

Management of R&D in Turkish Industrial Companies: The Case of Arçelik

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Agenda

- **Arçelik 1990**
 - Overview of Home Appliances Industry
 - Arçelik Milestones
- **Arçelik 2006**
- **R&D Organization**
 - Technology Management
 - R&D Environment in Turkey
- **Q&A**



arçelik

Briefly Arçelik;

- is a leading household appliance company based in Turkey,
- is one of the Koç Holding Companies.
- Core business is production, marketing, and after sales services of a full range of household appliances, components.

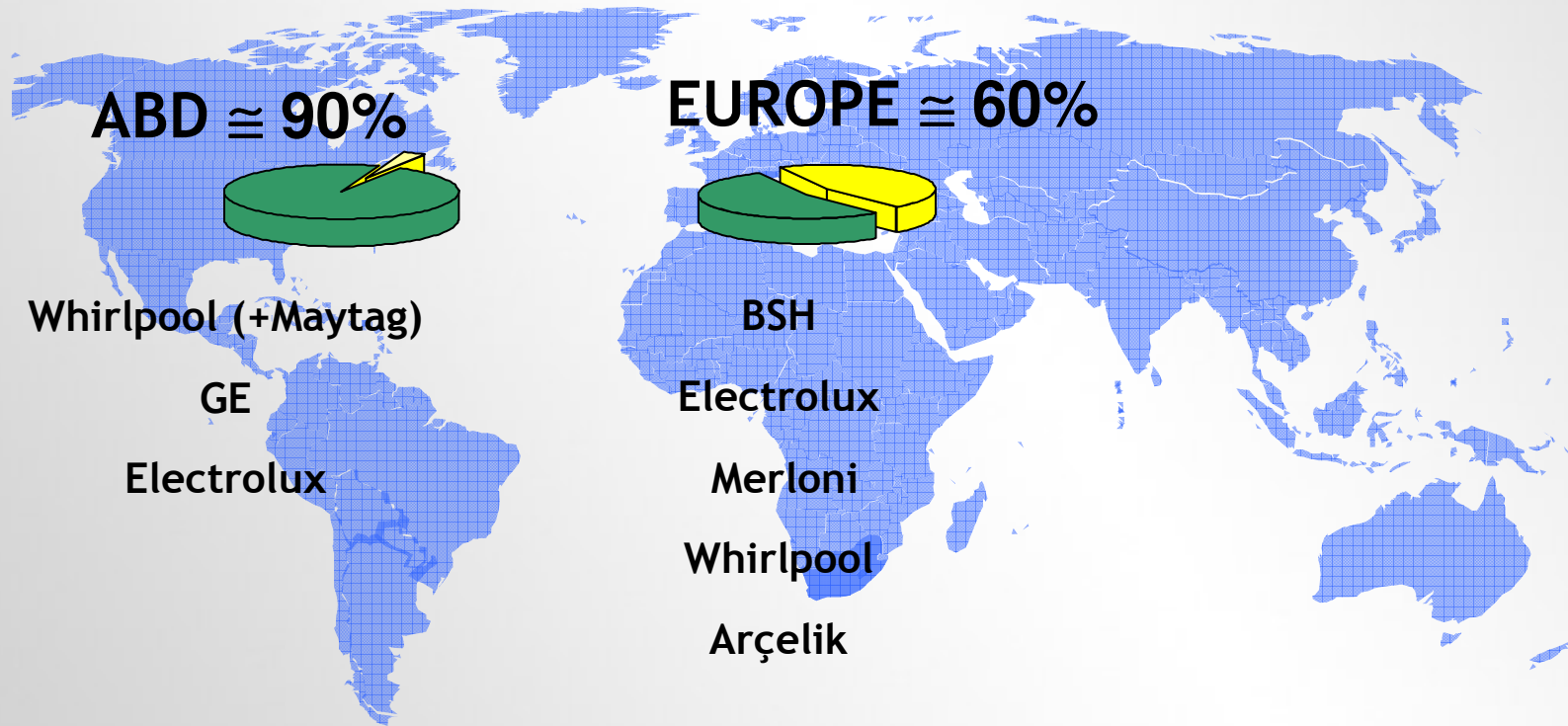
Arçelik - 1990

- Net Sales 728 M €
- Export 10 M €
- Total Products (Units) 2,540 K
- Export (Units) 90 K

Home Appliances Industry: Changes Between 1990-2000

- EUROPEAN MARKET
 - Consolidation
 - Maturity of Technology
 - **INCREASED COMPETITION**
 - **DECREASING SALES PRICE**
- TURKEY
 - Common custom tariffs
 - Intellectual property rights

Consolidation



Turkey – Customs Union

- Protectionism between TURKEY – EU abolished
 - Common customs tariffs
- Harmonization of Laws
 - Protection of Intellectual Property
 - Competition Laws
 - Anti-Dumping
 - Protection of Consumer

Arçelik Roadmap

- Quality
- Reorganization
- Technology

Quality and Environmental Management Systems

- Total Quality Management activities began in early 1980s with the application of Quality Cycles.
- These activities have been gathered under the Total Quality umbrella in early 90s and have been developed with the following applications:
 - Quality and Environmental Management System
 - EFQM Excellence Model
 - Total Productive Maintenance (TPM)
 - 6 Sigma
- Today all production facilities have the ISO 9001:2000 Quality Management System Certificate and ISO 14001:1996 Environmental Management Certificate.



