

Computer Aided Cost Engineering

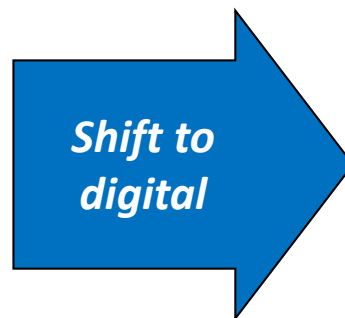
26 September 2019

Huub Ehlhardt | Vanderlande, Soest

Computer Aided Cost Engineering Content

- > **Digitalisation – new tools**
 - Shift to digital
 - Overview of some CACE tools
- > **How is it used and evolving**
 - Cost over the Product Life Cycle
 - Evolution in CACE software
 - Conclusion & Discussion

Adaption of modern tools has increased our productivity, *but also changed way of working*



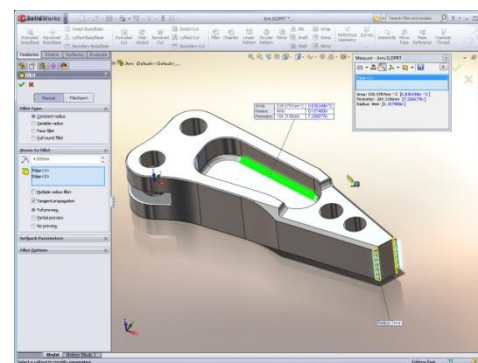
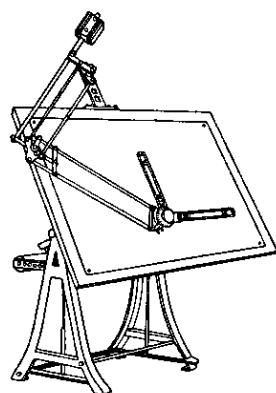
Related applications

- Email
- Publishing tools
- Presentation tools
- Etc.

Change in WoW is **'irreversible'**

- Computer Aided Manufacturing
- Rapid Prototyping
- AM
- Visualization tools
- FEM analytical tools
- Etc.

What will happen with **Cost Engineering?**

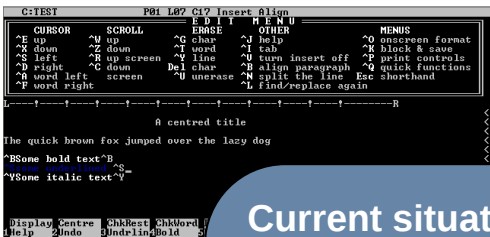


Digitalization of tools increases productivity

What's happening with cost estimation tools?



Mechanical type writer

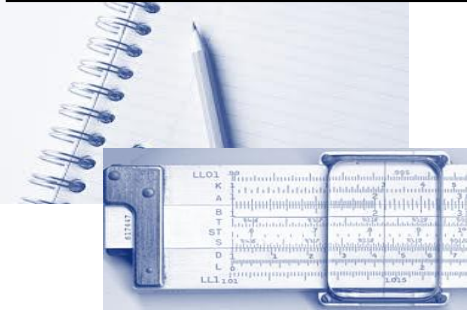


WordStar, since 1979. First market leader. 24% of the word processing market in 1989.



WordPerfect, since 1979. R4.2 overtook WordStar as most popular. R5.1 (1989) was most popular.

Cost estimation tools are still developing



Slide ruler, pen and paper.



Electronic calculators, since early 1970s

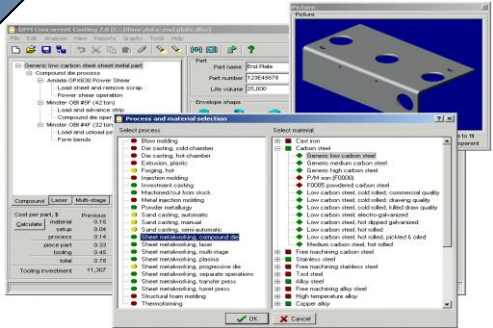
Current situation

- Various solutions available from many vendors with mixed backgrounds, but...
- No dominant design (in functionality, features, approach etc.).

In general

- No harmonisation, fragmented tool landscape

Spread sheets, since late 1970s



Cost estimation software, since around 2000s



Evolution expected

- Dominant design appears (in features, approach etc.)
- Growth of functionality and level of automation
- Integration into CAD or PLM suits
- Differentiation of features linked to license models
- Common use through value chain (from data exchange towards cost reference models)

What tools will future cost engineers use?

