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Systemic Management of Large Complex Projects through the application of Project/Program Health Check

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Complex Project Management Model (CPM2) – A paradigm shift in the management of large complex projects
Defining the project value

Value Identification

Value Realisation

Good Project Definition

Poor Project Definition

Phase 1
Opportunity Identified

Phase 2
Generate & Select Alternatives

Phase 3
Develop Preferred Alternative

Phase 4
Execute

Phase 5
Operate

Good Project Execution

Poor Project Execution

Source: CPDEP Caltex
Widespread dissatisfaction with project performance amongst the top 20 companies – including super majors, independents, and EPC firms, as well as some heavy industrial companies from the US, Europe, and Asia.

The companies surveyed had a combined capital spending of more than US$100 billion.

More than 40% of the projects had experienced significant schedule and cost overruns due to inadequacies in performance and risk management, initial project planning and problems with human resources.
Why projects fail

- Wrong projects are selected
- Projects are not properly defined and developed
- Projects are poorly executed (strategic management?)
- The rule of 1:10:100 is violated frequently!
- Nearly all PM literature and Standards focus on execution
- Up to 85% of project value is determined during the definition phase
- Strategic management of projects is vital
- Leadership is essential as most challenges in project management relate to softer variables, such as relationships, politics, governance, financing, competitor move and so on!
Project Health Check as Risk Assessment

- Poor project selection
- Project definition
- Poor or insufficient implementation planning
- Poor execution
- Use Project Health Check to ensure project is correctly defined, developed and planned (to mitigate failure risks)

= Failed Project
Value Improving Practices (VIPs) statistically demonstrated by Independent Project Analysis (IPA) to add value:

- Technology Selection
- Value Engineering, Process Simplification
- Value Engineering, Facility Optimisation
- Project Functional Objectives (or Classes of Plant Quality)
- Project Standards (or Customised Standards Specifications)
- Waste Minimisation
- Constructability (Reviews)
- Process Reliability & Availability Modelling
- Predictive Maintenance
- Design to Capacity
- Energy Optimisation
- 3D CAD
Holistic project management focus

- Focus is on project definition & implementation
- Projects must deliver their business case (satisfy business goals)
- While it must factor in operational requirements
- **Strategic Project/Program Management vital**
Key success factors

- Complexity management pivotal to success
- True risk management means getting an overall picture and timely intervention
- Focus on project definition and development
- Focus on the enabling processes and factors
- Needs tools to capture a broad picture & see shortcomings
- And direct the respective players to respond
Governance means leadership of the whole process.

Typical Enabling Processes:
- Sponsor’s Administrative System
- Governance & leadership
- Project planning and control
- Project business management
- Contractual & legal management

Resources/Environment

Objectives/criteria for measuring outcomes

Feedback

Focus: Managerial Performance Assessment (capabilities and actual practices deployed)

Main tool to assess: Project Health Check

Focus: Project/Program Outcome Assessment (Projected and Final)

Main tool to assess: Project Worth Method (Combining Fl, OS, BP)
Capital Projects – Life Cycle

1. Project Conception
   - Preliminary Project Statement
2. Project Development
   - Project Business Case Formulated
3. Project Initiation
   - Project Initiation Completed
4. Project Planning & Documentation
   - Project Documents Completed
5. Project Execution
   - Product/System Completed
6. Commissioning & Hand over
   - Project Completed
7. Operation
   - Project Recycled

Milestones:
- Project Brief
- Business Case
- Initiation Plan
- Project Plan & Bid Documents
- Product/System Complete
- Product/System Accepted
- Project Recycling Plan

Deliverables:
- Sponsor/Client
- Sponsor/Client
- PM/Sponsor
- PM/Project Directorate
- Client Project Manager
- Product/Operations Manager
- Operator

Approvals:
- Sponsor/Client
- Sponsor/Client
- PM/Sponsor
- PM/Project Directorate
- Client Project Manager
- Product/Operations Manager
- Operator
Core managerial functions on capital projects

Business & Strategic Management
- Customers & Markets
- Stakeholders
- Technology
- Facility Design and Operational Requirements
- Supply Chain System
- Learning & Innovation
- Finance
- Project Delivery
- Risks and Due Diligence

Implementation Management
- Governance & Leadership
- Engineering, Detailed Design & Specifications
- Procurement*, Transportation & Warehousing
- Planning and Control*
- Team Performance
- Information & Communications Management*
- Quality Management*
- Offsite Management

* Functions covered by PMI in their PMBOK®
Unit of analysis and progressive elaboration over project life cycle
### Project management framework

<table>
<thead>
<tr>
<th>Core Function (Enabling Processes) ▼</th>
<th>No. of Variables/Processes</th>
<th>Project Creation</th>
<th>Project Development</th>
<th>Project Initiation</th>
<th>Project Planning &amp; Documentation</th>
<th>Project Execution</th>
<th>Project Monitoring &amp; Control</th>
<th>Commissioning and Handover</th>
<th>Project Close out</th>
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**Progressive elaboration**
Best practice management

