



Technology Center in Turkey



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BUSINESS MADE SIMPLE

NORTEL

Agenda



- Nortel in Turkey: Nortel Netas
- Technology Group at Nortel Netas
- Where to from here?
- Technology ecosystem in Turkey
- The way forward for new Technology Centers in Turkey

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Nortel in Turkey: Nortel Netas



- Nortel Netas is the first joint venture of Nortel founded in 1967
 - Present shareholders: Nortel 53.13%, TAFF* 15%, Public 31.87%
- Significant footprint in Turkish telecommunications infrastructure:
 - 10.5 million lines of switching network equipment
 - Nationwide data network coverage
 - More than 5,000 NE's in the optical network
 - More than 30,000 enterprise customers
 - Wireline and wireless solutions for Turkish Armed Forces
- 3 main technology transfers:
 - Electro-Mechanical → Digital → Next generation
- Local development and productization for private, public and defense networks from concept to delivery
- Significant growth in technology investments in the last 4 years

Agenda



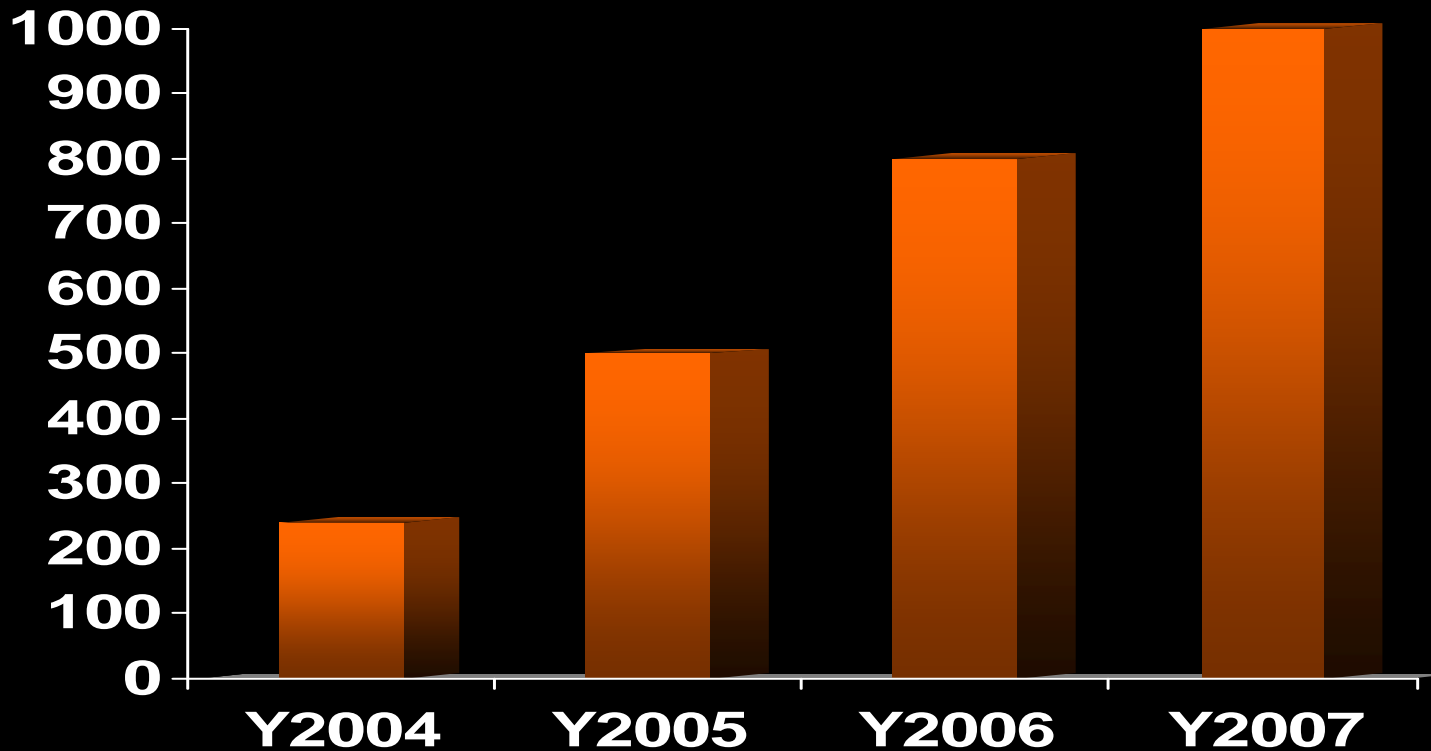
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Nortel's Global Lab in Istanbul



