

industrial management

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Modeling Systems by Nature

Take your scheduling methods from biology



Synchronized Execution for Speedy Projects

Avoid delays and expand capacity



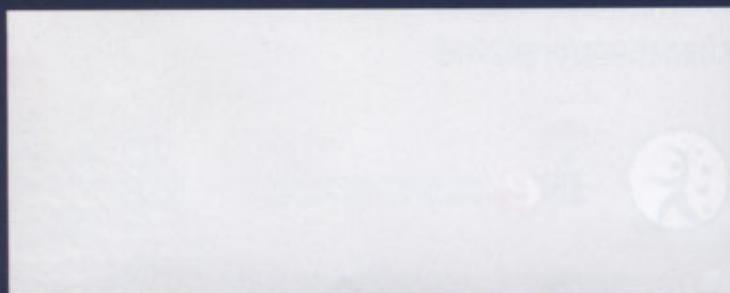
Process Mining for Organizational Agility

A Chilean company embraces continuous improvement

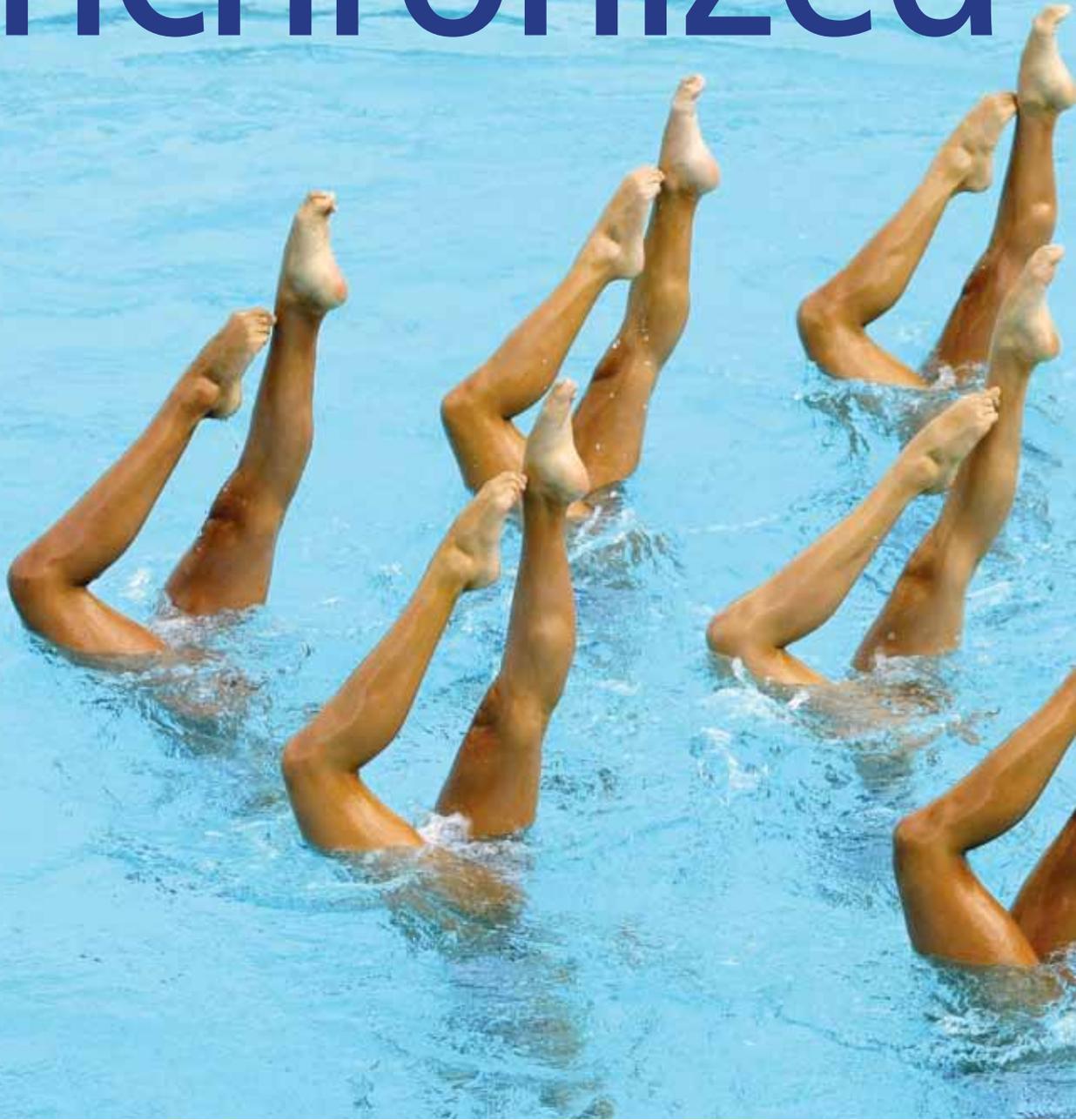


A Quick Response to Office Management

Improving productivity goes beyond the shop floor



Synchronized



The traditional approach to managing execution — which focuses on detailed planning, scheduling and tracking — fails to deliver projects faster because it assumes a perfect world where requirements never change, technology works as expected, vendors deliver on time, resources are available when needed, and every task is completed in the time planned. In the real world, however, rarely anything happens as planned.

To accelerate projects, managers must adapt to address the inevitable uncertainties in projects and must maintain synchronization among all of the moving pieces. The conventional methods of detailed planning, scheduling and tracking embodied in traditional project management software and shop-floor scheduling modules of enterprise resource planning systems fail miserably at this.

That is why traditional plans, methods and software are rarely used to manage execution.

In the real world, however, rarely anything happens as planned.

Against this backdrop, a new method of synchronizing project execution has become necessary. This method has sped up a wide variety of projects for more than 200 organizations, helping them realize their full potential. These projects include design and

execution

BY SANJEEV GUPTA

for speedy projects

EXECUTIVE SUMMARY

Projects are the lifeblood of economic growth and development. Yet poor execution has been the bane of project management for far too long, causing delays and missed deadlines. In the case of large infrastructure projects, poor execution delays the realization of returns and increases project costs. By improving project execution, manufacturers of industrial equipment that work on multiple projects simultaneously can free up capacity and take on additional projects with the same resources. Most importantly, speed of execution can be a competitive advantage, especially in today's era of killer competition.

