Faculty of Engineering and Mathematical Sciences

Project Management & Engineering Practice
(GENG 5505)

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Quality management: Achieving technical excellence and customer satisfaction (Ch 7)

(Week 4b) - Lecture 8, 21 March 2024

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The challenges of quality

- A personal dimension, framed by individual experiences & expectations;
- Implies reliability, satisfies customer, value for money, complies with specifications;
- Dictates measurement (if we cannot measure something, it makes it rather difficult to ensure conformance, compliance & ultimately improvement);
- Defined as a characteristic i.e. excellence, attainment;
- Every project is created & managed to be successful as measured against some defining benchmark, most notably time achievement (the schedule), deliverable compliance (specification) & cost control (the budget) + TBL and lifecycle;
- Project success (and, by inference, its quality) is also measured against the client's identified agreed needs; not just their wants;
- Clients not only have a technical specification, they also have an intangible expectation (often un-stated) of quality against which the deliverable is constantly measured.

The road to quality

1. Quality planning
2. Quality assurance
3. Quality control
4. Quality (continuous) improvement

1) Quality planning

All the mandated quality standards, operational definitions & business requirements relevant to the project are clearly identified & agreed. It then aims to ensure that those same standards can in fact be achieved & measured throughout the project (quality is always planned into the project from the start, not simply randomly inspected in, as required).

Examples

- Reviewing scope document, detailed product descriptions, and technical specification;
- Examining all operational procedures relating to best practice & operational efficiencies;
- Aligning with the current business quality policy and supporting processes;
- Conducting benchmarking activities with other projects to identify areas of improvement;
- Designing a range of checklists that can be used to verify consistency;
- Accessing any standards and regulations pertaining to the project.
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Building in quality

➢Assuring quality through:

- Budget cost
- Clear specification
- Defined standards
- Historical experience
- Qualified resources
- Impartial reviews
- Effective change control
- Organizational wide commitment
- Integrate processes
- Documented planning

2) Quality assurance

A declaration or guarantee that the overall project performance (input, process & output) is evaluated on a regular basis to give all stakeholders the confidence that the relevant quality standards will be satisfied.

Examples:

- Quality management plan;
- Business rules and operational definitions;
- Appropriate internal systems (from the project start);
- Processes to eliminate waste, variation and excess;
- Regular meeting of the quality team members;
- Scheduled &/or random quality audits;
- Lessons learned;
- ISO standards (i.e. Quality management practices (9000), Environmental management (14000), Social responsibility (26000 series);

http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm;
http://www.iso.org/iso/home/standards/management-standards/iso14000.htm;
http://www.iso.org/iso/home/standards/iso26000.htm.

- ....

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ISO standard examples (9000, 14000, 26000 series)

Quality management practice (ISO 9000)

- Customer focus
- Leadership
- People involvement
- Factual approach to decision making
- Mutually beneficial supplier relationships
- System approach to management
- Continual improvement
- ...

Environmental management (ISO 14000)

- Environmental performance
- Life-cycle management
- Emissions
- ...

Social responsibility (ISO 26000)

- Human rights
- Community involvement
- Labour practices
- .....

3) Quality control

Monitors specific task and project results to identify, measure & eliminate the causes of unsatisfactory performance while ensuring that quality compliance is always demonstrated & achieved.

Remember: control implies measurement

Examples of quality assurance and control tools:

- Peer reviews
- Physical inspection
- Control charts
- Scatter diagrams
- Checklists
- Pareto diagrams
- Statistical sampling
- Flowcharts
- Cause and effect diagram
- Trend analysis
- …..

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Quality control processes

- Quality control monitors specific task and project results to identify, measure and eliminate the causes of unsatisfactory performance, while also ensuring that quality compliance is always demonstrated and achieved.

- Quality control is used through the implementation and finalisation stages of the project to '…formally demonstrate, with reliable data…that acceptance criteria have been met'.

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Benefits of quality control

Examples of what quality control can deliver:

- Elimination of rework
- Completion of work-in-progress
- Confirmation of acceptance
- Documented quality improvement
- Completed checklists
- Process adjustments
- ....

4) Quality continuous improvement

A culture, a commitment & an ownership of what the project is delivering and ultimately, how well it is being delivered.