of engineers in
Technology Group

CAGR= 49%





Technology & Operational Excellence

Evolution in Hardware Development

2005	2006	2007
<ul style="list-style-type: none">• 14 Layers• 1.5 cmp/cm2• 5 B pck/crd• Pin #480	<ul style="list-style-type: none">• 16 Layers• 2 cmp/cm2• 10 B pck/crd• Pin #600	<ul style="list-style-type: none">• 26 Layers• 6 cmp/cm2• 27 B pck/crd• Pin #1428

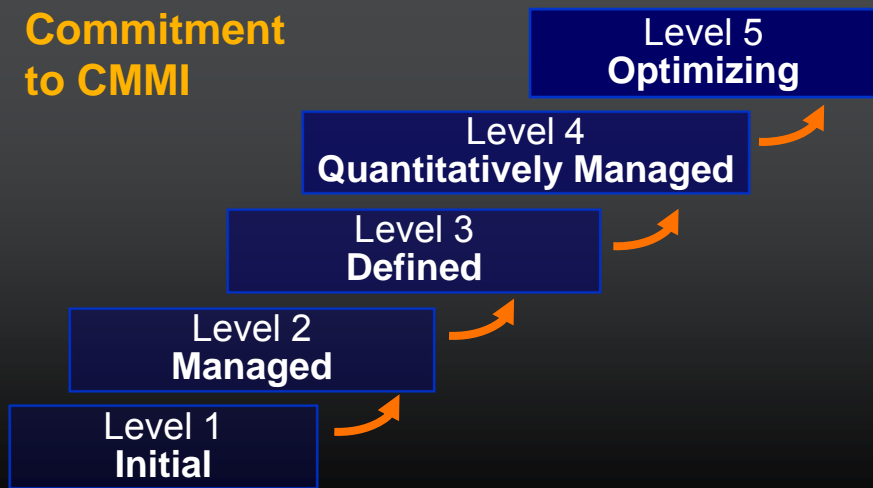
Industrial Design of Ruggedized Products

NORTEL NETAS

RUGGEDIZED SWITCH

More than 1000 Systems delivered to Turkish Army.

Commitment to CMMI



Nortel Netas tech focus

Emerging

Current

Legacy

2005

Today

25 %

40 %

35 %

40%

58%

2%

End to End Solutions



Application

- Carrier grade VoIP, IP/SIP based network software
- Seamless networking with PSTN and GSM networks for multimedia applications
- 3G Networks – Products & Services
- End to end wireless solutions with WiMAX integration
- Services layer in new generation wireless networks (IMS)
- Web based customizable applications for enterprise

Call Server

- Development of carrier grade softswitch (300 K VoIP, over 2 million busy hour call attempt)
- Support to all next generation access and carrier systems (SIP lines, IP Centrex, Wireline, Packet trunking)
- Real time running 30 million lines of software code (Fully designed or developed at Nortel Netas labs)

World-class R&D lab with end to end capabilities

Middleware

- Internet switching and routing at Gigabit/s rates
- Fiber optic access and transmission process
- Library of 30 million lines of SW running on 50 different HW
- Design of IP applications compliant to commercial and military standards (voice, data, video)
- Ethernet drivers SW
- Physical layers design such as ISDN, ATM, MPLS 10/100/1000 Ethernet, ADSL, SDH

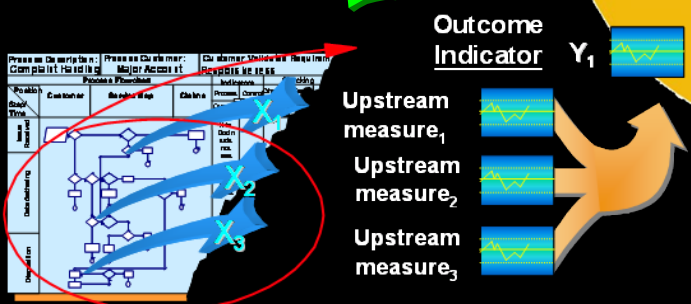
Hardware

- HW design patents
- Design with processors at a capacity of 100 billion instructions/s
- Product design at global & military standards
- Working temperature between -40°C and +55°C, up to %95 humidity, Water proof
- Compliant with drop and vibration standards
- Electromagnetic compatibility

