



# Technology Partnerships

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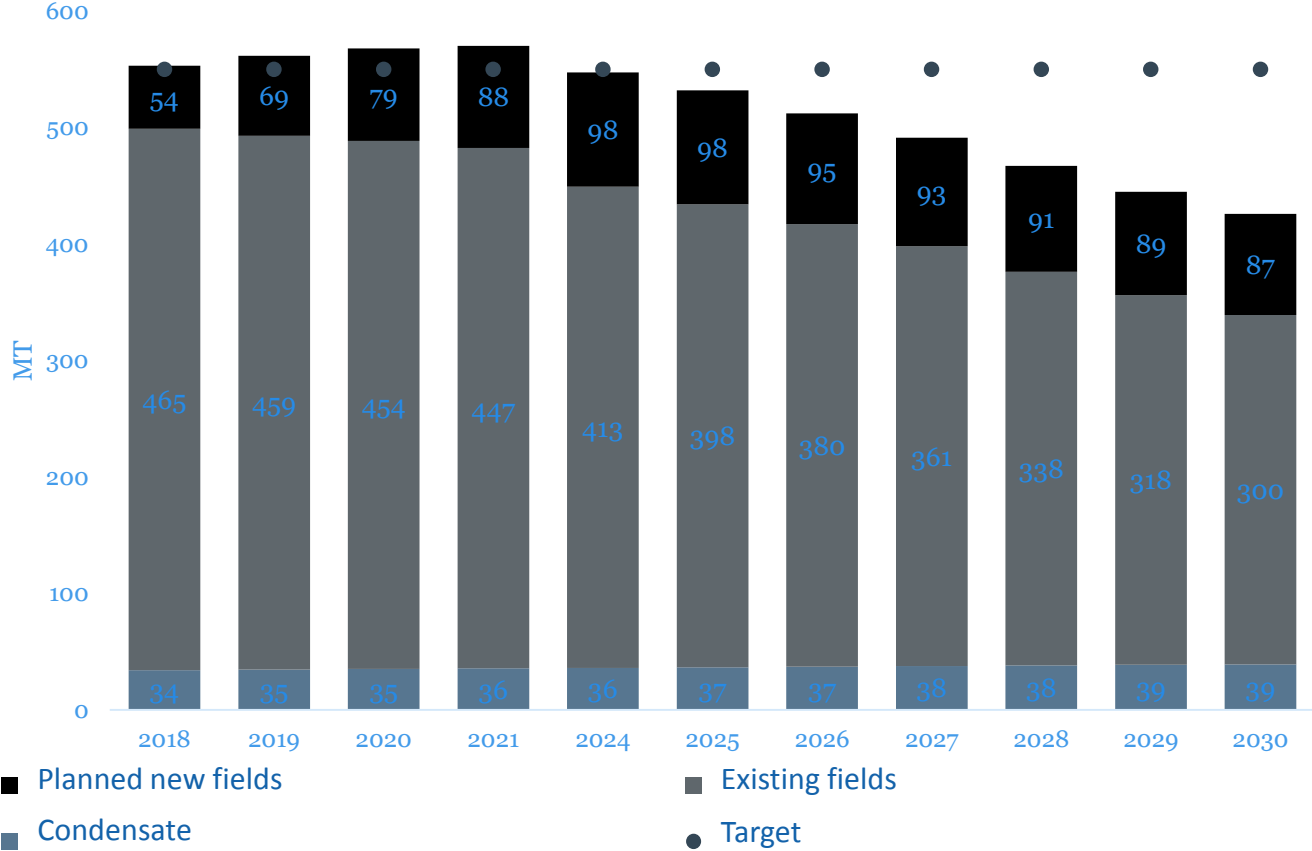
Director, Energy Centre, SKOLKOVO  
Moscow School of Management

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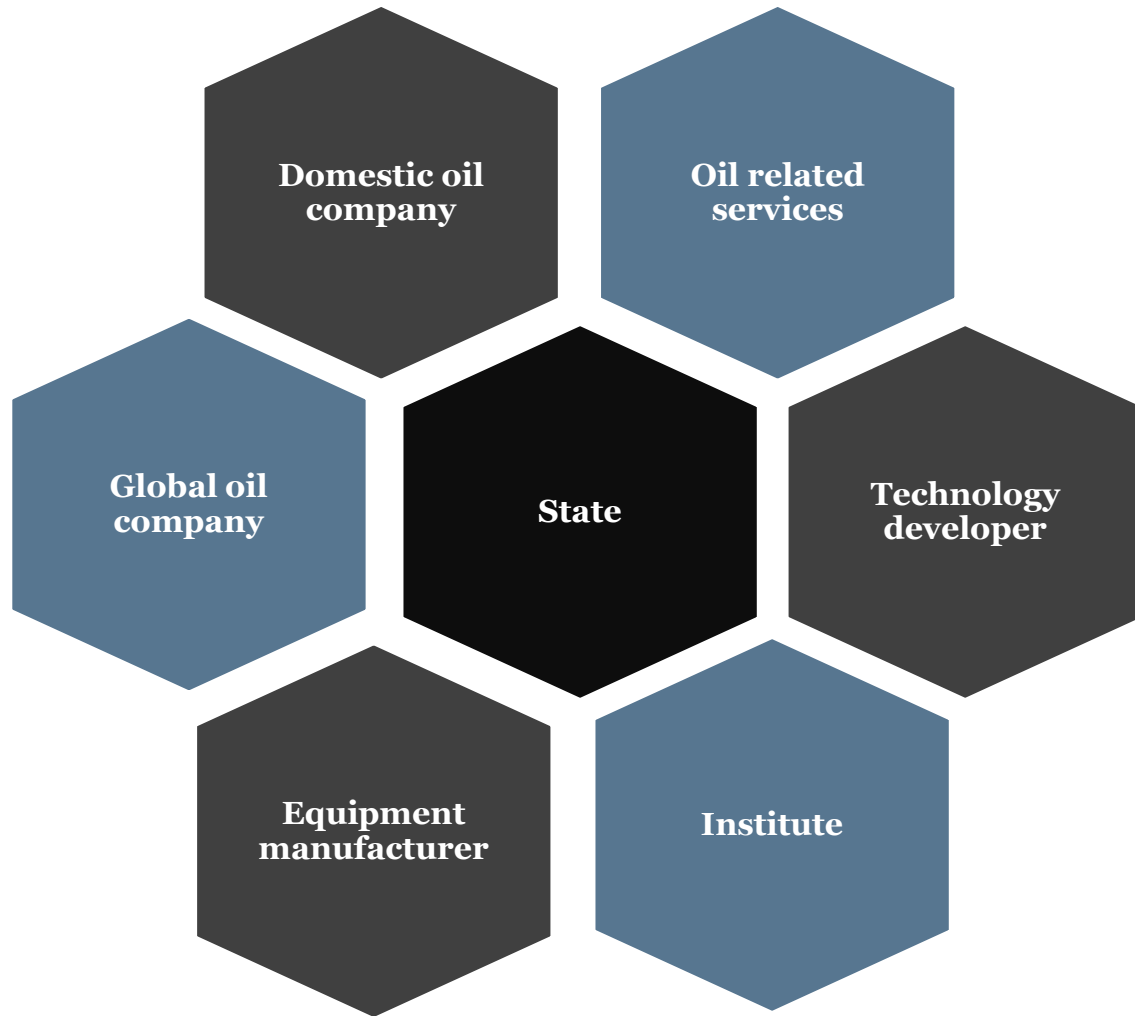
# By 2030, oil producing facilities for 125 MTPY, requiring new technologies, should be launched to maintain Russian output at 550 MT