Many cost estimation tools available, using different approaches

What's The Price

other



Automated – CAD model based / black box

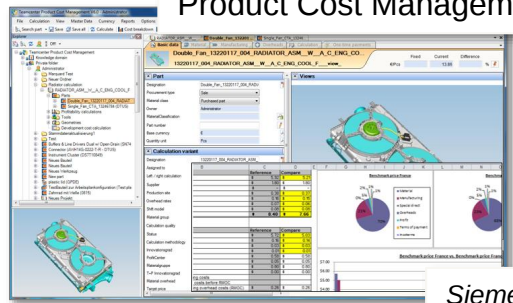
ABC / bottom up / open book

SolidWorks Costing



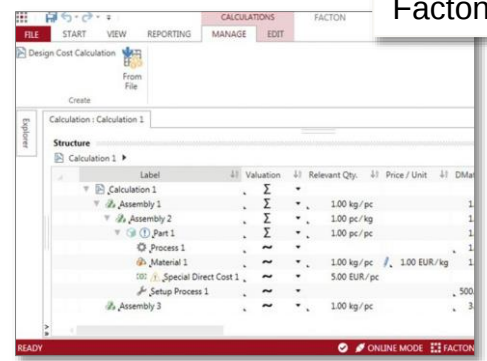
Dassault

Teamcenter Product Cost Management

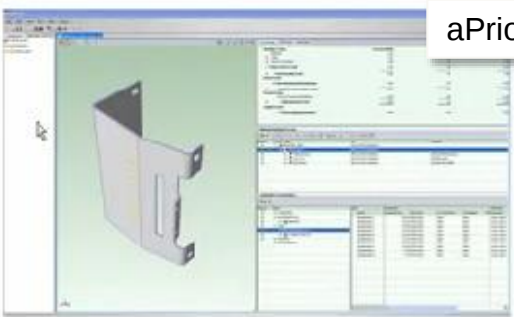


Siemens

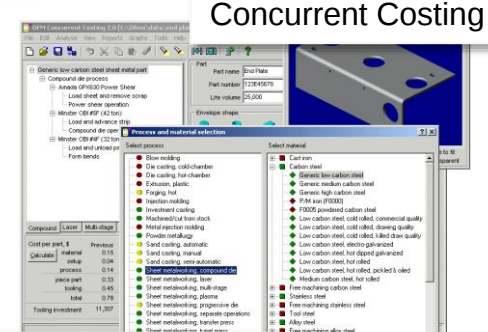
Factorion



aPriori

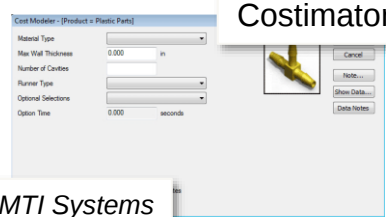


Concurrent Costing



Boothroyd Dewhurst DFMA

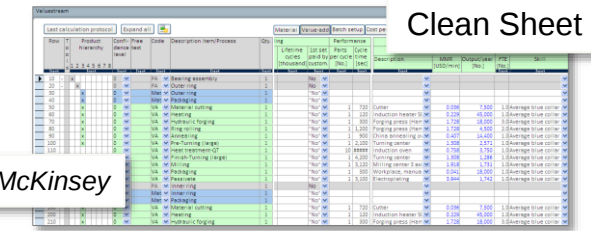
