

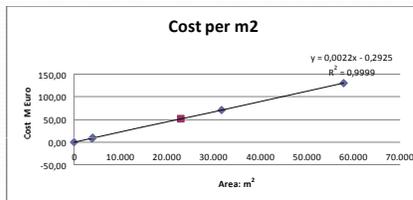
De noodzaak om risico's van software in projecten te identificeren

Nesma Ton Dekkers
Frank Vogelesang
Eric van der Vliet

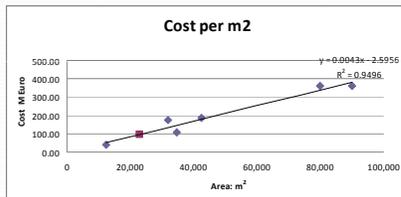
22 maart 2012, Soest





Construction cost of bridge – based on m²:

EUR 51.23 mio



Construction cost of tunnel – based on m²:

EUR 95.48 mio

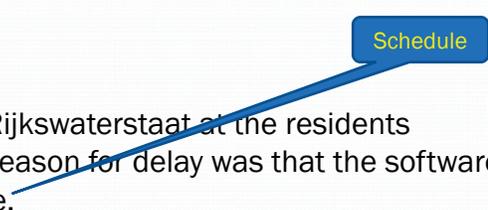
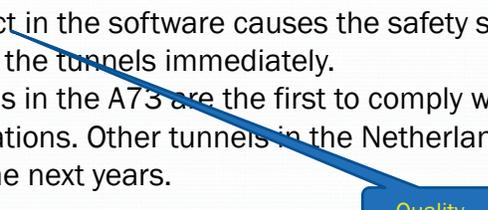


Decision

- It has been decided that a tunnel will be used for bridging the gap
- The tunnel costs are calculated based on m^2
- But what is the impact of the software part?
 - Software is x% of the tunnel cost
 - Software results in y% delay for the delivery of the tunnel
- How to determine the software costs?
- How to prevent the elapse time gap?



Risks

- **Leidsche Rijn Tunnel**
 - According briefing Rijkswaterstaat at the residents meeting, the main reason for delay was that the software was not yet available. 
- **Tweede Kamer wants explanation about A73**
 - Each defect in the software causes the safety system to shut down the tunnels immediately. The tunnels in the A73 are the first to comply with the new regulations. Other tunnels in the Netherlands will follow in the next years. 

How to determine software costs?

The Nesma vision

About NESMA

- NEderlandse Software Metrieken gebruikers Associatie
NEtherlands Software Metrics users Association
from 1995
- Started in 1989 as NEFPUG
NEderlandse FunctiePUnt Gebruikersgroep
NEtherlands Function Point Users Group
- Not-for-profit
- Run by volunteers
- Managed by an 'elected' board
- Organisation structure: association
Registered: Chamber of Commerce, Amsterdam



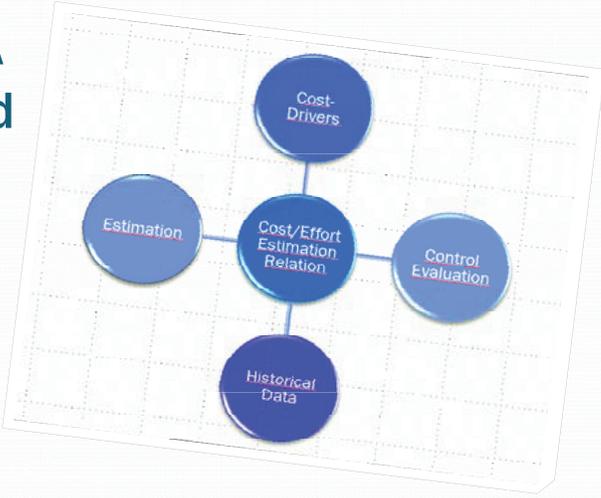
Mission

- Improving the predictability of the cost of the delivery of and the maintenance of software
- Making the predictability objective by means of unambiguous measurement data
- Offering a set of guidelines to both customer and supplier to get to an agreement on the predictability
- Providing an independent platform to share knowledge related to the predictability



The NESMA playing field

- NESMA has her initial base on the cost-drivers
- Her contribution radiates to the four other areas




Nesma

Cost-drivers

[1] How to determine the size of software

Knowledge holder of:

- Size of the functionality of software
- Size of the maintenance of software

Knowledge development:

- Product Non-Functional
- Process
 - Quality
 - Technology
- People

(Potential) Partners

- COSMIC
- IFPUG
- MAIN
- SIG
- SWEBOK
- SPIDER
- ASL/BISL



Nesma

Cost Estimation Relations

Knowledge holder:

- Which cost-drivers are suited as input for the calculation of cost or effort for the realisation and the maintenance of software

(Potential) Partners

- AACE / DACE
- ISPA / SCEA
- Universities / Research
 - Fraunhofer IESE (GE)
 - UCL (UK)
 - Twente / Delft (NL)



Nesma

Estimation

Knowledge development :

- Which methods / models are useful to produce realistic estimates for the delivery and the maintenance of software

[2] How to translate size to cost? A cost model for software

(Potential) Partners

- AACE / DACE
- Conferences:
 - IWSM
 - SMEF
- IEEE
- Tool-vendors
 - Cost Xpert
 - Galorath
 - PRICE
 - QSM
 - SPR



Nesma

Historical data

Knowledge holder:

- Which organisations do have data about the relevant cost-drivers

(Potential) Partners

- Benchmarkers
 - Gartner
 - ISBSG
- Tool-vendors
 - Cost Xpert
 - Galorath
 - PRICE
 - QSM
 - SPR
- End users





Control / Evaluation

Knowledge development:

- Which software metrics are most suited to control or evaluate projects for the delivery and the maintenance of software

(Potential) Partners

- ISBSG
- Metri
- PMI
- SIG

[3] How to translate size to cost? A cost model for software



How to determine the size of software?

Points instead of M^2



History

- 1979 Introduction FPA – productivity A.J.Albrecht
- 1984 FPA - estimation
- 1988 IFPUG Counting Manual 1.0 E.E. Rudolph
- 1991 Counting Manual 1.1, NEFPUG
- 1994 Counting Practice Manual 4.0, IFPUG
- 1996 Counting Manual 2.0, NESMA
- 1998 Functional Size Measurement Method ISO 14143
- 2001 Full Function Points 2.1, COSMIC
- 2004 Counting Manual 2.2, NESMA ISO 24570
- 2004 Counting Practice Manual 4.2, IFPUG ISO 20926
- 2007 COSMIC Functional Size Measurement Method 3.0 ISO 19761



System Description

“If you can’t tell me what it is, I can’t tell you what it costs.”
-Mike Jeffers

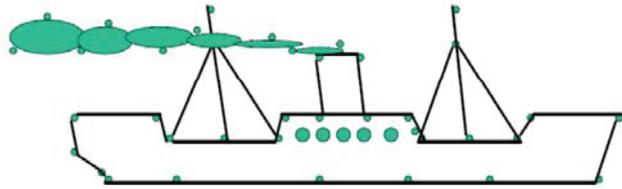


Source: ISPA-SCEA training

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System Description

“If you can't tell me what it is, I can't tell you what it costs.”
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Source: ISPA-SCEA training