Where innovation is encouraged, continuous improvement will flourish. Where efficiencies, economies of scale & capacity can be enhanced, continuous improvement will flourish.

Where risk taking is supported continuous improvement will again flourish.

Examples of tools used for continuous improvement:

- Regular performance reporting;
- Meetings and debriefs;
- Decision gates and approval processes;
- Walkthroughs and peer reviews;
- Scenario analysis;
- Evaluation reports;
- Suggestion boxes;
- User feedback.
- ...

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Balanced Scorecard (BSC)for projects – (Stewart, 2001)

- Performance measurement framework which includes strategic performance metrics – i.e. customer perspective, project/internal perspective, financial perspective, growth & innovation perspective - to give project managers & other key stakeholders a more 'balanced' view of project performance;

- Customer perspective: i.e. Customer satisfaction, economic value added, intended objectives, etc.

- Financial perspective: i.e. Within budget, variance between original budget & final budget, project costs compared to industry standards, etc.

- Project/internal perspective: i.e. Team satisfaction, resource management, etc.

- Growth & innovative perspective: i.e. Best practices identified, ongoing improvement, innovative ideas rate, TBL, life cycle, etc.

Balanced Scorecard (BSC)for projects – (Stewart, 2001) continues…

The BSC can be used for health checks throughout the project lifecycle:

- Project stage 1: Initial measurement to establish a baseline for project planning;
- Project stage 2: BSC benchmarks are included in the overall project plan;
- Project stage 3: BSC measurements are implemented & initial benchmarks are used to compare & improve the BSC outcomes;
- Project stage 4: BSC measurements are reviewed & documented in the final report to support best practices & for lesson learned.

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INDICATORS TO MEASURE SUSTAINABILITY PERFORMANCE – (Keeble et al., 2003)

- Case study 1: On Corporate sustainability performance

- Case study 2: Project activities & principles of sustainable development
- Economic
  - Will the project generate prosperity & enhance the affected economies?
- Social
  - Will the project be implemented in a socially responsible manner & benefit the affected communities in a fair & equitable way?
- Environmental quality
  - Will the project cause long-term damage to the environment?
- Use of natural resources
  - Will the project protect & enhance natural capital?

***Indicators consistent with TBL and life cycle thinking.

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INDICATORS TO MEASURE SUSTAINABILITY PERFORMANCE (Keeble et al., 2003), continues...

- 69 indicators (assessing the 4 dimensions in previous slide) grouped into 37 Sub-Criterion under 15 Criterion headings (Fig. 7, p.156)
- Economic dimension: Governance (e.g. Alignment with policies), economic (e.g. Jobs, tax, etc.), financial (e.g. Profit, etc.), innovation (e.g. Supports innovation, etc.), risk (e.g. Risk management, etc.);

- Social dimension: Governance (e.g. Alignment with policies), social infrastructure (public safety & security, local education, stakeholder engagement, etc.), employment (e.g. Job security, safety, etc.), risk (e.g. risk management, etc.);

- Environmental dimension: Governance, (e.g. Alignment with policies), emissions (e.g. Emission to air/water, waste, hazardous materials, etc.), risk (e.g. Risk management);

- Resources dimension: Governance, (e.g. Alignment with policies) natural resources (e.g. Materials, energy, biodiversity, hazardous materials, waste, etc.), risk (risk management).

Project assessment matrix – Project lifecycle sustainable development assessment

(Keeble et al., 2003) continues….

- Level A: Raise awareness of the sustainable development issues associated with the project & identify show stoppers;
- Level B: Set sustainable development objectives & select the project option with the best predicted sustainable development performance;
- Level C: Demonstrate that the selected project option will achieve the sustainable development targets & gain sanction to proceed;
- Level D: Select the best suppliers & contractors & demonstrate that they will achieve the sustainable development targets;
- Level E: Measure performance, identify gaps & action required, & feed back to improve future predictions.

Readings week 4b

Stewart W., 2001, Balanced Scorecard for Projects, *Project Management Journal*, pp 38 – 53

Hansen E. G. & Schaltegger S., 2016, The Sustainability Balanced Scorecard: A Systematic Review of Architectures, *Journal of Business Ethics*, pp 193 – 221

Keeble J., Topiol S., Berkeley S., 2003, Using indicators to measure sustainability performance at a corporate and project level, *Journal of Business Ethics*, pp 149 – 158