Costimator



MTI Systems

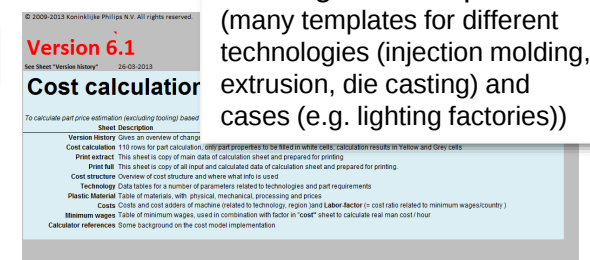


Clean Sheet



McKinsey

Version 6.1 Cost calculator



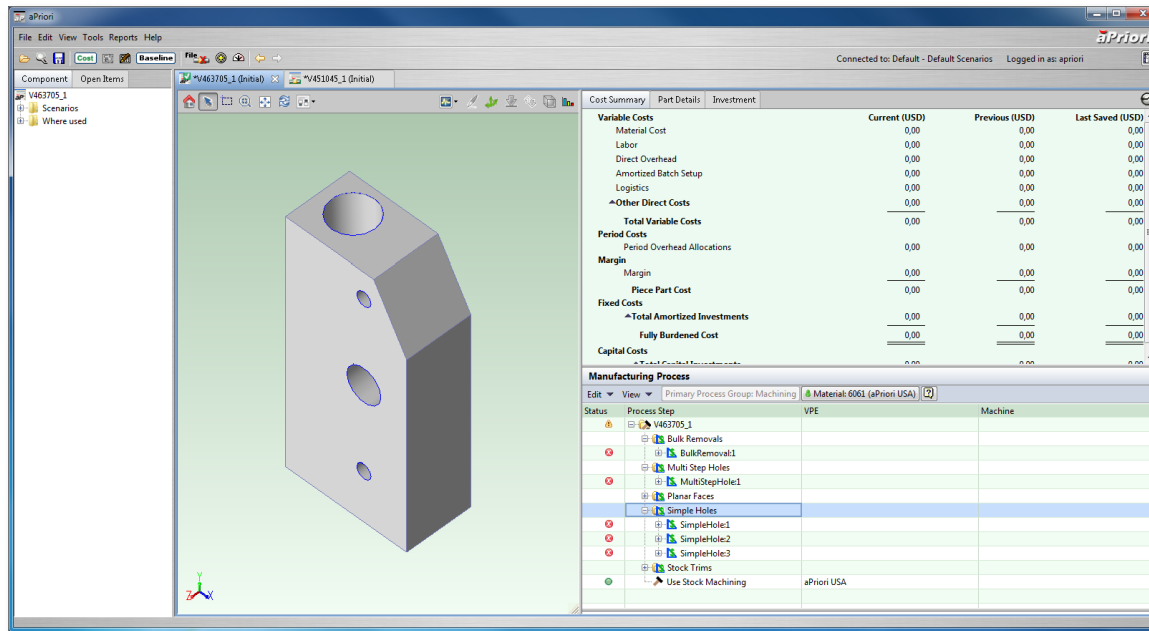
Home grown templates (many templates for different technologies (injection molding, extrusion, die casting) and cases (e.g. lighting factories))

PXC POLARIXCOSTING

pcc-tool GBC Solutions AG

Note, the list of tools shown is known to be not exhaustive.

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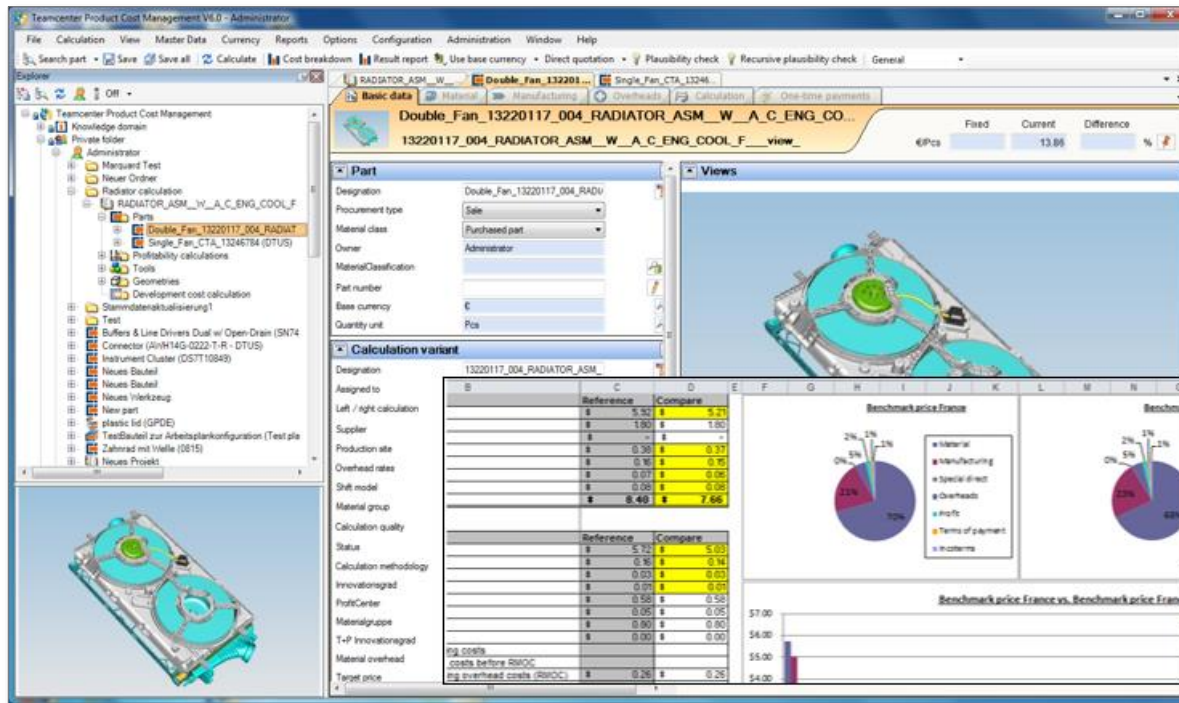
Synopsis

