Elon Musk by Walter Isaacson

Two years shadowing the man behind Tesla, SpaceX and Twitter: how he builds things, and the demons that drive him.

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THE ALGORITHM · HIS FIVE COMMANDMENTS, IN THIS ORDER

Shaped by the "production hell" surges at Tesla's Nevada and Fremont factories; now a mantra at Tesla and SpaceX production meetings. *"I became a broken record on the algorithm,"* Musk says. *"But I think it's helpful to say it to an annoying degree."*

1 Question every requirement

Each should come with the name of the person who made it, never just "the legal department."

"Requirements from smart people are the most dangerous, because people are less likely to question them."

2 Delete any part or process you can

"You may have to add them back later."

"If you do not end up adding back at least 10% of them, then you didn't delete enough."

3 Simplify and optimize

Only after step two.

"A common mistake is to simplify and optimize a part or a process that should not exist."

4 Accelerate cycle time

"Every process can be speeded up."

But he admits he *"mistakenly spent a lot of time accelerating processes that I later realized should have been deleted."*

5 Automate

"That comes last."

His big mistake in Nevada and Fremont: *"I began by trying to automate every step."*

THE COROLLARIES

- *"It's OK to be wrong. Just don't be confident and wrong."*
- Technical managers stay hands-on: software managers code at least 20% of their time.
- *"Comradery is dangerous."* It makes it hard to challenge each other's work.
- *"Never ask your troops to do something you're not willing to do."*
- Do a skip level: meet the people right below your managers.
- Hire for attitude: *"Skills can be taught. Attitude changes require a brain transplant."*
- *"A maniacal sense of urgency is our operating principle."*

THE ALGORITHM IN ACTION

½ the time A Fremont bolting robot ran at 20% speed and turned each bolt backward twice. He deleted the back-turns and set 70%: bolting time fell by more than half.

72 hrs *"to remove every unnecessary machine."* Then: *"Excessive automation at Tesla was a mistake,"* he tweeted. *"To be precise, my mistake. Humans are underrated."*

$5,000 the price he told an engineer to hit for an actuator a supplier quoted at $120,000. SpaceX came to make 70% of its rocket parts in-house.

50× His "idiot index": rockets cost at least fifty times their raw materials. *"If the ratio is high, you're an idiot."*

10% Solar roofs: more than half of 240 parts to go. When installers proved a second nail was needed, it went back in: the 10% rule.

GENIUS AND DEMONS

Bullied at school and berated by his father (*"It was mental torture"*), Musk says *"Adversity shaped me." "My pain threshold became very high."* Those close to him dread his **"demon mode."** His first wife Justine: *"He learned to shut down fear." "If you turn off fear, then maybe you have to turn off other things, like joy or empathy."*

"Elon wants risk for its own sake," says Peter Thiel. *"He is a drama magnet,"* says his brother Kimbal. His engine chief Tom Mueller on the impossible deadlines: *"You've demoralized them. It's Elon's biggest weakness."* In the 2018 surge, Tesla's injury rate ran 30% above the industry.

Do they excuse the bad behaviour? Isaacson: "The answer is no, of course not." But the strands are woven together: "It can be hard to remove the dark ones without unraveling the whole cloth."

2008: ON THE BRINK

- **2006–08** Falcon 1's first three launches all explode before orbit.
- **SEPT 28** Launch four reaches orbit: the first privately built rocket to get there from the ground, made by 500 people.
- **DEC 22** NASA awards SpaceX a $1.6 billion contract for twelve Space Station trips.
- **DEC 24** Tesla is due to run out of money that day. On a Christmas Eve call the investors back his rescue plan, and Musk breaks down in tears.

USE IT MONDAY

- Put a person's name on every rule. Ask, as Musk did: *"Who wrote that? Why does it make sense?"*
- Delete until you have to add about 10% back. Only then simplify, speed up, automate.
- **Walk to the red**: go and stand at the bottleneck until it is fixed.
- The book's own warning: some managers felt safety and quality were compromised to rush production.

"The only rules are the ones dictated by the laws of physics. Everything else is a recommendation." MUSK