Percorso di Eccellenza in PROJECT MANAGEMENT

PROJECT PROCUREMENT

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<table>
<thead>
<tr>
<th>Date</th>
<th>Object</th>
<th>Tutorial</th>
<th>Examples</th>
<th>Teamwork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday 29/10</td>
<td>Project Procurement&lt;br&gt;(focus point)</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Morning (4h)</td>
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<tr>
<td>Thursday 05/11</td>
<td>Portfolio Approaches</td>
<td>✔️</td>
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<tr>
<td>Morning (4h)</td>
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<td>+ Afternoon (4h)</td>
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<td>Tuesday 17/11</td>
<td>Supplier Selection&lt;br&gt;&amp; Vendor Rating&lt;br&gt;(hints)</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Morning (4h)</td>
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<tr>
<td>+ Afternoon (4h)</td>
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<tr>
<td>Wednesday 02/12</td>
<td>Project Work&lt;br&gt;(follow-up)</td>
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<tr>
<td>Afternoon (4h)</td>
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</table>
Team Work

+ Results
Communication & Discussion
The real importance of Project Procurement
The strategic management of procurement process is universally acknowledged to be an asset of fundamental importance.

Procurement is deemed the largest source of risk for (complex) projects.

Optimum management of risk and of procurement represents the best means of obtaining better results than competitors.
E&C worldwide declining profitability

Global E&C Industry Profit Margin

“Global”
1991 Recession

Asia

“Global”
2001 Recession

North America

Global Trend

Europe

5-Year Global Trend

? !
## Engineering and Contracting in Italy

Source: Ronchi 2009 on Mediobanca data

### EBIT / Sales (%)
- 1997: 2%
- 1998: 3%
- 1999: 3%
- 2000: 1%
- 2001: 1%
- 2002: 2%
- 2003: 3%
- 2004: 3%
- 2005: 1%
- 2006: 3%
- 2007: 3%

### Depreciation / Sales (%)
- 1997: 2%
- 1998: 1%
- 1999: 1%
- 2000: 1%
- 2001: 1%
- 2002: 2%
- 2003: 1%
- 2004: 2%
- 2005: 2%
- 2006: 1%

### Labour / Sales (%)
- 1997: 19%
- 1998: 19%
- 1999: 16%
- 2000: 18%
- 2001: 19%
- 2002: 17%
- 2003: 15%
- 2004: 14%
- 2005: 14%
- 2006: 16%
- 2007: 14%

### Services Purchases / Sales (%)
- 1997: 37%
- 1998: 37%
- 1999: 37%
- 2000: 40%
- 2001: 42%
- 2002: 44%
- 2003: 42%
- 2004: 42%
- 2005: 47%
- 2006: 47%
- 2007: 47%

### Goods Purchases / Sales (%)
- 1997: 41%
- 1998: 40%
- 1999: 43%
- 2000: 40%
- 2001: 37%
- 2002: 38%
- 2003: 39%
- 2004: 36%
- 2005: 32%
- 2006: 35%
- 2007: 35%
**Largest 2,000 Italian companies**

Source: Ronchi 2009 on Mediobanca data

<table>
<thead>
<tr>
<th>Year</th>
<th>EBIT / Sales (%)</th>
<th>Depreciation / Sales (%)</th>
<th>Labour / Sales (%)</th>
<th>Services Purchases / Sales (%)</th>
<th>Goods Purchases / Sales (%)</th>
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<tbody>
<tr>
<td>1997</td>
<td>5%</td>
<td>5%</td>
<td>18%</td>
<td>20%</td>
<td>51%</td>
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<tr>
<td>1998</td>
<td>6%</td>
<td>5%</td>
<td>17%</td>
<td>20%</td>
<td>52%</td>
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<tr>
<td>1999</td>
<td>7%</td>
<td>5%</td>
<td>16%</td>
<td>22%</td>
<td>51%</td>
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<tr>
<td>2000</td>
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<td>4%</td>
<td>15%</td>
<td>23%</td>
<td>51%</td>
</tr>
<tr>
<td>2001</td>
<td>6%</td>
<td>4%</td>
<td>13%</td>
<td>22%</td>
<td>56%</td>
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<tr>
<td>2002</td>
<td>6%</td>
<td>3%</td>
<td>13%</td>
<td>24%</td>
<td>53%</td>
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<tr>
<td>2003</td>
<td>5%</td>
<td>4%</td>
<td>13%</td>
<td>25%</td>
<td>52%</td>
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<tr>
<td>2004</td>
<td>6%</td>
<td>5%</td>
<td>13%</td>
<td>25%</td>
<td>51%</td>
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<tr>
<td>2005</td>
<td>7%</td>
<td>4%</td>
<td>12%</td>
<td>25%</td>
<td>52%</td>
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<tr>
<td>2006</td>
<td>6%</td>
<td>4%</td>
<td>12%</td>
<td>24%</td>
<td>55%</td>
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<tr>
<td>2007</td>
<td>6%</td>
<td>3%</td>
<td>11%</td>
<td>23%</td>
<td>57%</td>
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</table>
**EPC Sector**
*(Engineering, Procurement & Construction)*

Italian EPC sector *(ANIMP - Cagno et al., 2006)*:
- Revenue: ~ 20 bln €
  - % value of purchases: 65%
  - % value of project materials: 80% (up to 97%)

