

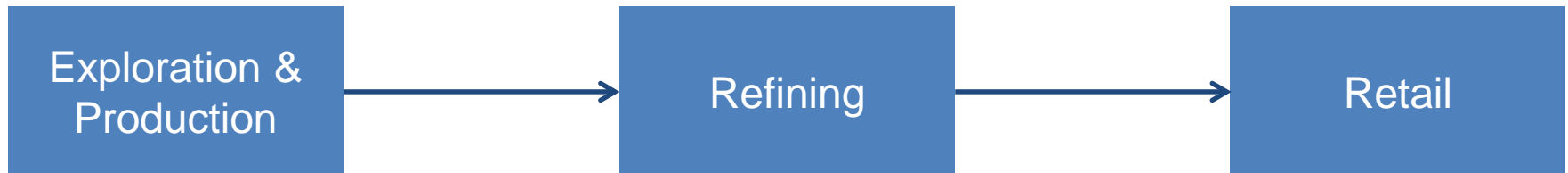
Innovation of technology, policy and industry: the case of disruptive innovation in Brazilian petroleum

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Introduction

For decades, the competitive dynamics of the oil & gas industry have remained the same:

- Dominated by major international players
 - Competition from smaller competitors with new business models
- Access to plentiful, cheap, easily-obtainable reserves
 - Low-hanging fruit scarce
- Ownership of a vertically-integrated value chain
 - Possible fragmentation of the value chain...



Two research questions are posed by this study:

1. How does disruptive innovation generate novel business models from new entrants, which differ from those of incumbent firms?
2. Under this scenario of uncertainty, how might breakthrough technologies and new entrants shift the balance of power away from the major players in the petroleum industry?

Disruptive Innovation

Technological Enabler

- Exploration & Production (greatest turmoil, technological challenges, increasing new entrants, degree of innovation intensity)
- Deep/ultra-deep water technologies
- Nanotechnologies (remote locations, harsh conditions, unconventional reserves, sensors, coatings, nanofluids, nanomembranes)

