



**Duxinaroe**



# **Roadmap**

to

## **Lean Manufacturing Excellence**

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**“I worked directly with W.E. Deming on his 'System of Profound Knowledge', David Bovis, has found and detailed what Dr. Deming was looking for before he passed away. This is exceptional and the next step forward in the world of organisational Change”**

**Randy Schenkat**



## I WHAT IS LEAN MANUFACTURING EXCELLENCE?

Volume upon volume of information has been gathered, written, presented, taught, talked about and argued over, regarding Lean Manufacturing Excellence. The weight of seemingly never-ending information can become confusing as we try to navigate the minefield of buzzwords, development programmes and the latest concept or fad.

Consultants across decades have been responsible for this often confusing message, initially introducing;

- 'Quality Circles' to the west in the mid 1970's, followed by
- 'Total Quality Management',
- 'Just in Time',
- 'World Class Manufacturing',
- 'Lean',
- 'Agile',
- 'Operational Excellence' &
- 'Six Sigma' among other titles.

Irrespective of the title given to the approach, all methodology is fundamentally promoting the same tools, which evolved out of some core beliefs and common sense. While promoting these tools, a deeper dimension is often overlooked and the same mistakes are repeated from one development programme to the next when translating an Eastern philosophy into a western logical toolbox.

So what is 'Lean manufacturing Excellence' as we're calling it here? **The official line** is that it's a name given to a set of tools which enable excellence in all areas of manufacturing performance. Our definition differs slightly to reflect a deeper understanding focused on the people involved. That deeper understanding is 'The Dux Method' (Detailing the transition people make during change).

Lean is the most common name given to the performance capabilities reported by Toyota over the last 6 or 7 decades. It's a loose term covering TPS (Toyota Production System), TMS (Toyota Management System) and TTW (The Toyota Way), while being guided by a strategy deployment model called 'Hoshin Kanri' (Policy Deployment).

Despite the breadth of the system, western consultants and organisations have focused on the tools of TPS over the last few decades. Many omit the strategic deployment model and fail to understand the importance of 'The Toyota Way' (TTW). TTW is a philosophy emerging from the culturally imprinted beliefs in the mind-set of Japanese leadership. It is this mind-set which has led to many of the most prolific global brands hailing from Japanese companies.

The key to replicating similar successes and winning market share through improved Quality, Cost, & Delivery performance, is 'Mind-set'. Lean is ultimately less about the application of tools and more about how people think, their attitudes, how they are being and, as a result, how they act in the process of carrying out their work.

It is about the way people apply themselves to the task of making changes, which improve the efficiency and effectiveness of the organisation at every opportunity.

However, over the years, 'Lean' as a term has become focused on the Tools and techniques, which comprise TPS (Toyota Production System). This **narrow view** of 'Lean', (as a method of introducing change and performance improvement via tools application alone) is a contributing factor in the global 'change program' failure rate of >75%, reported globally.

There is nothing wrong with the principles. There is nothing wrong with the philosophy. There is nothing wrong with the tools and techniques. 'Lean' fails when people fail to adapt and change, or, more accurately, when leaders fail to understand the process of 'Transition' in *People* (Including themselves) when targeting change in organisational performance, growth and/or process change.

With that knowledge firmly established through extensive experience and supported by numerous studies from leading names, our definition of 'Lean' (or change to organisational performance under *any* banner) is necessarily 'much' broader. We provide leaders a working knowledge of 'Transition' in people and we do this using the latest advances in Psychology and Neuroscience, ensuring your leaders are capable of leading effective, sustainable and profitable change based on scientific fact.

Quite simply, any form of change, be it introducing a Lean tool, going through a Merger, acquiring a new company, installing new technology, reviewing the profitability of your product portfolio, releasing working capital or dealing with H&S issues, is the art of **creating conditions** in which people can achieve excellence in all areas of operational performance.

This requires we start with 'root-cause' of actions and behaviours, comprising a conscious understanding of individual beliefs through to thinking patterns, feelings and emotions. Once this level of understanding exists within a leadership team, they can understand what it takes to **create conditions** in which people are enabled (psychologically) to focus on customer satisfaction and shareholder return, encompassing Quality-Cost-Delivery, as compared to the best in the world in each category. This applies regardless of manufactured product type or service provision. Without the foundations of change understood, 'Customer focus' for example, is just a stated intention with no substance. It is also, 'imposed change', often the cause behind the effect of 'resistance to change'.

Once leaders understand 'Change' is about 'Leading' the development of 'Prevailing conditions' in which *people* can perform, with *support from* principles, process, tools and techniques, it is easy to see that the approach, which has generated this horrendous 'Change program failure rate' of >75%, can be addressed practically, effectively and, can just as easily be applied to any and all industries and sectors... basically, wherever people are to be found.

### **Is there a formula for an organisation to successfully achieve Lean?**

This document is intended to help organisations and individuals understand why we choose to pursue the principles of 'Lean', what it means and how the tools can be used to continually move us closer to achieving 'Lean performance levels'.

That is the 'standard' message. What Duxinaroe have done within this document, is taken much of what is standard and added elements historically omitted, to make the links to the deeper issues underpinning 'Change', with science. We detail much of what is 'standard' (with additions), then offer a re-cap at the end of the document, helping the reader consider the details and the case studies with a deeper level of scientific understanding about change.

We help you consider profit and performance as a cultural outcome... an 'emergent property' of people and, how they are *being* in relation to what they are doing.

This is not intended to be a 'How to' manual and doesn't cover the complexities of People (as delivered through 'The Dux Method'), equally it doesn't detail the deployment of strategy per se. Rather it serves as a general guide in understanding long-term vision, presenting some of the bigger building blocks required to realise 'Lean'. It also suggests some of the steps one might expect to encounter along the way.

It is important to recognise no two organisations are the same, as first and foremost, all organisations employ different people. On that basis, there is no single magic formula for achieving Lean Manufacturing Excellence, however, from case studies and experience from work in the field over decades, it becomes apparent that the ingredients in organisations who post successes and failures, are common. Those ingredients are first and foremost *people, their values and beliefs!*

As you'll come to see, the attention given to the transition people experience in a change environment is found wanting in the standard approach to 'Lean' and 'Change' [management] in general. This incomplete approach has been adopted and accepted globally over many decades.

In today's truly global marketplace, competition, on a worldwide basis is fiercer than ever. Organisations who wish to compete on this global stage understand that traditional manufacturing and the traditional approach to dealing with change in people cannot achieve the necessary level of long-term customer satisfaction that supports organisational growth and sustainability objectives.

This document is part of a suite of development materials used by Duxinaroe when helping leadership teams make that transition.

### Traditional Manufacturing

To better understand world perceptions of manufacturing excellence it helps to review some of the characteristics associated to traditional manufacturing.

Traditional manufacturing organisations are typically characterised by:

- Batch processing. This is where the product is routed and staged in bulk quantity at each step of the process.
- Process equipment is arranged in a functional layout with like equipment placed in the same work area / department. E.g. Metalwork / bench assembly. This requires transport of the product for each batch process step.
- There is a large central stockroom usually within a fenced perimeter with an MRPII / ERP driven replenishment system.
- Computer transactions are high in quantity as work orders are issued to support the forecast and inventory is built to stock.
- Reactive rather than proactive management.

The result is often a high level of RM (raw material), WIP (work in process) and FG (finished goods) while customers suffer poor delivery performance and lead-times are excessive. There are too few of the necessary parts and too many of the unnecessary parts to meet customer demand. Quality suffers at the expense of expediting and productivity is slow and stagnant. The high levels of interdependencies in the traditional manufacturing environment make it very difficult to have excellent delivery and quality performance; this difficulty of task puts strains on morale and teamwork.

### Lean Manufacturing

Counter this description with a manufacturing operation employing 'Lean' techniques, in respect to People *and* Process and you will find;

- A layout based on product family and process flow in a cellular design.
- Resources are dedicated to the cell and work sequencing is calculated to meet takt time.
- Customer orders are level-loaded in a one-piece flow fashion.
- As customer orders are completed all components and raw materials are **pulled** through by a Kanban replenishment system.
- Employees are **empowered** to make decisions as a team and morale is high. The focus on the customer (internal and external) is never lost.

Put another way, Lean companies meet and exceed customer expectations. They eliminate defects before they happen.



Lean companies;

- Put quality first.
- Are on time, every time.
- Deliver when the customer wants it and they are able to change quickly for the customer.
- Are the fastest in their industry. What a traditional company takes weeks to do, Lean companies do in hours.
- Continuously find better and faster ways.
- Invest in their people. Each person has the ability and **desire** to satisfy the end customer and the next customer in-line.

### **Bench – Marking**

While definitions of 'Lean Manufacturing Excellence' vary, they usually focus around measures of Quality, Delivery, Cost, Customer Satisfaction and speed related to new product introduction and inventory turns.

Various acronyms have become popular including QCDGSM (Quality, Cost, Delivery, Growth, Safety, Morale).

All the way back in 1997 'Industry Week' magazine cited a joint IW / Price Waterhouse survey detailing benchmark measures associated with Lean Manufacturing Excellence. At that time, the following stood true. These benchmarks have developed since, however, a comparable study has not been carried out in recent years. You will notice there is no mention of associate engagement, ownership or empowerment as if such results can be achieved without people!

#### **QUALITY**

- Less than 10 ppm customer reject rate on shipped products
- Finished product first pass yield from 99-100%
- Scrap / rework costs less than 1% of sales

#### **DELIVERY**

- 100% on-time delivery
- Customer order lead-times less than 5 days
- Cycle times less than 5 hours
- Cycle times reduced more than 50% in the last 5 years

#### **COST**

- More than 25 inventory turns
- More than 52 annual work-in-process turns
- Sales per employee of \$250,000 or more (£150K @ 0.6 XC rate)
- Productivity increases of greater than 20% in one year
- Manufacturing cost reduction greater than 10% over the preceding year
- Plant level Return on Assets greater than 25%

However, recognise that it takes change in people (beliefs and behaviours in leaders at all levels) to achieve such levels of manufacturing excellence from improved process, and we immediately see the idea of 'Continuous Improvement' from a very different perspective.

In respect to understanding change in process **and people**, it would be a mistake to think that the competition is standing still.

This makes benchmarking potentially dangerous. In as much as; if we target best practice today, by the time we achieve it, the rest of the world will have moved on. To achieve a 'Lean manufacturing excellence' standard we must first aim to be the best we can be, better than the best if we wish to be No.1. ... *And* accept this is a moving target. For those aiming to improve their organisations, transition in people, as root cause of operational excellence, is fast becoming the central topic and driver behind core activities.

THE DUX METHOD provides the knowledge required to facilitate this shift in approach.

The capacity to effect change throughout organisations is fast approaching a step-change / paradigm shift and at Duxinaroe we like to think we are leading the way. Any thoughts of current performance and change capabilities in any industry now require a re-think in the face of the latest human-science Duxinaroe provide to deliver **leadership excellence**.

The key to 'Change' is the **creation of conditions** in which people are free from fear based responses during their own transition. The creation of conditions in which people understand how and why continuous adaptability and discovery (in themselves and others) is 'normal'.

Where we can create this understanding in the minds of individuals, that is, within the culture of companies, psychological safety prevails and *Operational Excellence* is realised through **Leadership Excellence** established from shop-floor to top-floor.

Shop-floor to top-floor means, from the value adding activities carried out on the front line to the deployment of strategy, (which determines and aligns tactics across functions), to the philosophical world view shared between those in the C suite and investors.

## How do we achieve Lean Manufacturing Excellence?

How can these levels of manufacturing performance be achieved? History tells us we apply the 'Tools' from the Lean toolbox, of which there are many. However, in practice, when led from outside of the leadership team and / or outside of the business, this approach has a very high failure rate. As previously mentioned, global reports over the last 20 years suggest an average failure rate upward of 75%. This is typically due to the 'resistance to change' (including scepticism, denial and other aspects of our defence mechanisms which are never openly addressed as part of the change program).

Before tools can be applied and their scope understood, there are a few additional steps to undertake and understand.

