

## **Project Efficiency v Resource Productivity**

How a narrow focus on increasing resource productivity can have the unintended result that your overall productivity falls.

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Focusing on maximising the utilisation of each resource in isolation might seem as obvious thing for managers to do, but it can result in the unintended result of a poor overall performance.

This seemingly counter-intuitive result is based on sound scientific principles. It demonstrates how the business rules that work so well in simpler situations, do not work when applied to more complex systems like organisations and projects.

To maximise the output of projects and project organisations, you need different managerial rules and processes from those used to manage simple situations.

This example also shows why implementing CCPM (Critical Chain Project Management), requires not only a change in the basic planning and management tools and methods, but also in mindset and behaviours.

*The example used in this paper is based on material developed by Realization, one of the largest providers of CCPM-based project management software. Used with their permission.*

*([www.Realization.com](http://www.Realization.com)).*

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Imagine you work in an organisation that has just been given 3 new projects to deliver.

You have three departments that the project needs to pass through in sequence:

- The Blue department has 3 people
- Red has 9, and
- Gold has 6.

Each project looks like this



The durations shown are based on using the whole team on a single project.

Because there are three projects, that could be started today, the organisation has a choice of how to execute them.

### Option 1: Maximise "local" resource productivity.

If each department works on the three projects at the same time, they can use their resource at the maximum 'efficiency'. They will work on all three projects in parallel, and whilst the project is with them, they have 100% utilisation. When the project is with other departments, they have a usable period of time to do other work.

I've also assumed that working this way is slightly more efficient, so for example the blue resource completes the task in 15 person-weeks, rather than the 18 person-weeks it would take if all three people work together on one project.

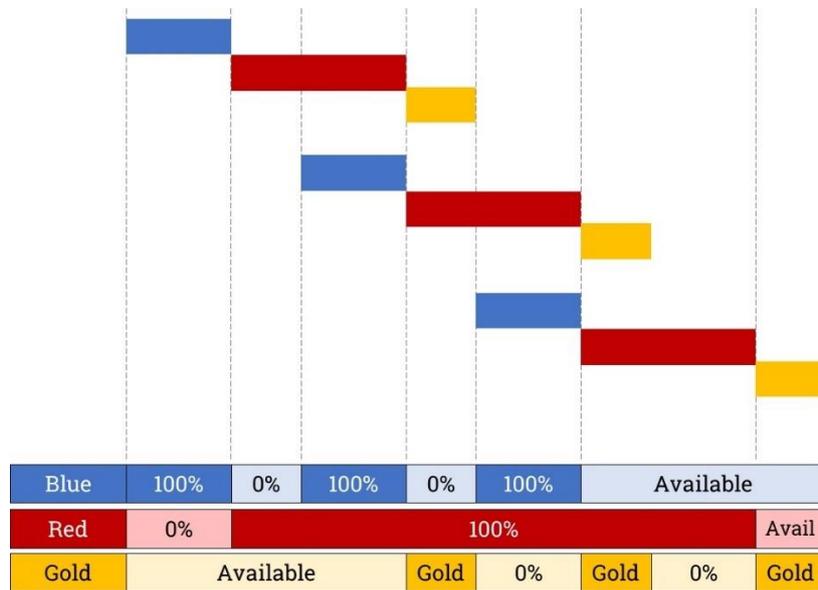


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The added benefit of working this way is that the project clients are happier. They like to see you getting started on their project as soon as possible. But just because clients like this, doesn't mean it is in their best interest!

### Option 2: Maximise "global" project results.

In this approach, the projects have been sequenced to complete projects as quickly as possible.



The projects have been sequenced to allow the maximum available resources to work together on the one project. Each team works only on one project at a time. This approach has been called "Focus and Finish".

One consequence of working in this way is the short 'dead zones' for the individual resources, where they are waiting for work to arrive to be done. These periods are too short for the resources to work on any other substantive tasks. I have also assumed slightly less efficient working. This is because if there is a delay on one project, there is no parallel project the resource can move to.

At a department level, this seems to be 'inefficient', because you are paying for people to do nothing.

However, it also illustrates a beautiful scientific phenomenon:

For a system to deliver optimum performance, you must have 'inefficient' elements in the system. If you optimise the performance of each individual element, your overall system performs below it's optimum.

This comes from a branch of science known as Systems Theory.

