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Certain About Uncertainty

Realization Technologies builds project management tools around Goldratt's Theory of Constraints, and is redefining project success rates.



COVER STORY • REALIZATION

It is very simple to win a Nobel prize in Physics,” says Eli Goldratt, educator, author, scientist, philosopher, and business leader. “All you need to do is publish a single paper. Only the paper must be of the caliber that when other physicists read it, they should exclaim, “Oh! My god!” You have a Nobel prize.” Goldratt is, first and foremost, a thinker who provokes others to think. Often characterized as unconventional, stimulating, and “a slayer of sacred cows,” Dr. Goldratt exhorts his audience to examine and reassess their business practices with a fresh, new vision.

Realization

Project Management Software
for an Uncertain World

Project variables have quantified only the tangible realities of an ideal world, claims this young startup in the Valley. What are they doing differently?

By Karthik Sundaram

CERTAIN ABOUT

“If you ask a programmer to estimate the time he or she will need to complete a particular task, the programmer will unknowingly add a safety buffer to his estimate. Compile a dozen tasks like this towards a large project, and you have disaster waiting just around the corner,” propounds Goldratt. When you strive to finish each task on time, it is almost guaranteed that the project won’t finish on time. Goldratt proposed that a better way to plan project

schedules would be to strip all the tasks of the safety buffers and introduce buffers to the project instead.

Sanjeev Gupta was an employee at Xerox, where he chanced upon a book written by Goldratt, *The Goal*. Written like a novel, it told about how a plant manager was struggling to get his company to speed, against a whole bunch of seemingly impossible scenarios. Gupta tried a few of the lessons that

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Ravi Radhakrishnan, Ajai Kapoor, and Sanjeev Gupta of Realization

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Goldratt proposes within his department and found them to work wonders. Not surprisingly, he quit Xerox and founded a company, Thru-Put, where he developed solutions for the manufacturing industry. After a successful acquisition of Thru-Put, Gupta and some of his colleagues spun out a project management solution from Throughput and founded another startup—Speed to Market. Rechristened Realization recently, the company has built out a project management software suite that is delivering some very good results for clients. Um, of course, it derives its logic from more of Eli Goldratt's theories, explained in *Critical Chain*.

"Microsoft's Project is good for the desktop, for single projects. In an enterprise, there are multiple projects, tasks, and thus, innumerable areas for failure. What we are tackling here is the animal called uncertainty," says Gupta. For simplicity's sake, in typical project management such as critical path method (CPM, invented in the sixties), task durations are treated as if they are deterministic, when in fact they are highly probabilistic. Project managers are attempting to simplify their jobs using methodologies that were designed before the advent of computers, unknowingly causing many undesirable effects.

The Internet, prolific PC-enabling of the enterprise, and the drastic shortening of timeframe perception in project completion, says Gupta, gave him the macro-picture of the Valley's need. "Projects became all important for the Valley to survive, and the need to manage projects assumed critical importance," Gupta says. "But many of the project management styles were from pre-PC days, and were directly translated to an online tool." Despite spending over \$1 billion in project management software, business worldwide agree that hardly 10 percent of projects are completed on time, within budgets or in total scope.

IN HIS RESEARCH, GOLDRATT TAKES A COUPLE OF steps backward to understand why projects fail and what lacks

in project management. "In spite of padding task estimates with safety, project failures are many," says Goldratt. This, he says, is because the safety buffer is wasted and he outlines three ways in which the buffers are wasted. The first is called "Student Syndrome." Goldratt contends that once a resource has negotiated a task completion time, they reevaluate the task and decide how long it will most likely take. Then they get caught up working on other projects with closer deadlines. When they have only the expected duration left until the deadline, they really

Even with safety padding in tasks, projects fail because the safety buffers are wasted by the resource. Managing the **SAFETY BUFFER IS THE KEY.**

ramp up the effort level. At that point, if they encounter an unexpected problem, the deadline is missed. If the resource would have started the work when it was assigned, they still could have easily met the deadline, even with the "Murphy factor."

The next way in which safety is wasted is the multiplying effect of multitasking. In order to keep each project on track, a resource does half of task X, then half of task Y, then half of task Z, then finishes task X, then Y, then Z. How long does each task take to complete? What happened to the safety time?

If a resource has three tasks assigned in descending priority X, Y and Z, what often happens is that they will start task X and work on this unless the work is "reprioritized." Most project managers are given the incentives that drive them to be concerned only with optimizing their project. Furthermore, they have learned from experience that in project management "the squeaky wheel gets the grease." Thus, what will typically happen is that Y's project manager will go to the resource and ask what progress he or she has made on his task. Not wanting to disappoint Y's project manager, the resource will drop what he or she is doing on task X and start working on task Y. This same thing happens with task Z. What finally ensues is that each one-week task has taken at least two weeks to complete. This picture does not even show the set-up time required when switching between tasks. The net effect is that each task finishes later than it would have if the resource had worked on task X until it was complete, then task Y, and then task Z.