USA EPC sector *(UECI, 2005)*:
- EBITDA: ~ 13 bln $
  - % value of “under-managed” risk: 30%
The cost of “undermanaged” project risk in profits (E&C Industry; USA)

- Realized E&C EBITDA: $12.7 Billion
- Loss Due to Project Failures: ~$3 - 4 Billion (1)
- Potential E&C EBITDA: ~$16 - 17 Billion
Procurement value

• Small % reductions in purchasing costs turn into huge % increase in profitability

• In the EPC industry, a 1% reduction in purchasing costs has the same effect of a 15% increase in sales
## Project management maturity

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Engineering/Construction</th>
<th>Telecommunications</th>
<th>Information Systems</th>
<th>Hi-Tech Manufacturing</th>
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<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>3.52</td>
<td>3.45</td>
<td>3.25</td>
<td>3.37</td>
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<tr>
<td><strong>Time</strong></td>
<td>3.55</td>
<td>3.41</td>
<td>3.03</td>
<td>3.50</td>
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<tr>
<td><strong>Cost</strong></td>
<td>3.74</td>
<td>3.22</td>
<td>3.20</td>
<td>3.97</td>
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<tr>
<td><strong>Quality</strong></td>
<td>2.91</td>
<td>3.22</td>
<td>2.88</td>
<td>3.26</td>
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<tr>
<td><strong>Human Resources</strong></td>
<td>3.18</td>
<td>3.20</td>
<td>2.93</td>
<td>3.18</td>
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<td><strong>Communications</strong></td>
<td>3.53</td>
<td>3.53</td>
<td>3.21</td>
<td>3.48</td>
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<tr>
<td><strong>Risk</strong></td>
<td>2.93</td>
<td>2.87</td>
<td>2.75</td>
<td>2.76</td>
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<tr>
<td><strong>Procurement</strong></td>
<td>3.33</td>
<td>3.01</td>
<td>2.91</td>
<td>3.33</td>
</tr>
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</table>

EPC Sector Trends
Project Materials

2002

2005

(Cagno et al. 2004; Cagno et al., 2006)
“This differing distribution of expenditure for project materials is part of a context in which [...] contractors increasingly play the role of integrators and coordinators of the entire realization process [...]”

(Cagno et al., 2006)
Project Procurement

**EPC Purchases in 2000 - Italy**

- **Project materials:** 76% (45% - 98%) on purchases
  - Standard Materials 20% (max 87%)
  - Taylor-made Materials 40% (max 96%)
  - Complex Systems 21% (max 70%)
  - Services 19% (max 90%)

- **Purchasing Department:** 0.5 - 10 MLN€/employee

- **Purchases/ (# Qual. Suppliers):** 8-1700 k€/supplier

**Small-Medium**
- 11% (max 20%)
- 69% (max 84%)
- 19% (max 40%)
- 1% (max 4%)

- 0.8 – 6 MLN€/employee
- 20 – 230 k€/supplier
EPC Purchases in 2000 - Italy
## Purchases in 2003 - Italy

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Purchases/Turnover</td>
<td>65% (61%)</td>
<td>48%</td>
</tr>
<tr>
<td>% Project material</td>
<td>80% (76%)</td>
<td>75%</td>
</tr>
<tr>
<td># average qual. suppliers</td>
<td>1500 (700)</td>
<td>300</td>
</tr>
<tr>
<td>k€ purchased/# qual. suppliers</td>
<td>10-2000 (8-1700)</td>
<td>140 (20-230)</td>
</tr>
<tr>
<td>Employees</td>
<td>49 (40)</td>
<td>9</td>
</tr>
<tr>
<td>MLN€ purchased/employee</td>
<td>0.5-29 (0.5-10)</td>
<td>4.9 (0.8-6)</td>
</tr>
</tbody>
</table>
Suppliers are chosen “far away”...
... **UE and W suppliers are used for complex and tailor-made supplies**
EPC Sector Trends (Engineering, Procurement & Construction)

- “more” procurement
- “less” technical know-how
- “more” complexity to manage
- “less” overall project control

In a word: “more” RISKY!!

Need of new procurement and risk management tools
The Procurement Process
The Project

A project is a temporary endeavour undertaken to create a unique product or service
The Project

• *Projects are temporary:* being temporary means that a real project has a definite beginning and a definite end, and these moments in time are defined in the planning phase of the project;

• *Projects involve the creation of unique product or service:* this characteristic means that the projects involve doing something that has not been done before;

• *Projects are unique undertakings:* real projects result in a single unit of output;
The Project

- **Projects are composed of activities**: these usually are non-repetitive in nature and have some kind of ordering which may be defined, for example, by technological requirements; the interrelations of the activities must be controlled during the project, for example by making network diagrams;

- **Projects involve multiple resources**: this means that projects typically are associated with very different kinds of resources, both human and non-human, and dealing with the conflicts between these resources needs profound concentration from the project management;
The Project

• “Project” is not synonymous with “product of the project”: in this sense the word project is often used quite ambiguously; however, these two concepts should be kept distinct (for example, building a power plant is a project but the power plant itself is not);

