Managing CTI Projects for Success – A Practitioner‘s View

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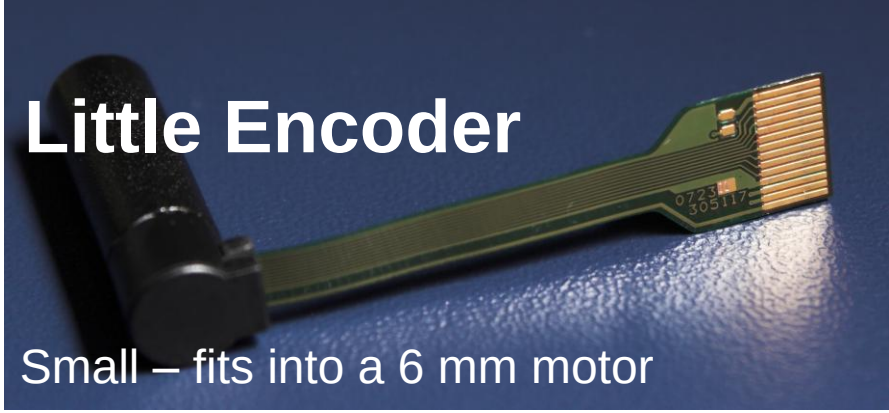
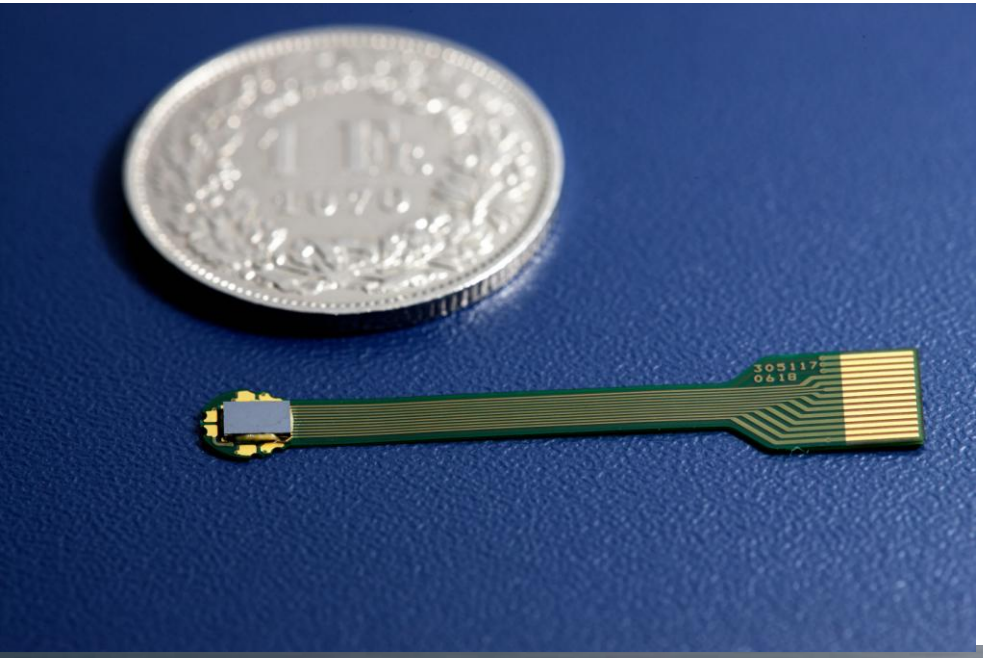
MILE: Maxon‘s Inductive Little Encoder



- Once a CTI project with Posic S.A.
- World‘s smallest absolute encoder
- Inductive (eddy current) principle
- Innovative MEMS technology



- Small – fits into a 6 mm motor
- Robust – insensitive to
  - Dust and Humidity
  - EMI, strong magnetic fields
  - Temperature: -40 °C to 100 °C
- Fast: beyond 100‘000 rpm
- Accurate: mounting tolerances compensated with a look-up-table.
- Highly integrated:
  - SSI or incremental interface
  - commutation signals für EC motors
  - Line drivers
- Full traceability

