Impact Estimation ©

A Basic Systems Engineering Tool

Tutorial

INCOSE, Rome, 2012

Tom @ Gilb . Com www.Gilb

Content
IE Tables

- 1. IE Basics
- 2. Advanced IE
- 3. Related Disciplines: Requirements & Design
- 4. Case Studies, Examples
- 5. Comparative Tools
- 6. Standards, Templates, Rules, Principles

1. IE Basics

The Question

- How good is your design
  - for satisfying your requirements?

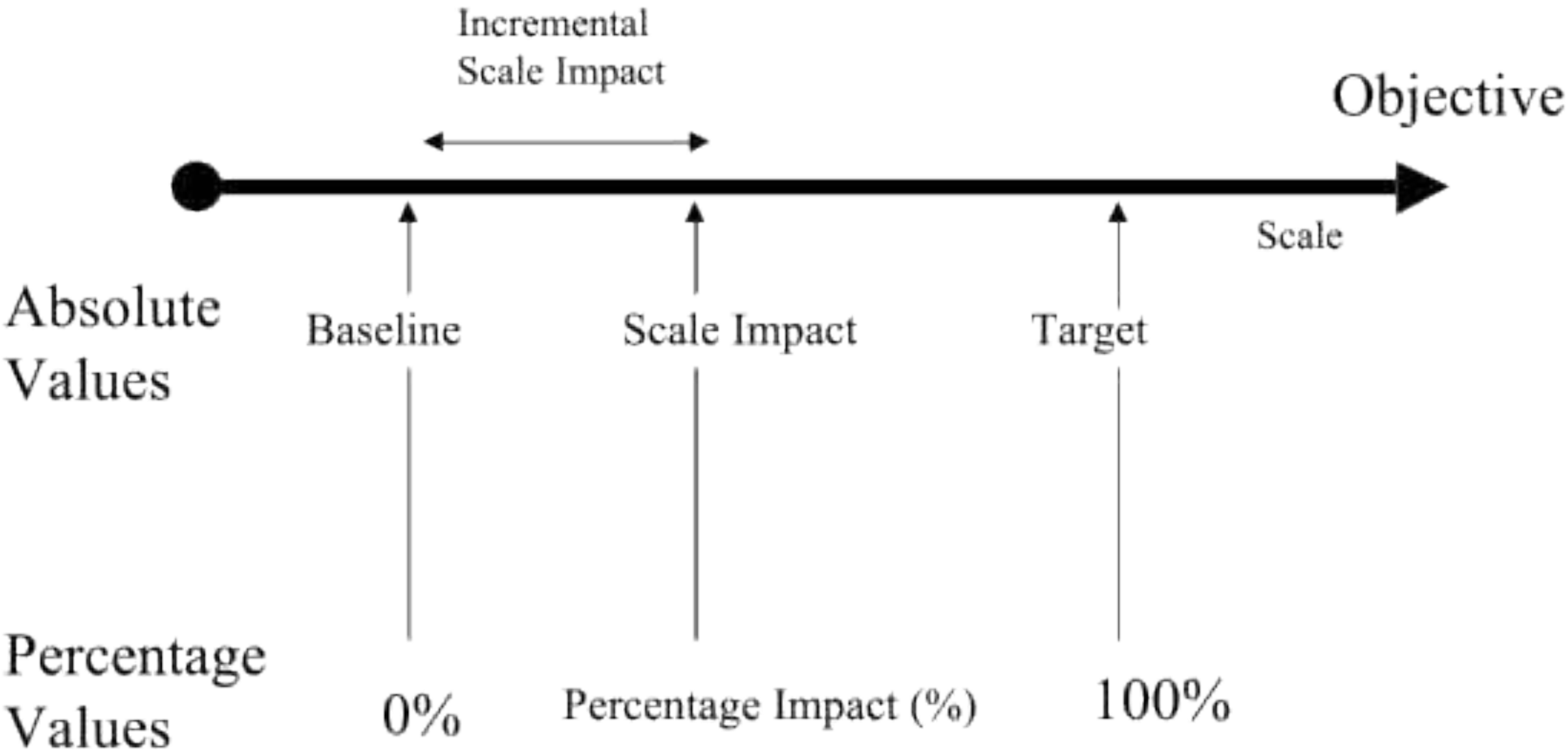
Primitive Basis a traditional design assertion

- ‘Design X
- will be the right one
- for our security requirements’

The Problems of understanding a design

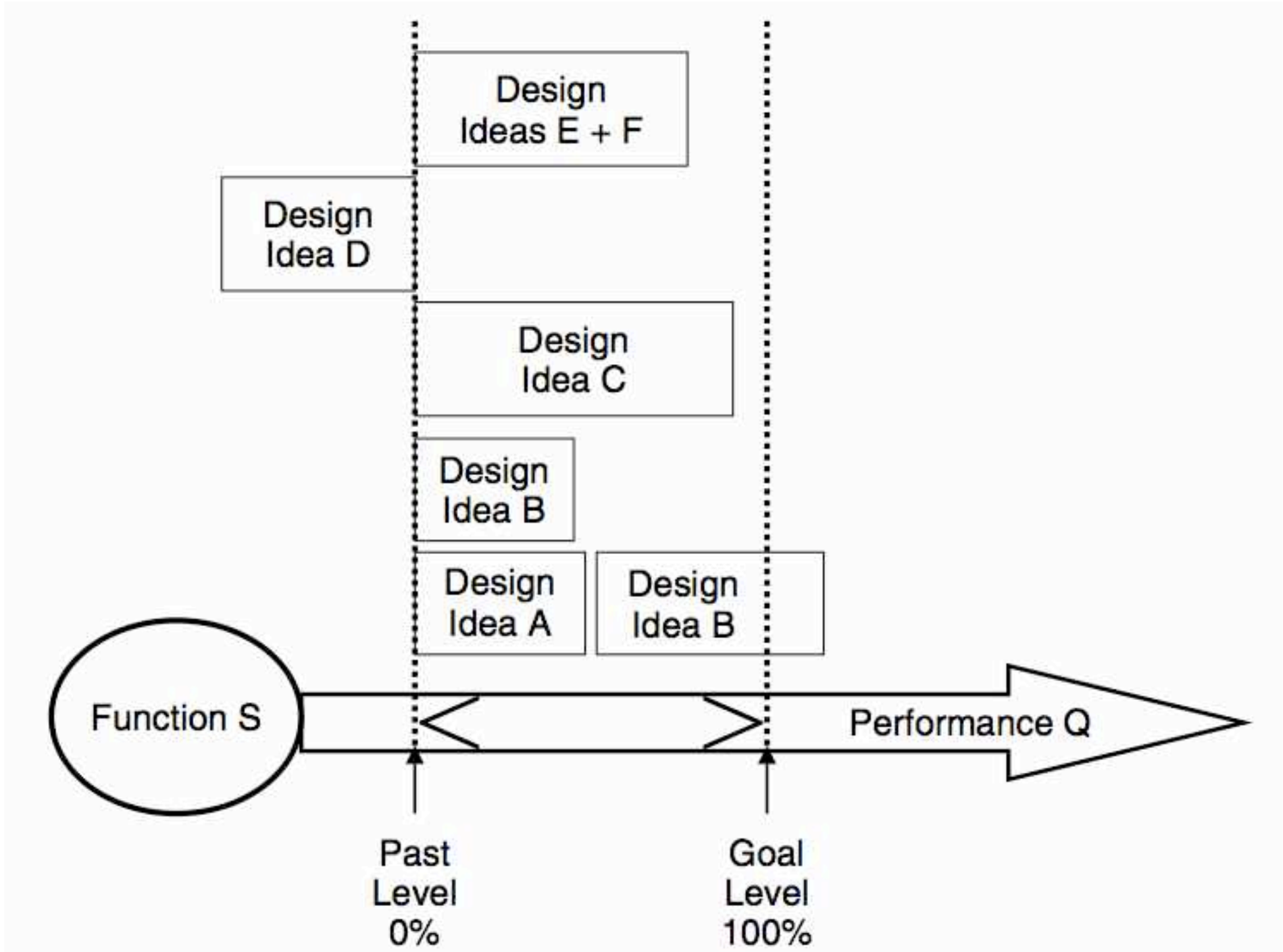
- 1. No clear definition of 'Security'
  - how much? (95% or 99.99%?)
  - what types? (detect, prevent, thrwart, fix)
  - which attacks (insider, hacker, terrorist)
  - when? (next week, next year)
- 2. No clear definition of the design
  - detail, history, costs, guarantees, side effects, risks, dependencies, issues
  - value ?

Impact Estimation Basic Concepts

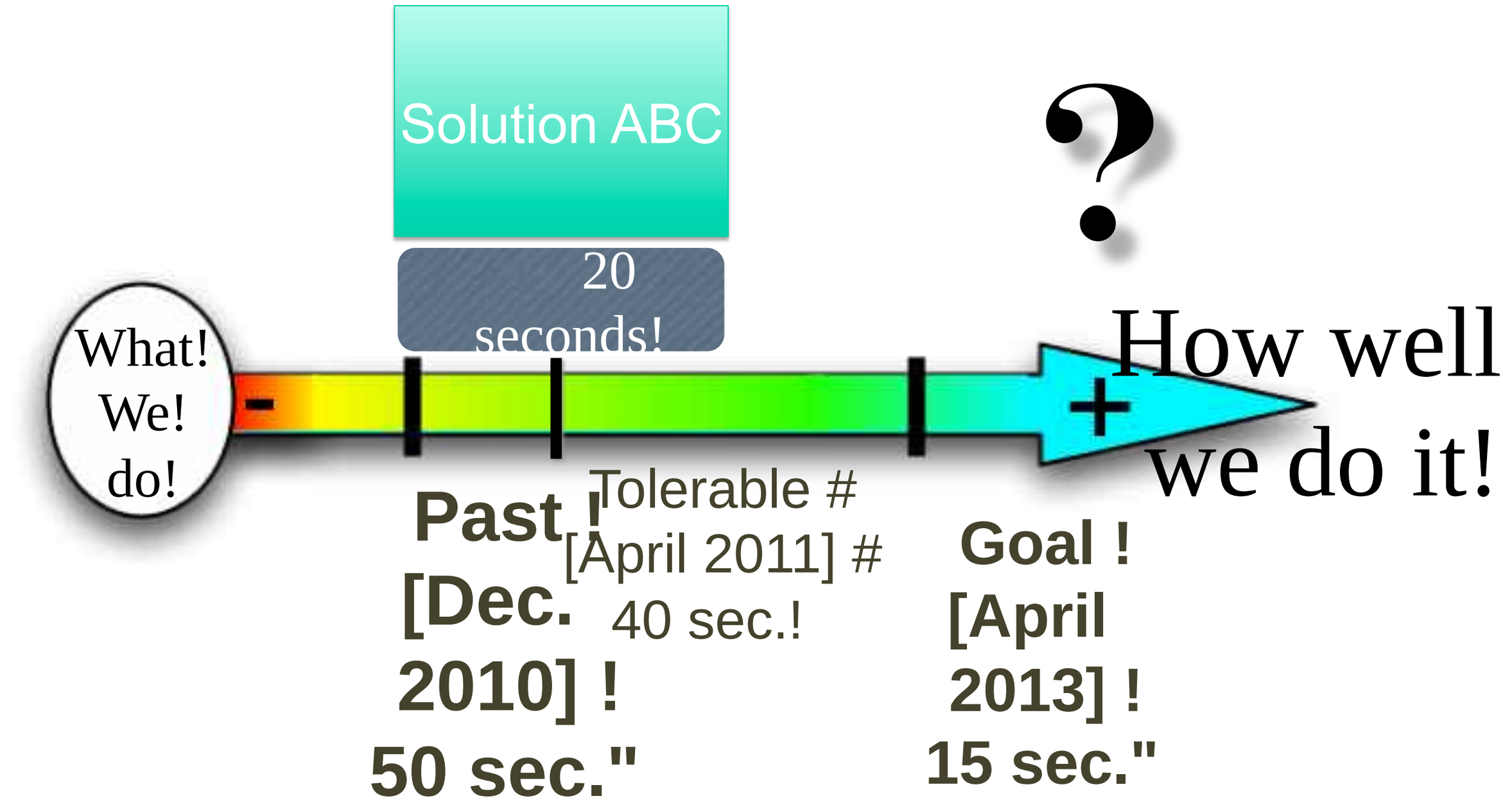


Source: Lindsey Brodie, Editor of Competitive Engineering May 2000

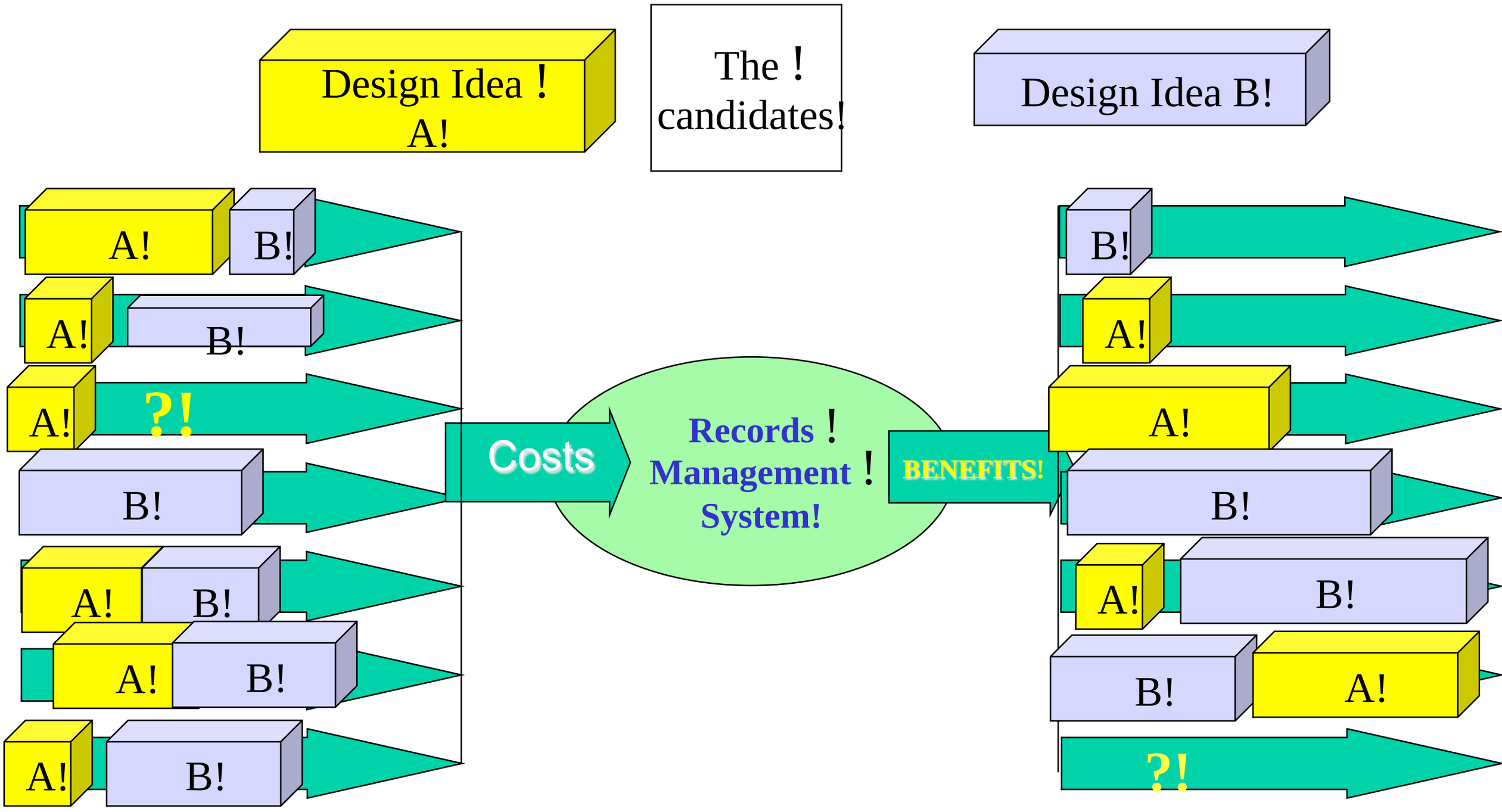
Impact Estimation Concepts



Some Concepts!
Designs, Functions, Requirements,!
Requirement levels (Constraint, Target)!

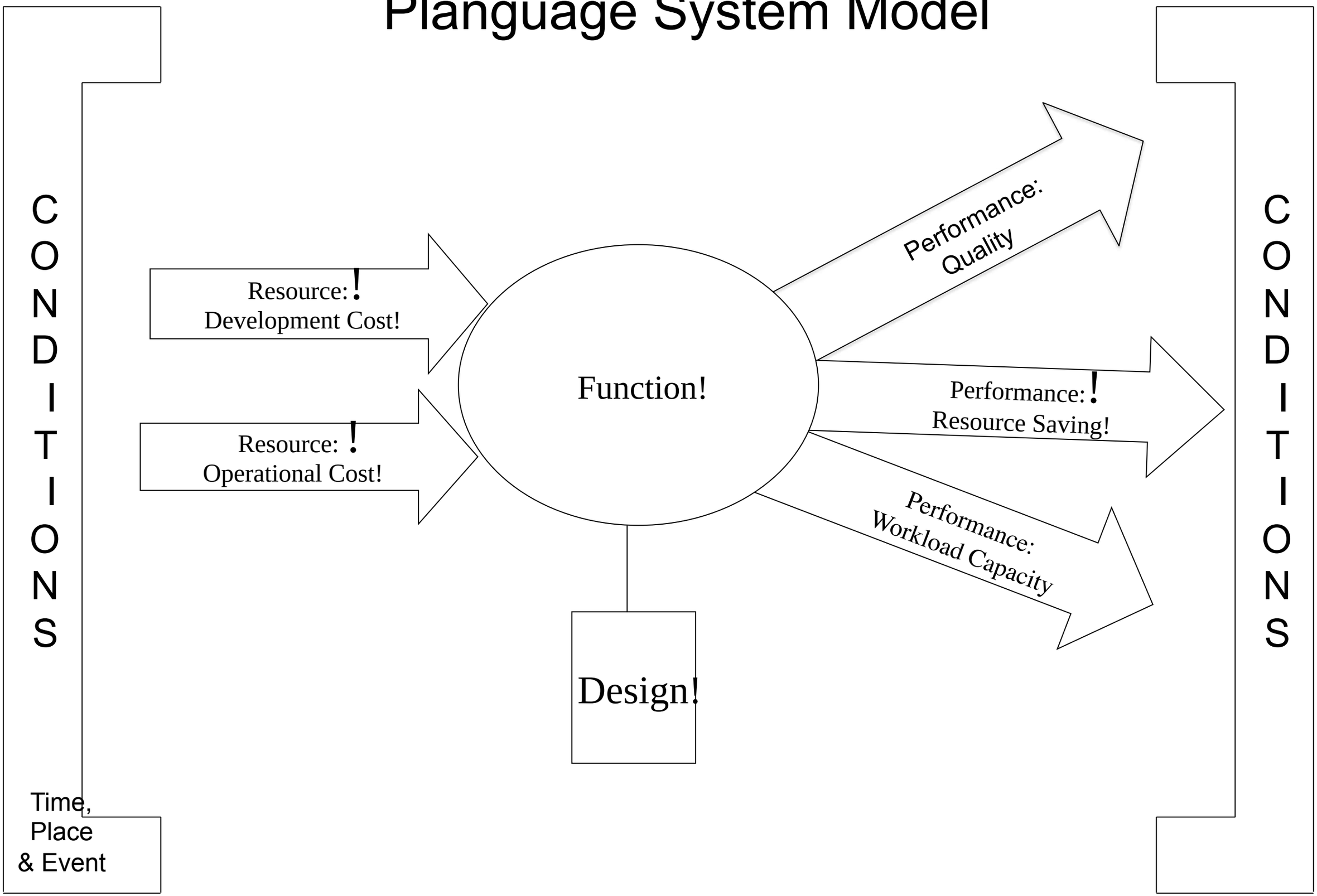


But, we have to consider side effects, and costs



Use of System Concepts and Metrics within Planguage / Impact Estimation (IE) – Bank Loan Case Study

Planguage System Model



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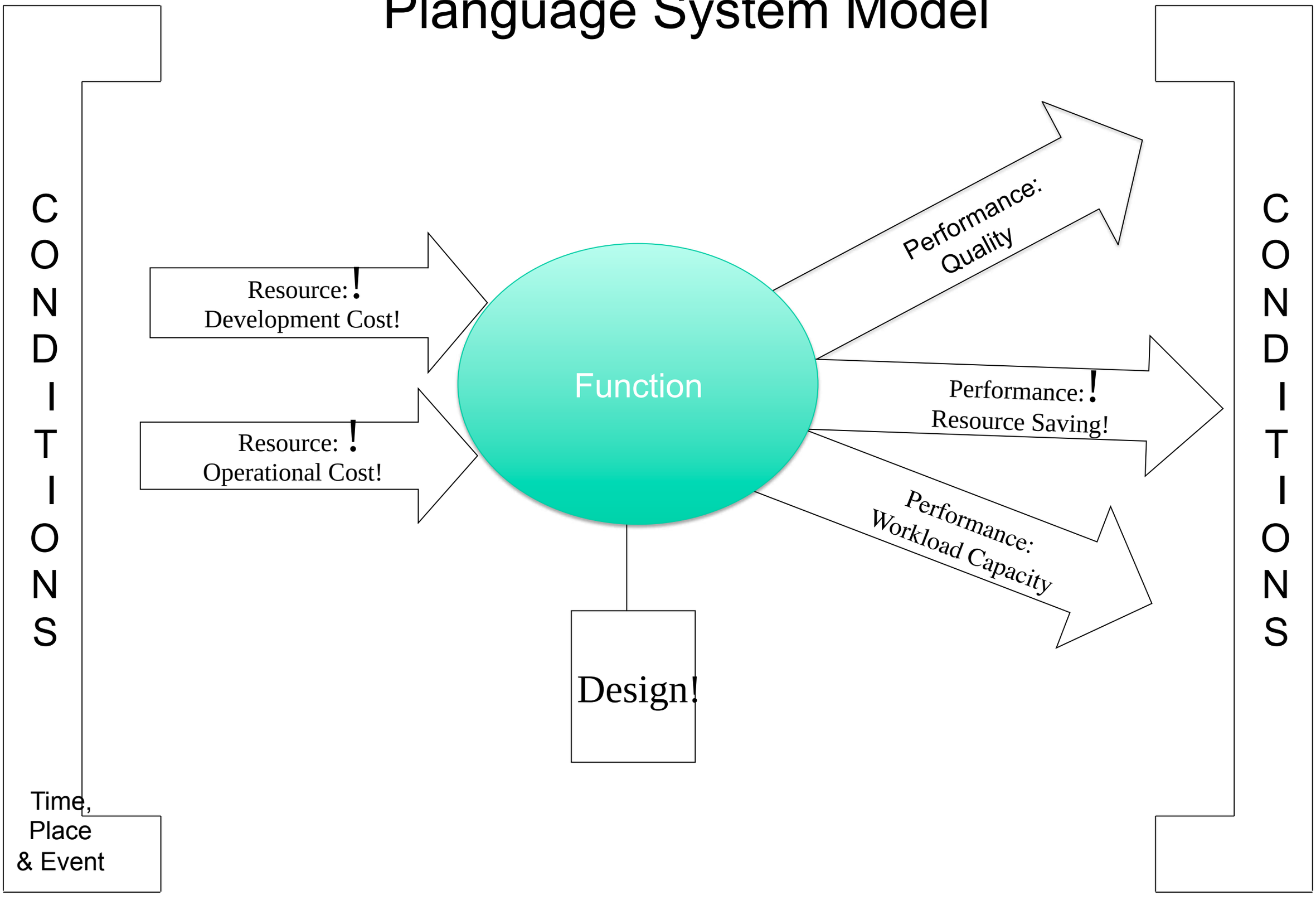
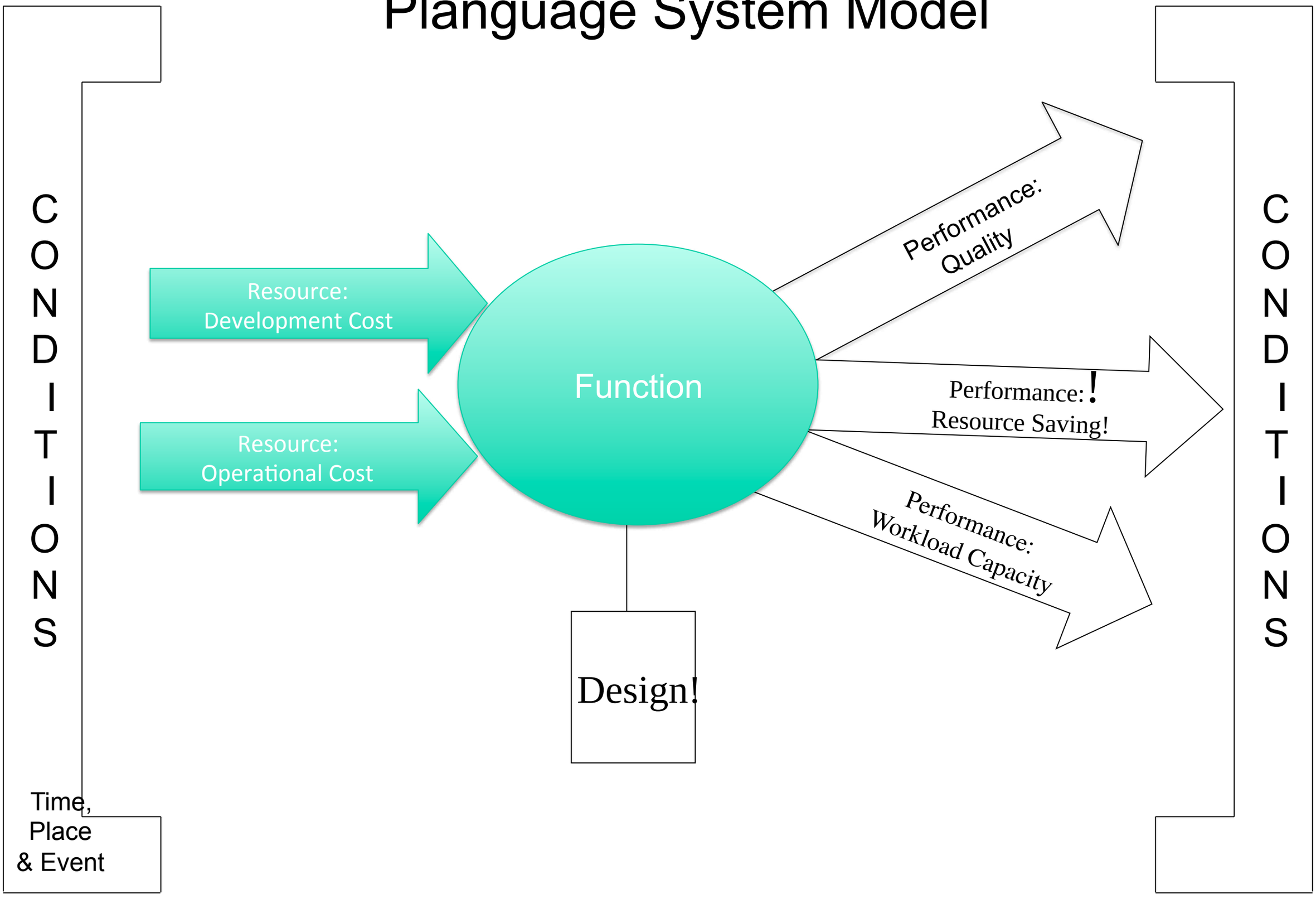
Planguage System Model



Planguage System Model



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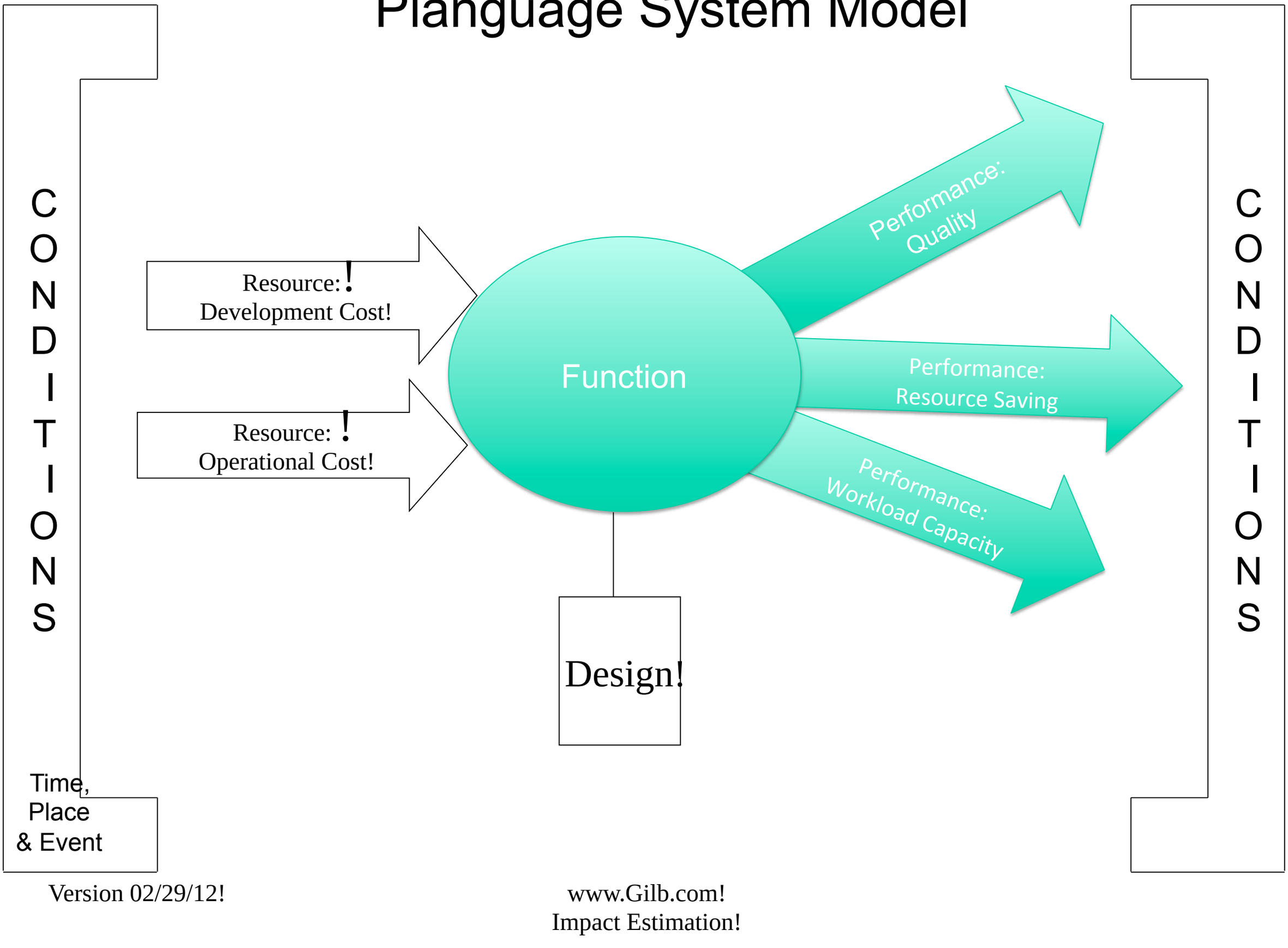

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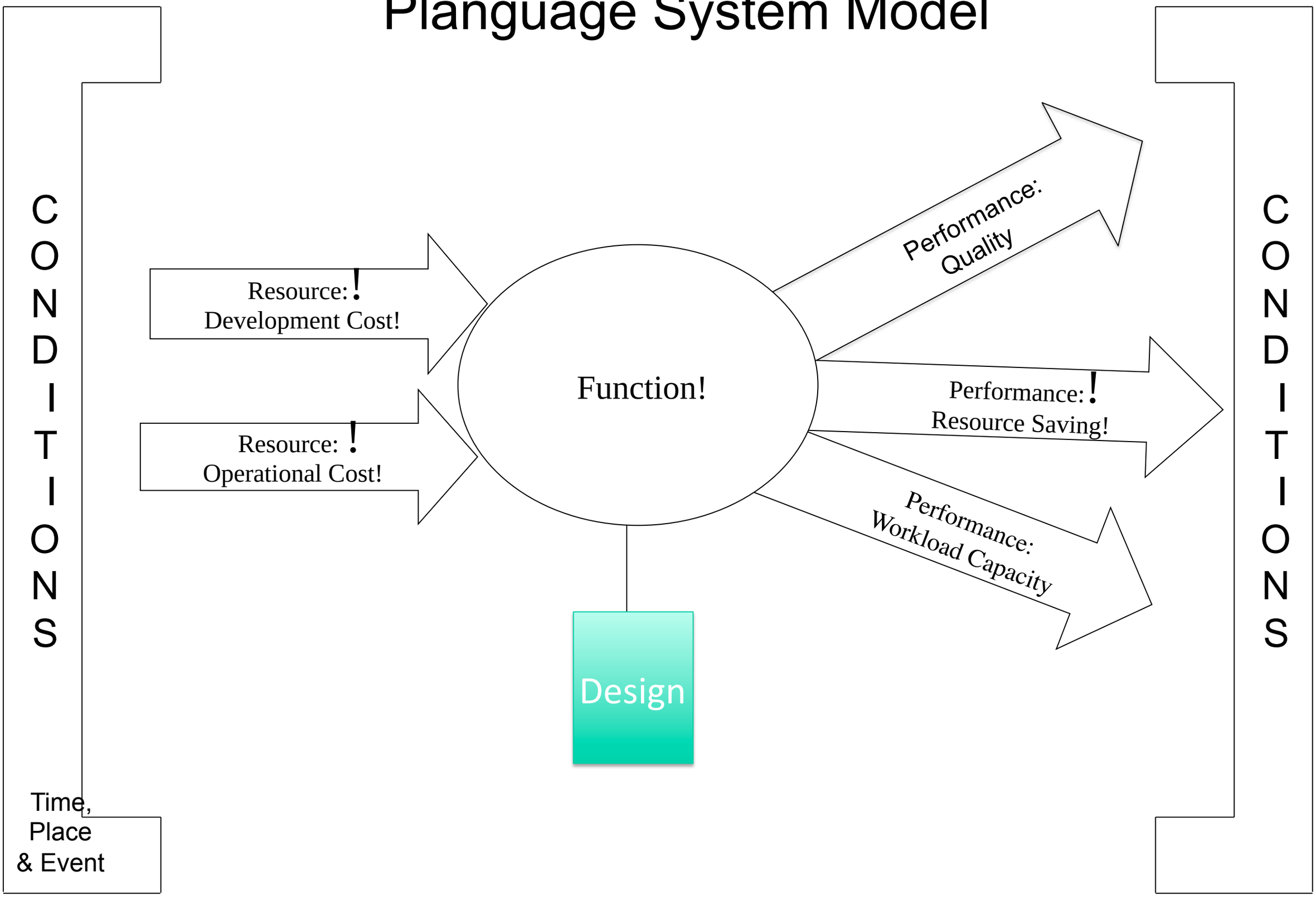

