

COST ENGINEERING SECRETS

With this e-book I would like to share with you Cost Engineering secrets and how to achieve accurate results quickly...

...Well I promise you, that I won't tell you a single thing you don't know. Not only no rocket science, but nothing new. 'Secrets'... - we're all old enough to know that there are no secrets.

In my workshops and trainings in the Cost Engineering Academy I often get the feedback that the content is an 'eye opener for the obvious.' All the basics we know work - but they get lost in the heat of the battle. That's a feedback of people with 20 years of experience in the automotive industry. Most of our Cost Engineering staff today is ways younger, some of them just graduated from university. And if the experienced guys lose the basics in the heat of the battle, the young colleagues do it for sure. This is what this e-book is all about: Basics that work.

As a starting point I would like to take you with me into my childhood, when I was 7 or 8 years old. This was the time I got in contact with Star Wars for the first time.

I love this movie. Do you know these movies that you watch a dozen times and each time you watch it you get a new message? Star Wars is such a movie to me. I recognize each time I watch it a new message for me.

Today Star Wars is more than 30 years at my side but my daily business is more like CAR WARS. We all need to deal with high pressure, complexity, Matrix Organizations, Processes, Responsibilities, Targets, Quality, Cost, Delivery, Transparency and all that stuff which is in our industry.



Master Yoda said: **"You cannot stop changes. Just as you cannot stop the sun from setting."** Of course he is right, but in the so called heat of the battle Cost Engineering will be the key to success in the future - if used in the right manner. This leads us to:



EPISODE 1

Things that happen frequently to me: A new customer requests support for reducing costs in his portfolio. In the Skype Conference the Purchaser, a Manager of Design, a Project Manager and the Project Designer are attending. The Design Manager asks for moderation for his design engineers who shall find new ideas to reduce costs and he wants to get more transparency, he wants a better collaboration between Purchasing and engineering ... such things... all are nodding.

... Then typically I start asking some questions about the status quo, like material cost ratio to turnover, quantities, boundary conditions for changes, technical and commercial background of the attendees, time schedules and all that stuff we all do. And I ask for something really obvious...

TARGETS

What is your cost reduction target? Silence is filling the conference... And this happens in 80 % of the projects through the complete Supply Chain from big Tier 1 to family owned Tier 4 suppliers. Silence at Targets. After half a minute they are answering...

Are you curious? Let's have a look at their answers:

Design Manager + Purchaser (fully motivated!): „**We don't need targets, we do the maximum.**”

Project Manager (completely impatient): „**We need to care about the costs later, the project schedule is very tight.**”

Project Designer (full of fear): „**We cannot change the design, it is a customer request.**”

Probably you have also heard similar answers in your career...

There is a very old but wise quote from Laozi that all of us know: "**Only those who know their destination will find their way.**" It means for us that we never reach our target; we are lost on the ocean in the middle of nowhere. We need to set absolute, clear and transparent targets which have to be communicated: For each project.

What should our targets look like? Depends on what kind of project we are talking about of course, but let's have a look at what Friedrich Nietzsche says:

“Aim for the moon even if you miss you'll land among the stars” Targets need to be BIG! If we think: ok, this target is realistic and big enough... Then it is too SMALL.

I remember a specific project where I stated to the team that the official target would be 20% although in reality it was only 8%. The comments I got were: Unrealistic! Impossible! Dreamer! Guess what happened? In the first design loop we reached 11%. In the second it



was exactly 20%. We reach what we target, but never more... Of course this is true for our personal lives as well.

What is really interesting about targets was found out in a **Study in 1979 at Harvard University**: There was a group of students asked for their future business targets:

- 84% had no targets
- 13% had targets, but did not write them down
- 3% had targets and wrote them down
- After 10 years the income of the 3% was 10 times higher than of the rest
- The 13% had twice the income of the 84%

That's why I always fix my targets and focus on them.

At the latest after this story the feedback of teams is: **Ok, Ok! Let'fix a target!**

And thereon, there is only one possible answer:

DO OR DO NOT. THERE IS NO TRY.

SIMPLICITY

After the Target setting process typically the question raises: How can we reach the target? And all successful business people I have ever met use the power of simplicity. Look what Napoleon said about this:

“The art of war does not require complicated maneuvers; the simplest are the best and common sense is fundamental. The reason why generals fail is because they try to be clever.”