- Fast – based on 3D CAD input
- Automatically identify cost drivers in design
- Evaluate design / manufacturing alternatives
- Automatically monitor changing product cost (overnight)
- Black box (less strong in nego support)
- *Venture, not yet linked to CAD or ERP vendor*

Cost estimation approach:

Automated Costing

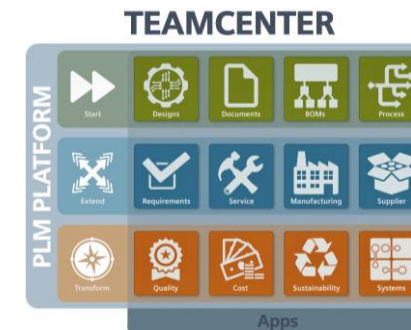
Teamcenter Product Cost Management



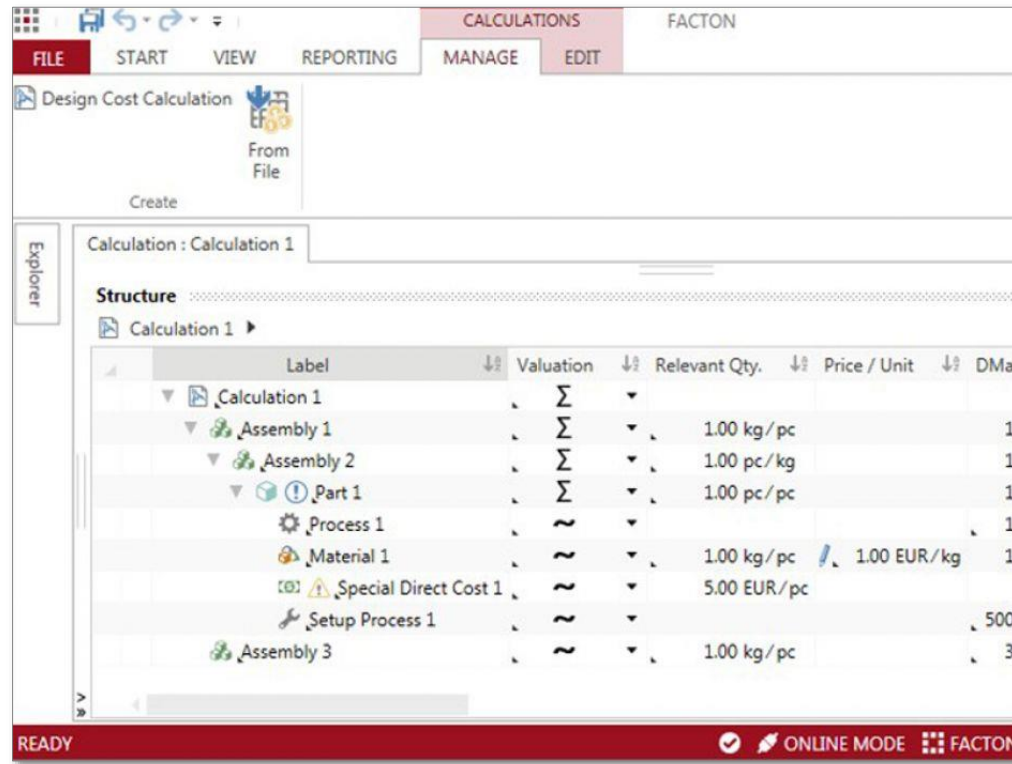
Synopsis

- Requires manual input / detailed
- Very large supporting data set (labor rates, machine rates)
- Evaluate Supply Chain alternatives
- Should cost / open book; strong in nego support
- *Part of Siemens PLM suit, expect more CAD based functionality in future*

Cost estimation approach:
Activity Based Costing



Facton



Synopsis

- Requires manual input / detailed
- Very large supporting data set (labor rates, machine rates)
- Evaluate Supply Chain alternatives
- Should cost / open book; strong in nego support
- *Linked to SAP*

