

The 10 Non-Negotiable Rules of Productivity Optimisation



If you browse the web for information on improving productivity in your factory, you'll quickly encounter a vast array of theories and products with impressive-sounding names. As you read some of the papers produced by their adherents, you'll be equally struck by the impressively long and difficult words that clutter their pages.

We developed this eBook for plastics manufacturers who may be struggling to make sense of this world. We don't intend our book to replace the aforementioned theories (many of which we have profound respect for) or the papers written about them (although our respect here is tempered by our dismay at the frequent inability of their writers to talk in language that a factory manager can relate to).

What then is our purpose? It's to provide you with a way in. A summary of the underlying principles of productivity optimisation – in language that doesn't require a dictionary for you to understand.

If you don't currently adhere to a proven system for improving productivity, and you follow the principles below, productivity in your factory will rise. You can count on that.

And you won't have to have understood a single theory along the way.

This booklet is also a companion piece to the AspectPL Workbook, provided to all AspectPL customers. Where this book describes principles, the AspectPL Workbook is a detailed programme for putting those principles to work in your factory using AspectPL. You can read each independently of the other, but the greatest value is to be gained by using them together.

What is Productivity Optimisation?

At its most fundamental level, productivity is manufacturing output divided by effort. If your factory can produce more with less, productivity goes up.

Productivity optimisation is the process required to reach the greatest achievable productivity given the resources at your disposal. In other words, even the oldest, most used equipment can still be run at optimal productivity. What's more, its owners will benefit from striving for this goal.

We have used the term "productivity optimisation" deliberately, to distance this book from other books and papers focusing on productivity tools and philosophies like 6 Sigma, kaizen, 5S, OEE and others.

Our intention here is not to promote – or denigrate for that matter – any of these tools. Instead, we're out to offer a broad view of the underlying principles (we've called them Non-Negotiable Rules just to up the ante) that are common to any successful, sustainable attempt to raise productivity.

Here are the rules:

1. It's not about you, it's about your customers
2. It all starts at the top
3. You can't measure OEE manually
4. Being tidy is essential
5. It's not your machines, it's your planning
6. If Bob on the factory floor doesn't get it, no one does
7. Looking good is not a good look
8. You need glasses
9. Inventory is a liability
10. Yesterday's breakthrough is today's problem

1st Non-Negotiable Rule

It's not about you; it's about your customers

The reason you've stayed in business this long is not your staff, not your machinery, not your factory, not the goods you produce – not even your high productivity levels.

It's the customers who are willing to buy from you. Take them away and instead of a business, all you have is the world's most expensive hobby.

In the day-to-day running of a complex operation, it's easy to overlook this fundamental fact. But you do so at your peril.

We've seen companies generate great results from their productivity programs, only to see sales fall and revenue remain static, at best. Without exception all succumbed to the same fallacious thinking: that productivity is an internal issue.

It's not.

The point of **lifting productivity** is that it **increases your ability to give customers what they want** at a price they are comfortable with.

That raises an obvious question: What do your customers want? Is it lower prices, faster delivery, more accurate delivery, better quality, or something else?

Manufacturers often assume it's one thing (usually price) when actually it's something else. So they lower their prices and wonder why sales don't rise. In fact, sometimes sales can even fall.

Why's that? Because if your customers want better quality from you and you use productivity gains to lower prices, not only are you not giving them what they want, you're probably also confirming their existing negative perception about the quality of your goods. "They've lowered their prices. I wonder what extra corners they cut in their production line to pull that one off. Where's my phone book?"

You might think no manufacturer could be so dense as to misunderstand their customers' needs.

But it's actually an easy mistake to make.

Imagine a customer says to you: "Your prices are too high." (OK, you may not have to imagine this!). It's natural in this situation to look at ways to lower your prices. But what the customer may really be thinking is that you're not providing value for money. In that case, while they may be looking for you to lower your prices, they may just as easily want you to lift your quality, improve your delivery times, raise your service levels, or something else.

Unless you understand what your customers really want, your efforts in improving productivity risk being wasted.

2nd Non-Negotiable Rule

It all starts at the top

Productivity in manufacturing environments is often seen as a factory floor issue, to be driven by the Production Manager. Get more efficiency out of that space, the reasoning goes, and productivity will track upwards.

Another common line of thinking is that automation will make the difference. Sometimes the two lines of thinking go hand in hand.