manufacturing of complex equipment, shipbuilding, engineering, procurement and commissioning of physical infrastructure, as well as maintenance, repair and overhaul of aircraft, submarines, ships, steel plants and oil refineries.

Project execution management brings order to project management chaos by changing the rules of management. It is based on the work

of Eliyahu M. Goldratt, as described in his book, *Critical Chain*.

Examples of success

Traditionally executed projects tend to take longer than expected, cost more than expected and accomplish less in scope than expected. Compare that to the results that project execution management has delivered to the following companies.

_____ A leading infrastructure equipment provider in the telecom industry chose to implement project execution management, in part because only 55 percent of its projects were being completed on time. Because of the size of the company — 4,000 engineers in multiple countries working on 300 to 400 projects at any given time with more than 30 monthly deliverables — uncertainties combined

Project execution management brings order to project management chaos by changing the rules of management.

with contention for resources to spin projects out of control.

After choosing to manage project execution, the company now delivers more than 90 percent of its projects on time, within budget and without compromising project scope. In addition, cycle times have been reduced by 10 percent to 25 percent, and per-person throughput increased by 45 percent. Execution management also helped the company achieve a shorter customer lead-time and improved ability to manage projects (especially a reduction in “re-planning”). All of these results have been achieved despite reducing head count.

As another example, one of the world’s leading solar equipment manufacturers implemented project execution management. Prior to implementation, the company had increased the number of projects it was working on simultaneously. Consequently, it needed to go into firefighting mode, especially as projects neared completion. Delays had customers complaining and penalties piling up.

