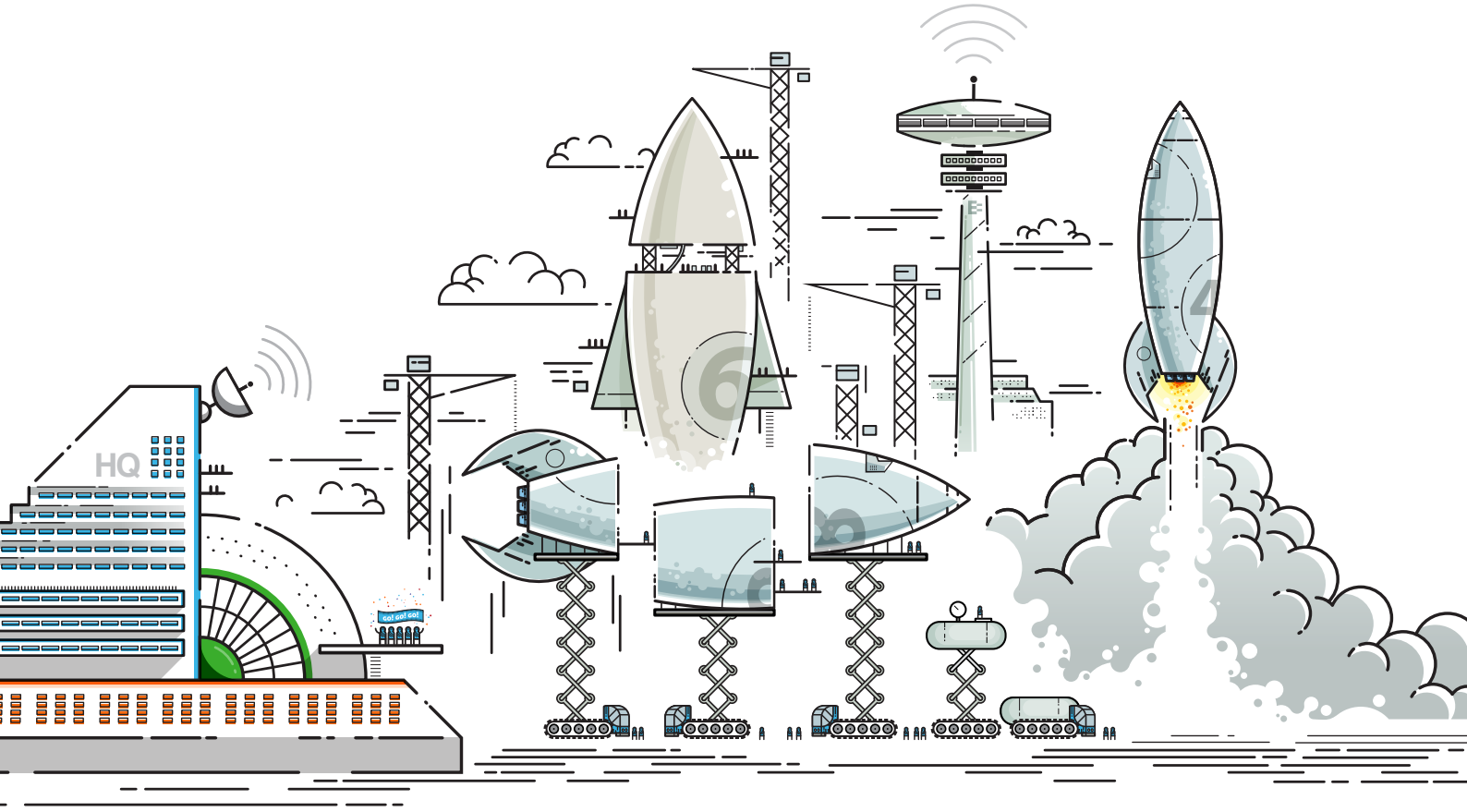
Ensemble
Consulting
Group

Critical Chain Project Management (CCPM)

The Executive Guide to Winning Results

Let's
Redefine
What's
Possible



In this guide, you'll gain insight into the systemic context and perennial challenges of project and portfolio management. It aims to provide you with a solid grasp of a well-reasoned set of principles for you to intelligently engage in a conversation with your PMO and other key stakeholders about the relevance of Critical Chain to your organisation.

In the classic British 1980s TV comedy *Yes, Prime Minister*, senior civil servant, Sir Humphrey, enjoyed running verbal rings around his boss, PM Jim Hacker. Although nominally in charge, Hacker's pride usually prevented him from admitting ignorance and truly grasping a problem. Sir Humphrey, we knew, was really steering the ship. Meanwhile, Bernard, the PM's private secretary, would point out how actions might be perceived from different perspectives: 'I give confidential press briefings; you leak; he's been charged under section 2a of the Official Secrets Act'.

If Hacker is the 'executive', then Sir Humphrey is the 'engineer', to use two of the sub-cultures identified by renowned organisational psychologist Ed Schein in his seminal book Organizational Culture & Leadership. The third is the 'operator', or the frontline worker. Each comes with his or her own beliefs, values and underlying assumptions. In a large organisation, the executive's implicit desire is: 'I set the course, you manage the project, they deliver the work'. But is this the reality? It probably feels more like: 'I expect results, you promise me a deadline, they're late again'.

In the manager's shoes it might feel more like: 'I plan the work, you (my team) wreck my plan, he (my boss) promises miracles'. While the operator feels: 'I do the work, you (my manager) get in my way, he (the boss) is clueless about what it really takes'. From these different perspectives, everyone is trying, everyone feels squeezed and it's always someone else's fault. Instead of a well-orchestrated performance, it's more like three groups playing different genres of music in different keys and time signatures. No one really sees the whole picture and the work is often a grind, wasteful and unjust.

What's really the problem?

Why projects are like spaceships

A modern spaceship is a remarkable feat of engineering. Most of the features would be known to the NASA engineers on the early Apollo missions: the structure, the motor, the controls, the launchpad, the re-entry heat shields must all work together to get the payload into space—and when required—safely back again. This analogy has three vital implications for projects.

One, a spaceship is a whole entity. It only takes off when all the parts work in unison; the rocket motor—no matter how well engineered—goes nowhere on its own. Two, every part of the rocket must match the overall design of the spaceship; you can't switch a Saturn V engine for an Ariane—even if the Ariane engine is the better design. And three, you can't run a space program on spaceships alone. By all means, the assembled parts which constitute the spaceship create a complicated machine, but you need a space centre, an integrated supply chain, skilled people, a regulatory compliance regime, a willing buyer, whether government or private sector, and all the other organisational elements that go into supporting an ongoing ability to successfully manage mission after mission. And that means you are dealing with a very complex system. Some things, such as astronaut training, mission selection and spaceship design are under your direct span of control; others, like regulatory regimes, government subsidies and launch windows sit within your sphere of influence and others, like the weather, are completely ungovernable.