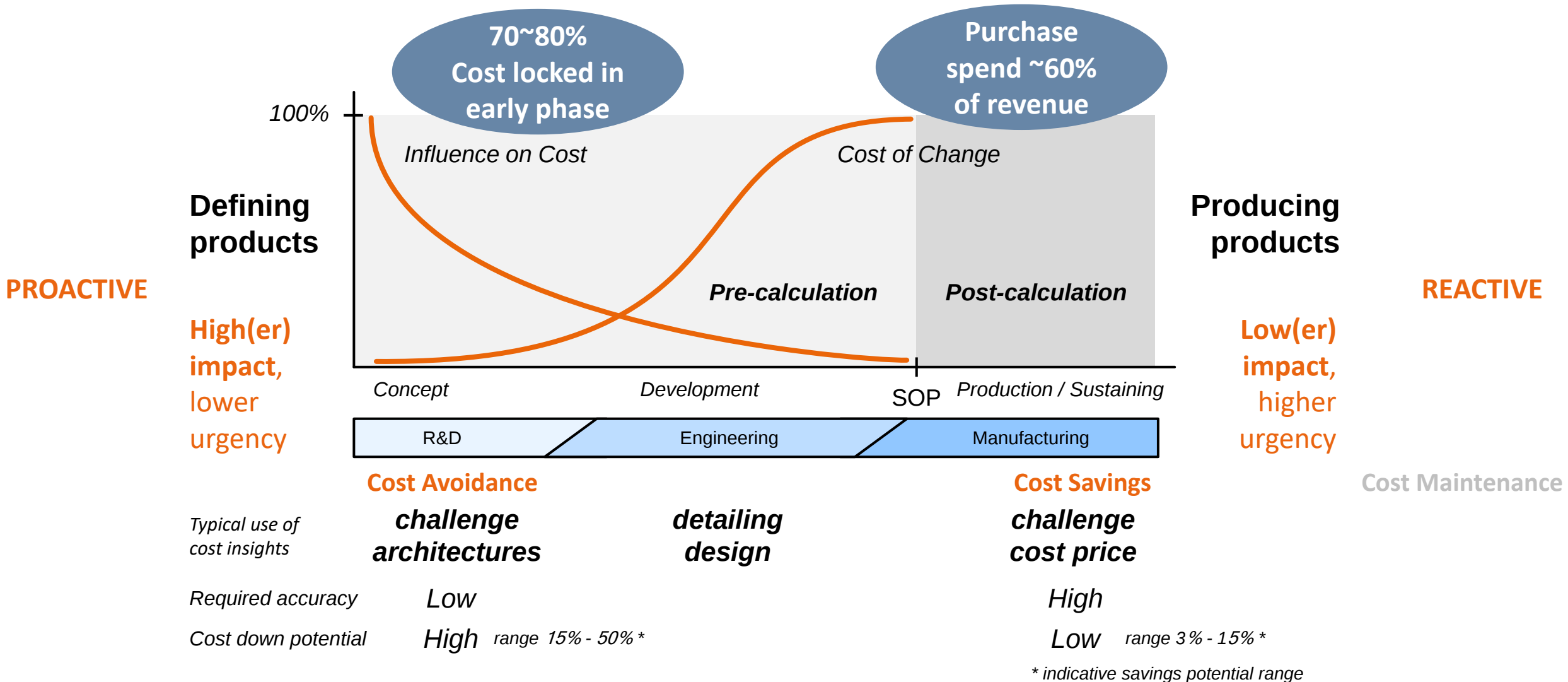
Cost estimation approach:

Activity Based Costing

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Cost over the life cycle; from concept to phase out