Nesma

A Bridge to the Future

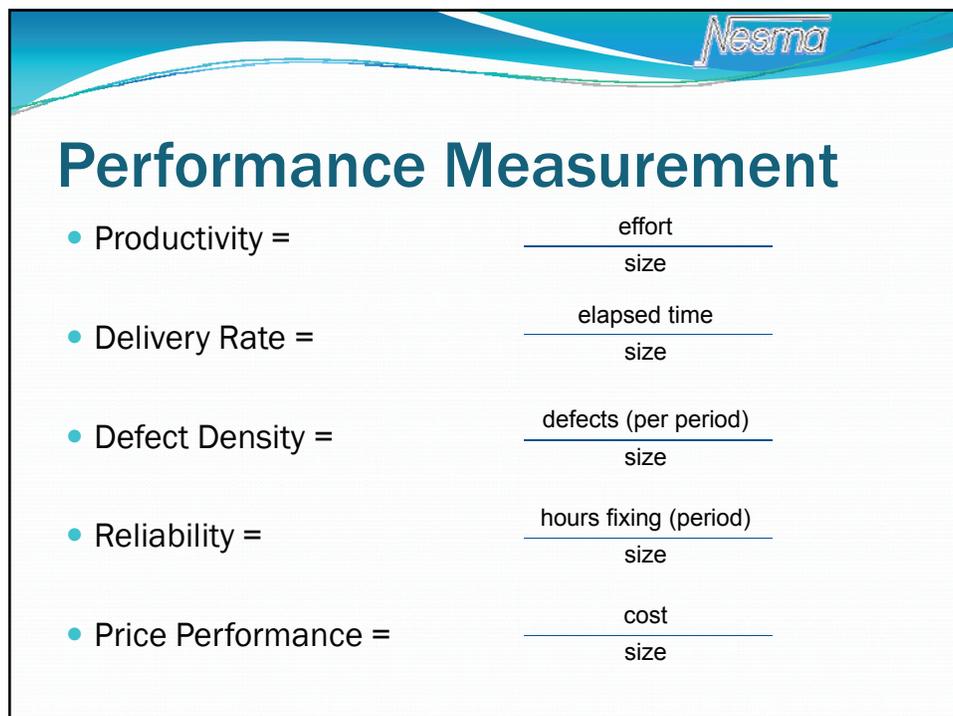
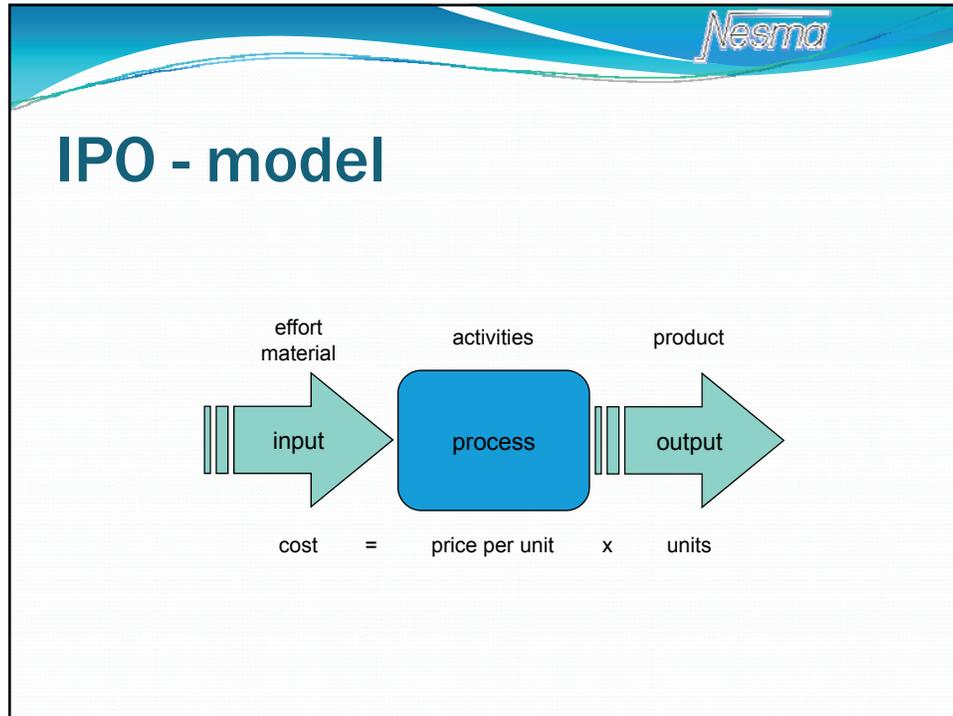


