri: Türkiye İçin Altgrup Dağılımı

(Overall Rank: No. 58 out of 141 countries; p. 290)

## 1 Institutions ..... 84

(Political environment 88, Regulatory environment 101, Business environment 67)

## 2 Human capital & research ..... 50

(Education 58, Tertiary education 57, Research & development 40)

## 3 Infrastructure ..... 63

(Infor. & commu. technologies 63, Gen. infrastructure 59, Ecological sustainability 57)

## 4 Market sophistication ..... 58

(Credit 104, Investment 51, Trade & competition 18)

## 5 Business sophistication ..... 117

(Knowledge workers 85, Innovation linkages 110, Knowledge absorption 127)

## 6 Knowledge & technology outputs ..... 60

(Knowledge creation 36, Knowledge impact 83, Knowledge diffusion 108)

## 7 Creative outputs ..... 37

(Intangible assets 17, Creative goods & services 52, Online creativity 59)

**SON SÖZ:**

**GİRİŞİMCİLİK RUHU ve ÖZGÜR DÜŞÜNCE**

GLOBAL GİRİŞİMCİLİK VE GELİŞİM ENSTİTÜSÜ (Policy development organization, Washington, US)

| Country        | Rank      | Score       |
|----------------|-----------|-------------|
| United States  | 1         | 82.5        |
| Canada         | 2         | 81.7        |
| Australia      | 3         | 77.9        |
| Sweden         | 4         | 73.7        |
| Denmark        | 5         | 72.5        |
| Switzerland    | 6         | 70.9        |
| Taiwan         | 7         | 69.5        |
| Finland        | 8         | 69.3        |
| Netherlands    | 9         | 69.0        |
| United Kingdom | 10        | 68.6        |
| Singapore      | 11        | 67.9        |
| Iceland        | 12        | 67.5        |
| France         | 13        | 67.2        |
| Belgium        | 14        | 66.5        |
| Norway         | 16        | 65.1        |
| Chile          | 16        | 65.1        |
| Germany        | 17        | 64.6        |
| Austria        | 18        | 64.0        |
| Spain          | 32        | 46.9        |
| Korea          | 33        | 46.7        |
| Japan          | 36        | 46.1        |
| <b>Turkey</b>  | <b>40</b> | <b>44.7</b> |
| Banqladesh     | 121       | 13.8        |

## Entrepreneurial **ATTITUDES** sub-index:

- Opportunity perception,
- Startup skills,
- Non-fear of Failure,
- Networking,
- Cultural support

## Entrepreneurial **ABILITIES** sub-index:

- Opportunity startup,
- Technology sector,
- Quality of human resources,
- Competition

## Entrepreneurial **ASPIRATIONS** sub-index:

- Product innovation,
- Process innovation,
- High growth,
- Internationalization,
- Risk capital

**(2013 Rank: 45)**

# Okul Bir şeydir; Ama Her şey Değildir



**Bill Gates** (Microsoft: \$87 milyar/yıl, 2014)

Dünyanın 2nci zengini, Harvard hukuk-hazırlık'tan terk; Ortaokuldan beri program yazıyor.

**Steve Jobs** (Apple: \$183 milyar/yıl, 2014)

Reeds College'den terk. 1980'lerde ilk grafik-tabanlı PC'yi (macintosh) yaptı. Apple dünyanın en yüksek değerli halka açık firması (\$700 milyar).



**Mark Zuckerberg** (Facebook: \$13 milyar/yıl)

Harvard'dan terk (Psikoloji ve Bilgisayar). Dünyanın en genç milyarderi. 'The Social Network' filminin konusu.

**Michael Dell** (Dell: \$57 milyar/yıl, 2014)

University of Texas Tıp-hazırlık'tan terk. Küçüklüğünde gazete satmaktan kazandığı parayı hisse senetlerine yatırdı, ve üniversitede iken Dell firmasını kurdu.



**Lawrence Ellison** (Oracle: \$38 milyar/yıl,

2014) Dünyanın 5nci zengini, Univ of Illinois'den terk.