1. **People need context if they are to gain any degree of understanding from communications.** The introduction of 'change' requires people adapt from their 'current state' (set of beliefs about what is 'good' for them) to a perceived 'future state' (new beliefs about a future set of conditions which will be good for them).

***Adaption in people is a neural and psychological process.***

Without careful and considered introduction, any message about 'change' or anything 'new' is automatically treated as a threat by the adult mammalian brain. It is not unusual for the very 1<sup>st</sup> steps in any change program (following the generally accepted approach) to actually undermine and inhibit the introduction of change across the organisation, without it ever being realised. It is not realised because 'resistance to Change' is not measured e.g. 5S is often introduced as an 'easy' tool, however, if misunderstood, even this 'simple' tool can lead to scepticism and resistance to change. Helping people understand the science of their own resistance & responses helps them deal with it. In this case, Knowledge really is power ... power to change.

2. **Historical context is important.** Before the 'tools' as we understand them today were created, there was a lot of development carried out in practice. This was done by people thinking in particular ways for 40 years at Toyota and for a further 40 years or more at Toyoda. The western world of consulting then copied what they thought they saw, while those at the head of Toyota were striving for perfection in line with a deeper philosophy.

It is important for people to recognise the importance and power of the **beliefs, values and attitudes** which sat behind the minds of those developing a different approach in the East, and the values and attitudes of those 'selling' the tools as a solution in the west. In the East, the tools evolved to compete and eventually leave behind the approach to production in the west. What didn't get translated was an understanding of the broader philosophy which led

to 'The Toyota Way' (The Philosophy behind the tools) being clearly specified as a guiding philosophical rudder for all subsequent developments across the organisation.

**The differentiating factor was the mind-set, thinking patterns and attitudes of the leaders of Toyota – this led to the tools, it was not created by the application of the tools!**

3. **Understand the building blocks of Culture.** Values, attitudes, beliefs (as imprinted on our brains throughout life), the language we develop and the perceptions we form are always changing to reflect our latest experiences. These consolidate and combine in any group of people acting together, to form culture and cultural layers and pockets. These Cultural layers often become 'boundaries', difficult to cross with everyday communications in a fast-paced world.

To understand what is required to affect 'Culture Change' (in layers and in general) requires people share a common view of what culture is. To make that point another way, we might say it would be impossible to get someone to change gear in a car, if the person didn't know what a gear-stick was (& ideally, how it connected to the gearbox, engine and wheels). Understanding 'culture change' is much like this. We have to understand the component parts and connectivity within the system if we are to understand how to change it.

4. **To 'emotionally' move toward a different future, people need to be able make sense of it. The stated outcome requirements of the organisation need to be intuitively understood as 'Good'.** Once 'Adaption' / 'Transition' (people change), 'History', and 'Culture' are understood, the complex issue of 'effective communication' considered at a philosophical, cultural and language level, can be directly linked and mapped (in the minds of the leadership team), to the more practical issue of applying a strategy deployment method and the (often sensationalised) performance enhancing 'Tools'.

Simply put, we must help leaders;

1. Understand human factors in respect to change (in detail)
2. Understand the historical evolution of the most successful methods utilised globally
3. Understand the human factors in respect to the effective communication of Strategy
4. Understand the mechanics of Strategy deployed to suit those human factors
5. Understand global 'good practice' in respect to Tools and techniques which can be employed to achieve the strategic outcome requirements.

The communication and delivery of strategic intent *must* suit the psychological needs of those people to be guided by it, *if* it is to be **effective** in practice.

This means strategy must be visually managed with the same discipline as 5S, Kanban or piece part presentation, to "consciously reduce assumption" as part of a 'psychologically aware' leadership process.

To ensure the visual management of strategy is effective and becomes a framework to guide development and the application of the 'tools', which improve manufacturing performance, it is essential leaders lead by example, in thought, word and deed.

This means leaders become **fully responsible** for the clear communication of outcome requirements and relative benefits. Each objective must be broken down into chunks, people [brains / minds], can associate to and deal with; these 'chunks' can then be used as a step by step plan (or 'road-map') for organisational development.

In essence this is nothing more than any good 'Goal setting' course aware of the psychology and neuroscience behind the principle of 'Toward' and 'Away from' will explain. However, to be successfully applied in practice, those leading must understand more than 'WHAT' a psychologically beneficial strategy deployment model consists of. For leaders to be truly effective, they must understand 'HOW' and 'WHY' this approach works at a deeper level.

Once these foundational issues are addressed openly and thoroughly, Leaders can consider how to navigate change (e.g. the application of 'Lean Tools') with a broader and deeper understanding of the transition they and their people have to make. It's this shift in knowledge / language, that will drive the efforts required to make change to process, procedure, organisational performance, expectations, assumptions and ultimately, the Culture, which emerges from values, beliefs and behaviours.

Get this foundational aspect of change wrong, and the change in people becomes a barrier to change in process, procedure and profit, causing 'Delays' to any intended change. Triggering any such emotional barriers subsequently requires additional effort to force through change (push vs. pull). Cost is then incurred over extended periods, often, to reach a lesser point of performance. We have seen People mask, hide and retain their original negative view over many years, even when they seemed to conform in their behaviours outwardly.

Helping your leadership team understand this in intricate detail, such that they are empowered to deal with their own and other's 'Transition' practically and in-line with Lean principles is;  
The DUX METHOD.

### What are The Tools?

There are many tools to choose from to achieve Lean manufacturing excellence. However, most are not mutually exclusive and require concurrent implementation to gain full benefits.

This presents something of a problem. For people to understand, be comfortable with and actively pursue the use of a mixed bag of **'New'** tools & techniques, they will ideally have experience of those tools. In the absence of such experience, most people default to their natural state, in which the brain determines anything 'New' to be a threat, to be avoided or opposed, until such a time as it can be seen as 'Good' and determined *not* to be a threat.

Until a level of comfort can be developed in respect to the 'New' tools, through experience, people often display a natural resistance to change. Failing to understand and openly address this need for the brain to determine 'Friend or foe' is the main reason 'Lean Implementation' projects fail to be sustained once the external force of a consultant or other 'believer' (new 'Lean' manager etc.) is removed.

***If the brain doesn't get change to stick, change doesn't stick in practice.***

If the 'world-view' (developed in respect to a threat) isn't altered in the brains of those introduced to the tools, the adult brain will go to work justifying its position, building the reasons why 'New' is wrong, while further reinforcing the rationale behind the resistance to change to itself. This happens due to complex issues to do with glucose energy consumption in the brain and the psychological need to keep ourselves consistent. Irrespective of the physiological and psychological reasons why this happens, it does happen... and on a surprisingly common and consistent basis.

Making the 'New' wrong (Guilty until proven innocent) is natural and part of our defence mechanisms. The trick is to develop leadership teams who can 'manage' the experience, so the 'threat' doesn't become a lasting memory, leading to an unspoken sub-culture of opposition toward change throughout the organisation.

In Section IV, there are examples from case studies of organisations implementing the tools as part of their journey toward Lean manufacturing excellence, as reported by the XXXXXX XXXXXX, one of the most successful capital venture groups in the world who utilise 'Lean' to turn their acquisitions around to profit.

These case studies provide examples of how some organisations approached and prioritised the significant change from traditional manufacturing to Lean Manufacturing Excellence strategies, providing a foundation from which you can plan and structure your own transition. There are many opportunities within these case studies to consider the beliefs and conviction of those leading change and how they came to have that conviction.

Regardless of the organisation, once the deeper issues described here are overtly addressed, while recognising there is no 'One-size-fits-all' solution, it can be seen that there *are* common tools and strategies which apply to any organisation where people are involved in the day-to-day activities which determine organisational performance and profit.

### V.O.C.

Most importantly, people aiming to develop a Lean approach must **develop a strong understanding** of the 'Voice of the Customer'.

Once people understand V.O.C., organisations can begin to establish the foundation for a successful transition to lean manufacturing excellence. This begins with opening levels of communication throughout the organisation. There must be on-going **effective communication** in which everyone understands the importance of why change is necessary.

Through the use of Policy Deployment (Hoshin Kanri – the visually managed deployment of strategy across departments / functions), breakthrough objectives are recognised and cascaded through the entire organisation. Not only does everyone understand what must be accomplished and by when, but they understand that they are an integral part of developing the plans they have to achieve through employee involvement and work teams (internal customers). Agile practitioners now talk about 'T' shaped customer journey focused work groups (the same as what used to be called Cross-functional Team-work). **They understand the detail behind 'Full responsibility for outcomes'.**

### Work Cells

A logical next step is to move away from batch manufacturing and towards cellularisation (the creation of work cells). Work cells are typically designed to meet 'Takt time' and produce with a single piece flow methodology with standard work fully implemented.

Moreover, 5S and good visual management typically play an important supporting role in reducing waste and communicating expectations to all. In addition, it is difficult to realise the expected reduction in inventory levels without moving all material to the point of use and triggering replenishment with a Kanban material system. A multi-skilled workforce is desirable to provide flexible staffing requirements and support productivity improvements. In addition, SMED (Quick changeover techniques) may also be necessary on machinery to support the smaller lot sizes and eliminate batch manufacture. **This is an enormous change in belief about what 'good' looks like.**

### Eliminate Defects

After these fundamentals are in place, organisations typically focus on the improvement of existing cells. A strong emphasis on eliminating defects from being passed to subsequent operations is usual at this point in the development cycle. To do this Jidoka (Autonomation – automation with a human touch) is a key priority. Variability within critical quality characteristics of products can be targeted for reduction by understanding and utilising the principles of SPC (Cp CpK)

or in higher volume environments, Six Sigma, which strives to reduce defects to 3.4 Parts per million (PPM) also called 3.4 DPMO (defects per million operations).

In addition, a total preventative maintenance program may be desired to minimise equipment downtime with operators taking a key role in the maintenance of their equipment.

Moreover, new product development and introduction will support Lean manufacturing Excellence strategies from the outset. Therefore a focus on concurrent engineering, Design for Manufacture and Assembly (DFMA) and a production preparation process (PPAP) are points of focus depending on the nature of the manufacturing business.

i.e. A company which produces its own product range and looks to strategically build its portfolio of offerings will have a different NPI focus than a company which makes bespoke products to customer request.

This is a brief overview of a 'typical' approach to developing an organisation such that it achieves 'Lean Manufacturing Excellence'. There are other tools which support development and also need to be considered in an implementation plan. Section II details a visual roadmap of these tools. This roadmap also acts as a general guide to the order of implementation. ***However, please remember that there is no single formula for the successful transition to Lean Manufacturing Excellence.*** Each organisation must determine its own strategy based on the specific objectives and needs of the organisation in its own market.

After reviewing the case study, the common tools of Lean Manufacturing and their order of prioritisation will become more apparent and this will help you see how you can fit these strategies to your own organisation and your own journey.

Duxinaroe offer support for any such transition to organisational excellence, lean or otherwise, with the additional benefit that we provide a scientific understanding for leaders such that the '**Orange text**' herein is understood in detail.

Delivering the knowledge and capability to leadership teams, in respect to navigating the change and transition in process and people is the key element often overlooked during change programmes.

Introducing Leadership teams to this depth of understanding can make the difference between change programme failure and change programme success.



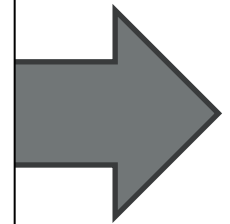
## II VISUAL ROADMAP.