• Managerial emphasis is on timely accomplishment of the project: in comparisons to the other modes of work mentioned above, accomplishing projects is very sensitive to delays; this is why time must seriously be taken into account when planning the managerial operations during the project;
The Project

• *Projects have their own organizations*: a project has a manager who is responsible of the project success and under his authority works the project team; in addition to these, the project may still have an external controlling group or a supervisor;

• *Projects concern inter-organizational efforts*: often a project is realized by the cooperation of two or more firms, each one giving its competencies and skills.
EPC Supply Chain Actors

- Owner
- Main Contractor
- Complex Systems Suppliers
- Components Suppliers
- Services Suppliers
- EPC Industry
- Level 0
- Level 1
- Level 2
- Level 3
- Raw and Standard Materials Suppliers
The EPC Supply Chain Actors

- **Client**: it is who directly interact with the EPC Company, so is who make the request for the EPC Project;

- **EPC Company**: it is the ultimate level of the EPC Supply Chain; it delivers the output of the project to the end customer. Its main activity is the management of the EPC project, which characteristics will be determined by the specific requirements of the Client. It plays the major ‘integrating’ role for all the upstream supply chains;

- **Construction and Civil Engineering Firms**: they are involved in the activities regarding building and/or assembling infrastructure, supervise the execution of construction projects;

- **Professional and Services Firms**: they includes all professional services firms that provide engineering, design and planning services, also called specialty contractors (for example mechanical, electrical, foundation, excavation or demolition contractors);
The EPC Supply Chain Actors

- **Materials Supplier**: it supplies materials recognized by Construction, Civil Engineering Firms and Professional Firms and used by the workers and Sub-Contractor Labour in order to participate in the building, mounting and assembling of infrastructure and plant subsystem;

- **Sub-Contractor Labour**: it supplies labour force to build, mount, and assemble the engineered system that composes the overall project.

- **Equipment Supplier**: it supplies items that need to be used in construction and assembly activities. Equipment can be purchased, leased or rented.
The EPC Supply Chain

[Diagram of the EPC Supply Chain showing various supply chains and stakeholders, including Construction SC, Materials Supply Chain, Labour Supply Chain, Equipment Supply Chain, Professional Services SC, and EPC Supply Chain.]
# Classes of Products and Services Realized in the EPC sector

| ENGINEERING AND PLANT CONSTRUCTION | 1. Architecture, municipal engineering, environmental engineering, railways, roads, ports  
2. Environment  
3. Energy  
4. Chemical, petrochemical, refining, fertilizers, cement  
5. Iron and steel, mechanical, manufacturing, textile  
6. Pulp and paper, glass, ceramic  
7. Fine chemicals, food, pharmaceutical, agro-industrial  
8. Information systems, information technology, telecommunications, remote control  
9. Production facilities for oil and gas fields, offshore, naval  
10. Oil pipelines, gas pipelines, water pipelines |
| OUTSOURCING OF SERVICES | 11. Preliminary projects, feasibilities studies  
12. Basic design, front end engineering, detailed engineering, supervision of erections, major maintenance works  
13. Project management, project control, organization consulting, management training  
14. Procurement, inspection, expediting, delivery, contract administration |
| ENGINEERING SERVICES ON SITE | 15. Construction, mechanical erection, electrical/instrumentation installation, maintenance  
16. Heavy lifting, plant transfer on turnkey basis, land, maritime, air shipping |
| END USERS AND PLANT OPERATIONS | 17. Management of environmental services  
18. Chemical, petrochemical, refining, fertilizers, energy, iron and steel  
19. Mechanical, textile, food, pharmaceutical, fine chemicals, telecommunications |
Classes of Products and Services Realized in the EPC sector

<table>
<thead>
<tr>
<th>SUPPLY OF PLANT COMPONENTS, UNITS AND EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Piping prefabrication, shop assembly of equipment, skid mounting</td>
</tr>
<tr>
<td>2. Pipes, bends, flanges, accessories and fittings for piping, hoses, expansion joints, flexible couplings</td>
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<tr>
<td>3. Valves, gates</td>
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<tr>
<td>4. Boilers, pressure vessels, columns, exchangers, vessel and column components</td>
</tr>
<tr>
<td>5. Piping, stacks, air coolers, cooling towers, non-pressurized vessels, structural steelwork</td>
</tr>
<tr>
<td>6. Insulation, painting, coating, soundproofing</td>
</tr>
<tr>
<td>7. Supply of plant sections and components for special applications for process units on turn key basis</td>
</tr>
<tr>
<td>8. Gas turbines, steam turbines, expansion turbines, electric motors</td>
</tr>
<tr>
<td>9. Pumps, compressors, refrigerating cycles, fans, mechanical seals couplings</td>
</tr>
<tr>
<td>10. Instrumentation, control-gears, automation systems, actuators</td>
</tr>
<tr>
<td>11. Fire-fighting systems and equipments</td>
</tr>
<tr>
<td>12. Electrical substations, transformers, electric power generators, UPS (Uninterruptible Power Supply), power units, inverters</td>
</tr>
<tr>
<td>13. Cables, bus-bar ducts, switchboards, switchgears, electronic equipment housing, batteries</td>
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<tr>
<td>14. Fluid treatment, gas purification, waste treatment/disposal, filters, air conditioning</td>
</tr>
<tr>
<td>15. Digesters, bioreactors, laboratory equipment, analytical instrumentation for liquids and gas</td>
</tr>
<tr>
<td>16. Storage silos, pneumatic or mechanical conveying systems and equipment, handling equipment</td>
</tr>
<tr>
<td>17. Operating machines, supply of machines and components for special turn key applications</td>
</tr>
</tbody>
</table>
The Project Operative Phases