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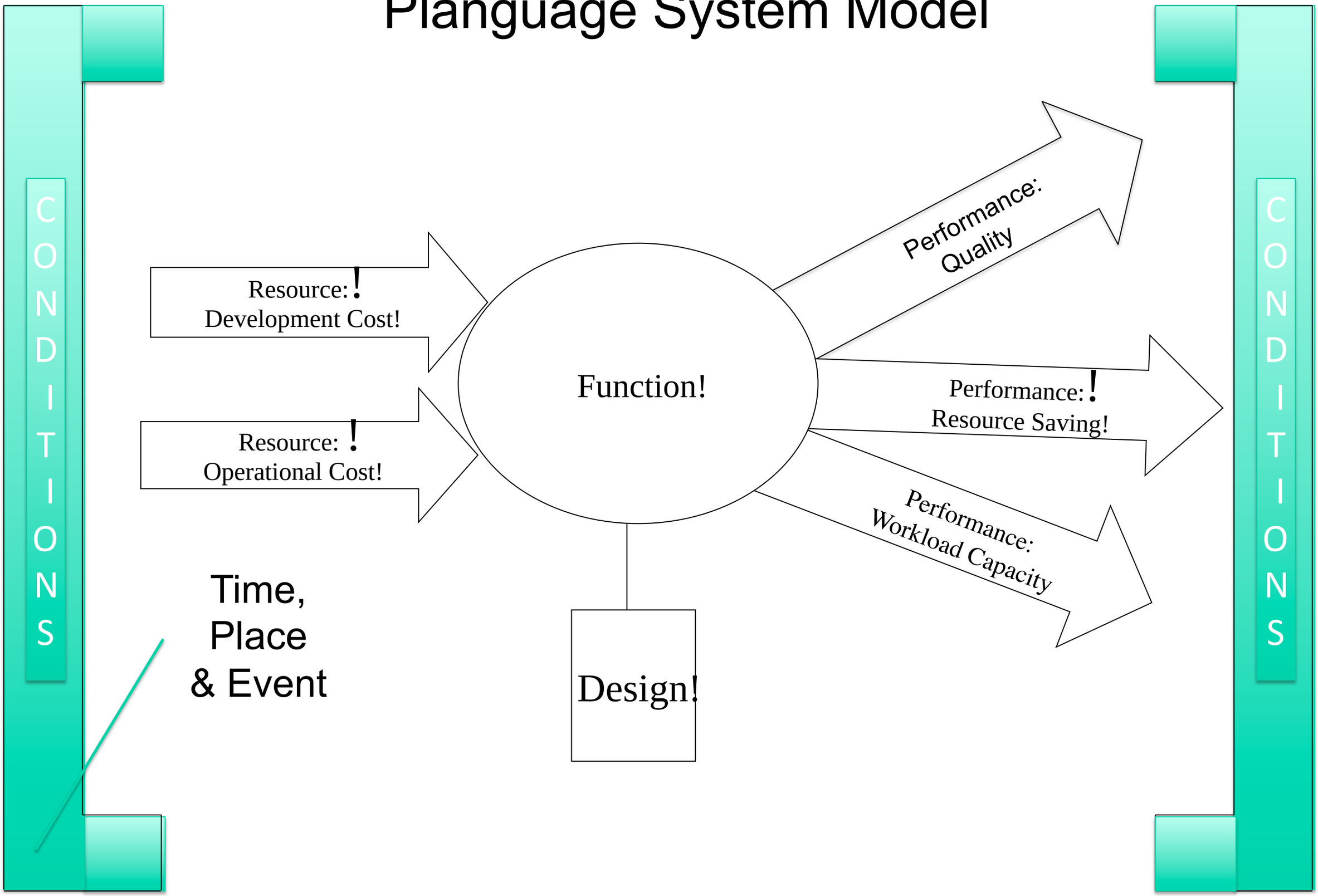
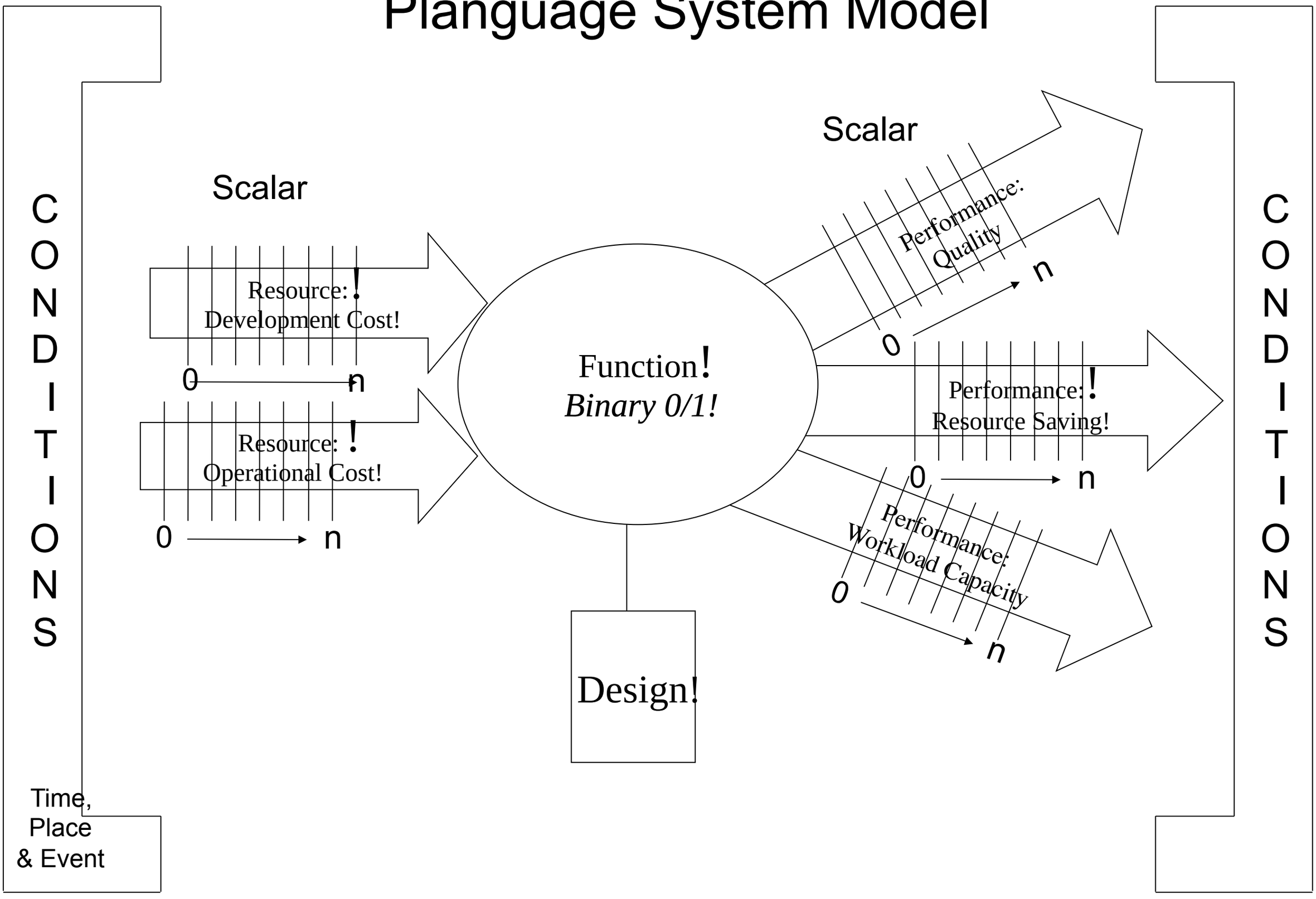
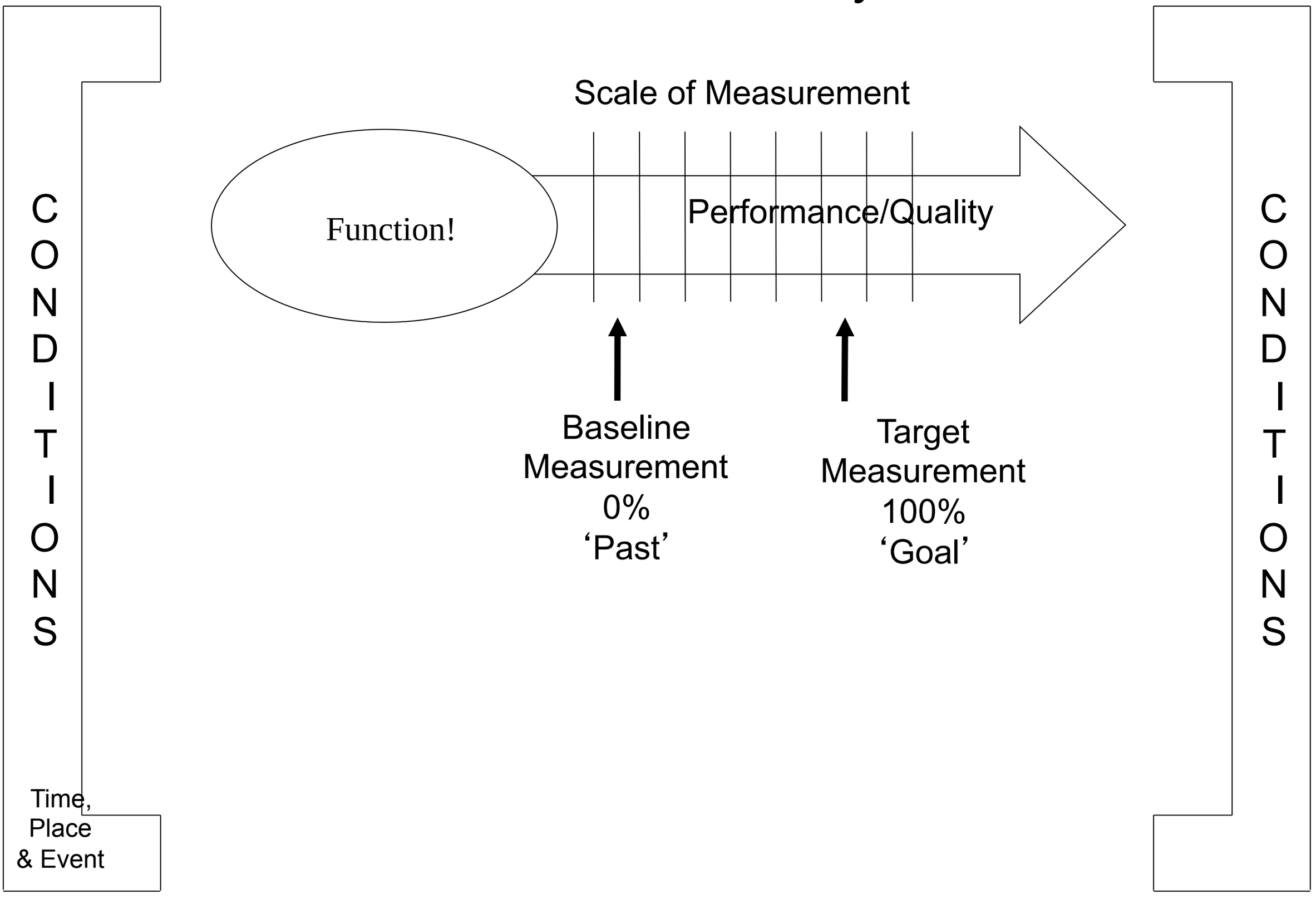


Planguage System Model

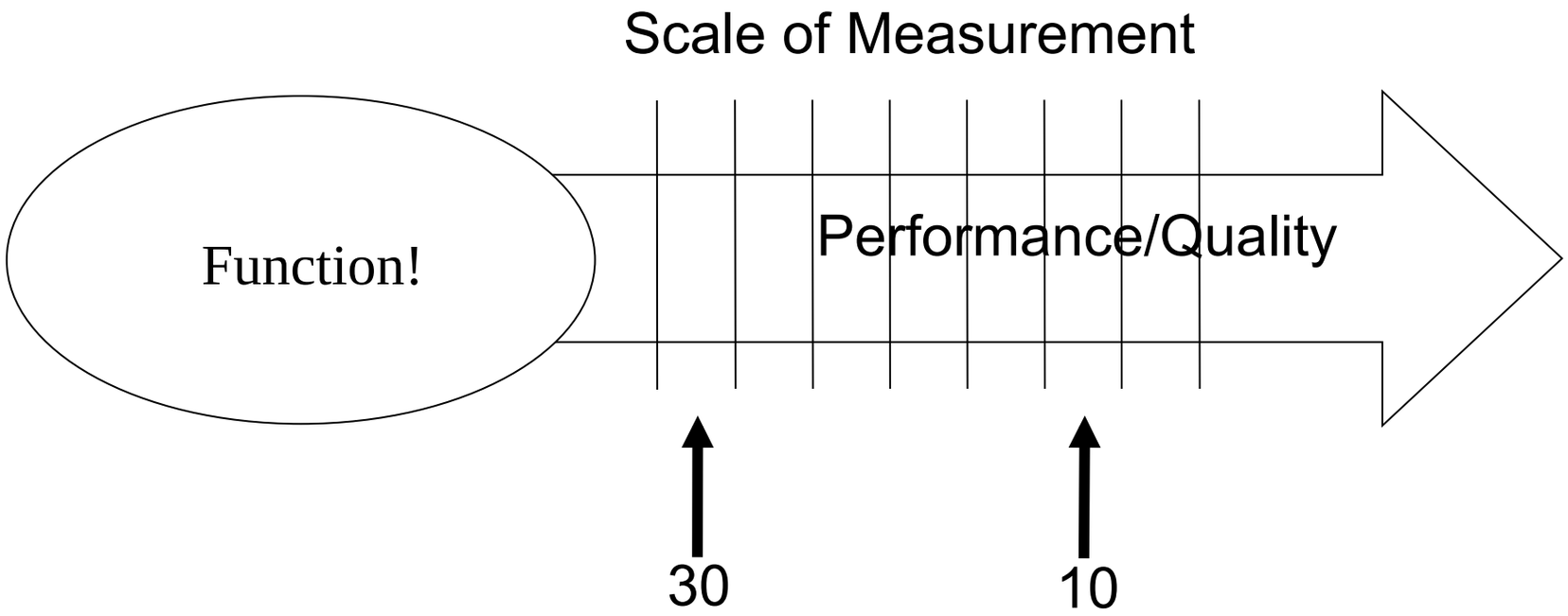


Scalar Performance/Quality Attribute



Scalar Performance/Quality Attribute

CONDITIONS



Function: Submit request.!

Performance requirement: !

!Reduce time for customer to submit request. !

Scale: Average time in minutes taken for defined [stakeholder] for defined [request type: Default = Loan]. !

Past [Customer]: **30**. !

Goal [Customer]: **10**.!

!

Past [Loan, Competitor A, July 2008]: **25**.!

CONDITIONS

Time, Place & Event

Case Study of a Bank Loan System

- "Overall aim was to speed up the processing of customer loan requests

- "Quality requirements originally expressed:
  - ""“up-to-date view”
  - ""“easy to use rules administration”
  - ""“low overhead cost”
  - ""“in a timely manner”
  - ""“high performance”

Case Study of a Bank Loan System

- "Overall aim was to speed up the processing of customer loan requests

- "Quality requirements originally expressed:
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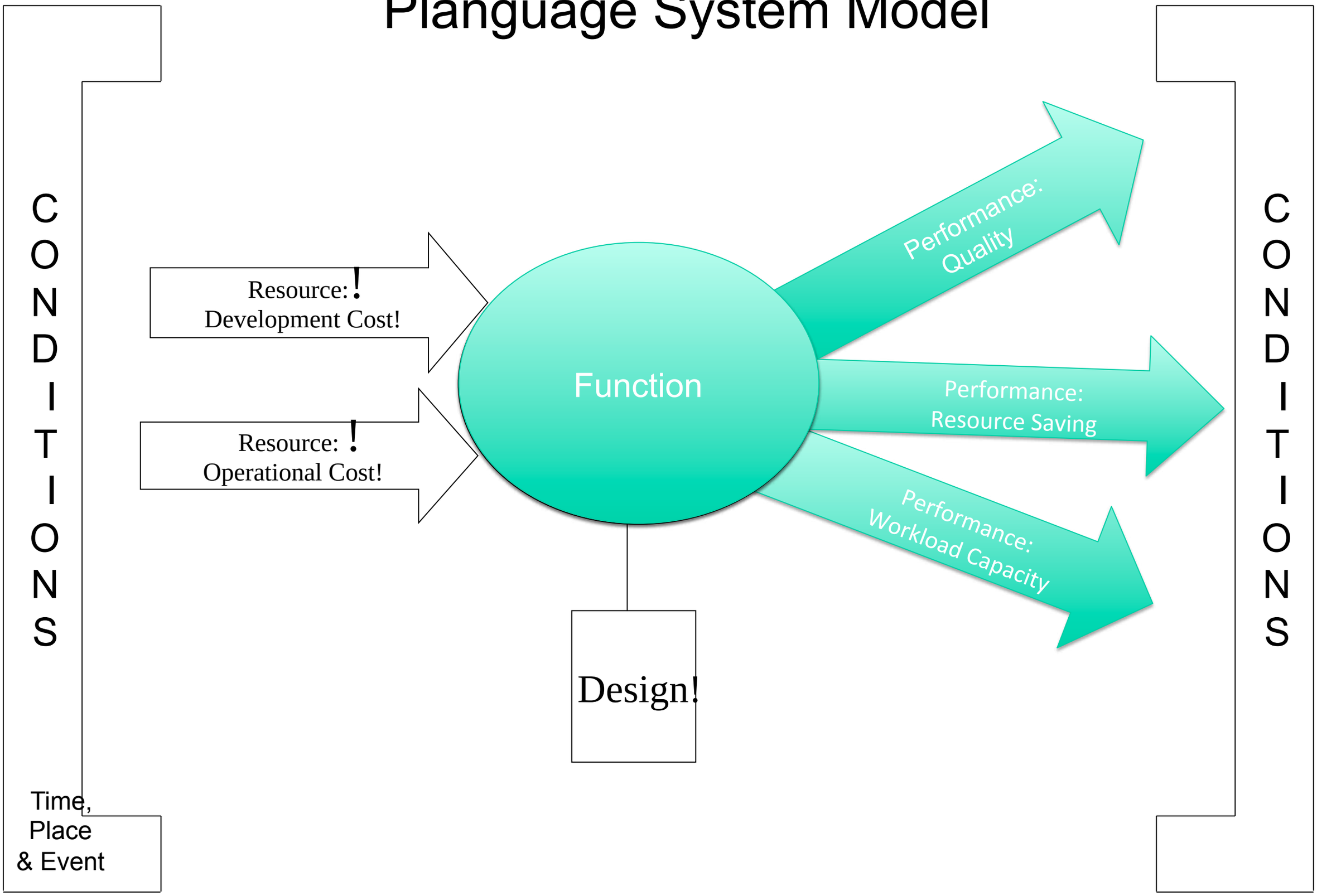
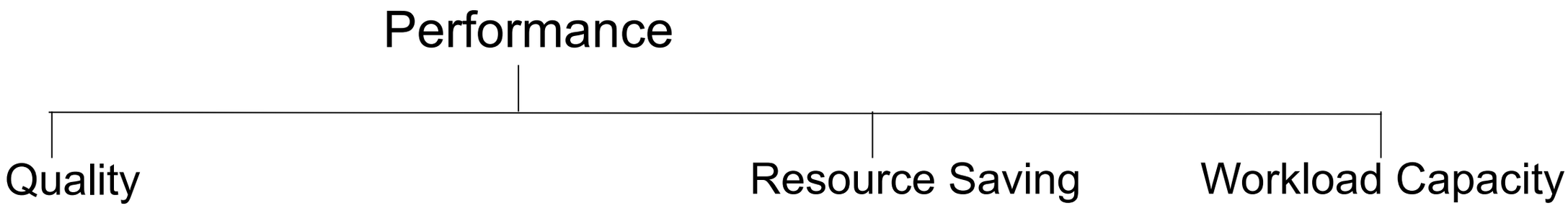
Planguage System Model



Hierarchy of Performance/Quality Attributes



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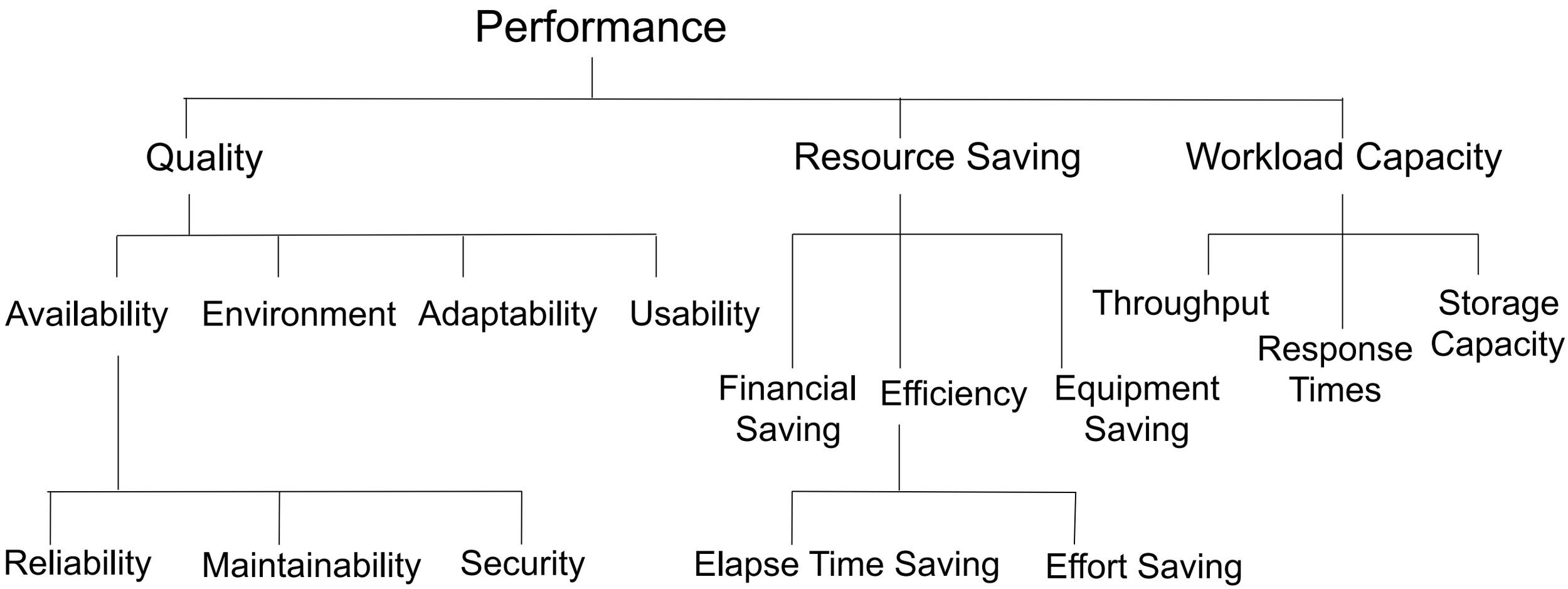

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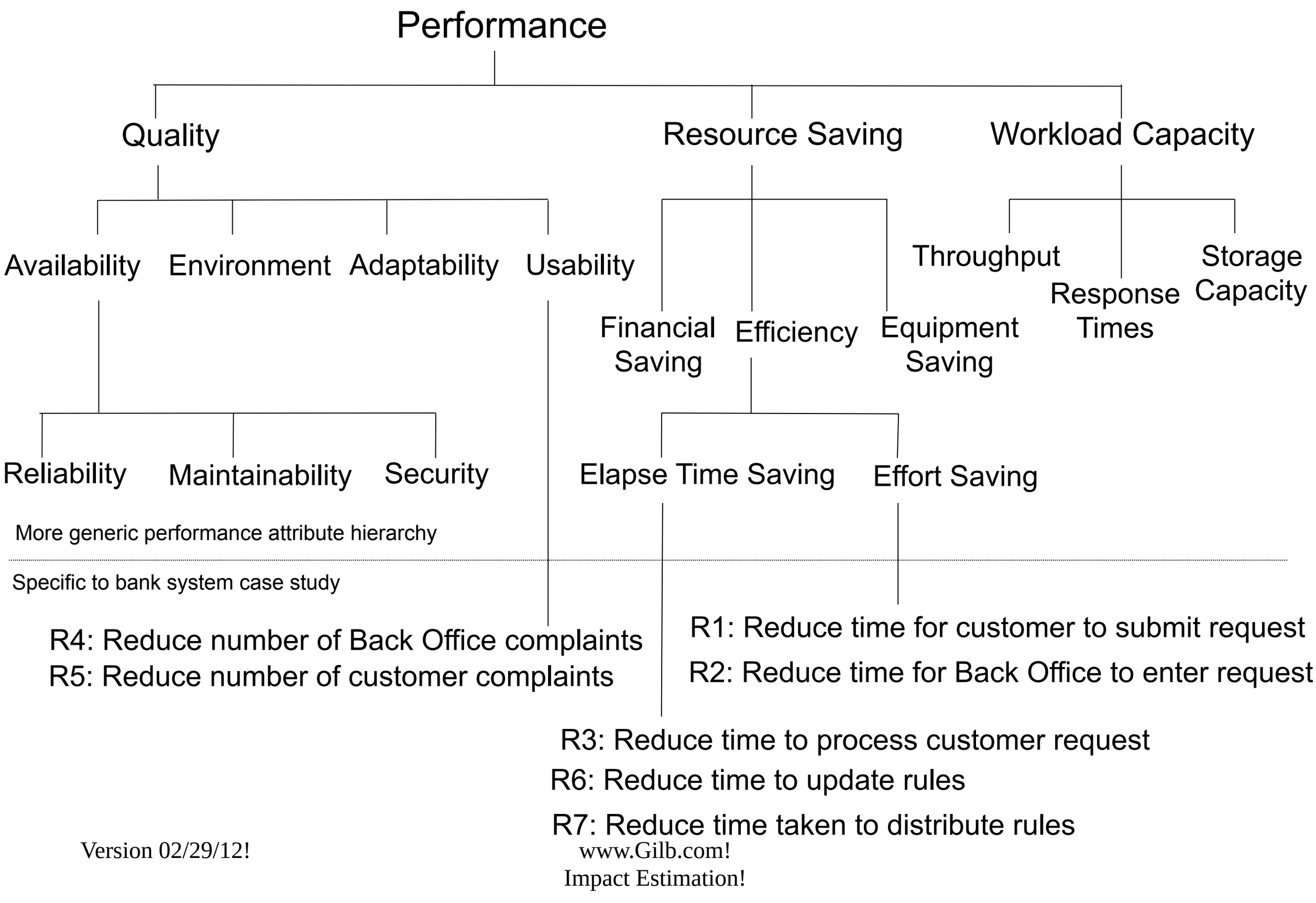

Building up an Impact Estimation Table

Performance Requirements

Requirements
R1: Time for customer to submit request 30 min <-> 10 min
R2: Time for Back Office to enter request 30 min <-> 10 min
R3: Time to process customer request 5 days <-> 20 seconds
R4: No of Back Office complaints 10 per week <-> 0
R5: No of customer complaints 25 per week <-> 5
R6: Time to update business rules 1 month <-> 1 day
R7: Time to distribute business rules 2 weeks <-> 1 day

!
Time for customer to submit request!
!
Past: 30. !
!Baseline 0%!
!
Goal: 10. !
!Target 100%!

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Building up an Impact Estimation Table

Some specific Conditions
- A snapshot of the system at a specific future date

Bank System By End Date: dd/mm/yyyy				
Requirements				
Performance Requirements				
R1: Time for customer to submit request 30 min <-> 10 min				
R2: Time for Back Office to enter request 30 min <-> 10 min				
R3: Time to process customer request 5 days <-> 20 seconds				
R4: No of Back Office complaints 10 per week <-> 0				
R5: No of customer complaints 25 per week <-> 5				
R6: Time to update business rules 1 month <-> 1 day				
R7: Time to distribute business rules 2 weeks <-> 1 day				
Resource Requirements Development Budget 2.5M <-> 300K				

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Designs
-"Brief Descriptions
-"Dependencies
-"Proposed Increments

Impact of the Development Cost of the Designs on Resource Requirements (Devt. Budget)

Development Cost or Other Costs for Design

Bank System

By End Date: dd/mm/yyyy

Requirements	Designs by expected Increment with design dependencies			
	1	2	3	4
	D1: Automate Rules + Manual Testing	D2: Back Office Loan Decisioning	D3: Web Self-Service	D4: Automate Rules + Automate Testing
R1: Time for customer to submit request 30 min <-> 10 min				
R2: Time for Back Office to enter request 30 min <-> 10 min				
R3: Time to respond to customer request 5 days <-> 20 seconds				
R4: No of Back Office complaints 10 per week <-> 0				
R5: No of customer complaints 25 per week <-> 5				
R6: Time to update business rules 1 month <-> 1 day				
R7: Time to distribute business rules 2 weeks <-> 1 day				
Cumulative Total for Performance Requirements				
Development Budget 2.5M <-> 300K	2.3	2.0	1.0	0.5
Development Cost for Design	0.2	0.3	1.0	0.5
Cumulative Performance to Devt. Cost Ratio				

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An Impact Estimation Table

Key:
s = seconds
m = minutes
d = days
w = week

Designs by expected Increment with design dependencies

Bank System

By End Date: dd/mm/yyyy

Requirements	1 D1: Automate Rules + Manual Testing	2 D2: Back Office Loan Decisioning	3 D3: Web Self-Service	4 D4: Automate Rules + Automate Testing
R1: Time for customer to submit request 30 min <-> 10 min	-	-	10 m 100%	-
R2: Time for Back Office to enter request 30 min <-> 10 min	-	-	0 m 150%	-
R3: Time to respond to customer request 5 days <-> 20 seconds	-	1 d 80%	20 s 100%	-
R4: No of Back Office complaints 10 per week <-> 0	5 50%	<1 90%	0 100%	(2) (80%)
R5: No of customer complaints 25 per week <-> 5	-	15 50%	5 100%	-
R6: Time to update business rules 1 month <-> 1 day	2 w 50%	-	-	1 d 100%
R7: Time to distribute business rules 2 weeks <-> 1 day	1 d 100%	-	20 s 103%	-
Cumulative Total for Performance Requirements	200%	170%	280%	50%
Development Budget 2.5M <-> 300K	2.3	2.0	1.0	0.5
Development Cost for Design	0.2	0.3	1.0	0.5
Cumulative Performance to Devt. Cost Ratio	1000	567	280	100

Impacts
-"Note this is simplified
not showing
any uncertainty,
credibility or
source data here

Total of the performance impacts for a design

Performance to Cost Ratio

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An Impact Estimation Table

Key:
s = seconds
m = minutes
d = days
w = week

Designs by expected Increment with design dependencies

Bank System

By End Date: dd/mm/yyyy

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Impact Estimation

Planguage System Model

CONDITIONS

Development Costs!

Annual Operational Budget!

Function!

Design!

Reliability

Maintainability

Security!

Adaptability!

Environment!

Usability

Efficiency

CONDITIONS

Designs Planned/Achieved

Design 1!

Design 2!

Design 3!

Requirements	Design 1 - Increment 1	Design 2 - Increment 2	Design 3 - Increment 3	Total Design (if complementary designs)
Performance Requirement A Baseline <-> Target				
Performance Requirement B Baseline <-> Target				
Total for Performance Requirements				
Development Budget				
Annual Operational Budget				
Development Cost for Design				
Performance to Development Cost Ratio				

Impact Estimation (IE)

System XYZ

Version 02/29/12!

By End Date: dd/mm/yyyy

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Impact Estimation!

Planguage System Model

CONDITIONS

Development Costs!

Annual Operational Budget!

Function!

Design!

Reliability

Maintainability

Security!

Adaptability!

Environment!

Usability

Efficiency

CONDITIONS

Designs Planned/Achieved

Design 1!

Design 2!

Design 3!

Increment 1

Increment 2

Increment 3

Total Design

(Elementary designs)

Baseline

Baseline

Total Performance

Development Budget

Annual Operational Budget

Development Cost for Design

Performance to Development Cost Ratio

Note the mapping - IE captures all of the system concepts including increments

System XYZ

Version 02/29/12!

By End Date: dd/mm/yyyy

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Impact Estimation!

An Impact Estimation Table

‘-’ means 0%
Or no effect

But what’s the stakeholder value?

What if one stakeholder carried out this transaction 10 times a day and another 2000 times a day?

(there are more slides on This subject, but NOT here!)