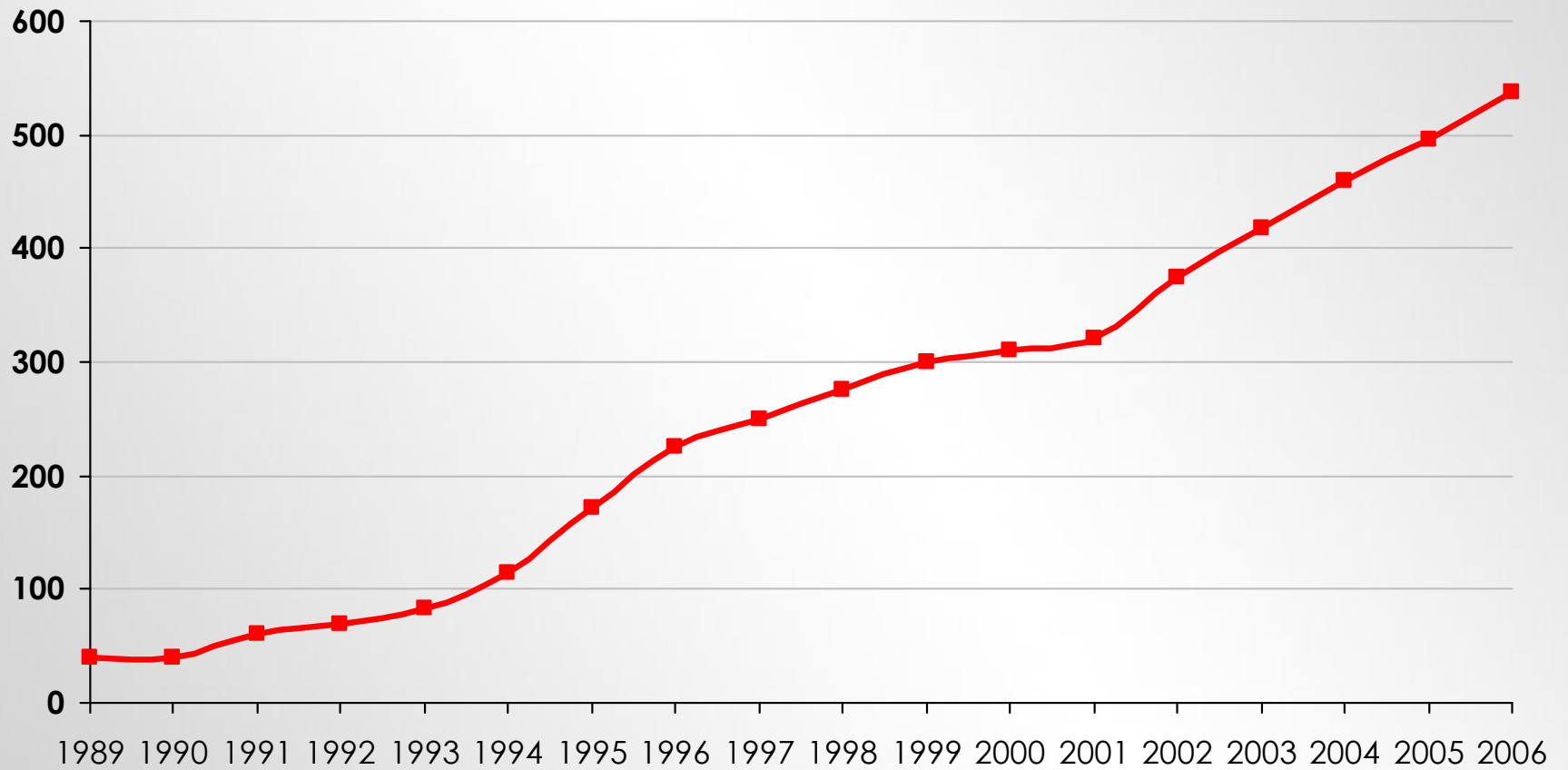
Organization

- 1995 (Lean Organization)
 - Organizational levels were decreased from 9 to 5:
Decision process improved
- 1999 – 2001 (acquisitions)
 - Blomberg, a German household appliance company,
 - Elektra Bregenz, an Austrian household appliances company.
 - Arctic, a refrigeration company in Romania.
- 2003 - 2005 (Investments)
 - Tumble dryer
 - A new plant in Russia (WM and refrigerator)