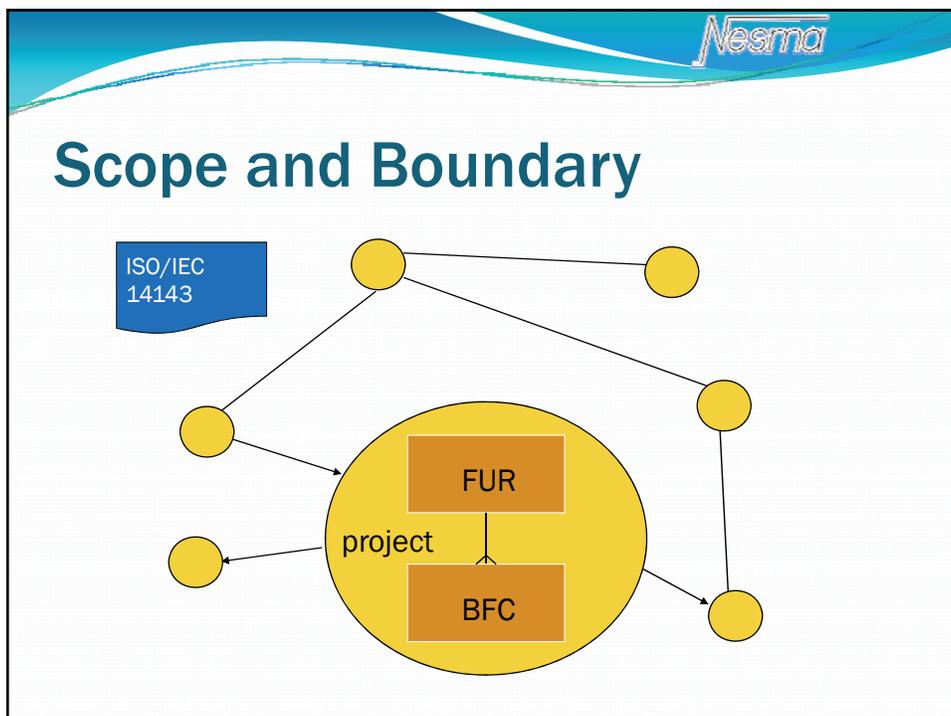
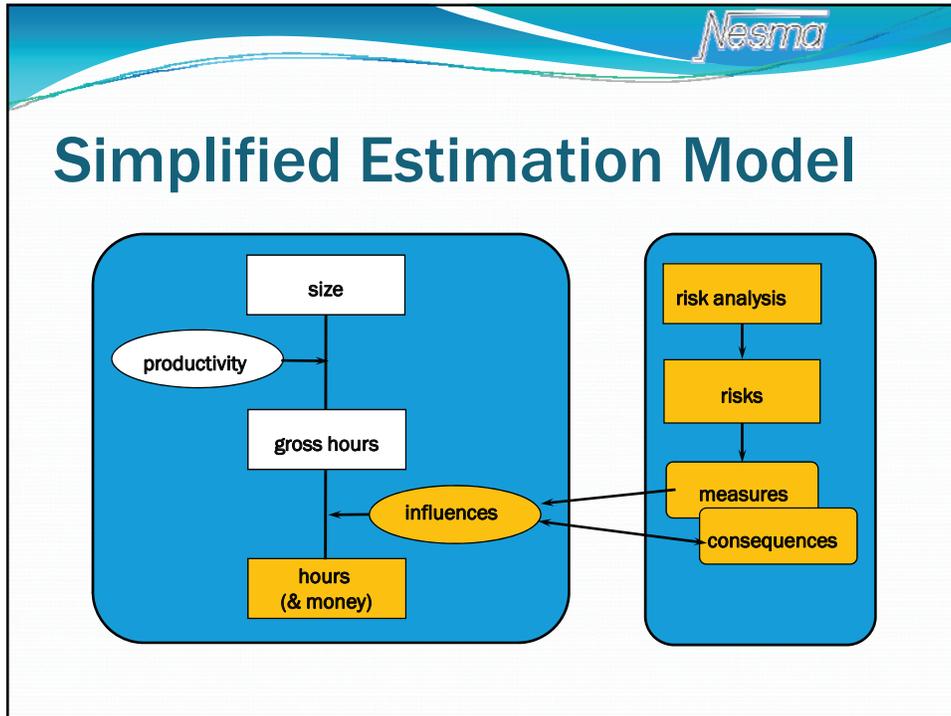
Historical data