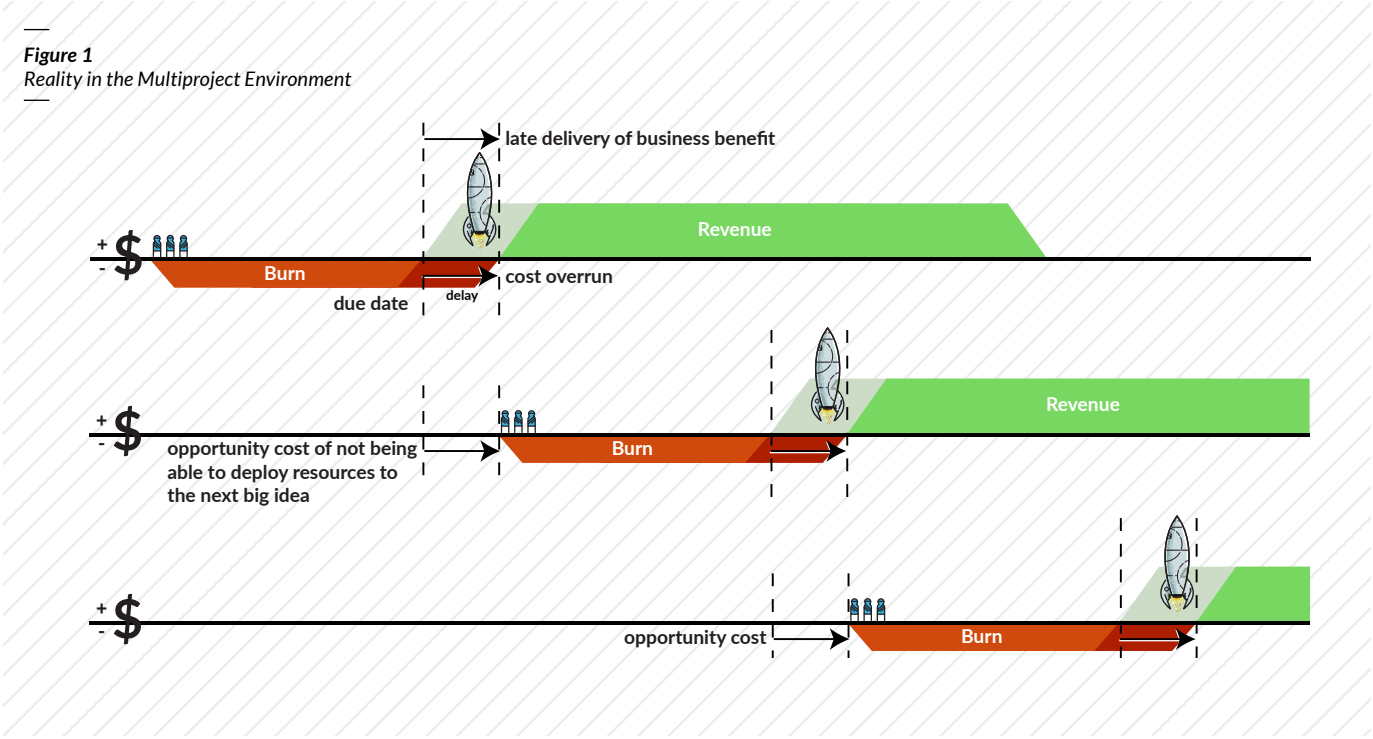
The big question is: when they do, why are your projects failing? Is it because you're not seeing the whole? The parts aren't fitting together properly? Or are you at the mercy of a complex operating environment?

The answer is probably all three. But let's wind back our analogy a bit. While assembling a spaceship is itself a project, a project needn't result in something so tangible. It could be an app. Or a conference. Or a piece of regulation. For our purposes it's helpful to think of your project as a single entity—with interconnected moving parts, on an uncertain journey to accomplish a stated goal. There are many milestones along the way, but we only care about one thing: delivery of what we promised.

Unfortunately, achieving the exacting and consequential promise of the trifecta of scope, cost and schedule is not the reality for most executives. For a given scope, each project timeline (below) has a due date with resources burning up cash along the way. Too often, delays push the due date into the future, with associated cost overruns. Worse, the revenue, and hence business benefit of the project is delayed, and there's an associated opportunity cost as every successor project gets bumped along the queue.

> "We really only care about one thing: delivery to promise"

Figure 1
Reality in the Multiproject Environment



What's a smart executive to do?

You're chairing your regular steering committee meeting and wondering at the creeping sense of déjà vu. Costs are ballooning, deadlines are blown and you sense that estimates for both are only that—optimistic guesses based on a rerun of the last similar project or some just a wild guess. A disturbing thought looms: What will your competitors do while you wait?

Behind their earnest expressions of commitment, your managers don't really believe their deadlines. Even the good ones spend undue time running around behind the scenes micro-managing, while preparing variation orders for more time, more resource or less scope. And on large projects—the ones designed to realise your grand future vision—the project end seems so distant in time from today's hustle and bustle that it's difficult to persuade anyone of the priority associated with work of such deep significance. You haven't a moment to lose, but they convince themselves they have all the time in the world. The old joke rings true: 'How do projects get late? One day at a time.' Because, whether it's today, tomorrow, next week, next month or next year—you're always on the critical path. A day lost on the critical path is as useless as yesterday's vacant hotel room.

You're thinking, or at least hoping, 'There has to be a better way to manage the execution risk of my most meaningful work.' Because, if another way exists that's better for you, your managers and the frontline, aren't you obliged to look into it?

Understanding the art and science of the discipline of Project, Portfolio and Program management in any depth is not usually the focus of a senior executive. Project Managers recently achieved Charter status in the UK and their profession is now as much a discipline unto itself as is finance, with their Chartered Accountants. They have their courses, conferences, accreditation and ongoing professional development. As a specialist discipline, you hope that the people you hire are across their accountabilities and that you can empower them to get on with it. You want to be presented with relevant and timely data to support your sense- and decision-making—not getting stuck in the weeds.

At your level of work, your accountability is to make the big strategic decisions, then control the work which will build the organisation of five years into the future and beyond. But how can you be a responsible steward of the business and an inspiring leader of its people if you and your organisation rely on flawed means to determine where to focus your limited resources? What is your data really telling you? What questions are you asking it to answer? What insights do you get from those questions? And what, then, is the wise course of action?

> "Whether it's today, tomorrow, next week, next month or next year—you're always on the critical path."

The real management challenges

Once you have decided what the scope of your strategic portfolio is, at the root of your operating system, you have two core challenges to contend with: resourcing and scheduling.

Start with resources. You can't just throw more people at the problem. There's an optimum number required to do the work. Introducing more people creates complexity and communication issues while diluting accountability. And you can't simply throw more money at it, as you don't know what your investment will yield. No matter who you are, nor what organisation you work for, the hard truth of limited resources ensures you must prioritise, figure out the trade-offs and make tough decisions about what to do and, just as importantly, what not to do. Notwithstanding the odd bit of dumb luck, superior outcomes derive from the extent that you apply the power of reason to your decisions.

On the scheduling side, how do you determine the sequence you work in, the dependency of activities, the prioritisation of work on any given day, the complex choreography of getting the right people, doing the right work, in the right place at the right time?

If you're using a 'waterfall' method with a critical path of sequential steps, your due-date is baked in. Everyone is confident—until the project starts, because everyone knows these plans, brittle as they are, don't survive first contact with enemy. With all the moving parts and complexity, how could they? It doesn't help that we're often our own worst enemy—adding scope, switching priorities, or dragging key resources onto competing projects or into the daily maelstrom. As Mike Tyson famously put it, 'Everyone has a plan until they get punched in the mouth'.

How to avoid that brittleness? One way is to use the increasingly popular Agile method. Which works very well for some things. But the way Agile hits a deadline is to dump scope. That's right. You get your project on time, but it's not what you were led to expect. And your customers' idea of a 'minimum viable product' might be very different from that of the people designing the product or service. And, despite what its advocates would have you believe, it doesn't scale.

You can toughen up KPIs and tie bonuses to performance, but working harder leads to burnout and is not sustainable. It's reminiscent of asking nineteenth-century doctors to save more patients by working faster. The root cause was hygiene; doctors weren't washing their hands. A change in the process led to immediate results and many lives saved. So, let's look at a process of project management that would be revolutionary if it hadn't already been in use for the past 30 years. It's the biggest kept secret in managerial leadership. And it's called Critical Chain Project Management (CCPM).

Goldratt's innovations

In 1984, physicist-turned-management-consultant Eli Goldratt published *The Goal* and set off a seismic shock in production management whose ripples are still being felt today. Written as a novel, with a hero who has to save his factory from closure, the book proposed a new way of looking at production through the lens of what Goldratt called the Theory of Constraints (TOC). It became a bestseller, selling more than three million copies to date. But although widely read, few companies followed through. Many who 'got it' felt the principles were just common sense—or too simplistic to apply to their situation. Those who implemented it found TOC to be the most effective management system for production since the Toyota Way. And given that Jeff Bezos lists *The Goal* in his top three business books, it has doubtless influenced his thinking and Amazon's gargantuan success.