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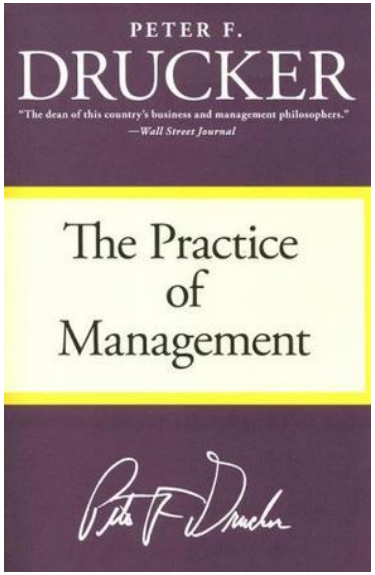
Managing for Success

- Reason for business: to create a customer
- Two main functions: innovation and marketing
- Profit: only a litmus test
- Marketing should provide information on:
  - Time window
  - Required features
  - Allowable cost for the features
  - … for good reasons CTI requires business plans. It is a good idea to take them seriously and even to come up with a „plan B“
- We will look at marketing and innovation from different perspectives and come up with some practical recommendations



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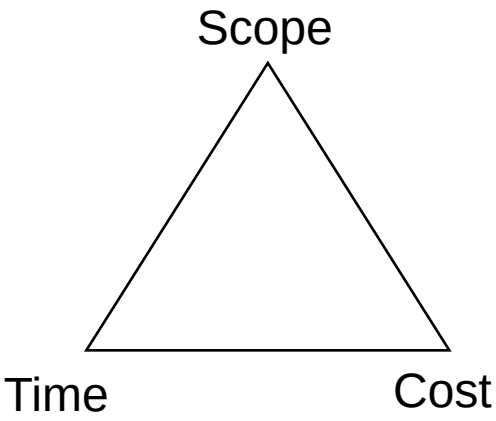
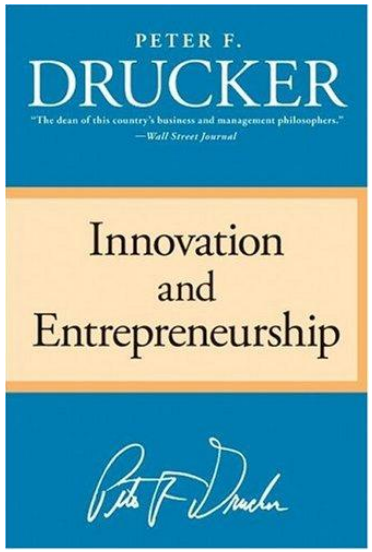
TCS and Risk

- Good project management takes care of the famous project management triangle
  - Time (or schedule)
  - Cost (of project, of product)
  - Scope (or specification)