Oil and Gas Condensate Output



- Oil output in the existing fields is to decline by an average of 3% in 2018/2030
- By 2025, the output is to be maintained due to the new fields to be developed
- After 2025, the current facilities will be insufficient to maintain the output at 550 MT

Source: Energy Centre, SKOLKOVO Moscow School of Management



## What is meant by TP?

**Technology Partnerships (TP)** are a form of cooperation that implies exchange of knowledge, sharing of risks, resources to address process and business objectives that are reasonable to be resolved jointly

### **Technology partnership types:**

- to create a new technology
- to transfer a technology (technology transfer)

**Technology Partnerships are always ‘non-zero sum game transactions’**

# Technology Partnerships: Main Objective is to Share Risks

## Global factors

- Pricing
- Global competition
- Geopolitical

## Technology factors

- Depletion of the existing fields
- Tight oil share growth
- Environment

## Financial factors

- High capital intensity of the sector

## Governmental support

- Local law
- State authorities' joining JVs or partnership agreements



## Formal risks

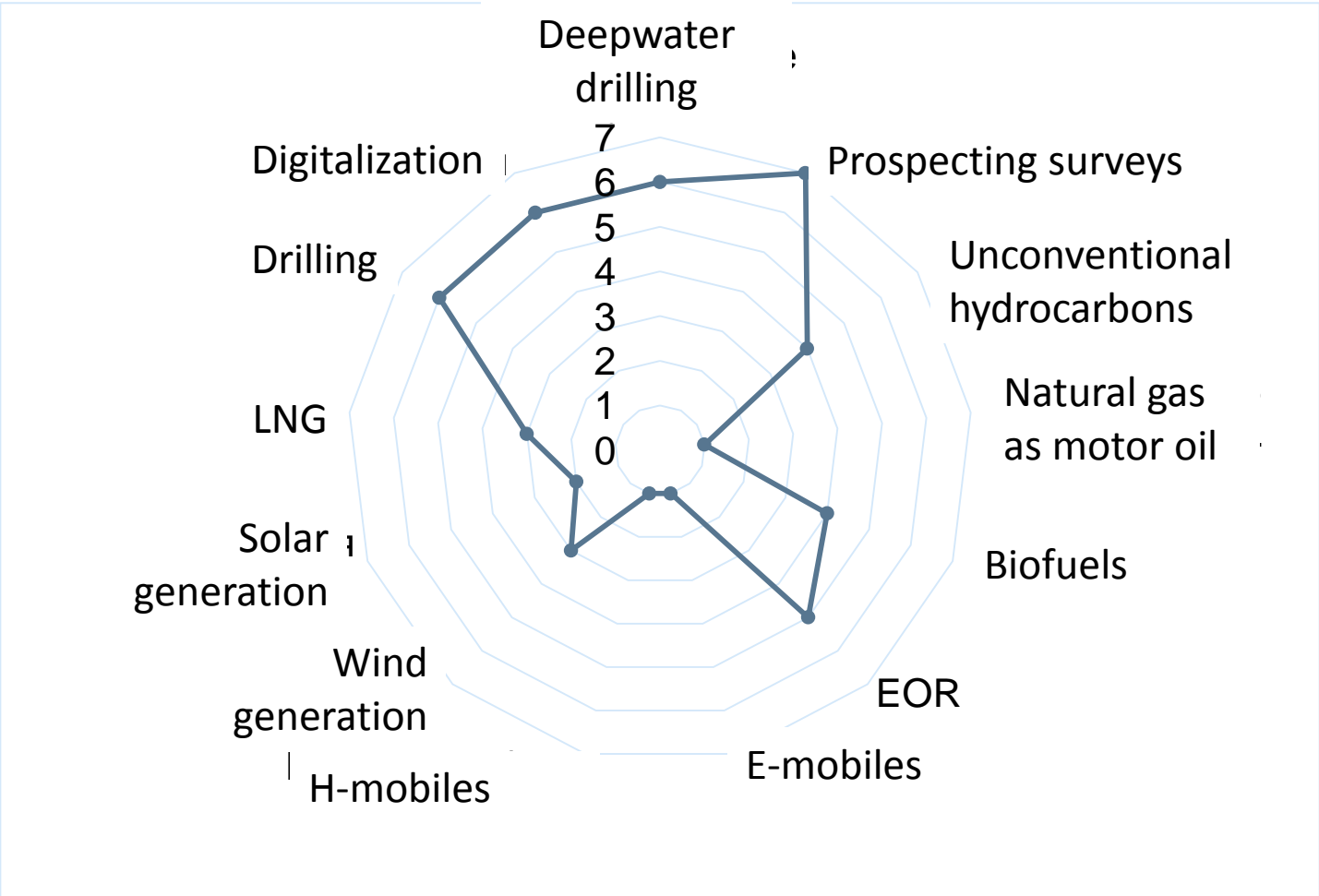
- Inadequate design of contracts

## Informal risks

- Cultural differences
- Integration error