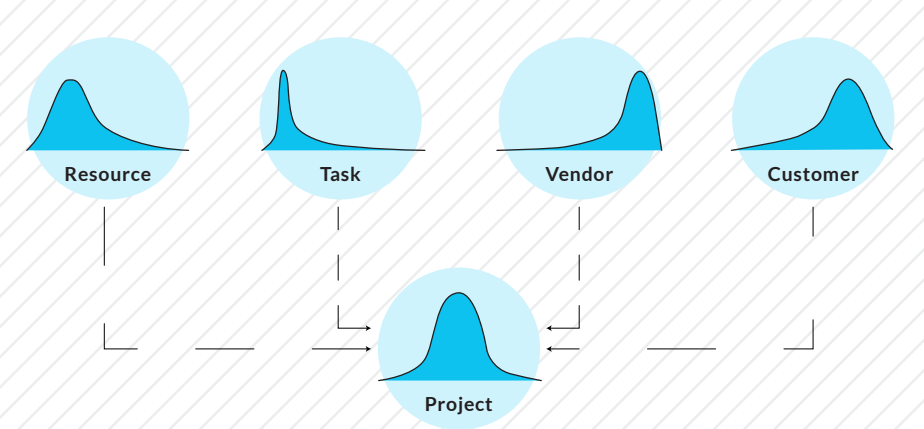


Figure 2
The Central Limit Theorem: The Law of Large Numbers

The power of aggregation

Why did it take a physicist to introduce a genuinely new system of management for business? One reason is that Goldratt recognised the importance of mathematics and statistics. In probability theory, the law of large numbers states that 'as the number of identically distributed, randomly generated variables increases, their sample mean (average) approaches their theoretical mean' [SOURCE: Brittanica.com]. Put more simply, as illustrated, regardless of how skewed the distribution of any given activity, throw enough of them together and the overall distribution will be the famous bell curve of the normal distribution.

Goldratt didn't discover this phenomenon, known as the Central Limit Theorem. It was proved in 1713 by Swiss mathematician Jakob Bernoulli (who also gave his name to the principle that allows things that are heavier than air to fly, but that's a different story). The late Israeli physicist's innovation in productivity was realising that this law held the key to resourcing and scheduling.

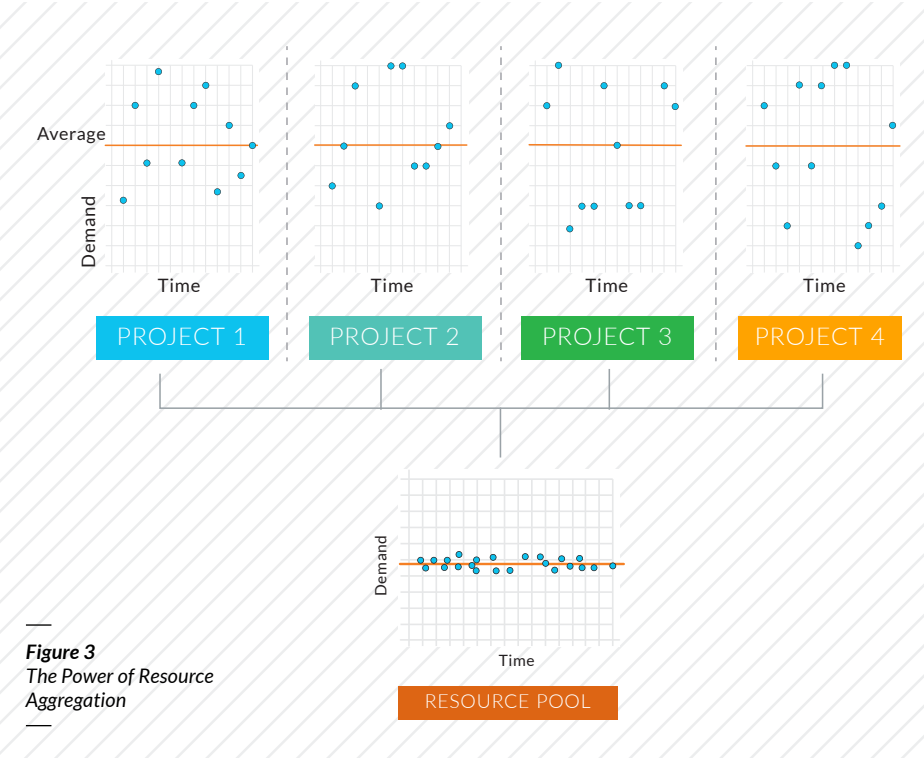


Figure 3
The Power of Resource Aggregation

Resource aggregation: stabilising demand

Let's say you have four projects (as shown) with demand (y-axis) for a particular role varying over time (x-axis). If you increased headcount to serve the maximum demand, you'd go broke. But if you don't account for those spikes, you'll fall behind.

One of the hard problems of scheduling, then, is managing the complexity that arises from variance in demand. When you aggregate the resource, the standard deviation of requirement for the aggregated resource becomes way less and therefore much more stable (see inset above with resource pool). Projects usually contain enough randomly generated variables to take advantage of Bernoulli's maths. So, you can achieve a much more stable consistency on the demand side—and have the people you need at the right time—by factoring aggregate probability of demand into your resourcing algorithm.

Many people will tell you they have software that looks at their resources across the whole business so they can make accurate resource plans. This is a great—and necessary—first step. But it's not sufficient. Like the brittleness of the simple waterfall schedule mentioned above, resource planning goes fine until you actually need people. In the dynamic midst of multiple projects, and the cacophony of the daily bind, how could you possibly know who should turn up three weeks from now? For which task? Are you sure you'll need them on Tuesday and not Wednesday? Will they even be available? Who's behind? What's taking longer than we thought? What's the implication? And so on.

Schedule aggregation: the magic 25%

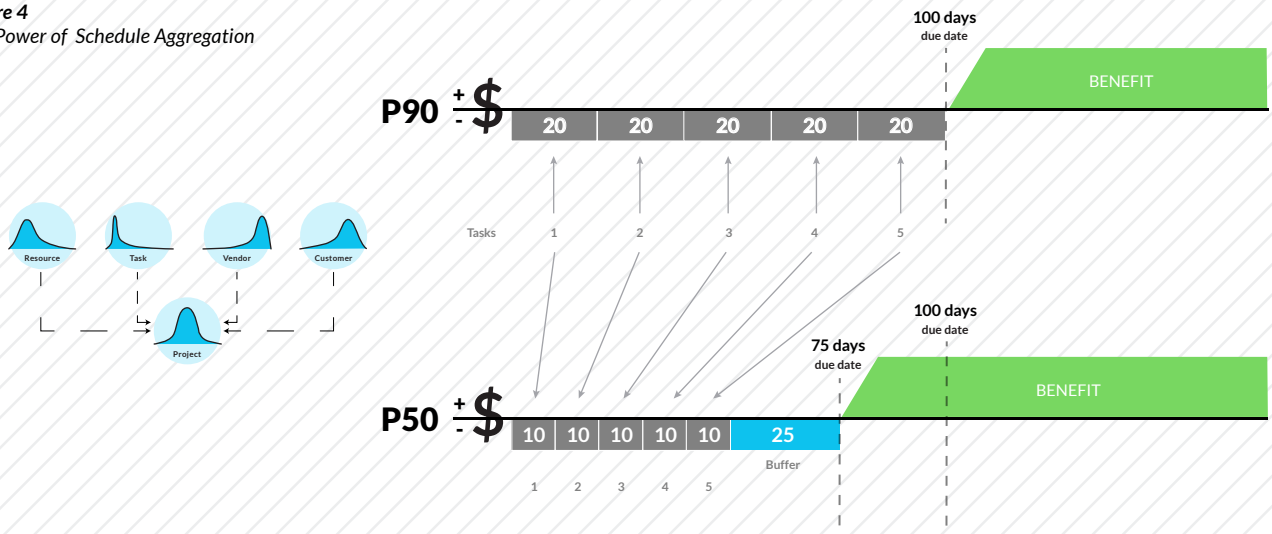
What you need, in addition to a well-articulated resource plan is a signalling system. Goldratt applied mathematics, logic and systems thinking to the problem. His genius was in creating a system of management that signals what resource, by type and quantity are required where and when. At any given moment, everyone can see the task causing penetration of the critical path and thus know the effect that early or late delivery is having on the project. Crucially, because the information is logically derived from objective data, everyone knows it is valid, and can thus trust the need to subordinate their own actions to what is best for the whole. Everyone knows where to pay attention—and you can take timely, unified, course correcting action. This is possible because of another kind of aggregation—that of the tasks themselves.

In the early stage of project planning, everyone gets a bit nervous. The project manager asks for estimates: How many people? What tasks? By when? If the manager holds their feet to the fire for a completion date that's certain, we all know what happens. People give themselves a cushion. It's human nature.