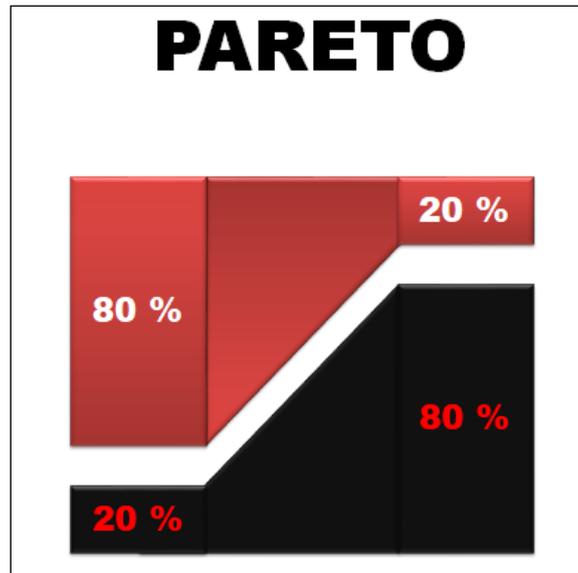
– Napoleon



PARETO

One of my favorite tools in my whole life is the **Pareto Principle** which states that:

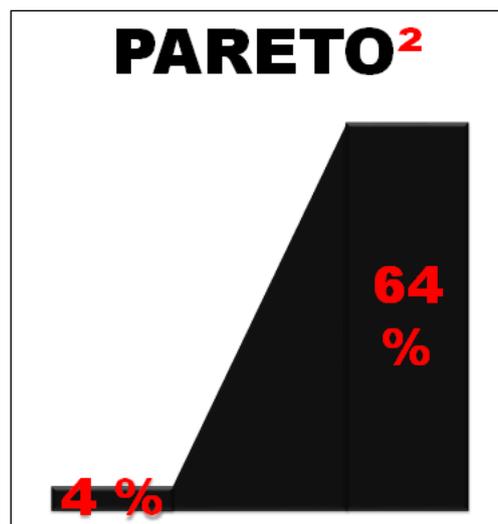
- 80% of the results can be achieved with 20% of the total effort.
- The remaining 20% of the results require 80% of the most work.



It is well known by all of you. What might be new to you is that you can get more out of Pareto with a simple trick:

PARETO²

Two times Pareto. 64% of the results can be achieved with 4% of the total effort.

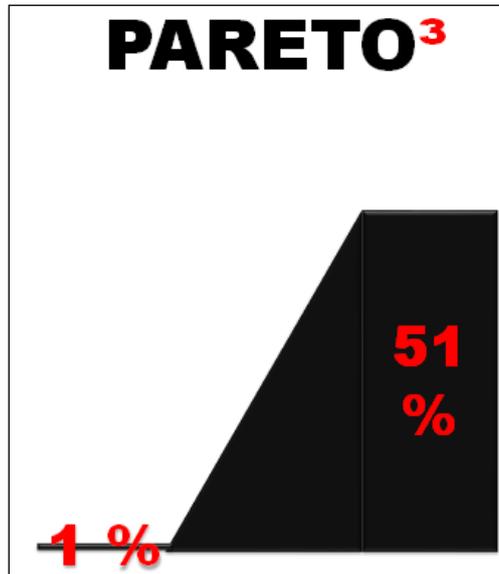


That's not bad, isn't it? But we're not finished yet ... We're experts, correct?



PARETO³

Three times Pareto. 51% of the results can be achieved with 1% of the total effort.



This one I really like. We can use it for example to identify the right parts we need to focus on, if we are system suppliers. Or we use it to identify the most important cost driver inside a component. Once again: If we knock down that one big domino, we can reach 51 % of our desired Cost Engineering result. That's effectivity – we do things that matter.

TRANSLATION

Next step is translation! Because translation builds up awareness. When we translate these 1% or 4% or even 20% of things that matter all project members know what is necessary to do.



In our translation we use terms that project members really understand. Let's have a look at the designer, as he defines the major part of material cost with his specification in 3D and 2D. When we know for example that 1 out of 100 parts in his assembly is driving the costs of the assembly we tell him in step one which part it is and why. He needs to understand the cost structure of his assembly. In step 2 we offer him an insight into the cost structure of this one specific component. Again those 20% or less of cost drivers need to be translated. This can be for example the raw material costs. So we give him a translation of how much EURO one kg will cost in the series project. Now he is able to track his personal impact on the total result of the target. Each change can be verified immediately by him. Another parameter could be cycle time for each machining feature etc etc etc.