# None of the global oil and gas majors is the leader in all technology areas simultaneously

Map of Process Competencies: Seven Global Oil and Gas Majors



# Areas where companies have to act jointly

1 Oil recovery enhancement methods

2 Development in extreme conditions and tight oil development

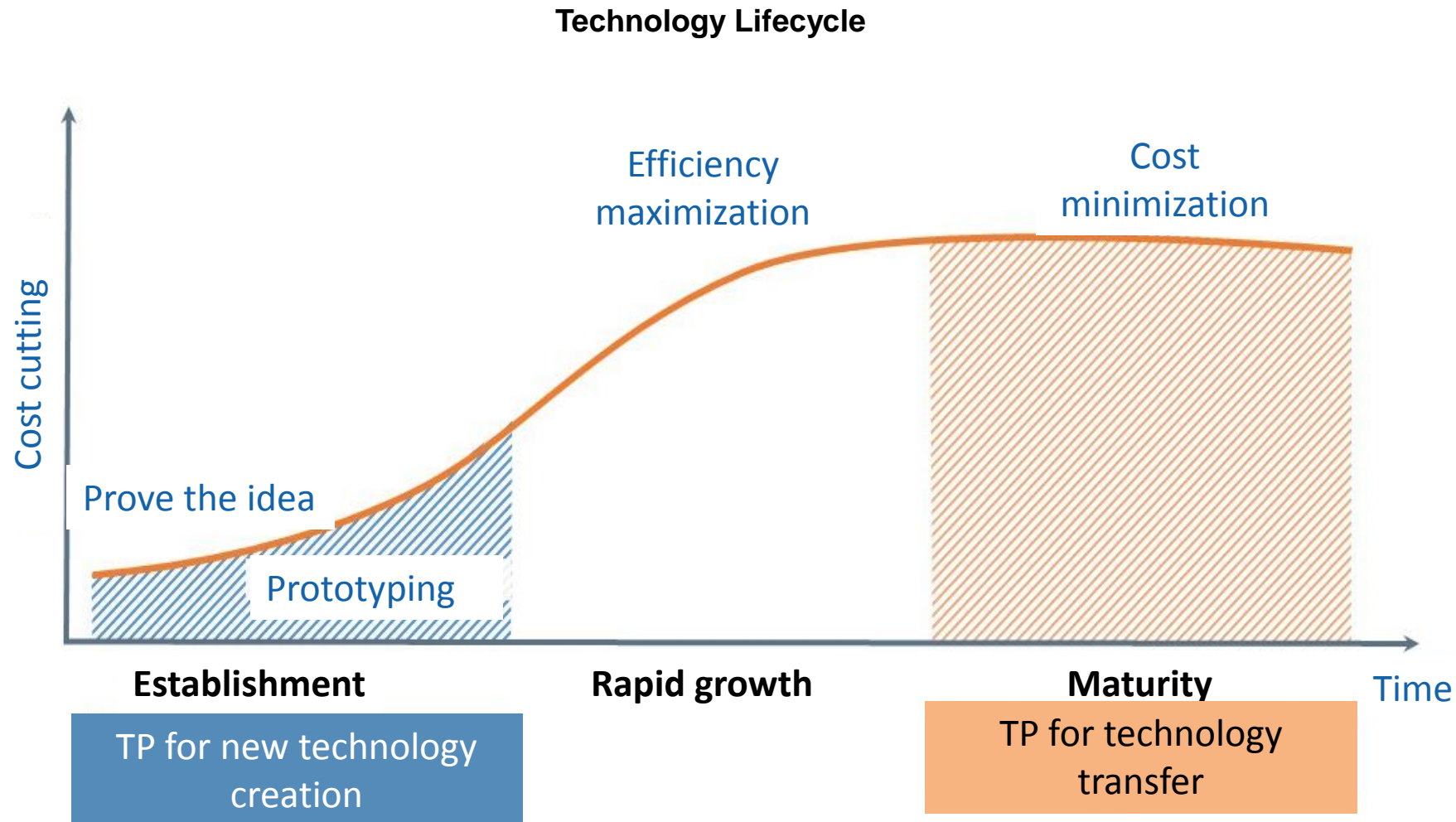
3 Refining

4 Integrated pipeline systems

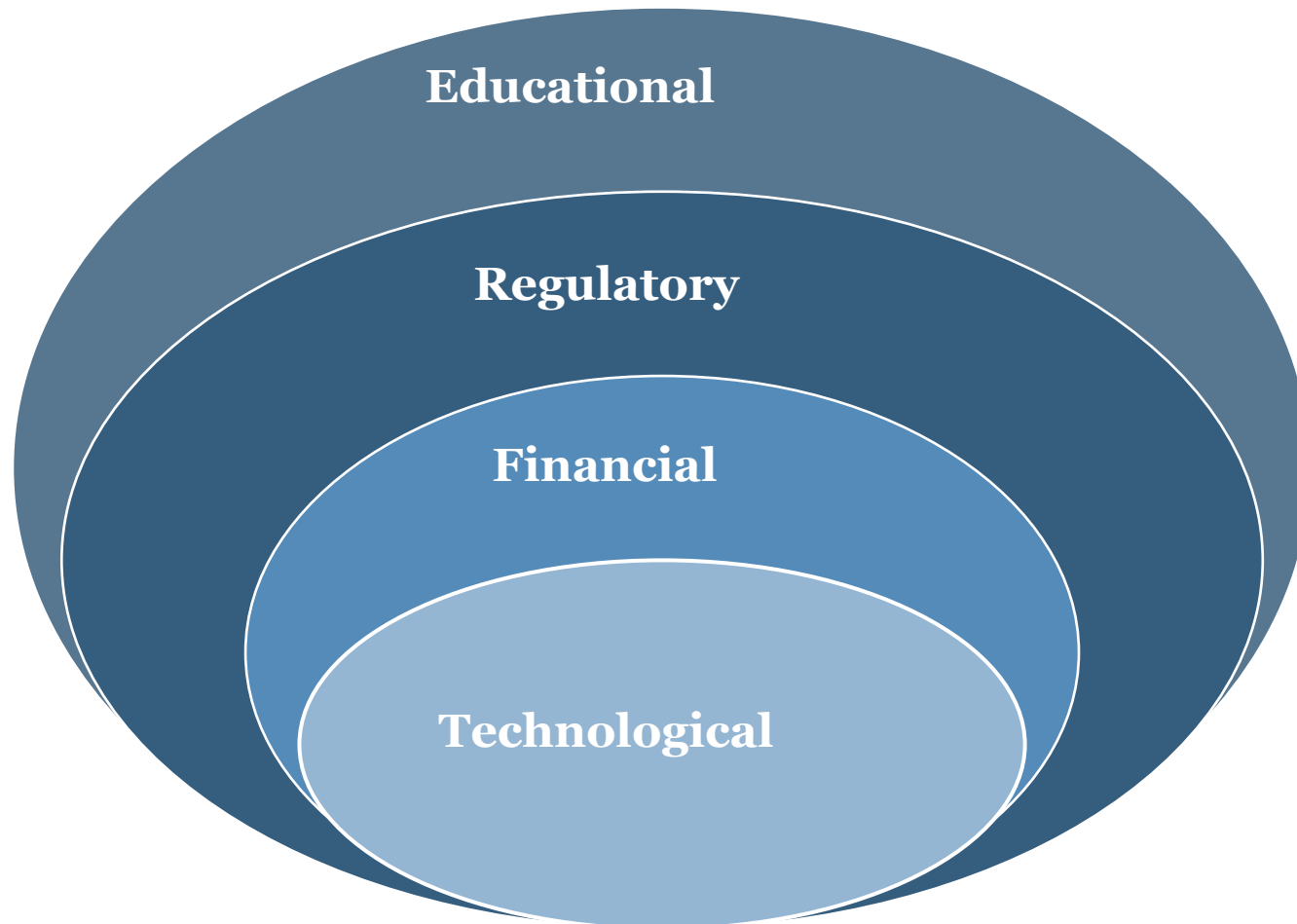
5 Environmental impact mitigation

6 Socio-economic cooperation

# Different technology partnership types apply, depending on the technology development stage



# Partnership Types



**Partnership can address one objective or cover several areas**

## **Legal forms:**

- License agreement
- Technology cooperation agreement
- Joint venture
- Joint industrial project
- Commercial agreement with technical support
- Production agreement



# Working together is more advantageous than individual work

## Technology Partnership Advantages

Profit allocation

Rapid market entry



Competitive advantages

Risk allocation

Access to new markets



# Technology Partnerships for Technology Transfer

# Technology Transfer

- Intra-sector TT and creation of new ones
- Direct technology transfer
- TT for market entry
- Inter-industry TT

Technology transfer occurs from the transferor (often a global oil company) to the recipient (often a domestic oil company), with subsequent commercialization