1. Identification
2. Performance Analysis
3. Response Planning
4. Implementation and Monitoring
5. Statutory & Operational Due Diligence
6. Goals and Targets

[Diagram showing a cycle of these steps]
Approach

- Assess managerial capabilities and approaches
- Correlate results with the work achieved
- Determine intervention (in order to reach the desired outcomes)
Assessment points vs. project life cycle

- Conduct assessment at any time in the project life
- Most beneficial during the early phase
- Examine project health check results and project progress report to draw inferences for action
- Measure improvements over time
- There is usually a lag from the time of intervention to measurement of effects
Project health check framework

Two sets of interrelated criteria:

- For assessing the project’s performance on business & strategic front (fitness of the purpose and fitness for the purpose)
- For assessing the project implementation efficiency and effectiveness

Measure how well project performs relative to its class
## Core Function

### Customers & Markets
- business priorities, innovation and branding
- alignment with sponsor organisation's strategy
- building of distinctive capabilities
- customers vision, values & culture
- existing operational support

### Stakeholders
- operators support
- customers experience
- suppliers and partners experience
- external stakeholders

### Technology
- process or conversion technologies
- schematic or concept design
- operability and functionality requirements
- product or users specification

### Facility Design and Operational Requirements
- process alignment & integration
- cycle time reduction
- waste minimisation
- internal efficiencies & benefits

### Variables
- project supplies
- warehousing & inventory management
- competency acquisition
- new work methods
- knowledge support for project teams
- distributed teamwork
- project finance including currency hedging
- cost estimation, budgeting & cash flow forecasting (contingencies)
- business case & portfolio management
- accounting and financial administration
- project delivery strategy & policies
- contractor pre-qualification rules and selection process
- contracts administration model (conflict resolution)
- HSE & statutory risks
- management competence
- process and operational risks
- procurement and transportation risks
- manufacturing and construction risks
- natural disasters & force majeure risks (insurance)
# Project Implementation Functions

<table>
<thead>
<tr>
<th>Core Function</th>
<th>Variables</th>
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<tbody>
<tr>
<td>Governance &amp; Leadership</td>
<td>leadership &amp; top management support</td>
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<td></td>
<td>governance structure</td>
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<td>timely actions or decisions</td>
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<td>team culture &amp; commitment to project goals</td>
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<td>maintenance of high morale</td>
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<tr>
<td>Engineering, Detailed Design &amp;</td>
<td>basic design (including part/product breakdown structure &amp; configuration management)</td>
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<tr>
<td>Specifications</td>
<td>detailed design &amp; integration</td>
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<td>parts specifications and documentation</td>
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<tr>
<td>Procurement, Transportation &amp;</td>
<td>procurement policies, strategy &amp; plan</td>
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<tr>
<td>Warehousing</td>
<td>execution and control of procurement</td>
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<td>handling, shipping &amp; local transportation</td>
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<tr>
<td>Planning and Control</td>
<td>implementation master plan (scope, WBS and integration)</td>
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<td></td>
<td>scope and change management</td>
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<td>scheduling and time management</td>
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<td>cost and financial management</td>
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<tr>
<td>Team Performance</td>
<td>project human resources</td>
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<td>skills assessment and training</td>
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<td>teamwork performance</td>
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<tr>
<td>Information &amp; Communications</td>
<td>project and internal communications</td>
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<td>Management</td>
<td>public relations and external communications</td>
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<td>information and documentation management</td>
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<td>Quality Management</td>
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<td>construction and manufacturing quality assurance</td>
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<td>administration and conflict resolution</td>
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<td>knowledge management</td>
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<td>Offsite Management</td>
<td>utilities and support projects</td>
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<td>training and induction of users/operators</td>
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<td>Risk Management</td>
<td>risk management master plan</td>
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<td>ongoing risk management and closure</td>
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## Sample assessment matrix (indicator)