- Conceptual Engineering
- Detailed Engineering
- Project Logistics
- Construction and Assembly
- Final Inspection and Startup
Resources Influence and Costs along the Project Life Cycle

INFLUENCE UPON RESOURCES

RESOURCES’ COSTS

Conceptual Engineering
Detailed Engineering
Construction and Assembly
Test and Startup
It can be divided into (three) different management areas:

*Yard Logistics*, which is concerned with the arrangement and keep in function of the yard. The objective is to guarantee that, when the materials are delivered, it could be possible to proceed with the following phases of assembly and construction.

*Materials Logistics*, which can be divided into a sequence of interrelated phases, whose objective is to guarantee the delivery of materials required by project, with relative technical documentation, in ways and times compatible with project schedule.
The Project Logistics

**Procurement**: on the basis of technical specifications of materials required for plant’s construction, provided by the engineering function, and respecting the economical and technical constraints of the project, the Procurement function has to select the right suppliers and to manage the buying process (data-base management, pre-qualification and qualification of suppliers, vendor assessment, vendor list definition, order management, supplier rating, and so on).

**Expediting**: this activity follows the order issue; its aim is to control and speed up the suppliers, in order to respect the time constraints of the project.

**Inspecting and Testing**: the aim of this phase is to control and verify the conformity with the qualitative specifications of the incoming materials.
The Project Logistics

*Transport*: it allows the delivery of materials in the yard at the right time, so that they can be used when required by project schedule.

*Receiving and inventory of materials in the yard*: the aim of this activity is to protect materials and to make them ready when they are required for construction.

*Supportive Logistics*, which is concerned with the development of maintenance politics and with the delivery of the spare parts necessary to maintain the plant in function.
EPC Process Scheme (operative view)
The EPC Procurement Process (operative view)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Material Take Off</td>
</tr>
<tr>
<td>2</td>
<td>Supplier Research</td>
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<tr>
<td>3</td>
<td>Market Price Prediction</td>
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<tr>
<td>4</td>
<td>Supplier Qualification</td>
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<td>5</td>
<td>Purchase Requisition</td>
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<tr>
<td>6</td>
<td>Supplier Selection and Final Choice</td>
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<tr>
<td>7</td>
<td>Development of the System, Supporting the Relations</td>
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<tr>
<td>8</td>
<td>Order Management and Inspection</td>
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<td>9</td>
<td>Shipping</td>
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<td>10</td>
<td>Knowledge Management</td>
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# The EPC Procurement Process (level 2)

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<tr>
<th>#</th>
<th>PROCUREMENT PROCESS PHASES</th>
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<tbody>
<tr>
<td></td>
<td><strong>LEVEL 1</strong></td>
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<tr>
<td>1</td>
<td>Material Take Off</td>
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<tr>
<td>2</td>
<td>Supplier Research</td>
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<td>Purchase Requisition</td>
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</tr>
<tr>
<td>6</td>
<td>Supplier Selection And Final Choice</td>
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<tr>
<th>#</th>
<th>PROCUREMENT PROCESS PHASES</th>
<th>LEVEL 2</th>
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<tr>
<td>7</td>
<td>Development Of The System, Supporting The Relations</td>
<td>Supplier/s Development Plan</td>
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<td>Development of Communication Systems</td>
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<td>Joint Product Development Procedures</td>
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<td>Cooperation Protocol Definition</td>
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<td>8</td>
<td>Order Management And Inspection</td>
<td>Expediting</td>
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<td>Inspection on Project Site Based only on Documentation</td>
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<td>Inspection on Supplier’s Site during the Intermediate and Final Tests</td>
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<td>Inspection on Supplier’s Site during the Product Development</td>
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<tr>
<td>9</td>
<td>Shipping</td>
<td>-</td>
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<td>10</td>
<td>Knowledge Management</td>
<td>Evaluation of Chosen Supplier</td>
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<tr>
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<td>Evaluation of the Advances and Knowledge Introduced by the Purchased Product</td>
</tr>
</tbody>
</table>
The Project Procurement Management
Project Procurement

- Procurement means acquiring goods and/or services from an outside source.

- Other terms includes purchasing and outsourcing.
Why Outsource?

- To reduce both fixed and recurrent costs.
- To allow the organization to focus on its core business.
- To access skills and technologies.
- To provide flexibility.
- To increase accountability.
What is Project Procurement Management?

Project Procurement Management involves engaging in a systematic process to purchase or acquire the needed products, services, or results from an outside source which will perform the work.

Procurement Management encompasses contract management and control processes necessary to administer contracts or purchase orders.