TT includes transfer of physical assets, documents, information or knowledge

TT is complete when the recipient is able to use it on its own

# TT Factors

## Governmental support



Recipient's scientific background



## Governmental support



Cultural distance

## Geological and climatic conditions



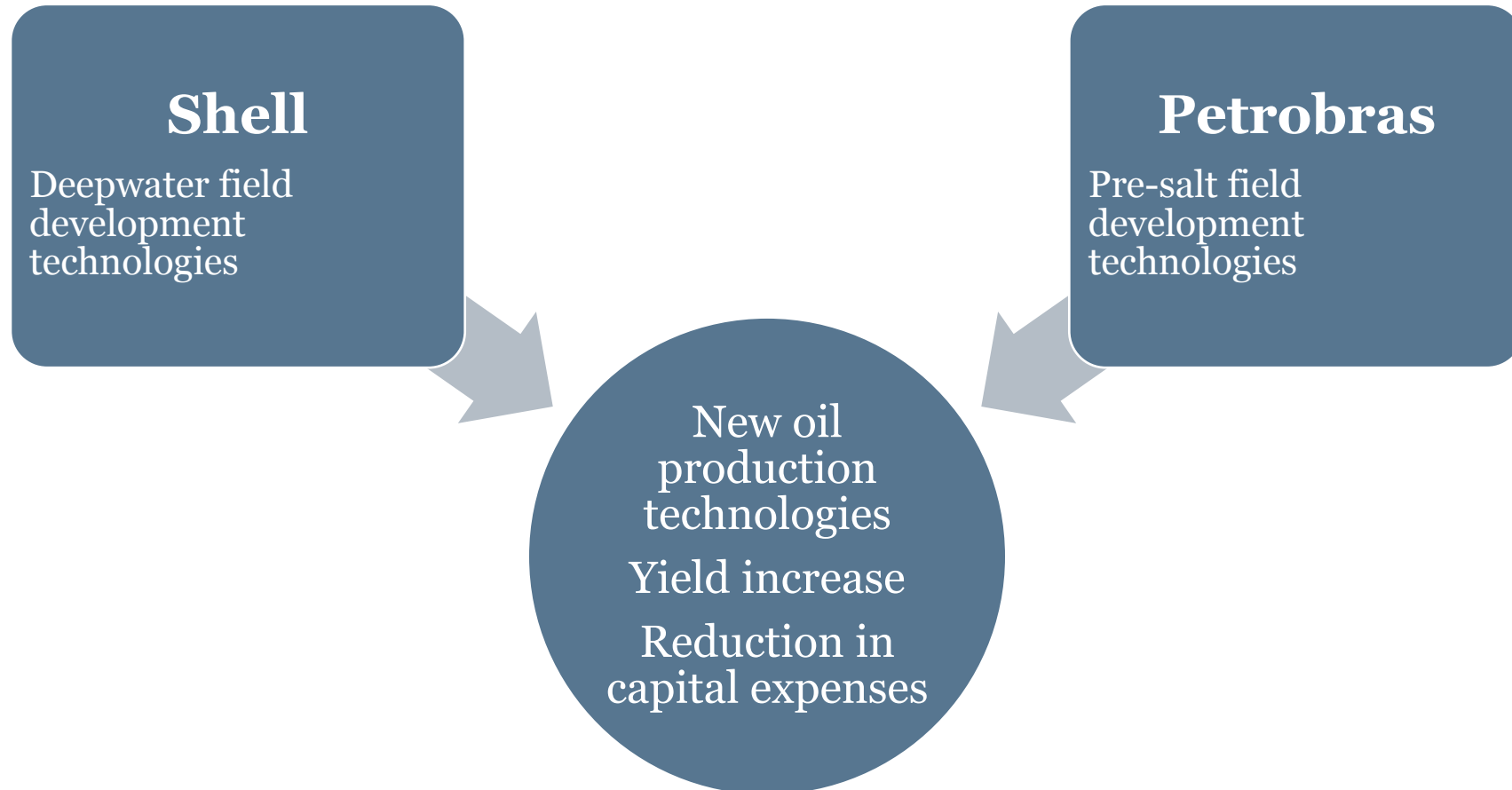
## Geological and climatic conditions



Competitive and  
business environment

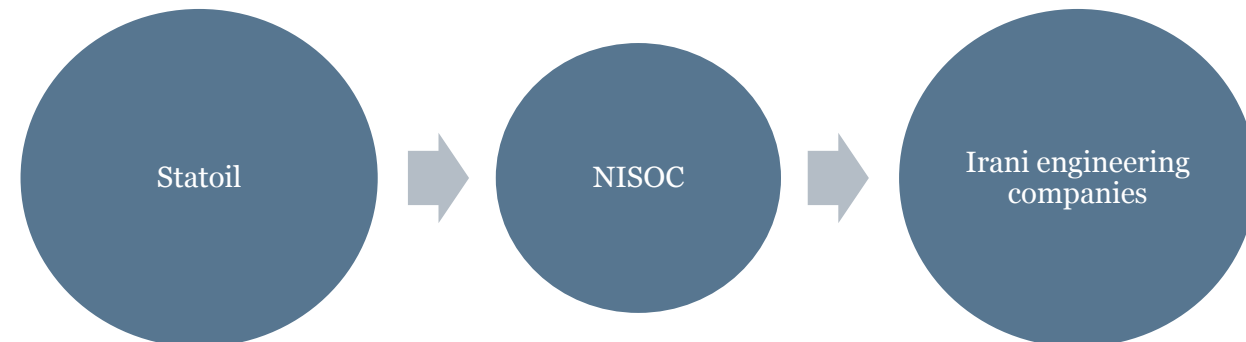
# Intra-sector TT: New Technology Creation

## Petrobras and Shell



# Direct Technology Transfer: Iran Case

- **Collector research technology**
- **Integrator: National Iranian South Oil Company.**
- **Contract term: 3 years (2001/2003)**
- **Fields: Ahvaz, Maroun, and Bibi Hakimeh**
- **SW for database maintenance and analysis purchased and installed**



Professional level of project top managers improved

Databases for three fields prepared

Data transfer protocols efficiency enhanced



Technology relevance: at best, it is a technology of today, at worst, that of yesterday, and it may become obsolete rather quickly