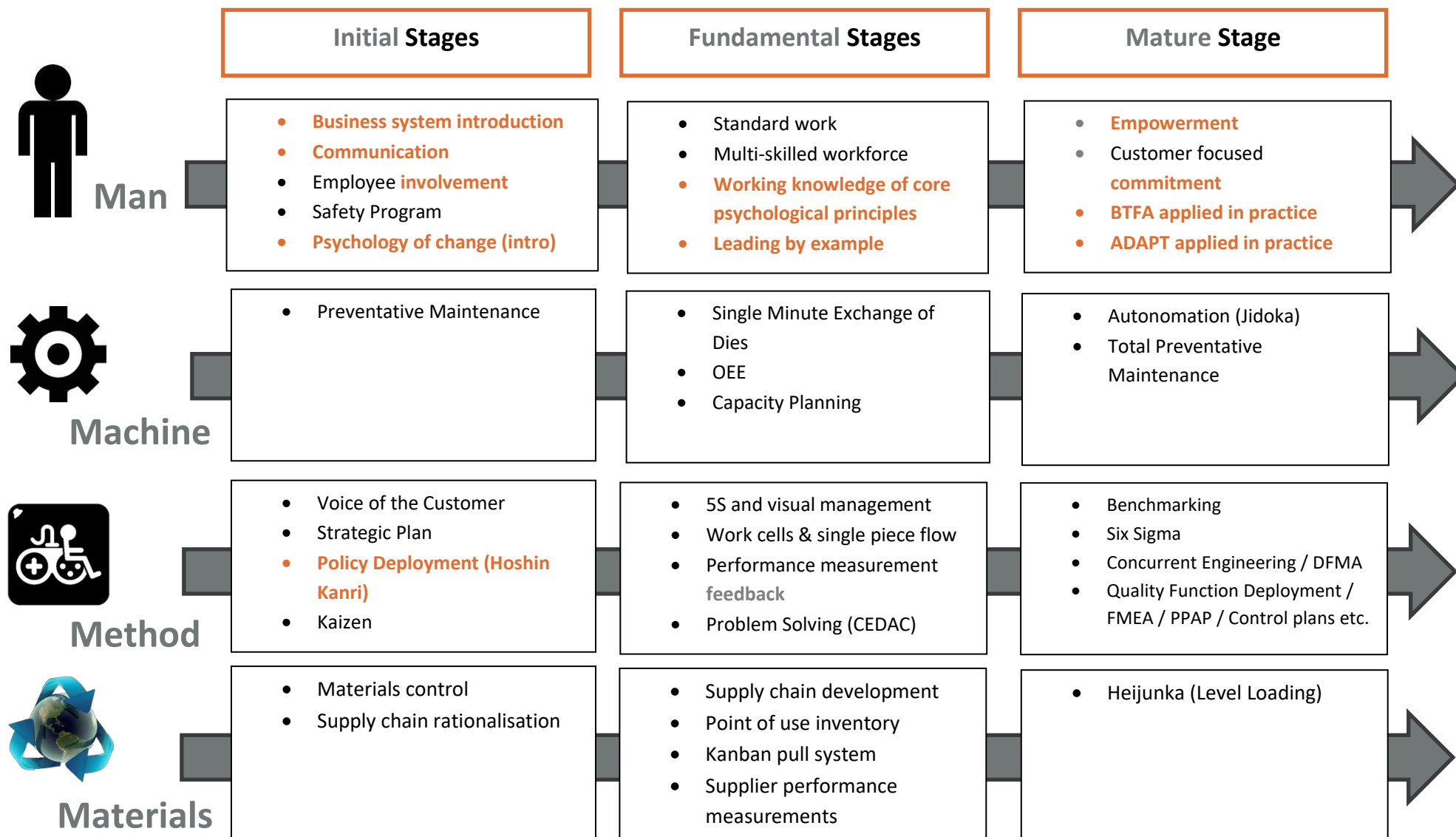
### **Traditional Manufacturing**

- Unsatisfied Customers
- Poor quality
- Poor Delivery
- Long lead times
- Poor teamwork & morale
- Low or stagnant productivity
- Excessive floor-space
- High product cost
- Long material moves
- Excessive downtime
- High Inventory levels
- Reactive management
- High number of system interdependencies
- Monthly shipments driven by amount produced

### **Lean Manufacturing**

- Focus on the Customer
- 3.4PPM defect rate
- 100% fill rate
- Lead-times less than 5 days
- Competitive cost position advantage
- Flexibility
- Inventory turns greater than 25
- High morale and teamwork
- Proactive management
- Simple systems
- Monthly shipments driven by amount sold





In addition to those tools mentioned in the visual roadmap above, there are other aspects of organisational planning and control required in a Lean organisation.

e.g. in addition to Capacity planning and production scheduling as a pre-cursor to Heijunka (Level loading), it is assumed there will be a standardised approach to 'estimating' in the external sales team and the internal quote raising process. Such control helps to ensure the direct and indirect overheads (and thus profits) are understood at each stage of the manufacturing process.

Ultimately the 'cost of time' spent on each element of each product, including sales, design and build is expected to be identifiable, understood and intrinsically linked to the financial performance of the organisation. i.e. Cost centres allow for Lean Accounting to become established.

This is typically considered under the title of 'Day by the hour profit & loss' (DBTH P&L) as an aspect of a Lean accounting system developed in support of Lean manufacturing excellence.

Stock volumes and values are known at all times in these conditions, enabling a quick and effective end of month check, to ensure the captured quality (Scrap / Rework) figures can be reconciled in the management accounts month on month. This ensures the right data is captured to define Gross and Net Profit, hourly, daily, weekly, monthly and quarterly with minimal need for additional administration processes. Ultimately, cell leaders have sufficient autonomy to plan their staffing levels based on educated commercial considerations.

These aspects of performance and control are standard-practice in the Lean world and essential / foundational aspects of organisational improvement in addition to the tools in the roadmap.

In addition, words like Empowerment, commitment, communication etc. are used freely without a thorough understanding of their construction within the brain. What do we mean? How visual management is processed by the visual cortex, for example, significantly informs the methods of approach adopted by those creating work cells and reporting mechanisms. This 'deeper view' of tools includes the psychological benefits realised from the effective introduction of Policy Deployment.

Understanding the brain and the psychological issues surrounding the practical application of such 'tools' provides those leading change with many proven reasons 'why?' they work. This higher level / foundational knowledge increases 'Commitment'. It helps leaders understand what is required during the introduction phase and the pre-conditions required to obtain the best result from the management systems they create, in respect to motivation, effective communication and feedback.

Without this level of understanding, in and around 'Visual Management' and other 'tools and techniques', many mistakes are made in the design of systems and the application of tools, leading to the global >75% failure rate reported in change programs globally over the last few decades.

### III OUTLINE OF KEY ELEMENTS

## MAN - Understand the psychological barriers to adopting new ways of working

### Business System Introduction

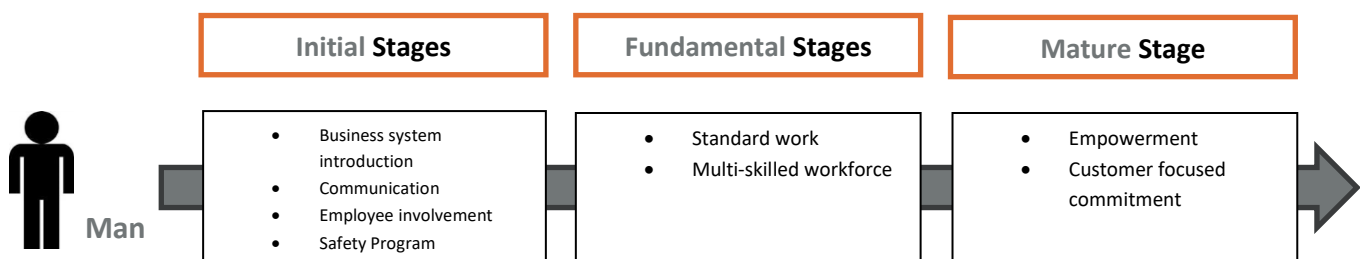
- Focus on the **self-concept** of the people you want to care for your customer
- **Understand the psychology behind a culture of Continuous Improvement, effective lean leadership and change management**
- Quality built into the process
- Produce to customer demand vs. forecast
- Eliminate waste and non-value added activities
- Pull vs. push production
- Produce with a lot size of 1
- Understand the 'House of Lean'
- Review of Lean Manufacturing Excellence tools
- Benchmarking

### Communication

- Move away from traditional **"Top Down", "Do what you're told"** approach (**Shift belief**)
- **Understand the psychology behind explaining** to all, why Lean Manufacturing techniques are critical in support of the strategic objectives
- **Understand the psychology behind explaining** what those strategic objectives are
- **Understand the psychology behind explaining** what must be accomplished and when
- Tour and benchmark other facilities
- **Break down barriers to change (understand the science behind the words - psychology and neurological adaption)**
- Hold regularly scheduled all employee meetings
- Develop **communication** and **effective meeting skills (Lead by psychologically mature example)**

### Employee Involvement

- Team **Participation (psychology and sociology of inclusion)**
- Ask for input / Apply catch-ball during Hoshin Planning
- Employee suggestion program



### Safety

- Address safety concerns immediately
- Safety review teams established
- Regular safety talks held by supervisors or cell leaders
- Hold all necessary training
- Understand underlying beliefs and behaviours behind poor H&S disciplines

### Standard work

- Elimination of waste
- TAKT time
- Work sequence
- Standard WIP
- Kaizen
- Reduce variability
- Expose problems

### Empowerment

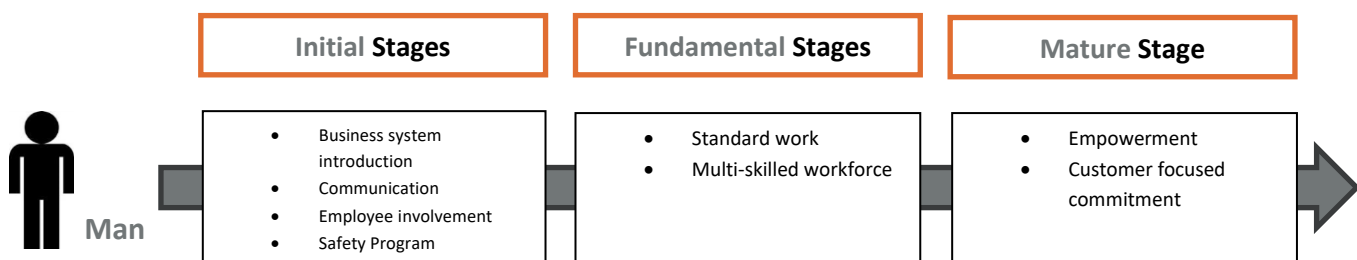
- Understand the 'Brain and Mind' mechanics, behind the principles of;
  - Pushing decision making lower in the company
  - Ownership
  - Responsibility / self-discipline
  - Initiative
  - Motivation
  - Leadership
  - Recognition

### Multi-skilled workforce

- Cross functional flexibility
- Scheduling flexibility
- Improved Quality
- Training Plan
- Training Resources

### Customer focused commitment

- Entire organisation has **internalised** the focus on customer satisfaction / delight



## MACHINE – Understand the psychological barriers to adopting new ways of working

### Preventative Maintenance

- Trained maintenance personnel
- Disciplined maintenance schedules

### Single Minute Exchange of Dies

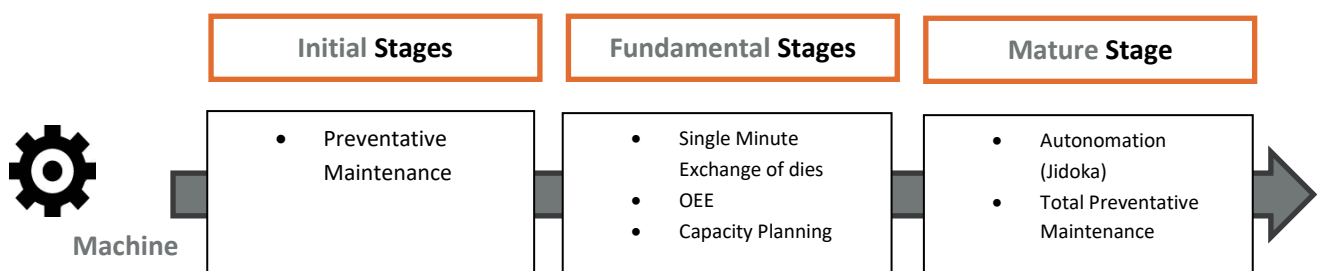
- Supports increased setups and smaller lot sizes
- All changeovers can be accomplished in under 10 mins (< double digit)
- Eliminate / Reduce downtime for setups and changeovers
- Document / Video setup sequence and critically assess
- Identify which elements of each setup are 'Internal' / 'External'
- Move internal to external
- Reduce or eliminate remaining internal
- Reduce or eliminate remaining external
- Measure changeover performance

### Autonomation (Jidoka)

- 'Automation with a human touch'
- Quality built into the process
- Impossible to pass on a non-conforming part to the next operation

### Total Preventative Maintenance

- Zero failures – Zero defects
- Autonomous operator maintenance to conduct inspection, cleaning, lubrication, maintenance and repair.
- **Focused 'group activities' (Cross functional teamwork = more brain power).**
- Eliminate the source of contamination
- Visual Controls
- Reduce the 6 losses of machine inefficiency: Breakdowns, set-up and adjustments, idling and minor stoppages, reduced speed, defects and rework, start-up & yield losses.
- Predictive maintenance: vibration analysis, Thermography (infra-red), Tribology (oil analysis)
- Overall Equipment Effectiveness – OEE = machine availability X performance X quality.