R&D in Transformation by Lean Six Sigma (DMADV) ... With Structured Methods

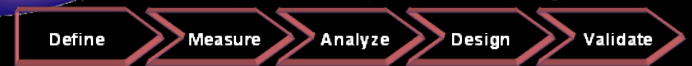


Top-Level Indicators



Process Management Control Systems

Process (Re) - Design (DMADV)



- **DEFINE** the project **opportunity** and **boundaries**
- **MEASURE** and prioritize customer **requirements** (CTQs)
- **ANALYZE** alternative **high level process design** against CTQs
- **DESIGN** and optimize the **detailed process flow** supporting the high level design selected
- **VALIDATE** that the detailed design meets customer requirements and achieves **performance objectives**

Achievements for Excellence



TN-1XE SDH Çoklayıcı / TN-1XE SDH Multiplexer

1500 Systems (2003 - 2007)



Ürün Tanıtımı
Nortel Networks Netas optik metro ağı çözüm alfa'nın vazgeçilmez bir üyesi olan TN-1XE, karışık, güvenilir arayüz servisi sunar ve STM-64 hatlarına kolaylıkla entegre edilebilir. Kompakt STM-64 optik çıkışı sayesinde, TN-1XE terminal, kâbe-çıkış ve toplayıcı kurulumlarında, esnek olarak, noktadan noktaya, doğrudan, zincir ve ring gibi değişik ağ yapılarına entegrasyonunda kullanılabilir. Ayrıca yüksek 1, 2, 3, 4 Mb/s ve Ethernet arayüz servisine esnek erişim imkânları sağlar.

Ağ Uygulamaları
TN-1XE, tüm basıncı uygulama alanı metro SDH ağıdır. Ozel devreler, PDH, Hİ, LAN, WAN, VPN, CSMA/CD gibi bağlantıları ve diğer çok sayıda değişik bağlantı/erişim uygulamaları TN-1XE ile kolaylıkla desteklenebilir.

Güvenilir ve Esnek
TN-1XE, yüksek kullanılabilirliği ve ürün mirasini de kapsayarak güvenilirliği sağlar. Ana fonksiyonlar yedeklenir. STM-64 optik ve elektriksel ve STM-64 optik hatlarına yüksek seviye güvenilirliği sağlayan 1+1 MSP ve VC yedekleme uygulamaları TN-1XE ile 1, 2, 3, 4 Mb/s PDH ve Ethernet kanalı kartları ihtiyaca göre 3 adet kadar yükümlenir ve N+1 koruma uygulanabilir.

Tam Yönetilebilir Çözümler
TN-1XE, çok üretilmiş ve çok kullanıcılar için üretilmiş kapsamlı element, 23 ve servis yönetimi sağlayan Nortel Networks Preside tarafından yönetilir. Yönetim merkezinden tam statüde erişim, hata, performans, öğrenme ve kurulum yönetimi sağlar. TN-1XE, işletim ve kurulum yazılımının, merkezden indirme işleminin de canlı trafik etkilenmeden yapılmasını destekler.

Product Description
TN-1XE is a full member of Nortel Networks Netas portfolio of solutions for Optical Metro networks. It is a field-proven STM-64 add/drop multiplexer with STM-64 line rate upgrade that reliably delivers services with a compact footprint. It can be deployed in a number of terminal, add/drop and hub configurations to flexibly suit different network deployment scenarios such as point-point, line, chains and rings. TN-1XE provides flexible access to a high density of 1, 2, 3, 4 Mb/s PDH and Ethernet service interfaces.

Network Applications
Primary applications of TN-1XE are in metro SDH networks. A huge variety of different interconnect applications can be supported, including private lines, PDH, primary rate ISDN, LAN-WAN, VPN, mobile base station links, etc.

High Reliability, Flexibility
TN-1XE has field-proven reliability based on a high level of integration and product architecture. Core functions can be duplicated and the STM-64 optical/electrical or STM-64 optical aggregates can be configured with 1+1 MSP, VC path protection which ensures high service availability. TN-1XE supports N+1 protected 2 Mb/s and 3.4 Mb/s PDH and Ethernet tributaries with easy upgrade of up to 3 tributary cards into the subrack.