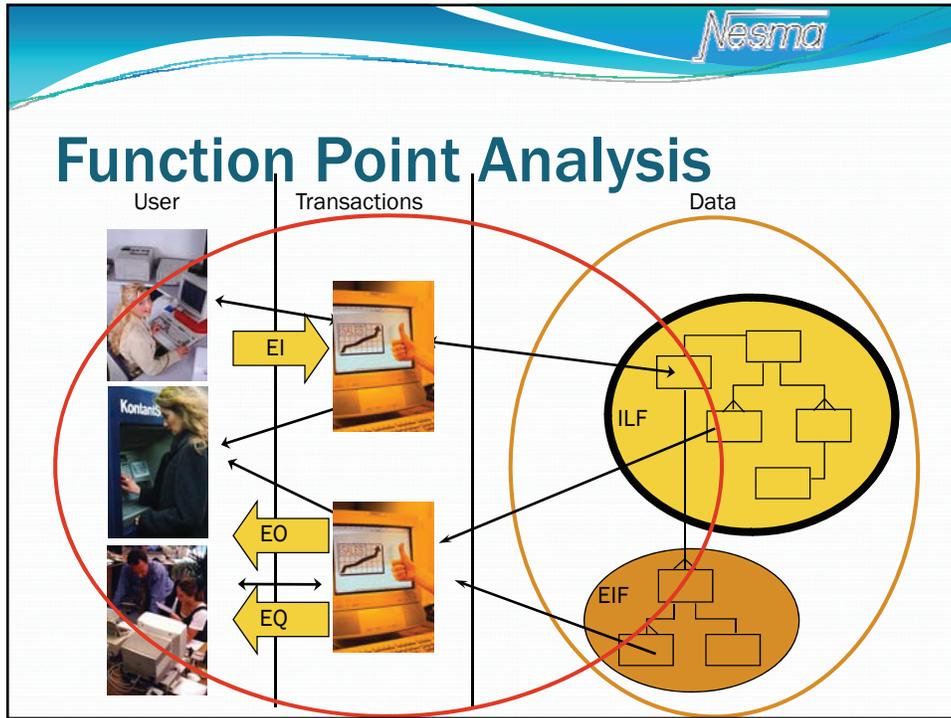
Time now

Estimate

Source: ISPA-SCEA training







FPA: Rating

- All of the components are rated based upon: DET's, and either RET's or FTR's *)

Component	RET's	FTR's	DET's
External Inputs (EI)		✓	✓
External Outputs (EO)		✓	✓
External Inquiries (EQ)		✓	✓
External Interface Files (EIF)	✓		✓
Internal Logical Files (ILF)	✓		✓

- RET Record Element Types
- FTR File Types Referenced
- DET Data Element Types

FPA: Rating values

- By Complexity Type
Low, Average, High

Component	Complexity Type		
	Low	Average	High
External Inputs (EI)	3 fp	4 fp	6 fp
External Outputs (EO)	4 fp	5 fp	7 fp
External Inquiries (EQ)	3 fp	4 fp	6 fp
External Interface Files (EIF)	5 fp	7 fp	10 fp
Internal Logical Files (ILF)	7 fp	10 fp	15 fp

- fp function point

FPA: Rating EO

- Complexity Type

FTR's	DET's		
	1-5	6-19	>19
0-1	L	L	A
2-3	L	A	H
>3	A	H	H

- FPA score

FTR's	DET's		
	1-5	6-19	>19
0-1	4 fp	4 fp	5 fp
2-3	4 fp	5 fp	7 fp
>3	5 fp	7 fp	7 fp



FPA: counting example

- Functional Process
Print birthday list (sorted by department)
Request HRM

Transaction Type	External Output
FTR	employee, department
DET	e-name, e-birthday, d-name
Complexity	Low
Score	4 fp



FPA: Size (application)

component	complexity	number	score	value
ILF	L	16	7	112
	A	0	10	0
	H	0	15	0
EIF	L	5	5	25
	A	0	7	0
	H	0	10	0
EI	L	11	3	33
	A	15	4	60
	H	19	6	114
EO	L	8	4	32
	A	18	5	90
	H	16	7	112
EQ	L	1	3	3
	A	0	4	8
	H	0	6	0
TOTAL				581