Once the project execution system was up and running, the company increased its revenues 31 percent and profits rose 70 percent. Cycle times dropped from 17 weeks to 14 weeks, and on-time delivery improved from 80 percent to 90 percent, cutting average project lateness from eight to nine weeks to two to four weeks.

Results like these are not extraordinary for organizations that adopt execution management.

Project execution impediments

Project execution is impeded by three major factors: uncertainties, limited resources and complexity.

Industrial projects are riddled with uncertainties. Vendors don’t always deliver as planned, customers are slow to approve completed project stages, specifications change, unexpected technical problems emerge, designs change and task times vary from

estimates. As uncertainties unfold, they disrupt the rigid schedules proposed by traditional management solutions. Task priorities become unclear and unsynchronized. Every department and every person starts prioritizing their tasks according to local interpretation and local objectives, all without regard to overall project delivery.

The second impediment to project execution is competition for limited resources — including engineers, specialists, tradesmen, transportation, cranes, facilities, tools and equipment — between different groups within the organization. To cope with conflicting demands, resources are shuffled from task to task. Without good priorities, however, these decisions are reactive and made in a haphazard fashion. As a result, tasks are further delayed and new fires erupt throughout the organization.

Project and resource complexity compounds these problems. Synchronizing tasks among various departments is particularly difficult for projects with a large number of people, departments and groups (often in different locations) with complex interactions. At the same time, large projects and organizations are the ones with the biggest need for synchronization.

Without synchronization, projects start falling behind. As projects are delayed, resources are pulled in multiple directions at once. Schedules are disrupted even more and people begin to multitask. When this happens, managers’ ability to control outcomes is compromised, and they often suffer nearly total loss of control. They cannot predict when a project will finish because they don’t control who will work on what and when. They can try to solve the problem by throwing more resources at it, even though they know that no matter how many resources they provide, projects will continue to be late.

The net impact means resources are less productive, and projects take much longer, deliver less scope than planned and cost more than planned.

Traditional management woes

When project managers are under the gun and afraid of missing deadlines, they respond by starting projects (or work streams within a project) as soon as possible, hoping that it will give them the extra time to deal with uncertainties and resource unavailability. The reality is quite different; starting new projects or work streams only intensifies the competition for limited resources. To gain control, managers insert artificial milestones in the project schedule and try to maintain the schedule by holding people accountable for meeting those due dates. However, setting so many hard dates in an environment full of uncertainties only leads managers to add hidden “buffers” to their task-time estimates, which they vigorously defend if questioned. These hidden buffers are inevitably wasted by firefighting and multitasking. As a result, tasks are still late.

To help keep projects on track, organizations have invested a great deal of time and money into detailed tracking systems that give them “visibility” into projects. These systems primarily provide after-the-fact reports that help assign blame for delays and do virtually nothing to improve project execution.

But to execute projects faster, frontline supervisors need clear priorities for their resources, within and across projects. Moreover, they should highlight the most urgent tasks so managers can take extraordinary actions when needed. Finally, project managers need early warning signals about problems that can prevent projects from making deadlines.

Synchronization is the key

Even though project execution is a complex problem, the solution need not be. In fact, sophisticated methods and software that rely on detailed schedules and complex inputs are not practical in the real world. An elegant solution that solves the synchronization problem and eases the work-lives of first line

Without synchronization, projects start falling behind. As projects are delayed, resources are pulled in multiple directions at once.

managers and project managers is the ideal answer.

Synchronized project execution challenges conventional wisdom and changes three main precepts of project management.

Rule 1: Limit the number of projects in execution at any given time. New projects should be staggered based on the availability of the most limited resources (the constraints). Work-in-process is carefully controlled based on how much work the constrained resources can handle. When projects are metered this way, resources across the board can concentrate on completing tasks without multitasking. Work flows smoothly, and problems are identified and resolved quickly. Resisting the temptation to start new projects as soon as possible also gives organizations time to prepare prior to execution (Figure 1).

