

# Software Economics

## A Garmisch and IBM Perspective

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### Topics

- Discussions in Garmisch & Rome
- Early Contributions by IBM & Former IBMers
- Beyond Cost Estimating

## 1968 in Garmisch

- „Size of Systems Grows Dramatically; OS/360 Spends 50 Mio. US\$/Year“ (David)
- „Every European Computer Manufacturer Needs 1000-2000 Software People. What will be Needed in 1978?“ (d'Agapeyeff)
- „5 \$/Instruction is a Good Number“ (Ercoli)
- „This may Vary by a Factor of 50“ (Endres)
- „Cost/Instruction is Meaningless“ (Barton)

## 1969 in Rome

- „Estimating manpower for large prog'ing jobs can be done by a simple quantitative method... It is not as good as an estimate based on sound experience“ (Aron)
- „Reason for undoubted success of Apollo progr'ing was its environment: one issue at a time, redone several times, no revolution“ (Randell)

# Data Collection & Cost Modeling at IBM & by Former IBMers

<i>Author</i>	<i>Year</i>	<i>Basis of Data</i>	<i>Impact</i>
IBM Internal (W. Humphrey)	< 1970	All Product labs	Benchmarking, Process Maturity
Fred Brooks	1974	OS/360	Awareness, Rules of Thumb
Walston/Felix	1977	60 FSD Projects	29 Variables, 14 as Significant
Allan Albrecht	1979	20 DP Service Projects	FP Method
Capers Jones	> 1972	~12,000 Projects, ~600 Companies	All Product & Project Types, All Methods

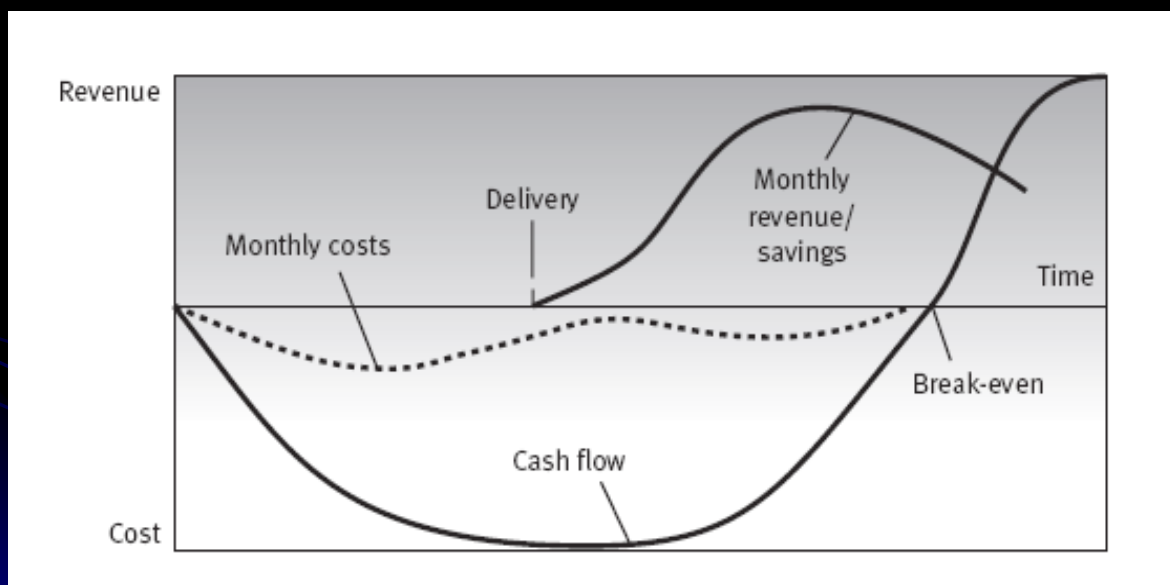
## Awareness & Usage of Historic Data

- Diffusion through Estimating Tools
  - Moderately Successful
- Transfer through Books and Consulting
  - Additional Costs and Time Associated
- Transfer through Education
  - So far Non-Significant

# The True Challenge: ROI

- Cost and Productivity are Key Issues only where Value of Product is Ignored
- Value ~ Revenue to be Generated
- Revenue: Net Acceptances \* Unit Income
- Forecasting of Acceptances (by Channel, by Industry, by Customer Type, over Time)
- Software Pricing & Business Models (incl. Service Business)

## Financial History of a Project



Source: Endres/Rombach 2003

# Summary

- Tools and Tons of Data are Available for Cost Estimating (if FP or LOC given)
- Improve Transfer of Knowledge
- Develop Skills, Tools & Habits to (better) Quantify Value

Thank You !!

# Endres' Rationale

- Definition of LOC can Vary by Factor of 10 (changed/shipped, HLL/Asm, executable/all)
- Activities Included can Vary Manpower Effort by Factor of 5 (Req'ts, Distrib, Maint, Admin, Overhead)
- In Addition, Cost per Person-Year Differs Immensely by Country (USA, Europe, Asia)
- Not Considered: F. Brooks' Factor 9 (Program -> Progr'g System -> PS Product)

# Cost Estimating

- Estimate Product Size [FP, LOC]
- Determine Project Attributes  
(Skills, Methods, Tools, Reqts Stability, ...)
- Size \* Attributes -> Effort [PM], Duration [M]
- Estimating Tools Capture Historic Data,  
Avoid Errors of Neglect

# Customer View of Value

- Reduction of Current Costs
- Enabling of New Business  
(Direct or Drag-Along)
- Improvement of Current Business  
(Reliability, Speed)
- Elimination of Unwanted Activities
- Satisfying Legal Reqts

# Literature

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