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Key:
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m = minutes
d = days
w = week

Bank System

By End Date: dd/mm/yyyy

Designs by expected Increment with design dependencies

Requirements	1 D1: Automate Rules + Manual Testing	2 D2: Back Office Loan Decisioning	3 D3: Web Self-Service	4 D4: Automate Rules + Automate Testing
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Value Decision Tables

Product Values		
Product Value 1		
Product Value 2		
Resources		

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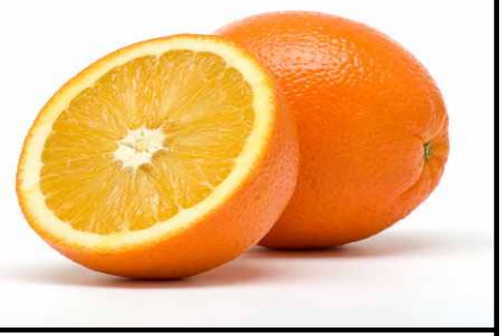
Value Decision Tables

Product Values		
Product Value 1		
Product Value 2		
Resources		

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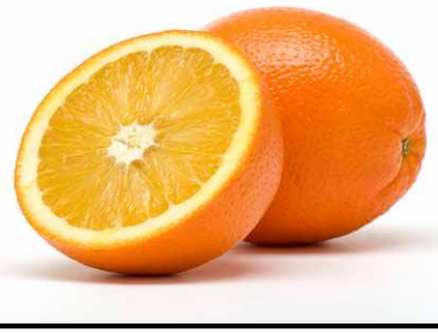
Product Values			
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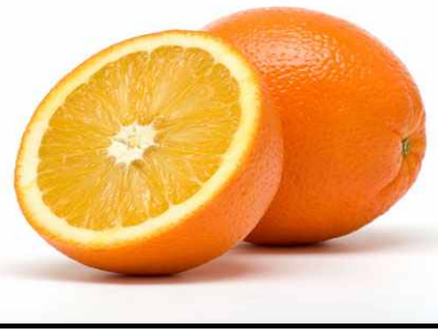
Product Values			
Taste			
Resources			

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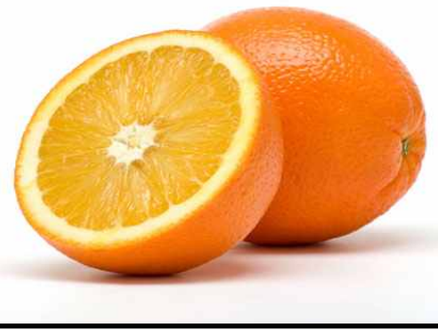
Value Decision Tables

Product Values			
Taste			
Nutrition			
Resources			

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Value Decision Tables

Product Values			
Taste			
Nutrition			
Shelf Life			
Resources			

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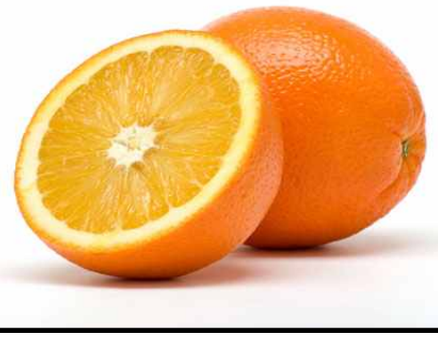
Value Decision Tables

Product Values			
Taste			
Nutrition			
Shelf Life			
Sum Goodies			
Resources			

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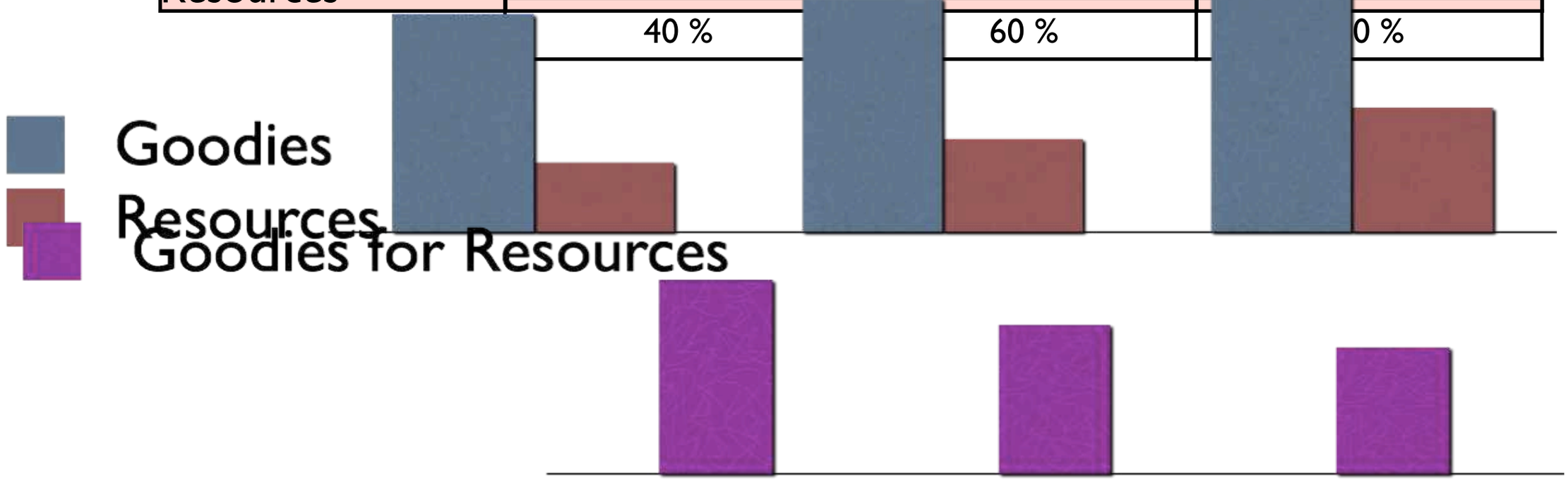
Value Decision Tables

Product Values			
Taste	20 %	50 %	90 %
Nutrition	30 %	70 %	90 %
Shelf Life	80 %	30 %	-10 %
Sum Goodies	130 %	150 %	170 %
Resources	40 %	60 %	0 %



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Value Decision Tables

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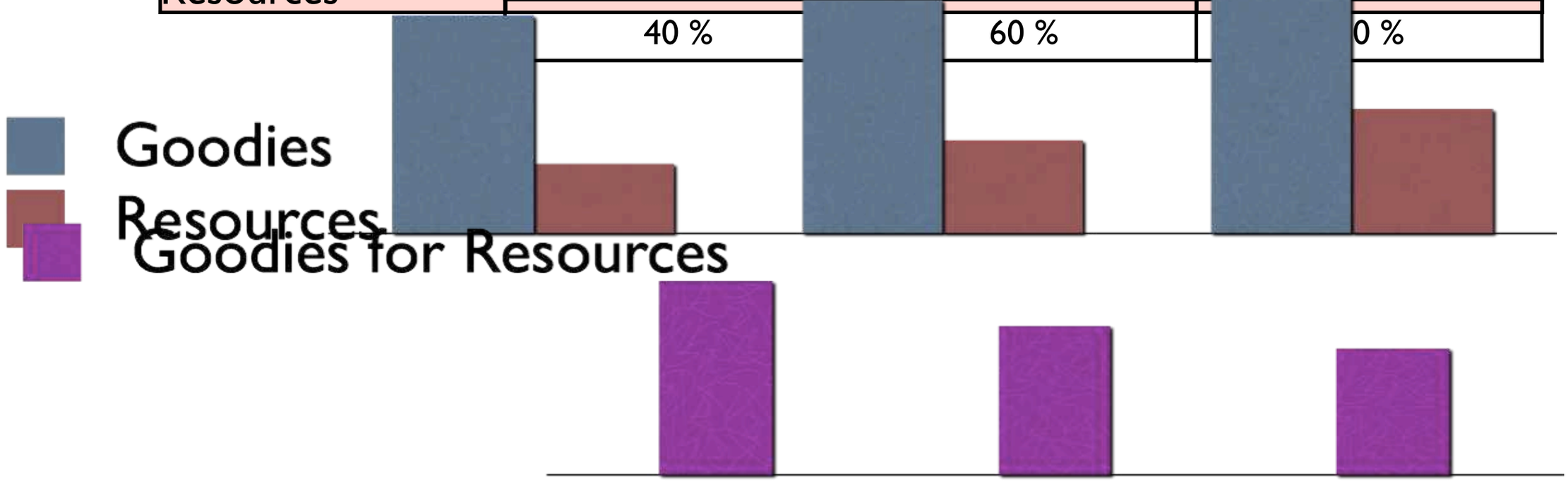
Taste	20 %	50 %	90 %
Nutrition	30 %	70 %	90 %
Shelf Life	80 %	30 %	-10 %
Sum Goodies	130 %	150 %	170 %
Resources	40 %	60 %	0 %



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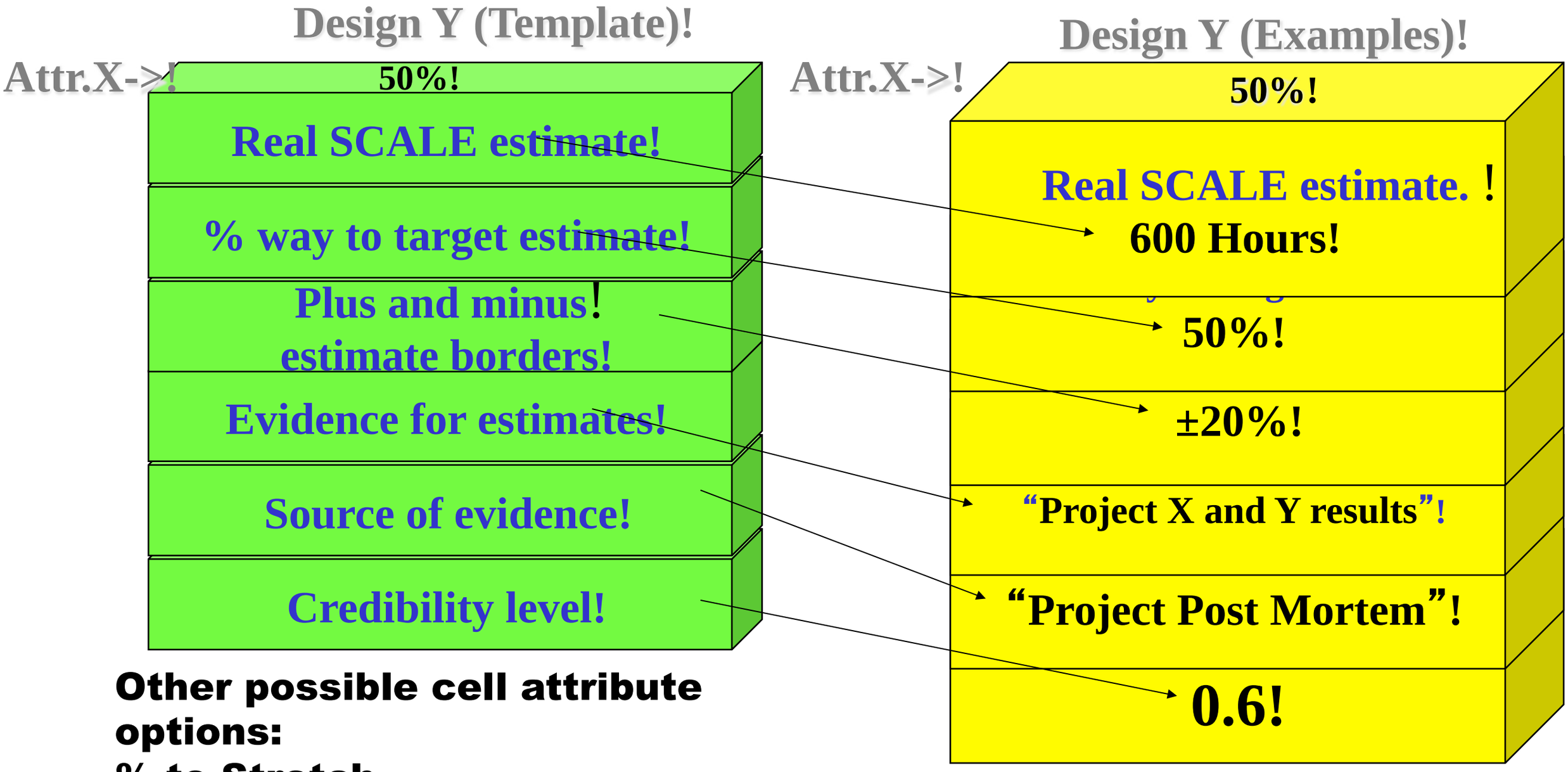
- 2. Advanced IE

  - How do we make estimates?
  - How do we document quality of estimates?
  - IE is a risk analysis and documentation tool
  - IE has a wide variety of practical applications
  - How does IE compare to other methods like QFD (Quality Function Deloyment)

Impact Estimation: Cell Depth



Other possible cell attribute options:
% to Stretch
% to Goal [other qualifier]
Owner of estimate. “Tom”
Version: 1.01
Date of Estimate: Oct 9, 2011

Credibility Table

Credibility Rating	*Meaning*
0.0	Wild guess, no credibility
0.1	We know it has been done somewhere
0.2	We have one measurement somewhere
0.3	There are several measurements in the estimated range
0.4	The several measurements are relevant to our case
0.5	The method used to obtain the several relevant measurements is considered reliable
0.6	We have used the method/design/idea/strategy in-house
0.7	We have reliable measurements for the design idea in-house
0.8	Reliable in-house measurements correlate to independent external measurements
0.9	We have used the idea on this project and measured it (Evo step, pilot and field trial)
1.0	Perfect credibility, we have rock solid, contract-guaranteed, long-term and credible experience with this idea on this project and,

Impact Estimation Analyzes Requirement |-| Design relationships across systems if necessary.

	On-line Support	On-line Help	Picture Handbook	On-line Help + Access Index
Learning Past: 60minutes <-> Goal: 10minutes				
Scale Impact	5 min.	10 min.	30 min.	8 min.
Scale Uncertainty	±3min.	±5 min.	±10min.	±5 min.
Percentage Impact	110%	100%	60%	104%
Percentage Uncertainty	±6% (3 of 50 minutes)	±10%	±20%?	±10%
Evidence	Project Ajax: 7 minutes	Other Systems	Guess	Other Systems + Guess
Source	Ajax Report, p.6	World Report, p.17	John B	World Report, p.17 + John B
Credibility	0.7	0.8	0.2	0.6
Development Cost	120K	25K	10K	26K
Performance to Cost Ratio	110/120 = 0.92	100/25 = 4.0	60/10 = 6.0	104/26 = 4.0
Credibility-adjusted Performance to Cost Ratio (to 1 decimal place)	0.92*0.7 = 0.6	4.0*0.8 = 3.2	6.0*0.2 = 1.2	4.0*0.6 = 2.4
Notes: Time Period is two years.	Longer timescale to develop			

•" Source Competitive Engineering Fig 9.5

A sample Impact Estimation Table: with Safety Factor 2x

Design Ideas / Requirements	Central	Youth	Facts	London	Diploma	Events	Discounts	Sum for Requirement
Performance Requirements		<- Designs - Means ->						
Participation	80% ±50%	60% ±70%	0% ±50%	0% ±50%	30% ±50%	20% ±50%	30% ±50%	220% ±370%
Representation	80% ±50%	80% ±50%	10% ±50%	0% ±50%	10% ±50%	20% ±50%	50% ±40%	250% ±340%
Information	0% ±50%	20% ±40%	80% ±50%	0% ±20%	20% ±50%	0% ±50%	0% ±30%	120% ±290%
Conviction	0% ±10%	20% ±50%	60% ±30%	80% ±50%	10% ±50%	80% ±50%	0% ±50%	250% ±290%
Influence	0% ±50%	40% ±40%	60% ±50%	0% ±50%	80% ±50%	80 %±5%	0% ±50%	260% ±340%
Fun	50% ±50%	40% ±50%	10% ±50%	0% ±0%	0% ±0%	80% ±50%	0% ±0%	180% ±200%
Sum of Performance	210% ± 260%	26[illegible] 300%	2[illegible] 280%	[illegible] 220%	150% ± 250%	2[illegible] 300%	80% ± 220%	
Resource Requirements								
Financial Cost	20% ±30%	1% ±1%	1% ±1%	1% ±1%	1% ±5%	30% ±50%	30% ±50%	111% ±135%
Performance to Cost Ratio	210/20	260/1	220/1	80/1	150/1	280/30	80/30	

Requirements - Ends

Relationships

Impact Tables and Risk

- IE Forces thorough Analysis
  - Of all cost/quality impacts
  - Based on facts, not opinion
- IE Analysis is documented
- IE Analysis can be quality controlled
- IE Risk is explicit
  - Credibility rating
  - Safety factors
- IE Forces better definition specification
  - Requirements
  - Designs
  - evidence

- Acceptable Risk levels can be managed:
  - By Setting safety factor limits in Rules for specification
    - ‘At least 200%’ sum for all designs’
      - “defect’ IE Table if not met (>200%)
  - By setting exit/entry levels for Credibility averages
    - ‘At least 0.5 average’
      - Unacceptable/not completed if we fail to meet these levels

What uses can we put impact estimation to?

1. Evaluating a single design idea. How good is the idea for us?

2. Comparing two or more design ideas to find a winner, or set of winners. Use IE, if you want to set up an argument against a prevailing popular, but weak design idea!

3. Gaining an architectural overview of the impact of all the design ideas on all the objectives and budgets. Are there any negative side effects? What is the cumulative effect?

4. Obtaining systems engineering views of specific components, or specific performance aspects.

Are we going to achieve the reliability levels?

5. Analyzing risk: evaluating a design with regard to 'worst case' uncertainty and minimum credibility.

6. Planning evolutionary project delivery steps with regard to value and cost.

7. Monitoring, for project management accounting purposes, the progress of individual evolutionary project delivery steps and, the progress to date compared against the requirement specification or management objectives.

8. Predicting future costs, project timescales and performance levels.

9. Understanding organizational responsibility in terms of performance and budgets by organizational function.

In 1992, Steve Poppe pioneered this use at executive level while at British Telecom, North America.

10. Achieving rigorous quality control of a design specification prior to management reviews and approval.

11. Presenting ideas to committees, management boards, senior managers, review boards and customers for approval.

12. Identifying which parts of the design are the weakest (risk analysis). If there are no obvious alternative design ideas, any 'weak links' should be tried out earliest, in case they do not work well (risk management). This impacts scheduling.

13. Enabling configuration management of design, design changes, and change consequences.

14. Permitting delegation of decision-making to teams. Teams can achieve better internal progress control using IE, than they can from repeatedly making progress reports to others, and acting on others' feedback.

15. Presenting overviews of very large, complex projects and systems by using hierarchical IE tables. Aim for a one page top-level IE view for senior management.

16. Enabling cross-organizational co-operation by presenting overviews of how the design ideas of different projects contribute towards corporate objectives. Any common and conflicting design ideas can be identified. This is important from a customer viewpoint; different projects might well be delivering to the same customer interface.

17. Controlling the design process. You can see what you need, and see if your idea has it by using an IE table. For example, which design idea contributes best to achieving usability? Which one costs too much?

18. Strengthening design. You can see where your design ideas are failing to impact sufficiently on the objectives; and this can provoke thought to discover new design ideas or modify existing ones.

19. Helping informal reasoning and discussion of ideas by providing a framework model in our minds of how the design is connected to the requirements.

20. Strengthening the specified requirements. Sometimes, you can identify a design idea, that has a great deal of popular support, but doesn't appear to impact your requirements. You should investigate the likely impacts of the design idea with a view to identifying additional stakeholder requirements. This may provide the underlying reason for the popular support. You might also identify additional types of stakeholders.

3. Related Disciplines: Requirements & Design

- Requirements Specification: quantified and "well defined"
- Design Specification: Estimated, and well-defined.

Requirements

- The 'Ends' in Impact Estimation
- The things the 'means' have impact upon

SPEC TEMPLATE: for 'Planguage' Specification

<Tag>:

Ambition:

---------- *Measurement* ----------

Scale:

Past:

Goal:

Meter:

---------- *Relationships* ----------

Type:

Supports:

Supported By:

--------- *Objective Admin* ----------

Version:

Owner:

Status:

Scope:

---------- *Definitions* ----------

Unclear Objectives

Case: Multinational Bank 2011

Critical Project Objectives 'not clear'

Case: Multinational Bank 2011

Critical Project Objectives 'not clear'

- A sample of about 6 projects, showed that **none of them had clear** quantified project top level critical requirements, yet
- The CTO commissioned us to look at his own selected sample of large troubled projects, wrt their requirements (2 days)
- The sample showed that they did **not** have clear quantified top level requirements
  - But that their tea[illegible]**le to write quantified requirements, sa[illegible]ay.** coached.

Case: Multinational Bank 2011

Critical Project Objectives 'not clear'

- The CTO concluded that **none of their 100s of projects had clear enough objectives**, or primary improvement requirements, at their base

Case: Multinational Bank 2011

Critical Project Objectives 'not clear'

The CTO asked Tom,

"This is so simple and obvious!

Why don't we do it?"

Tom replied:

"Universities don't teach it.

You don't teach it in house

You as CTO have not required it to be done

before giving funding

10 October

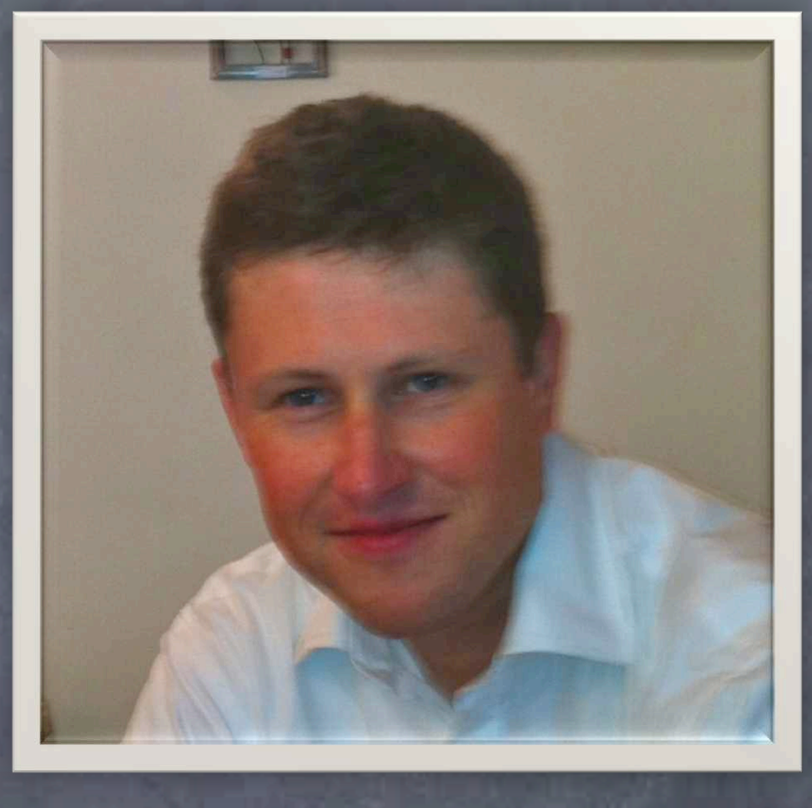
Case: Multinational Bank 2011

Critical Project Objectives 'not clear'

20 Sept, 2011 Report on Gilb Evo method (Richard Smith, Citigroup)

- http://rsbatechnology.co.uk/blog:R
- Back in 2004, I was employed by a large investment bank in their FX e-commerce IT department as a business analyst.
- The wider IT organisation used a complex waterfall-based project methodology that required use of an intranet application to manage and report progress.
- However, it's main failings were that it almost **totally missed the ability to track delivery of actual value improvements to a project's stakeholders**, and **the ability to react to changes in requirements and priority for the project's duration.**
- The toolset generated lots of charts and stats that provided **the illusion of risk control**. but actually provided very little help to the analysts, developers and testers actually doing the work at the coal face.
- The proof is in the pudding;
  - I have **used Evo** (albeit in disguise sometimes) on two large, high-risk projects in front-office investment banking businesses, and several smaller tasks.
  - On the largest critical project, the original business functions & performance objective **requirements document, which included no design, essentially remained unchanged** over the 14 months the project took to deliver,
  - but the detailed **designs** (of the GUI, business logic, performance characteristics) **changed** many many times, guided by lessons learnt and **feedback** gained by delivering a succession of early deliveries to real users.
  - In the end, the new system responsible for 10s of USD billions of notional risk, **successfully went live over one weekend for 800 users worldwide**, and **was seen as a big success by the sponsoring stakeholders.**

ed a 3-day course with you and Kai whilst at Citigrou



Richard Smith

ed a 3-day course with you and Kai whilst at Citigrou

Previous PM Methods:
No 'Value delivery tracking'.
No change reaction ability

Richard Smi

- "However, (**our old** project management methodology) main failings were that

- it almost **totally missed the ability to track delivery of actual *value* improvements to a project's stakeholders,**

- and **the ability to react to changes**
  - **in requirements and**
  - **priority**
  - **for the project's duration"**

We only had the illusion of control. But little help to testers and analysts

Richard Sm

- "The (old) toolset generated lots of charts and stats
- that provided **the illusion of risk control**.
- But actually provided very little help to the analysts, developers and testers actually doing the work at the coal face."

The proof is in the pudding;

Richard Smith

- "The proof is in the pudding;
- I have **used Evo**
- *(albeit in disguise sometimes)*
- on two large, high-risk projects in front-office investment banking businesses,
- and several smaller tasks. "

Experience: if top level requirements are *separated* from design, the 'requirements' are **stable**!

Richard Smith

- "On the largest critical project,
- the original ***business functions & performance objective*** **requirements document,**
- ***which included*** **no design,**
- essentially remained ***unchanged***
- over the **14 months** the project took to deliver,…."

-day course with you and Kai whilst at Citigroup in 20

Dynamic (Agile, Evo) design testing: not unlike 'Lean Startup'

Richard Sm

- "… but the detailed **designs**
  - **(of the GUI, business logic, performance characteristics)**
- **changed** many many times,
- guided by lessons learnt
- and **feedback** gained by
- delivering a succession of early deliveries
- to real users"

-day course with you and Kai whilst at Citigroup in 20

Richard Smith

It looks like the stakeholders liked the top level system qualities, on first try

- " In the end, the new system responsible for 10s of USD
  - billions of notional risk,
- **successfully went live**
- **over one weekend**
  - **for 800 users worldwide**,
  - and **was seen as a big success**
  - **by the sponsoring stakeholders."**

day course with you and Kai whilst at Citigroup in 200

Bank Training like Richard Used

THE LEARNING PROCESS

THEORY, PRACTICE, DISCUSS, DOCUMENTATIONS

1. Lectures (50%)

Basic Theory (Principles, Standards, Rules, Templates)
Case studies (as far as possible from DB and banking)
Examples of practice (as far as possible from DB and banking)

2. Questions and discussion

3. Participant exerci
(small groups 2 to 4), followed up by Instructors, and experienced DB assistants (if available)

4. Substantial digital documentation, a library of books, papers, cases

Requirements Course Outline http://www.gilb.com/dl52

Day 1
Quantify Requirements

1. **Overview**: Evo & Planguage in relation to Agile

Day 2
Standards, Principles, Risks

1. Tips for **analysing** project plans to find the 'real' value

Day 3
Design, Delivery, Culture Change

1. **estimating** the quantified impact of a **design** on

Bank Business Analyst Training

Requirements Workshop

Master how you communicate your organisation's 'real' requirements, and your stakeholders' most critical improvement requirements, in an unambiguous, clear, measurable, and testable way.

Project and System Level Requirements Specifications

WORKSHOP ADVANTAGES

a complete method for tackling all the critical and real stakeholder requirements for a project, at all levels of consideration for IT Projects.

BAR NONE

the most advanced and comprehensive workshop on requirements specification in the world.

Workshop **Objectives:**

This workshop will allow you to walk away with practical ability to improve your projects most critical requirements.

You will be able to identify, classify and specify critical project and stakeholder

Workshop **Intended for:**

People who write requirements (BAs), and their managers. Product owners, project managers and their managers Consultants, engineering/IT methods owners and teachers.

Workshop

Requirements Course Outline http://www.gilb.c

Detailed Syllabus: Metrics for ...

Day 1

Quantify Requirements

1. **Overview**: Evo & Planguage in relation to Agile Methods

2. practical **examples** of Planguage for requirements (case studies)

3. the various requirements **concepts** defined deeply and exemplified

4. requirements **templates** (to make standards practical) design constraint templates (a type of required design or architecture)

5. how to **quantify** any qualitative requirement (like intuitiveness or adaptability or security) – this is the key ability that most all other 'requirements' workshops do not teach!

6. **advanced** scale of measure specification methods (a 'scale' is more than units)

Day 2

Standards, Principles, Risks

1. Tips for **analyzing** project plans to find the 'real' value requirements.

2. **standards** for requirements (rules, processes, templates, glossary)

3. **principles** for requirements (help you to tackle new problems better)

4. **quality control** of requirements: measuring requirement conformance to standards (reviews, inspections, agile reviews)

5. how to give information that determines **priorities** of requirements (example Wish/ Goal/Fail and Qualifiers)

6. how to include requirement information about **risks and uncertainties**

Day 3

Design, Delivery, Culture Change

1. **estimating** the quantified impact of a **design** on requirements

2. evolutionary project management and how it integrates with requirements. The **Evo cycle** and how it relates to Agile iteration.

3. **training** requirements writers: how to train colleagues and yourself

4. changing requirements **culture**: how to change your culture of requirements

5. expected **results** from requirements culture improvement: how to measure or know that things are working well

6. a **policy** for improved requirements: summary of main guidelines for value driven projects, and value requirements.

Requirements Course Outline http://www.gilb.com/dl522

ONE PAGE PROJECT REQUIREMENTS QUANTIFIED

Real Bank Project : Project Progress Testability
Quantification of the most-critical project objectives on day 1

ONE PAGE PROJECT REQUIREMENTS QUANTIFIED

P&L-C
signed

Speed-To-Deliver: **Scale**: average Calendar days needed from New Idea Approved until Idea Operational, for given Tasks, on given Markets.
Past [2009, Market = EURex, Task =Bond Execution] **2-3 months** ?
Goal [Deadline =End 20xz, Market = EURex, Task =Bond Execution] **5 days**

Operational-Control: **Scale**: % of trades per day, where the calculated economic difference between OUR CO and Marketplace/Clients, is less than "1 Yen"(or equivalent).
Past [April 20xx] **10%** change this to 90% NH **Goal** [Dec. 20xy] **100%**

Operational-Control.Consistent: **Scale**: % of defined [Trades] failing full STP across the transaction cycle. **Past** [April 20xx, Trades=Voice Trades] **95%**
Past [April 20xx, Trades=eTrades] **93%**
Goal [April 20xz, Trades=Voice Trades] <**95 ± 2%**>
Goal [April 20xz, Trades=eTrades] **98.5 ± 0.5 %**

Operational-Control.Timely.End&OvernightP&L Scale: number of times, per quarter, the P&L information is not delivered timely to the defined [Bach-Run].
Past [April 20xx, Batch-Run=Overnight] 1 **Goal** [Dec. 20xy, Batch-Run=Overnight] <**0.5**>
Past [April 20xx, Batch-Run= **T+1**] **1 Goal** [Dec. 20xy, Batch-Run=End-Of-Day, Delay<1hour] **1**

Operational-Control.Timely.IntradayP&L Scale: number of times per day the intraday P&L process is delayed more than 0.5 sec.

Operational-Control.Timely.Trade-Bookings Scale: number of trades per day that are not booked on trade date. **Past** [April 20xx] **20 ?**

From Office Trade Management Efficiency Scale: Time from Ticket Launch to Trade updating real-time risk view
Past [20xx, Function = Risk Mgt, Region = Global] **~ 80s +/- 45s** ??
Goal [End 20xz, Function = Risk Mgt, Region = Global] **~ 50%** better?

Managing Risk - Accurate - Consolidated - Real Time

Risk.Cross-Product Scale: % of financial products that risk metrics can be displayed in a single position blotter in a way appropriate for the trader (i.e. - around a benchmark vs. across the curve).
Past [April 20xx] **0%** 95%. **Goal** [Dec. 20xy] **100%**

Risk.Low-latency Scale: number of times per day the intraday risk metrics is delayed by more than 0.5 sec. **Past** [April 20xx, NA] **1% Past** [April 20xx, EMEA] ??**% Past** [April 20xx, AP] 100**% Goal** [Dec. 20xy] **0%**

Risk.Accuracy

Risk. user-configurable Scale: ??? pretty binary - feature is there or not - how do we represent?
Past [April 20xx] **1% Goal** [Dec. 20xy] **0%**

Operational Cost Efficiency Scale: <Increased efficiency (Straight through processing STP Rates)>

Cost-Per-Trade Scale: % reduction in Cost-Per-Trade
Goal (EOY 20xy, cost type = I 1 - REGION = ALL) **Reduce cost by 60%** (BW)
Goal (EOY 20xy, cost type = I 2 - REGION = ALL) **Reduce cost by x %**
Goal (EOY 20xy, cost type = E1 - REGION = ALL) **Reduce cost by x %**
Goal (EOY 20xy, cost type = E 2 - REGION = ALL) **Reduce cost by 100%**
Goal (EOY 20xy, cost type = E 3 - REGION = ALL) **Reduce cost by x %**

EXAMPLE

Usability:
Type: Complex Quality Requirement.
Includes: Type: Elementary Quality Requirement {Entry Conditions, Training Requirement, Computer Familiarity, Web Experience Level, Productivity, Error Rate, Likeability, Intuitiveness, Intelligibility}.
Entry Conditions:
Scale: <Grade Level of User>.
Training Requirement:
Scale: Time needed to read <any instructions> or get <any help> in order to perform defined [Tasks] successfully.
Computer Familiarity:
Scale: Years of <experience with computers>.
Web Experience Level:
Scale: Years of <experience with using the web>.
Productivity:
Scale: Ability to correctly produce defined [Work Units: Default: Completed Transactions].
Error Rate:
Scale: Number of Erroneous Transactions requiring correction each <session>.
Likeability:
Scale: Option of <pleasure> on using the system on scale of −10 to +10.
Intuitiveness:
Scale: Probability that a defined [User] can intuitively figure out how to do a defined [Task] correctly (without any errors needing correction).
Intelligibility:
Scale: Probability in % that a defined [User] will correctly interpret defined [Messages or Displays].

Erieye, from CE chapter 5

Usability.**Intuitiveness:**
Ambition: High probability that an operator will within a specified time from deciding the need to perform a specific task (without reference to handbooks or help facility) find a way to accomplish their desired task.
Scale: Percentage Probability that a defined [Individual Person: Default: Trained Operator] will find a way to perform a defined [Task Type] without reference to any written instructions, other than the help or guidance instructions offered by the immediate system screen (that is, no additional paper or on-line system reference information), within a defined [Time Period: Default: Within one second from deciding that it is necessary to perform the task].
Comment [Intuitiveness:Scale]: "I'm not sure if one second is acceptable or realistic, it's just a guess" <- MAB.
Meter: To be defined. Not crucial this 1st draft <- TG.
Past [System R]: 80%? <- LN.
Record [Mac User Interface]: 95%? <- TG.
Fail [**Trained Operator, Rare Tasks** [{<1/week, <1/year}]]: From 50% to 90%? <- MAB.
Goal [**Tasks Done** [<1/week (but more than 1/Month)]]: 99%? <- LN,
[**Tasks Done** [<1/year]]: 20%? <- JB,
[Turbulence, **Tasks Done** [<1/year]]: 10% ? <- TG.
========== User Defined Terms ==========
Trained Operator: Defined As: Command and Control Onboard Operator, who has been through approved training course of at least 200 hours duration.
Rare Tasks: Defined As: Types of tasks performed by an Onboard Operator less than

Real Bank Project: Project Progress Testability

Quantification of the most-critical project objectives on day 1

ONE PAGE PROJECT REQUIREMENTS QUANTIFIED

Operational-Control:

Scale: % of trades per day, where the calculated economic difference between OUR CO and Marketplace/ Clients, is less than "1 Yen"(or equivalent).

Past [April 20xx] **10%**
Goal [Dec. 20xy] **100%**

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Focus

guided by
Quantified Goal sets,
the need to **estimate** , give **evidence,**
state **uncertainty** and assign **credibility.**
All culminating in decision documentation
which is auditable reviewable. Improvable and transparent!

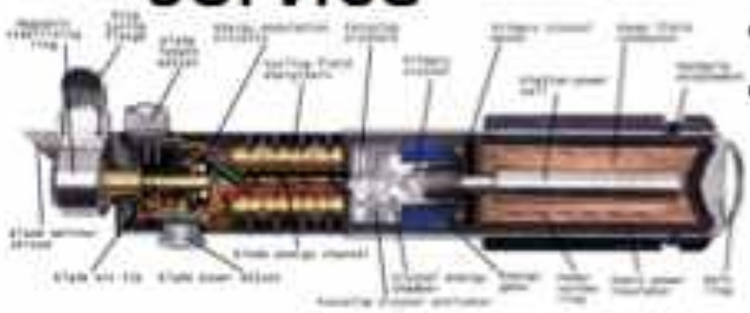
Design: Means: Strategy: Architecture

Don´t we need more detail to estimate costs and other attributes of a design?