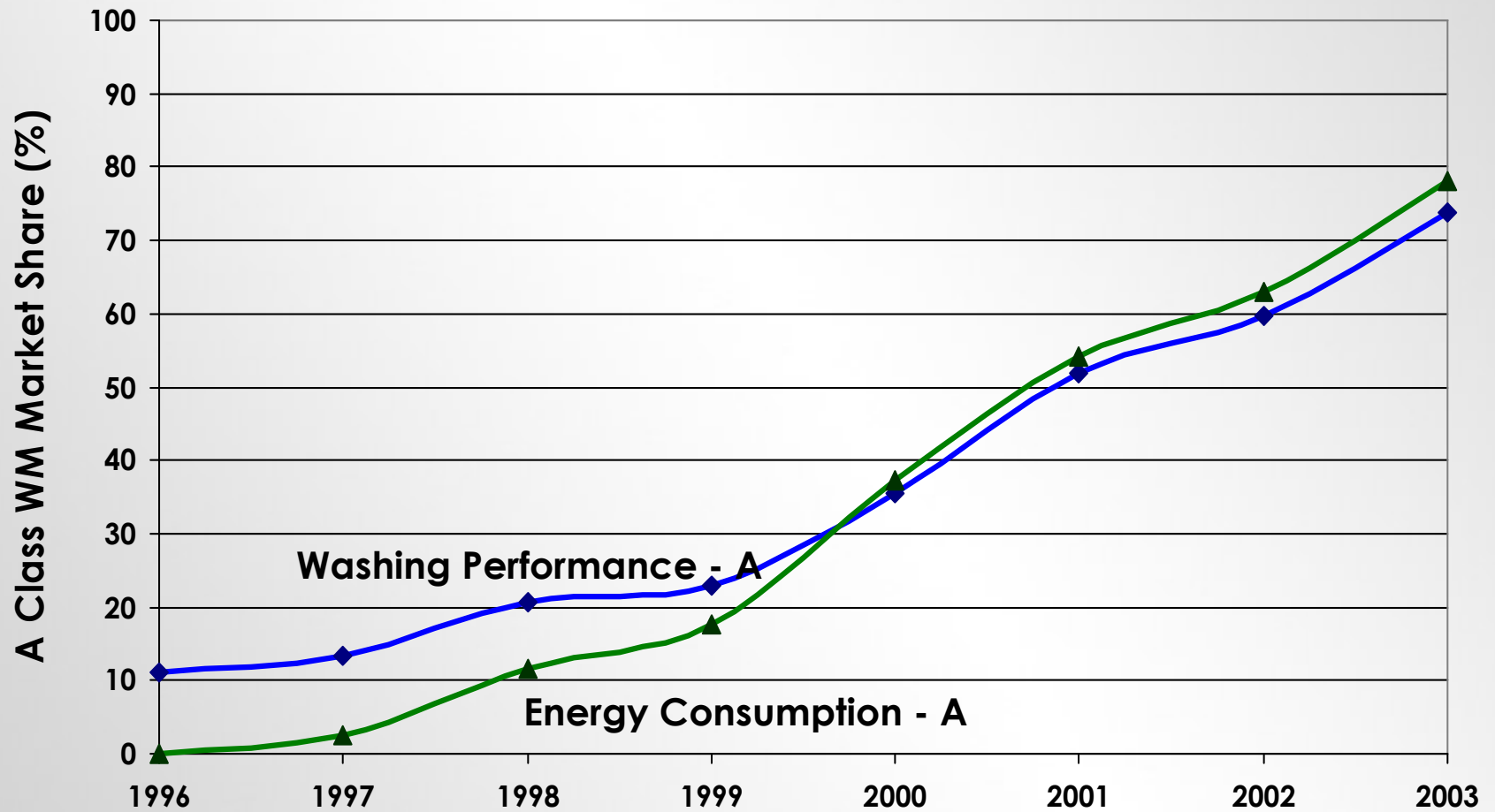
Technology

- 1991: R&D Center has been established.
- 1995: Product Development facilities decentralized.
- 2001: R&D Center – “Profit Center”