When we talk about Design Engineers my experience shows that the worst thing we can do is giving the Designer a freaky additional tool to his CAD system for calculations, because Designer love tools with 3D pictures, a lot of buttons and stuff where they can play around the whole day. This is very critical, as they start using this additional tool not because they need to but because they love it! To be very precise: Give your designer a simple excels sheet with core parameters not more, not less.

The answer why we should do that gives us Tim Ferris, author of the famous bestseller book "the 4-hour-week", which is a manifest to effectivity and efficiency. He says: **"The worst kind of inefficiency is efficiency in things that don't matter."**

A Designer is a Designer, not a calculator if you prefer fast results. By the way: I always use bottom up surcharge calculations based on machine hourly rates. They are simple to understand for all team members, they are known worldwide and I can explain them even after 5 beers in the bar.

PARKINSON

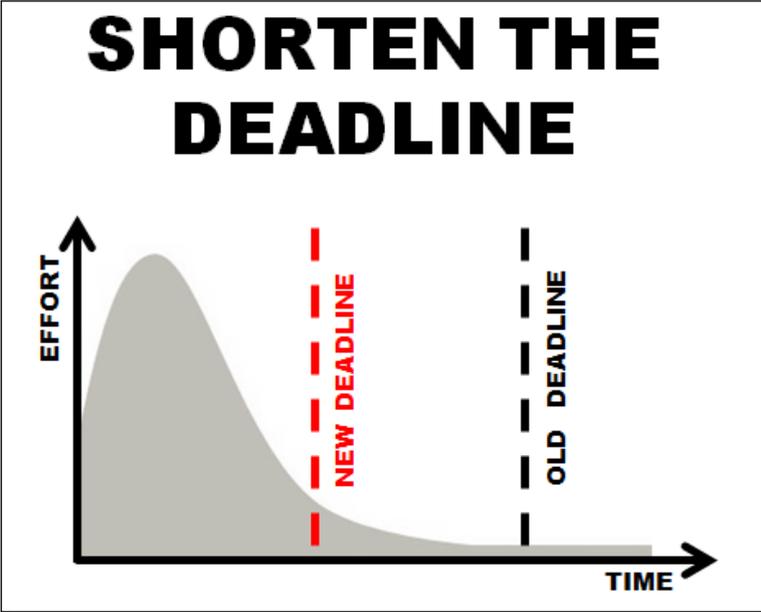
As I already mention Efficiency we come to the next tool I use: it's called the Parkinson Principle. Parkinson is in some kind a big buddy of Pareto. He says: **"Work expands so as to fill the time available for its completion."**

PARKINSON
**"Work expands so as to
fill the time available
for its completion."**

In other words: Mr. Parkinson tells us, that we can reduce the amount of time drastically and reach the same result. I tried this with Cost Engineers for cost estimations: Mr. Parkinson



was right! I tried this with Sales Managers for RFQs: Mr. Parkinson was right. I tried it with Purchasers for Cost Break Down Comparisons: Mr. Parkinson was right.



So as we already know what to do with Pareto, it's now time to do things right with Parkinson and boost our efficiency to the top. We combine Pareto and Parkinson.

PARETO

X

PARKINSON

This is like you sitting in the airplane and the Captain says: ladies and gentlemen we're ready for takeoff – please fasten your seatbelts.

Of course there are sometimes limitations and it will not always be this 1% but the direction is quite clear. To summarize: **“Identify the few critical tasks that contribute most to your desired outcomes and schedule them with very short and clear deadlines.”**



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Do the right things and do these things right.

EXECUTION

All of you know Peter Drucker – the Management GURU: “What unites all successful people is the ability to keep the gap between decision and execution extremely narrow.”

And the father of automotive industry Henry Ford says on top of this: “Whether you think you can or you cannot, you will be right in any case.”

“Whether you think you can or you can not, you will be right in any case.”

- Henry Ford



EPISODE 2

Imagine you are a big system supplier and a huge portion of your product price is coming from purchased parts. You have done your homework, made your cost analysis, the project team has mastered Pareto, Parkinson and Execution and you asked your preferred supplier for a quotation, BUT...

