PCIC EUROPE
PETROLEUM & CHEMICAL INDUSTRY COMMITTEE

LO – 90
Industrie 4.0 – What can the Oil & Gas and Petrochemical sector learn from this "Future of Manufacturing" concept?

Jean-Charles Guilhem, 2B1st Consulting

Summary

1. « Future of Manufacturing » Genesis
2. « Future of Manufacturing » Vision
3. Cyber Physical System
4. Industry Digitalization
5. « Future of Manufacturing » in World
6. German Industrie 4.0
7. « Future of Manufacturing » in Oil & Gas and Petrochemical Industry
8. Examples
9. Key Challenges
10. Conclusions

« Future of Manufacturing » Genesis

Lesson learnt from last 30 years in developed countries

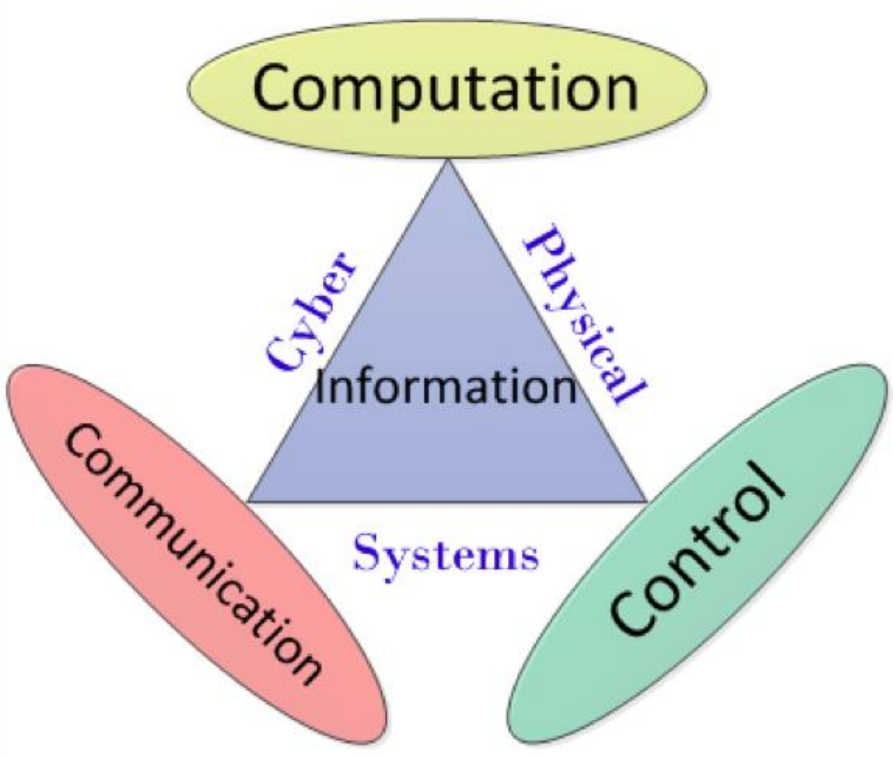
- **No developed country can sustain stable economical growth with jobs creation without solid industry.**
- **Service activities in large developed countries can only grow without severe dips if supported by significant industry sector contribution to GDP.**
- **Digital technologies introduced new concepts such as Cyber Physical System (CPS) to rethink industry models**

Industry Vision 2030

Goals may differ from country to country

- **Consolidate industry competitive advantage in global markets**
  - **China – Smart Automation 2.0**
  - **Germany – Industrie 4.0**
  - **India – Make in India**
  - **Japan – Abenomics**
  - **South Korea – Creative Economy**
- **Stop losing ground or restore industrial activity in service-oriented countries**
  - **France – Industrie du Futur**
  - **UK – Future of Manufacturing**
  - **USA – Industry Renaissance**

