THE FRAUNHOFER MODEL
BRIDGING THE GAP BETWEEN SCIENCE AND INDUSTRY
CREATE – VALIDATE – ACCELERATE

2nd Euro-Mediterranean Brokerage & Venturing Event on Research and Innovation
Berlin, Germany – 25/26 February, 2015

Prof. Dr. Holger Kohl and Dr. Mona El Tobgui | Fraunhofer Gesellschaft
Fraunhofer is a private association for applied research

Joseph von Fraunhofer (1787-1826)

- Director and partner in a glasswork
- Lines in the solar spectrum
- Methods for lens processing

Researcher

Fraunhofer-Gesellschaft (since 1949)

- R&D on behalf of state and industry
- MP3, white LED,…

Entrepreneur

Research volume: €2bn 2014
Fraunhofer – An international innovation driver
Fraunhofer at a glance

Goal: Promoting and conducting applied research for the benefit of private and public enterprises and society as a whole.

Approx. 24,000 employees

66 institutes and Research units

2 Bn
Infrastructure and defense research

1.7 Bn
28% base funding from Bund and Länder (2013)

Budget
2013
Applied research

More than 72% revenue from industrial and contract research
Fraunhofer International
Strategic imperatives

- **Goals**
  - Scientific added value for Fraunhofer
  - Positive Effects for both: Germany and partner country

- **Strategic guidelines**
  - **Partner**: scientific excellence
  - **Country**: intensity of integration of German economy

- **Operational challenge**
  - Quality management and monitoring
  - Compliance and Global Governance
Working in networks with the best to constantly improve capability

- Scientific excellence in specific knowledge domains
- National Networks
- International Cooperation with the best
  - Cooperation with the best universities
  - Cooperation with leading companies of dynamic markets
  - Internal programs to foster cooperation
  - Fraunhofer alliances
  - Fraunhofer Innovation Cluster
  - Cooperation with the best universities
  - Cooperation with leading companies of dynamic markets

- Scientific and technological excellence is most important for customer*
- Prestigious science awards for Fraunhofer researcher
- Attractive employer for best students

* Source: IfD survey 5241, January 2009, IfD-Allensbach
International activities and revenues worldwide
(2014 prel., without subsidiaries, without licensing)

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Fraunhofer’s position in the German Innovation System

Societal challenge as future markets - being ready for global competition

Universities perform excellent scientific research

Research cycle

RTOs bridge the innovation gap with technological R&D

Innovation cycle

Innovative companies create new products

Intensive exchange with society

- Close cooperation with universities, every Institutes Director is also Professor at this University
- Close cooperation with Max-Planck-Institutes
- Collaboration with international centers of excellence
- Professional R&D services to industry
- Demand driven research combined with scientific excellence
- Autonomy of institutes combined with simple corporate rules
- Working in networks
- Research services for SME as well as industry (~50/50)
- Research services for high-tech companies (>3,5% R&D) as well as non R&D-intensive companies (0-3,5%)*
- Close affiliation with industry through Fraunhofer advisory boards

* Equally important factor in national innovation activity; see O. Som (Fraunhofer ISI): Innovation without R&D, Springer 2012
Fraunhofer Model

- **Base Funding**: continuity of scientific excellence
- **Public Projects**: precompetitive research (networks)
- **Industrial Contracts**: direct innovation push

The distribution of funding is as follows:
- 1/3 for Base Funding (long term)
- 1/3 for Public Projects (between 2-4 years)
- 1/3 for Industrial Contracts (< 2 years)

The balance among these three components must be maintained.

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The Fraunhofer Alliances facilitate customer access to the services and research results of the Fraunhofer-Gesellschaft. Common points of contact for groups of institutes active in related fields provide expert advice on complex issues and coordinate the development of appropriate solutions.

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<th>Adaptronics</th>
<th>Digital Cinema</th>
<th>Polymer Surfaces</th>
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<td>AdvanCer</td>
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<td>Cloud Computing</td>
<td>Photocatalysis</td>
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Fraunhofer attracts the best
The most popular employers among elite students*
*Universum Survey of Students 2012

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<th>Natural sciences</th>
<th>Computer science</th>
<th>Engineering</th>
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<tr>
<td>1. Max-Planck-Gesellschaft</td>
<td>1. Google</td>
<td>1. Audi</td>
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<tr>
<td>2. Fraunhofer-Gesellschaft</td>
<td>2. Microsoft</td>
<td>2. BMW Group</td>
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<td>3. BASF</td>
<td>3. IBM Deutschland</td>
<td>3. Porsche</td>
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<td>5. Novartis Pharma</td>
<td>5. SAP</td>
<td>5. Daimler/Mercedes-Benz</td>
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<td>7. Merck</td>
<td>7. Siemens</td>
<td>7. EADS</td>
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<tr>
<td>11. Audi</td>
<td>11. Electronic Arts</td>
<td>11. DLR</td>
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Quelle: Universum Communications

*the best 25% of a graduating class
Fraunhofer’s Economic Impact
Development in Germany through Various Channels

- **Contract Research (Industry)**
  - Industry projects: 9,000
  - ~€452 mio
  - 40% SMEs
  - 60% large enterprises

- **Licensing**
  - €117 mio

- **Spin-offs**
  - 9 spin-offs in 2012
  - 250 since 2001

- **Equity Investments**
  - 4 equity investments in 2012
  - 60 in total (share up to 31%)

- **Knowledge Transfer and Education**
  - Fraunhofer Academy with 2,000 participants, 800 highly trained researchers and engineers per year

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The economic benefit of Fraunhofer’s work, an example:

Economic benefit through mp3 (Figures 2008)

- At least €1,67 billion volume of sales/turnover in Germany with mp3 devices, digital contents, equipment and audio devices with additional mp3 applications
- More than €300 million fiscal revenue per year
- At least 9,000 jobs in Germany in direct correlation through mp3
- Not taken into account:
  - Indirect benefit in the supplier chain and in the services
  - Indirect fiscal revenues and jobs!
It does not happen over night
Fraunhofer pushes innovation

1992
World-renowned mp3-format compresses music data

2000
new video format for fast live-streaming

2009
world record: multi-junction solar cells with 41% efficiency

2011
RIBOLUTION: Biomarkers for early diagnosis of common diseases. (use of non-coded RNA

2012
world record: 35% less energy consumption in carbody manufacturing
It does not happen without vision
Fraunhofer recent innovations and future outlook

2013
New second world record: multi-junction solar cells with 44.7% efficiency

2013
Dandelion as a substitute for natural rubber in car tires

2013
Broadband: 5th generation (5G) high speed internet (wireless transfer rate: 25 ms → 1ms)

2014
Innovative protective film prevents product piracy

2020
Big Data analysis platform
Next-Gen. Energy-system
Regenerative medicine