

Drivers and Barriers for University-Industry Interactions in Turkish Aerospace Industry

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Outline

- Introduction
- Major players in the Turkish Aerospace Industry
- Universities offering formal Aerospace Engineering Education
- Drivers for promoting university-industry collaboration
- Barriers for university-industry interaction
 - University induced
 - Industry induced
- Recommendations for enhancing university-industry collaboration

Introduction





- Activities in the Aerospace Industry in Turkey has shown a noticeable shift from **production under license** (1980s) to **system integration** (1990s) and finally to **indigenous designs** (2000s) especially in the last decade.



- Projects (often ambitious) led almost exclusively by the **Undersecretariat of Defense Industries** have surfaced the need for highly qualified research personnel and in great numbers.
- Aerospace is one of the **high-priority** technology fields in Turkey.



Major players in the Turkish Aerospace Industry

- **Turkish Aerospace Industries (TAI):** started as a facility for license production of components and complete products, but is now a major design and manufacturing organization for fixed and rotary wing aircraft, satellites. 
- **HAVELSAN:** an IT and systems company providing global solutions in the areas of defense and IT sectors. 
- **ASELSAN:** designs and develops indigenous systems in the fields of defense electronics by using high-end technologies. 
- **ROKETSAN:** company designing, developing and manufacturing rockets and missiles. 

Major players in the Turkish Aerospace Industry

- **Turkish Engine Industries (TEI):** is tasked with establishment, operation and maintenance of a modern aircraft engine industry in Turkey, on R&D, design, manufacturing, maintenance, repair, overhaul, modification and modernization of aircraft engines and other gas turbine engines.  TEI
TÜRKİYE MOTOR SANAYİ VE
TÜRKİYE ENJİNLERİ SANAYİ VE TİCARET A.Ş.
- **DGCA:** civil aviation authority in Turkey.  SHGM
TÜRKİYE
- **Turkish Technic:** responsible for the maintenance of the airplanes operated by the Turkish Airlines.  TURKISH TECHNIC

Universities with Aerospace Engineering Education

- Until very recently there were only **two universities** offering formal **Aerospace Engineering Education**:
 - Middle East Technical University
 - Istanbul Technical University
- More recently, **five additional universities** started offering Aerospace Engineering Education:
 - Turkish Air League University
 - Istanbul Medeniyet University
 - Ondokuz Mayıs University
 - Necmettin Erbakan University
 - Gaziantep University

Drivers for promoting university-industry collaboration

- Legislation allowing part-time or extended-time employment of academic personnel in the industry:
 - Consultancy,
 - Possibility of spending sabbatical leave in companies located in Technopoleis,
 - Exemptions offered by Law for Technology Development Zones (law no. 4691) and Law for Support of Research and Development Activities (law no. 5746),
 - Legislation allows academicians to establish their own companies or to be stakeholders in companies located within Technopoleis.

Drivers for promoting university-industry collaboration

- Short or long term training and/or education of industry personnel by universities:
 - METU Continuing Education Center offers the Certificate Program for Defense Technologies since 2011,
 - Graduate programs with/without thesis offered to industry personnel,
 - Graduate students employed in the industry can follow M.Sc. and Ph.D. programs offered by universities. The thesis work is not necessarily related to job function.

Drivers for promoting university-industry collaboration

- Joint M.Sc. and Ph.D. programs:
 - M.Sc. and Ph.D. programs targeted specifically for defense industry personnel (SAYP). Funded by Undersecretariat of Defense Industries. Requires one signatory university and a signatory defense company,
 - M.Sc. And Ph.D. support projects funded by the Ministry of Science, Technology and Industry (San-Tez). Requires one university and one industry partner (not necessarily defense).

Drivers for promoting university-industry collaboration

- Multi-national, multi-disciplinary research projects
 - EU funded projects bring together universities, research establishments and universities.

Barriers for university-industry interaction-university induced

- University research being too theoretical with limited practical applicability and not serving to the needs of the industry and the society.
- Conservative education systems.
- Scattered education and research efforts without clear targets.
- Lack of a research and technology plan.
- Universities trailing the industry in terms of innovative thinking.
- Insufficient ability or initiative to plan for the future, address and eventually guide the needs of the industry and the society.

Barriers for university-industry interaction-university induced

- Not being sure where the university research stands in the **Technology Readiness Level** scale.
- Reluctance in relations with the industry.
- Higher education system not encouraging innovative, active academia.
- Unrealistically high number of universities and programs that have to share research funding.
- Numbers count, not quality!



Barriers for university-industry interaction-industry induced

- Lack of innovative, competency enhancing policies.
- Impatience in transforming research and development to commercialized products. Overseeing the fact that R&D is a long term undertaking.
- Different timescales of university and industry.
- Premature diversification of activities before specializing in priority fields.
- Lack of a research and technology plan, lack of a plan for future enabling Technologies.
- Lack of self-confidence.
- Distrust in the academia.
- Distrust between rival companies.



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Recommendations for enhancing university-industry collaboration

- Using available mechanisms more effectively and efficiently.
- Encouraging participation in international conferences related to aerospace (AIAA, SAE, EUCASS, etc.).
- Participate in international projects as a Turkish Consortium (led by major universities and/or companies) rather than individually, reducing scatter.
- Increase the number of national aerospace conferences (AIAC, UHUK, UHAT, etc.).
- Rival companies and universities should learn to collaborate for the sake of the greater good.

Thank you for your attention!