Simple design description

- Design Spec:

— Risk and P/L aggregation service



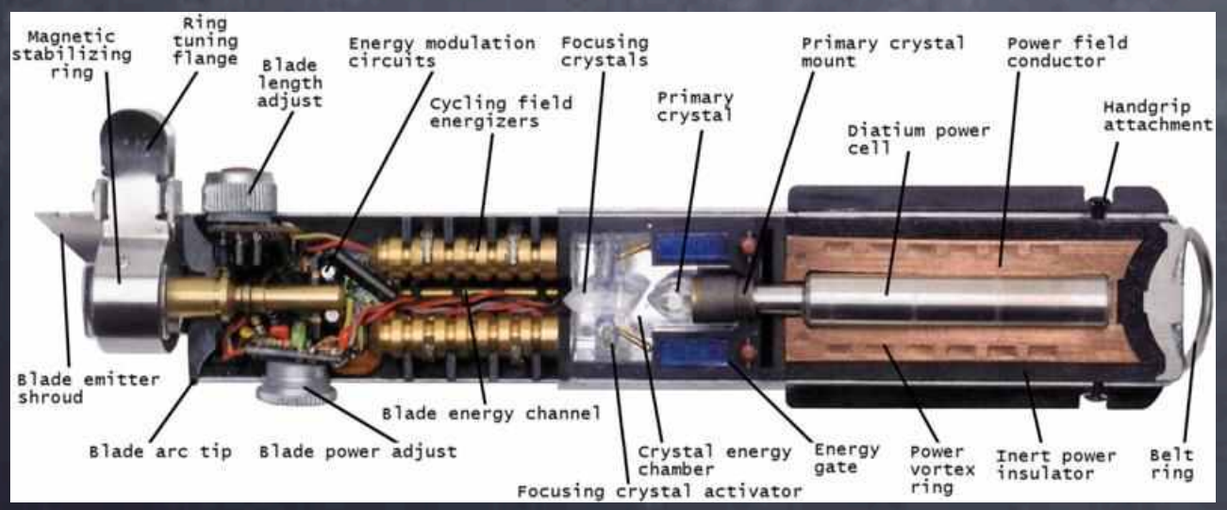
Ask the following questions about such brief design descriptions

- What will it cost to develop?
- What will it cost to operate?
- Will we deliver any or all of the quality and performance Goal levels on time?
- What are the critical assumptions, that might fail or be untrue?
- What are the known risks?
- Do we actually understand anything of consequence from such a short design specification?

The architecture needs

- If we want to understand costs, impacts priorities and risks early

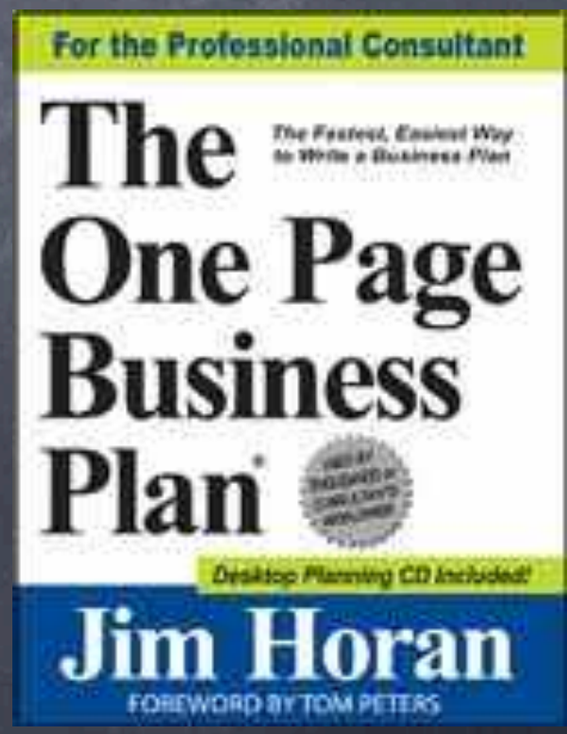
- More detail



- Rather than,
  - too late

Same Bank, Later Project: Strategy

- An **example of defining a major strategy!**
- On a **single** page
  - ***Do you really want to make do with the usual '1 liner'*** (Strategy or architecture specification)?
- This was done In **one** hour, it is NOT time consuming
- We get the detail **needed to manage**
  - Quantification, estimation of costs,
    - and effects
  - Risks
  - Priotritization



Defining a Design/Solution/Architecture/Strategy (Planguage, CE Design Template)

1. enough detail to estimate, 2. some impact assertion, 3. Assumptions, Risks, Issues

budget of say $nn mm and 3 years. The o+

costs may differ slightly, like $n mm for hardware. MA AH 3 dec

A3: Boss X will continue to own Orbit. TSG DEC 2

Orbit Application Base: (Formal Cross reference Tag)

Type: Primary Architecture Option

========== Basic Information =========

Version: Nov. 30 20xx 16:49, updated 2.Dec by telephone and in meeting. 14:34

Status: Draft

Owner: Brent Barclays

Expert: Raj Shell, London

Authority: for differentiating business environment characteristics, Raj Shell, Brent Barclays(for overview)

Source: <Source references for the information in this specification. Could include people>. Various, can be done later BB

Gist: risk and P/L aggregation service, which also provides work flow/adjustment and outbound and inbound feed support. Currently used by Rates ExtraBusiness, Front Office and Middle Office, USA & UK.

Description: <Describe the design idea in sufficient detail to support the estimated impacts and costs given below>.

D1: ETL Layer. Rules based highly configurable implementation of the ETL Pattern, which allows the data to be onboarded more quickly. Load and persist new data very quickly. With minimal development req

D2: high performance risk and P/L aggregation processing (Cube Building). -> Timeliness, P/L Explanation, Risk & P/L Understanding, Decision Support, Business Scalability, Responsiveness

D3: Orbit supports BOTH Risk and P/L -> P/L Explanation, Risk & P/L Consistency , Risk & P/L Understanding, Decision Support

D4: a flexible configurable workflow tool, which can be used to easily define new workflow processes -> Books/Records Consistency, Business Process Effectiveness, Business Capability Time to Market

D5: a report definition language, which provides 90+% of the business logic contained with Orbit, allows a quick turnaround of new and enhanced reports with minimal regression testing and release procedure impact -> P/L Explanation, Risk & P/L Understanding, Business Capability Time to Market, Business Scalability

D6: Orbit GUI. Utilizes an Outlook Explorer metaphor for ease of use, and the Dxx Express Grid Control, to provide high performance Cube Interrogation Capability. -> Responsiveness, People Interchangeability, Decision Support, Risk & P/L Understanding

D7: downstream feeds. A configurable event-driven data export service, which is used to generate feeds . -> Business Process Effectiveness, Business Capability Time to Market,

ONE PAGE PLAN

de the assumption that we can integrate Oribit with PX+
, even in the short term <- BB

y dependencies for this design idea>.

s Px+ in time. ? tsg 2.12

tags of any factors, which could threaten your estimated

ved. Mitigation: continue to use Pxx <- tsg 2.12

l **integration** of Px+ is not as easy as thought & we must

A4: the schedule, 3 years, will constrained to a scope we can in fact deliver, OR we will be given additional budget. If not "I would have a problem" <- BB

A5: the cost of expanding Orbit will not be prohibitive. <- BB 2 dec

R3: the and or scalability and cost of **coherence** will not allow us to meet the delivery.

R4: **scalability** of Orbit team and infrastructure, first year especially <- BB. People, environments, etc.

R5: re Cross Desk reporting Requirement, major impact on technical design. **Solution not currently known**. Risk no solution allowing us to report all P/L

Design Spec Enlarged 1 of 2

Spec Headers

Type: Primary Architecture Option

==== Basic Information ==========

Version: Nov. 30 20xx 16:49, updated 2.Dec by telephone and in meeting. 14:34

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Owner: Brent Barclays

Expert: Raj Shell, London

Authority: for differentiating business environment characteristics, Raj Shell, Brent Barclays(for overview)

Source: <Source references for the information in this specification. Could include people>. Various, can be done later BB

Gist: risk and P/L aggregation service,

Detailed Description and -> Impacted Objectives

Description: <Describe the design idea in sufficient detail to support the estimated impacts and costs given below>.

D1: ETL Layer. Rules based highly configurable implementation of the ETL Pattern, which allows the data to be onboarded more quickly. Load and persist new data very quickly. With minimal development required. -> Business-Capability-Time-To-Market, Business Scalability

D2: high performance risk and P/L aggregation processing (Cube Building). -> Timeliness, P/L Explanation, Risk & P/L Understanding, Decision Support, Business Scalability, Responsiveness.

D3: Orbit supports BOTH
& P/L Understanding, Deci

D4: a flexible configurable
workflow processes -> Boo
Capability Time to Market

D5: a report definition lan
Orbit, allows a quick turn
testing and release proced
Business Capability Time t

D6: Orbit GUI. Utilizes ar
Express Grid Control, to p
Responsiveness, People Int

D7: downstream feeds. A
generate feeds . -> Busin

which also provides work flow/

10 October

© Gill

The Detailed description is useful,

- to understand costs
- to understand impacts on your objectives (see '->')
- to permit separate implementation and value delivery, incrementally

Design Spec Enlarged 2 of 2

==== Priority & Risk Management ========

Assumptions: *<Any assumptions that have been made>.*

A1: **FCCP is assumed to be a part of Orbit.** FCxx does not currently exist and is Dec 20xx 6 months i
by TsG from dec 2 discussions AH

Consequence: FCxx must
costs rating.

A2: **Costs**, the development costs
budget of say $ nn mm and 3 yea
like $n mm for hardware. MA AH

A3:Boss X will continue to own O

A4: the schedule, 3 years, will co
deliver, OR we will be given addit
problem" <- BB

A5: the cost of expanding Orbit

A6: we have made the assumptio
in a sensible way, even in the short term <- BB

Dependencies: *<State any dependencies for this design idea>.*

D1: FCxx replaces Px+ in time. ? tsg 2.12

ASSUMPTIONS:
- broadcasts critical factors for present and future re-examination
- helps risk analysis
- are an integral part of the design specifiction

DEPENDENCIES:

Risks: *<Name or refer to tags of any factors, which could threaten your estimated impacts>.*

R1. FCxx is delayed. Miti

R2: the technical **integr**
redevelop Oribit

R3: the and or scalability
delivery.

R4: **scalability** of Orbit
People, environments, etc

R5: re Cross Desk report
Solution not currently k

Risks specification:
- shares group risk knowhow
- permits redesign to mitigate the risk
- allows relistic estimates of cost and impacts

Issues: *<Unresolved concerns or problems in the specification or the system>.*

I1: Do we need to put the fact t
(Ownership). MA said, other agre

I2: what are the time scales and

I3: what will the success factors
being asked to do. BB 2 dec 20x

I4: for the business other than f
to what the requirements are an
Options. BB

I5: the degree to which this opt
Day. BB 2 dec

Issues:
- when answered can turn into a risk
- shares group knowledge
- makes sure we don't forget to analyze later

4. Case Studies, Examples

- Persinscom (whole front end process week)
- Bring (hierarchical tables)
- Confirmit (active project value delivery)

Persinscon Case

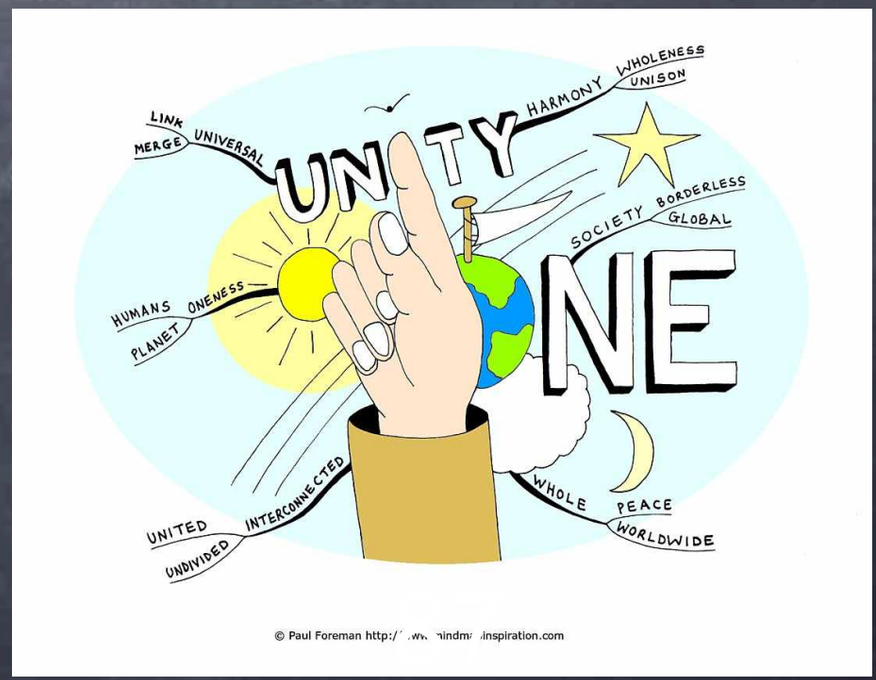
111111

The Unity Method 111111

for decomposition into iterative value delivery steps

By Tom@Gilb.com

Slides at www.gilb.com/downloads



´1´ 4 U2

One

Bono

U2

´One´ lyrics

Will it make it easier on you now?

You got someone to blame

You say, one love, one life

When it's one need in the night

One love, we get to share it

Leaves you baby if you don't care for it

One love, one blood

One life, you got to do what you should

One life, with each other

Sisters, brothers

One life but we're not the same

We get to carry each other, carry each other

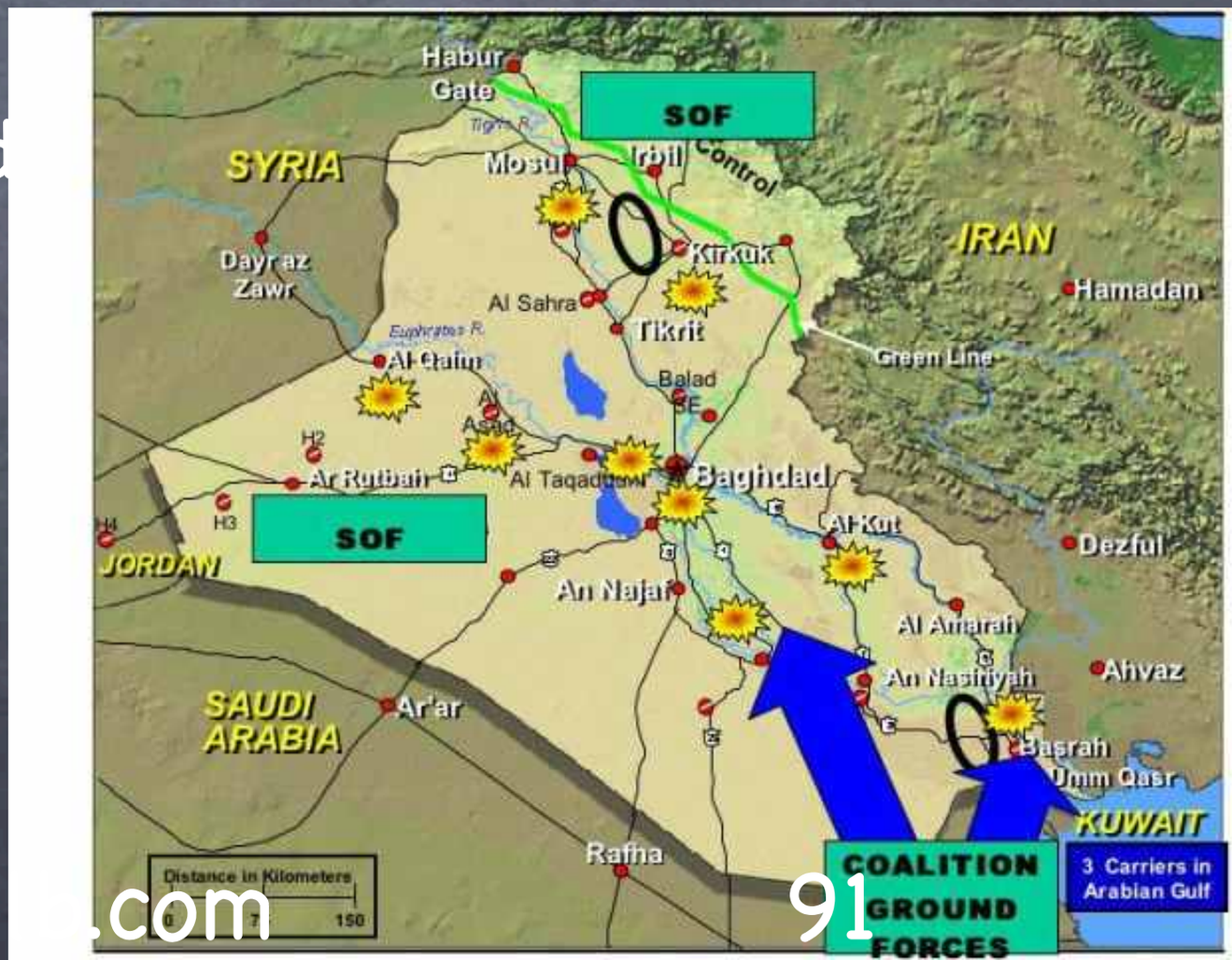
One

One

© POLYGRAM INT. MUSIC PUBL. B.V.;

A True War Story
111111 in practice

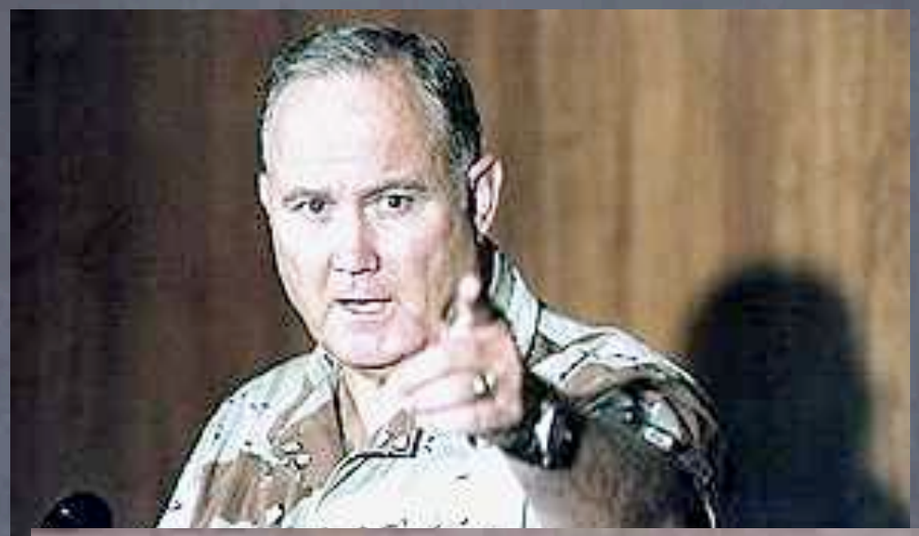
- How we found a value delivery step ´next week´
- a week of value d
  waterfall method

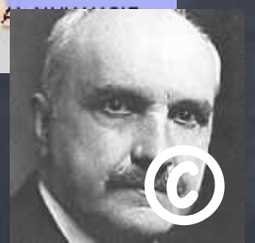


The *Persinscom II* System Case

Commanding General
Norman Schwartzkopf

´Stormin´ Norman´





The ´Evo´ Planning Week at DoD

Monday

Define top Ten critical objectives, quantitatively

Agree that thee are the main points of the effort/project

Tuesday

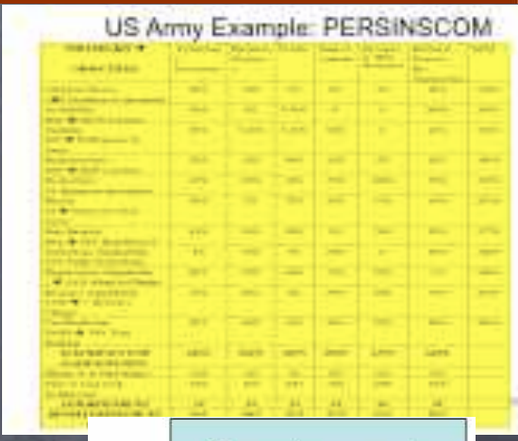
Define roughly the top ten most powerful strategies for enabling us to reach our objectives on time

Wednesday

Make an Impact Estimation Table for Objectives/Strategies

Sanity Test: do we seem to have enough powerful strategies to get to our Goals, with a reasonable safety margin?

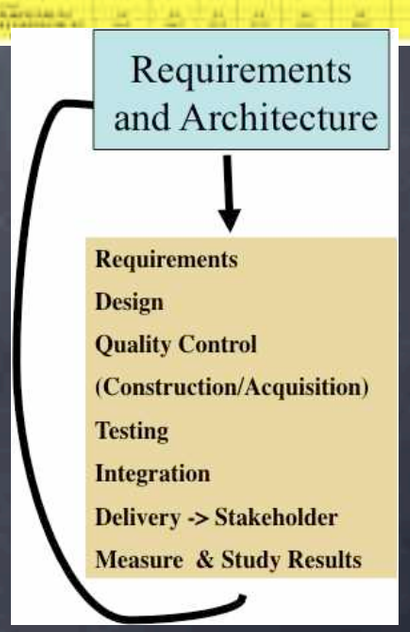
A tool for decomposing the value steps and seeing best value for resources



Thursday

Divide into rough delivery steps (annual, quarterly)

Derive a delivery step for 'Next Week'



Friday

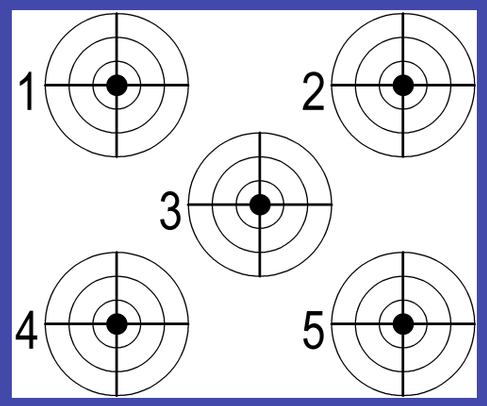
Present these plans to approval manager (Brigadier General Pellicci)

get approval to deliver next week

(they can´t resist results next week!

US Army Example: PERSINSCOM: Personnel System

STRATEGIES ➔ OBJECTIVES
Customer Service ?➔0 Violation of agreement
Availability 90% ➔ 99.5% Up time
Usability 200 ➔ 60 Requests by Users
Responsiveness 70% ➔ ECP's on time
Productivity 3:1 Return on Investment
Morale 72 ➔ 60 per mo. Sick Leave
Data Integrity 88% ➔ 97% Data Error %
Technology Adaptability 75% Adapt Technology
Requirement Adaptability ? ➔ 2.6% Adapt to Change
Resource Adaptability 2.1M ➔ ? Resource Change
Cost Reduction FADS ➔ 30% Total Funding



Monday

←The Top Ten Critical Objectives Were decided

Sample of Objectives/Strategy definitions
US Army Example: PERSINSCOM: Personnel System

- *Example of one of the Objectives:*

Customer Service:

Type: Critical Top level Systems Objective

Gist: Improve customer perception of quality of service provided.

Scale: Violations of Customer Agreement per Month.

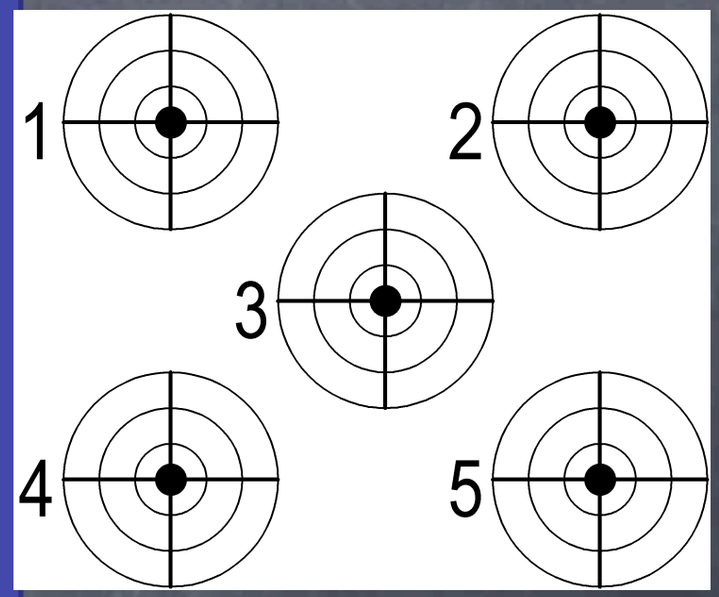
Meter: Log of Violations.

Past [Last Year] Unknown Number ←State of PERSCOM Management Review

Record [NARDAC] 0 ? ← NARDAC Reports Last Year

Fail : <must be better than Past, Unknown number> ←CG

Goal [This Year, PERSINCOM] 0 "Go for the Record" ← Group SWAG



US Army Example: PERSINSCOM: Personnel System

STRATEGIES ➔ **OBJECTIVES**	Technology Investment	Business Practices	People	Empow-erment	*Principles of IMA Management*	Business Process Re-engineering	SUM
Customer Service ?➔0 Violation of agreement							
Availability 90% ➔ 99.5% Up time							
Usability 200 ➔ 60 Requests by Users							
Responsiveness 70% ➔ ECP's on time							
Productivity 3:1 Return on Investment							
Morale 72 ➔ 60 per mo. Sick Leave							
Data Integrity 88% ➔ 97% Data Error %							
Technology Adaptability 75% Adapt Technology							
Requirement Adaptability ? ➔ 2.6% Adapt to Change							
Resource Adaptability 2.1M ➔ ? Resource Change							
Cost Reduction FADS ➔ 30% Total Funding							

Tuesday

The Top Ten

Critical Strategies

For reaching the

←objectives

Were decided

A Strategy (Top Level of Detail)

Technology Investment:

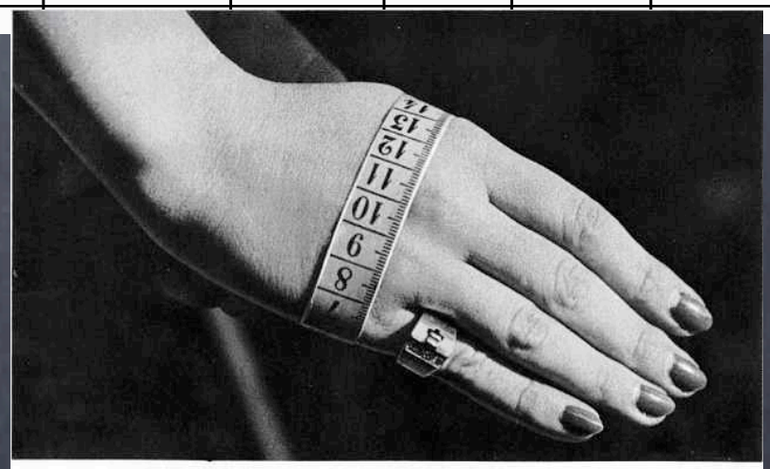
Gist: Exploit investment in hi return technology.

Impacts: productivity, customer service and conserves resources.

Wednesday: Sanity Check
Day 3 of 5 of 'Feasibility Study

- We made a rough evaluation
  - of how powerful our strategies might be
  - in relation to our objectives
- Impact Estimation Table
  - 0% Neutral, no ± impact
  - 100% Gets us to Goal level on time
  - 50% Gets us half way to Goal at deadline
  - -10% has 10% negative side effect

STRATEGIES → **OBJECTIVES**	Technology Investment	Business Practices	People	Empow-erment	*Principles of IMA Management*	Business Process Re-engineering	SUM
Customer Service ?→0 Violation of agreement	50%	10%	5%	5%	5%	60%	185%
Availability 90% → 99.5% Up time	50%	5%	5-10%	0	0	200%	265%
Usability 200 → 60 Requests by Users	50%	5-10%	5-10%	50%	0	10%	130%
Responsiveness 70% → ECP's on time	50%	10%	90%	25%	5%	50%	180%
Productivity 3:1 Return on Investment	45%	60%	10%	35%	100%	53%	303%
Morale 72 → 60 per mo. Sick Leave	50%	5%	75%	45%	15%	61%	251%
Data Integrity 88% → 97% Data Error %	42%	10%	25%	5%	70%	25%	177%
Technology Adaptability 75% Adapt Technology	5%	30%	5%	60%	0	60%	160%
Requirement Adaptability ? → 2.6% Adapt to Change	80%	20%	60%	75%	20%	5%	260%
Resource Adaptability 2.1M → ? Resource Change	10%	80%	5%	50%	50%	75%	270%
Cost Reduction FADS → 30% Total Funding	50%	40%	10%	40%	50%	50%	240%
SUM IMPACT FOR EACH SOLUTION	***482%***	***280%***	***305%***	***390%***	***315%***	***649%***	
Money % of total budget	15%	4%	3%	4%	6%	4%	
Time % total work months/year	15%	15%	20%	10%	20%	18%	
SUM RESOURCES	***30***	***19***	***23***	***14***	***26***	***22***	
BENEFIT/RESOURCES RATIO	***16:1***	**14:7**	**13:3**	**27:9**	**12:1**	**29:5**	



MEASURING HAND FOR GLOVE SIZE

Persinscom **Impact Estimation** Table:

Designs

Design Ideas ->	*Technology Investment*	*Business Practices*	*People*	*Empowerment*	*Principles of IMA Management*	*Business Process Re-engineering*	*Sum Requirements*
Requirements	50%	10%	5%	5%	5%	60%	185%
Availability 90% <-> 99.5% Up time	50%	5%	5–10%	0%	0%	200%	265%
Usability 200 <-> 60 Requests by Users	50%	5–10%	5–10%	50%	0%	10%	130%
Responsiveness 70% <-> ECP's on time	50%	10%	90%	25%	5%	50%	180%
Productivity	45%				100%	53%	303%
3:1 Return on Investment	50%				15%	61%	251%
Morale 72 <-> 60 per month on Sick Leave							
Data Integrity 88% <-> 97% Data Error %	42%				70%	25%	177%
Technology Adaptability 75% Adapt Technology	5%	30%	5%	60%	0%	60%	160%
Requirement Adaptability ? <-> 2.6% Adapt to Change	80%	20%	60%	75%	20%	5%	260%
Resource Adaptability 2.1M <-> ? Resource Change	10%	80%	5%	50%	50%	75%	270%
Cost Reduction FADS <-> 30% Total Funding	50%	40%	10%	40%	50%	50%	240%
Sum of Performance	*482%*	*280%*	*305%*	*390%*	*315%*	*649%*	
Money % of total budget	15%	4%	3%	4%	6%	4%	36%
Time % total work months/year	15%	15%	20%	10%	20%	18%	98%
Sum of Costs	*30*	*19*	*23*	*14*	*26*	*22*	
Performance to Cost Ratio	*16:1*	*14:7*	*13:3*	*27:9*	*12:1*	*29:5*	

R→ D Impacts

Impact Estimation: Value-for-Money Delivery Table

STRATEGIES ➔ OBJECTIVES	Technology Investment	Business Practices	People	Empow-erment	*Principles of IMA Management*	Business Process Re-engineering	SUM
Customer Service ?➔0 Violation of agreement	50%	10%	5%	5%	5%	60%	185%
Availability 90% ➔ 99.5% Up time	50%	5%	5-10%	0	0	200%	265%
Usability 200 ➔ 60 Requests by Users	50%	5-10%	5-10%	50%	0	10%	130%
Responsiveness 70% ➔ ECP's on time	50%	10%	90%	25%	5%	50%	180%
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SUM RESOURCES	***30***	***19***	***23***	***14***	***26***	***22***	
BENEFIT/RESOURCES RATIO	***16:1***	**14:7**	**13:3**	**27:9**	**12:1**	**29:5**	

Thursday:
Day 4 of 5 of 'Feasibility Study

- We looked for a way to deliver some stakeholder results, next week
- **1 1 1 1 1 1 1 Unity**
  - **1% increase at least**
  - **1 stakeholder**
  - **1 quality/value**
  - **1 week delivery cycle**
  - **1 function focus**
  - **1 design used**

STRATEGIES ➔ OBJECTIVES	Technology Investment	Business Practices	People	Empow-erment	*Principles of IMA Management*	Business Process Re-engineering	SUM
Customer Service ?➔0 Violation of agreement	50%	10%	5%	5%	5%	60%	185%
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Next weeks Evo Step?

“You won’t believe we never thought of this, Tom!’

The step:

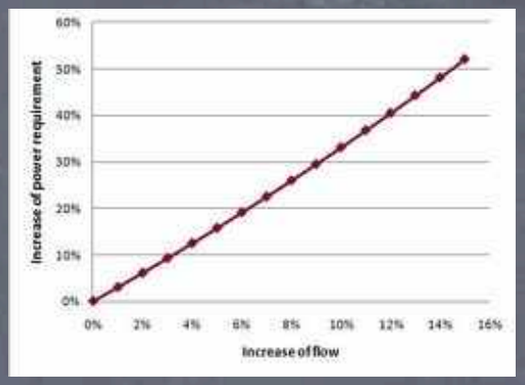
When the Top General Signs in

Move him to the head of the queue

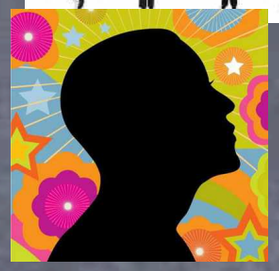
of all people inquiring on the system.

1 1 1 1 1 1 Unity

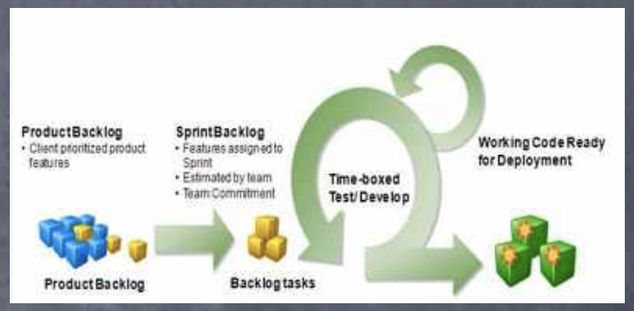
- 1% increase at least



- 1 stakeholder

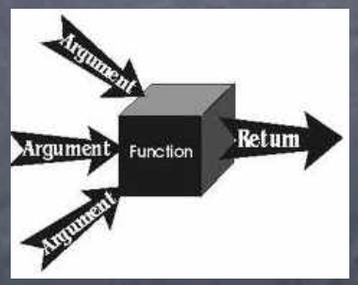


- 1 quality or value



- 1-week delivery cycle

- 1 function focus



- 1 design used

"I kill men for a living!" (General Pellicci)

UNITED STATES ARMY
PERSONNEL INFORMATION
SYSTEMS COMMAND

CERTIFICATE of APPRECIATION

is awarded to

MR. TOM GILB

for

SELFLESS AND DEDICATED SERVICE IN SUPPORT OF THE PERSONNEL INFORMATION SYSTEMS COMMAND. AS A MANAGEMENT CONSULTANT IN RESULT DELIVERY PLANNING, HIS PATRIOTISM, PROFESSIONAL COMPETENCE AND PERSONAL SACRIFICES ARE HIGHLY COMMENDABLE. TOM GILB'S DEDICATION AND THE EXCEPTIONAL MANNER IN WHICH HE PERFORMED HIS DUTIES HAD A DIRECT AND SIGNIFICANT IMPACT ON PERSINSCOM'S MISSION. HIS OUTSTANDING CONTRIBUTIONS AND DISTINGUISHED SERVICE REFLECT GREAT CREDIT ON HIM AND THE UNITED STATES ARMY. CONGRATULATIONS FOR A JOB WELL DONE.