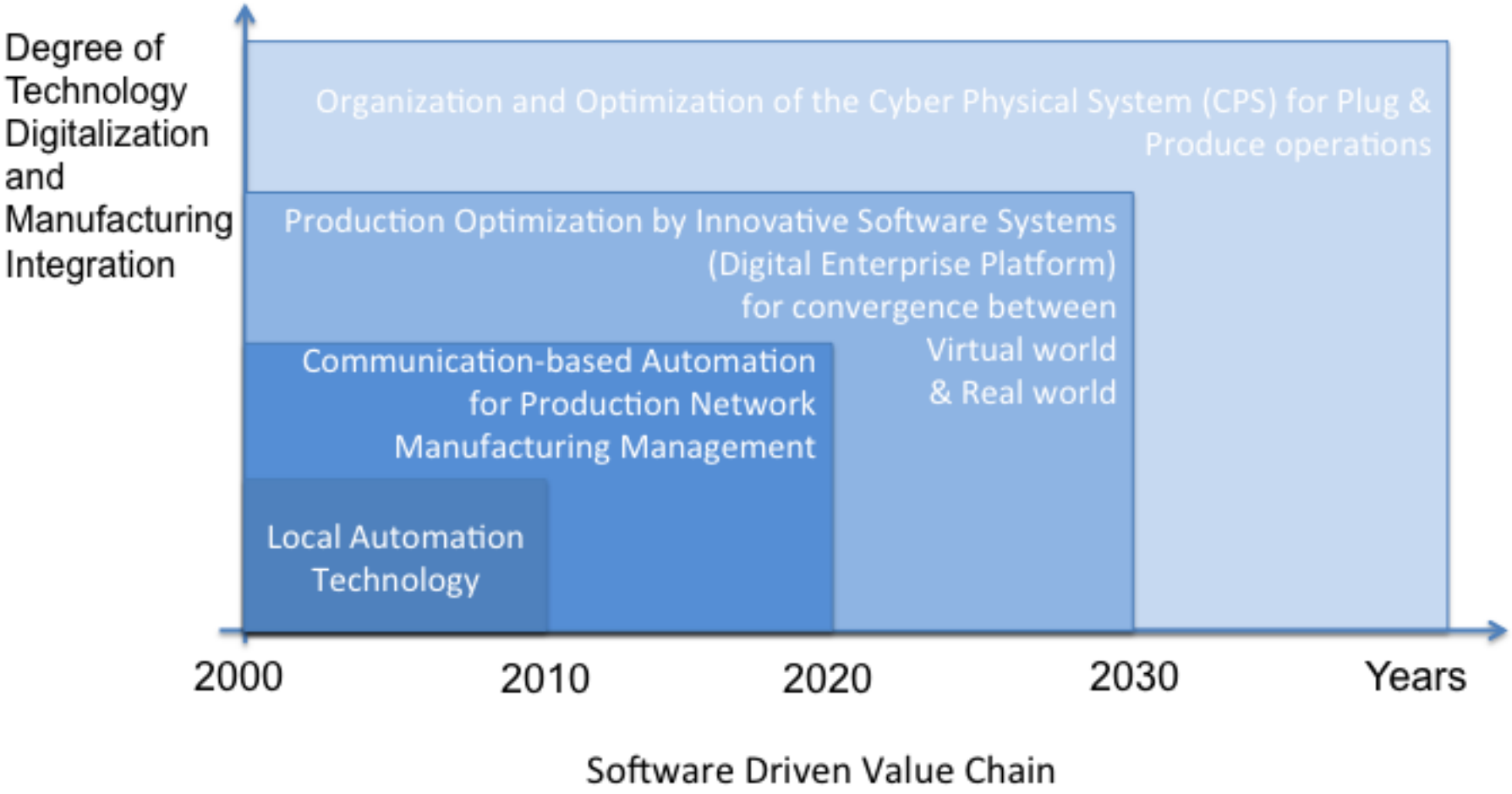
Cyber Physical System (CPS)



CPS Three Main Functions to

- **Stage 1: Digitalize a Machine**
- **Stage 2: Digitalize a Factory**
- **Stage 3: Digitalize an Industry**

Industry Digitalization in Vision 2030



“Future of Manufacturing” in the World

Three nations – Three models for the same ambition

South Korea
Creative Economy

- “CE Joint Task Force” of companies and Government
- “Creative Economy Centers”
- “Government 3.0” initiative to share government data