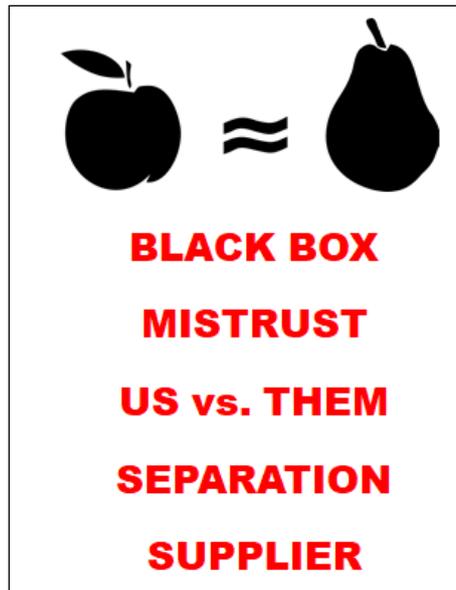


Your cost analysis and the supplier quotation show a huge gap... This is one of my customer's major problems! They are able to calculate, they are able to develop products, but they don't know how to realize the potential. And they ask: What shall we do next?

The biggest job for us as Cost Engineers is to break through the walls which have been built up over decades in this whole CAR WARS movie. In the past we often compared things which are definitely not comparable.

The past was a Black Box – most companies sourced out nearly everything and wonder now why they are purchasing a black box. Our industry lived in mistrust, in a fight of US vs. THEM of separation and of a behavior like “We are Customer you are Supplier”. If this behavior patterns are not replaced before a supplier workshop then we burn our relationship with our suppliers. Then the game is over before it started.





People who have not replaced these behavior patterns in advance act often like Droids. Like these two guys R2D2 or C3PO. In our car wars movie they are protocol droids. I have seen tons of supplier workshops with young inexperienced guys who started their conversation with 60 year old company owners like this:

“YOUR PRICE IS TOO EXPENSIVE! Tell me your turnover. Tell me your cycle time. Tell me your investment. Tell me your ... “



Often they are hiding behind their notebooks. Gave only a short or no introduction and are using a catalogue of questions about products and processes they only know from the university. This has nothing to do with a Supplier Workshop. When I train these Cost Engineers I use a technique which is called reframing. I put a known picture into another frame to awaken awareness. Let me give you an example:



This is Munich Airport from inside. You see tons of information there like Terminals, Parking spaces, information center, a lot of people and all that stuff...



But honestly this could be any Airport in the world...

And this is like talking about price at the very early beginning of a Supplier Workshop or what is even worse than that: talking about daily operational business problems that recently occurred. Before we start talking about detailed stuff on the ground floor, we need something different.



We need the big picture. We have had this picture in our head before, but our supplier did not. This means we need to navigate from 10.000 feet to ground zero. Step by step.



COST ENGINEERING FUNNEL

For this special problem I developed a solution I call “**The Cost Engineering Funnel**”: A Tool with **6 steps** with which I navigate together with the supplier from the highest flight level down to the Price discussion.



Once again: Rule number one... No price discussion at the beginning! At the top we start with VALUE, and Price is what we will finally get out.

In **Level 1** it's all about **MOTIVATION**. The question we need to answer is: WHY ARE WE PERFORMING A SUPPLIER WORKSHOP? Start with WHY. Our goal is to get our suppliers commitment – his YES – towards our motivation. He understands our situation and agrees to the further procedure.



In **Level 2** our Supplier already knows our motivation and he agreed. Now we take care about the **METHOD**. The question here is: HOW DO WE PERFORM A SUPPLIER WORKSHOP? Requirements, Agenda, participants, rules etc. etc. Again his commitment is required!



We have clarified so far WHY we are running the Supplier Workshop and HOW we do it. Two times we got a YES from him.

It is time for **Level 3: The TOOLS**.



A key role has the calculation method and the system I use. Like I already said I prefer the surcharge Calculation with machine hourly rates due to many reasons. Of course you can use another method as well. The important point is to get a commitment of the supplier that he accepts your tool! We want his YES regarding the tool.

At that point of time I explain our Supplier for the first time a **PRICE SPLIT**.