Critical Chain accepts the inherent uncertainty of estimates. But instead of letting everyone give themselves their own contingency to safeguard their individual estimates, the method rids the individual estimates of their local contingencies. It then identifies the resource levelled critical path and adds an aggregate contingency to the end of that path—called a project buffer.

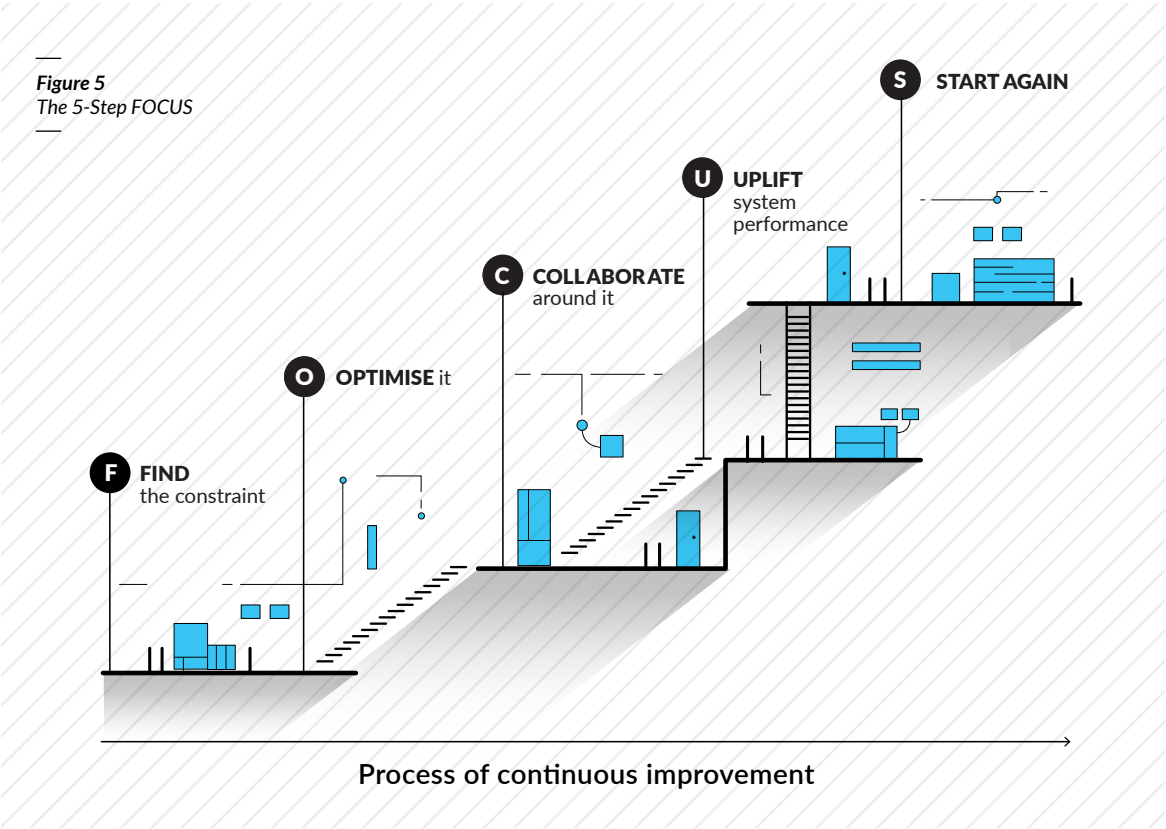
The table shows, in simple form, the maths behind this idea. We'll explain more on the buffer, as well as the meaning of the P90 and P50 estimates below.

Figure 4
The Power of Schedule Aggregation



	Task 1	Task 2	Task 3	Task 4	Task 5	Unbuffered duration	Buffer	Duration	Days Saved	% of P90
P90	20	20	20	20	20	100		100		
P50	10	10	10	10	10	50	25	75	25	25%

Figure 5
The 5-Step FOCUS



Focus on your goal

Goldratt's Theory of Constraints is called a theory but it's really built on a profoundly simple and pragmatic premise: every system has a constraint. What's preventing a production line from producing infinite throughput in zero time? Or what's stopping a single project from being delivered immediately? We all intuitively understand the truth behind these questions—somewhere there's a performance-limiting bottleneck or a weakest link in the chain.

The conclusion Goldratt drew from this truism is that a gain at the constraint means a gain for the system as a whole. Organise your system around the constraint and you can get remarkable results. He developed five simple steps to help you do this.

Goldratt's five focusing steps used words like 'exploit' and 'subordinate', which can be misinterpreted by the people you're asking to do the work. So we tweaked the language to create a memorable acronym. We think Goldratt would have appreciated it, since he said TOC is ultimately about 'focus'.

First, of course, you must find your constraint—the rate-determining step of your whole system. (Better yet, design it into your system.) We don't need to get into the details of optimisation and collaboration, except to say that this is where you get resourceful. By rejigging the system you help the constrained resource—whether a person or a bit of technology—go faster or do more. A key realisation is how much you can increase performance here before you need further investment, which is the 'uplift' step. Critical Chain is really about being more mindful with the resources you have.

After production, Goldratt turned his attention to managing projects. As we've seen, projects were ripe for renewal as the failure rate from waterfall management was simply too high. TOC encountered even more pushback here because project management was establishing itself with PRINCE2, PMBOK and other frameworks. But those who tried the TOC Critical Chain approach to project management—including BHP, Boeing, Delta Airlines and all branches of the US Department of Defence—have taken their performance to new heights.

Critical Chain provides a way to assign the resources available to you to the most profitable opportunities and ensure your team can respond to, and focus on, conditions in the real world. It gives you a way to do three things:

- **Deliver your promised business case**—in full, in less time, every time
- **Mindfully manage resources** to reduce your 'cash burn'
- **Free up your people sooner** to tackle the next big idea

Let's start with what's radically different about Critical Chain and some of the core principles behind why it works. We'll finish with how this helps you keep control of your portfolio and succeed despite risk inherent in execution.

Critical chain, not path

The definition of project success is the on-time (or sooner) delivery of what you promised, using no more resources than anticipated. The first thing, then, is to work out all the necessary tasks and decide in what sequence they need to be done. Once you've optimised for things that can be done concurrently, you're left with an apparently minimum timeline. The longest chain of sequential tasks defines the length of the project.

In this case, the constraint is this sequence. It may include many people. But at any one point in time, only one task is on the critical path. So isn't this what the critical path method already does? Unfortunately, classic critical path scheduling deals only with the issue of task precedence. Unless you're operating with infinite resources, your project duration is almost always extended by resource contention—different tasks competing for the same resources at the same time.

A project is like a relay race, with the baton passed along the chain of tasks and their participants. What's far more important than the date of the handover is the will of everyone to complete the overall race in the shortest time reasonable and possible.

A necessary condition of knowing what is reasonable and possible demands that you take resource availability into account, on top of the already mentioned need to define task durations and dependencies.

In the sidebar (Figure 7.3), you can see how the critical path lengthens when resolving resource contention.

The resource levelled critical path becomes a critical chain by constructing the logical dependencies, sizing the tasks according to their 'touch time' effort (that is eliminating any unnecessary queueing), and applying the aggregate contingency in the form of buffers, placed at the end of the chain, to absorb the inevitable risk and uncertainty that comes once execution begins.

A profound implication of Goldratt's Theory of Constraints is that non-constrained resources, by definition, have spare capacity. From the timeline view, technically, any task or chain of tasks not on the critical path has 'float'—it could start earlier or later and still deliver on time to the schedule of the critical path. To get the most out of your system, what non-constraints must do, supported by the relevant signal, is support the constraint in more quickly completing the relay—not maximising its own production.

Buffers

Ask someone to set their own deadline for a task and they'll pad their estimate. They know they'll be asked to take on something more urgent, yet still be expected to do the project. Or they'll try to factor in the fog of other projects they're being asked to work on. Critical Chain takes the idea of contingency and gets it out in the open.

Estimates start from the assumption that the person is fully kitted for the task; they know what's required and have the people, materials, information and money to do the job. Instead of asking them to estimate a due date with 90% certainty (P90), the method asks for 50% certainty (P50). In other words, people are expected to meet their estimated due dates only half the time. (Which half doesn't matter because we've aggregated resources and tasks with the laws of probability.) This takes the pressure off and allows for more realistic estimates. The project manager takes into account the duration of the chain of P50 tasks and adds a buffer to the end, usually equal to half the length of the chain it supports. Crucially, we expect this buffer to be consumed. We just don't know at what point or by whom. Yet.