# TT for Market Entry: Local Content

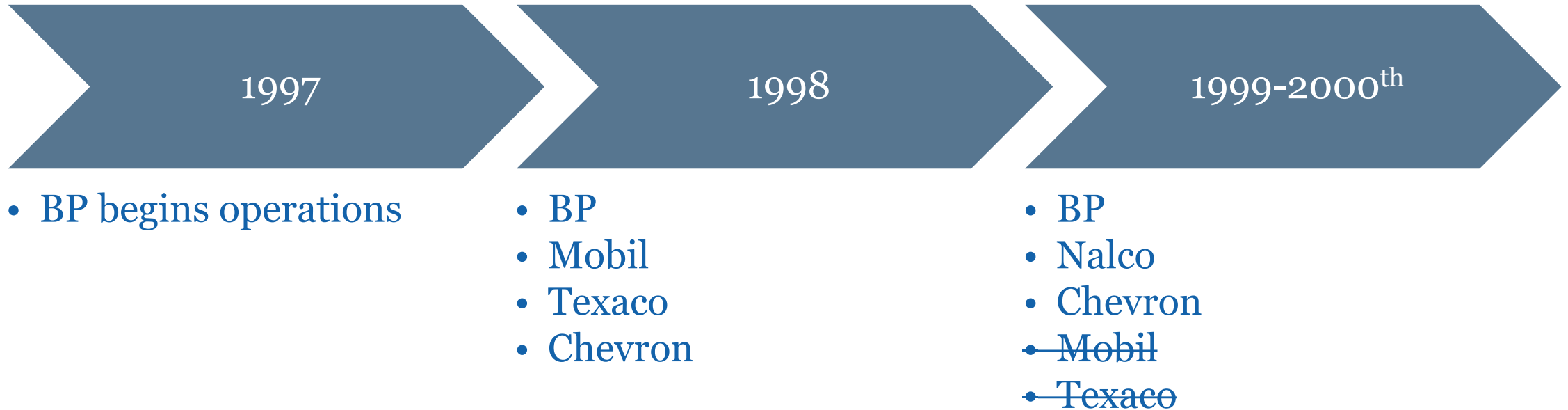


9 foreign oilfield service companies

15 years of operation under preferential conditions

# Inter-sector TT: Global Expansion

## BP's and Namco's BrightWater Project



**Applied by BP in the following projects: MilnePoint, PrudhoeBay, Samotlor, Tangri**



# Technology Transfer:

1

**TT gives the advantage of a comparatively quick technology acquisition and lower costs, as compared with the technology development**

2

**One has to account for the consequences of speed and cost savings - quick obsolescence of technologies**

3

**Organized correctly, TT may lead to creation of a new technology**

## TT in Russia: institutional obstacles

- No risk insurance for innovative companies
- No support to startups and small companies at the technology introduction stage
- Underdeveloped financial tools for promotion of innovations

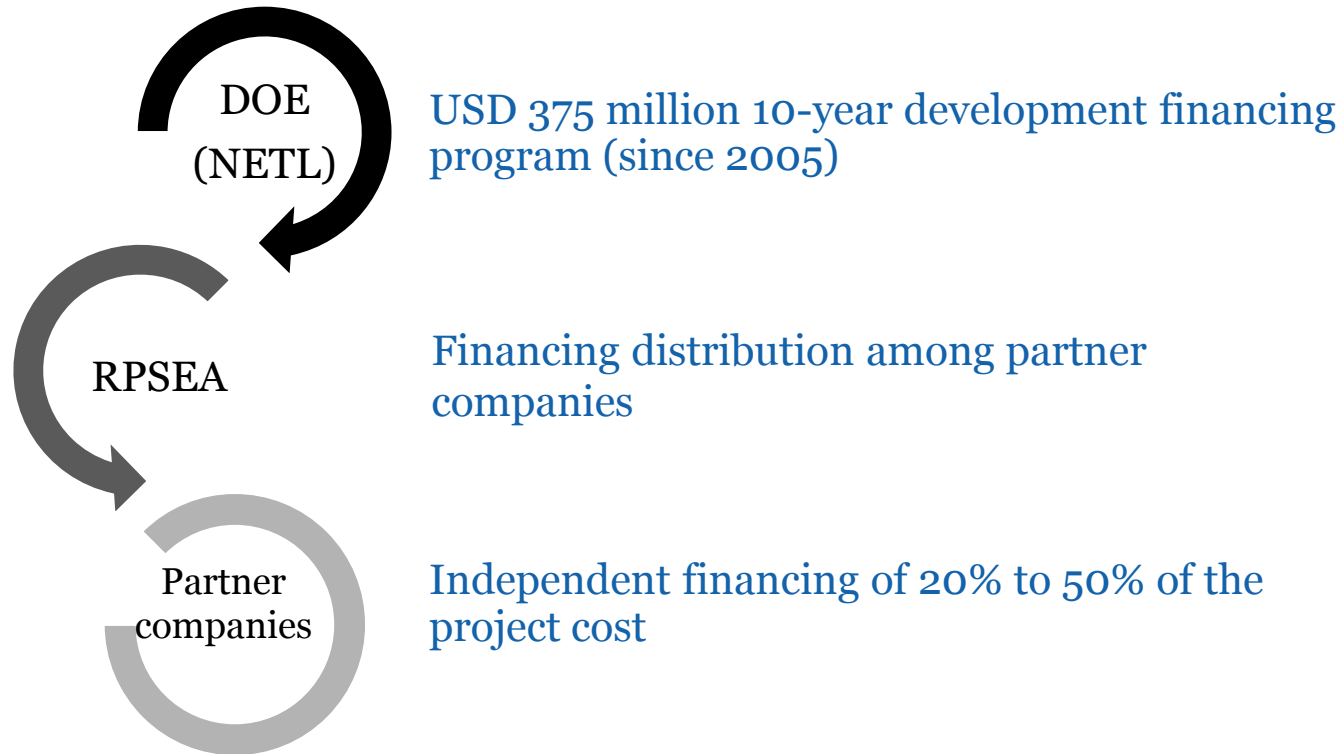
Technology monitoring can be one of the areas of TT efficiency increase.