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This is because real-life systems – like projects – have variability, uncertainty and interdependencies. They are examples of what systems scientists call Complex Adaptive Systems (CAS). A CAS has to be managed using very different rules to a simple linear system.

Simple linear systems can be managed by optimising each element. CAS's have to be managed differently.

In our simple project example, it is clear that the red resource is the most heavily loaded, and the blue and gold resources have excess capacity. However, this excess capacity is not waste. Any issue in the red team will have an impact on the overall system. An issue with the blue or gold teams is less critical because there is excess capacity that will allow them to absorb variability and recover from problems without impacting on the red team or the overall project.

If you try and optimise each individual element, for example by employing part time staff in the blue and gold departments and allowing the blue and gold tasks to take longer to fill the dead periods, you will have an extremely unstable, and probably unmanageable, system.

### Some comparisons between the options

#### A: Results

	Option 1: Local Productivity <i>"Keep resources busy"</i>	Option 2: Global Productivity <i>"Focus &amp; Finish"</i>
Project Throughput	3 projects completed in 50 weeks.	1 project in 20 weeks. 2 projects in 30 weeks. 3 projects in 40 weeks.  This approach could have completed 4 projects in the 50 weeks taken using Option 1, equating to a 33% increase in capacity.
Project Duration/Lead time	50 weeks	20 weeks
Rate	3 projects every 50 weeks, nothing in between. In a commercial environment this has a negative impact on business cashflow, delaying income.	1 project every 10 weeks.  In a commercial environment this provides a smoother cash flow, and reduces working capital.

B: Other Differences

	Option 1: Local Productivity <i>"Keep resources busy"</i>	Option 2: Global Productivity <i>"Focus &amp; Finish"</i>
Underpinning Belief	The overall system delivers the best results when all our resources are working 100% of the time.	The overall system delivers the best results when we maximise the flow of project completions through the overall system.  This requires most of the resources to be committed much less than 100%.
Rules	<ul style="list-style-type: none"> <li>• Keep people fully loaded.</li> <li>• Budget/plan at detailed levels and expect them to be achieved.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimise work in progress, to allow focused work.</li> <li>• Complete tasks as quickly as possible and pass on.</li> <li>• You need protective/excess capacity in many resources..</li> </ul>
Task-level productivity – effort used to complete all three projects.	<ul style="list-style-type: none"> <li>• Blue: 45 person-days</li> <li>• Red: 225 person-days</li> <li>• Gold: 60 person-days</li> <li>• 330 person-days in total</li> <li>• 110 person-days/project</li> </ul>	<ul style="list-style-type: none"> <li>• Blue: 54 person-days</li> <li>• Red: 270 person-days</li> <li>• Gold: 72 person-days</li> <li>• 396 person-days in total</li> <li>• 132 person-days/project</li> </ul> <p>20% more person-days were used to deliver the projects – seemingly much less productive!</p>
Team maximum WIP (work in progress)	3	1
Impact on experts/managers	Key resources spread thin as all projects want their support at the same time. Leading to increased errors and delays	Smoother flow of spreads out the workload on key resources such as experts and managers.

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	Option 1: Local Productivity "Keep resources busy"	Option 2: Global Productivity "Focus & Finish"
Support for non-project activities	Ad-hoc, dependent upon which team is heavily loaded at the time.	Blue and Gold teams have excess capacity, and can flex to meet urgent needs for support from other parts of the organisation or customer support. Red team should be protected from such disruptions by management policy.
Management Focus	<p>Everything – there is no simple focus and prioritisation mechanism.</p> <p>Results in higher management overload.</p> <p>Due to the higher levels of work in progress, and less smooth flow, when managers are actually needed – say to help with an issue, or to give approval – they tend to take longer to respond, further adding to the project duration.</p>	<p>Red resource.</p> <p>The blue and gold teams have protective capacity, and so can more easily recover from issues. They can be used to support non-project activities and to help the red team.</p> <p>The blue tasks on projects 2 and 3 could be pulled forward to provide a buffer of 'ready to go' work when the red team completes the previous project. This would further reduce delivery risk.</p>

### Conclusion:

The seemingly less efficient approach of allowing some resource to be idle some of the time, and taking 20% more person-days to complete each project, delivered better business results.