## METHODS - Understand the psychological barriers to adopting new ways of working

### Voice of the Customer

- Understand the customers needs
- Identify customer opportunities
- Decide what data needs to be collected
- Decide how to collect the data – what method
- Collect the data
- Analyse the data and transform into customer requirements
- Translate customer requirements into features and specifications
- Know what the customer wants before they know what they want

### Strategic Plan

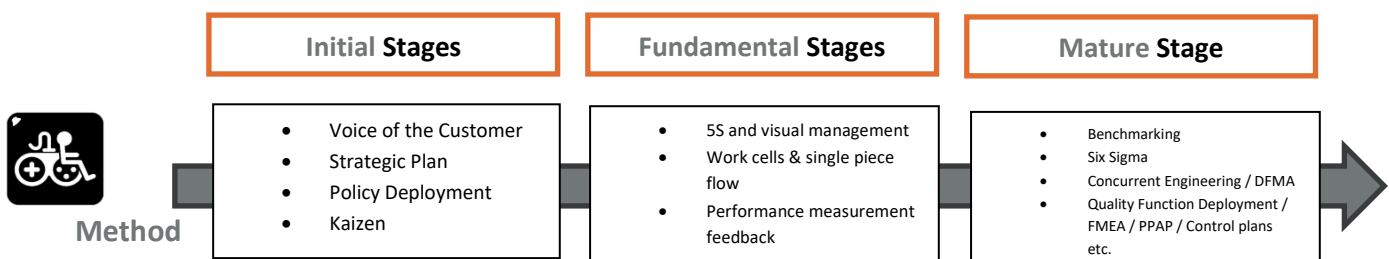
- **Mission statement (Having clarity of direction = releasing Dopamine as part of our reward mechanisms and the psychology of goal seeking).**
- Major changes from last year
- Situation analysis
- Plan of action / objectives
- Continuing Issues

### Policy Deployment

- One year plan reflecting the 3-5 year strategic plan
- Focus on breakthrough objectives
- Results oriented processes versus objectives
- **Develop annual objectives**
- **Deploy annual objectives**
- **Implement annual objectives**
- **Monthly review process**
- Benchmarking

### Kaizen

- Formal continuous improvement efforts
- **Measureable goals and objectives**
- What was done yesterday can be improved upon today



### 5S and visual management (originally 4S – no need for ‘Sustain’ in Japanese culture)

- Foundation for standard work and Lean manufacturing Excellence
- Highlight abnormalities
- Simplify (Sort) – Allow only what is necessary
- Straighten (Set) – Organise visually
- Scrub (Shine) – make as new and identify problems
- Stabilise (Standardise) – maintain that which has been accomplished
- **Sustain – internalise as an organisation**

### Work cells and single piece flow

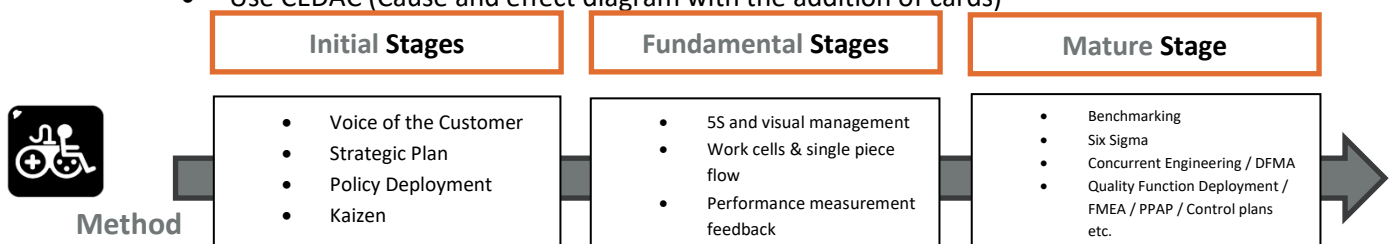
- Quality, delivery and cost improvements
- U-shaped cells
- Standard work in place in the cell
- Manufacturing flexibility
- Quality built into the process
- Significant reduction in WIP
- Productivity Improvements
- Eliminate batch manufacture

### Performance measurement feedback

- Cell performance measures of quality, delivery and cost posted and maintained in the cell
- Key aggregate measures posted in a central location (War / Control room + Policy Deployment) – **Understand measures as a fear based judgement mechanism**
- **Focus efforts**
- **Highlight key areas and issues**
- Make visible and simple
- **React! (Freedom to act – internal vs external locus of control)**
- Plan-Do-Check-Act

### Problem solving process

- **Properly define** / describe the problem
- Quantify the problem visually
- Data collection
- Root cause analysis
- Countermeasure implemented
- Standardise the improvements
- Use CEDAC (Cause and effect diagram with the addition of cards)



### **Benchmarking**

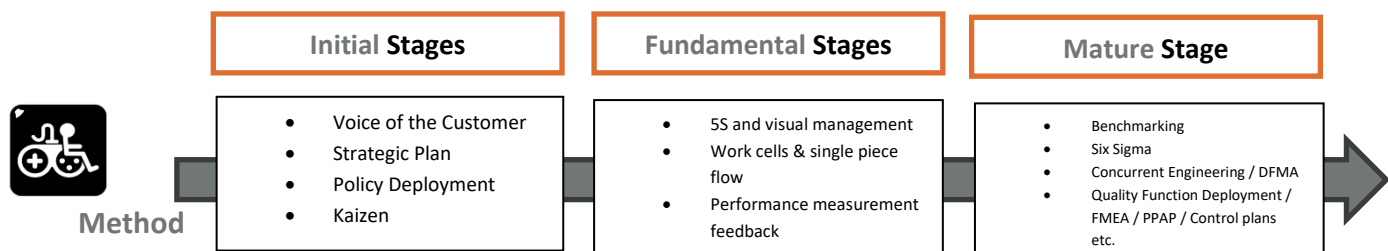
- Decide what to benchmark
- Understand how we do it today
- Decide who is best in the field at doing it
- Understand how they do it
- Implement & Improve

### **SPC (6 Sigma)**

- 3.4 parts per million
- 2.0 CP
- 1.5 CPK
- Identify critical characteristics
- Define the process elements that influence the critical characteristics
- Establish maximum tolerances for each element
- Determine the actual capability of the elements
- Attack variability and achieve  $CP > 2$ ;  $CPK > 1.5$

### **Concurrent Engineering / Design for Manufacture and Assembly (DFMA)**

- Product design analysis process
- Eliminate waste in assembly at design stage; consider motion & transportation / standardise parts across products (e.g. screw diameters and lengths to increase buying power, get cost down through procurement and improve quality and control while reducing tool requirements).
- Reduce cost through efficient design – reduce ‘over-processing’ needs in machine / build stages
- Develop standard parts – purchased and across product platforms
- Reduce the need for engineering changes
- Work closely with suppliers
- Shared responsibilities (work in cross-functional teams)



### Quality Function Deployment

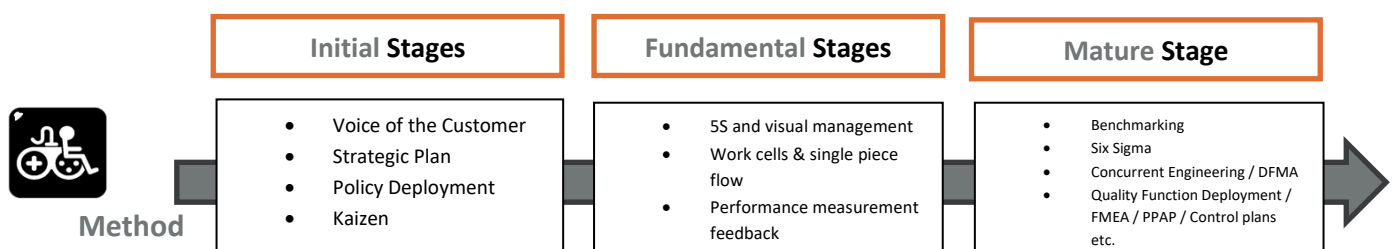
- Translate customer requirements into technical specifications
- Ensure quality requirements are incorporated through all phases of development
- Prioritise quality efforts
- Use a disciplined matrix format

### NPI & Supporting Systems

- Consciously and pro-actively manage 'New Product Introduction'(NPI) across all functions (consider 'contract review' or 'Sales, Operations & Financial Planning' (SO&FP) as a part of your Standard operating procedures (SOP's)/ leader standard work).
- Implement and use a 'Stage-gate' system of checkpoints and milestones (i.e. set information quantity / quality requirements per function and, if / where required, establish Service level agreements (SLA's) between functions.
- Ensure product definition and design meet the needs of the customer
- **Cross functional team work as standard**
- Standardise and document the overall process and process steps everyone agrees to follow
- Build exemplary quality into the product *and* process
- Consciously 'Design in' low cost and high quality by 'designing out' the 7 wastes at design stage

### Production Preparation Process

- Ensure the New Product introduction focus is on maximising the Value Adding capabilities of the manufacturing stage
- Increase the speed of getting new products into production
  - Flexibility (in attitude, approach and process)
  - Quick set-ups
  - Design with the operator in mind
  - Make equipment easy to move to allow 'Cells' to flex in line with customer requirements (match TAKT)
  - Jidoka (Semi-Automate wherever possible to improve efficiency at each build stage and improve quality and consistency).
- Make any new product introduction a cross-functional process
- Share responsibility for achieving required outcomes and performance improvement
- Build quality into the process (Poke Yoke for information and product)



## **MATERIALS** - Understand the psychological barriers to adopting new ways of working

### **MRPII**

- Requires **disciplined** inventory accuracy
- Requires accurate Bill of Materials (BOM)
- Requires accuracy in forecast demand
- Push system of production characterised by higher levels of inventory
- Requires tight stock room controls
- Manufacturing work orders issued to production – build to stock
- Many transactions

### **Supply Chain Rationalisation**

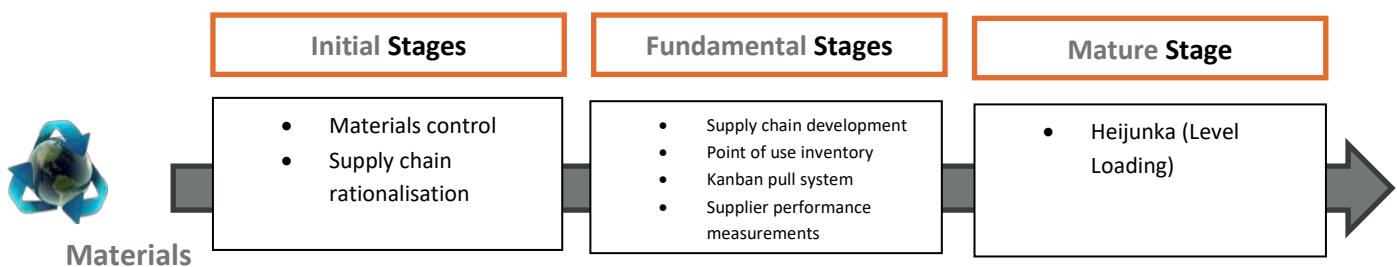
- Reduce transaction costs
- Review supply base for unnecessary redundancy
- **Partner with those willing** to support (JIT) Lean / Kanban implementation

### **Supply Chain Development**

- Reduce lead times
- Supplier partnering
- Smaller lot shipments
- Supplier contracts

### **Point of use inventory**

- **Visual control** of inventory
- Eliminate wasted motion and space
- Replace MRP with KANBAN for Runners, Repeaters and Strangers.