A modern building with a glass facade reflecting the sky, situated behind a body of water. The building has a unique, angular design with a grid-like pattern on its facade. The sky is overcast with dark clouds. The water in the foreground is calm, reflecting the building and the sky. The overall scene is dimly lit, suggesting dusk or dawn.

# Technology Partnerships to Create New Technologies

# Public-private TP: Addressing Strategic Objectives (1)

## Research Partnership to Secure Energy for America



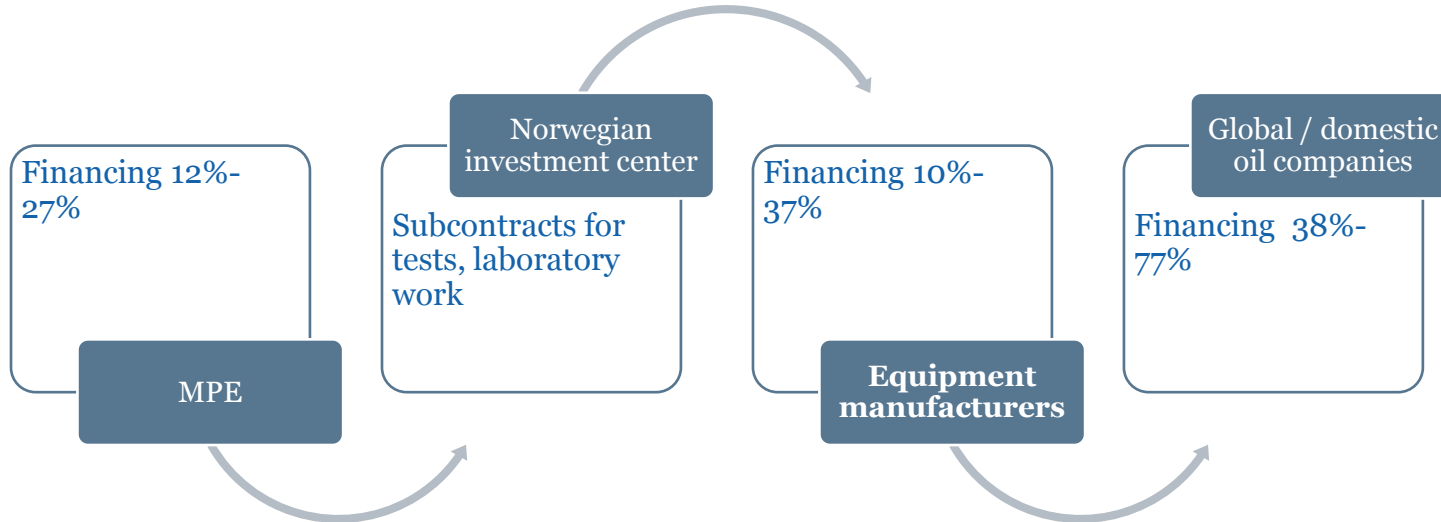