- Projects take much less time – *20 days v 50 days*
- More projects can be delivered by the same resources – *33% more capacity*
- The smoother flow of projects makes management and supervision easier and reduces risk – *1 completion every 10 days v 3 every 50 days*
- Team productivity is maximised, because the system is doing more

But the local performance measures don't look to good. Which is why organisations need to choose. Either choose to measure and reward local efficiency, or choose to deliver more projects faster.

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However, shifting from local performance measures to global measures is not easy. As a minimum you will need measures and tools that help managers to make the right day-day decisions based on their impact on the global performance.

For example, here are typical performance measures under the two approaches.

Local Productivity	Global Productivity
Resource Utilisation	Project completions rate
Resource Efficiency	Project Durations
Tasks being on time	Projects on time

The globally-efficient “Focus and Finish” behaviour is key to the success of CCPM. It encapsulates practices such as *relay runner*, *full kit*, and *reducing WIP* (work in progress). In some types of project environments, this behaviour is the major contributor to the improvements in performance.

### Additional note: Project Cost Allocation

If the resources allocated their costs to the projects based on the time they spent working on the project, and project managers are measured on the profitability of their project, this encourages the same sub-optimal behaviour.

With Option 1, although each project seems to be more profitable because they use less resource, in reality the whole organisation makes less money. This is because the resource costs do not disappear when they are not working on a project. They are still employed, and they appear on the resource managers cost centre as under-utilised. So three projects make higher ‘profits’, but for the company it is cancelled out by the ‘loss’ in the cost centre.

The problem with this approach is that resource managers might encourage people to spend longer working on projects than is necessary. You can then get finger-pointing energy-wasting arguments, and even project managers wanting to employ outside resource rather than internal employees, simply because it makes their project look good!

The idea of ‘Focus & Finish’ behaviour is for project work to be completed as quickly as possible. As the above example shows, this is in the interests of the overall company, and should be encouraged, not penalised.

Alternatively, resource managers might believe they have too-many people, and reduce the team size. Whilst this will make their budget look better, it will have a negative impact on the ability to deliver quality projects in short durations, which in turn will reduce income. It is just like a town laying-off their fire brigade because it has not had much to do in the past three months.

Team sizing is a strategic decision made on medium- to long-term timescales to support the business strategy. And as part of this strategy some resource types will be

constrained, but all others should have protective capacity. If you do not have additional capacity in most resources, this will reduce the overall capacity of the organisation, extend lead times, and make management very difficult. Trying to adjust core delivery capacity based on short-term measures is ineffective at best, and risks damaging the business.

And if you do find yourself with significant underutilised resource, this a sales problem, not a resource problem. And if you are implementing the ideas of Breakthrough Project Management, with your faster delivery, higher quality, and lower costs, you shouldn't have much difficulty finding work in a healthy competitive market!

If the performance measures used by the organisation are not system-wide (ie overall business profit), there is a great risk that they drive local behaviours that are not in the overall interest of the organisation, but they are in the interest of the managers who are held to account.

### Additional note: Multi-tasking

With smaller teams, and in organisations that have a large number of smaller projects, another consequence of using Option 1 (resource productivity) is that individual team members can be asked to support more than one project at the same time. This is often results in inefficient task switching (also known as 'bad multitasking'), where the resource stops work on one project before the task is complete, in order to work on another project. In this kind of environment, priority tends to be set by the more senior project manager, or the one who shouts loudest.

In the above example I assumed that spreading a team's resources over several projects improved their effectiveness, and they completed their tasks in less time than under 'Focus and Finish". No resource worked on more than one project at a time.

This isn't the case where task-switching is encouraged. Time is wasted when switching tasks, and having to remember where you got to on each project. Focus & Finish delivers even more improvement in environments where some resources frequently switch between different projects.

This is one of a series of papers published on the website  
[www.BreakthroughProjectManagement.com](http://www.BreakthroughProjectManagement.com).

If you find the ideas discussed here interesting, and you want to know what you can do about them, then you should read our book – *The Executive Guide to Breakthrough Project Management*.

It guides readers through our counter-intuitive approach to managing capex and construction projects, and will allow you to deliver projects in much less time, at a much lower cost, without compromising on the scope and quality, and without overworking your team and your supply base.

Why wouldn't you want to do this?

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He has over 35 years of experience of project management and procurement in several sectors, working for both clients and for the project supply chain.

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