Germany
Industrie 4.0

- Digital Enterprise Platform
- Automotive
- Original Equipment Manufacturers (OEMs)
- Food & Beverage

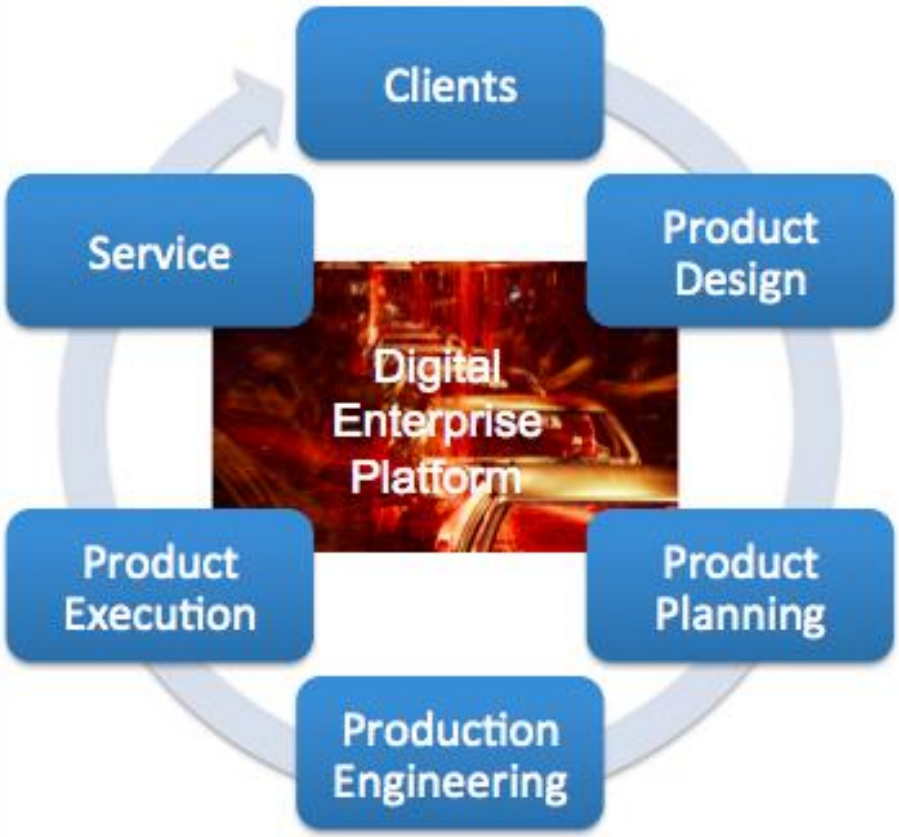
USA
Future of Manufacturing

- Shale Oil & Gas advantage to relocate industry at home
- Dow as process and manufacturing industries cornerstone
- 45 Technology Hubs Network

Foster nation wise long-term collaboration among industry, academia, banking system and government