Fully Managed Solution
TN-1XE is fully managed by Nortel Networks Preside, which provides comprehensive element, network and service management across multi-vendor, multi-domain networks. Full remote access to each TN-1XE from the management centre, including fault and performance monitoring and configuration management. TN-1XE supports proven remote download of operational and configuration software without impacting live traffic.

NORTEL NETAS



TACTICAL ISDN / ADSL TERMINAL

More than 1000 Terminals shipped to Turkish Army.

Tactical ISDN terminal suitable for requirements of secure and non-secure communications usable in tactical field and/or headquarters environments.



One of the 9 R&D Centers of Excellence



Billerica
Advanced networking,
software platforms,
hardware platforms, high-
performance hardware



**Research Triangle Park
Solutions**



Galway
End-user applications,
end-user context



Maidenhead
End-user Applications



Istanbul
High-performance
hardware, software
platforms



**Silicon Valley
Solutions**



Richardson
S/W platforms, protocols,
solutions, advanced
networking, end-user apps



Bangalore (NTEC)
Software platforms,
advanced networking



LG-Nortel
Advanced networking,
S/W platforms, HW
platforms, solutions



High-tech Center of Excellence for Global Operations



- High-tech support to biggest operators in the world
 - Carrier VoIP
 - Optical
 - GSM Access
 - GPRS / UMTS Packet Core
 - CDMA Access
 - CDMA Packet Core & EVDO
 - CDMA Voice Core
 - Services Edge



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What We Aspire to Continue ..



- Becoming most productive and efficient in Leading Edge Technologies
- Simplifying R&D processes with Lean Six Sigma
- Increasing the number of patents
- Contributing to Turkey's technology development
- Introducing latest technologies to Global market

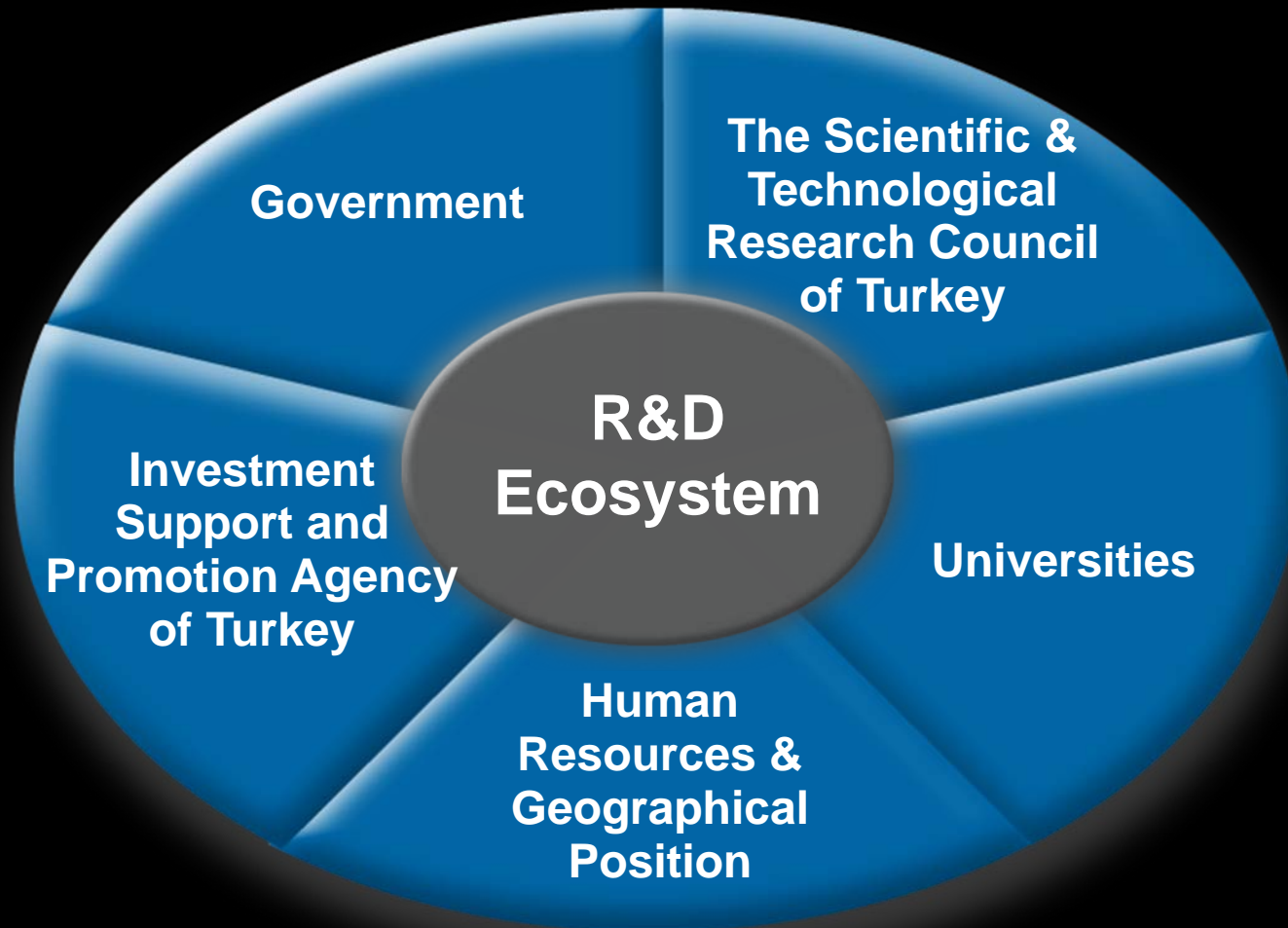
**Our target for 2011: A technology workforce
of 1500 engineers**