It also includes processes which assist in administering a contract to assure the buyer/seller relationships are properly managed.
Procurement Steps

1. Plan Purchases & Acquisitions
2. Plan Contracting
3. Request Seller Responses
4. Select Sellers
5. Contract Administration
6. Contract Closure

First Process is Planning Process Group

Closing Process Group

Monitoring & Controlling Process Group

Enrico Cagno © Project Procurement
Procurement Steps

1. Plan Purchases & Acquisitions
   Determining what to procure and when

2. Plan Contracting
   Documenting product requirements and identifying potential sources

3. Request Seller Responses
   Obtaining quotations, bids, offers, or proposals
Procurement Steps

4. Select Seller
   Choosing from among potential buyers

5. Contract Administration
   Managing the relationship with the seller

6. Contract Close-out
   Completion and settlement of the contract, including resolution of any open issues
Project Procurement Management Processes

**Planning**
Process: Plan purchases and acquisitions
Outputs: Procurement management plan, contract statement of work (SOW), make-or-buy decisions, requested changes to the project

**Plan contracting**
Outputs: Procurement documents (i.e., RFP, evaluation criteria, updates to the contract SOW)

**Executing**
Process: Request seller responses
Outputs: Qualified sellers list, procurement document package, proposals

Process: Select sellers
Outputs: Selected sellers, contracts, contract management plan, resource availability information, updates to the procurement management plan, requested changes

**Monitoring and Controlling**
Process: Administer the contract
Outputs: Contract documentation, requested changes, recommended corrective actions, updates to organizational process assets and the project management plan

**Closing**
Process: Contract closure
Outputs: Closed contracts, updates to organizational process assets

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Project Procurement
Project Procurement Management Processes

- Procurement Planning: Make make-or-buy decision
- Solicitation Planning: Issue RFP
- Solicitation: Receive proposals
- Source Selection: Award contract
- Contract Administration: Complete substantial amount of work
- Contract Close-out: Formally close contract
Environment in which procurement take place is a critical factor.

There are two environments:
1. Macro &

Macro environment includes general external variables that can influence “How & When” procurement is done and it includes:
• Recession,
• Inflation,
• Cost of borrowing money,
• Unemployment,
• ...

Enrico Cagno © Project Procurement Management Processes
Micro environment is the internal to firm include “Procurement / Contract System” six cycles:

1. **Requirement Cycle**: defines boundaries of project
2. **Requisition Cycle**: analysis of sources
3. **Solicitation Cycle**: bidding process
4. **Award cycle**: contractor selection & contract award
5. **Contract Admin Cycle**: managing subcontractor until completion of the contract
6. **Contract Closure**: managing subcontractor until completion of the contract

Several activities of procurement process that overlaps several of cycles.

These cycles are conducted in parallel, especially “requisition & solicitation”.

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Planning Purchases and Acquisitions or Procurement Planning or Requirement Cycle

• Describes how the procurement processes will be managed, from developing documentation for making outside purchases or acquisitions to contract closure. Contents varies based on project needs.

• It involves identifying which project needs can be best met by using products or services outside the organization.

• It includes deciding
  - whether to procure
  - how to procure
  - what to procure
  - how much to procure
  - when to procure

• If there is no need to buy any products or services from outside the organization, then there is no need to perform any of the other procurement management processes.
Planning Purchases and Acquisitions

It’s the first step in procurement process

It includes:
1. Defining the need for the project
2. Development of the statement of work, specifications, and work breakdown structure
3. Performing a make or buy analysis
4. Laying out the major milestones and the timing/schedule
5. Cost estimating, including life-cycle costing
6. Obtaining authorization and approval to proceed
Tools and Techniques for Planning Purchases and Acquisitions

- Make-or-buy analysis: general management technique used to determine whether an organization should make or perform a particular product or service inside the organization or buy from someone else.

- Often involves financial analysis.

- Experts, both internal and external, can provide valuable inputs in procurement decisions.
**Statement of Work (SOW)**

- A statement of work is a description of the work required for the procurement.
- If a SOW is used as part of a contract to describe only the work required for that particular contract, it is called a contract statement of work.
- A SOW is a type of scope statement.
- A good SOW gives bidders a better understanding of the buyer’s expectations.
## Statement of Work (SOW) Template (ICT)

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Scope of Work</td>
<td>Describe the work to be done to detail. Specify the hardware and software involved and the exact nature of the work.</td>
</tr>
<tr>
<td>II. Location of Work</td>
<td>Describe where the work must be performed. Specify the location of hardware and software and where the people must perform the work</td>
</tr>
<tr>
<td>III. Period of Performance</td>
<td>Specify when the work is expected to start and end, working hours, number of hours that can be billed per week, where the work must be performed, and related schedule information.</td>
</tr>
<tr>
<td>IV. Deliverables Schedule</td>
<td>List specific deliverables, describe them in detail, and specify when they are due.</td>
</tr>
<tr>
<td>V. Applicable Standards</td>
<td>Specify any company or industry-specific standards that are relevant to performing the work.</td>
</tr>
<tr>
<td>VI. Acceptance Criteria</td>
<td>Describe how the buyer organization will determine if the work is acceptable.</td>
</tr>
<tr>
<td>VII. Special Requirements</td>
<td>Specify any special requirements such as hardware or software certifications, minimum degree or experience level of personnel, travel requirements, and so on.</td>
</tr>
</tbody>
</table>
Plan Contracting or Solicitation Planning or Requisition Cycle