<table>
<thead>
<tr>
<th>Step: Check matrix items</th>
<th>Matrix 1/8</th>
<th>Criterion: Customers &amp; Markets</th>
<th>Indicator: business priorities, innovation and branding</th>
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<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td><strong>Level 2</strong></td>
<td><strong>Level 3</strong></td>
<td><strong>Level 4</strong></td>
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<tr>
<td>Has the project team</td>
<td>Has the project team</td>
<td>Has the project team</td>
<td>Is the project team tracking</td>
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<td>identified business</td>
<td>set goals related to business</td>
<td>consulted the stakeholders and</td>
<td>changes to business priorities,</td>
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<tr>
<td>priorities, innovation</td>
<td>priorities, innovation and</td>
<td>set goals wrt business priorities,</td>
<td>innovation and branding continually and</td>
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<td>and branding?</td>
<td>branding?</td>
<td>innovation and branding?</td>
<td>revising or realigning the goals</td>
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<td>Does the project team</td>
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<td>Does the project team</td>
<td>Does the project team apply</td>
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<td>apply a basic process for</td>
<td>apply a streamlined process</td>
<td>apply a refined process to</td>
<td>an optimum process and related</td>
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<td>managing business</td>
<td>and tools for managing</td>
<td>manage business priorities,</td>
<td>tools for management of business</td>
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<td>innovation and branding?</td>
<td>priorities, innovation and branding?</td>
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<td>and branding?</td>
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<td>Has the project team</td>
<td>Has the project team</td>
<td>Did the project team identify</td>
<td>Has the project team</td>
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<td>included all activities</td>
<td>set business priorities,</td>
<td>the scope related to business</td>
<td>quantified or has otherwise</td>
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<td>innovation and branding</td>
<td>priorities, innovation and</td>
<td>measured and optimized the project</td>
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<td>and branding in the early</td>
<td>branding in the early phase</td>
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<td>phase?</td>
<td>considering the goals?</td>
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<td>project plan and</td>
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<td>implemented the same?</td>
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<td>Has the project team</td>
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<td>included business</td>
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Example result from PHC tool
Case Study
Project Description

- A major redevelopment program, current budget is $110 million rising to around $330 million
- Managing contractor contract
- Project manager is the principal’s representative
- Progressing reasonably well
- APIC was asked for a comprehensive 360 degree study
- And provide strategic advice and directions for improvement
Overall situation

APIC collected data from 27 individuals belonging to multiple organisations working on the project.

They were divided into 3 groups:
- The client team and their advisers
- The PM team
- The Managing Contractor team

Results of the assessments were grouped together and compared.

Advice was provided to the client for improvement in managerial performance and outcome.

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Case study overall performance

- Average performance index = 50
- Standard deviation = 11 points
- Traditional areas of PM show highest performance
- As a whole it is not managed holistically well
• Average performance is around 51 points
• The views of the PM team are different to those held by the client team and the contractor team
• There was some confusion among 27 people and 3 teams on what actions and priorities had to be taken into account!
• The average performance is 47 points
• Designers were novated to the contractor
• Surprising to see client’s low satisfaction with the design
• The contractor team has given a high rating to design in waste minimisation and cycle time reduction (perhaps referring to their own construction operations!)
• The average performance is 60 points
• The client team has rated it 50 points
• Contractors and the PM team have given it higher rating
• It appears that this function is not managed to specified goals and there is no performance evaluation to see if it performs well enough!
• The average performance is 48.5 points.
• Traditional areas of estimating and cost management are OK
• Business and portfolio management appears to be poor
• It is doubtful if project cost management is at 80% (level 4)
• Both the PM team and the contractor team thought they were doing a good job regarding cost management whereas the client team thought differently
• The average performance is 43 points
• The governance structure appears confused
• The role of the client is not an effective leadership and governance
• There is evidence of low understanding of how to define and manage governance and leadership as per comments made, e.g.
  • *Culture = Relationship Contract*
  • *Not aware of tracking culture*
• Thus, the leadership and governance are not recognised or managed and there is evidence that the project has developed its own character but is managed still as a pockets of interest group (weak cohesion and morale)
• The performance on average is rated at 45 points
• Public relations and external communications performance is 32 points
• The contractor team rated information and documentation management at above 80 points. This is not shared among all project team
• In fact the disparity in views among project teams (contractor, PM & client) point to a communication issue
• All members of the 3 entities should have gone through induction and their views aligned on the managerial functions and agreement reached on how to approach and manage the various functions collectively
• Loyalty to project goals is questionable
• Communication workshops are essential; must agree and firm up on the way ahead (incl. new members who join the project on all sides)
• Average performance is at around 43 points
• The client team rated learning and innovation at 32 points
• Some individuals did not even know what it was all about
• Learning and innovation could lower both construction & operational costs, as well as improve cycle time etc.
• Competency acquisition was not given attention to and yet good outcomes depend on the project people’s competency
• One respondent stated: “Competency acquisition – what is this?”
- The average performance was 42 points (the client team puts it at 30 points)
- The project has a significant offsite dependency
- In particular one observer noted: “Significant conflict between other projects at the moment”
- There is confusion in terms of who is responsible for management of utilities and support projects (contractor or the client team)
- Overall, no systemic approach to the management of this function is observed
• The average performance was rated at 66 points (client team rated it 50 and the contractor 75)
• Overall it is much higher than performance in other functions (traditional PM area that are better understood and practiced)
• Still there was confusion, e.g. one respondent noted: “cost and financial management - Not implemented in accordance with policies and strategies”
• Some confusion regarding some terms and or responsibilities of the parties, some as a result of the MCC contract and other oddities
The main issue that there is no effective project management
• The average performance is 60.5 points (the client team rated 56 points)
• The PM has rated it at 71 points. There is gap between the two perceptions
• One respondent observed: “Too early in construction to respond”
• Project delivery strategy’s link to the client needs and strategic goals is not clear
• Conflict resolution mechanism not clear
• Success to-date may be due the good will of the parties than robustness of the contractual arrangements
• Overall the selected project delivery system has a number of inbuilt inconsistencies (mixing of responsibilities and contractual obligations). It has the features of general contracting mixed with those of MC that acts as the agent of the client.
• Average performance was rated at 60 points (client rated it at 49 points)
• The PM team does not consider procurement & transportation of their concern (i.e. after appointment of MC)
• Procurement and transportation management should be overseen by the client or their PM
• Project did not appear to have heavy reliance on procurement of specialised items
• Average performance was rated 48 points (the client team rated it 32 points)
• Sample comments made by respondents:
  • Quality plan has not been assessed against goals as there are none.
  • There is an expectation that QA will be managed by the Contractor therefore limited policies or strategies have been developed.
• Focus of QM has been construction works and services
• Need to consider QM across the whole project organisation and all related activities
• Need to see it as part of project governance strategies
  Important role for holistic QM due to the diffusion of responsibilities and the use of a hybrid delivery model
• Average performance was 52 points (the client team rated it 41 points)
• Comments made by respondents show divergence of the views
• Risk management plan prepared but its focus is implementation risks
• Client objectives wrt financial, performance, environment not formally identified and made the focus of risk and due diligence decisions (what are the risks of not realising return on investment? Etc)
• A much more rigorous risk analysis and mitigation approach necessary to inform decisions, plans and actions
• Average performance was 50 points (the client team rated it 38 points)
• Risk management follows from strategies developed to risks and due diligence
• As with Quality Management a master risk management plan is necessary for systemic risk management
• It appears that risk management is rather intuitive and informal
• Mostly focused on delivery risks