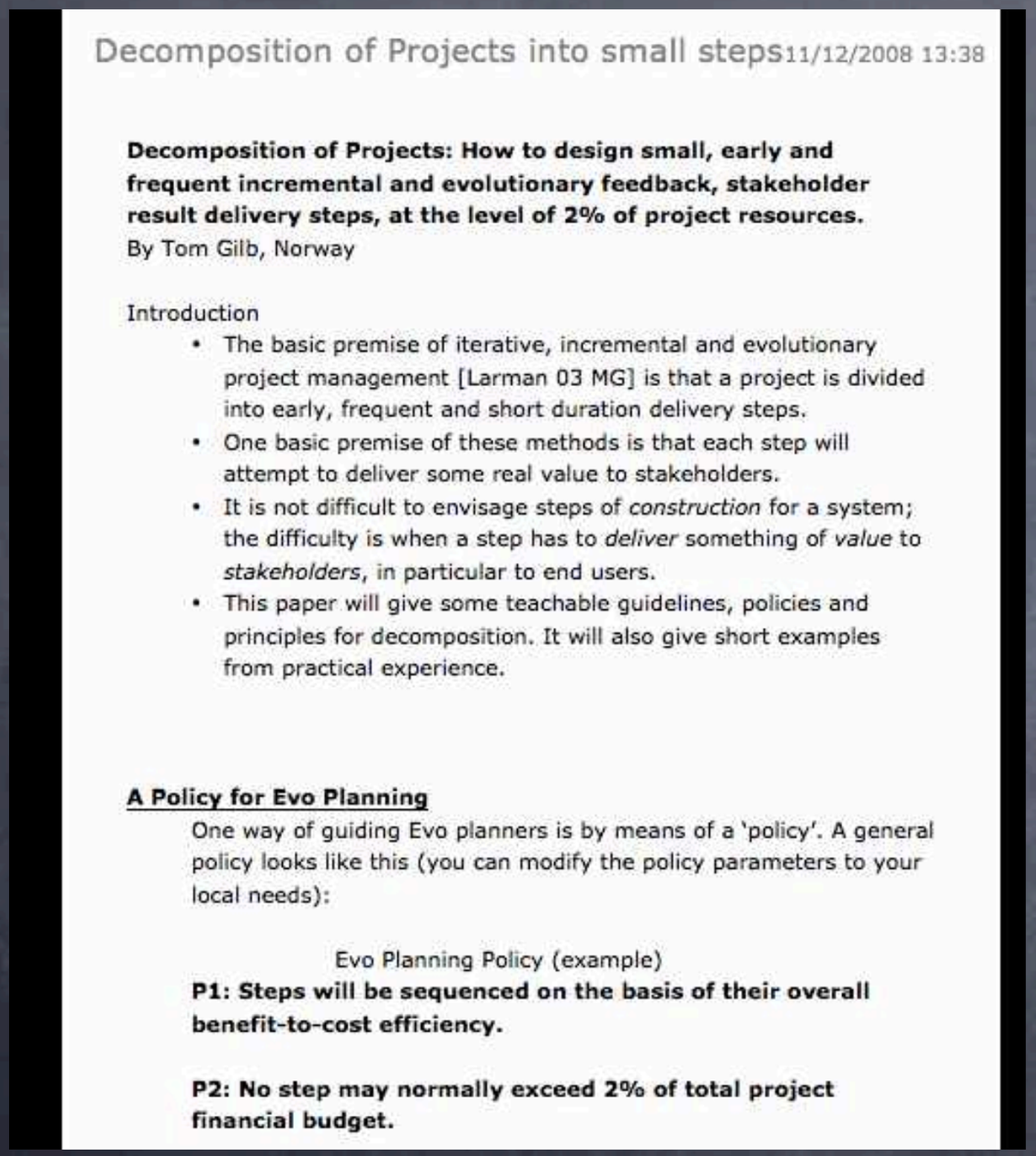
30 AUGUST 1991

Personnel Information Systems Command

Jack A. Pellicci

JACK A. PELLICCI
Brigadier General, USA
Commanding

Decomposition Principles
A Teachable Discipline
The IE Table a tool for decomposition by Value



Decomposition of Projects into small steps11/12/2008 13:38

Decomposition of Projects: How to design small, early and frequent incremental and evolutionary feedback, stakeholder result delivery steps, at the level of 2% of project resources.

By Tom Gilb, Norway

Introduction

- The basic premise of iterative, incremental and evolutionary project management [Larman 03 MG] is that a project is divided into early, frequent and short duration delivery steps.
- One basic premise of these methods is that each step will attempt to deliver some real value to stakeholders.
- It is not difficult to envisage steps of *construction* for a system; the difficulty is when a step has to *deliver* something of *value* to *stakeholders*, in particular to end users.
- This paper will give some teachable guidelines, policies and principles for decomposition. It will also give short examples from practical experience.

A Policy for Evo Planning

One way of guiding Evo planners is by means of a 'policy'. A general policy looks like this (you can modify the policy parameters to your local needs):

Evo Planning Policy (example)

P1: Steps will be sequenced on the basis of their overall benefit-to-cost efficiency.

P2: No step may normally exceed 2% of total project financial budget.

http://www.gilb.com/tiki-download_file.php?fileId=41

Decomposition Principles

How to decompose systems into small evolutionary steps:

some principles to apply:

1• *Believe* there is a way to do it, you just have not *found* it yet!

2• *Identify* obstacles, but don't use them as excuses: use your imagination to get *rid* of them!

3• Focus on *some usefulness* for the user or customer, however small.

4• Do not focus on the design ideas themselves, they are distracting, especially for small initial cycles. Sometimes you have to ignore them entirely in the short term!

5• Think; one customer, tomorrow, one interesting improvement.

6• Focus on the *results* (which you should have defined in your goals, moving toward target levels).

7• Don't be afraid to use temporary-scaffolding designs. Their cost must be seen in the light of the value of making some progress, and getting practical experience.

8• Don't be worried that your design is inelegant; it is results that count, not style.

9• Don't be afraid that the customer won't like it. *If* you are focusing on results *they want*, then by definition, *they* should like it. If you are not, then *do*!

10• Don't get so worried about "what might happen afterwards" that you can make no practical progress.

11• You cannot foresee everything. Don't even *think* about it!

12• If you focus on helping your customer in practice, *now*, where they *really* need it, you will be forgiven a lot of 'sins'!

13• You can understand things much better, by getting *some* practical experience (and removing *some* of your fears).

14• Do *early* cycles, on willing local mature parts of your user community.

15• When some cycles, like a purchase-order cycle, take a long time, initiate them early, and do other useful cycles while you wait.

16• If something seems to need to wait for 'the big new system', ask if you cannot usefully do it with the 'awful old system', so as to pilot it realistically, and perhaps alleviate some 'pain' in the old system.

17• If something seems too costly to buy, for limited initial use, see if you can negotiate some kind of 'pay as you really use' contract. Most suppliers would like to do this to get your patronage, and to avoid competitors making the same deal.

18• If *you* can't think of some useful small cycles, then talk directly with the real 'customer' or end user. They probably have dozens of suggestions.

19• Talk with end users in *any* case, they have insights you need.

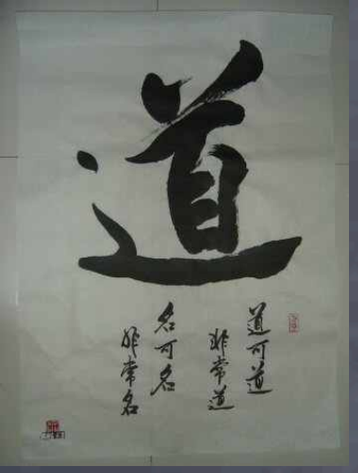
20• Don't be afraid to use the old system and the old 'culture' as a launching platform for the radical new system. There is a lot of merit in this, and many people overlook it.

I have never seen an exception in 33 years of doing this with many varied cultures. Oh Ye of little faith!

Rene Descartes on Focus

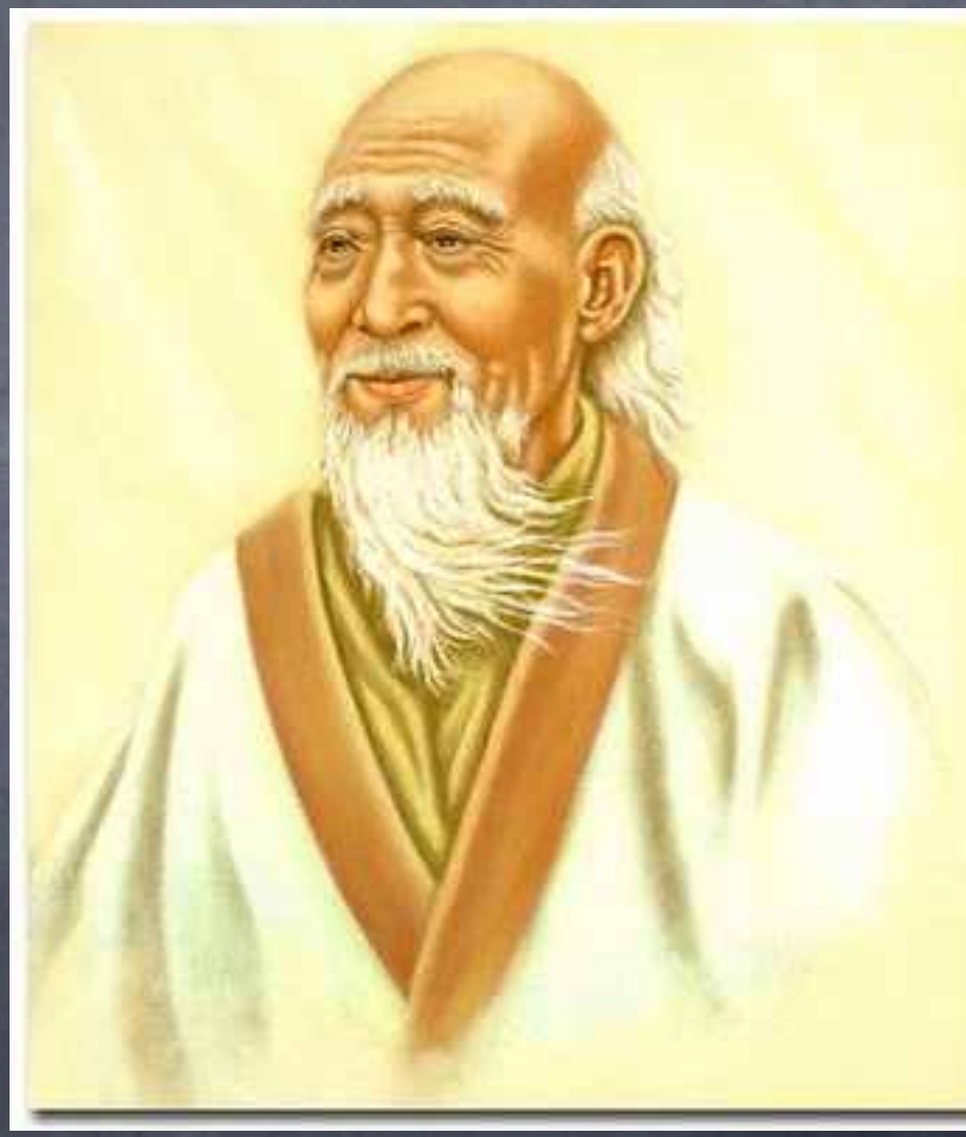
- **"We should bring the whole force of our minds**
  - **to bear upon the most minute and simple details**
  - **and to dwell upon them for a long time**
  - **so that we become accustomed to perceive the truth clearly and distinctly."**

- **Rene Descartes, Rules for the Direction of the Mind, 1628**



Tao Te Ching (500BC)

- That which remains quiet, is easy to handle.
- That which is not yet developed is easy to manage.
- That which is weak is easy to control.
- That which is still small is easy to direct.
- Deal with little troubles before they become big.
- Attend to little problems before they get out of hand.
  - For the largest tree was once a sprout,
- the tallest tower started with the first brick,
- and the longest journey started with the first step.



- From Lao Tzu in Bahn, 1980 (also quoted in Gilb, Principles of Software Engineering Management page 96), Penguin book

Bring Case

Identify Stakeholders

Who and what cares about the outcome of our project?

Learn

Stakeholders

Values

Solutions

Decompos

Develo

Deliver

Measure

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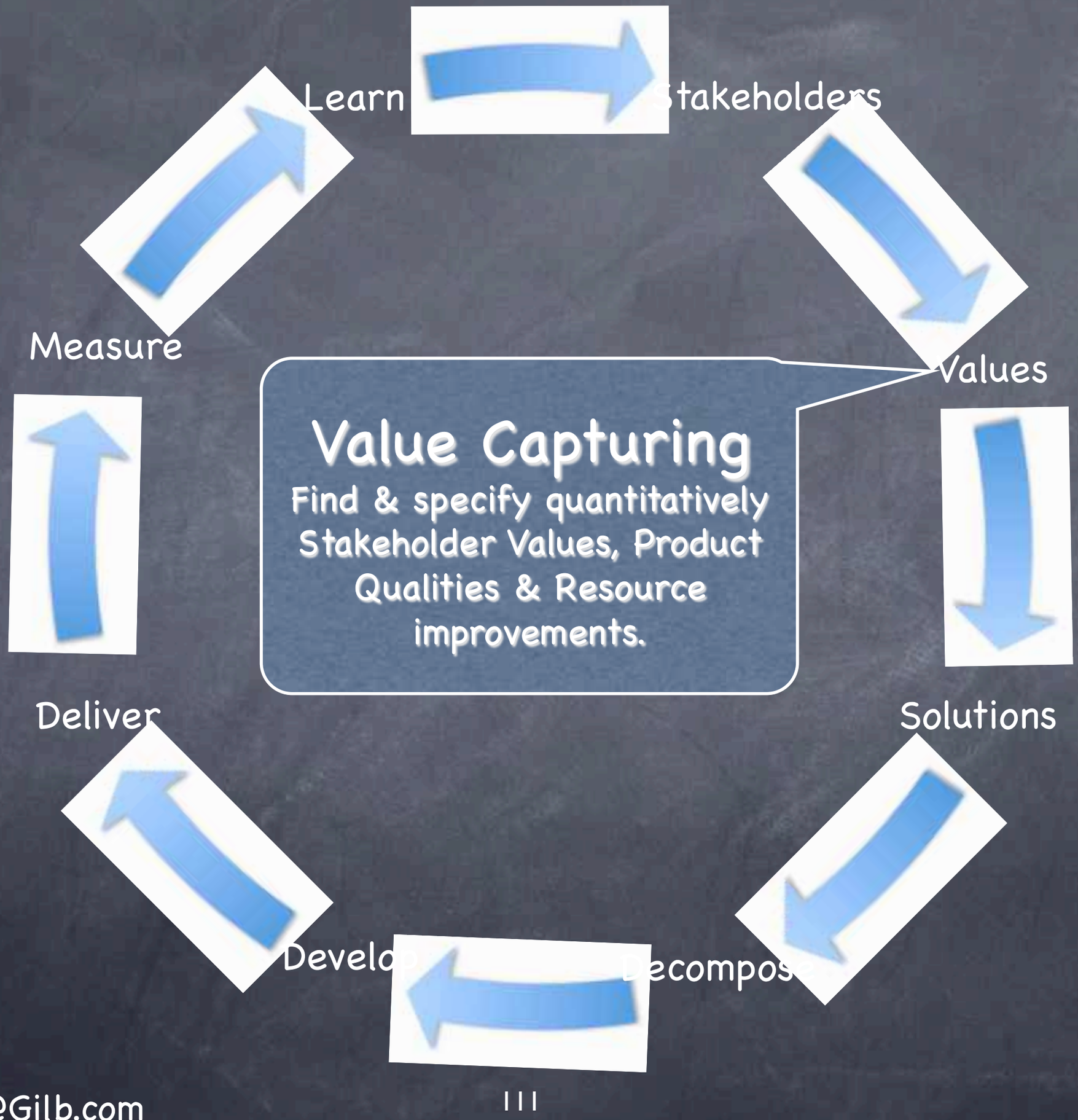

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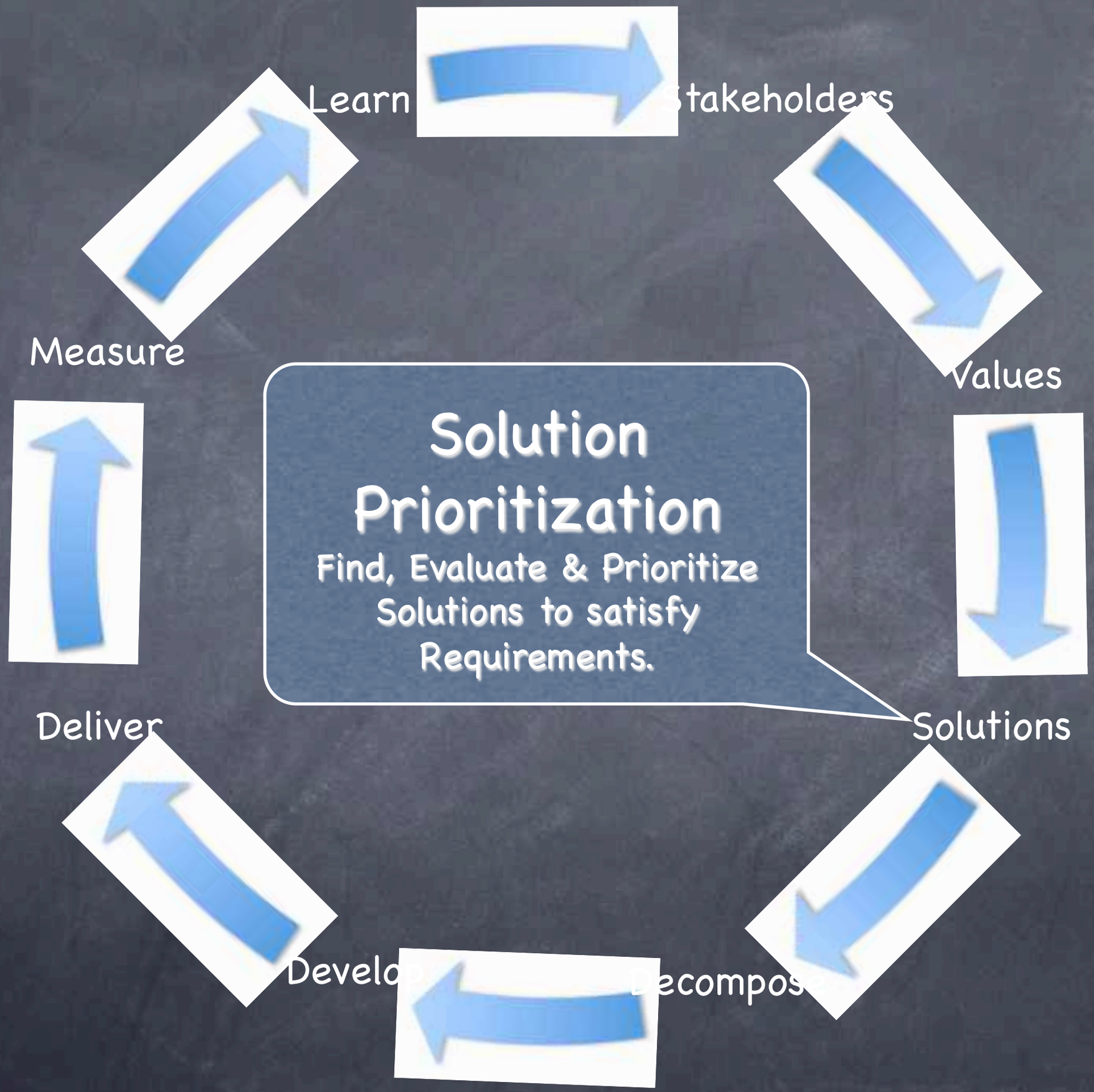

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Evo Cycles

Decompose the winning Solutions down into smaller entities,
then package them so they deliver maximum Value.

Learn

Stakeholders

Values

Solutions

Decompose

Develop

Deliver

Measure

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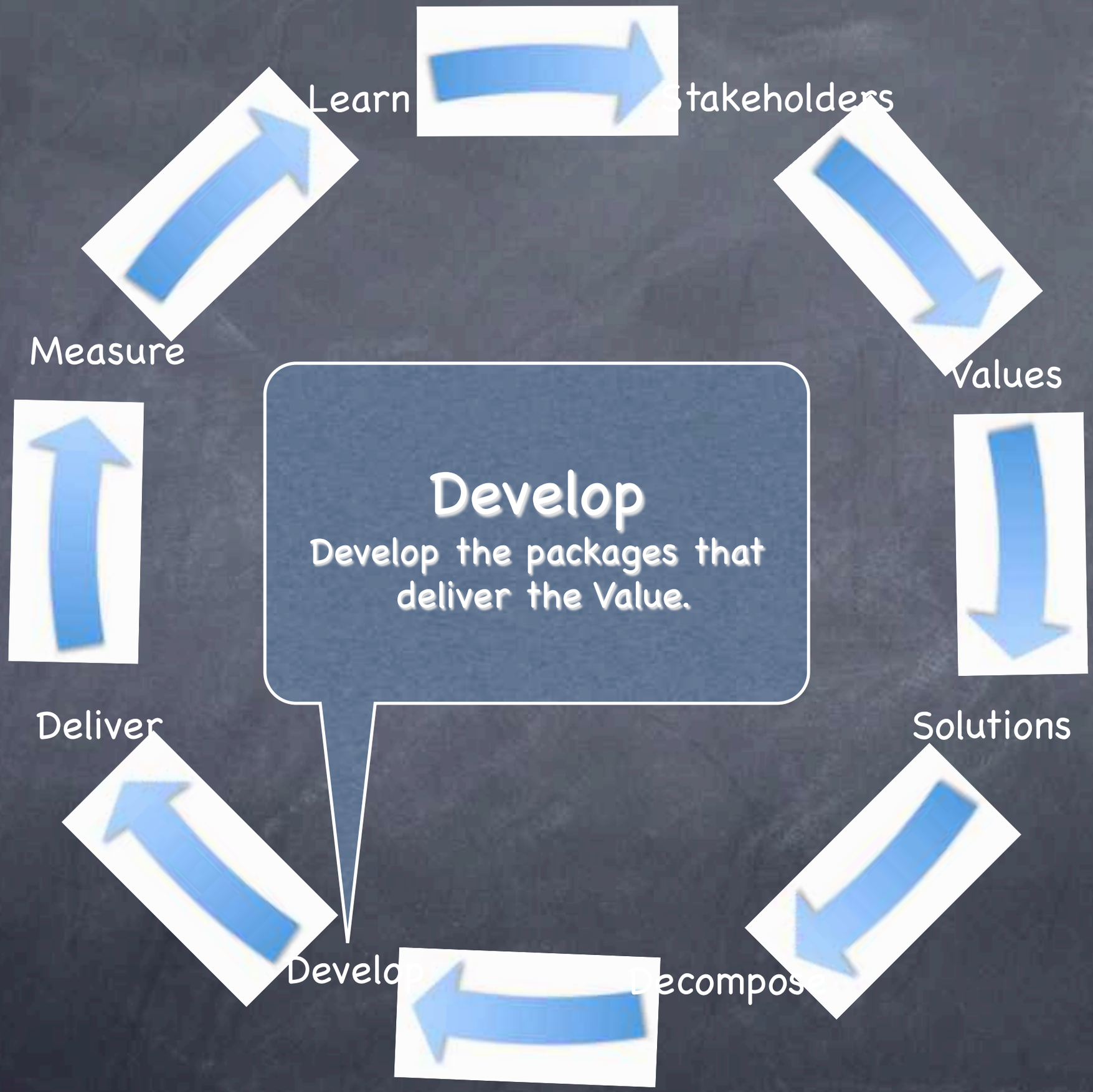

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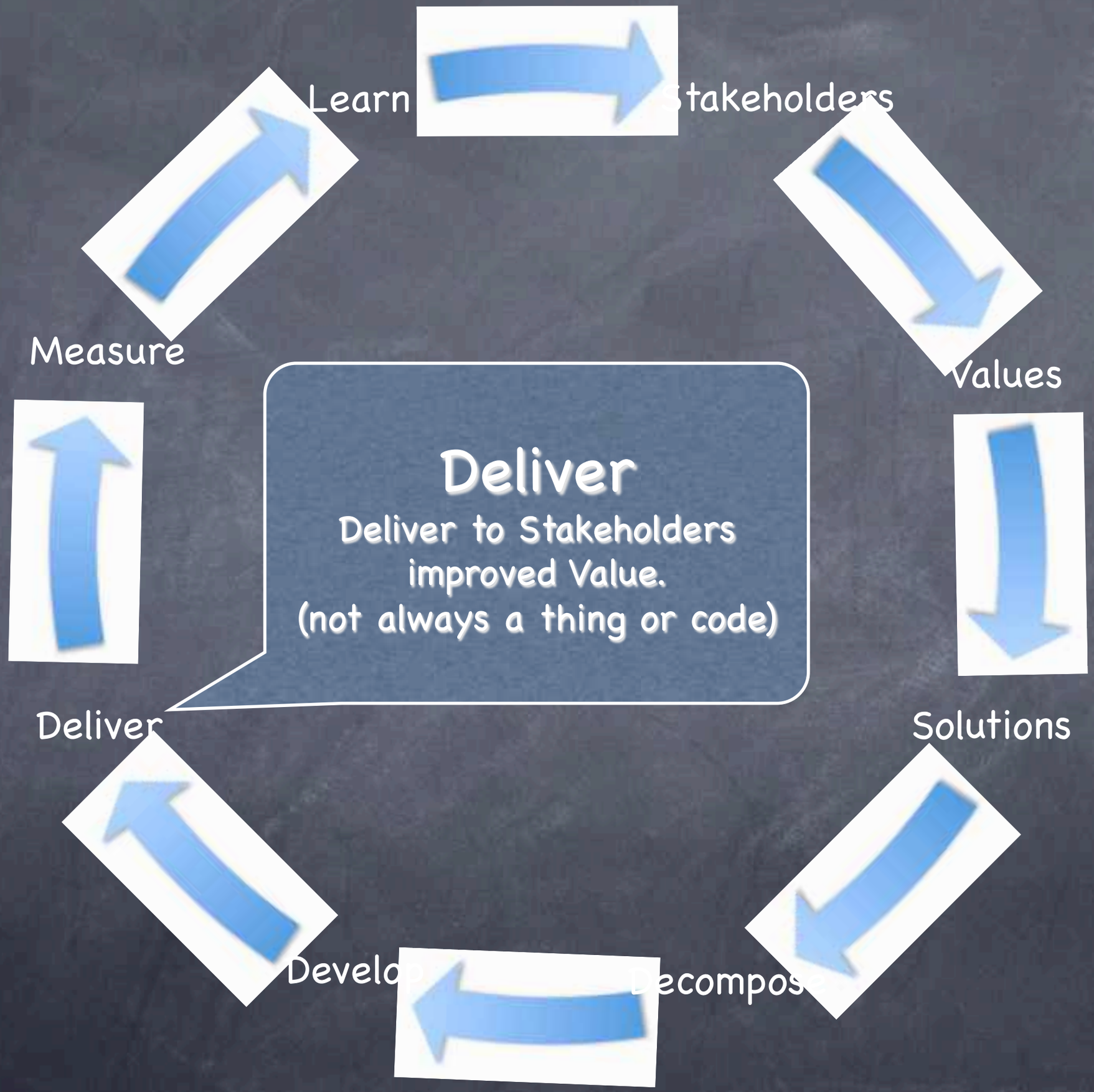

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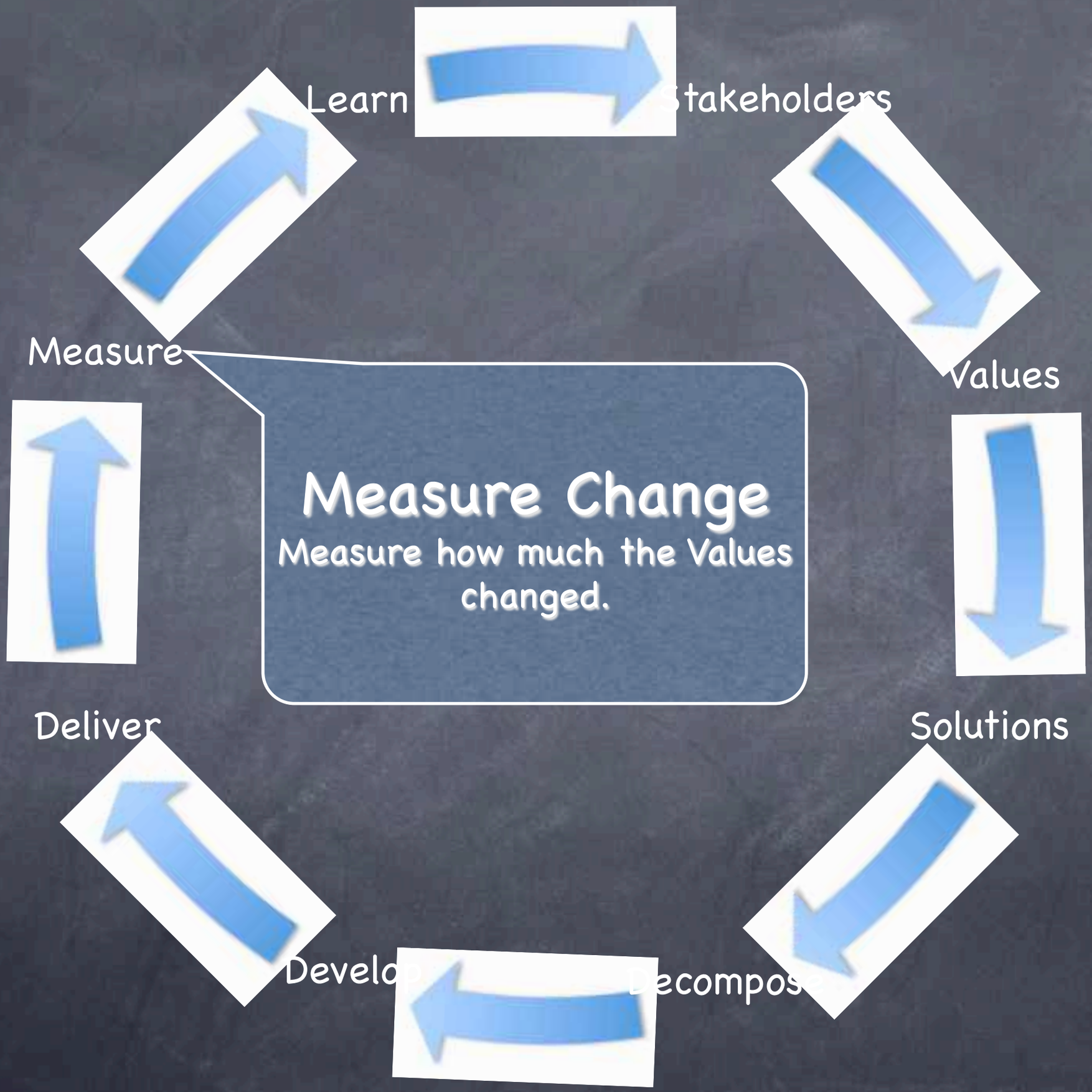

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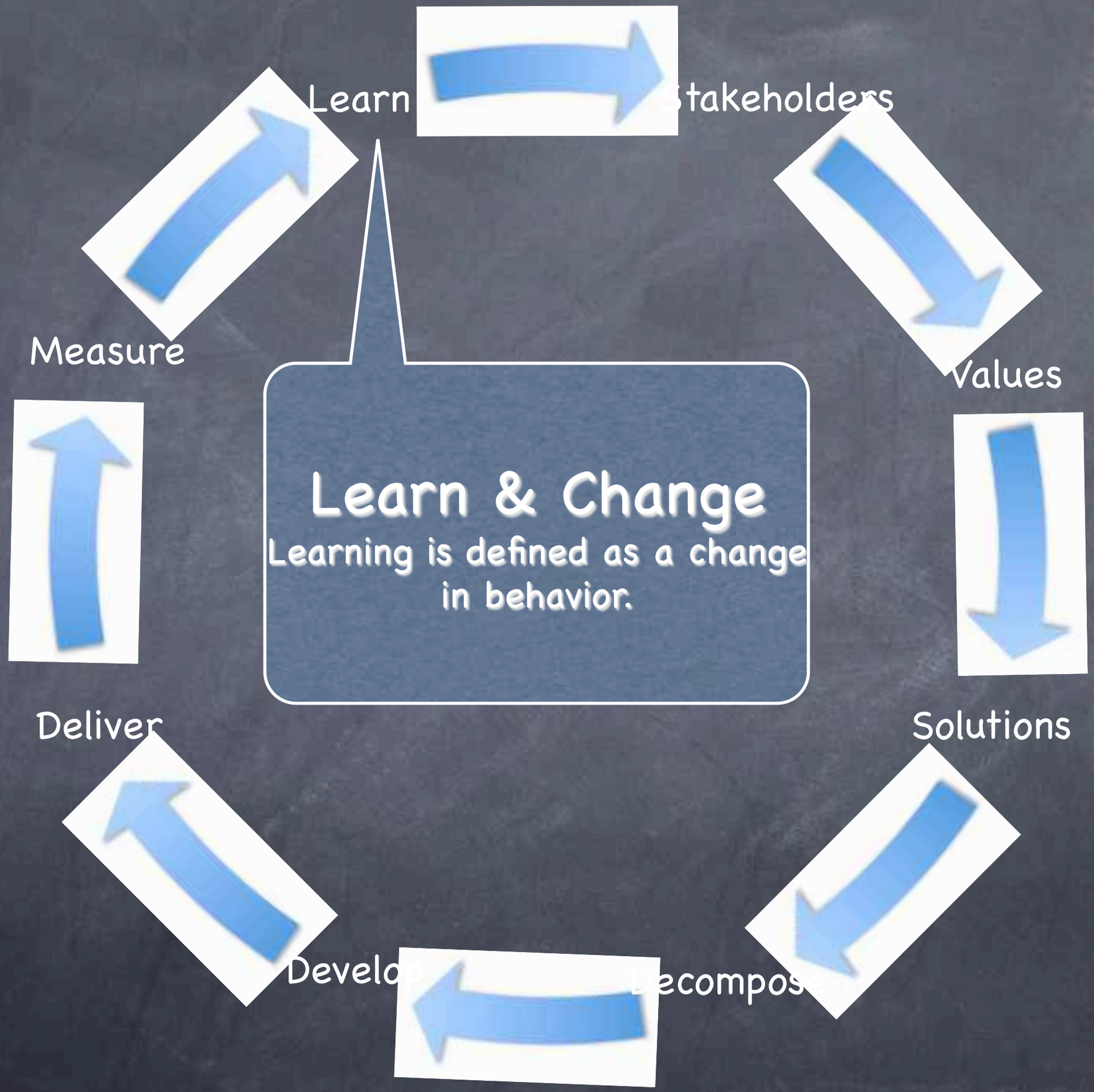