Problem is, they're both based on a big fallacy.

The most efficient way to increase productivity is not to maximise productivity of individual machines or processes. It is to **focus on product flow throughout the entire manufacturing chain**, from raw materials purchase to delivery of the finished product.

This calls for a higher level of thinking – one that focuses on all the business processes that drive the enterprise: how they interact with one another, and how that interaction adds to or disrupts throughout at the various points in the chain.

That thinking can't happen on the factory floor alone. It calls for everyone in management to work together – including production, purchasing, accounting, inventory management, staff training, HR, maintenance and quality. In larger companies it calls for powerful integration between factory floor systems and the ERP.

And only senior management in your company can make that happen.

The collective task of your management in this context is to organize the inputs required to achieve the company's business goals, coordinate activities to achieve them, and continuously monitor progress. Improving productivity on the factory floor may (and likely will) be an essential part of such a plan, but what will have it die or fly will be the extent to which it impacts and coordinates with total product flow throughout the company.

As for the idea that automation equals efficiencies, all it equals is automation of whatever processes you currently have in place. If they are inefficient, you will now have automated inefficiency.

3rd Non-Negotiable Rule

You can't measure OEE manually

Effective measurement of OEE is built on accurate data. If you have someone wandering your factory floor with a clipboard, you may have data, but it is not information and you can be absolutely certain that not only is it inaccurate, it's also incomplete and wildly out of date by the time you get to use it.

OEE removes the guesswork about **how to unlock the factory's hidden capacity.**

The best way to illustrate this is with a story. Before we installed AspectPL in a client's factory, we asked the CEO, Manufacturing Manager and Production Manager to each predict the single greatest factor in machine downtime. The CEO wasn't sure, the MM said Setups and Production Manager said Electrical. Now, who do you think was right? (*See below for the answer.)

Once we installed AspectPL the true state of affairs became abundantly clear. And once they were able to identify the greatest cause of downtime, they could focus their attention on rectifying that issue – thereby getting the greatest return for their efforts.

What's more, the data they gained didn't just tell them the main cause of downtime. It also provided an accurate picture of actual shot times and reject rates, all critical measures of operational effectiveness along with equipment utilization during open hours.

Armed with this data, the owners were able to establish highly detailed production rules for every item the factory produced, against which every new job could be monitored using AspectPL. Any variations from those rules showed up instantly as each new job was running, allowing the Production Manager to take immediate action to get the job back on track.

Production rules are not a new idea. McDonald's founder Ray Kroc built a massive fortune on them – and the idea wasn't even new when he implemented it.

Ray Kroc's great insight was that by **standardizing (and recording) every procedure in his business it was made repeatable.**

That's why you can go into a McDonald's in Shanghai and buy exactly the same hamburger you enjoy down the road at your local McDonald's.

When you record and implement standards in your factory, you dramatically reduce downtime and lift quality. Moreover, you now have the basis for ongoing improvement.

It's impossible to improve something for which no standard exists! As they say **“if you can measure it you can manage it to a standard”**

As a business owner, you also have a powerful intellectual property that adds to the value of the business, making it a more attractive proposition to buyers, investors and potential partners.

4th Non-Negotiable Rule

Being tidy is essential

Even a small amount of research into productivity theories can soon have your head swimming. Kaizen, 5S, 6 Sigma the like... not only are there a host of different approaches, but each one seems to have a library full of impenetrable white papers that go along with it, and its own adherents who swear that this is the one true way.

How's a factory owner meant to make sense of all this and settle on the best approach for his or her own business?

The answer is: you don't need to. Settling on a proven approach is far more important than choosing the best one.

And for those who are allergic to any kind of theory, the news gets even better. The first, underlying principle of productivity improvement is based on pure common sense (and it's also the underlying principle of most productivity theories – but that's another story).

Here's the principle: keep your operating environment clean, tidy and organized. Put another way, have a place for everything and keep everything in its place.

This is so important that we're going to say it again.

Have a **place for everything** and **keep everything in its place**.

For some factory owners this will mean a major shift from your current haphazard approach. But unless you're willing to tackle the state of your factory floor and business environment, you can forget about making any meaningful productivity gains.

Here's why. The foundation for productivity is workability; the state of being capable of being put into effective operation. Clutter, disorganization, not knowing where tools are at any given moment – these all hinder your ability to put your factory into effective operation.

They destroy workability.

