MILL
Managing multinational investment projects
Introduction to EPCA model

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Background

• EPCA model (engineering, procurement, construction and alliance) is a project delivery model that aims at better project performance by combining the elements from design & build (EPC) and collaborative project delivery models
  – Alliance model has been widely used in infrastructure projects with local actors, but is not directly applicable for industrial investment projects
  – Industrial investment projects are usually delivered by EPC/EPCM models
  – EPCA combines the details of these models with collaborative elements from project alliance models
  – Projects have their own features and EPCA model should be tailored to each project
  – EPCA model includes a process model with a set of guidelines, questions and instructions to help conducting a collaborative industrial investment project
Identified challenges for collaborative approaches in international investment project context

- Global contractual practices
- Intellectual property rights (IPR)
- Supplier selection and early supplier involvement
- Involvement and early acceptance is needed from the investors to start EPCA activities at the right time
- Risk sharing
- Cultural differences
- Decision making authority
- Collaboration capability
- Current practices produce fairly good results => no identified improvement need
EPCA objectives and benefits

• Better project performance and success by working in collaboration with the key project actors with the best-for-the-project mindset

• Benefits include:
  – Early integration – get the best know-how for the project from different project actors by integrating them early
  – Common vision, innovation and fast problem solving to reach project goals
  – Better predictability and risk management during the project
EPCA aims to lead to:

- Savings in time and costs through collaborative scheduling and planning
- Earlier start of production and return on investment through shorter implementation time
- Improving quality through collaborative continuous involvement and innovation, searching for optimal solutions
- Life-cycle cost savings in implementation, production and maintenance phases that compensate for increased investment in early development phase
- Shared benefits for all project parties though success funds based on savings created in time and costs
Phases of an investment project (EPCM)

**EPCM model**
- Development
- Implementation
- Production

**Analysis**
- Product and Market Analysis
- Pre-feasibility Study
- Feasibility Study
- Definitive FS

**Engineering**
- Pre-engineering
- Basic engineering
- Detail engineering

**Procurement**
- Procurement

**Construction**
- Construction
- Start-up
- Ramp-up
EPCA project delivery model

• EPCA model is constructed around:
  – Commercial model and contracts
  – Governance and decision making structures
  – Collaborative practices and mindset
  – Continuous improvement and innovation
EPCA activities

- **Delivery model** to select and develop the best delivery model that enables to meet the project goals from the project owner’s point of view
- **Project team selection** to select the best actors and optimal timing of the (early) integration of project actors
- **Commercial model** to define project goals (i.e. target cost, schedule, and key result areas) and incentives to ensure that all parties are motivated to work toward the project goals and benefit from the project success
- **Management system** and joint decision-making to create a collaborative governance structure and to ensure collaborative decision-making and collaborative work flow
- **Localization** to take into account the local context for efficient project development and implementation (e.g. regulation and permitting process)
- **Collaborative practices and tools** to select and implement the most appropriate collaborative practices in different phases of the investment project-lifecycle (such as Big Room, Last Planner, collaborative information management systems and practices, change process)
- **Development of project team and collaborative identity** to develop and maintain collaborative culture for effective informal coordination of work processes and commitment to project goals
- **Continuous improvement and innovation** to establish an effective process for continuous improvement and innovations during the project life-cycle
Descriptions of activities

• The short descriptions of the EPCA activities contain:
  – objective for the activity,
  – core content,
  – potential sub-activities or tasks,
  – timing during the project life-cycle,
  – possible outputs for the process for each phase,
  – interfaces to other activities (outputs as potential linkages)
# Industrial investment project phases and EPCA activities

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**PILOT**

- Pilot – Collaboration with authorities
## Summary of EPCA vs. other delivery models