- Involves preparing several documents needed for potential sellers to prepare their responses and determining the evaluation criteria for the contract award.
  - Request For Information (RFI): Used to solicit information from prospective suppliers.
  - Requests for Quotes (RFQ): Used to solicit quotes or bids from prospective suppliers for well-defined procurements.
    - A bid, also called a tender or quote (short for quotation), is a document prepared by sellers providing pricing for standard items that have been clearly defined by the buyer.
Plan Contracting

- Request for Proposals (RFP): Used to solicit proposals from prospective sellers.
  - A proposal is a document prepared by a seller when there are different approaches for meeting buyer needs.
- Invitations for bid or negotiation, and initial contractor responses are also part of solicitation planning

• The request for Proposal (RFP) is the most costly endeavor for the vendor.
Plan Contracting

It includes:

1. Confirming specifications
2. Confirming/identifying sources
3. Reviewing past performance of sources
4. Producing Solicitation Package (S/P)

*Solicitation Package sent to each possible “Supplier for Playing”*
Plan Contracting

**Specification Package Includes:**
1. Bid documents (usually standardized)
2. Listing of qualified vendors (expected to bid)
3. Proposal evaluation criteria
4. Bidder conferences
5. How change requests will be managed
6. Supplier payment plan
Sample Request for Proposal (RFP) Template

Proposal Format

The Proposal must consist of the following sections in the order presented:

Section 1 – Executive Summary
Section 2 – Requirements Response
Section 3 – Technical Response
Section 4 – Project Management and Implementation Services
Section 5 – Maintenance and Support Services
Section 6 – Bidder Qualifications
Section 7 – Terms and Conditions
Section 8 – Optional Services and Features
Attachments
Evaluation Criteria

• It’s important to prepare some form of evaluation criteria, preferably before issuing a formal RFP or RFQ.
• Beware of proposals that look good on paper; be sure to evaluate factors, such as past performance and management approach.
• Can require a technical presentation as part of a proposal.
Requesting Seller Responses or Solicitation

- Deciding whom to ask to do the work, sending appropriate documentation to potential sellers, and obtaining proposals or bids.
- Solicitation involves obtaining proposals or bids from prospective sellers.
- Organizations can advertise to procure goods and services in several ways:
  - Approaching the preferred vendor.
  - Approaching several potential vendors.
  - Advertising to anyone interested.
- A bidders’ conference can help clarify the buyer’s expectations.
Selecting Sellers or Award Cycle

• Also called source selection.
• It is helpful to prepare formal evaluation procedures for selecting vendors
• Buyers often create a “short list”
• Involves:
  - Evaluating proposals or bids from sellers.
  - Choosing the best one.
  - Negotiating the contract.
  - Awarding the contract.
Selection Criteria

- **Financial and Economic Factors**, include the evaluation of the supplier’s margin, financial stability, scale and experience, and barriers’ to the supplier entry and exit, further an assessment of the economic factors also includes an evaluation of the slack, which is a measure of the reduction of the buyer’s internal economic process costs;

- **Performance Factors**, include traditional evaluation of delivery, quality, and price;

- **Technological Factors**, include assessment of the supplier’s ability to cope with changes in the technology and an assessment of the current and future depth and types of the supplier’s technological capabilities, the speed in development and the supplier’s patent protection;
Selection Criteria

• The *organizational, cultural and strategic factors* include an evaluation of the relationship’s influence on the company’s overall supply chain position. An evaluation of the possibility of opportunistic behaviour and other internal and external factors is also important;

• The *group of other factors* includes the supplier’s ability to cope with general changes in the environment, these changes could include changes in legislation, supply condition, level of competition, then another important factors could be the safety record of the supplier.
Selecting Sellers

It results in a “signed contract”.

Several types of contracts.

Negotiation process also include “selection” of the type of contract.

Objectives of Award Cycle is to negotiate a contract:

- Type & Price
- Results in reasonable “contractor risk” and provide contractor risk with greatest incentive for efficient and economic performance.
Selecting Sellers

There are certain basic elements of most contracts.
- Mutual Agreement: there must be an offer and acceptance.
- Consideration: there must be a down payment.
- Contract Capability: the contract is binding only if the contractor has the capability to perform the work.
- Legal Purpose: the contract must be for a legal purpose.
- Form Provided By Law: the contract must reflect the contractor's legal obligation, or lack of obligation, to deliver end products.
Contracts

• A contract is a mutually binding agreement that obligates the seller to provide the specified products or services and obligates the buyer to pay for them.
• Contracts can clarify responsibilities and sharpen focus on key deliverables of a project.
• Because contracts are legally binding, there is more accountability for delivering the work as stated in the contract.
• A recent trend in outsourcing is the increasing size of contracts.
The two most common contract forms are completion contracts and term contracts.

- **Completion Contract**: the contractor is required to deliver a definitive end product. Upon delivery and formal acceptance by the customer, the contract is considered complete, and final payment can be made.

- **Term contract**: the contract is required to deliver a specific "level of effort," not an end product. The effort is expressed in woman/man-days (months or years) over a specific period of time using specified personnel skill levels and facilities. When the contracted effort is performed, the contractor is under no further obligation. Final payment is made, irrespective of what is actually accomplished technically.
Contracts

Customer may provide the contractor with a letter contract or letter of intent (LOI).