Not his Price Split, but a Price Split. I use examples of other industries that do not relate to the supplier, for example furniture. Use whatever feels good to you but avoid automotive parts. The price split of the surcharge calculation with machine hourly rates has the advantage that we can easily explain it to the suppliers CEO. Most CEOs are often facing the situation of complex in-house calculations that cannot be understood within 5 minutes. This price split everybody understands independent from the business unit he is working for. I always get my required YES for this Split, which is my goal.

Level 4: the CONTENT.



Everybody who wants to discuss a price later on needs be sure, that all ingredients have been respected. Parts, raw material, purchased parts, production material, freight, packaging and all that stuff we well know. We only proceed to the next level if we have the 100 % commitment that everything is inside the calculation. EVERYTHING. Important to note: We listen. The supplier talks! It is not our content, it is his content! This is the key. WE DEFINED THE FIRST THREE LEVELS , THE FRAMEWORK – OUR SUPPLIER DEFINES THIS LEVEL



IN THE FIRST LOOP. Got it? If he defines the content this is a commitment and finally the fourth YES.

Now we can proceed – to **Level 5: PARAMETERS.**



Level 5 is again the playground of our supplier. Same procedure – very important. Our Supplier told us in Level 4 the Content, now he is providing us the parameters of the content. For example: his true scrap rates in % for each manufacturing process. HE DEFINES WHAT IS RESPECTED AND HOW MUCH OF IT. WE NEVER EVER DISCUSS THAT! WE ONLY NOTE. This is the key to YES number 5.

Level 6 – Finished.



We have a YES for Motivation, a YES for the Method, a YES for the Tools, a YES for the Content and a YES for the Parameters. 5 times YES – nobody will give us now a NO. The Price is only the output of 5 times YES. Congratulation – We’re done.



This is the rough blueprint; of course the complete Cost Engineering Funnel has ways more content.

Remember, we started with BLACK BOX, MISTRUST, US vs. THEM, SEPARATION and a SUPPLIER. If we have done a good job we're now talking about OPEN BOOK, we have built up TRUST, we have integrated him. He is now not any more a supplier he has become a STRATEGIC PARTNER. Our future will be not US vs. THEM, the future is a common one – it's WE.



Let's get started – and don't be afraid. As Dieter Zetsche once said: "FROM EXPERIENCE WE KNOW, IT WILL NOT WORK EVERYTHING IMMEDIATELY" - But who cares, JUST DO IT.

Another important quote comes from Elon Musk: „FAILURE IS AN OPTION HERE. IF THINGS ARE NOT FAILING, YOU ARE NOT INNOVATING ENOUGH.“

**„FAILURE IS AN OPTION
HERE. IF THINGS ARE
NOT FAILING, YOU ARE
NOT INNOVATING
ENOUGH.“**

- Elon Musk

Take your time and think about it.



This is the common baseline to INNOVATE now. SO it is time to train your chain! Time to give them the same tools that we use as well. Episode 1 times Episode 2 + Supplier Workshops will not only boost our business but also the business of our new strategic partners. This is really a big step into a direction which was not very popular in the past, but I believe that the future will be ours, the future belongs to innovative companies, and the future belongs to us Cost Engineers.

INNOVATE
TRAIN YOUR CHAIN
EPISODE 1 x EPISODE 2



EPISODE 3

BARRIERS IN COST ENGINEERING PROJECTS

Whether we want to run Supplier Workshops for cost reductions in series projects or we want to run cross-functional Cost Engineering Projects with Engineering, Purchasing and others or something very special: we want to implement Cost Engineering in our company from ground zero... In any case we might face barriers or hurdles that seem to be not passable.

What is interesting to me is that there are patterns in each case of a barrier. If there are patterns of problems then my conclusion was: there must also be a pattern for the related solutions. I was searching like hell and... I found these solutions in Strategy books that I want to share with you:

1. The Art of War – from Sun Tzu – probably known by all of you.
2. The Psychology of Crowds – from Gustave Le Bon, a French guy –this book was the base for all Political Systems which were raising afterwards
3. The Blue Ocean Strategy – from W. Chan Kim, Renée Mauborgne, lecturers of Harvard University – This book is one of my favorite books at all in the last five years. It is a definitive MUST READ...

The pattern of barriers which can be recognized is:

1. Awareness
2. Resources
3. Motivation
4. Politics



AWARENESS

Let's start with awareness:

AWARENESS

Make staff and suppliers aware that a profound change in strategy is needed.