Extra-deep fields

Unconventional resources

Small manufacturers

# Public-private TP: Addressing Strategic Objectives (2)

## DEMO 2000 Program (Norway)



## 4 priority areas

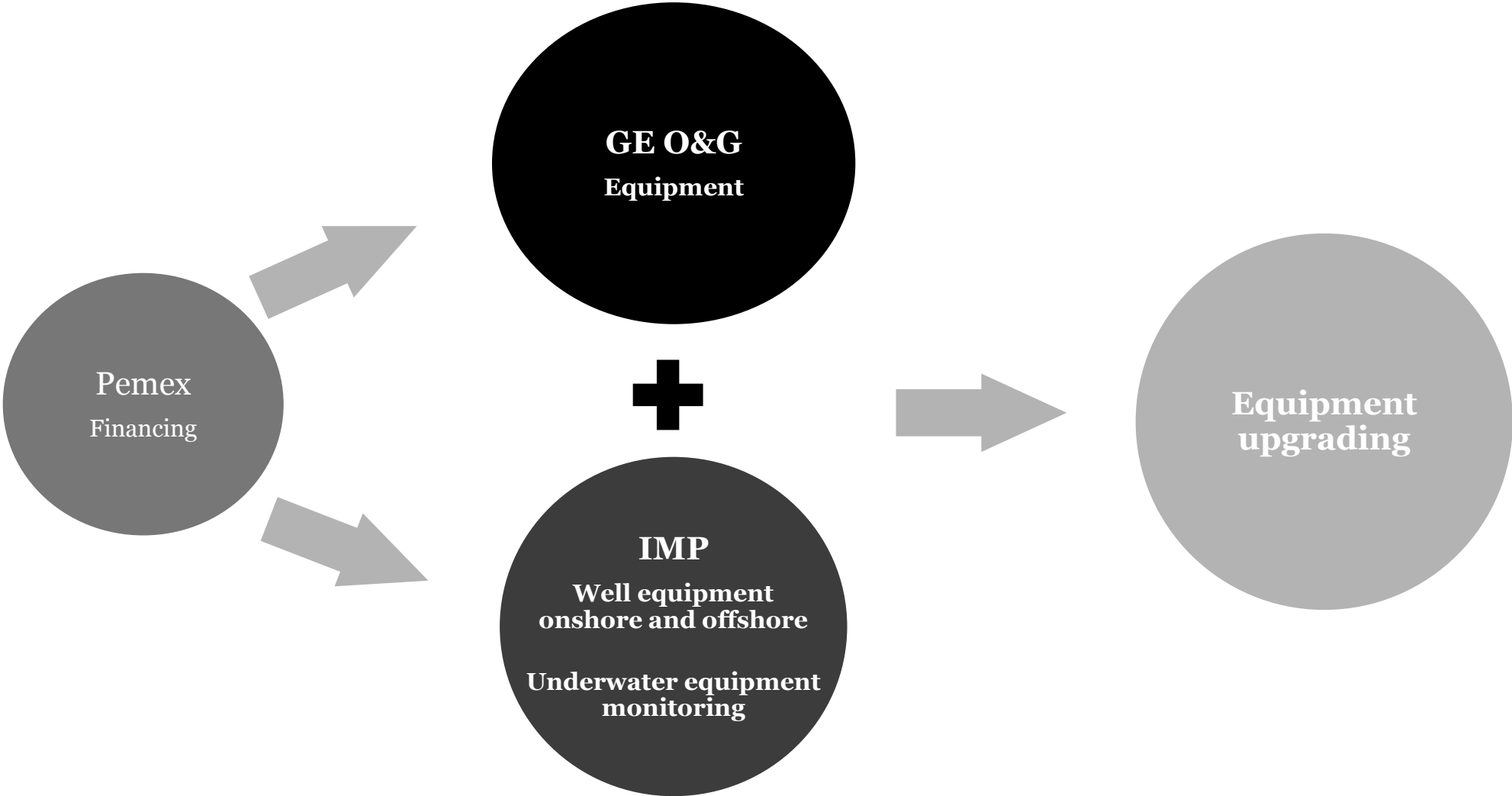
- Environment and energy savings
- Prospecting and enhanced oil recovery
- Drilling, pumping, and wellwork
- Production, refining, and transportation

## 3 main topics

- Reduction in hothouse gas emissions and power savings
- Digitalization
- Arctic regions

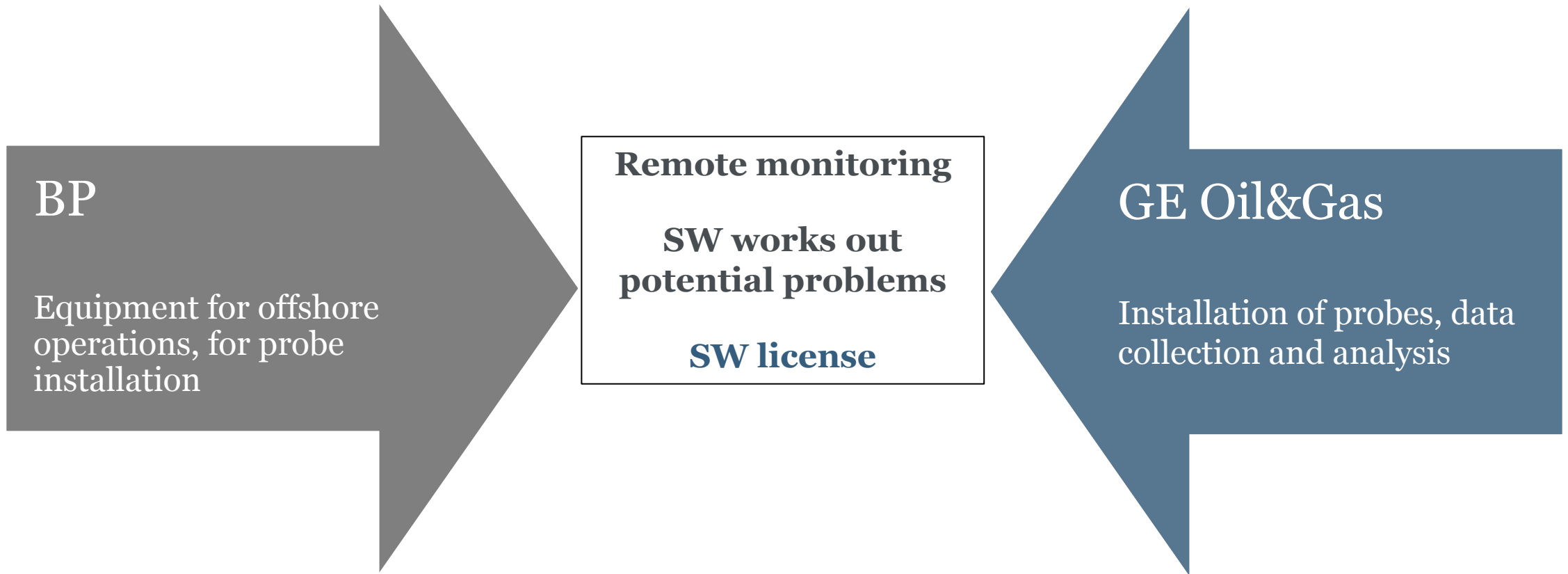
# TP with Equipment Manufacturer: Upgrading