The letter contract is a preliminary written instrument authorizing the contractor to begin immediately:

1. the manufacture of supplies or
2. the performance of services.
Types of contract selection based upon following:

1. Overall degree of cost & schedule risk
2. Type & complexity of requirement (technical risk)
3. Extent of price competition
4. Cost/price analysis
5. Urgency of requirements
6. Performance period
7. Contractor's responsibility (and risk)
8. Contractor's accounting system
9. Concurrent contract
10. Extent of subcontracting
Types of Contracts

• Different types of contracts can be used in different situations:
  - Fixed price or lump sum contracts: involve a fixed total price for a well-defined product or service.
  - Cost reimbursable contracts: involve payment to the seller for direct and indirect costs.
  - Time and material contracts: hybrid of both fixed price and cost reimbursable contracts, often used by consultants.
  - Unit price contracts: require the buyer to pay the seller a predetermined amount per unit of service.

• A single contract can actually include all four of these categories, if it makes sense for that particular procurement.
Contracts

- Competitive contracts
  - (Single) fixed price (Lump sum)
  - Unit price contract
- Negotiated contracts
  - Cost plus a fee (+ GMP)
Single fixed price (Lump-sum)

- The contractor agrees to provide a specific amount of work for a specific sum
- Used normally with the traditional delivery method
- The owner does not need to heavily control the efficiency in the performed work
- The negotiation takes time and requires many documents coming from the design stage (not always complete!)
- Any change must be renegotiated (low flexibility)
- The whole risk is taken by the contractor
  - The owner might risk on quality
Unit price contract

- The owner and the contractor agree on the price that will be charged per unit for the major elements of the project (based on estimates of quantities)
- The work can start before the design is complete, thus speeding up the project
- Actual quantities must be measured in the field by the owner and the contractor (high control on efficiency)
- The risk is shared between the owner and the contractor (the owner risks on quantities and the contractor risks on prices, often they might be related to indexes)
- Higher flexibility in changes (might be linked to minimum quantities)
- Unbalanced bid by the contractor
  - Higher prices for underestimated activities;
  - Higher prices for initial activities
Cost plus a fee

- The contractor is reimbursed by the owner for his or her work costs and receives an additional agreed-upon fee
  - Fixed
  - Percentage
  - Variable percentage / target estimates (related to the accuracy of the estimate)
- High flexibility to changes during the project
- High control on performed activities
- Used with both construction management and design/build methods
- The work can start far before the design is complete (speeding up the project)
- A GMP (Guaranteed Maximum Price) might be introduced (similar to options)
  - Design must be at a good level of completion and the flexibility might be reduced
- The risk is taken by the owner
  - Without a GMP he or she risks on costs
  - With a GMP he or she risks on quality and the contractor risks on costs
Cost Reimbursable Contracts

- Cost plus incentive fee (CPIF): The buyer pays the supplier for allowable performance costs plus a predetermined fee and an incentive bonus.
- Cost plus fixed fee (CPFF): The buyer pays the supplier for allowable performance costs plus a fixed fee payment usually based on a percentage of estimated costs.
- Cost plus percentage of costs (CPPC): The buyer pays the supplier for allowable performance costs plus a predetermined percentage based on total costs.
Contract Types Versus Risk

<table>
<thead>
<tr>
<th>CPPC</th>
<th>CPFF</th>
<th>CPIF</th>
<th>FPI</th>
<th>FFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost plus percentage of costs</td>
<td>Cost plus fixed fee</td>
<td>Cost plus incentive fee</td>
<td>Fixed price incentive</td>
<td>Firm fixed price</td>
</tr>
</tbody>
</table>

Buyer risk: high → low
Seller risk: low → high
Contracting Relationship Risks

- Cost Reimbursable
- Target Cost
- ADMESURE
- Lump Sum
Contract Clauses

- Contracts should include specific clauses to take into account issues unique to the project.
- Can require various educational or work experience for different pay rights.
- A termination clause is a contract clause that allows the buyer or supplier to end the contract.
Selecting Sellers

• Organizations often do an initial evaluation of all proposals and bids and then develop a short list of potential sellers for further evaluation.
• Sellers on the short list often prepare a best and final offer (BAFO).
• Final output is a contract signed by the buyer and the selected seller.
## Sample Proposal Evaluation Sheet

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Proposal 1</th>
<th></th>
<th>Proposal 2</th>
<th></th>
<th>Proposal 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rating</td>
<td>Score</td>
<td>Rating</td>
<td>Score</td>
<td>Rating</td>
<td>Score</td>
</tr>
<tr>
<td>Technical Approach</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Approach</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past Performance</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Score</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Administering the Contract or Contract Admin cycle

- Ensures that the seller’s performance meets contractual requirements.
- Contracts are legal relationships, so it is important that legal and contracting professionals be involved in writing and administering contracts.
- Many project managers ignore contractual issues, which can result in serious problems.
Administering the Contract

Functions of contract administrator include:
• Change management
• Specification interpretation
• Adherence to Quality
• Warranties
• Subcontractor Management
• Production surveillance
• Waivers
• Contract breach
• Resolution of disputes
• Project Termination
• Payment “Schedule”
Suggestions for Change Control in Contracts

• Changes to any part of the project need to be reviewed, approved, and documented by the same people in the same way that the original part of the plan was approved.