Rule 2: Replace “hidden” buffers with aggressive project plans and global buffers. Local task-level estimates are not commitments. When people know that estimates will not be turned into commitments, they typically give accurate estimates of how long tasks will take to complete. The overall project due date is protected by one “time buffer” that absorbs all project delays (Figure 2).

Rule 3: Prioritize tasks and look for early warning signs by monitoring buffer consumption. Tasks that consume the most buffer time are given the highest priority to keep the entire project on track. Engineers and crews focus on a single task at a time and, when finished, are given a new task based on priority. Since the entire organization works toward the same set of priorities, synchronization improves, work flows much faster and productivity goes up. Buffer consumption also provides early warning signals to managers so they can react before problems become worse (Figure 3).

Employing these three rules can quickly expose 20 percent to 30

Pipelining

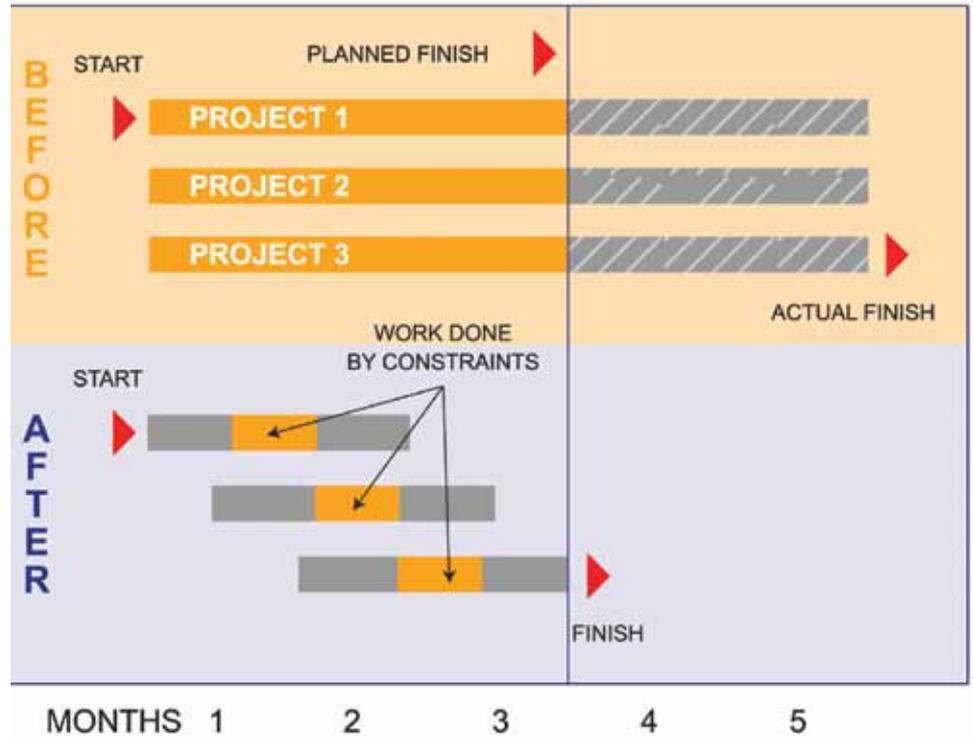


Figure 1. The first rule of synchronization is to limit the number of projects in execution at any given time.