Different types of use will influence functional evolution



Functions supported

- **R&D**
- **Engineering**
- **PLM**

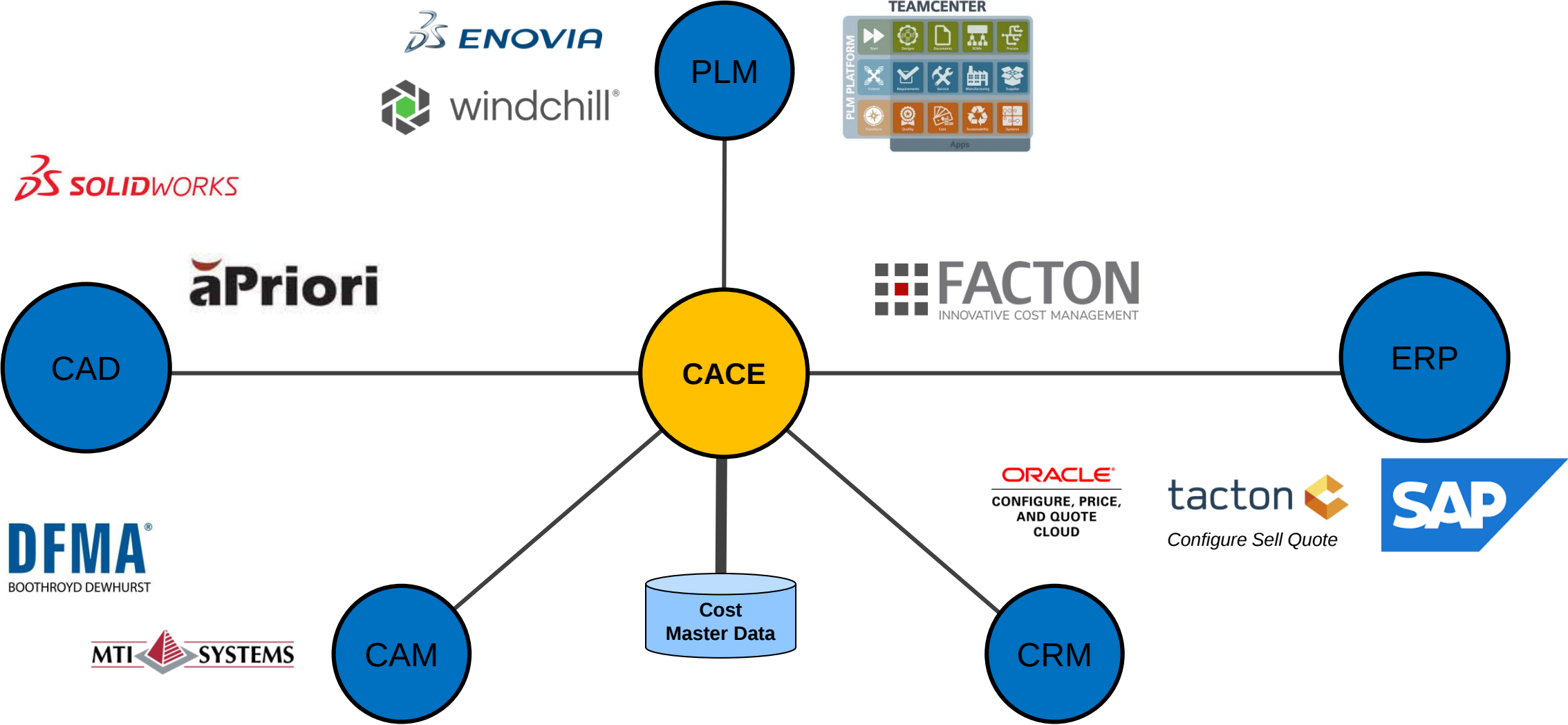
- **Purchasing**
- **Supply Chain**

Types of functionality

- **Part cost**
- **Cost driver analysis**
- **Evaluation design alternatives**
- **Mould cost**

- **Part cost**
- **Negotiation support** (should cost, open book)
- **Evaluate supply chain scenario's**

IT landscape integration will influence evolution



Various trends in CACE software

Types of use

- Two different approaches emerge;
CAD based (automated) ↔ ABC / bottom up / open book
- Integration in suit of business applications (around CAD, PLM, ERP)
- Professional software houses ↔ consulting firms

General

- Digitalization progressing – applications getting more advanced
- Enterprise Data Warehouse > linking of various databases & systems; allows to derive more information from data
- Master Data > needs to be managed, roles to be defined, interaction with Purchasing function

Is Computer Aided Cost Estimating mature yet?

The use of CACE will *change way of working in cost engineering!*

- ... bring **faster insight in should-cost**, evaluation of alternatives
 >> **more cost transparency**
- ... a need to maintain master data available in CACE software
 (material cost, OH levels etc.)
- ... **evolve over time**. Current software is showing no standardization yet
 in approach. CAD/PLM vendors might integrate CACE in portfolio's.
- ... ultimately change relations in supply chains
 (towards a handshake model?)

Standardizing via tools will help to drive a consistent approach, efficient output and reliable costs analysis.

Where does it stop?



evolution never ends

VANDERLANDE