• Evaluation of any change should include an impact analysis. How will the change affect the scope, time, cost, and quality of the goods or services being provided?

• Changes must be documented in writing. Project team members should also document all important meetings and telephone calls.
Suggestions for Change Control in Contracts

- Project managers and teams should stay closely involved to make sure the new system will meet business needs and work in an operational environment.
- Have backup plans.
- Use tools and techniques, such as a contract change control system, buyer-conducted performance reviews, inspections and audits, and so on.
**Contract Close-out or Closing the Contract**

- Involves completing and settling contracts and resolving any open items.

- The project team should:
  - Determine if all work was completed correctly and satisfactorily.
  - Update records to reflect final results.
  - Archive information for future use.

- The contract itself should include requirements for formal acceptance and closure.

- Procurement audits identify lessons learned in the procurement process.

- A records management system provides the ability to easily organize, find, and archive procurement-related documents.
The Procurement Function
The Evolutions of Purchasing Function

Can be identified three levels:

• (lowest level) *Integrating Purchasing Strategy with Corporate Strategy*, specific strategies employed by the purchasing function are defined following the articulation of the corporate objectives, to support those objective, the purchasing function has a long-range plan, purchasing focus is on longer term issues that involve risk and uncertainty;
The Evolutions of Purchasing Function

- (medium level) *Purchasing Strategies to Support the Firm*, purchasing role in supporting the strategies of other functions and those of the firm as a whole, top management considers purchasing to be a vital part of corporate strategy, purchasing views are important to most top managers. The chief purchasing officer has high visibility within top management;
The Evolutions of Purchasing Function

- (highest level) *Purchasing as a Strategic Function*, the utilization of purchasing as a strategic function of the firm, purchasing is included in the firm’s strategic planning process, the purchasing function has a good knowledge of the firm’s strategic goals, purchasing performance is measured in terms offer its contributions to the firm’s success. Purchasing professionals’ development focuses on elements of the competitive strategy, top management emphasizes the purchasing function’s strategic role.
### Four Stages of Purchasing Development

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage I</strong></td>
<td>In the <strong>passive stage</strong>, purchasing normally begins as a reactor to requests from the other departments. Many of purchasing’s legitimate activities are handled by other functions outside of purchasing.</td>
</tr>
<tr>
<td><strong>Stage II</strong></td>
<td>In the <strong>independent stage</strong>, purchasing departments spend considerable time attempting to professionalize the purchasing function by introducing such things as computerized information systems, formalized supplier programs, and communication links with the technical functions.</td>
</tr>
<tr>
<td><strong>Stage III</strong></td>
<td>In the <strong>supportive stage</strong>, purchasing departments are viewed by top management as essential business function. Purchasing is expected to support and strengthen the firm’s competitive advantage by providing timely information to all departments in the firm about potential changes in the price and availability of materials, which may impact the firm’s strategic goals.</td>
</tr>
<tr>
<td><strong>Stage IV</strong></td>
<td>In the <strong>integrative stage</strong>, the firm’s competitive success rests significantly on the capabilities of the purchasing department’s personnel. Purchasing’s role within the firm changes from facilitator to functional peer. This development process must be implemented and guided by management over a period of time.</td>
</tr>
</tbody>
</table>
Procurement Function Organization

- *Organization for area*, in these cases within the procurement function there are many units same located or in different locations which care the procurement of goods and services at service area level;

- *Organizations for specific goods or services* by commodity managers, here certain staff are recognised as “experts” in procuring certain goods or services, so the units within the function can be identified as group of employees that have good experience in one or few specific products;

- *Organization for different markets*, the functional units within the procurement function are focused on the procurement for products part of the same markets, so inside the procurement function there are as much functional unit as much as the product purchased from different markets;
Procurement Function Organization

- **Centralized Procurement**, all the request for good and service are processed by a central unit, a corporate-level purchasing department makes decisions and exercises control over purchasing throughout the organization, the main advantage of this solution is primarily the possibility to exploit volume synergies among products and among request from different project;

- **Decentralized Procurement**, business units or departments purchase their own materials and supplies with no oversight from corporate headquarters;
## Procurement Function Organization

<table>
<thead>
<tr>
<th>CENTRALIZED</th>
<th>DECENTRALIZED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports to a higher level, giving purchasing greater muscle within organization</td>
<td>Broadens job definition for purchasing professionals, leading to greater job satisfaction</td>
</tr>
<tr>
<td>Consolidates buying volume for greater negotiating power and lower costs</td>
<td>Enables access to local and more specialized sources</td>
</tr>
<tr>
<td>Enables a reduction in supplier base</td>
<td>Finds specialty suppliers for products with a competitive edge</td>
</tr>
<tr>
<td>Focuses on overall corporate strategy</td>
<td>Focuses on customers and end users, recognizing their particular needs</td>
</tr>
<tr>
<td>Leverages the Company brand and stature</td>
<td>Responds more quickly to extraordinary situations</td>
</tr>
<tr>
<td>Enables tighter control of purchasing policies and procedures</td>
<td>Empowers the business unit</td>
</tr>
<tr>
<td>Allows business units to focus on their core competencies</td>
<td>Communicates more readily with operations departments</td>
</tr>
</tbody>
</table>