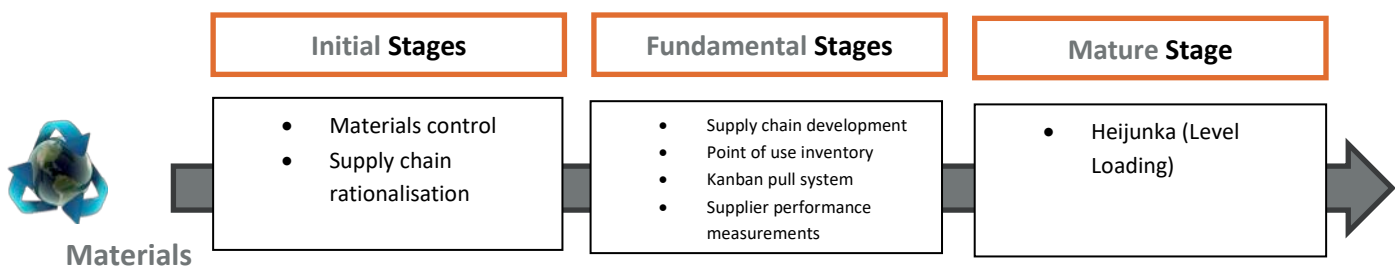


### Kanban

- Visual trigger for replenishment rather than a computer trigger
- 'Pull' parts through the production system rather than 'Push'
- Place / deliver materials at the point of use
- Eliminate the 'Stockroom' – free up floor space
- Live stock accuracy and rapid stock take
- Only quality product is sent to the subsequent process
- We only manufacture what was 'pulled' by the customer
- Level load final assembly


### Supplier performance measurements

- Develop supplier certification program
- Implement 'On-Time Delivery' ratings to monitor supply chain performance
- Develop and introduce quality ratings to monitor supply chain performance


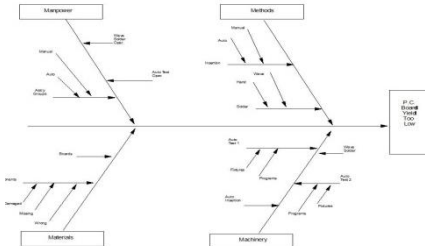


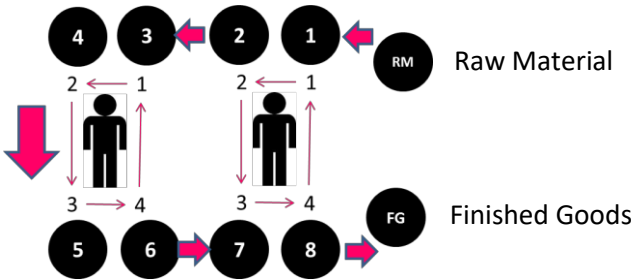
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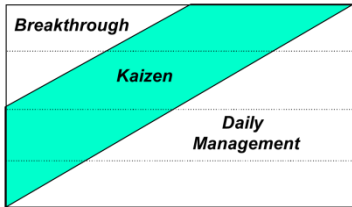
## Glossary (Understanding the Jargon!).

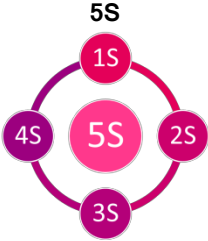
<b>ADAPT</b>	<p>An acronym designed to consolidate other models by Bovis to provide a psychological lens through which to better understand the Human Factors involved with Change Management.</p> <p>ADAPT = Awareness, Desire, Ability, Performance Opportunity, Tracking. It considers the complexities of neuroscience and psychology, ensuring the neural chemical state, self-concept and locus of control issues behind an 'Away from' / 'Towards' response and defence mechanisms, are consciously considered by those leading organisational change. It can be used as an over-arching guide for any technical change requirement. Lean, ERP / MRP / CRM, Merger and Acquisition, Capex etc.</p>
<b>AFFINITY DIAGRAM</b>	<p>A process to organise disparate language information by placing it on cards and grouping the cards that go together in a creative way. "Header" cards are then used to summarise each group of cards.</p>
<b>ANDON</b>	 <p>A line indicator light or board hung above the production line to act as a visual control. Andons are used to signal an abnormal situation.</p>
<b>ANNUAL OBJECTIVES</b>	<p>In Policy Deployment, those objectives that we need to achieve this year, and will enable us to reach our overall 3-5 year Breakthrough Objectives.</p>
<b>AUTONOMATION</b>	<p>'Automation with a human touch' ... or ... transferring human intelligence to a machine. This allows the machine to detect abnormalities or defects and stop the process when they are detected. Also known as Jidoka.</p>
<b>BACKFLUSH</b>	<p>The process of automatically reducing inventory volume records, based on the bill of materials in a computer system for that product. The 'Booking off of stock' process (Backflush) is normally triggered by shipment and invoicing to a customer, backflushing has been used to reduce wasteful inventory transactions.</p>
<b>BENCHMARKING</b>	<p>A method of establishing internal expectations for excellence, based on direct comparison to current "Best" practice in the field. In some cases the "Best" may not be a direct competitor in your industry, therefore Benchmarking is carried out 'across industries'. In recent times, 'Best-Practice' has been referred to as 'Good Practice', where it is accepted there is always room for improvement.</p>

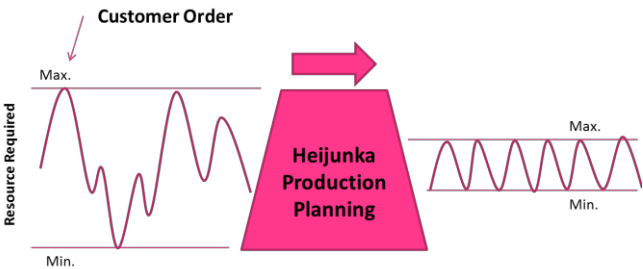


BOWLING CHART	<table><tr><th colspan="18">POLICY DEPLOYMENT BOWLING CHART</th></tr><tr><td colspan="18">Department Name: <u>Production</u></td></tr><tr><th>No.</th><th>Improvement Priority</th><th>Measure</th><th>JOP 12/96</th><th>1997</th><th>JAN</th><th>FEB</th><th>MAR</th><th>APR</th><th>MAY</th><th>JUN</th><th>JUL</th><th>AUG</th><th>SEP</th><th>OCT</th><th>NOV</th><th>DEC</th><th>Target</th></tr><tr><td>1</td><td>Est. Production Preparation Process</td><td>Days Concurrent Leadtime</td><td>150 Days</td><td>Plan</td><td>145</td><td>137</td><td>130</td><td>123</td><td>117</td><td>110</td><td>105</td><td>99</td><td>94</td><td>89</td><td>84</td><td>80</td><td>80 Days by 12/31/97</td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td>144</td><td>137</td><td>128</td><td>120</td><td>115</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td>Est. Fixture Dwg. Release Process</td><td>Fixture Dwg. Release Leadtime</td><td>65 Days</td><td>Plan</td><td>60</td><td>56</td><td>53</td><td>50</td><td>47</td><td>44</td><td>41</td><td>39</td><td>36</td><td>34</td><td>32</td><td>30</td><td>30 Days by 12/31/97</td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td>60</td><td>55</td><td>52</td><td>49</td><td>47</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td>Est. Prototype Production Process</td><td>Prototype Leadtime</td><td>45 Days</td><td>Plan</td><td>40</td><td>38</td><td>35</td><td>33</td><td>31</td><td>29</td><td>27</td><td>26</td><td>24</td><td>23</td><td>21</td><td>20</td><td>20 Days by 12/31/97</td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td>39</td><td>37</td><td>33</td><td>33</td><td>38</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Plan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Plan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Plan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Plan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>Actual</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	POLICY DEPLOYMENT BOWLING CHART																		Department Name: <u>Production</u>																		No.	Improvement Priority	Measure	JOP 12/96	1997	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Target	1	Est. Production Preparation Process	Days Concurrent Leadtime	150 Days	Plan	145	137	130	123	117	110	105	99	94	89	84	80	80 Days by 12/31/97					Actual	144	137	128	120	115									2	Est. Fixture Dwg. Release Process	Fixture Dwg. Release Leadtime	65 Days	Plan	60	56	53	50	47	44	41	39	36	34	32	30	30 Days by 12/31/97					Actual	60	55	52	49	47									3	Est. Prototype Production Process	Prototype Leadtime	45 Days	Plan	40	38	35	33	31	29	27	26	24	23	21	20	20 Days by 12/31/97					Actual	39	37	33	33	38													Plan																		Actual																		Plan																		Actual																		Plan																		Actual																		Plan																		Actual														<p>A form used to track performance (Plan vs. Actual) on Policy Deployment Objectives. Usually reviewed with top management on a monthly basis, but reviewed by the PD team more frequently.</p>
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BREAKTHROUGH OBJECTIVES	<p>In Policy Deployment, those objectives characterised by Multi-functional teamwork, significant change in the organisation, significant competitive advantage and a major ‘stretch’ for the organisation to achieve.</p>																																																																																																																																																																																																																																																																																																																			
<div><p>BTFA</p></div>	<p>BTFA is the model designed by David Bovis to provide the market a simple model which can be used to understand and focus on the ‘People machine’ behind tools, techniques, process, procedure and profit. The construction of the model followed a decade studying philosophy, psychology and neuroscience while Bovis led change in manufacturing organisations across Europe. It incorporates the complexities of Perceptual Control Theory and Cognitive Behaviour principles. It is often shown linked to Deming's PDCA cycle, to highlight the balance required between the ‘Logical’ approach popularised through accounting practices, project management and Technology and the Emotional aspect of the people involved (Yin-Yang) ... BTFA details what Deming started to build into his SoPK model.</p>																																																																																																																																																																																																																																																																																																																			
CATCH BALL	<p>Communication occurring vertically or horizontally in an organisation with the goal of attaining common understanding and consensus.</p>																																																																																																																																																																																																																																																																																																																			
CAUSE AND EFFECT DIAGRAM	<div><p>A problem solving tool used to establish relationship between effects and multiple causes.</p></div>																																																																																																																																																																																																																																																																																																																			

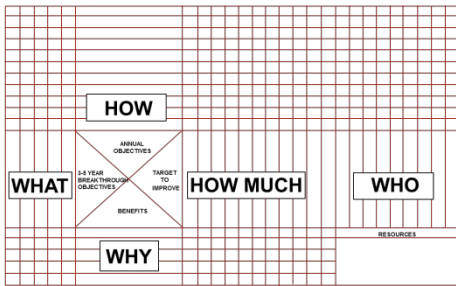
<b>CEDAC</b>	Acronym for <u>C</u> ause and <u>E</u> ffect Diagram with the <u>A</u> ddition of <u>C</u> ards. CEDAC is a method for involving team members in the problem solving process.
<b>CELLULARISATION</b>	 <p>Grouping machines or processes that are connected by work sequence in a pattern that supports flow production.</p>
<b>CHAKU-CHAKU</b>	Japanese term for 'Load-Load'. It refers to a production line raised to a level of efficiency that allows the operator to simply load the part and move on to the next operation. No effort is expended on unloading (See Hanadashi).
<b>CHANGEOVER</b>	As defined within manufacturing environments, the term 'Changeover' is often associated to the Tyre change capabilities of a Formula 1 team. It refers to the time between the last 'Good' piece coming off of a machine and the next 'Good' piece of the next product coming off that machine. It includes warm-up, first piece in section and adjustments. Changeover times can be reduced through the use of S.M.E.D.
<b>CONCURRENT ENGINEERING</b>	The practice of designing a product (or service), it's production process and it's delivery mechanism simultaneously. The process requires considerable up-front planning as well as the dedication of resources early in the development cycle. The pay off comes in the form of shorter development time from concept to market, higher product quality, lower overall development cost and lower product or service cost.
<b>CONTROL CHART</b>	A statistical tool for problem solving that indicates control of a process within established limits
<b>CONTROL ELEMENT</b>	A specific process variable which must be controlled. Measurements of a control element indicate whether or not a stable condition has been achieved.