The last way in which safety is wasted has to do with the structure of most schedules. Because tasks can have multiple necessary predecessors, delays are passed on, while gains are not. Because schedules are built around dates, if preceding tasks are completed, the



Project Environment in the New Business Model

- Projects are small to large in size.
- Project managers are coping with several projects and multiple roles.
- Resources are empowered to manage their own work to meet corporate objectives.
- Resources are matrix-managed and may be working on multiple projects simultaneously.
- Technology resources are noninterchangeable and multi-skilled.
- Work interruptions and priority changes are the norm.
- Metrics are not known.
- All work, including project and down time, has to be accounted for.

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next task will not begin till nearing the safety limits of its completion dates. Goldratt proposed radical changes in the way project scheduling were done.

GUPTA AND HIS TEAM FIGURED THAT THEY COULD build a software based on Goldratt's theories that could become a viable project management software. In one of his consulting projects, Goldratt convinced Gupta to fly to Israel and meet his client, where Goldratt saw potential to test the software in an extremely complex multi-task environment. "The company was in the business of high tech electronics, and the factors that influenced task completion and project completion were numerous, varied, and extremely uncertain," recalls Goldratt.

Gupta managed to deliver some very creditable control levels on the projects in the company, and Concerto, Realization's marquee project management software filled sails. "Since then, I have seen the company grow," comments Goldratt. "A bit too fast, for my taste." Uncertainties can be translated into tangible factors in a



project, says Gupta. "In the beginning, we went after different verticals and soon realized that a project is a project is a project," says Shailesh Sood, VP of marketing. Realization developed algorithms that could address the numerous uncertainties, while building a safety engine into each project. "The reutilization of safety buffers in the project planning has helped clients in many ways," says Ajai Kapoor, a co-founder and VP of product management at Realization. "Project managers are able to monitor the buffers at key areas in the project and hold meetings only with those team members whose buffers are shrinking. And once the problem is identified and sorted out, the buffer tops up to the original level, and the project is really on track now. The cascading effect of a task delay is cut out." The Safety Engine makes room for uncertainties in projects with blocks of unscheduled time, called buffers, placed at a few critical junctions. These buffers absorb and lessen the shocks of uncertainties. With unscheduled time buffering the right places, people have no reason to hide safeties at multiple levels. Commitments are now more aggressive and real.

Sheri Phillips at IBM Consulting agrees. "We typically have over a dozen large scale projects running at any given time, some more in different stages of being confirmed with their own set of timeframes, demands and constraints. With Realization's product,

we are able to be in better control of many of the uncertainties in the projects, simply because the management tools it provides are capable of understanding the project needs." Phillips has been using Realization's tools for over a year, and recalls reviewing other products in the market, end of the 2001. "We were not willing to buy just any product, when Realization offered to give us their product for a trial." Gupta says this is a key to convincing clients. "They can actually pay us once they notice an ROI on the product they would be buying. This strategy came from our total confidence in our product's capabilities to help client manage their projects better."

William Kemmel at NASA Langley had been scouting for project management software. "We had too many projects on hand and less resource. The staff were overburdened and there was a dire need to help them schedule their work, or risk losing the resource itself," recalls Kemmel. He spent a few months reviewing ProChain and other tools in the market. Most software tools were very complex and pre-configured, requiring users to adapt

In reality, as soon as you create a plan, uncertainties strike, making your plans **OBSOLETE.**

their process to fit the tool's process. "Our managers found Concerto to be very flexible," says Kemmel. "We have had excellent improvements in the project scheduling and people morale."

I DON'T THINK WHAT WE HAVE DONE IS ANYTHING really sexy," says Gupta. "It is just a clear understanding of the meat and potatoes of projects, and some clear-cut solutions for these projects." By automating repetitive tasks and processes, Concerto cuts the administrative overhead typically associated with managing project operations. During execution, Concerto predicts if schedules will be missed and also assists all managers in getting schedules back on track. Such control is made possible by Concerto's innovative "bi-directional pegging" algorithm. Bi-directional pegging allows project managers to instantly drill down from endangered buffers to most penetrating tasks/resources, and task and resource managers to go up from their tasks/resources to most endangered buffers.

In the short three years, Realization has racked up an impressive client list. "We invested time in deploying this software for trials, and today, clients come in by word-of-mouth," says Sood. One of their marquee client has been the U.S. Navy, which pioneered the concept of project management. "One of the key advantages with Concerto has been easy deployment, and immediate realization of project control. People can tangibly see advantages in the product immediately," says Gupta.

Despite a big price tag on the product, the team is confident of an expanding market. "The important point here is the realization that dawns on the client side—that projects, however complex, can be managed and completed in shorter time, and in real world constraints," says Gupta. "That realization is key to our success." 