People do not want to move. They want to feel comfortable and stay in a stable state. Our Job is, to make staff and suppliers aware that a fundamental change in strategy is needed – that Cost Engineering is not any more a nice to have feature of a few big global player, but a **MUST HAVE** for all companies which want to be competitive in the near future. Again: **NEAR FUTURE**. The clear message is: **INNOVATE OR DIE!**

In the – let me call it old world – managers and leaders thought, that they can hit the ball by using facts & figures **BUT**: the opposite is the case and ever was... Why? Because Facts & Figures

1. ...can be manipulated
2. ...don't connect with people
3. ...don't motivate

FACT & FIGURES...

...can be manipulated

...don't connect with people

...don't motivate



If we want to create awareness within the supply chain or in other divisions inside our company we need to use another key. And the key for awareness is called experience.

Let's have a look at what Confucius said around 2.500 years ago:

**“Tell me and I will forget,
show me and I may
remember;
involve me and I will
understand.”**
- Confucius

“Tell me and I will forget, show me and I may remember; involve me and I will understand.”

This is really powerful, isn't it? It means that there is no need to talk, as experience is key!

We only need to think about little children that are being told to stay away from the hot plates in the kitchen. Do they learn from words? No! They learn from experience when they put their hands on the hot plates.

In that case we can see that we learn from pain – we then change immediately for our own sake.

JOY & PAIN
Joy - more of the same
**Pain - immediate change,
for its own sake**

How can we use this information for Cost Engineering? We need to find possibilities for colleagues to make pain experiences if they do not want to move. For example we can involve colleagues that have normally no customer contact to join directly a customer meeting to experience the need of change. For a designer the experience could be that he joins a meeting with the customer's Purchasers where he gets to know that we lose a project because our product is designed too expensive, or overshot time schedules...



RESOURCES

Next barrier can be resources.

RESOURCES

BELIEVE OF THE CROWD:
Big changes = more resources

TRUTH:
**Most successful implemented
innovations come with**
reduced resources

We all know these everlasting discussions about missing resources, don't we? The important point is that the crowd believes that big changes always lead to more required resources. Subsequently a long-lasting process of internal fight for money and headcount starts.

But reality is showing us a completely different scenario: the most successful implemented innovations – and Cost Engineering is an innovation if done consequently - come across with reduced resources.

To implement this we have to maximize the value of existing resources. Therefore we can use three key levers.

MAXIMIZE the VALUE of resources

**3 key levers to set free
existing resources and
maximize their value**

Key lever 1 are critical areas.

These are areas with little existing resources but high potential. Do you remember Pareto and Parkinson? Here they are again... The question I typically ask customers is: Which



activities have high impact on performance, but would urgently need more resources? Of course in our niche this is Cost Engineering.

Key lever 2 are **uncritical areas**. These are areas with high existing resources but little performance. The related question is: Which activities need tons of resources but have little effect on performance?

Key lever 3 are **barter deals** or exchanges among different company divisions.

To give you an example: One of my customers – a midsized tier 3 supplier for powertrain components wanted to improve the customer satisfaction by reduced part prices and reduced response time for designs and RFQs. They had no budget planned for new resources in the running financial year and asked for solutions. We shifted 3 people of the design & development division – which had in total 30 employees – to the newly founded Cost Engineering Team. The Cost Engineers knew the products in detail, used the bottom up calculation as mentioned before plus Pareto and Parkinson and reduced the main cost driver by 15 % in average for their new quoted products. Additionally we standardized the RFQ-Process bypassing long-lasting RFQs to their own suppliers by knowing their cost structure out of Supplier Workshops and two or three further changes. The response time reduced from average 4 weeks to 3 days. This I call innovation.

<p>Critical areas Little existing resources but high potential</p> <p>Uncritical areas High existing resources with little performance</p> <p>Barter deal / exchange From uncritical areas to critical areas</p>

MOTIVATION

Third possible barrier is **motivation**.

The most important question is: How do we make the KEY PEOPLE move quickly and work hard to break the status quo? When I say key people, this is already the first of three possible levers.



MOTIVATION

How do you make the
KEY PEOPLE
move quickly and work hard
to break the status quo?

Key people means KEY PEOPLE, not the crowd. Normally these are our Managers but in some case these are influencers inside our organizations that shape the opinions of larger groups. Often they are in our company since many years and are well connected in all divisions. Keep looking for them. We might need them later on. The point with key people is comparable with bowling: if you hit the king pin, all other pins fall. Got it?