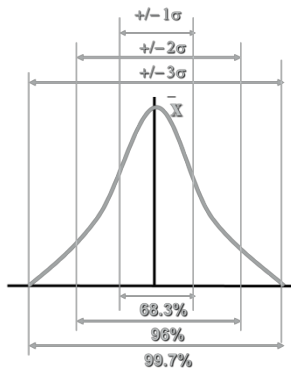
<b>COUNTERMEASURES</b>	<p>Immediate actions taken to bring performance which is tracking below target back on track. Requires Root Cause Analysis.</p>
<b>CURTAIN EFFECT</b>	<p>A method that permits the uninterrupted flow of production regardless of external process location or cycle time. Normally used when product must leave the cell for processing through equipment that cannot be put into the cell (i.e. heat treatment, curing oven, plating, wave soldering etc.). Large equipment and 'off-line' processes are often referred to as 'Monument' processes, indicating that they are fixed in position, like a statue or monument.</p> <p>Curtain quantities are established using the following formula.</p> <p>Per unit cycle time  <math display="block">\frac{\text{Of Curtain process}}{\text{Takt time}} = \text{Curtain quantity}</math></p> <p>(Curtain Quantities are similar to 'Buffer Stocks' and 'Acceptable Work In Progress').</p>
<b>DAILY MANAGEMENT</b>	<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p><i>Top Mgt</i></p> <p><i>Middle Mgt</i></p> <p><i>Supervisor</i></p> <p><i>Associate</i></p> </div> <div style="flex: 1; text-align: center;">  </div> <div style="flex: 1;"> <p>Attention each day to those issues concerned with the normal operation of a business. The chart to the left is popular throughout the world of Lean excellence, showing the proportionate time to be spent on Everyday management vs. improvement activities (Kaizen) vs. Breakthrough.</p> </div> </div>
<b>DFMA</b>	<p>Design / Designed for Manufacture and Assembly – A philosophy that strives to improve costs and employee safety by simplifying the manufacturing and assembly process through product design.</p>
<b>ECONOMIC VALUE ADD (E.V.A.)</b>	<p>A residual income measure that subtracts the cost of capital from the net operating profits after taxes (NOPAT). It is the financial performance measure most closely linked to shareholder value and the cornerstone for a financial management and incentive compensation system that makes managers think and act like owners.</p>
<b>FMEA</b>	<p><u>F</u>ailure <u>M</u>ode and <u>E</u>ffect <u>A</u>nalysis. A structured approach used to assess the magnitude of potential failures on a 'Severity / Occurance / Detection' set of criteria. It is also used to identify the sources of each failure mode and make recommendations for actions to rectify at a root cause level. This can form part of a DFMA process. FMEA is one tool in a set of tools commonly considered part of a QMS – Quality Management System and is typically included in an over-arching NPI process called APQP (Advanced Product Quality Planning). FMEA links to Problem Solving tools and directly informs 'Control Plans'.</p>

	<p>A method of creating a self-sustaining culture that perpetuates an organised, clean and efficient workplace. English words are used to approximate the original Japanese meanings;</p> <ol style="list-style-type: none"> <li><b><u>1. Simplify / Sort</u></b> – (Seiri) Clearly distinguish between what is needed and what is not needed to perform a given work process</li> <li><b><u>2. Straighten / Set</u></b> – (Seiton) Organise those things that are needed, making it easy for users to locate, use and return them. This stage often includes the use of visual management (Making the workplace ‘talk back’).</li> <li><b><u>3. Scrub / Shine</u></b> – (Seiso) Clean all aspects of the area, including floors, machines and furniture.</li> <li><b><u>4. Standardise / Stabilise</u></b> – (Seiketsu) Maintain and improve the first 3 S’s in addition to developing personal orderliness and neatness. Share best practice and make the best methods the standard across the organisation.</li> <li><b><u>5. Sustain</u></b> – (Shitsuke) Achieve the discipline or ‘Habit’ of maintaining the correct 5S procedures.</li> </ol>
<p><b>FILL RATE</b></p>	<p>The number of items shipped on time, divided by the total quantity of line items shipped. ‘On-time’ based on customer request.</p>
<p><b>FIVE WHY’s</b></p>	<p>A simple problem solving method of analysing a problem or issue by asking “Why” five times. Applied correctly, this can be a quick and efficient tool used by all to quickly get beneath the surface of problems and expose root cause (s).</p>
<p><b>FLOW CHART / DIAGRAM</b></p>	<p>A visual ‘Block &amp; Arrow’ presentation of a process, often used at the front end of a problem solving process to ensure the members of a cross functional team have the same understanding of the ‘Macro-overview’ of the process in which the problem occurs. It can be used for ‘Current state’ or ‘Future State’ and will ideally make waste evident. This is typically a simple account of process. More detail in respect to waste is typically detailed when carrying out a process flow mapping exercise.</p>
<p><b>FLOW PRODUCTION</b></p>	<p>A philosophy that rejects ‘Batch’, lot or mass processing as wasteful. In a ‘Flow’ environment process is designed to ensure product moves from operation to operation in the smallest increment. Having process designed in such a way that one piece can be produced just as easily as 10 or 100 is seen to be the ultimate goal. In a flow environment, product is ‘pulled’ from the preceding operation as needed. It is often referred to as ‘One Piece Flow’ or ‘Single Piece Flow’, only quality parts are allowed to move onto the next operation.</p>
<p><b>HANEDASHI</b></p>	<p>Device or means of automatic unloading of piece parts from an operation, machine or process. (Auto eject of pressed parts, roller track between stations etc.). The idea is to remove effort from the unloading action to leave the machine or process step ready for the next piece part or product. This forms part of a process known as ‘Piece Part Presentation’ in which it is essential each part is presented in the correct orientation and position for the next operation to use it. This often links to supplier development and the design of packaging to suit use of the supplied parts in practice. (E.g. Sprung cassettes to lift / drop regular shaped pieces ready for the operator to select and use).</p>

<b>HEIJUNKA</b>	 <p>Production levelling process. This process attempts to minimise the impact of peaks and troughs in customer demand. It includes level production-volume and level production-variety. The key is to have visibility of multiple orders from various customers and have the flexibility and controls in place in the production line to mix and match orders through the production process to minimise set-ups and other 'delay' wastes.</p>
<b>HISTOGRAM</b>	A chart that displays data in distribution, generally in graph format. It may be used to reveal the variation that any process contains.
<b>JIDOKA</b>	'Automation with a human touch' ... or ... transferring human intelligence to a machine. This allows the machine to detect abnormalities or defects and stop the process when they are detected. Also known as Jidoka.
<b>JUST IN TIME (J.I.T)</b>	A strategy that concentrates on making quality products, in the quantity needed, when it is needed. (Not late, not early, not too many or too few). This strategy exposes waste and makes continuous improvement possible.
<b>KAIZEN</b>	Over the decades, it has been suggested that Kaizen is the Japanese word for 'Continuous Improvement'. This is a poor translation and undermines the cultural heritage of the word and its origins. Kaizen more accurately translates as 'On-going goodness / benefit for all, no one-person gaining at another's expense'. It is a philosophy, promoting the belief that what is done today will be better than it was done yesterday and what is done tomorrow will be done better than it is today, for the benefit of all. It is about attitude and the drive to move forward, avoiding complacency, never accepting things are as good as they can be, never resting or accepting the status quo.
<b>KANBAN</b>	A means of communicating the need for products or services. It literally means 'Ticket' or 'Signal'. It is generally used to trigger the movement of material where one piece flow cannot be achieved. It is also used to 'Signal' upstream processes to produce product for downstream processes (internally and within the supply chain).
<b>KEY PERFORMANCE INDICATORS (KPI's)</b>	<u>Key Performance Indicators</u> . A method of tracking or monitoring the progress of existing daily management systems.
<b>MUDA</b>	Japanese for 'Waste'. Specifically the 7 Wastes. (See Waste).

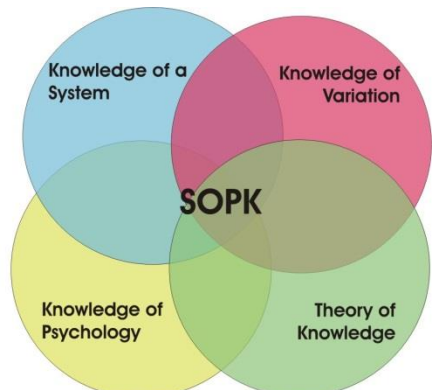

<b>MURA</b>	<p>Any variation leading to unbalanced situations. In short: UNEVENNESS, inconsistency, irregularity.</p> <p>Mura exists when workflow is out of balance and workload is inconsistent and not in compliance with the standard. In the Japanese terminology / translation <b>there is also a link to the inconsistency in the human state, leading to discomfort / unquiet.</b></p>
<b>MURI</b>	<p>Unreasonable, impossible, overdoing and overburdened.</p> <p>MURI: Any activity asking <b>unreasonable stress or effort from personnel</b>, material or equipment. In short: OVERBURDEN</p> <p>For people, Muri means: <b>a too heavy mental (Stress)</b>, or physical burden. For machinery Muri means: expecting a machine to do more than it is capable of - or has been designed to do.</p> <p>Usually the three (Muda / Muri / Mura) cannot be seen as separate. When a process is not balanced (mura), this leads to an overburden on equipment, facilities and people (muri), which will cause all kinds of non-value adding activities (Waiting / delay is also one of the 7 wastes) which is muda.</p> <p>To eliminate MURA and MURI at 'Root cause' larger parts of the system need to be looked upon. It is often not sufficient to consider only a process or process step or operation, but a broader view needs to be taken to consider an entire Value Stream. This has been recognised in the world of Lean and Change Management with those most experienced now promoting tools and methods from 'Systems Thinking' to overcome 'Kamikaze Kaizen'. (Improvements to an isolated process which fails to fix bigger systemic issues).</p> <p>However, with only 'Critical Systems Heuristics' and 'Multiple perspectives analysis' as the main 'soft skills' tools within ST, it is still inadequate in respect to understanding the entire system, including the <b>human machines</b> involved in any process.</p>
<b>NON VALUE ADDED (NVA)</b>	<p>Those process steps that take time, resources or space but do not transform or shape the product or service towards that which is sold to the customer.</p>
<b>P.D.C.A. CYCLE</b>	<p>Plan-Do-Check-Act. The PDCA cycle is sometimes referred to as the Deming Cycle as it was promoted by William Edwards Deming. Deming was more famous for his introduction of SPC (Statistical Process Control) to the Japanese in the late 1950's.</p> <p>However, the models, including PDCA, that Deming is now famous for were originally designed by his colleague Walter Shewhart. In 1918 Shewhart joined the Western Electric Company to assist their engineers in improving the quality of telephone hardware. Western Electric produced hardware for the Bell Telephone Company, which became the American Telephone and Telegraph Company (AT&amp;T). The Western Electric Company manufactured telephone equipment for them and since 1905 its major plant was the Hawthorne Plant in Cicero, a suburb of Chicago. The company and its factory grew rapidly with the need for telephones. By 1913 there were 14 000 employees and by 1930 there were 43 000. It was one of the largest manufacturing plants in the country. Shewart worked at Hawthorne until 1925 when he moved to the Bell Telephone Research Laboratories where he remained until his retirement in 1956.</p> <p>It was at Bell that Deming worked with Shewhart and it was after Shewharts retirement that Deming became famous for the models we consider part and parcel of the 'Lean toolbox' today.</p>