• **Apply Project Health Check regularly to ensure the project is being managed well (to targets) and no part is lagging behind**
The emphasis is on the construction phase
Average performance was 44 points (the client team rated it 31 points)
The client and the PM team considered it principally the MC’s responsibility
The PM/client should have an oversight of this function
A proactive approach required pre-contract strategies
Inclusion of these strategies in the respective MCC contract
Management of the MCC should ensure the realisation of such strategies
Particularly on cost plus type contracts
E.g. prior purchase of many construction materials and components could have save the client a lot (avoided price rises and locked in higher $A value)
• Stakeholders’ management performance was 46 points (the client rated it 37 points)
• Not a consistent view among the project team regarding stakeholders
• The PM considered the client as their customers not the eventual end users
• Different stakeholder groups should be identified and strategies for their management agreed by the whole project team
• Stakeholders have a major influence on the success or otherwise of a project
• Average performance was 44 points (the client team rated it 27 points)
• HR is seen individual firm responsibility and not managed at project level
• Confusion on team performance dominated the project team. The PM team considered it inside their own organisation not the greater project
• It should refer to all parties working in teamwork form inside the project organisation
• Training to address specific skills for construction purposes, etc
• Also dependency on skilled workforce and professional managers should be managed in a proactive manner
- Average performance was 51 points (the client team rated it 35 points)
- Refers to the technologies utilised during the operation phase
- Technology issues not seen in a consistent manner across the project team
- Users’ validated requirements needed to stimulate search for best available technology
- In many businesses technology determines the success or otherwise of the respective operations
- In this project the whole operational phase was to have been analysed and search made for appropriate technology

As with all other functions one needs to have goals and targets to work to
Recommendations

- Set **targets** for management of project functions across the board and manage to these targets
- Clarify **governance role** and **PM role** (may need revisiting contractual arrangements)
- Utilise client team and strength for **strategic direction** of the project
- Improve **communication and cooperation** (shared understanding of project dimensions and complexity, agreement on strategies to manage various aspects of the project and translate these into work methods etc.)
- Focus on **value creation** and **risk reduction** strategies
- Develop and apply **project-wide QM plan**
Conclusions

- Projects and programs change dynamically
- Project definition and value creation critical
- Leadership of the whole process essential
- Regular and fast evaluation is necessary to learn:
  - how the project is shaping up versus triple objectives of financial, performance & environment
  - Whether managerial functions are being performed well enough relative to their targets
  - Where intervention and redirection of resources is required
  - How effective past interventions have been
- Learning through regular feedback and alignment essential
- Tools (e.g. PHC) aid this process
- Having a **competent team** and the team applying **appropriate managerial practice** to manage the project is best risk management strategy

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