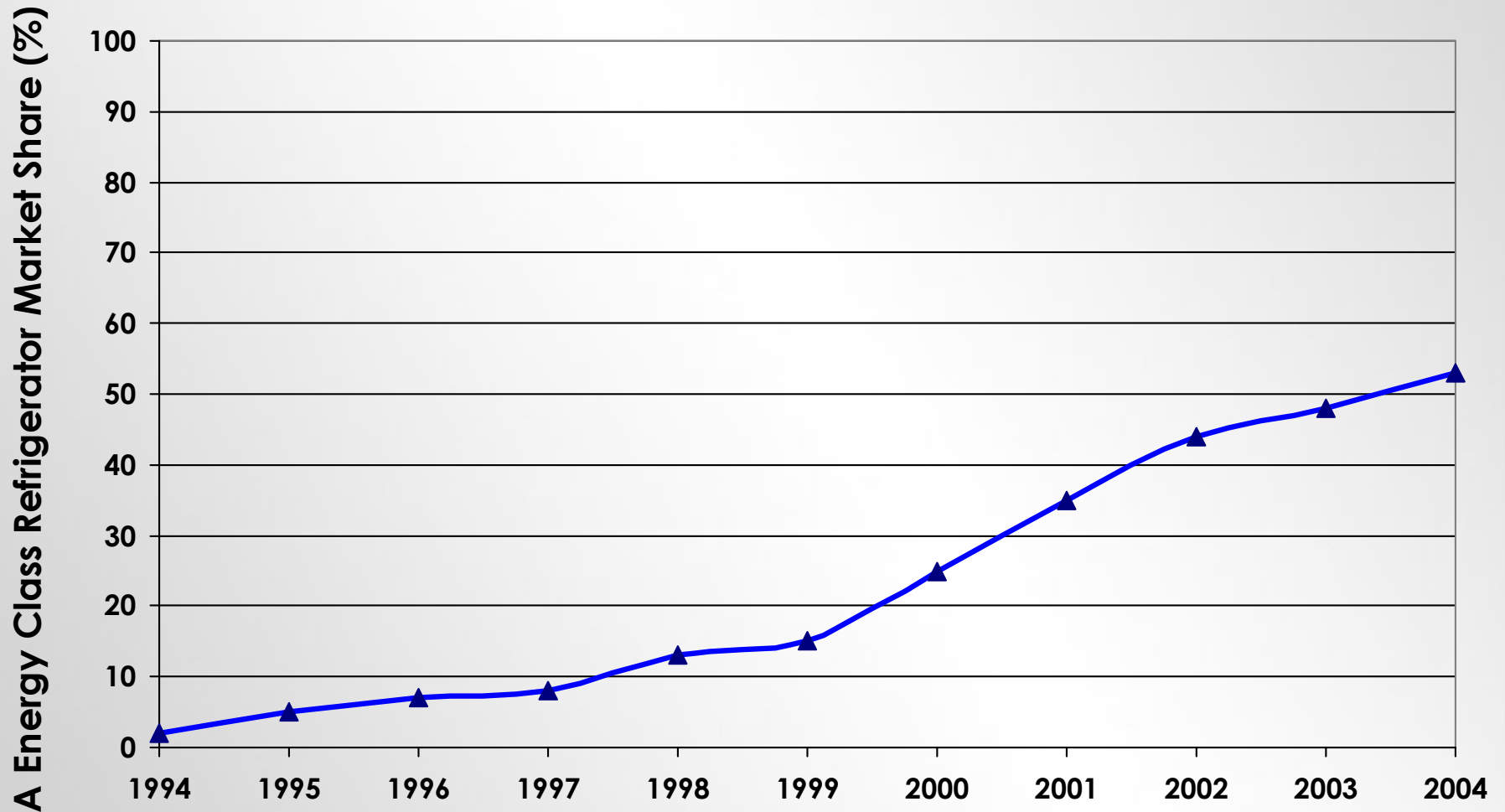
R&D Personnel



Washing Machine – Labels in EU Market

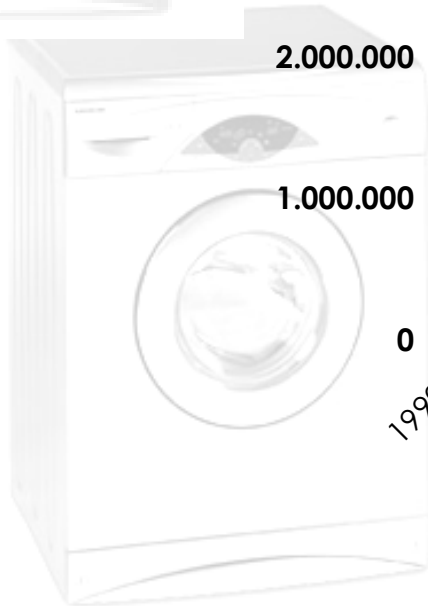
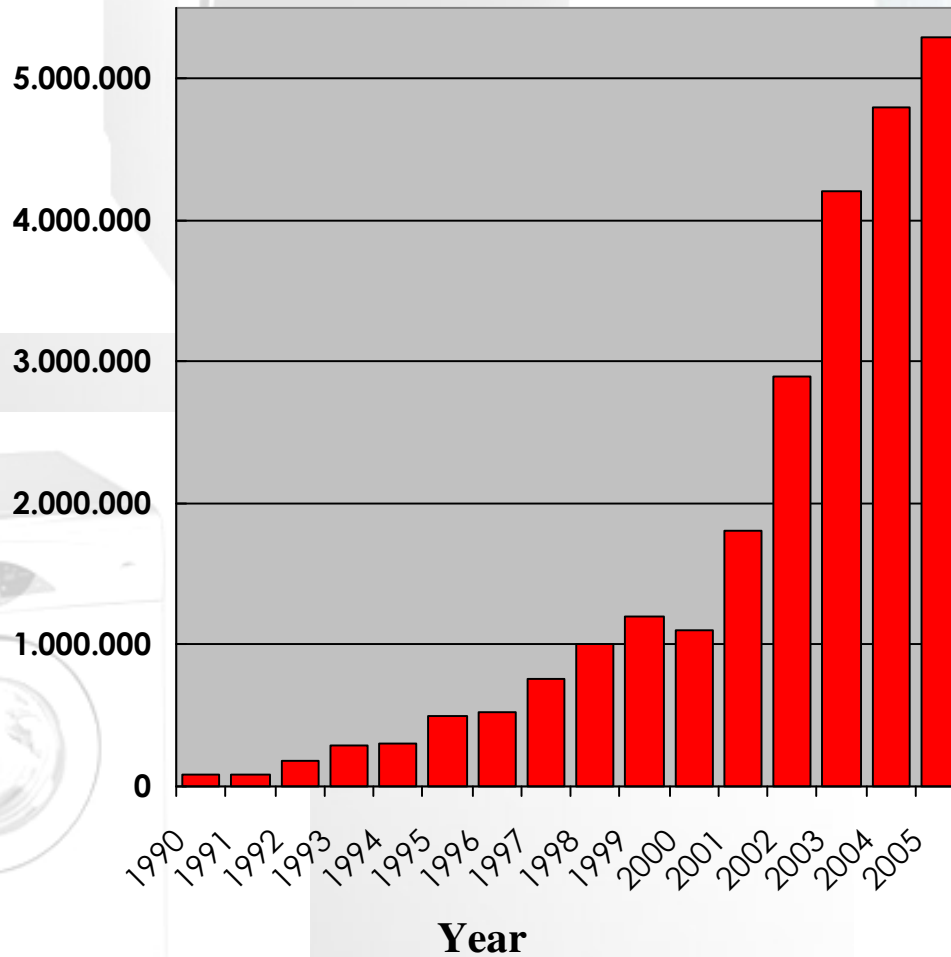


Refrigerator – Energy Label in EU



Arçelik Export

Number of Units



Arçelik 2006

- Total net sales 3,9 billion €
- Net Sales-International 1,9 million €
- Total sales (Units) 11 million
- International sales (Units) 7 million

Arçelik

	1990	2006
Net Sales (Milyon €)	728	3,900
Total Sales (Units)	2,5 Mio	11 Mio
International Sales (Units)	90 K	7 Mio