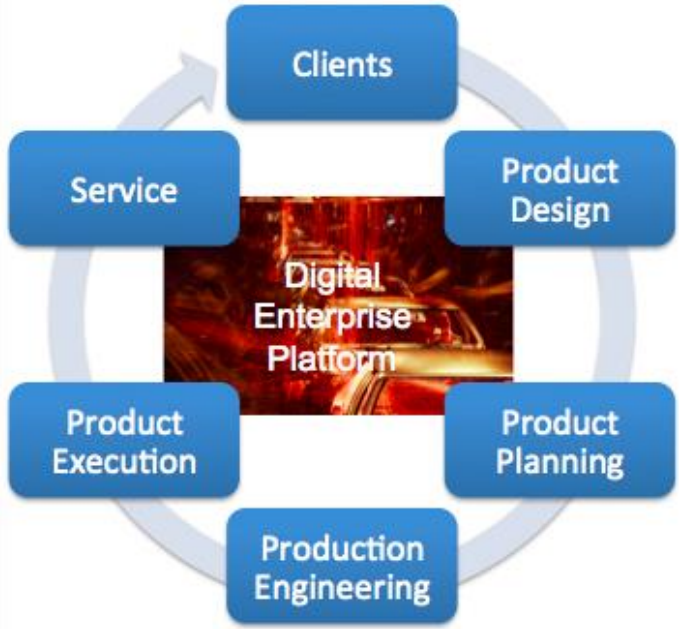
German Industrie 4.0: Client is King

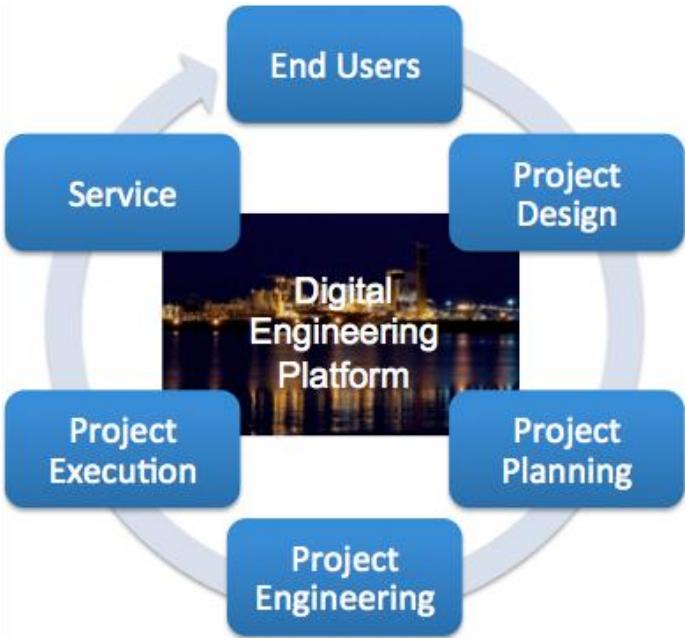
Industrie 4.0 put Clients on the top of the auto-adaptive and collaborative manufacturing process loop



Future of Manufacturing in the OGP Industry

Digital Enterprise Platform ➔ Digital Engineering Platform





Discrete Key Values

- **Efficiency**
- **Time to Market**
- **Flexibility**

OGP Key Values

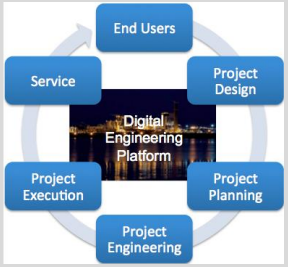
- **Market Acceptance**
- **Capital Intensity**
- **Safety & Reliability**

Future of Manufacturing in OGP Industry

Digital Engineering Platform

Multi-access collaborative platform for

- End Users
- Engineering companies, Contractors & Sub-contractors
- OEMs & Sub-suppliers
- Services providers
- Institutes & Universities & High schools



OGP Key Values along the Supply Chain

Market Acceptance

- Speed up market access
- Develop environment friendly solutions
- Promote local content & social value proposition

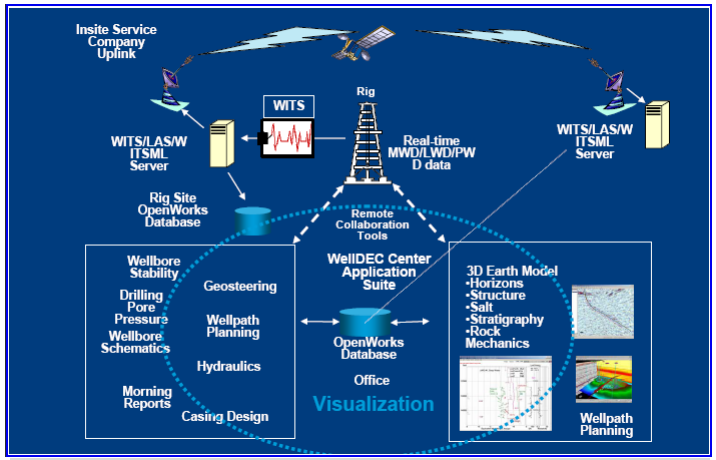
Capital Intensity

- Align demand and offer
- Visibility on future needs
- Reduce projects costs & risks
- Mutualize resources
- Cut time to market from FID