Second lever is Spotlight Management. It means a regular meeting of all key people presenting the common defined KPIs. Good results are being highlighted and – very important – they are rewarded. The Spotlight Management never talks about divisions but always about persons. So the Manager himself is responsible for the result, not the division. No excuses are allowed.

KEY PEOPLE
SPOTLIGHT MANAGEMENT
STRATEGY BREAKDOWN

Last lever: Strategy Breakdown. Most people are overwhelmed from big changes. Remember the Munich Airport? It is important to know the big picture, but the job gets done later on the runway. So let's break down our target in small portions for the staff.



POLITICS

The last barrier is **politics** inside our company.



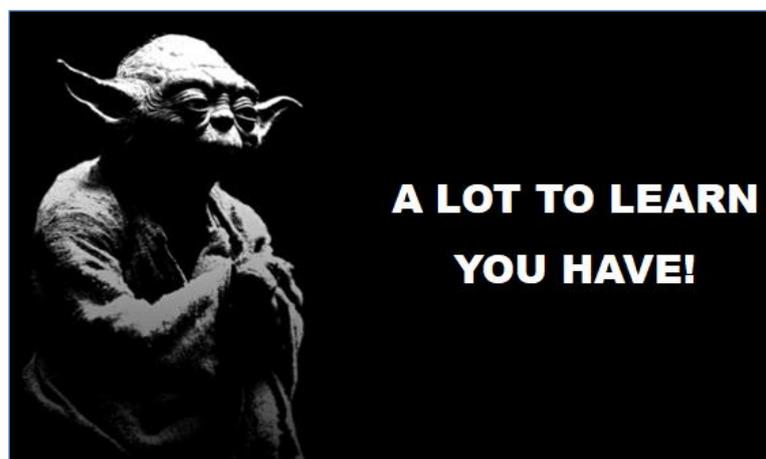
Do you know this strange feeling in your stomach, asking yourself: Does the guy in front of me really support me? It happens every day and also in the best companies, that the best and most intelligent people lose or their ideas are being blocked because of politics and intrigues. But we can manage that!

First Point is to enable the Yedis, those expecting the biggest benefit of the changes. We connect to them and start our alliance.

Those expecting the biggest loss are the Siths – we need to isolate them with nearly no information flow and acting fast.

Last point: we need to set our Yoda. He is our adviser, well connected and politically correct he knows as insider the ticking bombs in advance – securing us from the dark side of the force.

I did not find each barrier in each project over the last decade but whenever it comes to politics I hear this voice behind me saying:



Probably you know the famous 10.000 hour rule:

It states that ten thousand hours of practice is required to achieve the level of mastery associated with being a world-class expert - in anything. Finally this was underlined by Daniel Levitin, a famous scientist of the University of Montreal.

“Ten thousand hours of practice is required to achieve the level of mastery associated with being a world-class expert - in anything.”

- Daniel Levitin

Honestly 10.000 hours is a lot of stuff! Considering an 8 hour working day and 5 days per week this makes around 5 years. 5 years of blood, sweat and tears!

The point is: each hour is worth to be spent, because we as Cost Engineers have an important responsibility and can make the change in the Car Wars that is needed so much.

As Gene Kranz from Apollo 13 said: “It isn’t equipment that wins the battles; it is the QUALITY and the DETERMINATION of the PEOPLE fighting for a cause in which they believe.”

“It isn’t equipment that wins the battles; it is the QUALITY and the DETERMINATION of the PEOPLE fighting for a cause in which they believe.”

– Gene Kranz NASA, Apollo 13

I believe in the power of Cost Engineering and our future success!

Every story of success has its starting point. I would like to quote Sir Richard Branson: „TRAIN PEOPLE well enough so they can leave. TREAT THEM well enough so they don’t want to.”



**„TRAIN PEOPLE well
enough so they can leave.**

**TREAT THEM well
enough so they don't want to.“**

- Sir Richard Branson

If you would like to qualify your people for the next Cost Engineering battle, I recommend you the three Stages education of the Cost Engineering Academy: Junior Cost Engineer, Senior Cost Engineer and Cost Engineering Professional.



To treat them well, so that they stay at your side, that's your job. I believe in you.

Whatever you will decide, there is a last message I would like to share with you:



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