Assuming the project has more than a handful of tasks and participants, the law of averages means that some activities will go faster than anticipated and some will take longer. Provided you've got a way of signalling which tasks are starting to drag the chain, the variation will wash out in the end.

The maths here is really calculus, that is, analysing the rate of change. Our two variables are the rate at which the chain is being consumed (ie, how you're progressing on the tasks) and the rate at which the buffer is being consumed (ie, how that tracks against expectation). This allow us to create the 'critical ratio' which gives us our signal. That signalling system is the 'fever chart' (see later).

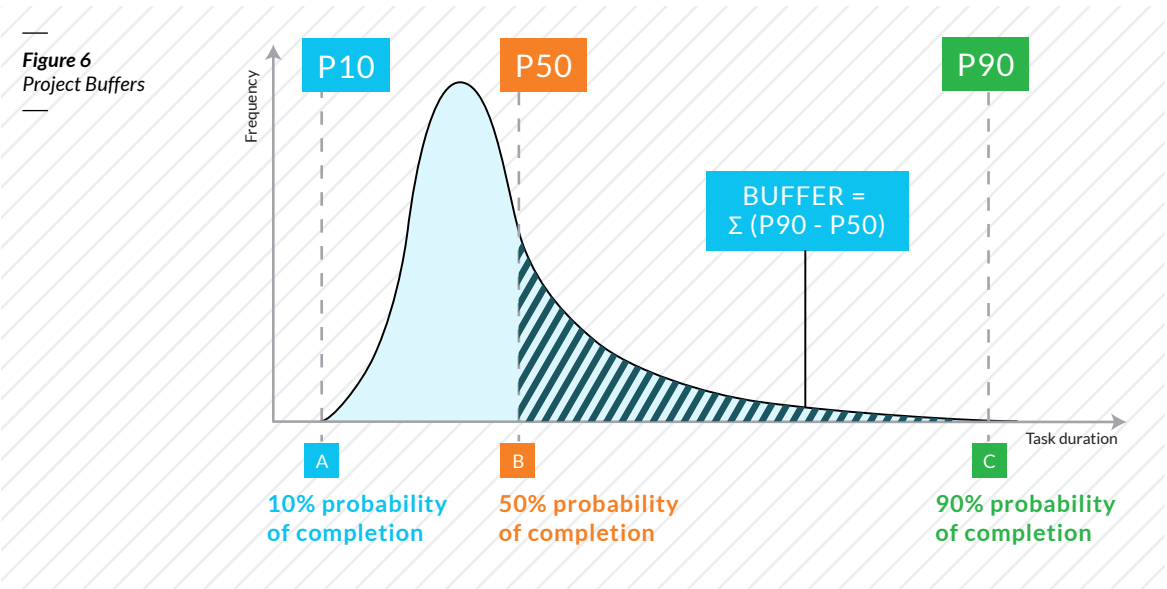


Figure 6
Project Buffers

Figure 7.1: Identifying the critical path

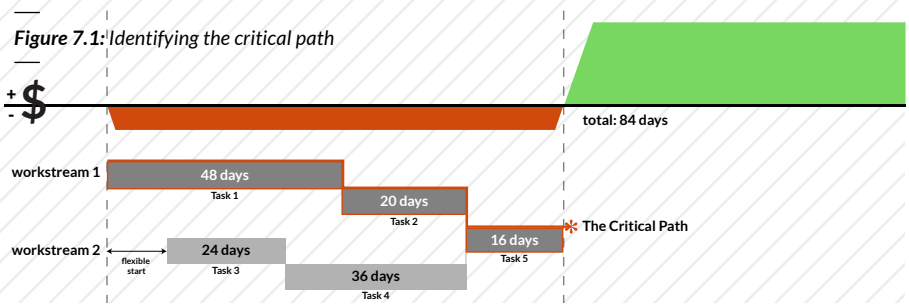


Figure 7.2: Resource contention

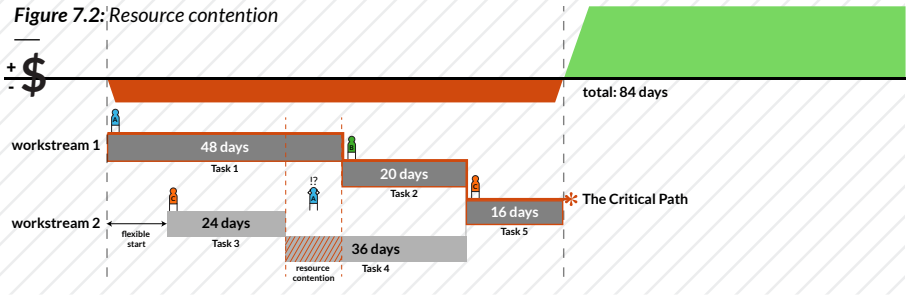


Figure 7.3: Resource levelling

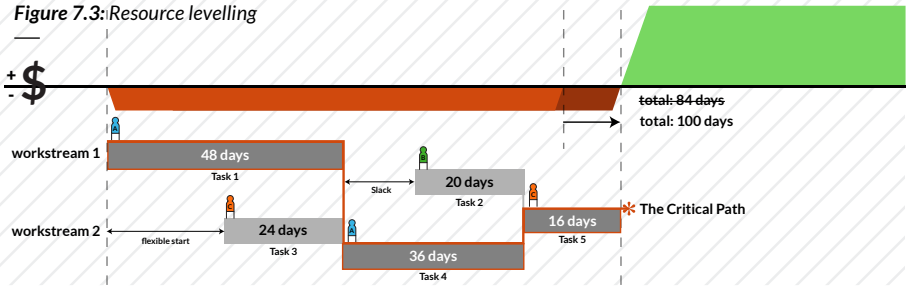


Figure 7.4: Scheduling at p50 — beating the Murphy factor

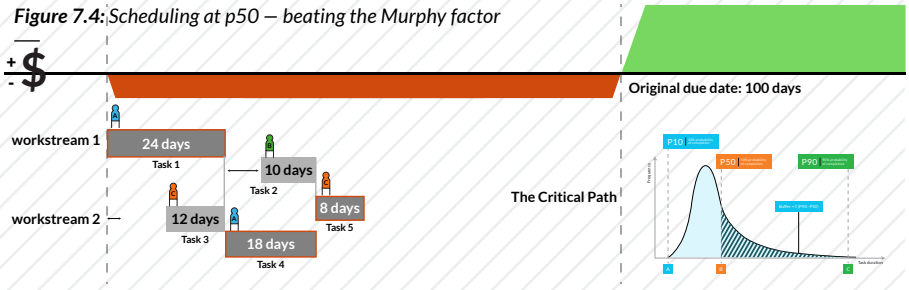


Figure 7.5: Introducing the project buffer

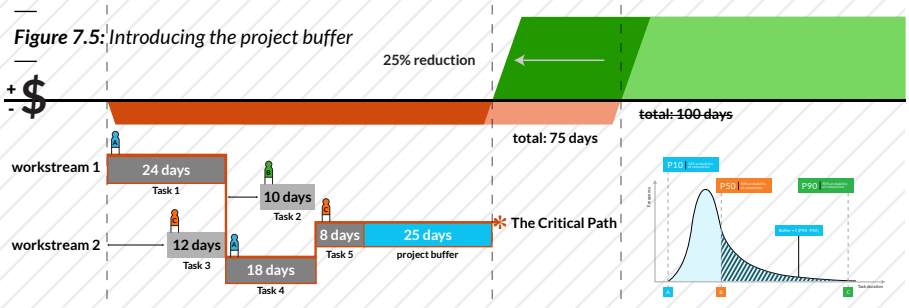
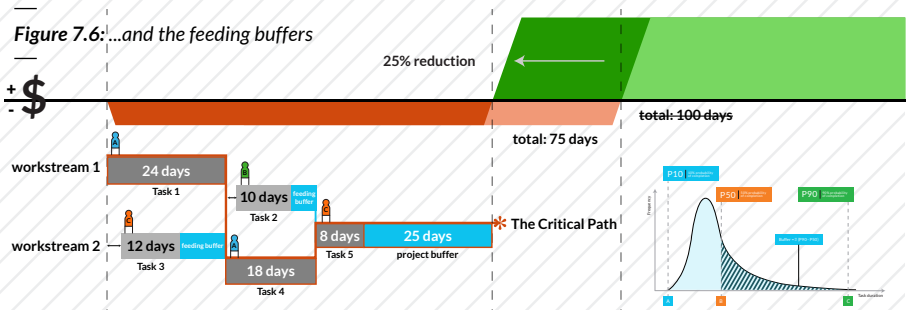


Figure 7.6: ...and the feeding buffers



In this simplified plan, the red represents the project burn and the green the realisation of the project benefit. There are two workstreams which run concurrently until the last stage. Tasks 1, 2 and 5 create the longest chain; workstream 2, with Tasks 3 and 4, has a little wiggle room. As long as Task 4 is served up in time for Task 5's start, the relay race is won.