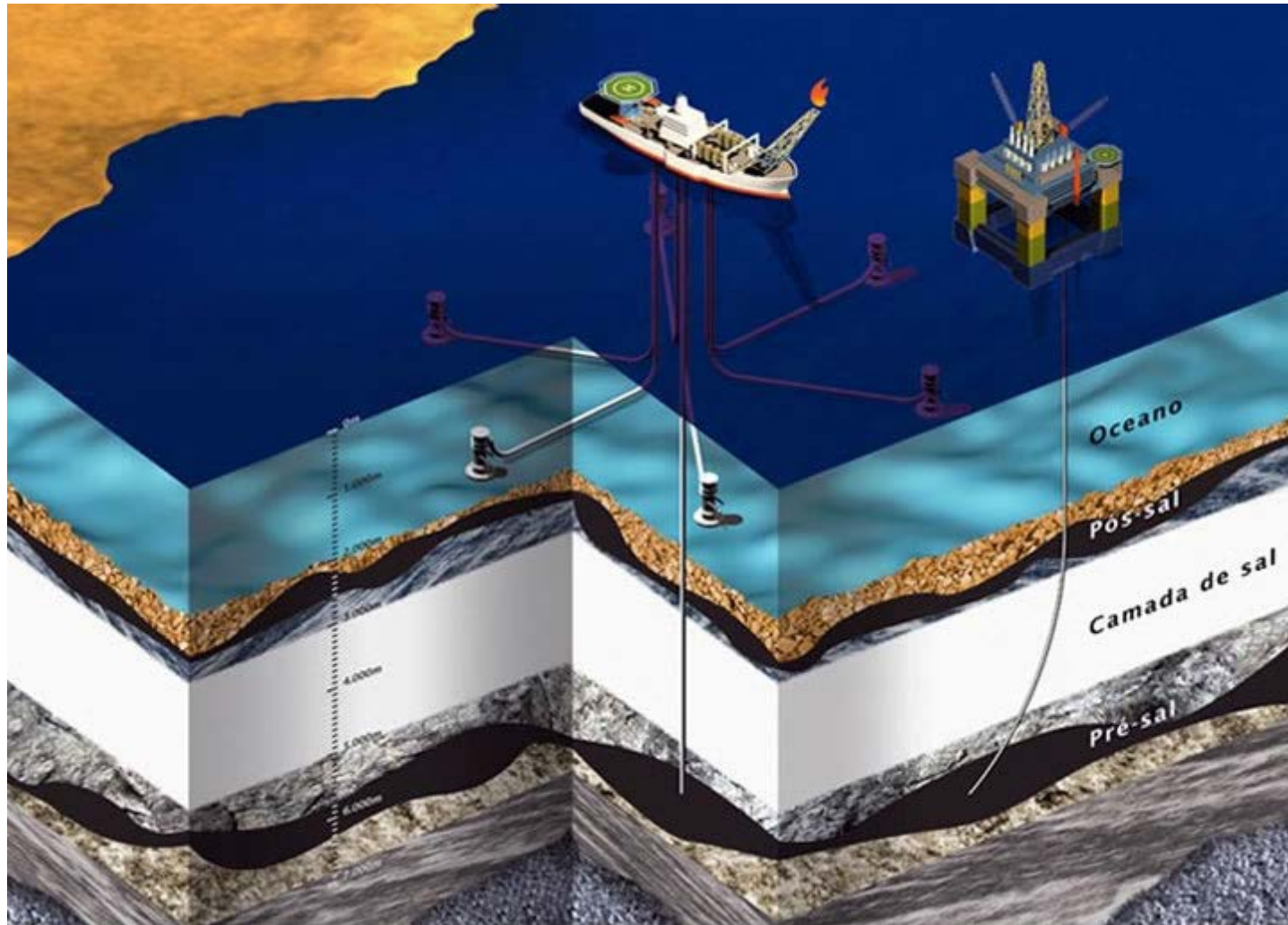
Business Model Innovation

- Incumbents & new entrants
- Exploitative & exploratory business
- Creative accumulation

Value Chain Disruption

- Market readiness for potential disruption
 - Closely related to maturity of the industry/organisation
- Balance of power may be shifting: from those who own reserves to those who develop the technology required to extract those reserves

Brazil's Petroleum Industry



Research Methodology

Research Methodology

- Focus countries: Brazil (China later)
- Focus sector: E&P
- Around 30 semi-structured interviews of parties engaged in the development of breakthrough technologies for E&P in Brazil
 - Government
 - MNE (domestic & international)
 - Universities
 - Research centres
 - SMEs
- Comparative case study analysis (different firms, value systems and national industries)

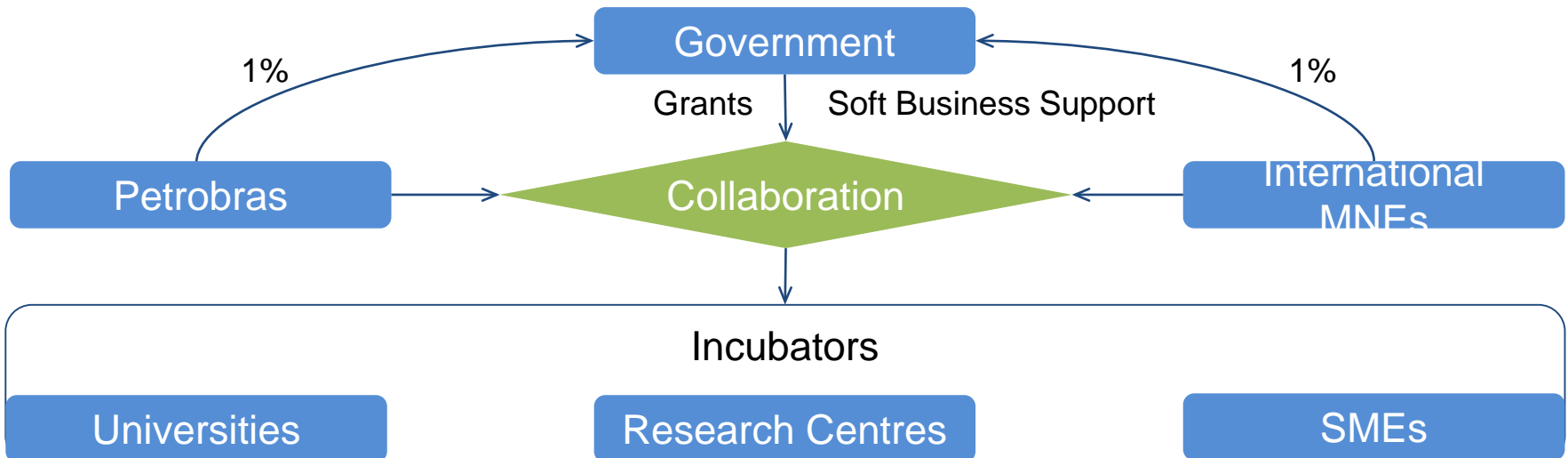
Changing Face of Industry

For the last forty years, innovation in the Brazilian petroleum industry has been dominated by:

- Petrobras, operating a vertically-integrated value chain
- A single collaboration between UFRJ & Petrobras
- A high degree of importing innovations from abroad

The future for this industry looks quite different:

- Initiated by local content policy



Early Findings

The objective is clear: to develop new technologies and an expertise base that can be sold around the world, establishing Brazil, rather than just Petrobras, as world-leaders in this industry:

- Collaboration rather than increased competition & market disruption
- Grants as incentive for collaboration between firms and universities/research centres – provides opportunities
- Development of incubators provide further opportunities for collaboration
- Move from importing to innovation and competence-building
- Novel business model – make the R&D programme the marketing programme

- Petrobras is a late adopter of technology; other MNEs engaged in disruptive innovation & risk-taking
- Grants often support incremental innovation – prescribed technologies
- Culture of entrepreneurialism – not taught in schools; not seen as viable career option
- Scepticism towards Brazilian technology (home & abroad)



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Any questions?

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