

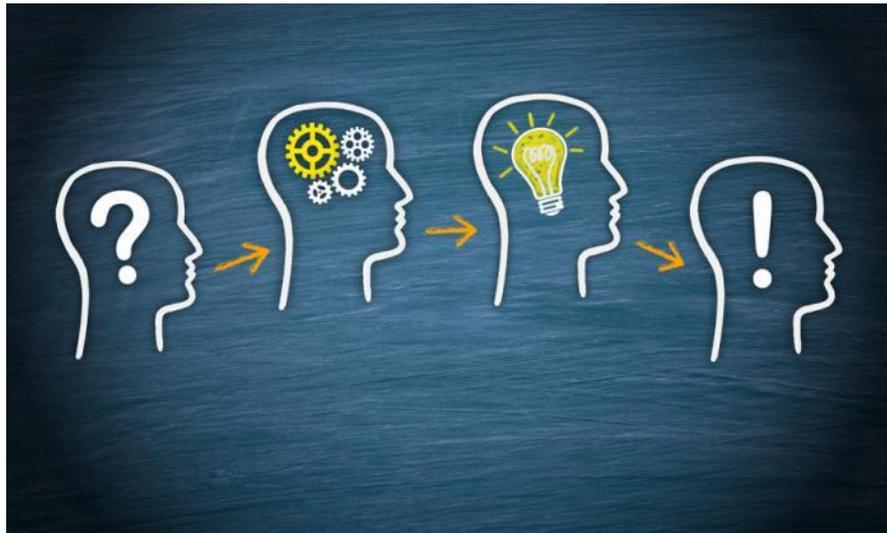


# E & P innovation chain of the future

Rio de Janeiro – 27/10/2016

Wilson Arruda | Research and Innovation

***Innovation*** is the process and outcome of creating something new and of value



- **system solutions**
- **products / services**
- **business models**
- **processes**

Important to leverage innovations of all different scales, from small / incremental to radical and disruptive.

# What is the most likely future state?

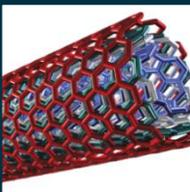
## Yesterday

Longer, deeper,  
colder, harsher

-  Longer step outs
-  Deep and ultra-deep water
-  Colder / Arctic
-  Harsh environment
-  Subsea factory  
All electric  
Complex

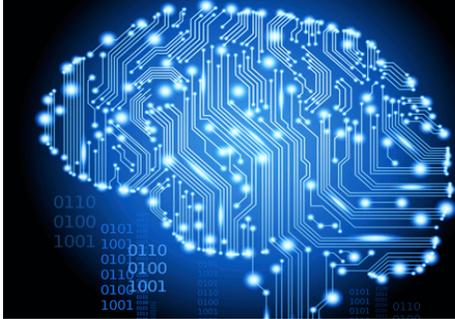
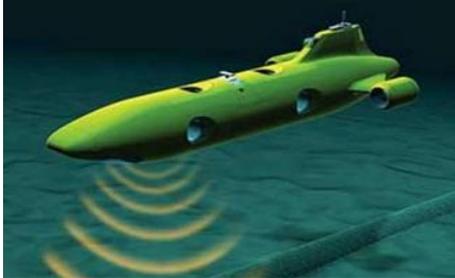
## Today

Easy oil, standard, cost, new  
business models

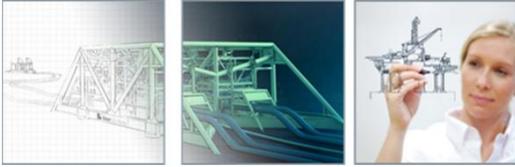
-  Easy oil,  
Brownfield,  
gas
-  Standard,  
Schedule &  
Cost
-  Materials,  
Digital &  
Data
-  New business  
models

## Tomorrow??

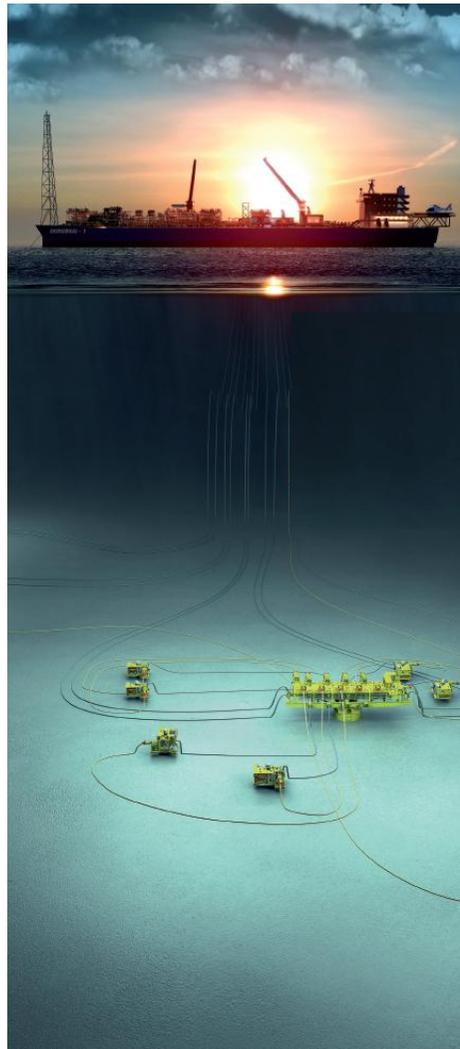
Smart & connected, unmanned,  
new frontiers?

- 
- 
- 

# Business drivers and solutions

<p><b>Production Systems</b></p> 	<p>HSE &amp; Reliability</p>	<p><b>Processes</b></p> 	<ul style="list-style-type: none"> <li>Standard Products</li> <li>Standard Requirements</li> <li>New manufacturing techniques</li> </ul>
<p><b>Services</b></p> 	<p>Cost</p>	<p><b>Products / Technology</b></p> 	<ul style="list-style-type: none"> <li>Rotating machinery</li> <li>Subsea processing</li> <li>Alternative materials</li> <li>Software/ automation</li> </ul>
<p><b>Alliances</b></p> 	<p>Performance</p>	<p><b>Field Lifecycle Economy</b></p> 	<ul style="list-style-type: none"> <li>EOR, IOR, P&amp;A</li> <li>Integrity management</li> <li>AUV solutions</li> </ul>
<p>Packaging</p>	<p><b>New Frontiers</b></p> 	<ul style="list-style-type: none"> <li>Remote/unmanned</li> <li>Deep/long step-out</li> <li>Smarter &amp; Connected</li> <li>Carbon capture tech.</li> </ul>	
<p>Sustainability</p>			

# Collaboration, Alliances and Partnerships



## Customer Projects and JIPs



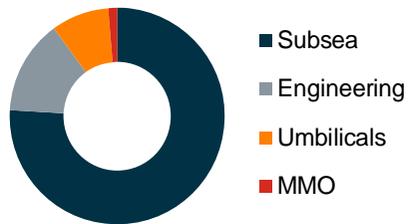
## Internal Development



### Engineers Worldwide

PhD	38
Master	1006
Bachelor	1271

### More than 1500 Live Patents



## Industry - Industry



MAN Diesel & Turbo



## Industry – Research Institutes



Imperial College London



# Conclusions



- Market changes impacts:
  - What we do
  - How we do it
  - How we fund it
- Development of fit-for purpose solutions is necessary
- Clear direction towards collaboration, alliances and integrated solutions
- Required improved processes, lean design and lean execution for RD&I



# Thank you

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Research and Innovation

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