Your first job if you want to lift productivity is to lift the workability of your factory. That's why Toyota, and many other companies, created shadow boards for factory floor tools and made it compulsory for workers to replace them immediately after use. And that's just one example.

5th Non-Negotiable Rule

It's not your machines, it's your planning

Most lost production in factories results not from machine failure, but from ineffective planning.

That may seem counter-intuitive – especially if your machines are older and prone to breaking down.

The point, however, is this. Every time a machine breaks down, and a schedule needs rearranging, there is a potential flow-on effect on other jobs in the system. Tool changes that were previously coordinated may now be uncoordinated. Materials that had been ordered at the right time under the previous schedule, may now be arriving at a less-than optimal time. Staff availability may no longer be optimal and so on.

Every hour a machine is down can add up to many hours being lost on other jobs.

Effective planning systems not only ensure optimal scheduling from day one, they also allow you to quickly reorganise the schedule when a breakdown (or any other delay) occurs.

The key is visibility. Modern, computer-based systems such as AspectPL graphically display all the relevant details of each job over time, (start and end times for example), and update them in real-time as the job progresses. Because they also show how the individual schedules interact with one another, (for example will ending this job at this time cause a tool setter conflict with another job?), they dramatically reduce the impact that a delay on one job has on other jobs going through the factory.

For this reason, every effective factory has, at its heart, a methodical, computer-driven planning approach overseen by one or more dedicated staff with clearly defined planning roles and responsibilities.

Such a system can reduce initial planning times by as much as 90%. But its real power is that it allows you to escape ad hoc planning in favor of a systematic, methodical approach that optimizes use of your resources, minimises conflicts, and enables tight control over deliverables and consumables.

The productivity gains from this will far exceed what you achieve from reducing machine breakdowns.

6th Non-Negotiable Rule

If Bob on the factory floor doesn't get it, no one does

Having earlier stated that productivity is a management issue, we're now going to seemingly contradict ourselves.

Companies who are committed to lifting productivity must ensure that **every staff member supports the initiatives.**

Standardized tasks and processes are the foundation for continuous improvement. While there may be many ways to change a tool, only one of them is the most efficient. When that way is standardized, (that is, it's how everyone does it every time), productivity rises.

Does that mean your staff become robots, unable to think for themselves? Quite the opposite. Once a process is standardized, those who implement it can now critique it and suggest improvements. If there's no standard, this possibility barely exists.

How do you encourage such critiquing? The short answer, expressed succinctly by Toyota, is: Grow leaders who understand your work, live the philosophy, and teach it to others. By leaders, we do not mean management exclusively. Leaders exist everywhere in the company. Your task is to draw them forth and, to use that vastly over employed word, empower them to express their views and ideas.

For some companies that may mean investing significantly in training for perhaps the first time in their history. For others it may mean a fundamental shift in culture, away from an authoritarian management style to one that is inclusive and curious about what others think.

Why do you want leaders throughout the company? Because unless Bob on the factory floor is a leader, how will you ever develop a more efficient way to change the tool on the machine that he's responsible for?

7th Non-Negotiable Rule

Looking good is not a good look

If you're going to raise productivity, you have to be willing to identify where improvements can be made. In other words, aggressively look for where you're less than perfect.

How do you do that? Let's say, for example, you've instituted all the principles of 5S in your workplace, and now everything is in its most effective place and the factory is running more efficiently than ever before. How do you improve on that?

You start by assuming that you've missed something. And then you look for what it is.

This principle is encompassed in the well known philosophy of kaizen (continuous improvement) and its less well known sister, hansei (relentless reflection).

It's also the reverse of how humans normally operate. Normally we wait till we see a problem – and only then do we look for what we missed (if we look at all).

Likewise, our usual assumption is that if we've done all we can think of to improve something, no further improvement is available.

And that puts a limit on how far we can go.

In practice, we're even more devious than that. We actively hide our shortcomings from ourselves. A classic example are businesses who self-report over-the-top OEE figures – often above 100%, when world's best practice is a "mere" 85%.

Those business owners are pulling off a trick that humanity perfected millennia ago – that of fooling ourselves. The usual way of doing it with OEE is to overstate machinery performance; for example, a machine is said to be performing at 120% of capacity, even though no machine can perform at more than 100%. Multiply that 120% by 85% and 90%, and you've got a great OEE number. And no way to identify where improvements could be made

Now here's the rub. In many companies, the Production Manager is under pressure from management – real or perceived – to demonstrate that the factory is operating at close to its maximum productivity.