When we introduce resources, though, we find a conflict. Resource A (the person in blue) is assigned to Task 1 and Task 4, which overlap in the plan. If you have a large team with proper taxonomy of resources, now's the time to find a replacement for one of the tasks. But Resource A might be a single lab or machine or aircraft hangar. So you need to shift Task 4's start date.

Now the plan has a clear critical path with resources available for each task. But the original hoped-for lead time has gone from 84 days out to 100 days.

If, however, we schedule with expectation of each task being accurately estimated only 50% of the time (P50) we dramatically cut our lead time. Of course, we have to factor in the probability of half the tasks taking longer than this.

THE MAGIC 25%

We intelligently take half of the length of the critical path and add that to the end of the project. This is now our critical chain and the project buffer is what will give us a valid signal for how the project's travelling.
We can also see that, thanks to our P50 estimates and the project buffer, the original due date of 100 days has been brought forward to 75 days—a 25% performance benefit, confident of being delivered in no small measure because of the power of the central limit theorem articulated above.

For tasks that are not on the critical path, we can also add in feeder buffers. This allows us to protect their integration points with the critical chain and gives us the flexibility to move resources around to keep the overall delivery promise on track.

Turning this simplified representation of the critical chain into an 'executable work plan' would include detailing all task names with grammatically correct task oriented sentences, defining resource names with a consistent taxonomy of roles to allow for resource demand to be measured against supply, and ensuring that every task has a successor. It is recommended to have checklists for more granular work, as there is no need to clutter the performance reporting with data that is primarily of use to the person accountable for completing the activity.

The Critical Chain method saves you time, makes more money and builds a solid reputation for effectively managing execution risk: more projects, in less time, on time, every time. It also provides you with a way to inspire your people to be the best they can be, in service of the greater goal. After all, what you're asking for is demonstrably both reasonable and possible.

> “To change the way you work, you have to change the way you work”

Eliminate bad habits

We’ve already talked about how the use of buffers can dramatically reduce estimate padding. But there are several other behaviours that the Critical Chain method can help eliminate.

Parkinson’s Law states that ‘work expands to fill the time available for its completion. When you’re working to P50 estimates, the available window for ‘busy’ work, unnecessary meetings and general faffing is curtailed.

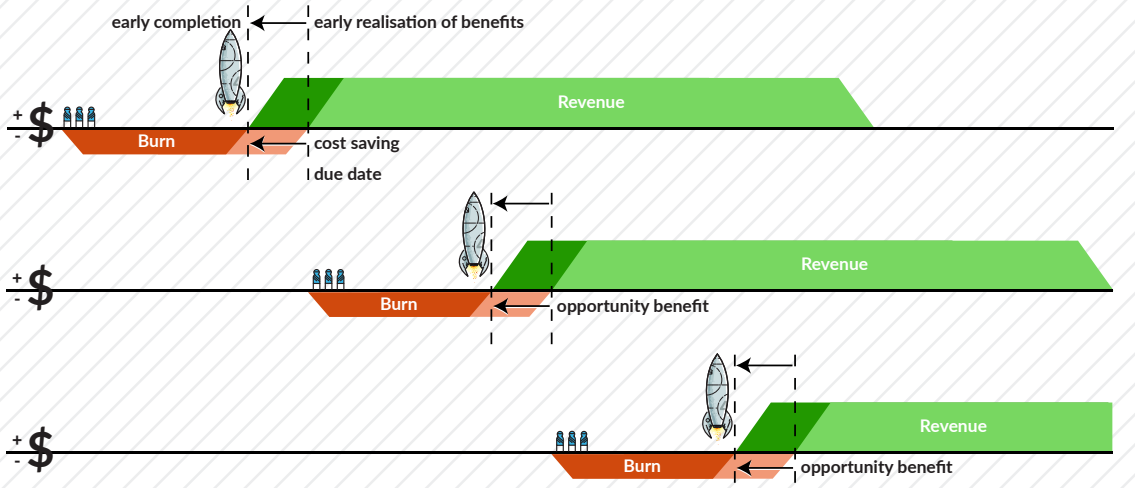
Gold-plating can charitably be seen as over-delivering. But often the project doesn’t warrant it; delivering to spec would be fine. Again, the Critical Chain approach doesn’t offer the time to indulge in gilding the lily.

Student Syndrome is the habit of leaving work till the last minute. The impression is of working hard but the bulk gets done just in time. Bring that time forward and you benefit from the deadline.

Multi-tasking has been proven many times to be less productive than focused work. (clearing WIP)

One other benefit. In a normal project environment, people who finish tasks early often won’t let on. Why? Because they think they’ll be expected to finish as quickly next time, too. But P50 estimates allow the team to celebrate an early finish while not expecting it. Of course, the person may find that avoiding some of the laws and syndromes above means they can work better in flow, which is more productive and at a personal level, more rewarding.

Figure 8
Opportunity Benefit in the Multiproject Environment



WHAT’S A DAY REALLY WORTH?

‘Time is money’ is a cliché, but few executives understand the value of a day. You can calculate value in projects in three main ways.

One, your project delivers a financial benefit after completion. Say a mining company’s new mine will, on completion, produce $1m of value per hour. Each day late represents millions in missing revenue. Knowing what this number is and sharing it with your team will change how you all think about due-date promises and the trade-offs required to keep them.

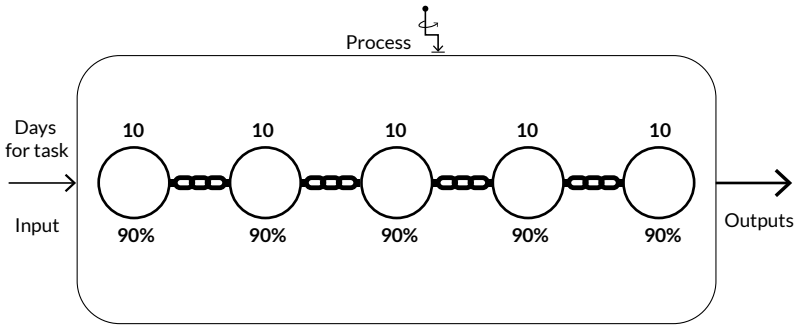
Two, your project is of the type that doesn’t appear to benefit from early completion. But, if you’re in charge of building, say, a new Olympic stadium, you can’t miss the opening ceremony. An early-warning system can save you having to ramp up resources in the final phase to guarantee the due date. Also, when you know the cost of every day of your project’s ‘burn’, and you have a highly reliable delivery capability, you can evaluate the cost savings of just-in-time completion.

Three, you might have a ‘necessary condition’ project, such as complying with new regulations. In the airline industry, for example, a day late could ground your airline.

Few people can accurately tell you what a day is worth—and how you’re tracking to deliver to it. But expertise in TOC and CCPM will provide you with a ready and reliable method for doing so. It’s a way of using reason to make it possible to navigate effectively through the complexity of your strategic portfolio. It contributes to maximising the delivery of value by looking through the front window, relying on lead indicators rather than depending on the false signals of the rear-view mirror.

COVARIANCE

One reason projects run late is the statistical principle of covariance. Let's say every 10-day task has a 90% chance of completing on time. When you multiply the probabilities together, the actual chance of the overall project being delivered on time in 50 days is only 59%. And yet everyone was so nearly sure that they would each, on their own, with 90% confidence, be on time.