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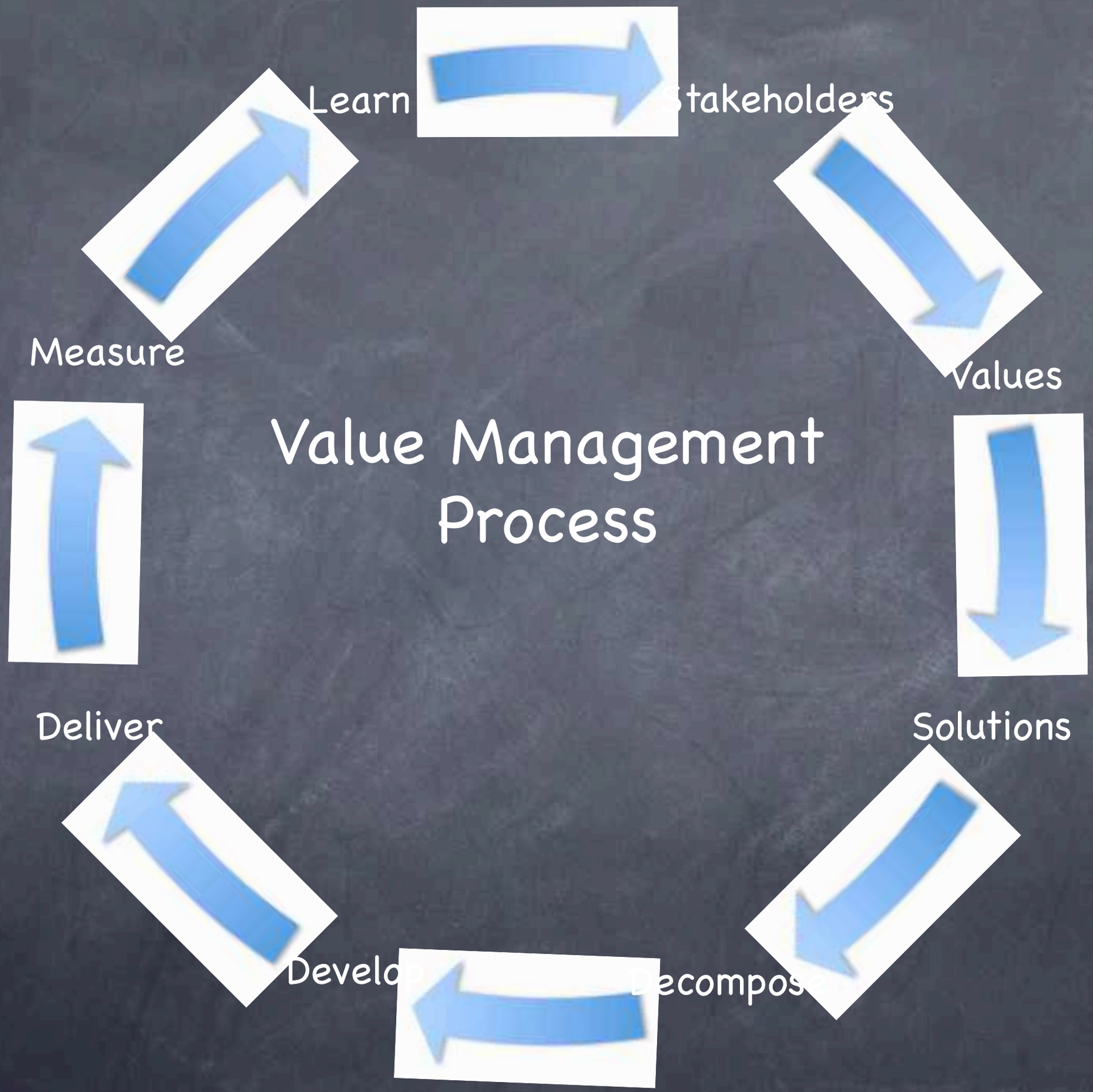
Value Management Process



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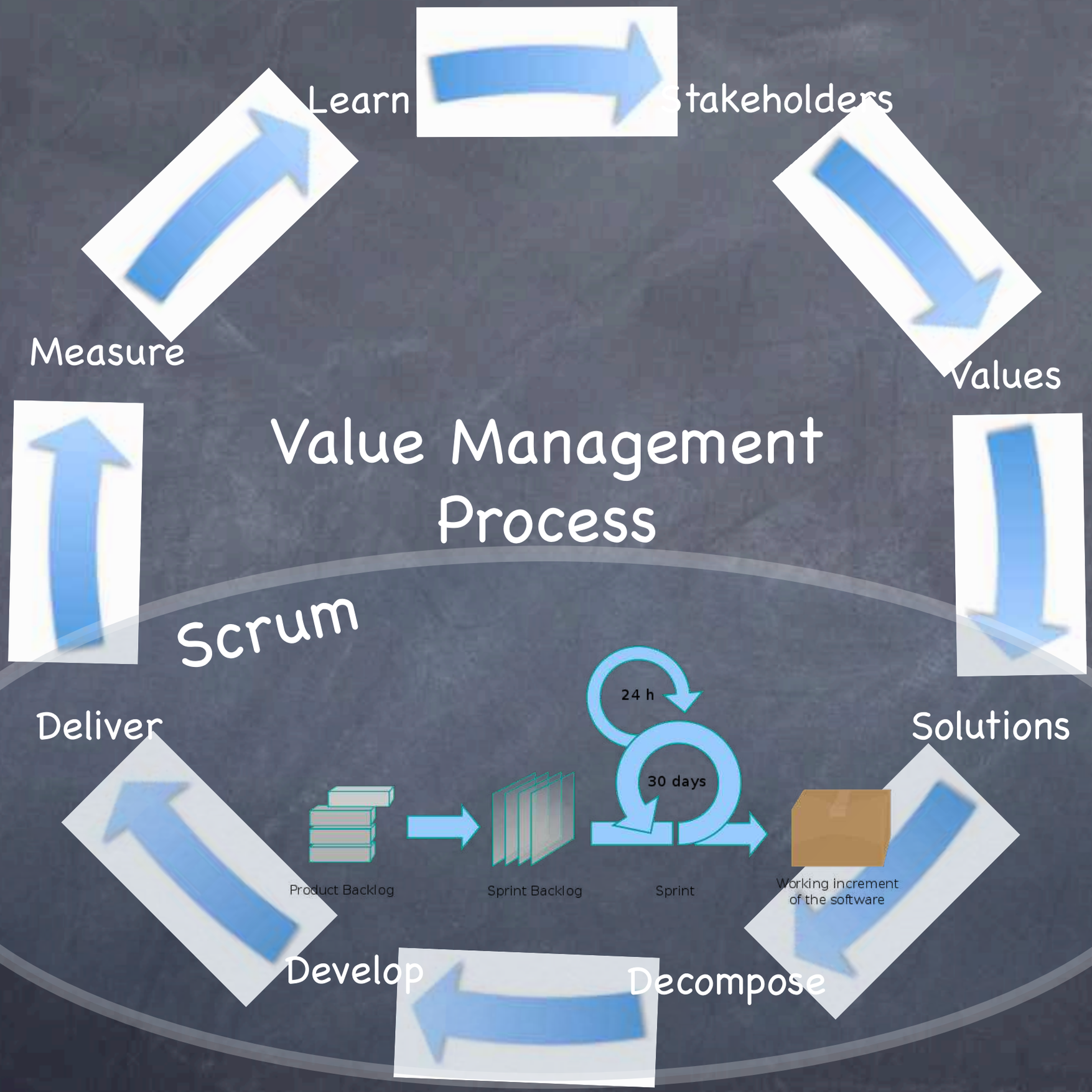

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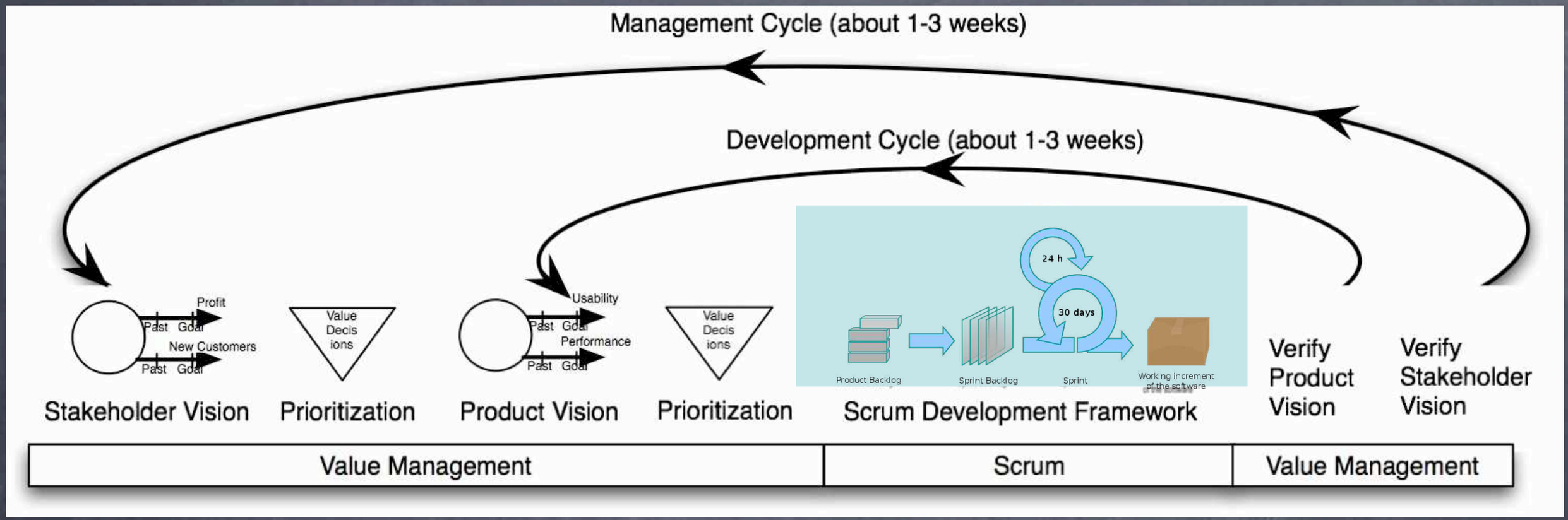
Value Management



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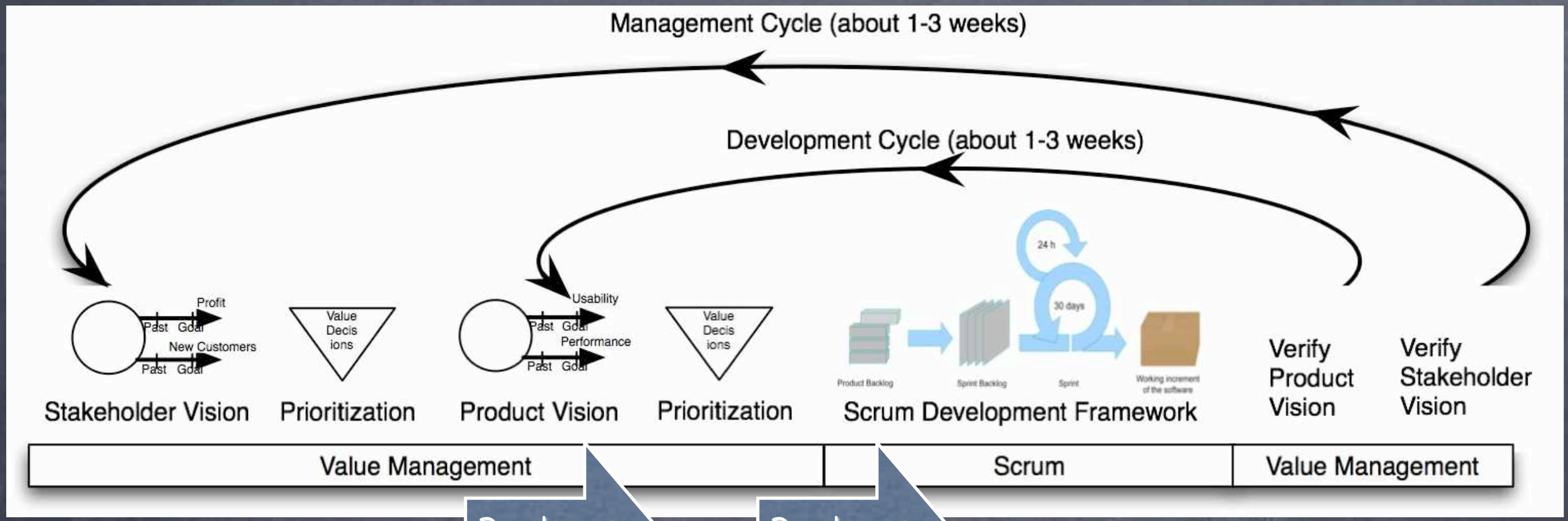

Developers

Developers

Management

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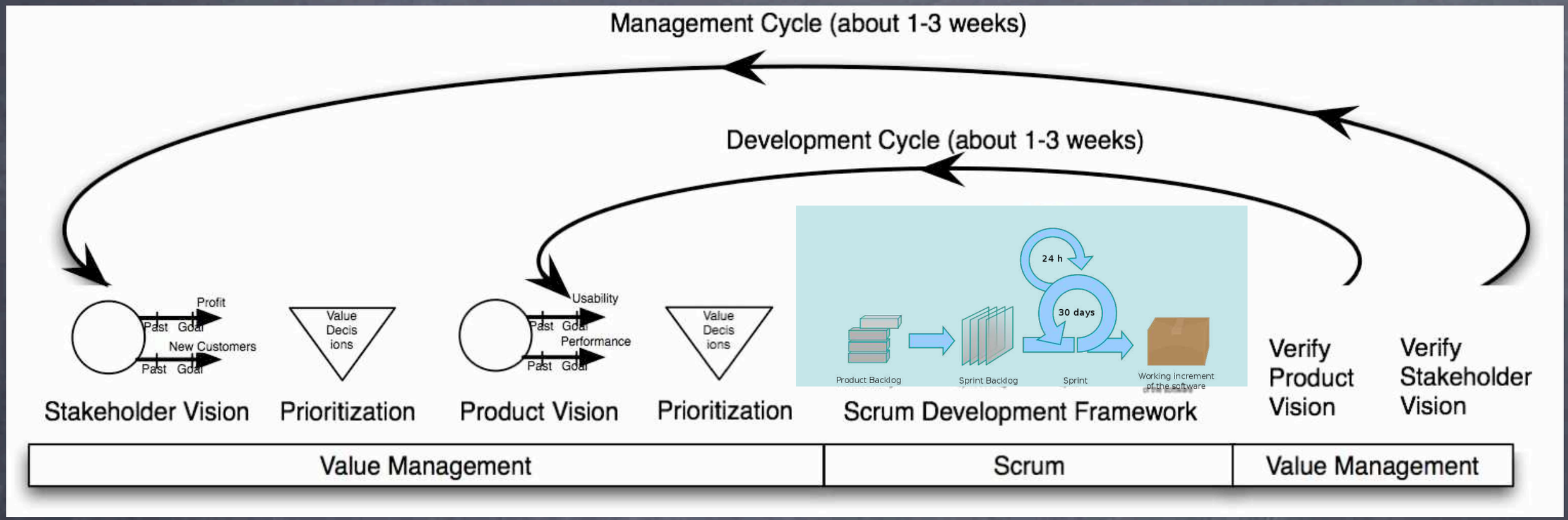
Value Management



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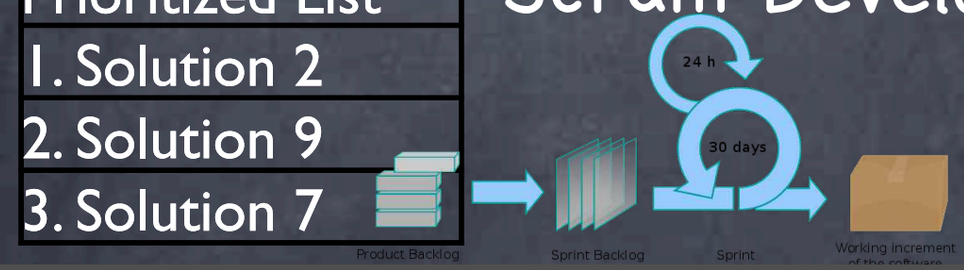
Value Decision Tables

Business Goals	Stakeholder Value 1	Stakeholder Value 2
Business Value 1	-10%	40%
Business Value 2	50%	10%
Resources	20%	10%

Stakeholder Val.	Product Value 1	Product Value 2
Stakeholder Value 1	-10%	50 %
Stakeholder Value 2	10 %	10%
Resources	2 %	5 %

Product Values	Solution 1	Solution 2
Product Value 1	-10%	40%
Product Value 2	50%	80 %
Resources	1 %	2 %

Prioritized List
1. Solution 2
2. Solution 9
3. Solution 7



Scrum Develops

We measure improvements
Learn and Repeat

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Value Decision Tables

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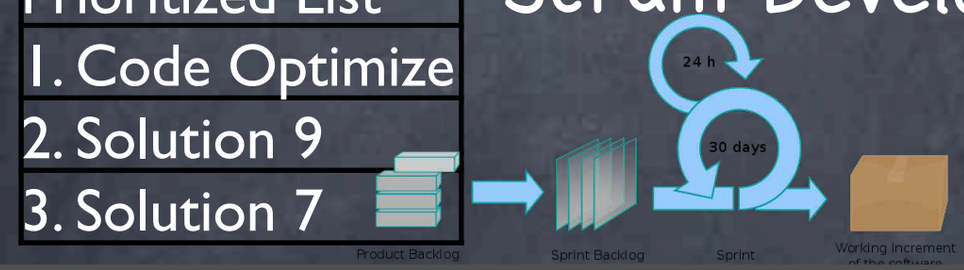
Value Decision Tables

Business Goals	Training Costs	User Productivity
Profit	-10%	40%
Market Share	50%	10%
Resources	20%	10%

Stakeholder Val.	Intuitiveness	Performance
Training Costs	-10%	50 %
User Productivity	10 %	10%
Resources	2 %	5 %

Product Values	GUI Style Rex	Code Optimize
Intuitiveness	-10%	40%
Performance	50%	80 %
Resources	1 %	2 %

Prioritized List
1. Code Optimize
2. Solution 9
3. Solution 7



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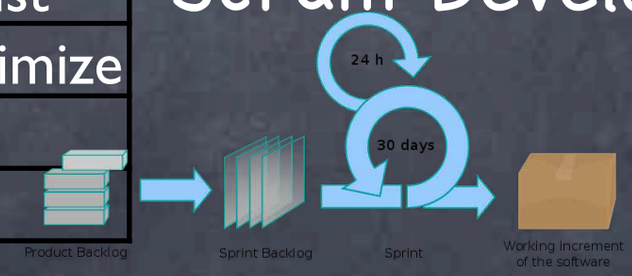
Scrum Develops



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Confirmit Case

The Confirmit Case Study 2003-2009

See paper on this case at www.gilb.com

Papers/Cases/Slides, Gilb Library,

value slide w… http://www.gilb.com/tiki-download_file.php?fileId=152

ppr wrong ag… http://www.gilb.com/tiki-download_file.php?fileId=50

Paper Firm http://www.gilb.com/tiki-download_file.php?fileId=32

And see papers (IEEE Software Fall 2006) by Geir K Hanssen, SINTEF

Their product = confirmit

Chief Storyteller = Trond Johansen

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Customer Successes in Corporate Sector

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Real Example of 1 of the 25 Quality Requirements

Usability.Productivity ***(taken from Confirmit 8.5,*** **performed a set of predefined steps, to produce a standard MR Report.**

development)

<u>Scale for quantification</u>: Time in minutes to set up a typical specified Market Research-report

<u>Past Level [Release 8.0]</u>: 65 mins.,

<u>Tolerable Limit [Release 8.5]</u>: 35 mins.,

<u>Goal [Release 8.5]</u>: 25 mins.

Note: end result was actually 20 minutes ☺

<u>Meter [Weekly Step]</u>: Candidates with Reportal experience, and with knowledge of MR-specific reporting features

Trond Johansen

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Shift: from Function to Quality

- **Our new focus is on the day-to-day operations of our Market Research users,**
  - **not a list of features that they might or might not like. 50% never used!**
  - **We KNOW that increased efficiency, which leads to more profit, will please them.**
  - **The ‘45 minutes actually saved x thousands of customer reports’**
    - **= big $$$ saved**
- **After one week we had defined more or less all the requirements for the next version (8.5) of Confirmit.**

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FIRM (Future Information Research Management, Norway)
project step planning and accounting:
using **an Impact Estimation Table**

Trond Johansen

- IET for MR Project – Confirmit (<-FIRM Product Brand) 8.5
- **Solution:** Recoding
  - Make it possible to recode variable on the fly from Reportal.
  - Estimated effort: 4 days
  - **Estimated** Productivity Improvement: 20 minutes (50% way to Goal)
  - actual result 38 minutes (95% progress towards Goal)

	A	B	C	D	E	F	G	BX	BY	BZ	CA
1											
2		Current Status	Improvements		Goals			Step9			
3								Recoding			
4								Estimated impact		Actual impact	
5		Units	Units	%	Past	Tolerable	Goal	Units	%	Units	%
6					Usability.Replacability (feature count)						
7		1,00	1,0	50,0	2	1	0				
8					Usability.Speed.NewFeaturesImpact (%)						
9		5,00	5,0	100,0	0	15	5				
10		10,00	10,0	200,0	0	15	5				
11		0,00	0,0	0,0	0	30	10				
12					Usability.Intuitiveness (%)						
13		0,00	0,0	0,0	0	60	80				
14					Usability.Productivity (minutes)						
15		20,00	45,0	112,5	65	35	25	20,00	50,00	38,00	95,00
20					Development resources						
21			101,0	91,8	0		110	4,00	3,64	4,00	3,64

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Evo – IET

- Product quality:
  - **Usability.Intuitiveness:**
  - **Scale: Probability that <secret name of stakeholders> can intuitively, and without any help, figure out how to do a set of defined, common, simple tasks correctly**

Current Status		Improvement	Goals			Step 1 (7.-18.Aug)		Step 2 (21.-1.sep)		Step 3 (4.-15.sep)	
	Units		Past	Tolerable	Goal	Estimated Impact	Actual Impact	Estimated Impact	Actual Impact	Estimated Impact	Actual Impact
Usability.Intuitiveness											
	9,0	9,0	18	12	8					8	9
	1,5	5,0	6,5	3,0	1,0					4,5	5,0

  - **Meter1: The time it takes for “secret name of stakeholders” (First time users) to create a SimpleSet1 of pre-defined authoring tasks**
  - **Meter2: The number of times “secret name of stakeholders” (First time users) are uncertain of how to perform a step in SimpleSet1**

New slide by Trond October 2 2006

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EVO Plan Confirmit 8.5 in **Evo Step Impact *Measurement***

4 product areas were attacked in all: **25 Qualities** concurrently, one quarter of a year. Total development staff = 13

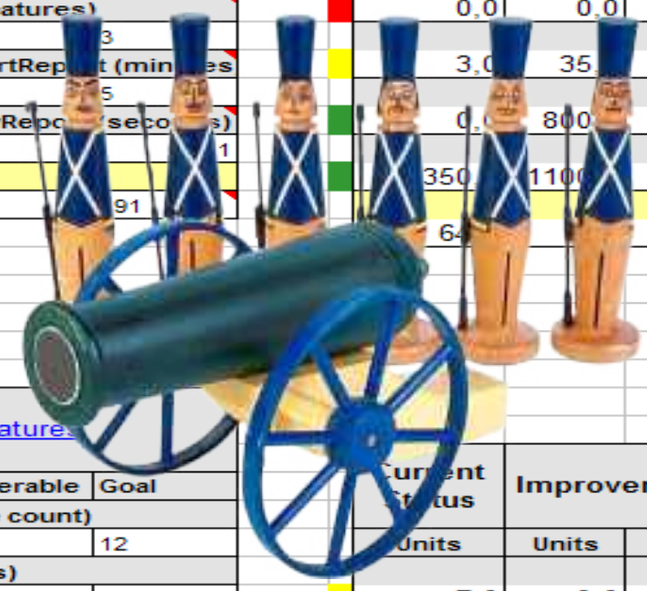
9

8

Impact Estimation Table: Reportal codename "Hyggen"

Current Status	Improvements		Reportal - E-SAT features		
Units	Units	%	Past	Tolerable	Goal
			Usability.Intuitivness (%)		
75,0	25,0	62,5	50	75	90
			Usability.Consistency.Visual (Elements)		
14,0	14,0	100,0	0	11	14
			Usability.Consistency.Interaction (Components)		
15,0	15,0	107,1	0	11	14
			Usability.Productivity (minutes)		
5,0	75,0	96,2	80	5	2
5,0	45,0	95,7	50	5	1
			Usability.Flexibility.OfflineReport.ExportFormats		
3,0	2,0	66,7	1	3	4
			Usability.Robustness (errors)		
1,0	22,0	95,7	7	1	0
			Usability.Replacability (nr of features)		
4,0	5,0	100,0	8	5	3
			Usability.ResponseTime.ExportRep t (min es		
1,0	12,0	150,0	13	13	5
			Usability.ResponseTime.ViewRepo (seco s)		
1,0	14,0	100,0	15		1
			Development resources		
203,0			0		91

Current Status	Improvements		Survey Engine .NET		
Units	Units	%	Past	Tolerable	Goal
			Backwards.Compatibility (%)		
83,0	48,0	80,0	40	85	95
0,0	67,0	100,0	67	0	0
			Generate.WI.Time (small/medium/large seconds)		
4,0	59,0	100,0	63	8	4
10,0	397,0	100,0	407	100	10
94,0	2290,0	103,9	2384	500	180
			Testability (%)		
10,0	10,0	13,3	0	100	100
			Usability.Speed (seconds/user rating 1-10)		
774,0	507,0	51,7	1281	600	300
5,0	3,0	60,0	2	5	7
			Runtime.ResourceUsage.Memory		
0,0	0,0	0,0		?	?
			Runtime.ResourceUsage.CPU		
3,0	35	97,2	38	3	2
			Runtime.ResourceUsage.MemoryLeak		
0,0	800	100,0	800	0	0
			Runtime.Concurrency (number of users)		
350	1100	146,7	150	500	1000
			Development resources		
64			0		84



3

Current Status	Improvements		Reportal - MR Features		
Units	Units	%	Past	Tolerable	Goal
			Usability.Replacability (feature count)		
1,0	1,0	50,0	14	13	12
			Usability.Productivity (minutes)		
20,0	45,0	112,5	65	35	25
			Usability.ClientAcceptance (features count)		
4,4	4,4	36,7	0	4	12
			Development resources		
101,0			0		86

3

Current Status	Improvements		XML Web Services		
Units	Units	%	Past	Tolerable	Goal
			TransferDefinition.Usability.Efficiency		
7,0	9,0	81,8	16	10	5
17,0	8,0	53,3	25	15	10
			TransferDefinition.Usability.Response		
943,0	-186,0	######	170	60	30
			TransferDefinition.Usability.Intuitiveness		
5,0	10,0	95,2	15	7,5	4,5
			Development resources		
2,0			0		48

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Confirmit **Evo Weekly Value Delivery Cycle**

	Development Team	Users (PMT, Pros, Doc writer, other)	CTO (Sys Arch, Process Mgr)	QA (Configuration Manager & Test Manager)
Friday	✓ PM: Send Version N detail plan to CTO + prior to Project Mgmt meeting ✓ PM: Attend Project Mgmt meeting: 12.00-15.00 ✓ Developers: Focus on genereal maintenance work, documentation.		✓ Approve/reject design & Step N ✓ Attend Project Mgmt meeting: 12-15	✓ Run final build and create setup for Version N-1. ✓ Install setup on test servers (external and internal) ✓ Perform initial crash test and then release Version N-1
Monday	✓ Develop test code & code for Version N	✓ Use Version N-1		✓ Follow up CI ✓ Review test plans, tests
Tuesday	✓ Develop Test Code & Code for Version N ✓ Meet with users to Discuss Action Taken Regarding Feedback From Version N-1	✓ Meet with developers to give Feedback and Discuss Action Taken from previous actions	✓ System Architect to review code and test code	✓ Follow up CI ✓ Review test plans, tests
Wednesday	✓ Develop test code & code for Version N			✓ Review test plans, tests ✓ Follow up CI
Thursday	✓ Complete Test Code & Code for Version N ✓ Complete GUI tests for Version N-2			✓ Review test plans, tests ✓ Follow up CI

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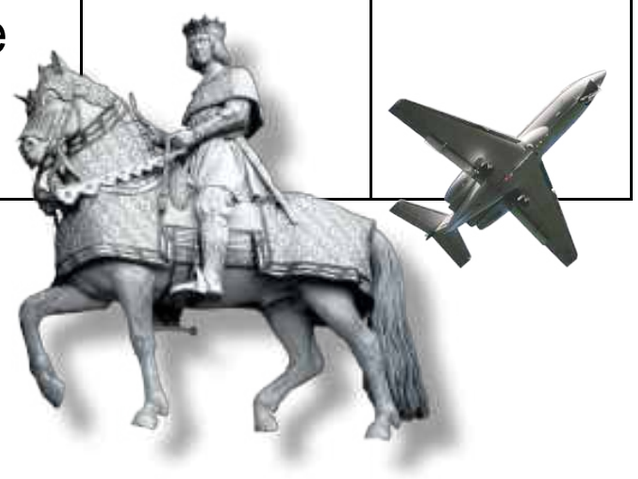
Evo's impact on Confirmit product qualities 1st Qtr

- " Only 5 highlights of the 25 impacts are listed here

Description of requirement/work task	Past	Status
Usability.Productivity: Time for the system to generate a survey	7200 sec	15 sec
Usability.Productivity: Time to set up a typical specified Market Research-report (MR)	65 min	20 min
Usability.Productivity: Time to grant a set of End-users access to a Report set and distribute report login info.	80 min	5 min
Usability.Intuitiveness: The time in minutes it takes a medium experienced programmer to define a complete and correct data transfer definition with Confirmit Web Services without any user documentation or any other aid	15 min	5 min
Performance.Runtime.Concurrency: Maximum number of simultaneous respondents executing a survey with a click rate of 20 sec and an response time<500 ms, given a defined [Survey-Complexity] and a defined [Server Configuration, Typical]	250 users	6000



confirmit

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Initial Customer Feedback on the new Confirmit 9.0

November 24th, 2004

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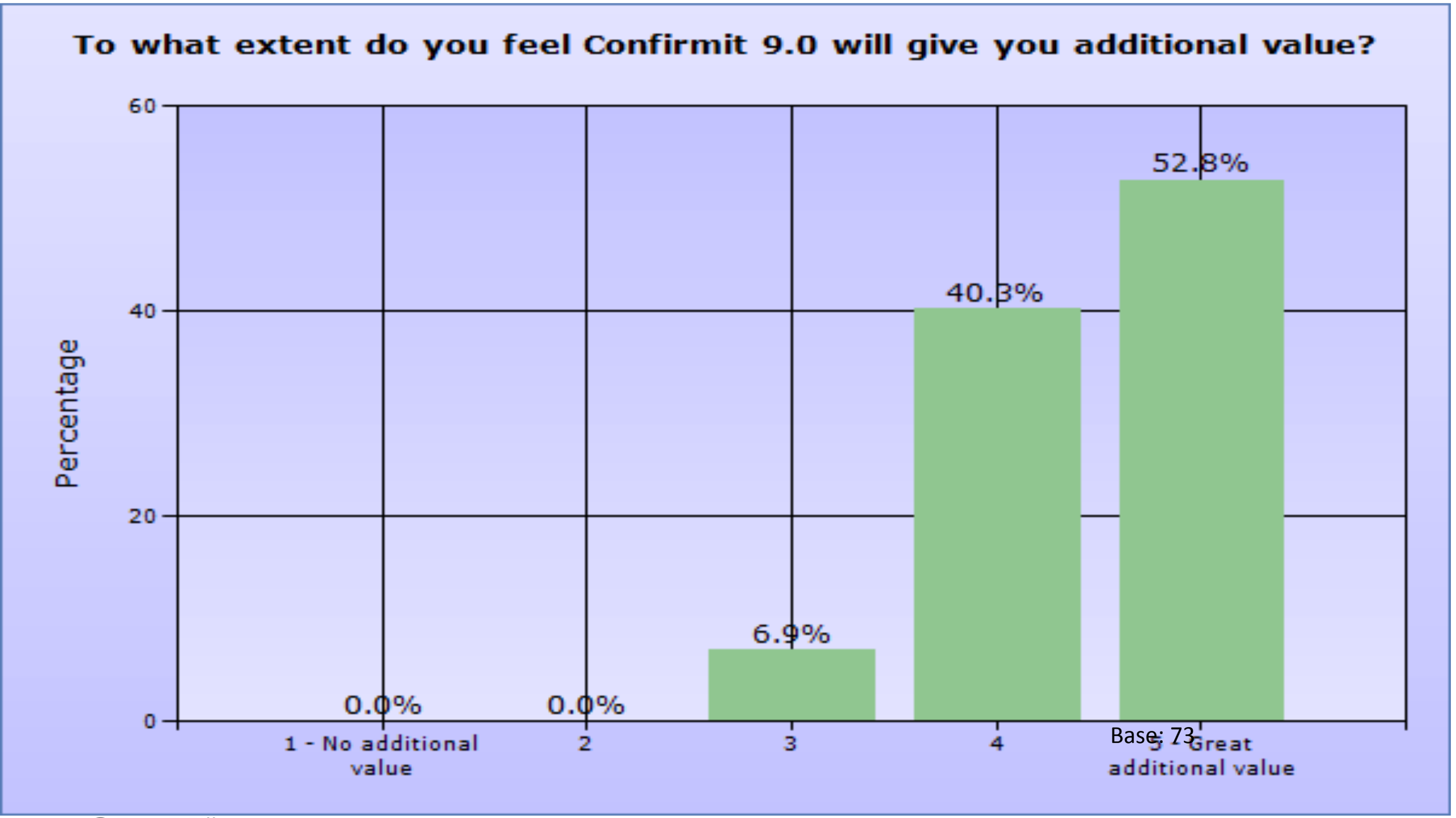
Initial perceived value of the new release (Base 73 people)



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Evo's impact on Confirmit 9.0 product qualities
Results from the second quarter of using Evo. 1/2

Product quality	Description	Customer value
Intuitiveness	Probability that an inexperienced user can intuitively figure out how to set up a defined Simple Survey correctly.	Probability increased by **175%**
Productivity	Time in minutes for a defined advanced user, with full knowledge of 9.0 functionality, to set up a defined advanced survey correctly.	Time reduced by **38%**

Product quality	Description	Customer value
Productivity	Time (in minutes) to test a defined survey and identify 4 inserted script errors, starting from when the questionnaire is finished to the time testing is complete and is ready for production. (Defined Survey: Complex survey, 60 questions, comprehensive JScripting.)	Time reduced by **83%** and error tracking increased by 25%

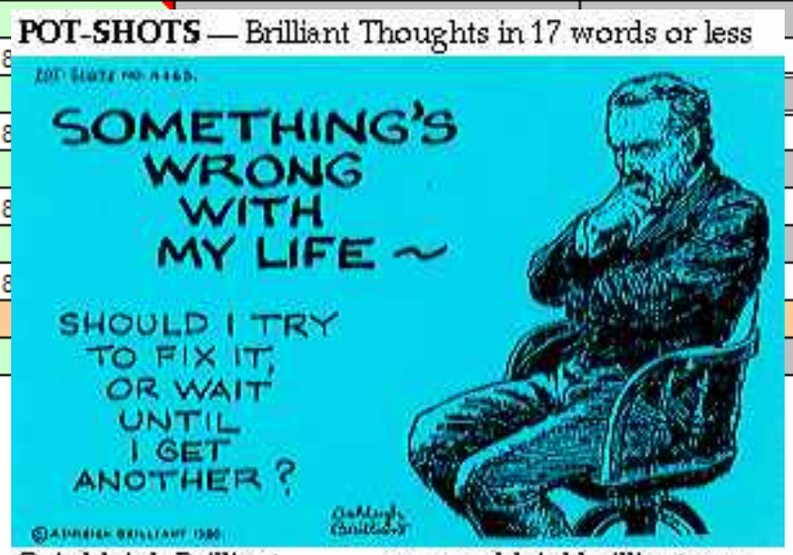
Evo's impact on Confirmit 9.0 product qualities
Results from the second quarter of using Evo. 2/2

Product quality	Description	Customer value
Performance	Max number of panelists that the system can support without exceeding a defined time for the defined task, with all components of the panel system performing acceptable.	Number of panelists increased by **1500%**
Scalability	Ability to accomplish a bulk-update of X panelists within a timeframe of Z second	Number of panelists increased by **700%**
Performance	Number of responses a database can contain if the generation of a defined table should be run in 5 seconds.	Number of responses increased by **1400%**

Code quality – ”green” week

- In these ”green” weeks, some of the deliverables will be less visible for the end users, but more visible for our QA department.
- We manage code quality through an Impact Estimation table.