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Accommodating Ecosystem In Place



Full support from Turkish Government



Government Program

- R&D spending in GDP to 2% by 2013
- Technopark projects
- Transparent investment incentives and legislative environment

Target: Become one of the 10 biggest economies by 2023

9th Development Plan

Turning into an Information Society

Improving R&D and innovativeness

Strengthen industry – university cooperation

Gaining competitive edge in Global competition



- **Competitive incentives to support R&D**

Concept
Development

Test production

Technical
Feasibility
Research
Laboratory
Studies

Patent and
License studies
Prototype
Production
Construction

Design and
Sketching
Studies of pilot
facilities

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Activities related
to post-sale
problems
stemming from
product design

- **Strong collaboration with the private sector**

Investment Support and Promotion Agency of Turkey



Continuous assistance to global business community for investments in Turkey

- Founded in 2006
- Liaised with Prime Ministry and directly reporting into Prime Minister
- Promotes Turkey's economic potential in global marketplace
- Supports investors through administrative processes (before, during, after) with a services approach

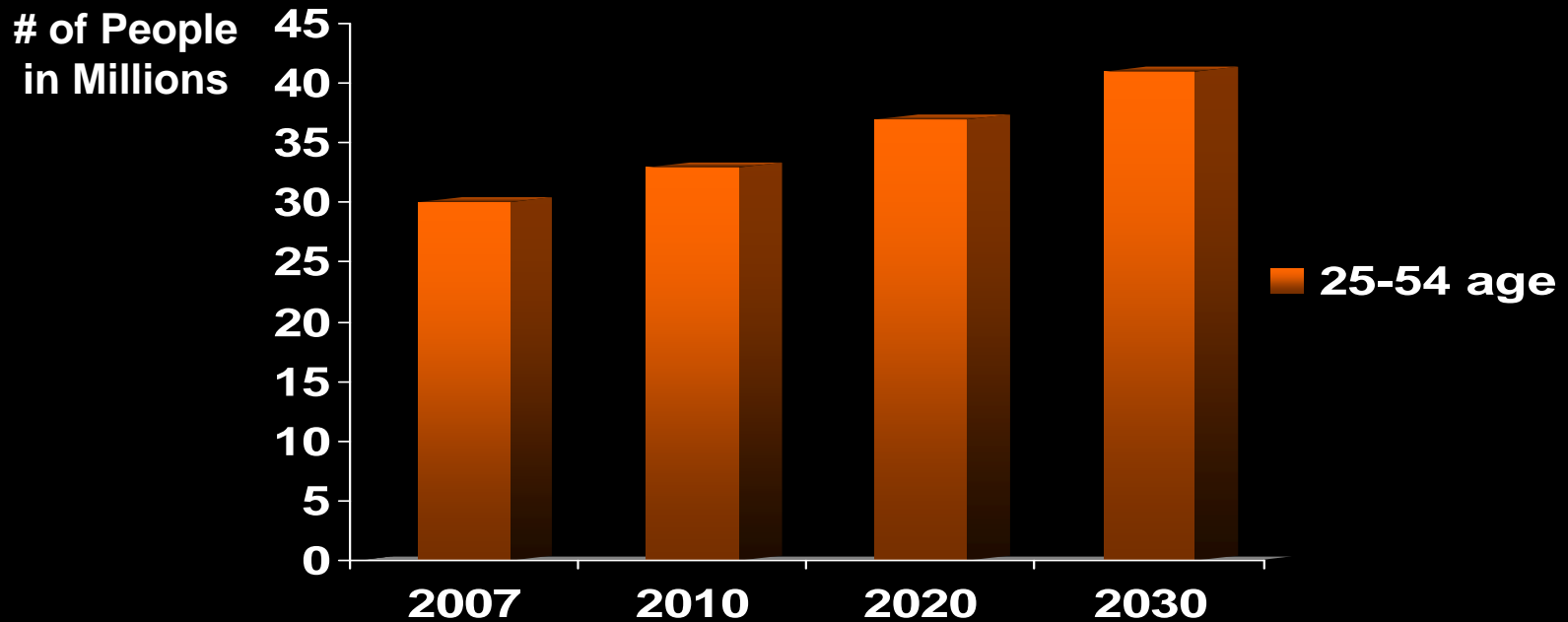


Around \$50bn FDI realized between 2005 – 2007

Human Resources



Well educated and motivated workforce:



Universities



- More than 90 Universities/Colleges
- More than 930k university students
- 150k graduates every year
- 1.6 million students to enter common university exam
- The most successful segment prefers engineering studies
- 6.27 % CAGR in the number of Computer, Electrics & Electronics departments graduates (2000-2006)

Geographical position



Time zone advantage

Communication with USA & China within the same day

China / between 08:30 – 11:00

North America / between 15:00 - 23:00

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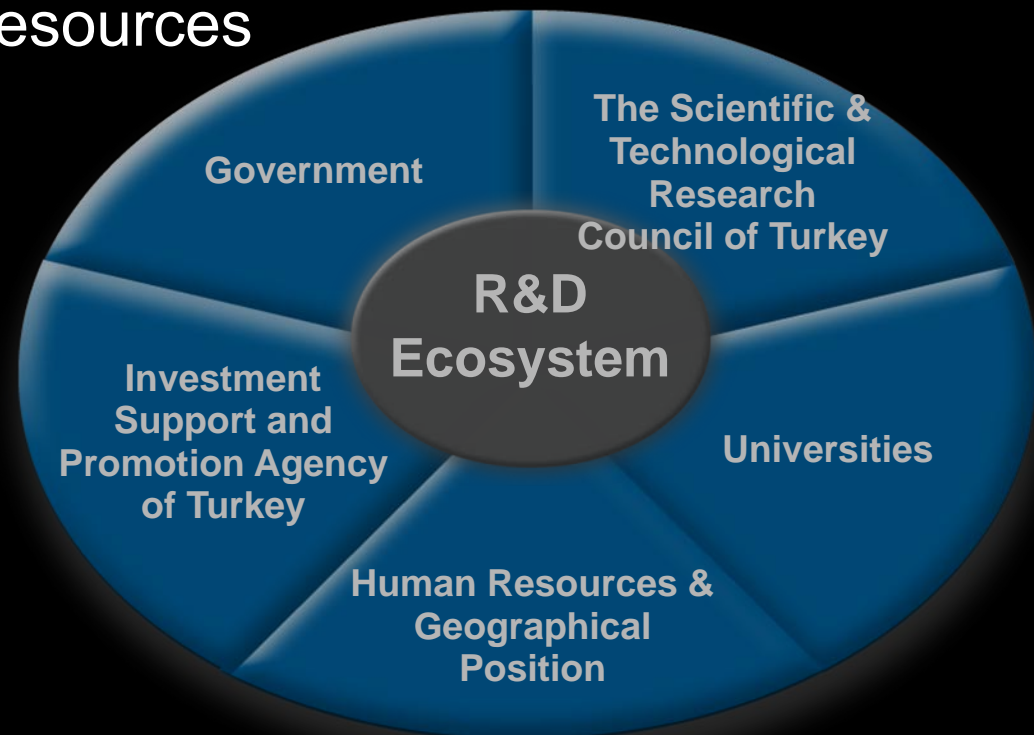


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Consider Turkey for Technology...

- Favorable legislative environment
- Competitive R&D Incentives
- Guidance for investment
- Highly qualified human resources
- Geo-strategical location
- Time zone advantage



Consider Turkey for Technology Investments



Thank you