# Ancak ....



Üniversiteden-terk bu kişiler ve firmaları:

- Üniversiteden-terk **hiç kimseyi** işe almazlar;
- Çalışanlarını, en iyi üniversitelerin **en parlak mezunları** arasından seçerler;
- Bu tür firmalarda çalışan **girişimci ruhlu ve özgüven sahibi** çok kişi, bir süre sonra, yüksek maaşlı işlerini bırakıp **kendi firmalarını** kurarlar.

**Önemli bir nokta:** Bu kişiler okulu terkettiği için başarılı olmadı; başarıyı henüz öğrenci iken yakaladıkları için okulu terketti.

# ABD Tecrübesi: İnovasyonda Başarının Sırrı

- “*Amerika* var olmuş en büyük inovasyon makinesidir ve yakın bir zamanda kopya edilemeyecektir. Çünkü bu, çok sayıda faktörün çarpımının ürünüdür:
  - ✓ *Ekstrem seviyede düşünce özgürlüğü,*
  - ✓ *Bağımsız düşünceye yapılan vurgu,*
  - ✓ *Sürekli yeni beyin göçü,*
  - ✓ Teşebbüs edip başarısızlığa uğramanın ayıplanmadığı bir *risk alma* kültürü,
  - ✓ Yolsuzluğa bulaşmamış bir *bürokrasi,*
  - ✓ *Yeni fikirleri global ürünlere* dönüştüren rakipsiz bir *rizk sermayesi* sistemi ile para ve sermaye piyasaları.”

- Thomas Friedman, New York Times, 7 Mart 2004

# BTY Ekosisteminin Olmazsa Olmazı: UYGUN İKLİM

## SERACILIK

27° C  
%70 nem  
Güneş



## TEKNOLOJİK GELİŞİM

Hür Düşünce,  
Güven ortamı,  
Farklı Olma,  
Rizk Alma



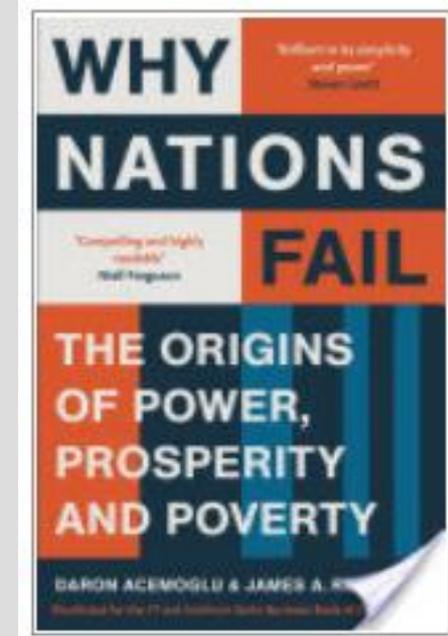
**SERALARDA EKOSİSTEM:** Gübre, su + **Uygun İklim** (sıcaklık, nem, güneş,..)

**BTY EKOSİSTEMİ:** Ar-Ge harcamaları, insan kaynakları + **Uygun İklim** (kişisel/kitlese hak ve hürriyetler, demokratik ortam, bağımsız düşünce, farklılık, yaratıcılık, yenilikçilik, girişimcilik, rizk alma, rizk sermayesi, takım çalışması, güven ortamı, beynin cazibesini, ... )

# MIT Ekonomi Profesörü Daron Acemoğlu: En Gelişmiş Ülkeler: En Özgür ve Demokratik Olanlar



**Uluslar Neden  
Başarısız Olur?**  
kitabının yazarı  
Daron Acemoğlu:



- 'Demokrasi ve çoğulcu değerlerin ekonomik büyüme üzerinde olumlu etkisi vardır. **Daha zengin ülkelerin daha özgür ve demokratik olmaları tesadüf değildir.**
- Büyümenin temeli liderler değil, kurumlardır.
- Türkiye'nin ekonomik ve siyasi kurumlarının düzelmesinin tek yolu ise **insan hakları, özgürlük ve şeffaflığın artmasıdır.'**



*Başarılı ve keyifli bir öğretim  
yılı dileklerimle...*

*“Gerçekten büyük ve ilham verici her şey  
hürriyet içinde çalışabilen kişi  
tarafından yaratılmıştır.”*

- Albert Einstein