Current Status		Improvement	Goals			Step 6 (week 14)		Step 7 (wee	
	Units		Past	Tolerable	Goal	Estimated Impact	Actual Impact	Estimated Impact	A
	100,0	100,0	0	80	100			100	
Speed									
	100,0	100,0	0	80	100	100	100		
Maintainability.Doc.Code									
	100,0	100,0	0	80	100	100	100		
InterviewerConsole									
NUnitTests									
	0,0	0,0	0	90	100				
PeerTests									
	100,0	100,0	0	90	100			100	
FxCop									
	0,0	10,0	10	0	0				
TestDirectorTests									
	100,0	100,0	0	90	100			100	
Robustness.Correctness									
	2,0	2,0	0	1	2	2	2		
Robustness.BoundaryConditions									
	0,0	0,0	0	8					
Speed									
	0,0	0,0	0	8					
ResourceUsage.CPU									
	100,0	0,0	100	8					
Maintainability.Doc.Code									
	100,0	100,0	0	8					
SynchronizationStatus									
NUnitTests									



- Speed
- Maintainability
- Nunit Tests
- PeerTests
- TestDirectorTests
- Robustness.Correctness
- Robustness.Boundary Conditions
- ResourceUsage.CPU
- Maintainability.DocCode
- SynchronizationStatus

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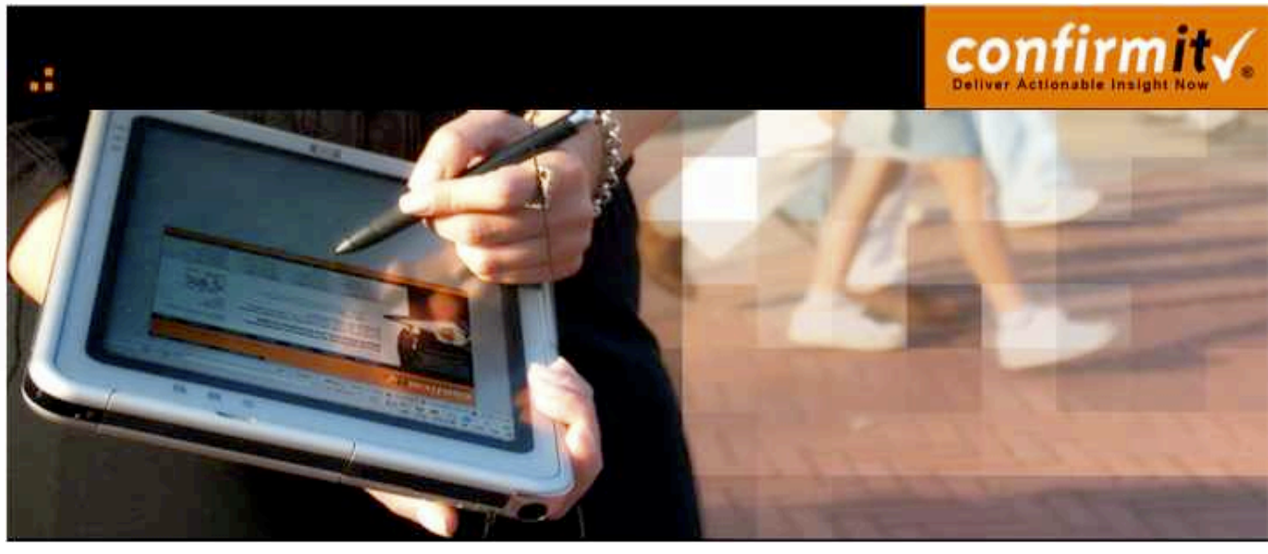
Confirmit Results Since Evo Method

.: Revenue growth

confirmit
Deliver Actionable Insight Now

Quarterly revenues - Y/Y growth

- ✓ Full year 2005 revenue growth: 33%
- ✓ YTD Q2 2005 revenue growth: 27%
- ✓ YTD Q2 2006 revenue growth: 27%



http://www.newsweb.no/index.asp?symbol=FIRM&melding_ID=132091

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- 5. Comparative Tools
  - QFD
  - Balanced Scorecard
  - Middlesex Research PhD

Quality Function Deployment

- See Paper
- What's wrong with QFD
- http://www.gilb.com/tiki-download_file.php?fileId=119
- How problems with Quality Function Deployment's
  - (QFD's) House of Quality (HoQ) can be addressed by applying some concepts of Impact Estimation (IE)

Quality Function Deployment QFD for Comparison

Much less well defined and objective quantification than Impact Estimation

INTERACTIONS:
- XX Strong negative relationship
- X Mild negative relationship
- ◉ Mild positive relationship
- ○ Strong positive relationship

RELATIONSHIPS:
- ◉ Strong relationship
- ○ Moderate relationship
- △ Weak relationship

Customer Reqmts. / Product Design Reqmts	Priority	Bleed air ducting to interface pt. X	Low APU weight	Low turbine wheel weight	High equivalent shaft horsepower	Controlled turbine inlet temperature	Turbine assy. bl hub containment	Strong internal containment ring	Lightweight containment ring	Competitive Evaluation 1 — 5
Cust. envelope/interface	3	◉						◉		X O
Max. Weight 160 lbs.	4	○	◉	○			○		◉	O X
Bleed air 75 lbs/min	4	○			◉	◉				O X
Turbine containment	5			○		○	◉	◉		OX
Elect pwr. 40 KVA	3				◉					X O
Reliable	5			○		◉	○			XO
Support oil-cooled gen.	5		○							O X
▪ ▪ ▪										
Technical Evaluation 5 / 1		X O	X O	X O	X O	O X	O X	X O	X O	
Target Value		Targ. Loc.	158lb	<6 lb	350hp	1850°	2.5 lb @ Pwr	3 lb @ Pwr	<6 lb	
Technical Difficulty		1	4	3	5	3	4	2	4	
Importance Rating		39	35	42	35	60	52	40	20	

EVALUATIONS:
- X ...
- O XYZ Co.

Figure 4 QFD House of Quality

Stakeholder Need

How 'Reliable'?

How 'Strong' is Strong?

What is this 'importance' rating?

QFD EXAMPLE WITH UNDEFINED REQUIREMENTS

Example of checking the correlation grid: Ignored Stakeholder Characteristics...

Design Dependent Parameters (HOWs) / Customer Requirements (WHATs)		Requirements Importance	System to Facilitate Interactive Sessions between Remote Parties						
			Show Design Dependent Parameters						
			1	2	3	4	5	6	7
A Conferencing Facility for Multiple Remote Parties									
Good Performance	Security	☆☆☆☆☆		△		●			
	Like face-to-face	☆☆☆☆	◎						○
	Setup time	☆☆							
Ease of Use	Easy to operate	☆☆☆					△		
	Easy to maintain	☆			○			△	

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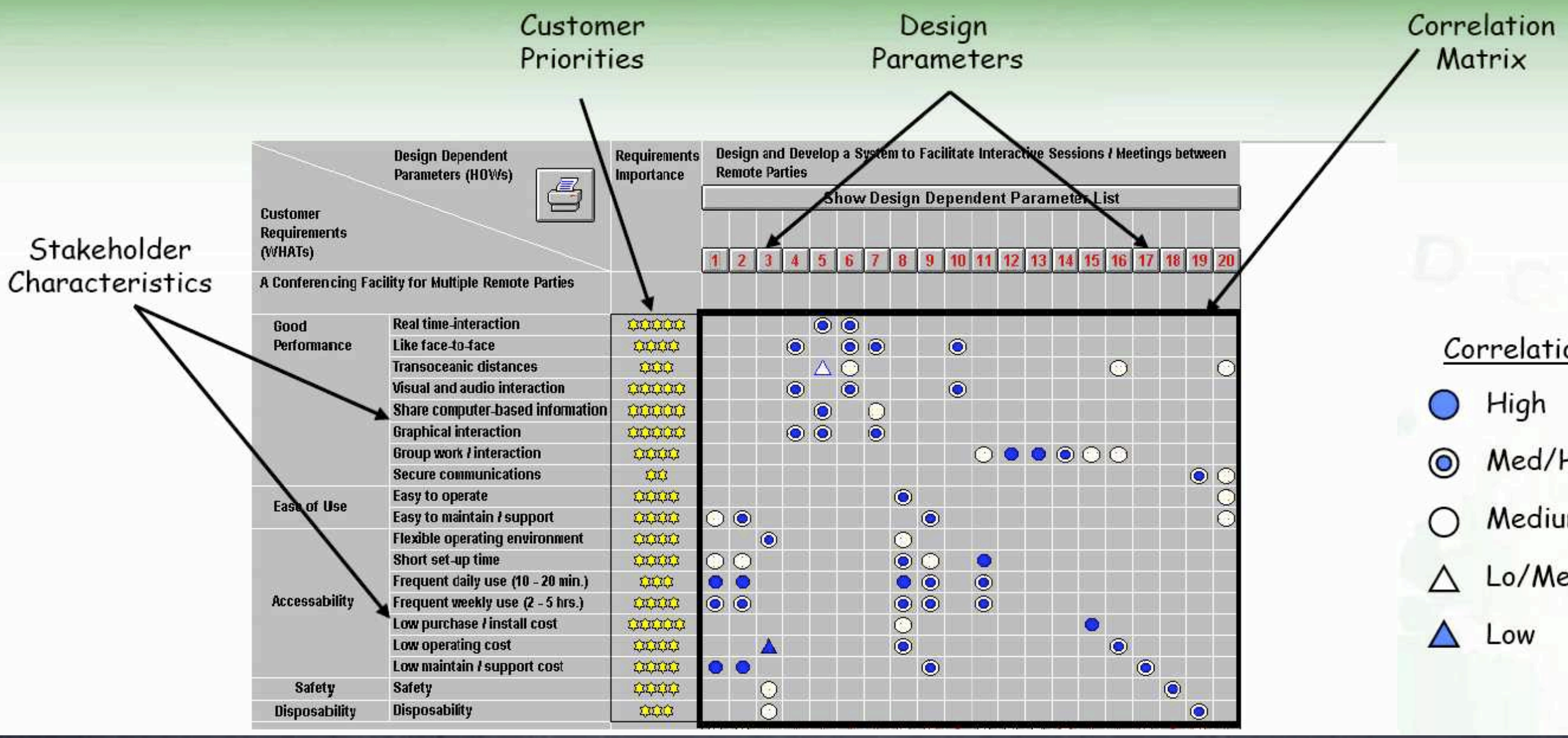
More Vague Requirements in QFD

DDP / Requirements	Hi Rise Escape System QFD	Priority	Activation Time	Communication with Central Alarm System	Throughput (X persons/Hr)	Size of lifeboat	Number of steps required to set up	Strenght	Time to Install/Maintain	Operational Independence	Material Cost	Interoperability	MTTR
Cost	Maintenance	2							H				
	Cost of Procurement	3									H		
	Installation	3							H				
Safety	Appearance	3							M	H			
	Accomodation of all body Types	3			L	H							
	Tied to Central Alarm System	3		H									
	High Probability of Servival	3						H					
	Conforms to All Government Regulations	3				M	L					H	
	Ease of Training	1					H						
Versitality	Compatable with Emergency Equipment	2										H	
	Deal with Multiple Incidents	3			M								
Maintenance	Minimal Periodic Maintenance	2											H
	No Interference with routine building maintenance	2							L	H			
Performance	Throughput	3			H			L					
	Ease of Use	1	H				H	L					

Example of QFD



PhD Thesis on Impact Estimation

- Lindsey Brodie
- Middlesex University
- 2012
- Lindsey Brodie <L.Brodie@mdx.ac.uk>

6. Standards, Templates, Rules, Principles: The Practical Tools of 'Planguage'

- The array of standards types
- IE Policy
- Concepts, Concept Definition, Glossary
- Rules: best practice specification, defining specification faults in Quality Control
- Processes: recommended work sequences
  - Entry and Exit conditions for processes
- Templates: with 'hints', practical 'rules', and training
- Principles: strong guidelines

Impact Estimation Policy

- All design ideas or strategies which can have a significant impact (5% or more) on any critical performance or cost requirement of a project must be evaluated in an IE table.

- The design ideas must be specified in sufficient detail and clarity to support IE, irrespective of who would make or evaluate the estimates.

- An IE table, together with all its related design and requirement specifications, must be quality controlled with respect to all the relevant rules. The level of estimated remaining major defects/page must be low enough to exit and it must be stated (ideally on the cover page of the document).

- Significant proposed changes to the design ideas or architecture must be accompanied by a quality controlled IE table showing the net impact of the changes.

- 9.4 Rules/Forms/Standards: Impact Estimation
- Tag: Rules.IE.
- Version: October 7, 2004.
- Owner: TG.
- Status: Draft.
- Base: The generic rules, Rules.GS and the requirement specification rules, Rules.RS apply.

- R1: Table Format: The requirements must be specified in the left-hand column. The design ideas must be specified along the top row.

R2: Requirement:

- Each performance requirement (objective) and each resource requirement must be identified by its tag and by a simplified version of the chosen Baseline<->Target Pair (B<->T pair). The B<->T pair should be written under the tag.

- Each B<->T pair must consist of two reference points, the chosen baseline (Past) and the planned target (Goal or Budget). Each reference point must be stated as a numeric value or as a tag to a numeric value. The numeric values must be expressed using the chosen Scale for the requirement.

- The baseline is stated first as it represents the 0% incremental impact point. Then usually an arrow '<->'. Then the planned target, which represents the 100% incremental impact point.

- It must be possible to distinguish between multiple-level specifications for the same Goal or Budget statement. Where necessary, to be unambiguous, use a qualifier or tag the specific baseline and/or target for use in the IE table.

EXAMPLE

- Reliability:
  Type: Performance Requirement.

- Baseline <-> Target Pair:

  - Benchmark Reliability <-> 30,000 hours [USA, Next Year].

- Note: Reliability and Benchmark Reliability are tags.

R3: Qualifiers:

- If there is one common set of qualifier [time, place and event] conditions for reaching all targets,
  - this should be explicitly stated in the notes accompanying the IE table.
  - If the qualifiers vary then they must be explicitly stated next to the relevant B<->T pair.
- By default, the entire system is implied
  - and no specific conditions are assumed.
  - The deadline time period must always be explicitly stated.

R4: Design Idea:

- Each single column must identify a design idea
  - or set of design ideas that could be implemented as a distinct Evo step.
  - Each design idea must be identified by its tag.
  - Multiple tags may be specified as a set of design ideas in a single column.
- All tags must be supported by a design specification,
  - which must exist in the supporting documentation and must be sufficiently detailed to allow impact estimations to the required level of accuracy.
  - As a minimum, each design specification must be sufficiently detailed to permit financial cost to be estimated to within an 'order of magnitude.'

R5: Scale Impact:

- For each goal or budget,
  - the Scale Impact is the estimated or actual performance or cost level respectively
    - (expressed using the relevant Scale)
- that is brought about by implementing the design idea(s) in each column.

R6: Percentage Impact

- " : The Percentage Impact is a percentage (%) value
  - " derived from the Scale Impact
  - " (see Rules.IE.R2).
  - " An estimate of zero percent, '0%,' means the impact of the implementation of this design idea is estimated to be equal to the specified baseline level of the objective.
  - " '100%' means the specified target level would probably be met exactly and on time.
  - " All other percentage estimates are in relation to these two points.
  - " Note: In an IE table, it is acceptable to specify either Percentage Impacts and/or the Scale Impacts (the absolute values on the defined scale of measure).
  - " Examples: 60%, 4 minutes.

R7: Uncertainty:

- The ± Uncertainty
- (based on the evidence experience borders)
- of the Scale Impact estimate shall normally be specified.
- Percentage Uncertainty values are then calculated in a similar way to the Percentage Impacts.
- Example: 60%±20%.
- Usually, the uncertainty values are calculated individually for each cell.
  - An exception to this occurs when some overall uncer- tainty (such as ± 50%) is declared for the whole table or specified parts of it.
  - Another more fundamental exception can be when a decision is made to defer dealing with uncertainty data.

R8: Evidence:

- Each estimate must be supported by facts
  - that credibly show how it was derived.
- Numbers, dates and places are expected.
- If there is no evidence,
  - a clear honest risk-identifying state- ment
    - expressing the problem is expected
    - (such as 'Random Guess' or 'No Evidence').
- The exact source of the evidence must also be explicitly stated.
- Note: Reference to a specific section of a document is permitted as evidence.

R9: Credibility:

- The evidence, together with its source, must be rated for its level of credibility on a scale of 0.0 (no credibility) to 1.0 (perfect credibility).

- The relevant standard Credibility Ratings Table must be considered for use.

- Explanation must be given if alternative ratings are chosen.

Credibility Table

Credibility Rating	*Meaning*
0.0	Wild guess, no credibility
0.1	We know it has been done somewhere
0.2	We have one measurement somewhere
0.3	There are several measurements in the estimated range
0.4	The several measurements are relevant to our case
0.5	The method used to obtain the several relevant measurements is considered reliable
0.6	We have used the method/design/idea/strategy in-house
0.7	We have reliable measurements for the design idea in-house
0.8	Reliable in-house measurements correlate to independent external measurements
0.9	We have used the idea on this project and measured it (Evo step, pilot and field trial)
1.0	Perfect credibility, we have rock solid, contract-guaranteed, long-term and credible experience with this idea on this project and,

R10: Completeness:

- All IE cells (intersections of a design idea and a requirement) must have a non-blank statement of estimated impact.

- This must be given as a numeric value

- using the relevant Scale units, or as a Percentage Impact as assessed against the defined

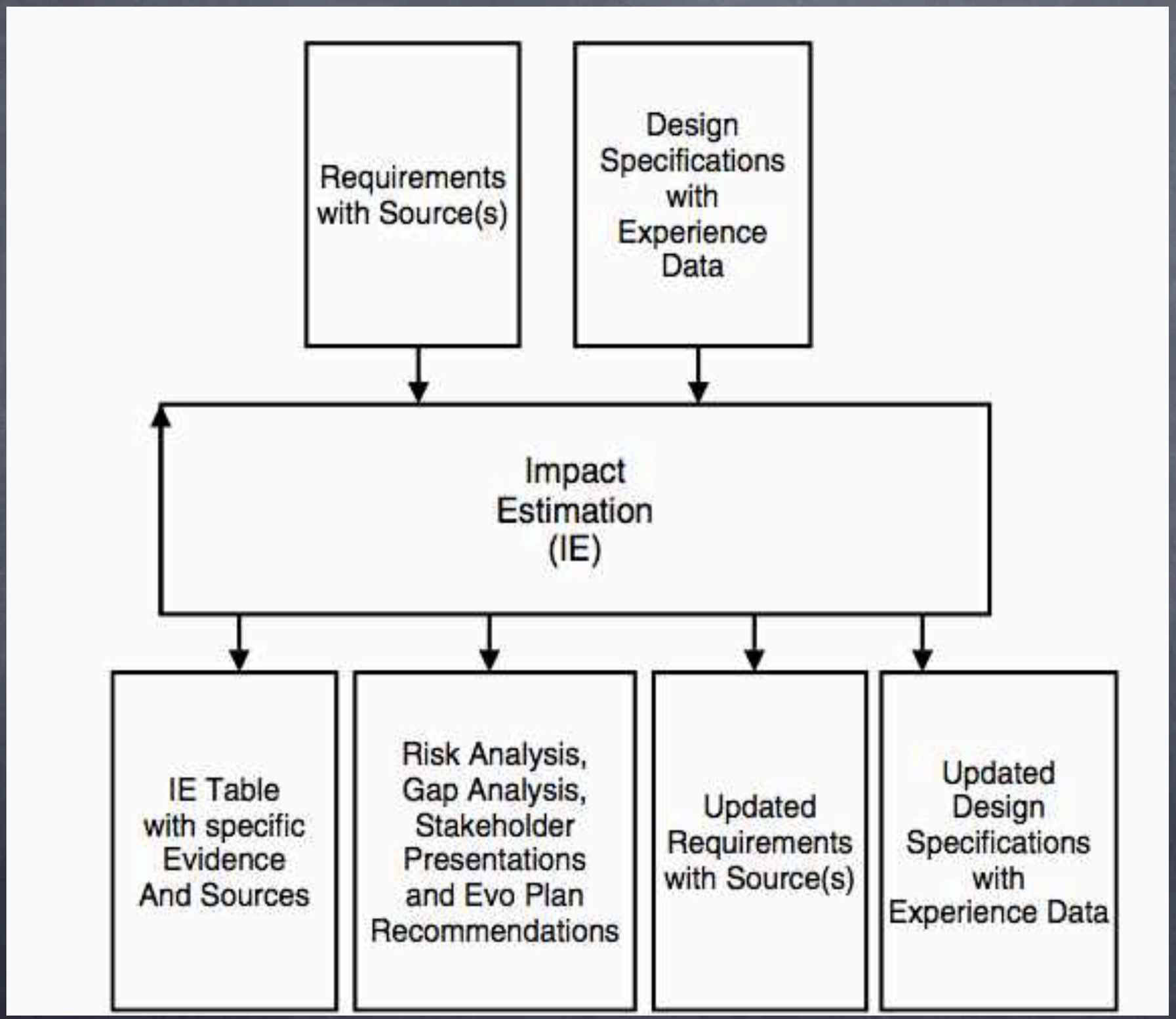
Baseline <->Target Pair, or both.

- If there is no estimate, then a clear indication of this must be given.

R11: Calculations: All the appropriate IE calculations must be carried out and the arithmetic must be correct. Hint: Using an application, such as a spreadsheet, helps! The IE calculated values include:

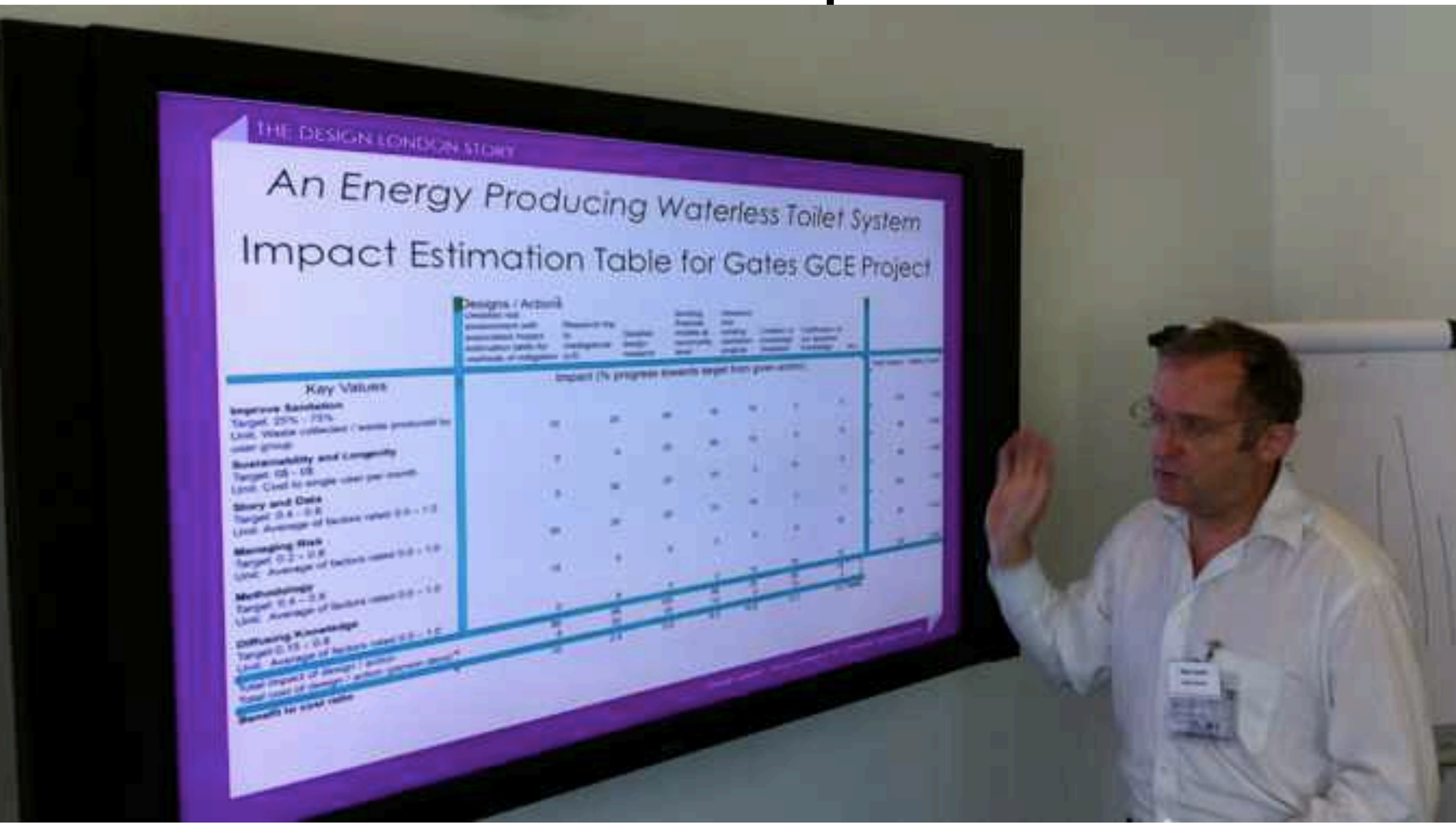
- . Percentage Impact: See Rule R6.
- . Percentage Uncertainty: See Rule R7.
- . Sum of Performance: For each design idea, an algebraic sum of its
- Percentage Impacts on all the performance requirements. (A 'ver-
- tical' sum.)
- . Sum of Costs: For each design idea, an algebraic sum of all its
- Percentage Impacts on the selected resource requirements. ('Selected' as it might well not make sense to sum all the costs represented in an IE table.) (A 'vertical' sum)
- . Sum of Scale Costs: For each design idea, an algebraic sum of all its Scale Impacts on the selected resource requirements. (A 'vertical' sum.)
- . Performance to Cost Ratio: The performance to cost ratios are calculated using either (Sum of Performance/Sum of Costs or
- Sum of Performance/Sum of Scale Costs).
- . Sum for Requirement: For each requirement, an algebraic sum of all
- the Percentage Impacts for the simultaneously applicable and com-
- patible design ideas. (A 'horizontal' sum.)
- . Safety Deviation: For each requirement, subtract the Safety Margin
- from the Sum for Requirement. The relevant standard safety margin must be considered for use. Explanation or justification must be given if an alternative safety margin is chosen for use. By default, a standard safety margin of factor 2 (200% for performance require- ments, 50% for budgets) will be used. For example, if the required safety margin is 200% and Sum for Requirement for a performance requirement is 120%, then ''-80%'' is the deviation to be displayed. (A 'horizontal' sum.)
- . Calculate all the relevant (□) uncertainty values. Base this on best case and worst case observations or estimates.

IE Process


Requirements with Source(s)
Design Specifications with Experience Data
Impact Estimation (IE)
IE Table with specific Evidence And Sources
Risk Analysis, Gap Analysis, Stakeholder Presentations and Evo Plan Recommendations
Updated Requirements with Source(s)
Updated Design Specifications with Experience Data

IE Principles

IET Principles



The Principles of Impact Estimation

- 1. The Principle of ‘Words being difficult to weigh’
  Non-numeric estimates of impact are difficult to analyze and improve upon. A design idea described as ‘excellent’ could actually be worse than another merely described as ‘good.’
- 2. The Principle of ‘Doubtful digits are better than none’
  A bad numeric estimate, and its definition, can still be systematically criticized and improved. In fact, a random number is a better starting estimate than flowery, descriptive words.
- 3. The ‘Evident’ Principle
  Estimates without sources, evidence and credibility are not evident.
- 4. The Principle of ‘Uncertainty in no uncertain terms’
  The uncertainty estimate is at least as important as the main estimate.
- 5. The Principle of the ‘Seat Belt’
  A safety margin is as necessary with uncertain
- 6. The Principle of ‘Profitable Proposals’
  The value of an idea is how well it meets objectives. The net value considers the costs too.

  7. The Principle of ‘the Swiss Army Knife’
  Impact Estimation is a multi-purpose method. It can help you in many situations: to evaluate, to compare, to present, to argue, to destroy, to find weaknesses, to cut fat, to see risk, to prioritize, to sequence and more.

  8. The Principle of ‘Always Useful’
  Impact Estimation can assist a project throughout its lifecycle – from identifying requirements to assessing feedback data from implemented systems.

  9. The Principle of ‘Multiplicity’
  When stakeholders have multiple
  need to evaluate multiple design
  requirements including considerat
  make a reasonable choice.

  10. The Efficiency Principle
  When real life has many stakehol
  constraints, then evaluation of de
  done with respect to both the valu

- "1. The Principle of ‘Words being difficult to weigh’

- "Non-numeric estimates of impact
  - "are difficult to analyze and improve upon.
  - "A design idea described as ‘excellent’
  - "could actually be *worse* than another
  - "merely described as ‘good.’

- "2. The Principle of ‘Doubtful digits are better than none’

- "A bad numeric estimate, and its definition,
  - "can still be systematically criticized and improved.
- "In fact, a random number is a better starting estimate
  - "than flowery,

Another method for square root is iteration.

view source

print
?

```
01
function sqrtByIteration( $number , &$time )
02
{
03
    $start = microtime();
04
    if( $number < 0 )
05
        return;
06
    // Guess a number
07
    $guess = round( $number / 7, 10 );
08
    $found = 0;
09
    $i = 1;
10
    // Iterate while guessed number is not equal to the found
number from the formula
11
    while( $guess != $found )
12
    {
13
        if( $found )
14
            $guess = $found;
15
        $found = ( ( $number / $guess ) + $guess ) / 2;
```

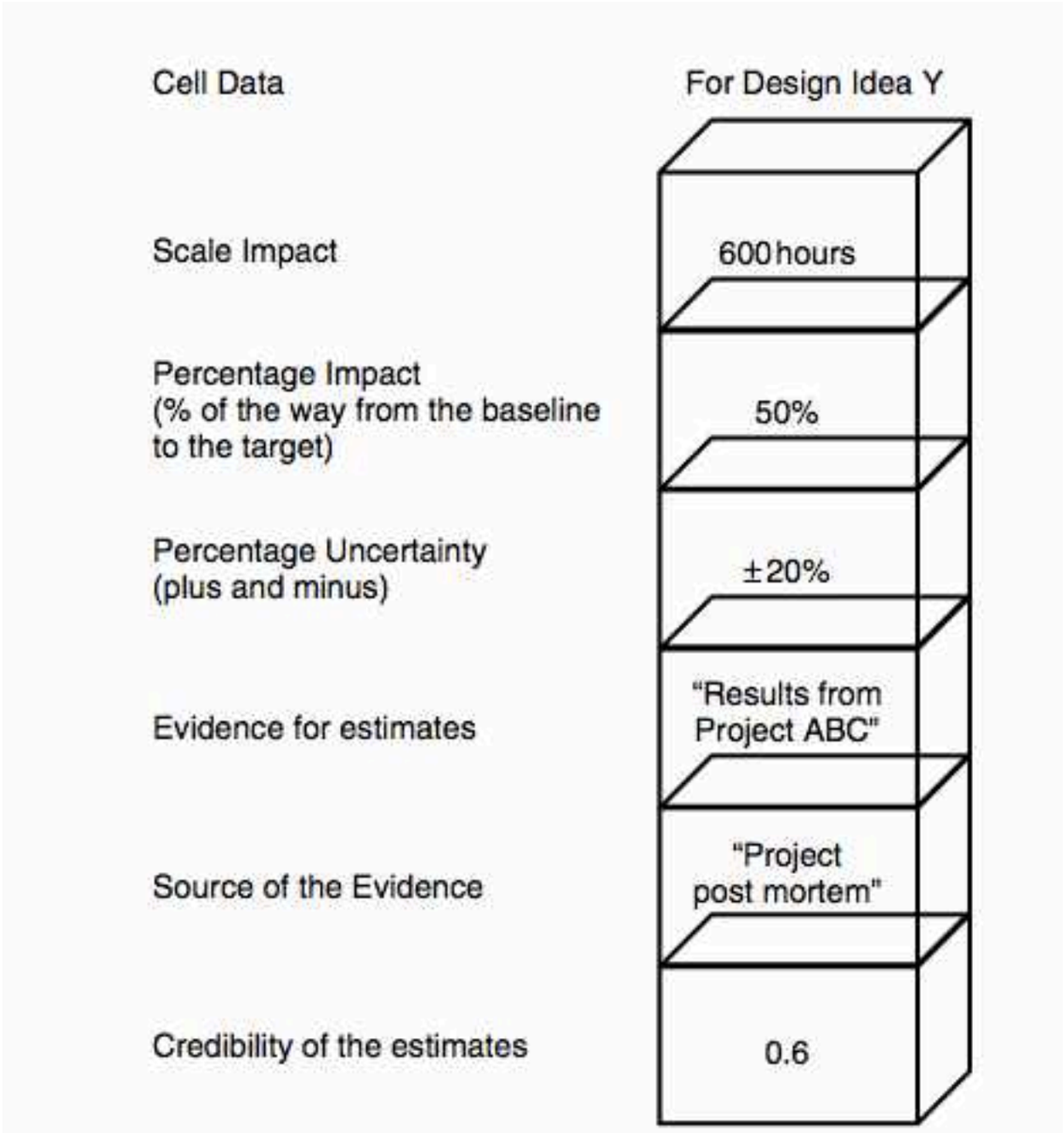
- "3. The 'Evident' Principle

- "Estimates without "sources, evidence and credibility
  - "are not evident.

"Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passions, they cannot alter the state of facts and evidence." -- John Adams

The Data Elements for one IE Cell

- "Design X:
- "Description: x....x
- "Impacts: Usability
- "Impact: 20 minutes
- "Impact %: 50%
- "Uncertainty: ±40%
- "Evidence: Saves 12 to 28 m.
- "Source: Report XYZ, pp 33-35



Evidence

- "It has been said that man is a rational animal.
- "All my life I have been searching for evidence which could support this.
- "Bertrand Russell

Evidence

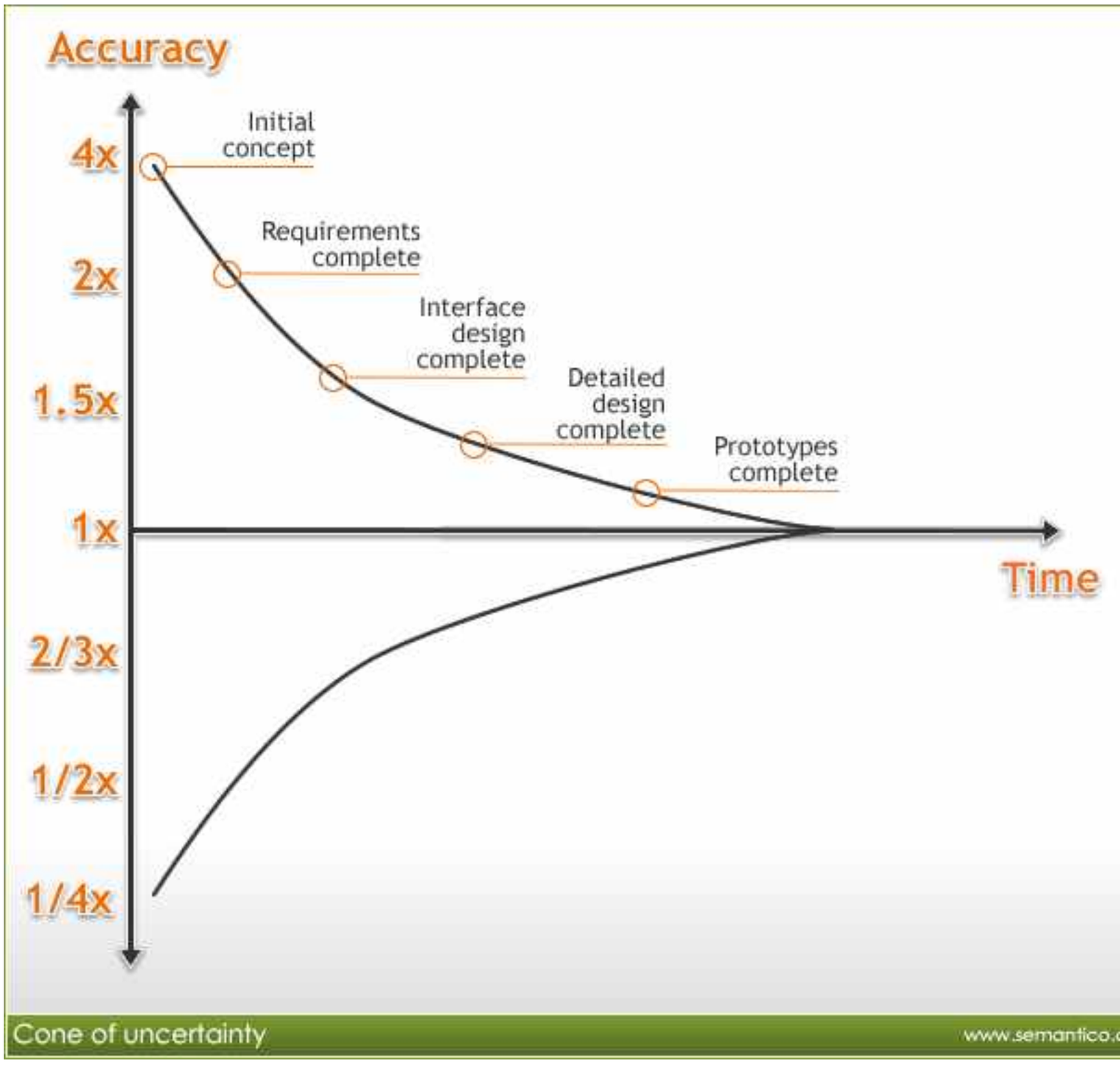
- "The most savage controversies are those about matters as to which there is no good evidence either way.
- "Bertrand Russell

•"4. The Principle of ‘Uncertainty in no uncertain terms’

•"The uncertainty estimate is

•"at least as important

•"as the main estimate.



± Uncertainty: Spread

Example of a Simple Impact Estimation Table

Designs

Performance Requirements

Resource Requirements

Design Ideas-> / Requirements: Goals and Budgets	Idea 1 Impact Es	Idea 2 Impact Es	Sum for Requirement (Sum of Percentage Impacts)	Sum of Percentage Uncertainty Values	Safety Deviation
Reliability 300 <-> 3000 hours MTB F	1950hr (1650hr) ±0	1140hr (840hr) ±240	92%	±9%	-108%
	61%±0	31%±9%			
	19min. (1min.) ±4	14min. (6 min.) ±9	70%	±130%	-130%
	10%±40%	60%±90%			
Maintenance 1.1M <-> 100K/year US $	1.1M $/Y (1.1 M $/Y) ±180K	100K $/Y (1 M $/Y) ±720K	100%	±90%	-100%
	0%± 18%	100%±72%			
Sum of Performance	71%	191%			
$$	500K (500K) ±200K	100K (100K) ±200K	60%	±40%	-10%
	50%±2	10%±2			
Sum of Costs	50%	10%			
Performance to Cost Ratio	1.42 (71/50)	19.10 (191/10)			

Notes: 1. Time Period: Within next 12 months.
2. Same Safety Margin of factor 2 has been declared for performance requirements and resource requirements. Factor 2 means minimum planned performance requirements > 200% of target (goal), and maximum planned costs < 50% of target (budget).
3. Evidence, Source and Credibility not stated.

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5. The Principle of the ‘Seat Belt’

- "A safety margin
  - –"is as necessary with uncertain estimates,
  - –"as a seat belt is with uncertain traffic.

Designs / Actions	Detailed risk assessment with associated impact estimation table for methods of mitigation	Research trip to madagascar (x3)	Detailed design research	Building financial models at community level	Research into existing sanitation projects	Creation of knowledge 'database'	Codification of our acquired knowledge	etc....	Total Impact	Safety Factor
Key Values	**Impact (% progress towards target from given action)**									
Improve Sanitation Target: 25% - 75% Unit: Waste collected / waste produced by user group	10	20	40	18	15	0	0		103	1.03
Sustainability and Longevity Target: 0$ - 0$ Unit: Cost to single user per month	0	5	20	50	10	0	0		85	0.85
Story and Data Target: 0.4 - 0.8 Unit: Average of factors rated 0.0 – 1.0	5	35	20	15	3	15	5		98	0.98
Managing Risk Target: 0.2 – 0.8 Unit: Average of factors rated 0.0 – 1.0	50	20	20	15	15	0	3		123	1.23
Methodology Target: 0.4 – 0.8 Unit: Average of factors rated 0.0 – 1.0	15	0	0	0	0	0	10		25	0.25
Diffusing Knowledge Target 0.15 – 0.8 Unit: Average of factors rated 0.0 – 1.0	0	8	0	0	10	50	15		83	0.83
Total impact of design / action	80	88	100	98	53	65	33	0		
Total cost of design / action (person days)	8	30	20	15	5	15	4	0		
Benefit to cost ratio	10	2.9	5.0	6.5	10.6	4.3	8.3	####		

•"6. The Principle of ‘Profitable Proposals’

•"The value of an idea is how well it meets objectives.

•"The net value considers the costs too.

Which are the key requirements? What are the current levels and what are the target levels?

Which designs? When? What is their estimated or actual impact on the requirements?

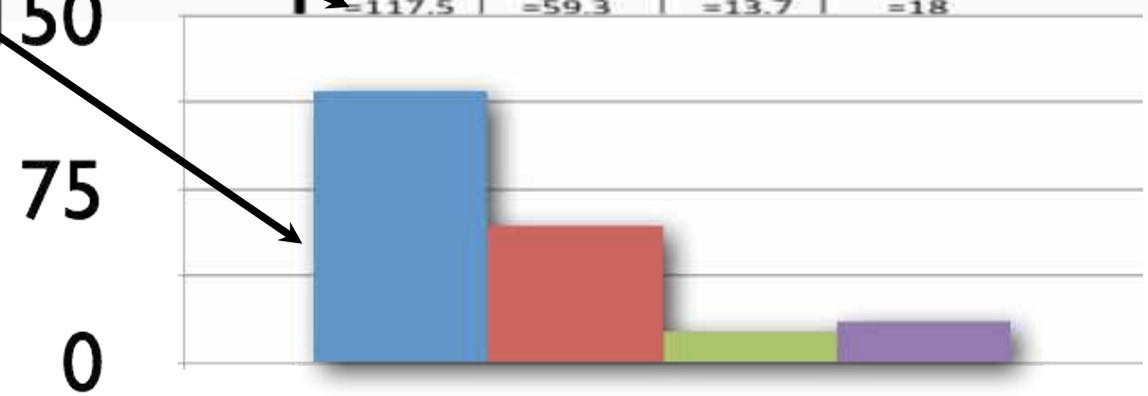
Are the current designs sufficient to meet each of the requirements?

m = minutes
d = days
w = week

Bank Syst
By End Date dd/mm/yyyy

Designs by expected Increment with design dependencies

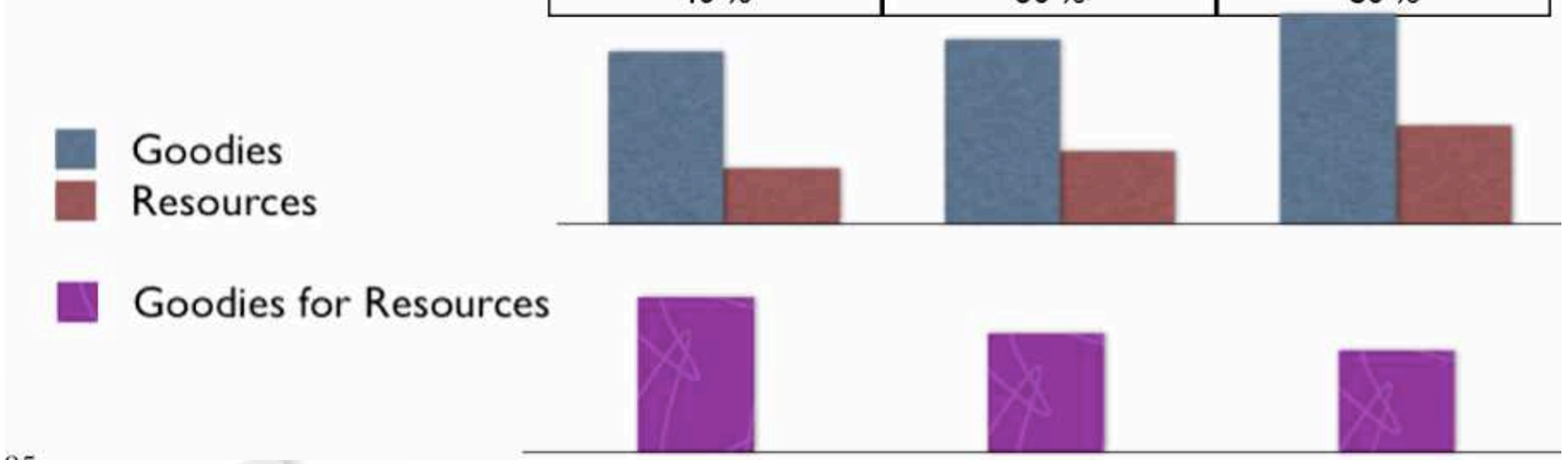
Requirements	1 D1: Automate Rules + Manual Testing	2 D2: Back Office Loan Decisioning	3 D3: Web Self-Service	
R1: Time for customer to submit request 30 min <-> 10 min	-	-	10 m 100%	
R2: Time for Back Office to enter request 30 min <-> 10 min	-	-	0 m 150%	-
R3: Time to respond to customer request 5 days <-> 20 seconds	-	1 d 80%	20 s 100%	-
R4: No of Back Office complaints 10 per week <-> 0	5 50%	<1 90%	0 100%	(2) (80%)
R5: No of customer complaints 25 per week <-> 5	-	15 50%	5 100%	-
R6: Time to update business rules 1 month <-> 1 day	2 w 50%	-	-	1 d 100%
R7: Time to distribute business rules 2 weeks <-> 1 day	1 d 100%	-	20 s 103%	-
Cumulative Total for Performance Requirements	200%	170%	280%	50%
Development Budget 2.5M <-> 300K	2.3	2.0	1.0	0.5
Development Cost for Design	0.2	0.3	1.0	0.5
Cumulative Performance to Devt. Cost Ratio	1000	567	280	100
Cumulative Stakeholder Value to Development Cost Ratio	23.5/0.2 =117.5	17.8/0.3 =59.3	13.7/1.0 =13.7	9/0.5 =18



•"7. The Principle of ‘the Swiss Army Knife’

- "Impact Estimation is a multi-purpose method.
- " It can help you in many situations:
  - –"to evaluate,
  - –"to compare,
  - –"to present,
  - –"to argue,
  - –"to destroy,
  - –"to find weaknesses,
  - –"to cut fat,
  - –"to see risk,
  - –"to prioritize,
  - –"to sequence
  - –"and more."

Product Values			
Taste	20 %	50 %	90 %
Nutrition	30 %	70 %	90 %
Shelf Life	80 %	30 %	-10 %
Sum Goodies	130 %	150 %	170 %
Resources	40 %	60 %	80 %



SEQUENCE
by risk or value

EVALUATE
all critical
attributes

COMPARE
alternatives

SEE RISK
by documenting
uncertainty

DESTROY
false beliefs
with facts

PRESENT
facts & basis

Design Ideas-> Requirements: Goals and Budgets	Idea 1 Impact Estimates	Idea 2 Impact Estimates	Sum for Requirement/ (Sum of Percentage Impacts)	Sum of Percentage Uncertainty Values	Safety Deviation
Reliability 300 <-> 3000 hours MTBF	1650 hr ± 0	840 hr ± 240	92%	%	−108%
	61% ± 0	31% ± 9%			
Usability 20 <-> 10 minutes	1 min. ± 4	6 min. ± 9	70%	±130%	−130%
	10% ± 40%	60% ± 90%			
Sum of Performance	71%	91%			
Capital 0 <-> 1 million US$	500 K ± 200 K	100 K ± 200 K	60%	±40%	−10%
	50% ± 20	10% ± 20			
Maintenance 1.1 M <-> 100 K/Year US$	0 K$/Y ± 180 K	1 M$/Y ± 720 K	100%	±90%	−50%
	0% ± 18%	100% ± 72%			
Sum of Cost	50%	110%			
Performance to Cost Ratio	1.42 (71/50)	0.83 (91/110)			

FIND WEAKNESS
in useful quality
or excessive costs

ARGUE
for or against
alternatives

PRIORITIZE
using performance to
cost ratio

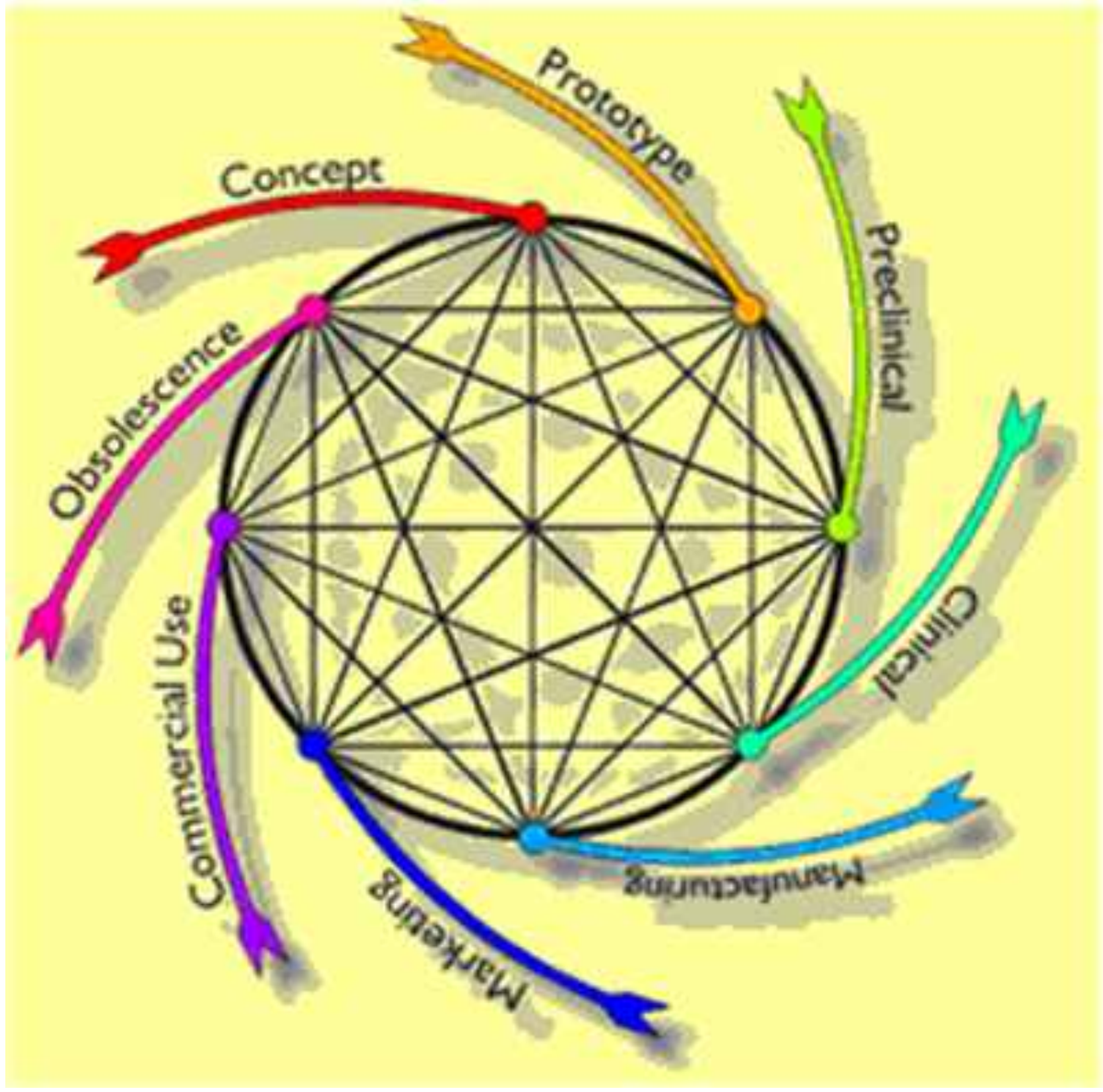
CUT FAT
by understanding
performance
to cost ratio

•"8. The Principle of ‘Always Useful’

•"Impact Estimation can assist a project throughout its lifecycle

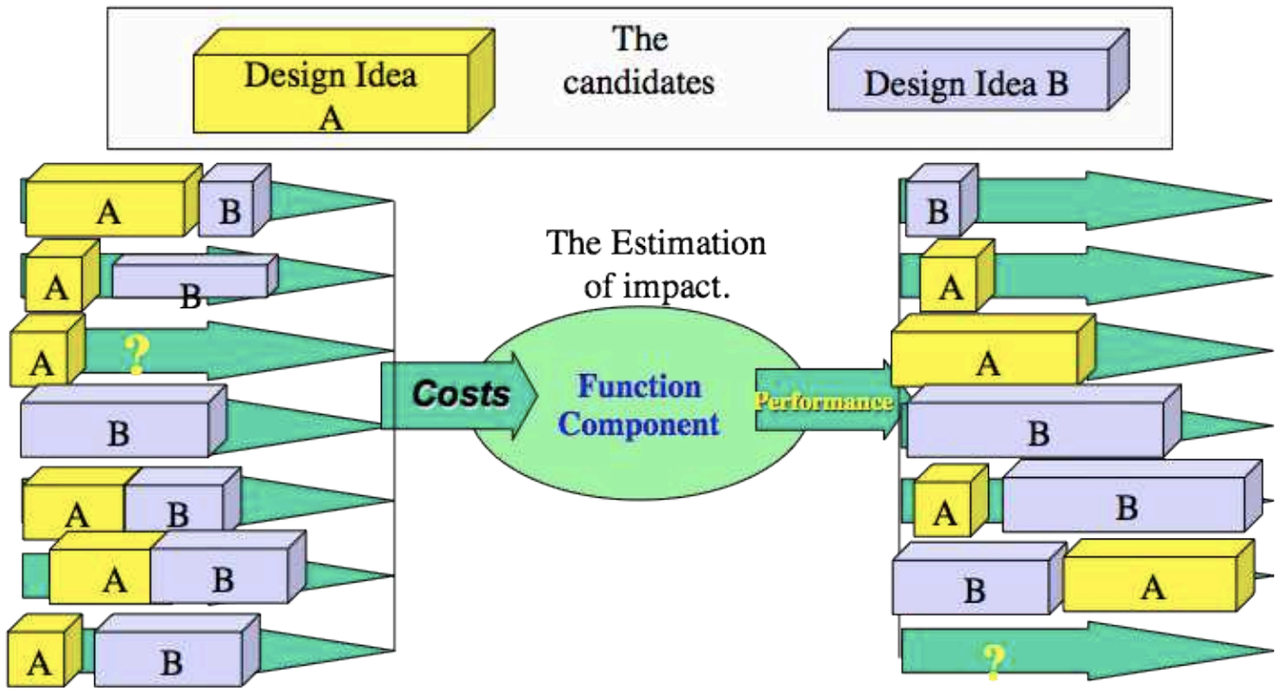
–"from ‘identifying requirements’

–"to ‘assessing feedback data from implemented systems’.

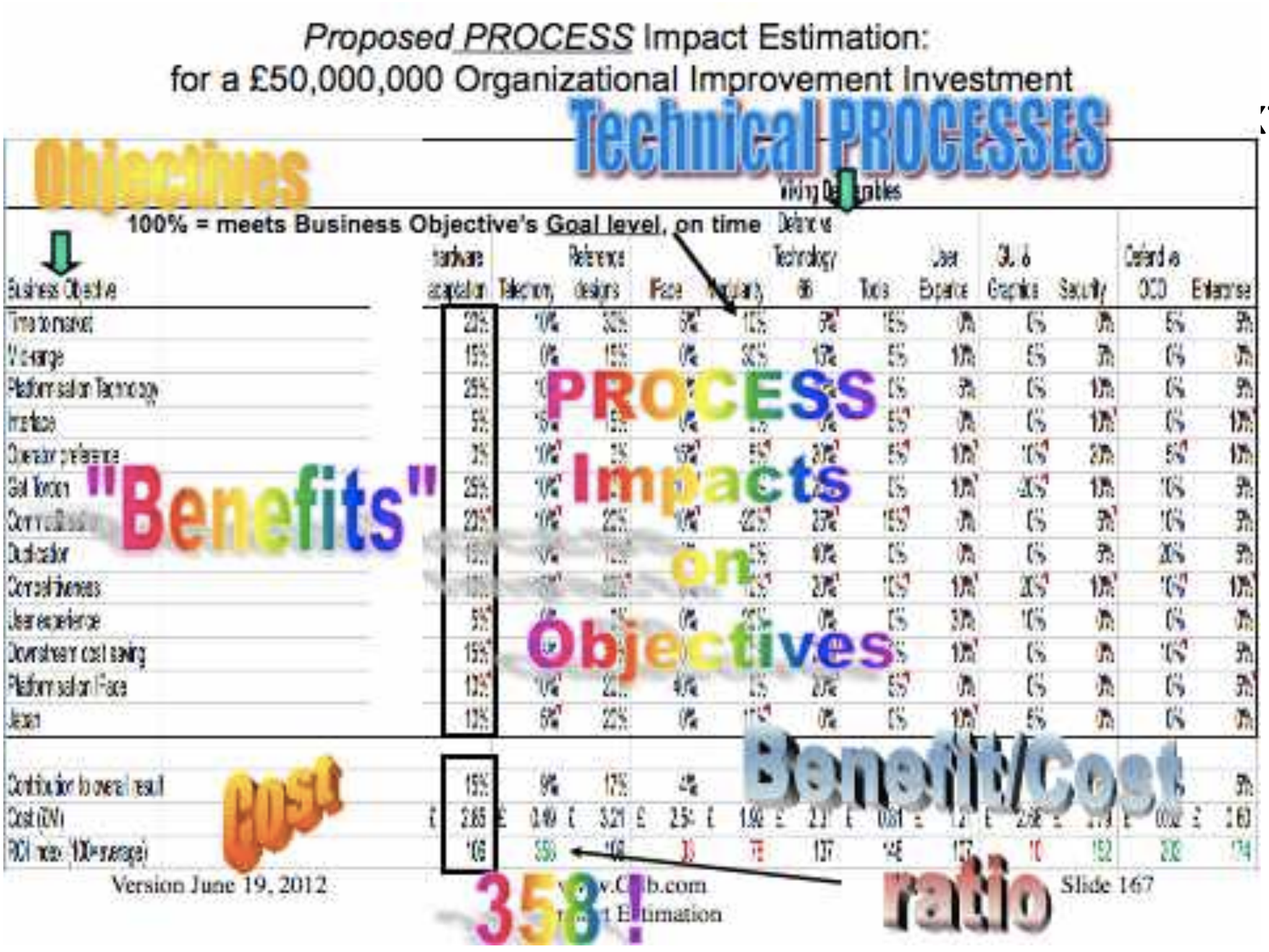


- "9. The Principle of 'Multiplicity'

- "When stakeholders have multiple requirements,
  - "then we need to evaluate
  - "multiple design options against all those requirements
  - "including considerations of value, (not just cost)
  - "in order to make a



Multiplicity

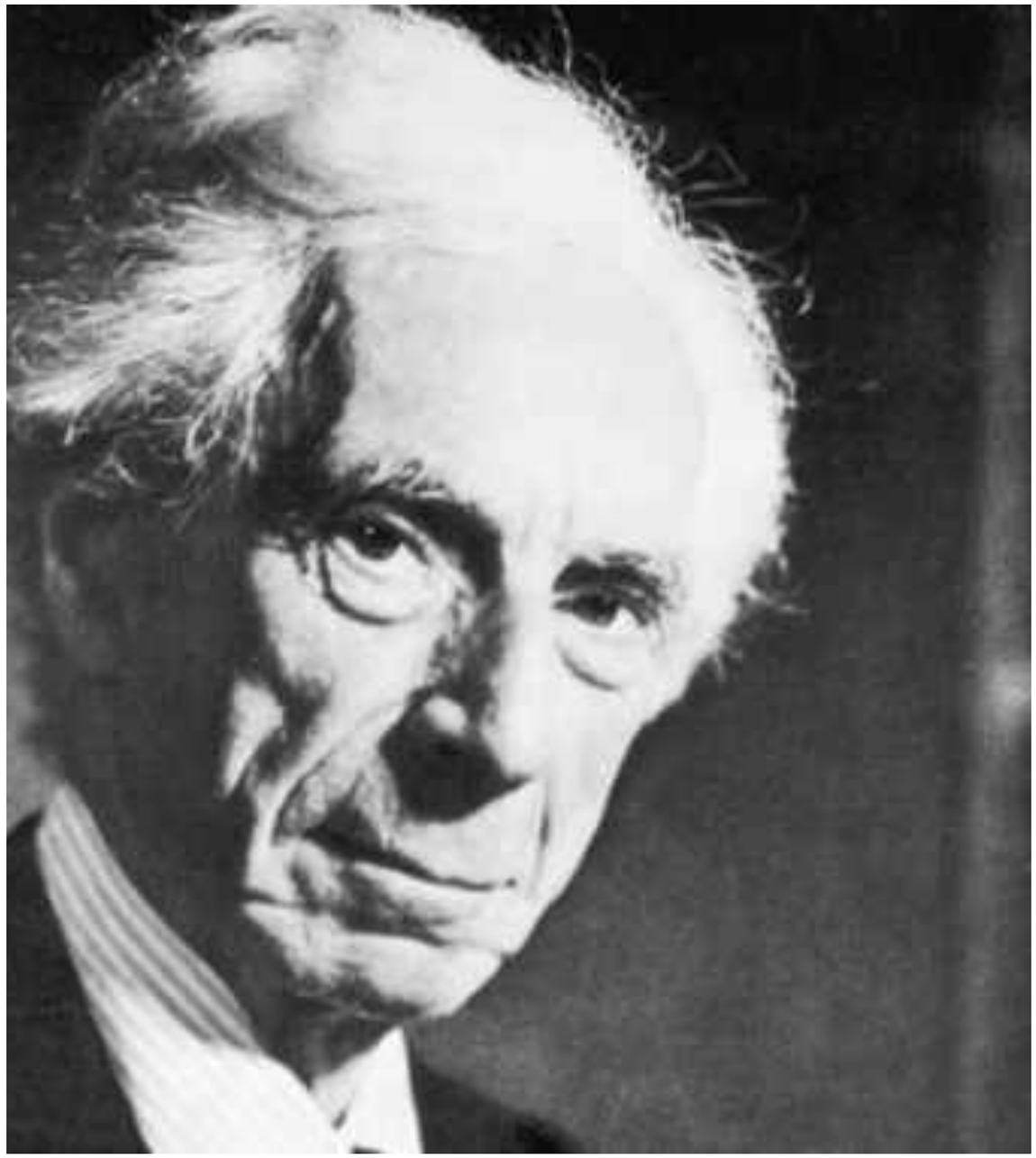


- "10. The Efficiency Principle
- "When real life has
  - "many stakeholder values,
  - "and many cost constraints,
  - "then
  - "evaluation of designs (strategies)
  - "must be done
  - "with respect to both the values and the costs.

Team	Home points during 09/10 Premier League Season	Highest Season Ticket Price 10/11 Premier League Season	£/point
Blackburn	36	£393	£11
Wigan Athletic	25	£295	£12
Manchester City	40	£515	£13
Everton	39	£631	£16
Bolton	24	£399	£17
Aston Villa	32	£550	£17
Birmingham City	33	£580	£18
Liverpool	42	£785	£19
Manchester Utd	49	£931	£19
Stoke City	27	£599	£22
Chelsea	52	£1,210	£23
Sunderland	34	£845	£25
Fulham	36	£899	£25
Tottenham	44	£1,175	£27
Wolverhampton	21	£630	£30
West Ham Utd	26	£830	£32
Arsenal	47	£1,825	£39
produced by www.moneytothemasses.com			

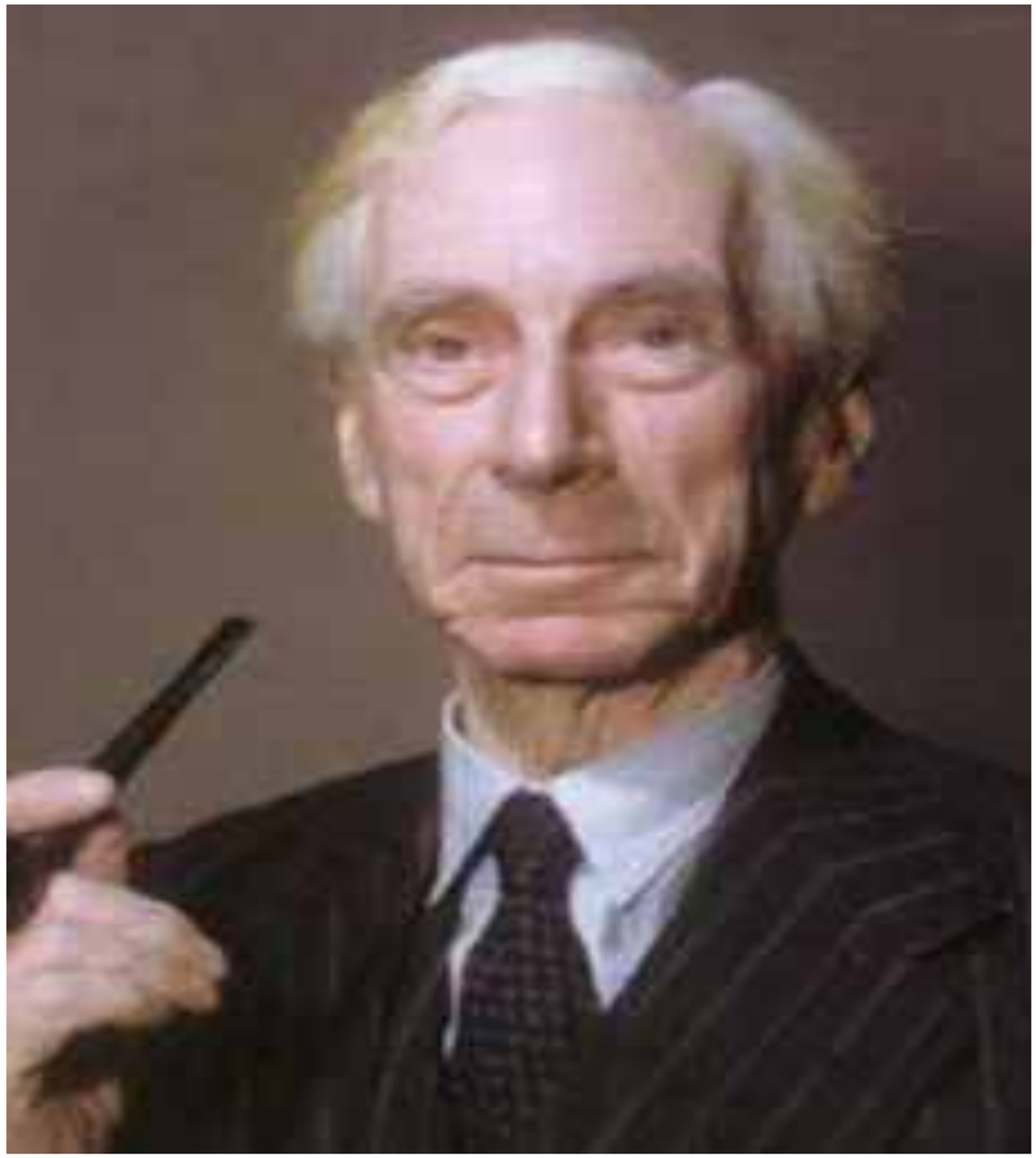
Problem Statement

- "The greatest challenge to any thinker is stating the problem in a way that will allow a solution.
- "Bertrand Russell



Everything is vague

- "*Everything is vague to a degree you do not realize till you have tried to make it precise*".
- 'Bertrand Russell



Last slide

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