Pemex, Mexican Oil Institute (IMP), GE Oil&Gas



# Intra-Sector TP: Field IoT

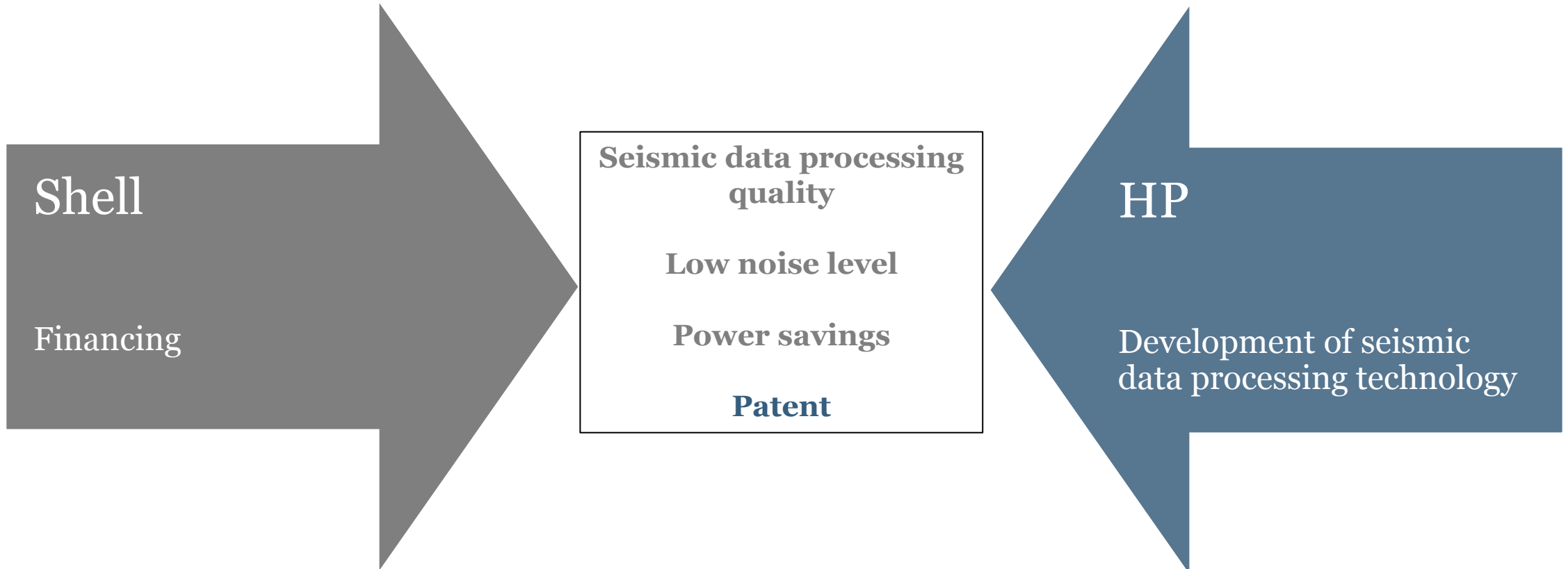
**GE Oil&Gas and BP**



**For 6 months of 2016, BP 'saved' 118 mln. b.o.e.**

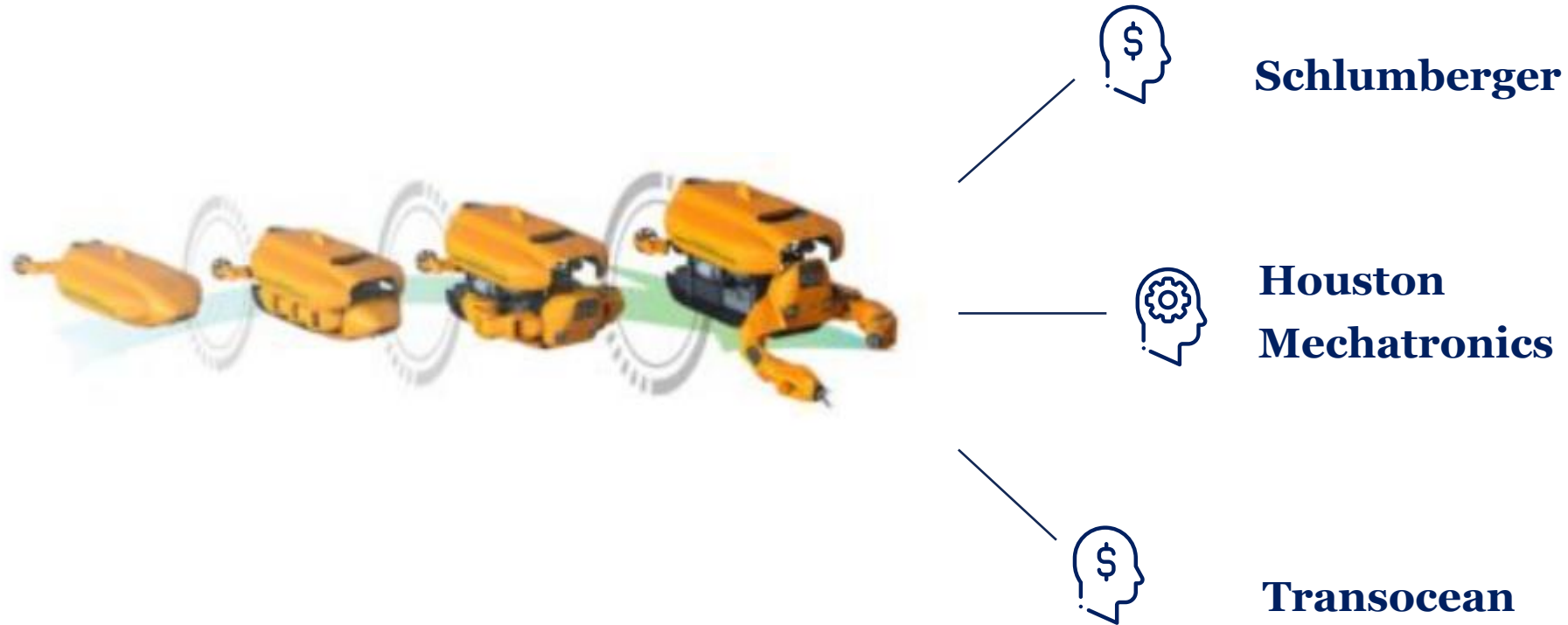
# Inter-sector TP: Efficiency Increase

**Shell and HP**



# Inter-sector TP: Advancing Robots

## Autonomous underwater robotic vehicle (AURV) Aquanaut



**Reduction in underwater work costs**  
**No need in hiring or purchasing expensive ships**  
**No need for humans under water**



# Conclusions

- 1 **Technology partnerships are a form of cooperation for technology creation or exchange**
- 2 **Maximum benefit from cooperation (benefits from sharing of investments and risks within a TP should exceed the risks of losing competitive advantages when implementing technology projects on one's own)**
- 3 **TT is a simplified TP form, it may also lead to creation of a technology**
- 4 **The extent of transaction costs needed to establish and maintain stable partnership is essential**

- 5 **To address strategic objectives, the State often acts as one of the partners**
- 6 **The most significant technology cooperation deliverables can be seen in the areas where governmental support exists and where a favorable environment encouraging technology partnerships and technology development is created**
- 7 **Oilfield service companies are more open to partnerships and more willing to share the deliverables of new technological developments**
- 8 **Digitalization and IoT have become new areas for cooperation**