Probability of delivery:

$0.9 \times 0.9 \times 0.9 \times 0.9 \times 0.9 = 0.9^5 = 0.59 = 59\%$

Projecting proactively

Too often we think of the word 'project' as a noun, a thing, when it's really a verb, a process. The real innovation of Critical Chain for the executive is the ability to view accurate projections at any point in the project. Every project is a journey from A (an idea) to B (its delivery). That journey happens in time. You need a way to interpret cause and effect in the dynamic swirl of real-time events.

Manage by exception

While it's interesting to understand how the internal combustion engine works, it's not a necessary condition of knowing how to drive a car. For that, you need to understand the instrumentation, controls and how to respond to your environment. The preceding sections of this guide have shown you a glimpse under the hood at the maths and algorithms lurking in the principles. Now it's time to get into the driver's seat.

This is a very simplified 'fever chart' (sometimes called a trend chart) which tells the story of a particular project from its beginning to its completion. The x-axis shows the percentage of the critical chain that's been completed, while the y-axis indicates the percentage of buffer consumed at any given point in time. The yellow band is where you want to be—the flow zone—using up the buffer steadily as the project progresses.

In the green zone, everything is going smoothly. Anything in the red zone means pay attention. At the point in time on the project when the chain was only 45% complete, the buffer was 60% consumed, and thus caused the spike into the red on the fever chart. With the right software (in simple cases without any specialist software at all), you can establish what's happening at that red data point, who's working on it, figure out what help they need and deploy the appropriate non-constrained resources to provide support to get back into the race.

If you dial back a click or two on your zoom, you can see your whole portfolio in flight. Now each dot in Figure 10 (below) represents a project. Project 3 is doing fine, while Project 2 is almost complete but needs a little help to finish on time. Project 1 isn't even halfway complete, but we can already see it needs some attention before it veers further off course.

This is what management by exception really means. You now have finely calibrated instrumentation to show you the reality of your portfolio and provide you with the means to make intelligent decisions to deliver the portfolio to promise.

Figure 9
The Critical Chain Fever Chart

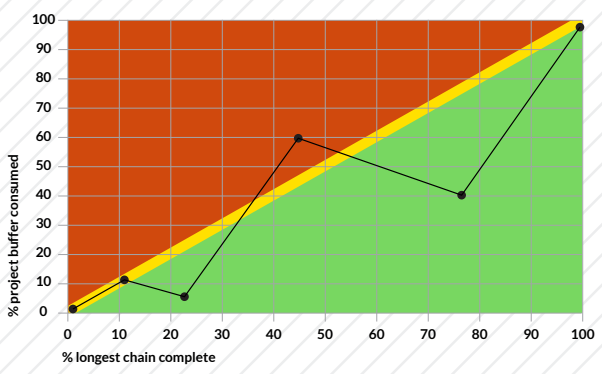
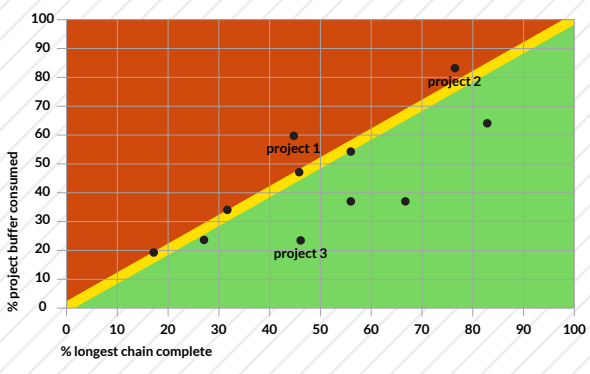


Figure 10
Fever Chart of the Progress of the Project Portfolio



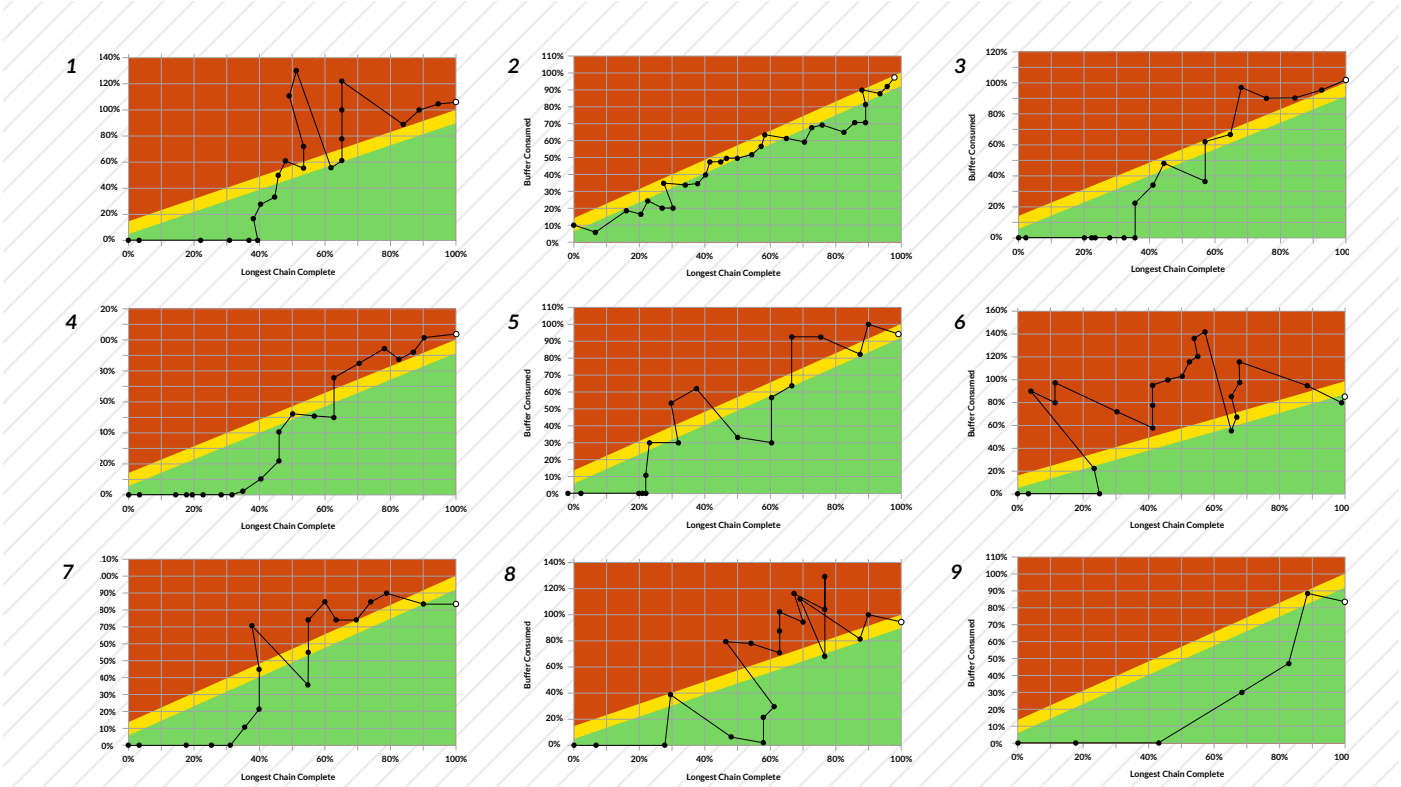


Figure 11
Managing Portfolio Performance

Every fever chart tells a story

The previous two charts are simple stylised graphics to make a point. The nine charts above, however, are taken from real-world projects after completion. Each one tells a story. In the [2] top-middle, we can see a very well-executed plan. In [1] something went haywire around the middle. Perhaps a part didn't arrive or weather prevented work. The team focused there and brought it back on track. On the bottom row, for [7], [8] and [9], we see the 'caterpillar effect' of living in the deep green grass, which is usually due to proper full-kitting enabling quick completion of early tasks. And [6] was the problem child that had to be cajoled all the way. But every single project finished on time.

The beauty of these charts is not only how they help you manage during the project, but what they can tell you afterwards—you can have a proper wash-up after the project completion. Why did things drift into the red at that point? What might we do better next time? How can we take advantage of the learning? This is the essence of a proper process of ongoing improvement.

But our PMO already does this, doesn't it?

It may or may not surprise you and your fellow executives to discover that all project management doesn't happen like this. Surely, some think, every method has tools to track progress and enable action? What about earned value and critical path management? But it's simply not the case. Conventional waterfall project management planning is simply too brittle and focuses on what happened yesterday, not what you have to do today to outperform. That said, adopting TOC can happily embrace other methodologies. It creates a potent combination with Lean and Six Sigma, and we have created our own take on Agile which we call Reliable Agile—but that's a subject for another guide.