- … and most importantly
  - Risk
  - Good PM:
    eliminate Risk first



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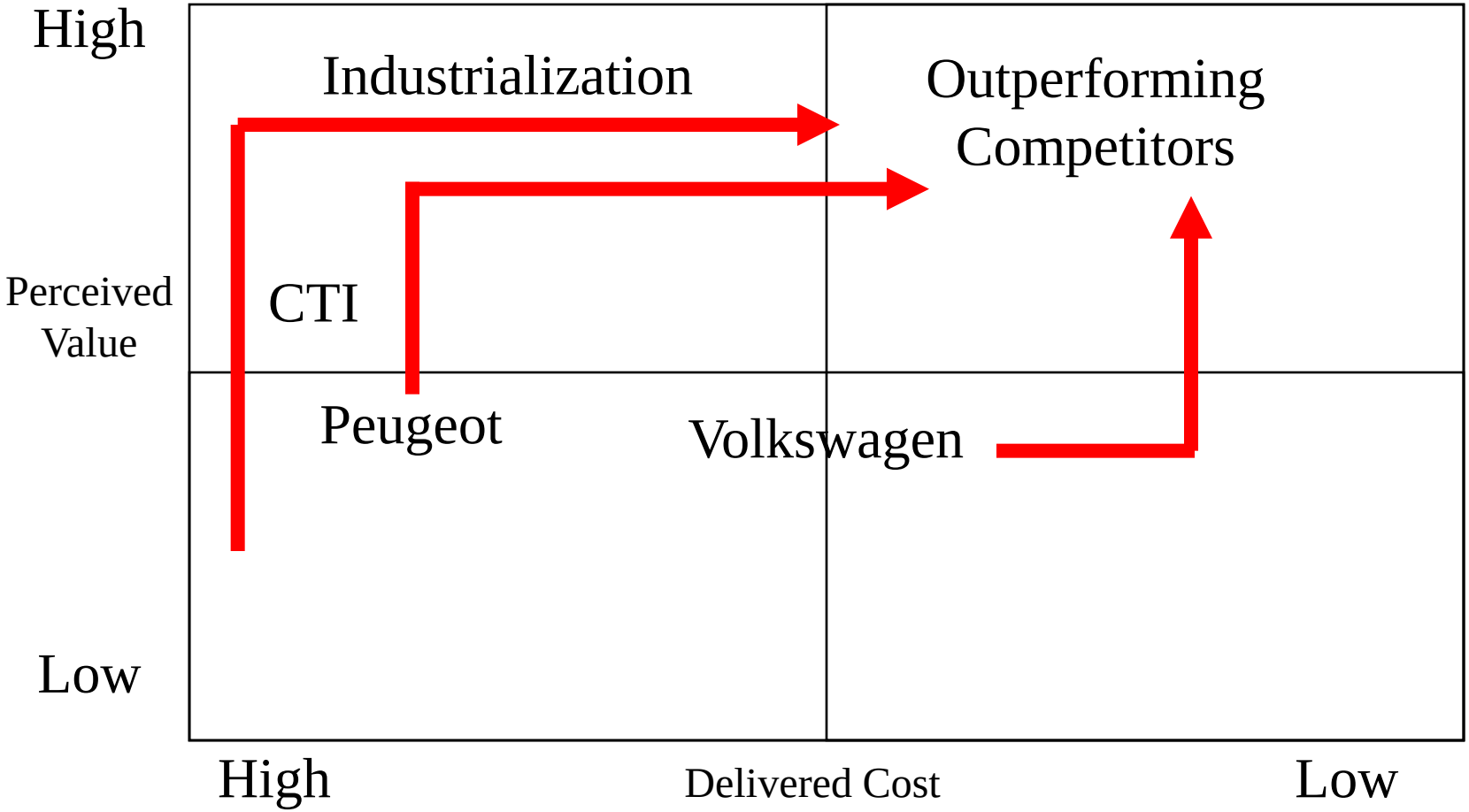
Managing Scope:
How to Go For Lower Price / Higher Quality



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How CTI Helps

- Money
  - Is that really it?
- Resources
- Management
  - Review business plan.
  - Keep academic partners on track… (well, you should do that too)
- Network
  - Find best partners, achieve highest quality

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What CTI Can (or Should) Not Do for You

- Finance industrialization projects where the outcome is important
  - NPV: money vs. risk and time
- Help you win a price war
  - Except when you do a „logistics“ CTI project
- Manage scope and products
  - It is your responsibility to avoid cost intensive scope creep
  - „Front-loading“ the project by investing a lot in the specification and market research phase will greatly help
- Manage people
  - This means, it is your responsibility to arrange good Kick-Off-Meetings
  - Workshops greatly help

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Managing People: A Good Kick-Off Meeting

- Not: a meeting of V.I.P.s giving useless commitments.
- Let the real team meet. This is an invaluable social event.
- Swear them in:
  - Clear goals
    - What is important
    - What is flexible
    - What are the contingency plans
  - A clear IP strategy and operations plan (!!!)
    - Conflict of interest: publishing vs. patenting.

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Managing People: Example for a Workshop

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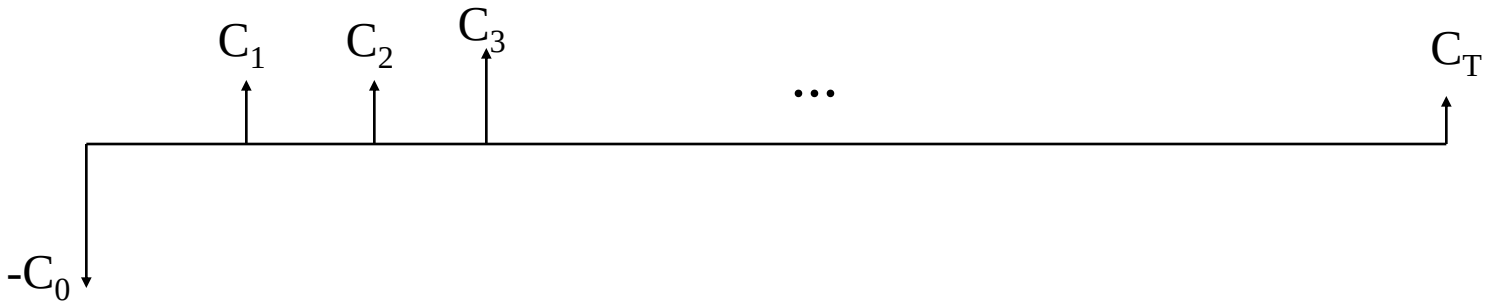
… and its Outcome