<b>PARETO CHART</b>	<p>A vertical bar chart showing the bars in descending order of significance, ordered from left to right. This graphical representation helps us focus on the 'Vital Few' problems rather than the trivial many. An extension of the Pareto Principle suggests that the significant items in a given group normally constitute a relatively small proportion of the items in the total group. Conversely, a majority of the items will be relatively minor in significance. This has led to the Pareto principle being referred to as the 80/20 rule.</p> <p>The principle is named after Italian economist Vilfredo Pareto who observed 80% of land in Italy was owned by 20% of the population. Pareto also observed that 20% of the pea pods in his garden contained 80% of the peas</p>
<b>POKE YOKE</b>	<p>Also called Baka-Yoke, a Japanese expression meaning 'Common or simple, mistake proof'. Methods of designing production or administrative processes which will, by their nature, prevent errors. This may involve designing fixtures which will not accept an improperly loaded part. In the administrative area, having a credit memo might be a different colour than a debit memo. It requires thought is put into the design of any system to anticipate what can go wrong so measures can be built in to prevent errors.</p>
<b>POLICY DEPLOYMENT</b>	<p>A one year plan, reflecting the long term vision and the 3-5 year strategic planning objectives. A planning / implementation process that focuses on a few major, long-term, customer focused breakthrough objectives that are critical to the company's long term success. This process links major objectives with specific support plans throughout the organisation.</p>
<b>POLICY DEPLOYMENT ACTION PLAN</b>	<p>A form used by the team working on a policy deployment objective, detailing specific activities required for success, milestones, responsibilities and due dates. Team members are also listed with objective definitions, meeting dates and management support or owner.</p>
<b>POLICY DEPLOYMENT MATRIX</b>	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p style="text-align: center;"><i>Top Level Policy Deployment Matrix</i></p>  </div> <div style="flex: 1; padding-left: 20px;"> <p>Form used, usually on a large scale in the work-place to 'visually manage and communicate the strategy. With a 'Bowling Chart' supporting it, it shows the relationship between the 3-5 year objectives, improvement priorities, targets, resources required and benefits to the organisation. It is sometimes called the 'X' Matrix.</p> </div> </div>
<b>PROCESS FLOW MAPPING</b>	<p>This is a process often adopted as part of a Lean development program. Ideal for highlighting the 7 Wastes in a production environment it not only helps to highlight opportunities for improvement but regularly informs layout in support of 'Flow'. Using ASME symbols to identify 'Transport', 'Store', 'Delay', 'Inspection', 'Operation' categories against each process step, it also provides a visual indicator of complexity.</p>

<b>QUALITY FUNCTION DEPLOYMENT (QFD)</b>	A system for translating consumer requirements into appropriate company requirements at each stage from research and product development to engineering and manufacturing to marketing / sales and distribution. Makes use of the voice of the customer throughout the process.
<b>QUALITY MANAGEMENT SYSTEM (QMS)</b>	The systems, organisations and tools which make it possible to plan, manufacture and deliver a quality product or service. This does not imply inspection or even traditional quality control; rather, it builds quality into the entire process of bringing goods and services to the customer.
<b>ROOT CAUSE ANALYSIS</b>	A method or methods used (Typically 5Y's / 5W1H / CEDAC) which helps individuals or teams establish the ultimate reason(s) for an event or condition.
<b>SINGLE MINUTE EXCHANGE OF DIES (SMED)</b>	<p>A method of increasing the amount of productive time available for a piece of machinery by minimising the time needed to change over from the manufacture of one part to the next. This is often found to be the crux of organisational flexibility where different parts or products pass through stages involving machines (e.g. Product change in an FMCG environment, i.e. food manufacture, this might be changing one-dough to make white bread to another for brown bread. Equally the principle applies to CNC machining centres and production machines i.e. an injection moulding machine, where tooling has to be changed in between one product being produced and another, or a CNC where cutters have to be changed or programs have to be up-loaded).</p> <p>However, the principle of efficiency in long set-ups for long production runs is a strong belief in most organisations following decades of promoting this approach from a cost-accounting perspective. The reality is, if change-over times can be reduced, it can be more efficient to satisfy small batch or even single piece manufacture to satisfy more customers in shorter time-frames. Simply put, Quick change = quick response to changes in customer demand. It also has the added benefit of allowing an organisation to greatly reduce the amount of inventory that it must carry because of improved response time, while maximising ROI and EVA.</p>
<b>SIX SIGMA</b>	<div data-bbox="584 1375 876 1740" data-label="Figure">  </div> <p>A term that evolved out of the application of Statistical Process Control (SPC) and the application of Cp and Cpk quality control measures. The math behind Cp and Cpk calculations relies upon 'Standard Deviation', denoted by the Greek letter 'Sigma' (<math>\sigma</math>).</p> <p>Six Sigma (<math>6\sigma</math>) is, in other words, 6 standard deviations, as defined within the world of statistical mathematics. It comprises <math>3\sigma</math> above the nominal tolerance value and <math>3\sigma</math> below the nominal tolerance value.</p> <p>This is typically displayed on a Gaussian Bell shaped curve, so called, as it was originally produced by a famous German mathematician some call the Father of Statistics, 'Carl Gauss'.</p> <p>Six Sigma, for all the wrong reasons, has evolved into a stand-alone business performance improvement process comprising many of the same tools and techniques originally associated to 'Lean' and best practice quality management e.g.</p>



	<p>DOE / APQP / QFD / FMEA etc. as well as developing a '12 step' approach to 6 <math>\sigma</math> project management taken from the 'logical' approach taken historically toward 'Kaizen Events'.</p> <p>It is suited to very high volume environments, but is not a complete business improvement package having been defined by Motorola as their 'Official approach' in application for the Baldrige award. The actual approach used by Motorola at the height of their success was the Shainin Method. Jack Welch famously adopted 6 <math>\sigma</math> for GE in the 90's to try and replicate Motorola's success and pursued it until the mid-noughties, at which point he issued the statement "GE can no longer afford to do 6 <math>\sigma</math>"</p> <p>It has since been adopted and dropped by the Banking and Finance industry, who have since turned to 'Lean'. The Cp / CpK aspect of quality control can add value to repeatable operations in mid-volume companies, however it is not typically used in lower volume and bespoke production environments.</p>
<b>STANDARD</b>	A prescribed documented method or process that is sustainable, repeatable and predictable
<b>STANDARDISATION</b>	The system of documenting and updating procedures to make sure everyone knows clearly and simply what is expected of them. Essential for application of PDCA cycle.
<b>STANDARD WORK</b>	<p>Standard work is a tool used to define the interaction of people and their environment when processing a product or service. It details the motion of the operator and the sequence of action. It provides a routine for consistency of an operation and a basis for improvement. It provides a routine for consistency of an operation and a basis for improvement. It details the best process we currently know and understand. Tomorrow, it will be better (continuous improvement) provided the right conditions in which this ideal can be realised are consciously created by all levels of leadership across the organisation.</p> <p>Once improvements are made, the standard work method is revised to reflect it. There can be no improvement without a basis or standard.</p> <p>Standard work has 3 central elements; Takt time, Standard Work Sequence and Standard work in process. Standard work as a tool establishes a routine/habit/patter for repetitive tasks, makes managing (Scheduling, resource allocation) easier, establishes the relationship between person and environment, provides a basis for improvement by defining the normal and highlighting the abnormal. It prohibits 'back-sliding' into old comfort zones and ways of doing things.</p> <p>Standard work is typically defined on a 'Combination sheet'. This combines Time elements of Manual Op's / Machine Op's &amp; Travel/Transport, highlighting the process time in relation to the Takt time, as the following image.</p>

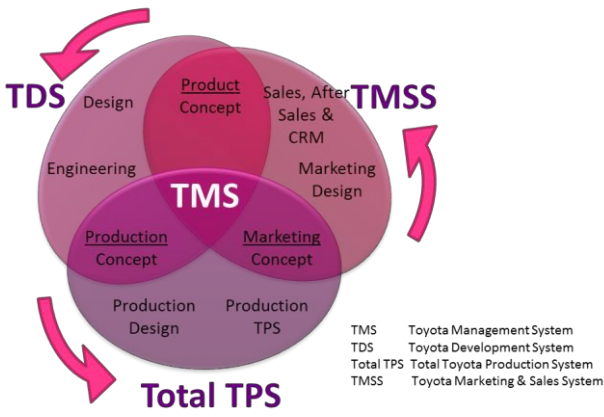
	<table><tr><td>Component</td><td>Process</td><td>Department</td><td>Req'd Qty / Shift</td><td>Manual Operation</td><td></td></tr><tr><td></td><td></td><td></td><td>Takt Time</td><td>Machine Operation</td><td></td></tr><tr><td></td><td></td><td></td><td>Total shift time</td><td>Walking</td><td></td></tr><tr><td></td><td></td><td></td><td>Total shift qty req'd (sold)</td><td></td><td></td></tr><tr><td>Step</td><td>Description of Operation</td><td>M/C No.</td><td>Manual</td><td>Machine</td><td>Walking</td></tr><tr><td>1</td><td>Cut</td><td>10</td><td>25</td><td>15</td><td>10</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Component	Process	Department	Req'd Qty / Shift	Manual Operation					Takt Time	Machine Operation					Total shift time	Walking					Total shift qty req'd (sold)			Step	Description of Operation	M/C No.	Manual	Machine	Walking	1	Cut	10	25	15	10																								
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STANDARD WORK IN PROCESS	The minimum amount of material or a given product, which must be in process at any time to ensure proper flow of the operation.																																																												
SUNK COST	An expenditure that has already been incurred and cannot be reversed. It is advised that future decisions are not based on sunk costs.																																																												
SUPPLIER PARTNERSHIPS	An approach to business that involves close cooperation between the supplier and the customer. It provides benefits and responsibilities that each party must recognise and work together to realise. (E.g. a mutual objective of achieving annual cost-down by developing packaging solutions together, and feeding back to the design team to ensure packaging manufacture capabilities are considered in the initial design stages of new product introduction).																																																												
SYSTEM OF PROFOUND KNOWLEDGE (SoPK)	<p>In his later years, after decades promoting SPC globally, Dr. Deming evolved his thinking and presented 4 Elements of 'Good Organisational Management &amp; leadership' he called SoPK (System of Profound Knowledge). He retained the principles of Quality control through SPC and 'Lean' tools and techniques in the first section calling it</p> <ol style="list-style-type: none"><li>1. 'Variation Control'.</li></ol> <p>The second element was called</p> <ol style="list-style-type: none"><li>2. 'Systems', the third</li><li>3. 'Psychology' and the last</li><li>4. 'The theory of knowledge'.</li></ol> <p>Today, the last element is often considered to be 'Neuroscience'.</p> <div></div>																																																												

worked directly with W.E. Deming on his 'System of Profound Knowledge', David Bovis has found out what Dr. Deming was doing for before he passed away. He is exceptional and the next step forward in the world of Organisational Change"

**Randy Schenk**

This model has been widely accepted across the world as valid, yet the latter sections were not detailed before Dr. Deming sadly passed away.