Vision



To possess one of the 10 most preferred global brands in our sector by the year 2010 with BEKO



Research & Development

2007

Arçelik R&D

Arçelik Research, Technology and Product Development is positioned to develop products that are:

- ✓ **Comfortable and providing client satisfaction
(smart, quiet, easy to use)**
- ✓ **Environment friendly**
- ✓ **Innovative & Competent**
- ✓ **Compliant with the current and future standards**

Arçelik R&D Organization Units

Product Development (PD) Departments

- Refrigerator PD
- Washing Machine (WM) PD
- Ovens PD
- Dishwasher PD
- Dryer PD
- Motor and Pumps PD
- Compressor PD

Central R&D

(Central R&D is working according to “Profit Center” principles)

Workforce - 2007

DEPARTMENT		
Cental R&D		149
Product Development		389
Dept.s	TOTAL	538

18 Ph.D. , over 180 M.S. degrees

Expertise - Central R&D

- Thermodynamics & Fluid Dynamics
- Vibration & Acoustics
- Electronics
- Materials
- Washing & Cooking Techniques
- Rapid Prototyping
- Structural Design & Analysis
- Intellectual Property

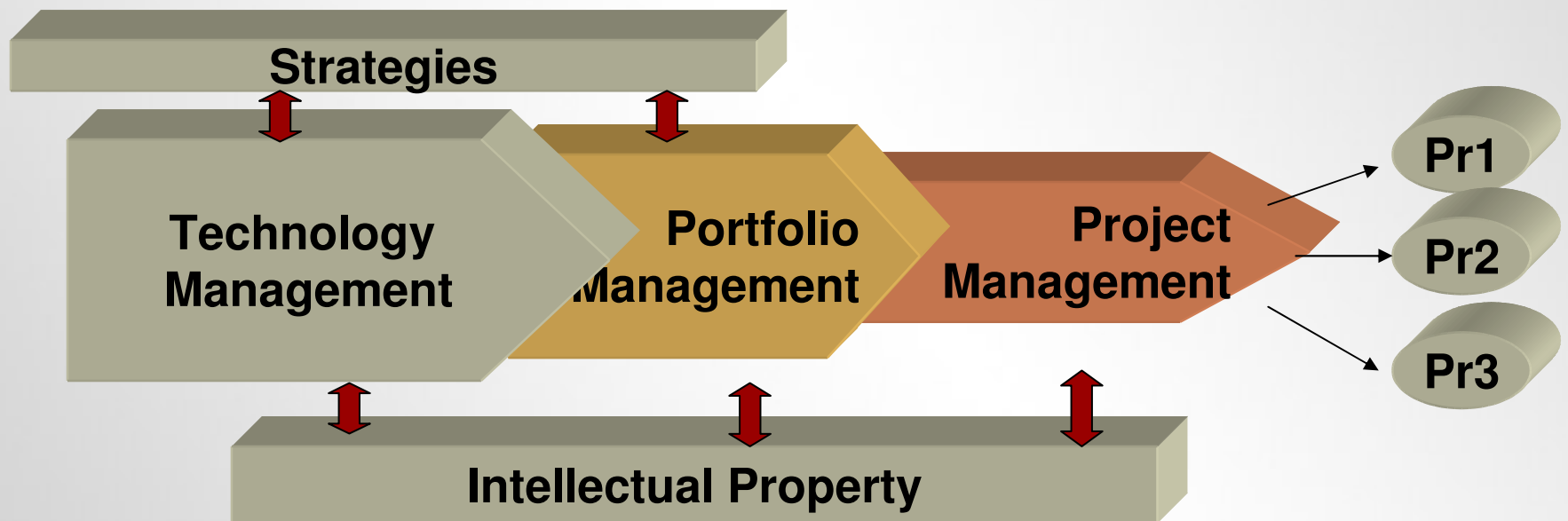
Collaborations

- EUREKA
- EU – Research Framework Program Projects
- Universities and Research Institutes
 - Turkey (Universities and TÜBİTAK)
 - Europe
 - WFK, IIR, TNO, LGA, ...
 - U.S.A.
 - University of Illinois – ACRC, University of Maryland, Purdue University, ...
- Suppliers
 - GE Plastics, Bayer,...
- Member of EIRMA

Collaborations ctd.

- İstanbul Technical University - protocol
 - 78 Master's Theses and 26 BS Project (1997 – 2006)
 - 48 of the Master's students are working in Arçelik now.
- Deployment of Protocol
 - Yıldız Technical University
 - Boğaziçi University
- More than 30 ongoing studies

