

Process Benchmarks

Target Value Design: Current Benchmark (1.0)

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Introduction

The University of California, Berkeley's Project Production Systems Laboratory periodically publishes a description of the current benchmark in each project management process that is a subject of research. This reports on the current benchmark in Target Value Design (TVD), a revision of the original benchmark published in November, 2005².

The first successful adaptation of target costing from product development to construction was the St. Olaf's College Tostrud Fieldhouse Project, completed in 2002. Roughly a dozen projects have been completed since that time, all in the building sector, either healthcare or education; most of them testing and developing modifications in the TVD process. Further development of TVD will occur, both within and beyond the building sector. This benchmark is based on research to date.

In the building sector, it has been customary for architects to work with customers to understand what they want, then produce facility designs intended to deliver what's wanted. The cost of those designs has then been estimated, and too often, found to be greater than the customer is willing or able to bear, requiring designs to be revised, then recosted, and so on. This cycle of design-estimate-rework is wasteful and reduces the value customers get for their money. Cost has been an outcome of design.

Cost, time, location and other constraints are conditions that must be met in order to deliver value to customers. Target Value Design is a management practice that seeks to make customer constraints drivers of design for the sake of value delivery.

Implementation of TVD has also consistently resulted in the delivery of projects faster (where that is valued by customers) and under budget, both against market benchmarks and project targets. Consequently TVD is both a method that assures customers get what they need (delivers value) and also a method for continuous improvement and waste reduction.

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² The Nov 05 benchmark used the term "Target Costing", which has subsequently been replaced by "Target Value Design" for two reasons: 1) "Target costing" is a term used in the construction industry with a different meaning, and 2) "Target value design" better indicates the intent to deliver customer value, as opposed to mere cost cutting.



Current Benchmark

How best to do Target Value Design? P²SL's research on this question supports the following description, but note that research to date has been limited to healthcare and educational facilities, working with owners acquiring means of production for their own use. The TVD process may require changes when applied to other owner and facility types.

- With the help of key service providers, the customer develops and evaluates the project business case and decides whether to fund a feasibility study; in part based on the gap between the project's allowable and market cost.
- The business case is based on a forecast of facility life cycle costs and benefits, preferably derived from an operations model; and includes specification of an allowable cost—what the customer is able and willing to pay to get life cycle benefits. Financing constraints are specified in the business case; limitations on the customer's ability to fund the investment required to obtain life cycle benefits.
- The feasibility study involves all key members (designers, constructors, and customer stakeholders) of the team that will deliver the project if the study findings are positive.
- Feasibility is assessed through aligning ends (what's wanted), means (conceptual design), and constraints (cost, time, location, ...). The project proceeds to funding only if alignment is achieved, or is judged achievable during the course of the project.
- The feasibility study produces a detailed budget and schedule aligned with scope and quality requirements.
- The customer is an active and permanent member of the project delivery team.
- All team members understand the business case and stakeholder values³.
- Some form of relational contract is used to align the interests of project team members with project objectives.
- A cardinal rule is agreed upon by project team members - cost and schedule targets cannot be exceeded, and only the customer can change target scope, quality, cost or schedule.
- The cost, schedule and quality implications of design alternatives are discussed by team members (and external stakeholders when appropriate) prior to major investments of design time.
- Cost estimating and budgeting is done continuously through intimate collaboration between members of the project team—'over the shoulder estimating'.
- The Last Planner^{®4} system is used to coordinate the actions of team members.
- Targets are set as stretch goals to spur innovation.
- Target scope and cost are allocated to cross-functional TVD teams, typically by facility system; e.g., structural, mechanical, electrical, exterior, interiors, ...
- TVD teams update their cost estimates and basis of estimate (scope) frequently. Example from a major hospital project during the period when TVD teams were heavily in design: estimate updates at most every three weeks.

³ Stakeholders have a stake in the project; its outcome affects their interests; e.g., permitting agencies, neighborhood representatives, facility users, investors.

⁴ Last Planner[®] is a registered trademark of the Lean Construction Institute.



- The project cost estimate is updated frequently to reflect TVD team updates. This could be a plus/minus report with consolidated reports at greater intervals. Often project cost estimates are updated and reviewed in weekly meetings of TVD team coordinators and discipline leads, open to all project team members.
- Co-location is strongly advised, at least when teams are newly formed. Co-location need not be permanent; team meetings can be held weekly or more frequently.

To implement these components of the current benchmark involves a radical change from traditional practice. Consider the following:

- Customers spend more time and money in the project definition phase of projects than they traditionally have done.
- Key members of the project team are selected through value based proposals rather than competitive bidding.
- Architects relinquish their exclusive access to customers.
- Design professionals embrace true collaboration with suppliers and builders - collectively exploring problems and jointly developing solutions.
- Suppliers and builders understand and respect designers and learn how to contribute and participate in project definition and design processes.
- Design solutions are developed with cost, schedule, and constructability as design criteria.
- Designers' work is restructured based upon completing smaller batches of design documents and releasing work to other members of the team.
- General contractors allow and encourage specialty contractors to have an equal seat at the table.
- The incentives of all team members are aligned with pursuit of project objectives.