	<p>With modern advances in science and technology surrounding Neuroscience and psychology, we can now better understand Dr. Demings 4 point leadership model and advance it.</p> <p>You will notice all the 'soft skill' terminology (Communication / attitude etc.) throughout this document, assumed to be something one can just 'facilitate automatically', has been highlighted in 'Bold Orange'. These are the issues which must be understood by leaders at a psychological / neurological level if they are to lead their organisations to the heights of performance achieved by many of those organisations Dr. Deming studied and supported, held up today as exemplars of 'Good Practice'.</p>
<b>TAKT TIME</b>	<p>The frequency with which the customer wants a product. How frequently a sold unit must be produced. The number is derived by dividing the amount of time available in a shift by the customer demand for that shift. TAKT time is usually expressed in seconds.</p>
<b>TARGET COSTING</b>	<p>A method of establishing a cost objective for a product or service during the design stage. The target cost is determined by the following formula.</p> <p>Sales Price – Target Profit = Target Cost</p>
<b>TOTAL PRODUCTIVE MAINTENANCE (TPM)</b>	<p>Productive maintenance carried out by all employees. It is based on the principle that equipment improvement must involve everyone in the organisation, from line operators to top management.</p>
<b>THE TOYOTA WAY (Over-arching Philosophy behind 'Lean')</b>	<p>The Toyota Way is a set of principles and behaviors that underlie the Toyota Motor Corporation's managerial approach and production system. It consists of principles in two key areas: continuous improvement, and respect for people.</p> <p>According to Jeffery Liker in 2004, the 14 principles of The Toyota Way are organized in four sections:</p> <ol style="list-style-type: none"> <li>1. Long-term philosophy,</li> <li>2. The right process will produce the right results,</li> <li>3. Add value to the organization by developing your people, and</li> <li>4. Continuously solving root problems drives organizational learning</li> </ol> <ul style="list-style-type: none"> <li>• The first principle involves managing with a long-view rather than for short-term gain. It reflects a belief that people need purpose to find motivation and establish goals.</li> <li>• The next seven principles are focused on process with the intention of achieving a high quality outcome.</li> <li>• Human development is the focus of principles 9 through 11. Principle 9 emphasizes the need to ensure that leaders embrace and promote the corporate philosophy</li> <li>• The final principles embrace a philosophy of problem solving that emphasizes thorough understanding, consensus-based solutions swiftly implemented and continual reflection (hansei) and improvement (kaizen). The 12th principle (Genchi Genbutsu) sets out the expectation that managers will personally evaluate operations so that they have a first-hand understanding of situations and problems.</li> </ul>

<b>TOYOTA MANAGEMENT SYSTEM</b>	<p style="text-align: right;">Lean is</p>  <p>fundamentally TPS only. It is often overlooked that beyond the Toyota production system, from which the tools and techniques listed here were developed, there is also the Toyota Management system and the The Toyota way.</p>
<b>TOYOTA PRODUCTION SYSTEM</b>	<p>The Toyota Production System (TPS) is an integrated socio-technical system, developed by Toyota, which comprises its management philosophy and practices. The TPS organises manufacturing and logistics for the automobile manufacturer, including interaction with suppliers and customers. The system is a major precursor of the more generic term "lean manufacturing." Taiichi Ohno, Shigeo Shingo and Eiji Toyoda developed the system between 1948 and 1975. Originally called "just-in-time production," it builds on the approach created by the founder of Toyota, Sakichi Toyoda, his son Kiichiro Toyoda, and the engineer Taiichi Ohno. The principles underlying the TPS are embodied in The Toyota Way.</p>
<b>VALUE ADDED</b>	<p>As used in the Duxinaroe Business System (SBS), any process or operation which shapes or transforms the product or service into a final form that the customer will purchase.</p>
<b>VALUE STREAM MAPPING</b>	<p>A broader approach to waste identification and elimination which uses the same principles as Process flow mapping, in which one 'Goes to Gemba' (The place where it happens) to see. In this instance, organisations often identify major infrastructure issues which can be addressed before the finer detail improvements are addressed.</p> <p>VSM often picks a part supplied by a sub-contractor and follows the part through it's entire journey from order to delivery to the end customer as part of a finished assembly. The part followed can be anything, e.g. a 10mm nut or a wood screw. Whatever normally moves through the business. In the same fashion as Process Flow Mapping identifies the major wastes of Transport, Delay, Inspection and Storage, VSM identifies Movement of information, product and assigns times to each major process step, providing an overall view of what is value adding and what is waste.</p>
<b>VERTICAL TEAMS</b>	<p>Vertical teams are groups of people who come together to meet problems or challenges. These teams are made up of the most appropriate people for the issue, regardless of their levels or jobs within the organisation.</p>
<b>VISION</b>	<p>A long term plan of direction that is based on a careful assessment of the most important directions for the organisation. E.g. SWOT / PESTLE Analysis and the decision to increase make vs. Buy ratio's or break into new markets.</p>

<b>VISUAL MANAGEMENT</b>	Systems that enable anyone to immediately assess the current status of an operation or given process at a glance, regardless of their knowledge of the process.
<b>VOICE OF THE CUSTOMER (VOC)</b>	Desires and requirements of the customer at all levels, translated into real terms for consideration in the development of new products, services and daily business conduct.
<b>WASTE</b>	<p>Also known as Muda. Any process or operation that does not add value. Eight types of waste have been identified for business. They are;</p> <ol style="list-style-type: none"> <li>1. Waste from overproduction</li> <li>2. Waste from waiting or idle time</li> <li>3. Waste from unnecessary transportation</li> <li>4. Waste from inefficient processes</li> <li>5. Waste of unnecessary stock on hand</li> <li>6. Waste of motion and efforts</li> <li>7. Waste from producing defective goods</li> <li>8. Waste from unused creativity</li> </ol>
<b>WORK SEQUENCE</b>	The specific order in which an operator performs the manual steps of the process.
<b>'WORLD CLASS' / 'LEAN' QUALITY MANAGEMENT</b>	An operating methodology totally committed to quality and customer satisfaction. It focuses on continuous improvement in all processes and advocates decisions based on fact. Lean Quality Management includes all associates in meeting and exceeding customer expectations. Lean promotes going beyond 'Customer satisfaction' and achieving 'Customer Delight'.
<b>'XXXX' BUSINESS / OPERATING SYSTEM ('X'BS)</b>	<p>'XXXX' Insert Company Name: - e.g. Honeywell Operating System (HOS) / Danaher Business System (DBS).</p> <p>A business management system designed to achieve Lean Manufacturing Excellence through the relentless focus on achieving Customer Satisfaction. The system, beginning with the voice of the customer, continuously strives to improve Quality, Cost and Delivery. It intends to provide the necessary tools to achieve specific business objectives. The intention within the original philosophy (behind the term) is to involve all associates – the reality is, without the depth of knowledge provided by THE DUX METHOD, true involvement is often an ideal which receives little more than lip-service seeing large and small organisations alike often struggling with similar people-centric challenges they are not equipped to understand as a cultural issue.</p>
<b>'XXXX' DEVELOPMENT SYSTEM ('X'DS)</b>	<p>'XXXX' Insert Company Name.</p> <p>An approach to product development that starts and ends with the voice of the customer. It involves representatives from manufacturing, finance, design engineering, sales and marketing as contributing team members from the concept stage to final product.</p>

## Suggested Reading

Built to last – Collins & Porras, Harper Collins Publishers, 1997  
CEDAC, Ryuji Fukuda, Productivity Press, 1996  
Kanban; Just in time at Toyota, Translated by David J. Lu, Productivity Press, 1989  
Lean Thinking, James P Womack and Daniel T. Jones  
Poke Yoke, Nikkan Kogyo Shimbun, Ltd., Productivity Press, 1989  
The Machine that changed the world, James P Womack and Daniel T. Jones and Daniel Roos, 1990  
The Visual Factory, Michael Greif, Productivity Press, 1991  
Toyota Management System, Yasuhiro Monden, Productivity Press  
Toyota Production System, Taiichi Ohno, Productivity Press, 1988  
Toyota Production System: An integrated Approach to Just-In-Time, Yasuhiro Monden, 1993  
Understanding Variation; The key to managing Chaos, Donald J. Wheeler, SPC Press

## Case Study

It is important to recognise that no two organisations are the same. There is no one magic formula for achieving manufacturing excellence but in reviewing the case studies it becomes clear that the ingredients are common in all. Each organisation must look at their own individual situation and policy deployment objectives to see which tools are most relevant and supportive of achieving those objectives. Each organisations current status and needs must be evaluated and a decision made on what will be implemented.

**Extensive case studies accompany this document (Removed in this version).**

## Understanding the Dux Method

The preceding accounts of organisational transformation to 'Lean' are XXXXXXX Corp. case studies. They are a typical representation of and pre-cursor to, many change programs which have tried to follow a similar change implementation pattern across the world in the last few decades;

1. Train people,
2. Change some roles / introduce 'change champions'
3. Introduce cells and tools,
4. Introduce kanban and reduce stock holding etc.

... It is the focus on and often enforced introduction of, the tools and techniques, driven by financial forecast figures, which has produced the '75% failure rate' reported globally.

The reader might notice, to results cited in the case studies were realised in practice, only AFTER the executive leaders had developed a clear belief in the approach, forged from 1<sup>st</sup> hand, intense, shop-floor experience.

It was this that provided them the conviction and energy to drive the changes through, even when the problems encountered along the way may have made the ultimate benefit seem dubious.

In 'Dux' terminology, they had to imprint a new neural net through sensory stimulus. They had to change the wiring in their brains, or in simple terms, form a new belief about 'what good looked like'.

One might also notice on pgs.23, 24, the term 'Empowerment' is stated as a 'condition' realised in the Mature stage of development. Globally, this has been seen as a by-product of 'Experience' through the forced introduction of Lean tools and methodologies. In reality, the leadership teams in the case studies developed the characteristics listed in the 'Empowerment' section through their own personal change in beliefs ***before the change initiative.***

This highlights the principle that, 'Change' (lean or otherwise) requires a change in 'Mind-set' 1<sup>st</sup>, Strategic approach 2<sup>nd</sup> and the application of tools and techniques 3<sup>rd</sup> in ALL people involved, ***NOT*** shop-floor, management or the leadership team members individually, but in everyone. To achieve this, the senior teams must be deeply aligned in respect to their ultimate intent and purpose.

The current world of best-practice has been unwittingly enforcing the introduction of tools *onto* people 1<sup>st</sup> (through training / project planning etc.) while failing to make the following connection; **a change in a leaders actions, follows a change to that leaders belief about what 'Good' looks like.** The change in action, required at all levels, follows a leaders capability to facilitate the same 'change in belief' in others, as they have been able to achieve within themselves and demonstrate.



In the absence of this 'Change in belief', change is 'Pushed' onto people rather than 'Pulled' by people ... with one sure fire result ... The harder you push people, the harder they 'push back' (i.e. an increased resistance to change develops at a sub-cultural level ... "Telling is destructive").

In today's socio-cultural conditions, if Lean is on the radar for an organisation at all, focusing on the application of tools is seen as 'best-practice'. In the current western culture, leadership teams rarely challenge or change their approach to strategic deployment or recognise a need for a heightened awareness of the psychology of change in pursuit of Lean practices on the front-line.

In fact, it's common to see leaders demonstrating the 'resistance to change' that the psychology and neuroscience we have at our disposal today, can explain. This is often (and ironically) in response to the idea that an awareness of psychology can have a positive impact on process improvement & profit. Such resistance most often manifests when those who lead, are sufficiently comfortable in life, so as not to need to practice Hansei (reflection for personal improvement). This is something automatically and deeply appreciated in the Japanese culture but, since the days of Socratic reflection, Bacon and Descartes, increasingly rare in the West

In the absence of an appreciation for the science we can now use to explain Eastern Wisdom in the west, many still prefer to rely on 'fear' based control and judgement mechanisms (which often manifest in the form of financial targets generated off the back of poor data and bad reporting structures). This approach is automatic and adopted to pursue conformity and compliance, over commitment. (i.e. Top down command and control undermines a truly lean culture and creates a lot of 'cognitive dissonance' across the organisation).

This has been the approach when 'leading people' since time immemorial, from the armies of Empires, global institutions and through the industrial revolution to the default management approach adopted in organisations around the world today. With the new science we have available today, we are better placed to 'Level-Up' and improve the performance of our leaders, their organisations and the [emotional] quality of life for all involved with them, than we ever have been before.

Currently however, the relatively low-level of knowledge surrounding 'people' (Brains and minds) creates issues of 'Learned Helplessness'. This leads to cultural stagnation, where 'Innovation' and 'Change' are no more than a dream, because people are psychologically 'Shut-down' by the very control mechanisms leaders rely upon to move the company forward.

Duxinaroe use 'The Dux Method' to help reverse this approach to deal with 1<sup>st</sup> things 1<sup>st</sup>. Innovation where it happens, empowerment, where it happens, action, where it happens ... In the brain.

Some 'Great leaders' (See Jim Collins, Level 5 Leadership and similar) know the 'People piece' intuitively, many more don't.



In the absence of such knowledge, many change programs fail.

Duxinaroe exclusively offer this depth of understanding to leadership teams, providing new models which make a complex subject easy to understand and implement practically.



To discuss your organisations development needs in confidence  
Contact Duxinaroe today.

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