Buffering

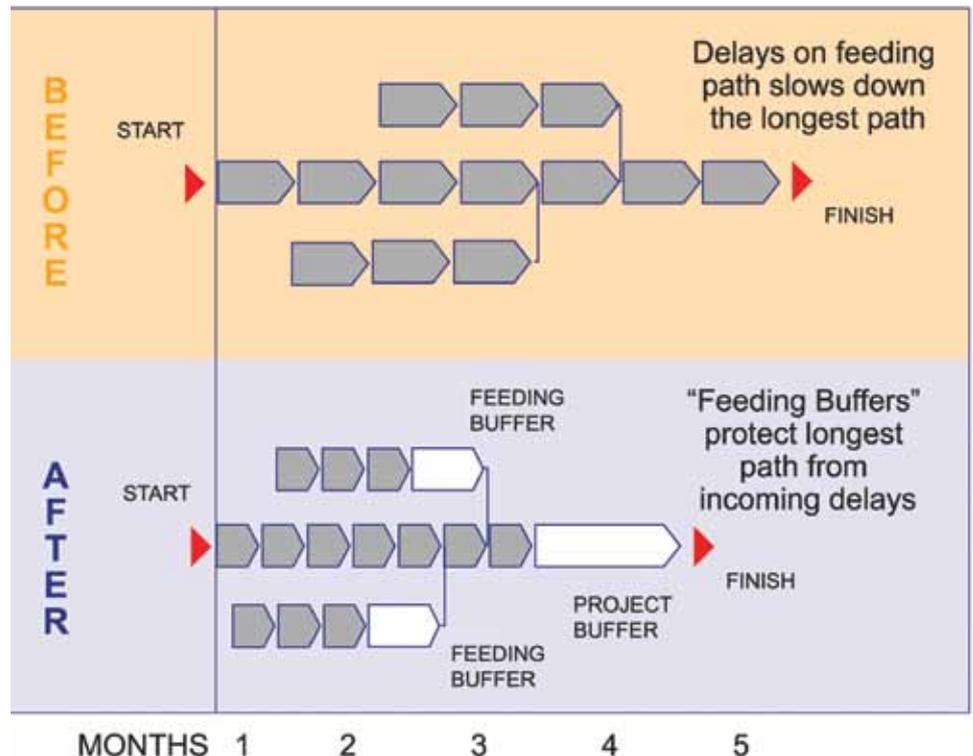


Figure 2. The second rule of synchronization is to replace “hidden” buffers with aggressive project plans and global buffers.

Buffer management



Figure 3. The third rule of synchronization is to prioritize tasks and look for early warning signs by monitoring buffer consumption.

Old vs. new

Attribute	Traditional management systems	Project execution management systems
Core idea	<ul style="list-style-type: none"> Assumes a perfect world where requirements never change, resources are never constrained and every task happens as planned Assists with creating project budgets and schedules Reports on adherence to a pre-determined timeline and budget 	<ul style="list-style-type: none"> Assumes unpredictability in project execution Dynamically synchronizes resources and activities based on current priorities to ensure fastest possible completion
Typical user	Project administrators who need to compile progress reports	Business line managers and executives who need to increase revenue and profitability by completing more projects and completing them on time and without additional resources
Value during execution	Helps identify which teams and managers are behind schedule and over budget	<ul style="list-style-type: none"> Continually re-prioritizes activities to minimize the impact of uncertainties Helps identify projects that could fall behind as well as the constraints that could impede execution
Primary emphasis	Planning and measuring adherence to static plans	Adaption and response to changing real-time conditions during a project

Figure 4. A comparison of traditional management and project execution management systems

percent additional time and capacity. Figure 4 shows a comparison of traditional management and project execution management systems.

Implementing change

Putting the new method in place and sustaining the new rules requires implementing a complete execution management system that includes:

- Operational goals and measurements to achieve business goals. Operational goals include targets for cycle-time reduction, improvements in throughput and due-date performance, and measurements that promote execution according to synchronized priorities and early warning signals.
- Management policies and processes to enforce the new rules and translate these rules into decisions and actions readily understood by all
- Execution-oriented project plans with enough detail to provide good execution priorities, but not so detailed that control becomes difficult
- Enabling software that helps managers meter the release of new projects, puts buffers in the right place, synchronizes day-to-day priorities and alerts managers to potential problems

Project-based manufacturers and engineering organizations around the world have implemented the project execution management methodology and software. They improved execution — shorten delivery times by 20 percent to 30 percent and increase productivity by 15 percent to 20 percent — within a few weeks and institutionalize the changes in under a year. These improvements have increased their profits dramatically and accelerated cash flow.

This method of project execution allows organizations of all types to expedite projects, provided they are ready to challenge conventional management precepts. ❖