R&D Innovation Management



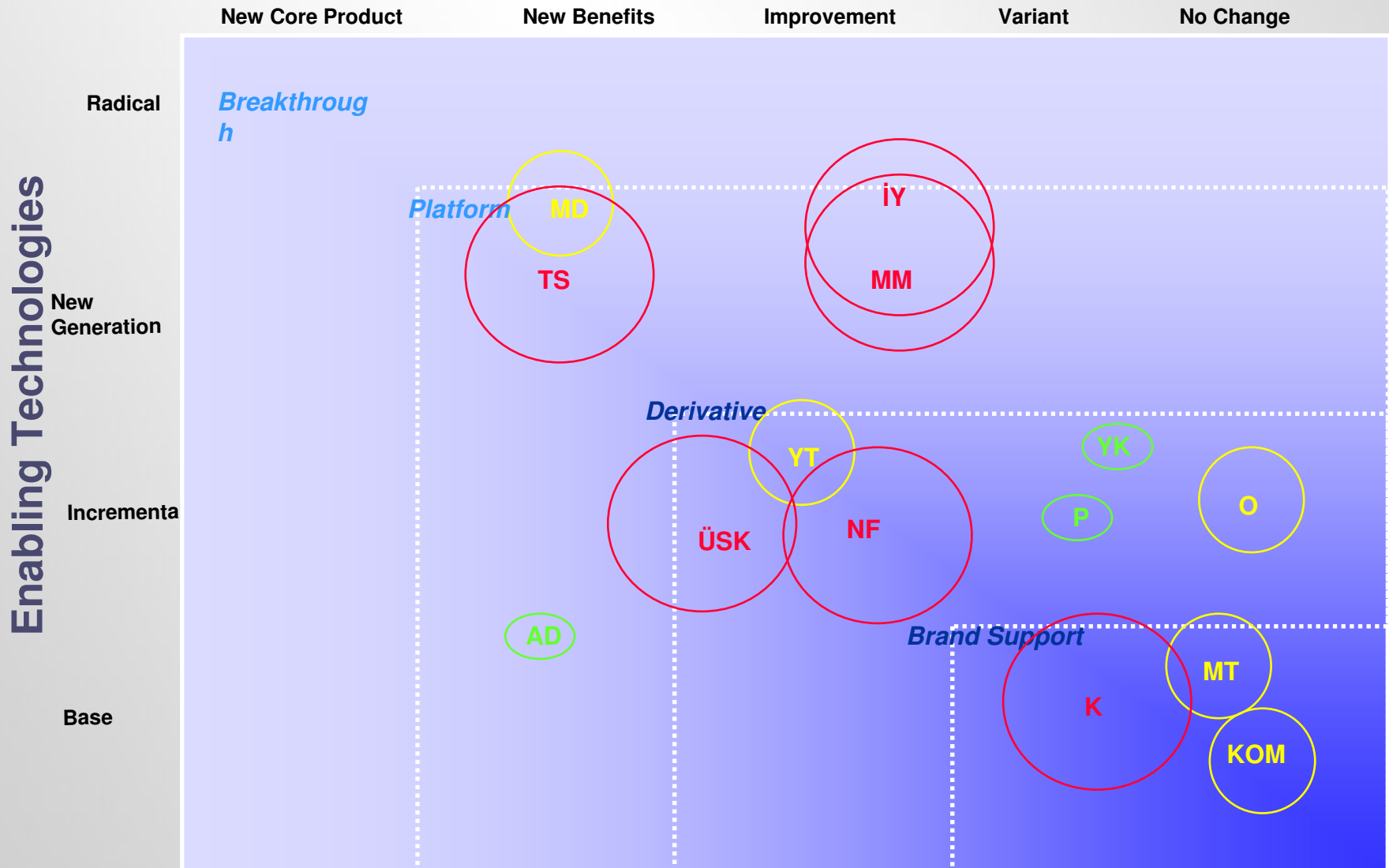
- Technology monitoring/forecasting
- Technology roadmaps

- Value Maximization
- Portfolio Balancing

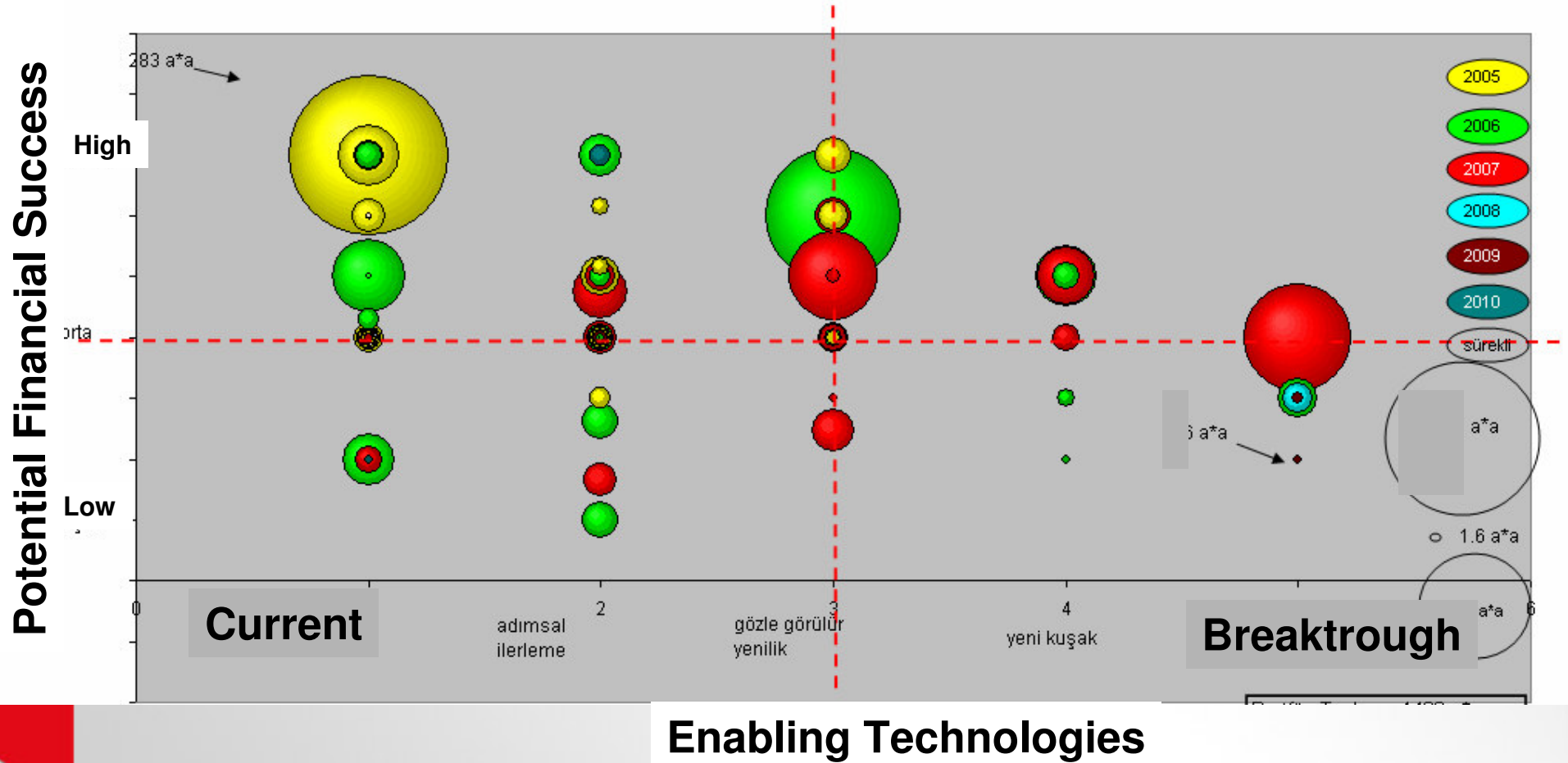
- Stage-Gate Process
- NPD Process
- Performance management