How does he or she do that? By showing that there's little room for improvement of course.

This culture is often so ingrained that if a Production Manager found a way to lift productivity by 30%, he or she would risk being fired for incompetence.

The solution to this dilemma is a fundamental culture shift at every level within the company (we didn't say this would be easy.) Toyota, perhaps the world's greatest exponent of continuous improvement, has struggled to replicate this culture in many of its plants outside Japan. But it's continuing to search for ways to do so because the reward for success is so high.

Looking good is a powerful – and probably universal – human need. The payoff for those who can overcome this need are powerful, ongoing, and sustainable insights into where the next improvements can be made.

8th Non-Negotiable Rule

You need glasses

It's still common in mid-sized factories for a machine operator to record equipment performance using a clipboard and paper. Given the technology that is available today, this approach is akin to operating blind.

Not only is the data likely to be inaccurate, it will also be out of date by the time it is analysed, making it virtually useless for dealing with whatever issues the factory is now facing.

Moreover, even if the data were accurate and timely, it would still suffer from a third fatal flaw. It's extremely hard to analyse and interpret compared to a graphical display.

Visualisation tools enable supervisors and managers to see what's happening throughout the factory, right now, at a glance.

Which machines are down, how long they've been down for, average shot times for any machine over any selected period, average OEE for any selected period, and so on.

Consequently, remedial actions can be taken much sooner.

9th Non-Negotiable Rule

Inventory is a liability

Despite what the company balance sheet says, material sitting on your factory shelves or inside large hoppers is not an asset. It's a drag on your cash flow and your business.

One of the key first steps to lifting productivity is getting to grips with your process flow and the supply chain. Value stream mapping (sometimes called material and information flow mapping) is one technique used to analyse the flow of materials and information needed to deliver a product to your customer.

In essence, value stream mapping involves graphically representing all the steps needed to create and deliver a product. Those steps that add value may be represented by horizontal lines, while those don't add value are represented by vertical lines. The so-called "value stream" then runs from left to right across the page, and the "waste streams" are easily identified against it.

Waste streams is a slight misnomer, as they may actually be necessary steps such as tidying up after a job is completed. (In fact, some people further divide these streams in 'non-value-add' and 'waste').

The technique sounds simple – and it is. While useful software is available to facilitate value stream mapping, many people regard hand drawn maps as more intuitive and superior. Software's major benefits are speeding up calculations (such as time, inventory, and value-add time) as well as tools to analyse current process and help generate "what if" scenarios.

The key to **effective value stream mapping** is **accurate data**.

Depending on what you're analysing, you must accurately measure such things as process times, inventory or materials information, and customer (or demand) requirements. Don't underestimate the time needed to collect this data, and remember that the results you get at the end will only be as sound as the data you capture now.

Value stream mapping is a powerful tool for reducing waste throughout the production process. One factory we know used it to discover that:

- The single member of staff responsible for quality tests was dealing with a regular backlog of items during busy times. In such situations he traded accuracy for speed – and made a lot of mistakes.
- Suppliers of many raw materials were delivering irregularly. To compensate, procurement were over ordering materials.
- Some customers were ordering products well ahead of time based on forecast demand. Others, however, were merely passing on sales data, forcing the factory to guess what their requirements would be. The procurement department compensated by ordering enough raw materials for the largest likely order.

By identifying these areas of waste, the company was able to establish new procedures (adding more people to quality testing at busy times, agreeing to set delivery times for all suppliers, and having customers agree to place orders within a set time frame) and significantly reduce the volume of raw materials it needed on hand.

10th Non-Negotiable Rule

Yesterday's breakthrough is today's problem

Productivity optimisation is not a place you get to, but a path you take. Once you're on it you cannot remain still. The only places to go are forward or backwards.

Going back is easy. Once you've achieved your most recent productivity improvement goal, congratulate yourself on a job well done and seek no further improvements.

Gradually, **complacency will seep into your workplace** and everyone, including you, will let **standards slip back little by little** over time.

There's nothing mysterious about this. Toyota, recognizing this very human phenomenon of either going forward or back – but never staying still – developed the idea of the “kaizen mind”, an unending sense of crisis behind their constant drive to improve.

That – or your version of it – is your key to not sliding back.

And if you're not sliding back, that must mean **you're moving forwards.**