Nesma

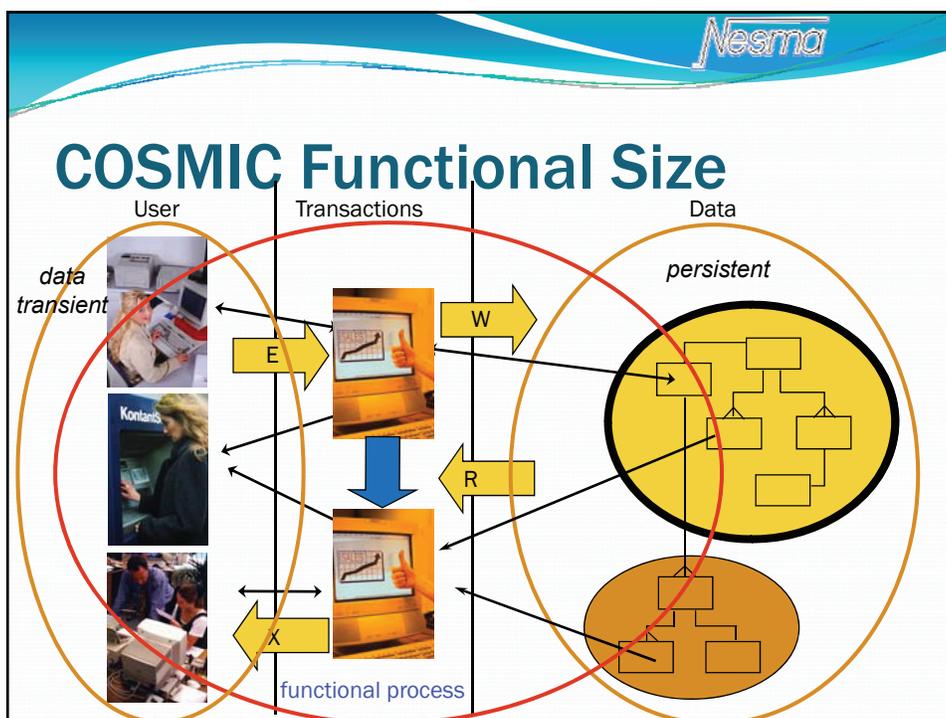
FPA: Quick validation

- NESMA 2.2 Indicative count
IFPUG 4.2 can be applied similarly
Precondition: autonomous system
- Logical Data Model

Component	Value per occurrence
External Interface Files (EIF)	15 fp
Internal Logical Files (ILF)	35 fp

- Example previous slide

Quick size	635 fp	(16 x 35) + (5 x 15)
Actual size	581 fp	cause: low number EQ



COSMIC: Rating (value)

- All of the data movements are rated equally
assumption: algorithmic complexity distributed equally

Data Movement	Value
Entry (E)	1 Cfp
Exit (X)	1 Cfp
Read (R)	1 Cfp
Write (W)	1 Cfp

- Cfp Cosmic Function Point

COSMIC: counting example

- Functional Process
Print birthday list (sorted by department)
Request HRM

Functional Process	
Data Group	Employee: e-name, e-birthday Department: d-name
Read	Employee: e-name, e-birthday
Read	Department: d-name
eXit	Employee: e-name, e-birthday
eXit	Department: d-name
	4 Cfp

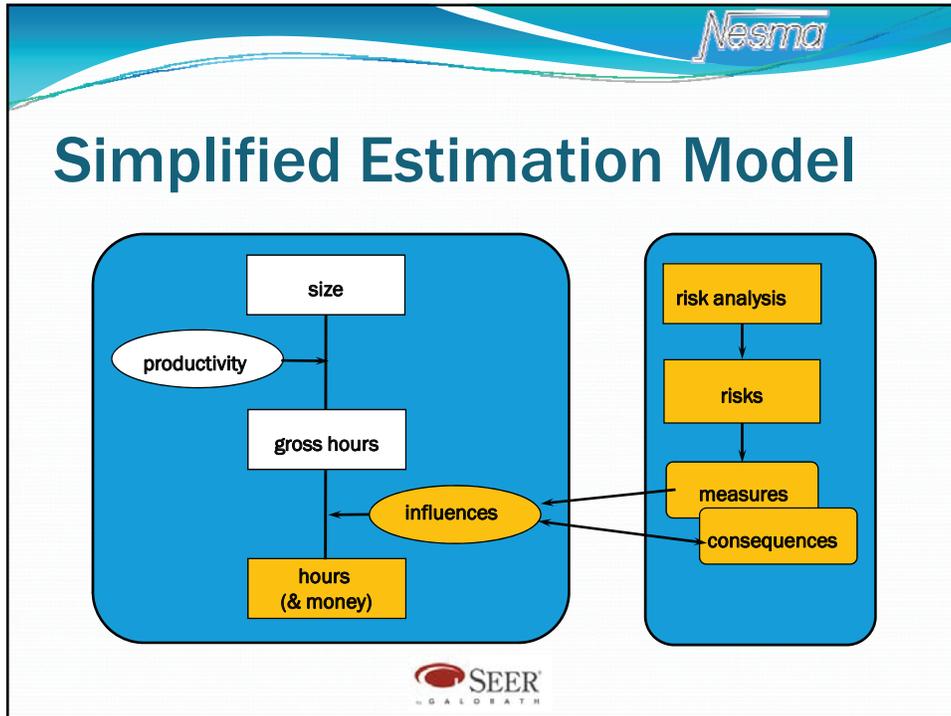
Summary

- Functional Size
A measure for what the software should do
- Functional Size
A consistent base for scenario analysis
- Functional Size
Does not include technology and quality requirement

It's (COSMIC) Function Points instead of M²

Hoe omvang te vertalen naar kosten?

Een Cost Model voor software



How to incorporate software in a budget discussion?
The small software part with a large impact



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