Portfolio Management

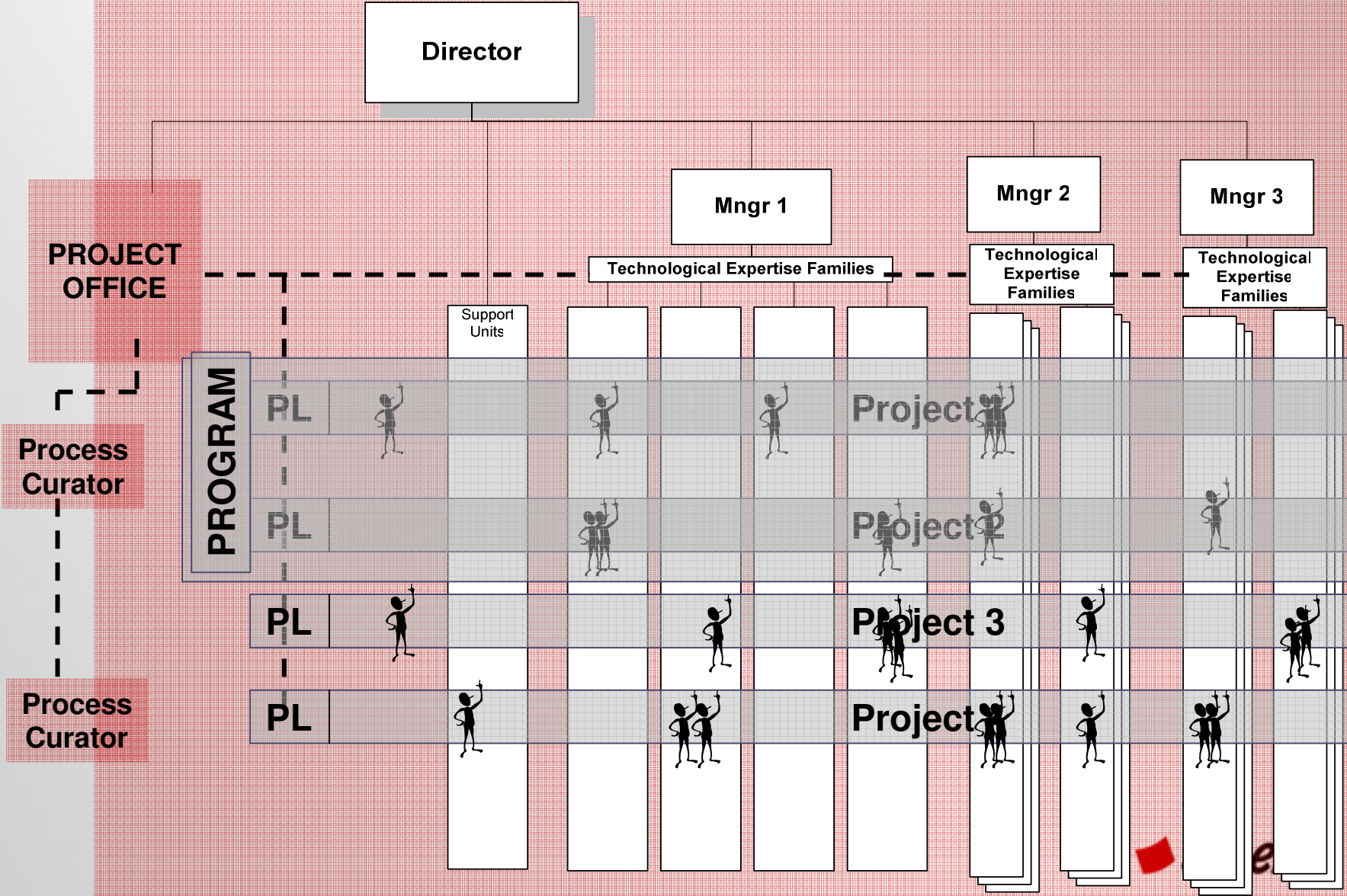
Customer Perception



Portfolio Evaluation



Project Organization



Project Management: Basic Tools

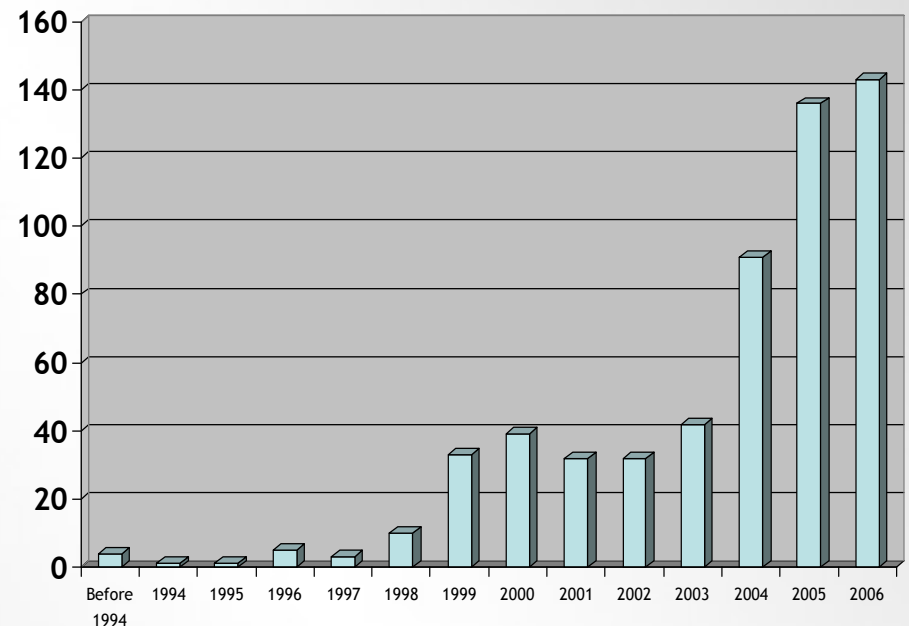
- Stage-Gate Process
- Planning and Tracking Software :
P3e (Primavera Enterprise) &
Progress Reporter
- Project Office

Performance Management

- Project performance is evaluated based on the stages
- Evaluation based on the milestones
- The interim performance is evaluated
- At the end of the year, Project Success Grade is reflected as Project Leader and Project team member performance grades
 - CSI
 - Variations (Cost – duration – man-hour)
 - TİDEB Support
 - Achievement of the Quality Criteria

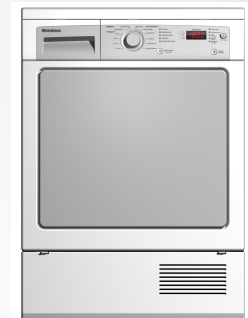
Patents

- Arçelik is one of the leading technology and patent developing corporations in Turkey:
 - 13% of the patents issued during the last 3 years belong to Arçelik.
 - In the past 3 years, 45% of the international patent applications (PCT) filed by Turkey to the World Intellectual Property Organization (WIPO) belong to Arçelik.



Highlights

- Refrigerator: 19.8 Index
(EU Energy + Award)
- Dishwasher: The first Brushless DC Motor Application
- Dryer: Energy efficient Heat Pump Application (Wool Dry)
- Turkish Coffee Machine



Highlights

Energy+ Award Winner, Europe's Most Energy Efficient Refrigerator

The refrigerator produced in Arçelik's Eskişehir factory;

- was awarded for producing the Most Energy Efficient Refrigerator in all categories
- achieved the lowest Energy Efficiency Index ever attained in Europe