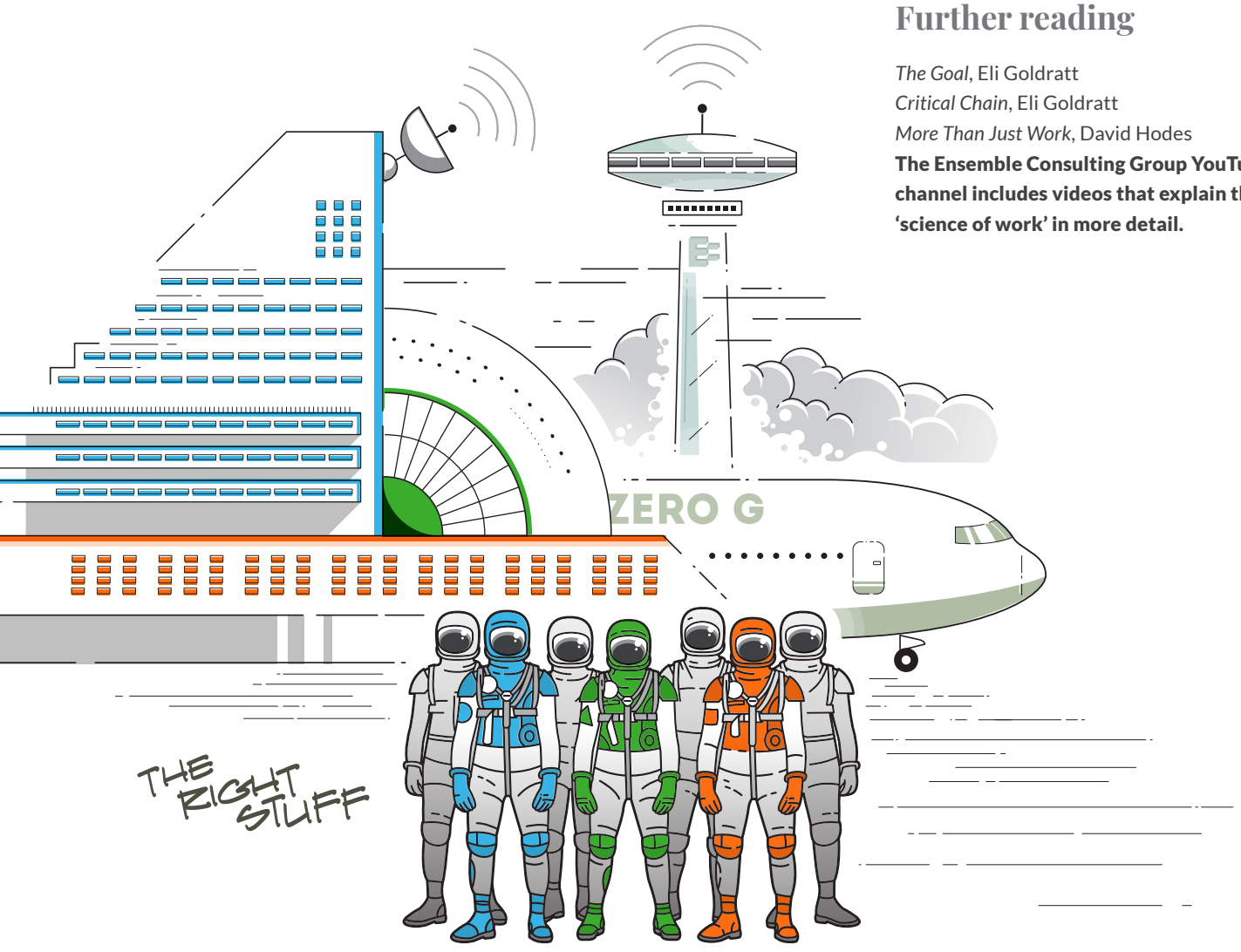
What's the catch?

With all this maths and talk of aggregation, you might expect people to feel like cogs in a machine. That's not our experience at all. Frontline operators, whether developers or mechanics, are usually the first to see the benefit. Finally, they have a way to see what really needs to be worked on—and in what sequence. They can raise a hand and ask for help when the line in the fever chart starts to head north. And when it feels like what they're being asked to do is neither reasonable nor possible, they can prove to their bosses why. It leads to a more 'just' way of working all around.

If you think all this sounds too good to be true, you're right. You can't simply flip a switch and introduce Theory of Constraints or CCPM. It requires a fundamental change in mindset. Your people need to understand that, instead of doing their normal work, they may need to support a colleague who's carrying the baton on the critical chain. For such a transformation, you'll need to consider both organisational design and organisational learning. But when they see how their role directly influences business outcomes, people are more engaged. And when you shift from a reductionist worldview of local optimisation to a holistic systems approach, the results are remarkable.

At the outset, this guide compared the executive's plight to that of the fictional PM, Jim Hacker. We promised to help you have the requisite conversation with your PMO about better ways to manage your initiatives so that you can be in control of the execution risk of delivering on your strategy and accomplishing your organisational goals.

The goal of effective portfolio management is to see the whole, know the constraint and focus your effort where it counts. On his deathbed, Eli Goldratt was asked what was the ultimate constraint in business. His answer was simple: 'Management attention'. We hope you feel yours has been repaid.

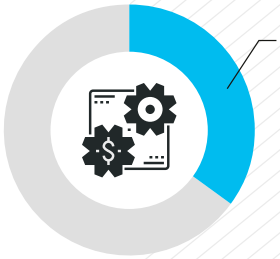


Further reading

The Goal, Eli Goldratt
Critical Chain, Eli Goldratt
More Than Just Work, David Hodes
The Ensemble Consulting Group YouTube channel includes videos that explain the 'science of work' in more detail.

Our Results: Percentage and Dollar Values

Business Management Systems

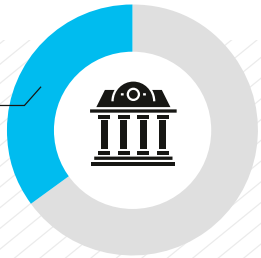


35% REDUCTION IN LEAD TIMES
despite independent auditors giving a 3% chance of on-time completion

$180m IN COST SAVINGS

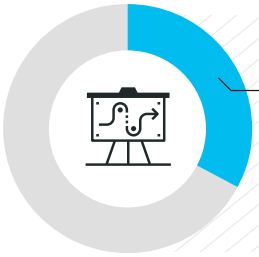
Banking

35%
REDUCTION IN CREDIT APPROVAL LEAD TIMES



Generated capacity for
$45m
IN ADDITIONAL INCOME

Engineering

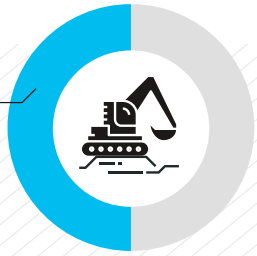


33%
IMPROVEMENT IN PRODUCTIVITY

$100m
IN ADDITIONAL PROFIT

Construction

50%
IMPROVEMENT IN PRODUCTIVITY

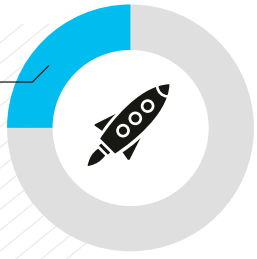


Liquidated damages in excess of
$100m
AVOIDED

New Product Development

25% INCREASE IN PRODUCT LAUNCHES from 100 to 125

$20m IN ADDITIONAL REALISED PROFIT



Manufacturing

25%
CAPACITY REALISED

$45m
ADDITIONAL PROFIT IDENTIFIED

Our innovations in productivity give ambitious executives three ‘value levers’

1. **Deliver your promised business case** — in full, on time, every time;
2. **Mindfully manage resources** to reduce your ‘cash burn’;
3. **Free up your people sooner** to tackle the next big idea.

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Group

> “Even if I was allowed to mention dollar value numbers, this is still the first thing I would always write: **These outcomes are so valuable they literally print their own money.”**
>
> VP Projects

Are you an ambitious executive looking to apply the Theory of Constraints and other innovations in productivity to your organisation?

Get in touch

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