Safety & Reliability

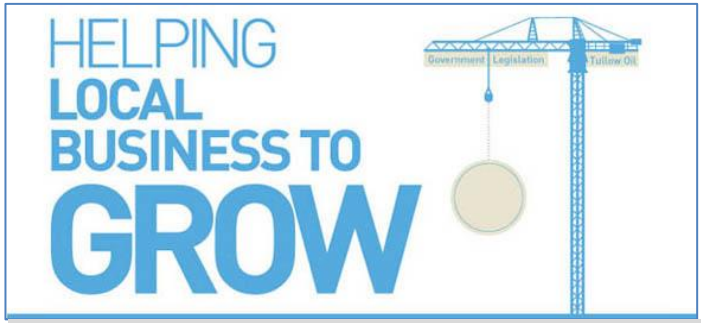
- Reduce risks in re-using qualified solutions
- Integrate new regulations and good practices
- Increase meantime between shutdowns

Examples of Applications



Oil Field Digitalization

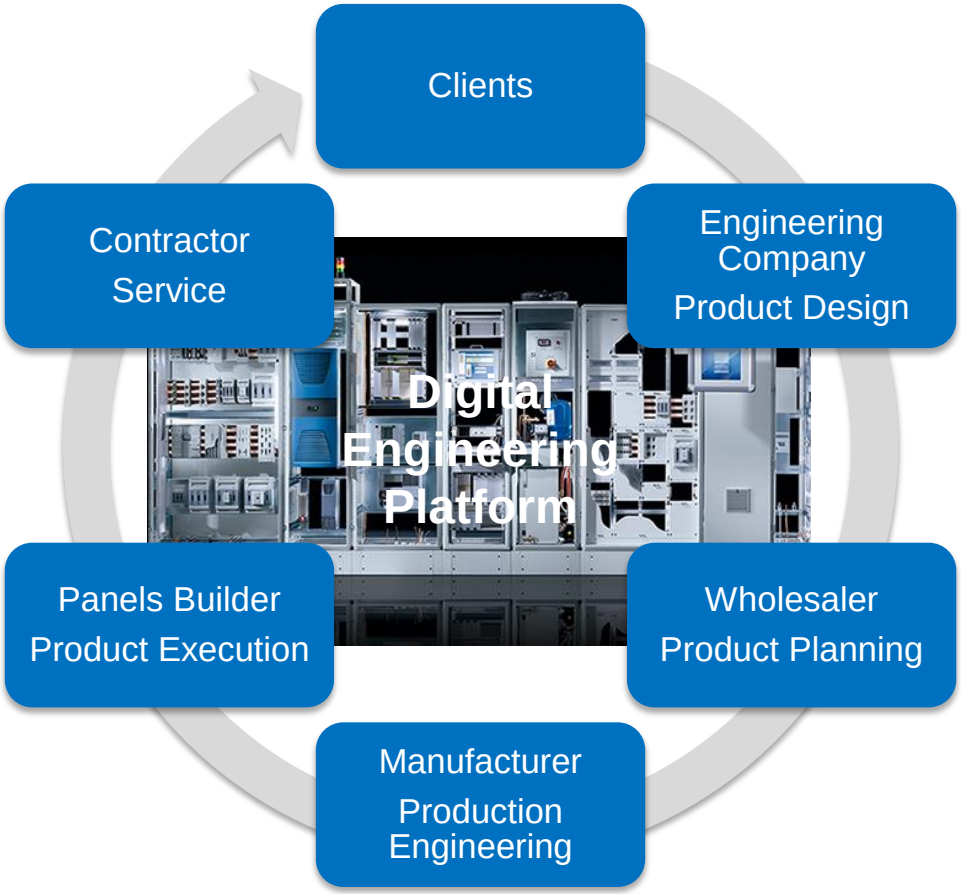
Modular Design & Construction



Local Content

Legal & Administration

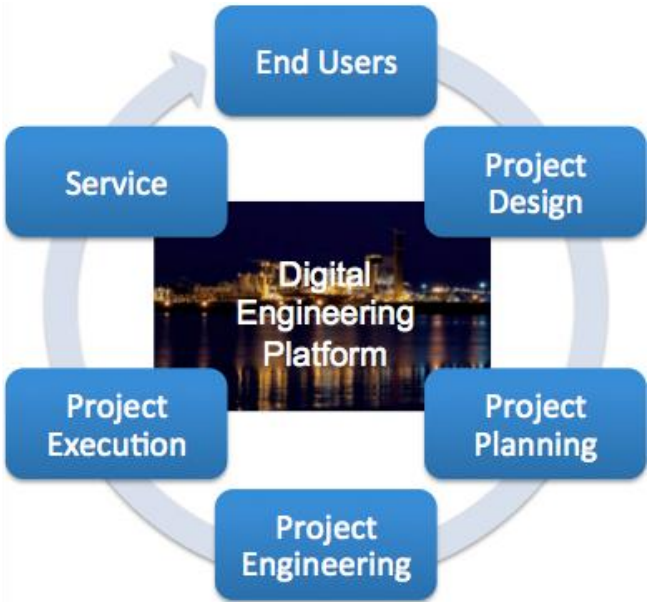
Example: Control Panels



- **Client**
  - **Functional Specifications**
- **Engineering Company**
  - **Design Solutions in respect with other players capabilities**
- **Wholesalers**
  - **Products Availability**
- **Manufacturer**
  - **Machines tools and software for**
  - **Punching steel sheet**
  - **Selecting and Assembling components**
- **Panels Builders**
  - **Workshop availability**
  - **Prices**
- **Contractor**
  - **Installation Capability**
  - **Price**

Cut Delivery Time from one Month to one Week

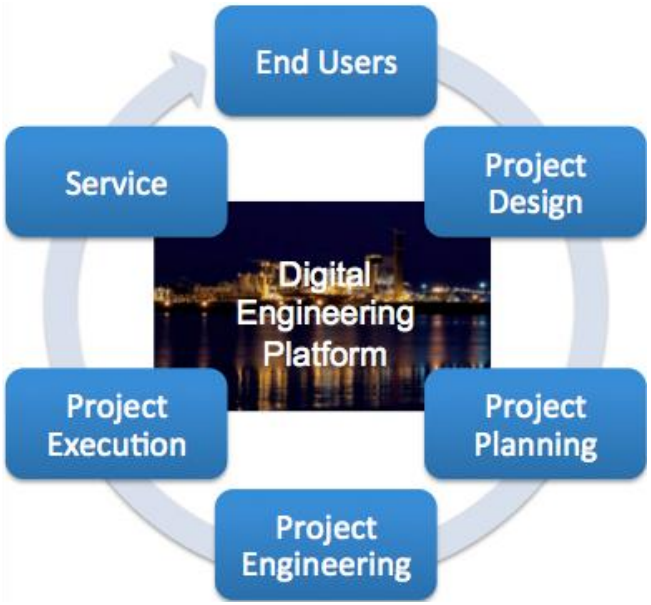
Keys Challenges



- **Technology**
  - Collaborative platforms
  - Communication
  - Cyber security
- **Collaborative Innovation**
  - Collaborative innovation ecosystem
  - Intellectual properties principles
- **Access rights to collaborative platform**
  - To contribute technically, financially, Legally
  - To benefit from outcome
- **Business Model**
  - Organization to support the process
  - Financing

Conclusions

Keys Benefits for all Players



- **End Users**
  - Improve Safety & Reliability by collaborative continuous improvement
  - Integrate Safely & Timely Innovation in
    - Monitoring performances
    - Sharing experience
  - Reduce Projects Capital Intensity & Time-To-Market
  - Improve Local Acceptance
    - Bring more value for local partners (NOCs)
    - Sell “Best partner” value proposition to the local industry
- **EPCs & OEMs & Service Providers**
  - Get higher visibility & Facilitate access to market
  - Reduce investment risk & speed up decision process
  - Give premium to Innovative and collaborative companies
  - Quicker Innovation payback
  - Convert project business into overseas sustainable development