- The company was invited to the UN Conference on “**World Climate Change**” in Buenos Aires to make a presentation on the technology that created “Europe's most energy efficient refrigerator”



Highlights



- Arçelik technology has created **the world's quickest dishwasher** with **A** washing performance in 58 minutes for full/daily load.



Highlights



- With its own technology, Arçelik Company has developed Turkish coffee machine “Mini Telve” with single tank and launched it in the year 2006.
- This product is protected with 4 patents.

AntiSpill



taşma önleme sistemi

“Kahve pişirilirken başında bekleme zorunluluğunu ortadan kaldıran ek güvenlik sistemi”

Patentli bir teknolojiyi içerir.

CookSense



pişme algılama sistemi

“Kahvenin en ideal kıvamda pişmesini sağlayan teknoloji”

Patentli bir teknolojiyi içerir.

Highlights



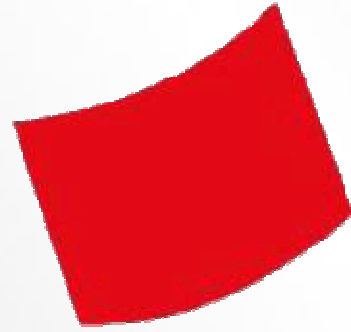
- Turkish coffee machine 'Telve' with 8 patents.
- The winner of IF design award



- Heat-pump dryer; 40% more energy efficient compared to its competitors
- Eco Top Ten Energy Award

Awards

- | | |
|------|---|
| 1994 | European Simulation Symp. – Best Paper |
| 1995 | İTO (İstanbul Chamber of Commerce) Technology Development Award |
| 1998 | I. National Technology Award |
| 1998 | Society Of Plastics&Polyurethane Industry – Best Paper |
| 1999 | II. National Technology Award |
| 2002 | University – Industry Collaboration Award |
| 2003 | 54. International Appliance Technical Conference (IATC)- Best Paper |
| 2004 | 55. IATC – Best Paper |
| 2004 | “The Most Energy Efficient Refrigerator”, EU Energy+ Competition |
| 2005 | 56. IATC – Best Paper |



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