To successfully make these changes requires special effort. The following have been observed to be effective:

- Clear understanding and frequent reminders of customer value.
- Clear statements up front, plus frequent reminders, about the nature and extent of the changes required in attitudes and behaviors.
- Standard processes to encourage collaboration and measure progress toward targets.
- Inclusion of all team members in user group meetings and other occasions where they can hear and see for themselves what is of value to the customer and other stakeholders.
- Empowering and requiring team members to declare breakdowns; i.e., to speak up when they perceive that agreed criteria are not being followed, that value is being sacrificed or waste is being generated.
- Education, coaching and building trust among team members.

Specific tools and techniques used to do the work of planning and designing include:

- Space planning based on contents and use, not historical standards
- Reverse phase scheduling (aka, pull scheduling, pull planning)
- Fixed schedules for user group meetings
- Room data sheets as records of agreements, signed off by users
- Weekly coordinating meetings with strict documentation of commitments
- nD computer models (aka BIM)

Going Beyond the Current Benchmark to Better Practice

We do not believe that the current benchmark is the best that can be achieved. Indeed, given the lean principle of continuous improvement, better practice is always possible. Based on research to date, we offer the following tasks to be performed and hypotheses to be explored and experimentally tested:

- How best to select project delivery teams; e.g., test for compatibility, engage self assembled teams, other?
- Can the process of determining stakeholder value be improved, be done earlier? Can stakeholder management be improved? Can the number of stakeholders be reduced?
- How best size and manage contingency to achieve targets? Research to date suggests that contingency reduction is one of the primary contributors to underrunning market costs, but the nature and extent of contingencies is not sufficiently understood.
- What information technologies can be used (and how) to support Target Value Design practices; e.g., integrating product, process and cost models?
- What training is needed to support TVD; e.g., training in consensus decision making?
- Development of TVD began with owners-healthcare and education-building means of production for their own use. How/Can TVD be extended to other owner types, construction sectors and situations?
- Analyze and explain phenomena associated with TVD:
 - On TVD projects to date, the expected cost (cost estimate) has declined as design has developed. Initial analysis suggests that this is caused by proactive value engineering, increased scope control, refinement of scope to reflect buildability and other design criteria, and reduction of contingency in estimates.
 - TVD projects to date have been completed under market (as much as 19% under) and under budget (client's allowable cost). How explain? Can reliably repeat?
 - Does the investment in upstream processes pay off in a) the avoided costs of bad projects that are not allowed to continue, b) in the increase in value from more effective processes for articulating values and controlling design and construction to the delivery of those values, c) in the reduction in waste from incomplete and inaccurate drawings, from duplicated efforts, from rework, d) from more reliable delivery to quality, time and cost expectations, e) from the ability to respond more quickly to changes and discoveries?
- Describe and assess practices used in previous TVD implementations:
 - Industry advisors' role in client project business planning
 - Benchmarking against market cost. Both the 'Quarterback Rating' process developed by Scott Morton of Boldt and Haahtela's TaKu process look promising, but need testing.
 - Aligning team member interests
 - Populating cost models as early as possible with quantities and rates
 - Proactive value engineering/value management

- Set based design strategy, so that selection from design alternatives is made at the last responsible moment and all time and resources available within project constraints are used to test and develop alternatives
- A3 format for proposals
- Choosing by Advantages to select from design alternatives
- Motivated by a desire to be able to invest cost savings earlier in projects, P2SL has launched an initiative to develop and test a 'Whole Life Target Value Design', involving the following steps:
 - Learn how to derive an allowable cost from a facility operations model.
 - Learn how to link facility models (BIM) to facility operations models, so the impact of design alternatives on whole life costs and benefits can be predicted.
 - Give facility operations models to the project team so they can recalculate the allowable cost based on expected impact of design alternatives on whole life costs and benefits.
 - Learn how to finance projects where the budget (allowable cost) varies during design, and where whole life investment decisions are made during design.

If you would like to participate in the P2SL Target Value Design initiative please contact Glenn Ballard at ballard@ce.berkeley.edu or (415) 710- 5531.

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Process Benchmarks – This is a document that summarizes experiences and knowledge gained from scholarly activities:

This is a publication category in the Lean Construction Journal (LCJ) intended to summarize experiences and knowledge gained from the activities:

- At Lean Construction Institute affiliated university-based research labs;
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This document captures the state of practice and theory to date on a particular topic (the current state of standard work), and serves as advice to industry that is grounded in research. The Process benchmark establishes a point of departure from where we can improve on standard work. This category is reviewed by the LCJ editors only. Updates to a published process benchmark are welcome.