Time Value of Money: An Easy Linkage Between Cost, Risk, Time

- $NPV = -C_0 + C_1/(1+r) + C_2/(1+r)^2 + .. + C_T/(1+r)^T$
  - Which income C_n do you forecast, especially in uncharted terrain?
  - What after all is the interest rate r?
    - Weighted average cost of capital (WACC)?
    - Hurdle rate for new projects?
    - Risk adjusted interest rate?
  - *Decisions solely based on NPV lead to underinvestment.*
- CTI should help you reduce „uneconomical“ risks.
- However: Time (to market) is Money! (… create customer …)



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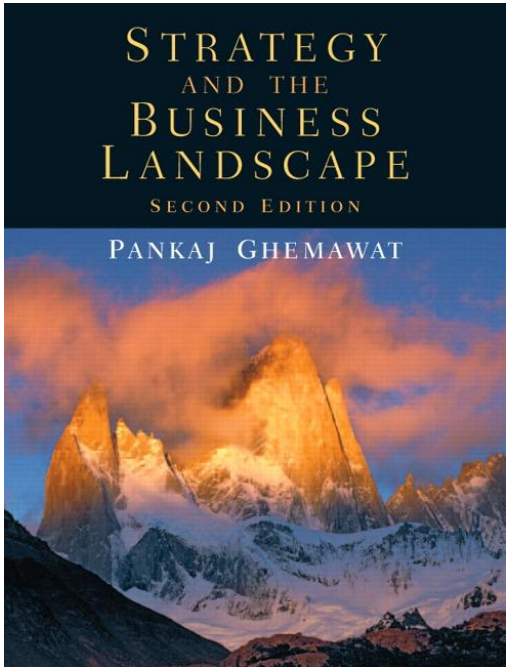
Managing Risks and Threats, Ghemawat‘s Framework Applied to CTI Projects

- Ghemawat‘s „margin eaters“
  - Imitation
    - Special warning: „V 2.0“ of your technology available for competitors
    - IP strategy and execution is of paramount importance
  - Substitution
    - Avoid the „best-technology = high-value“ fallacy
  - Hold-Up
    - Watch out for single sources!
  - Slack
    - Problem #1 for market leaders
    - Similar danger for „free“ projects



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Some Recommendations for Managing Time, Cost, Quality

- Let the very best do the task
  - Opticians should do the optics
  - Microelectronics specialists should do chip integration
  - Low power experts should do low power design
  - *Packaging experts should do the package (and process) design*
- If an existing industrial partner can do it, he should do it
- Let your academic partners feel the competition (your industrial partners should feel it anyway) – and be ready to switch in case of non-performance
- Neutralize risk or make it work to your advantage, by being flexible:
  - Note: there is also „positive“ risk. How to respond to a tenfold market demand compared to predictions?

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Countering Risk with Flexibility: Applications for Everyday Use

- To counter risk, it is very advisable to look for or to implement flexibility in the project / product:
  - Scale up / down, scope up / down, switch, learn,wait
- Hence, you might ask yourself the following questions:
  - How much would it cost (time, money, quality) to switch suppliers and with what probablity would I have to do so?
  - How much are my fixed costs? How much would it cost to increase / decrease capacity? → Strong link to make / buy decisions.
  - Which other markets could I serve with the same technology?
  - How much do I lose when I wait? How much do I (or others) learn?

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Thinking about Flexibility Early

- Have a „plan B“ for
  - Other features
  - Bigger market
  - Other partners
- Do everything to keep the costs for „plan B“ reasonable
  - Introduce alternative partners early in the project
  - Do not become overly dependent on single persons → especially difficult but all the more advisable in high tech
- Exploit the dynamics of time: cost erosion vs. margin erosion. First mover (often single source, higher price) vs. second mover (often proven multi-source, lower price) advantage.
  - Best case: bringing product maturity and market maturity in sync.

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Summary

- Never forget the aim: to create a customer.
  - Profit will come as a by-product
- Balance:
  - Time / money / risk
- Don‘t cut corners:
  - Quality first, then price
- Manage people
  - Kick-off meeting
  - Workshops
  - Let qualified people do qualified work
- Make every partner feel the competition. Be ready to switch
- Counter risk with flexibility

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Questions and remarks invited!