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<th>Alliance</th>
<th>EPCA</th>
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<td>Contracting and team selection</td>
<td>Main contract is negotiated between the owner and the EPC contractor. EPC contractor selects its own project team. Typically, there is no input from owner and possible involvement has to be clarified in the contract.</td>
<td>EPCM works under consulting contract. Owner selects project team based on competition and negotiates bilateral contracts with the parties. EPCM contractor provides advice and assistance in the process.</td>
<td>Owner selects key parties based on competition between teams or between individual parties and one of the criteria is that they must have an ability to work together. Key parties sign together an alliance contract and form the project alliance.</td>
<td>Owner selects project core team based on competition between teams or between individual parties and one of the criteria is ability to work collaboratively. There is bilateral contracts and multiparty contract that includes, for example, requirement to work collaboratively between all project core team parties.</td>
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<td>Project development</td>
<td>EPC contractor develops the project plans, design and engineering according to the scope of supply that is agreed with the owner. EPC contractor can use expertise of its own suppliers and contractors in the development work but there is not collaborative project development phase.</td>
<td>EPCM contractor develops the project plans, design and engineering together with the owner. They can use expertise of suppliers and contractors in the development work but there is not unambiguous collaborative project development phase.</td>
<td>Owner starts the process by call for proposals and then selects suitable parties. After that collaborative project development that includes technical, key target areas, project cost and schedule and commercial model development is started by alliance team(s). Then final alliance team is selected to continue the project together and to form the project target cost under the alliance agreement.</td>
<td>Owner starts technical development and then initial core team(s) are selected and they collaboratively do technical development and start forming project key result areas, project cost and schedule and commercial model. Then suitable core team is selected and they continue development work with the aim to improve the original plans and target cost.</td>
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<td>Decision-making</td>
<td>Decisions are made early by the owner, decisions related to the project implementation made by the EPC contractor. Scope of supply is dependent on original project specifications, changes cannot be done flexibly and they might be expensive from the owner perspective.</td>
<td>The owner forms project specifications and scope of supply with the help of EPCM contractor and has a possibility to modify scope of supply later. Continuing decision-making, prepared by EPCM contractor, final decisions by the owner.</td>
<td>Project scope and initial schedule and cost targets are formed by the owner and improved and agreed during development phase by alliance team. Changes to turnover cost (TOC) or plan agreed during implementation by unanimous decisions. Decision are made unanimously at all levels including Alliance Project, Management and Leadership Teams.</td>
<td>Project scope and initial schedule and cost targets are formed by the owner and further developed and agreed together by core team. Continuing decision-making by the cross-functional groups and Project Management and Steering groups consisting of project core team members but in the event of an unresolved conflicts decisions are made according to the bilateral contracts.</td>
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<td>Commercial model</td>
<td>The owner pays EPC contractor as agreed in the contract and EPC contractor can use any agreed commercial model with its suppliers and contractors. Typically, almost all financing from the owner is needed in the beginning.</td>
<td>The owner pays for EPCM contractor, suppliers and subcontractors as agreed in the contracts and it can use any commercial model when agreements are achieved. Typically, down payments or irrevocable letter of credit etc. are used and all financing is not needed in the beginning.</td>
<td>The compensation for alliance team members typically includes direct agreed costs that are monitored via open books method, fee and incentive model. Direct agreed costs are paid in any case. Fee that consists of corporate overheads and normal profit margins is the TOC minus the direct agreed costs.</td>
<td>There are traditional bilateral contracts between the owner and the other parties with sanctions in the case of failure and then there is the multiparty contract with a bonus model for the project core team parties. Target of the bonus model is to use project contingency fund to reach key targets related to schedule, cost and other key targets areas that are formed together.</td>
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<td>Project costs and risks</td>
<td>Any cost savings or saved risk margins within the EPC contractor’s scope of supply are for its own account not for the owner. Similarly, cost overruns within EPC contractor’s scope of supply cannot be passed on to the owner. However, in practice the contracts have maximum liability caps and when they are exceeded the owner is responsible for the rest project costs.</td>
<td>Owner carries the project cost risks and is responsible for the cost overruns with the exception of the fixed price supply contracts and any cost savings or saved risk margins are for the owner’s account. Owner can transfer project cost risks and set conditions for liquidated, process and warranty damages. However, in practice the contracts have maximum liability caps.</td>
<td>Incentive model consists of cost bonus or sanction depending on exceeding or undershooting the TOC and performance bonus or sanction for fulfilling or not fulfilling the key targets. The total compensation is direct agreed costs and the fee plus or minus the incentive. The maximum sanction or bonus can be only as big as the fee. So, direct agreed costs are paid in any case and alliance team members can lose only their corporate overheads and normal profit margins and not get any bonuses and the owner carries the actual budget cost overruns over that.</td>
<td>Some of the budget costs savings are shared to the project core team parties if the project key targets are reached and also individual bonuses when parties’ key targets are reached. The project core team has incentive to succeed because of the bonus model and in addition they have to pay liquidated, process or warranty damages if they fail. However, in practice the contracts have maximum liability caps.</td>
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### Reference
- Armstrong et al., 2011; Branconi & Loch, 2004; Chen, 1993; Guo et al., 2010; Merrow, 2011; Yeo & Ning, 2002; Armstrong et al., 2011; Branconi & Loch, 2004; COAA EPCM Contract Committee, 2008; Loots & Henchie, 2007; Jefferies et al., 2006; Lahdenperä, 2011; Ross, 2003; Yeung et al., 2007