Introduction to Function Point Why and How

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CHRISTINE GREEN

Owner of IPbyGreen - Senior Consultant

20+ years of experience in the software industry. Focus on Process Improvement, Complex and Critical software projects. **Software delivery with success.**

Worked on Critical contracts and projects for both government and private sector since 2003 for EDS and HPE (employed between 1996-2017). Independent Consultant since 2017.

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CFPS Fellow since September 15th 2020

Function Point Analysis

The Business Reason

IP by Green

Software projects is critical to the business
…but only 35% is considered successful

Over the past decade
at least 19% failed

Removing the ability to fail a software project would bring a ROI of at least 1% of the revenue…

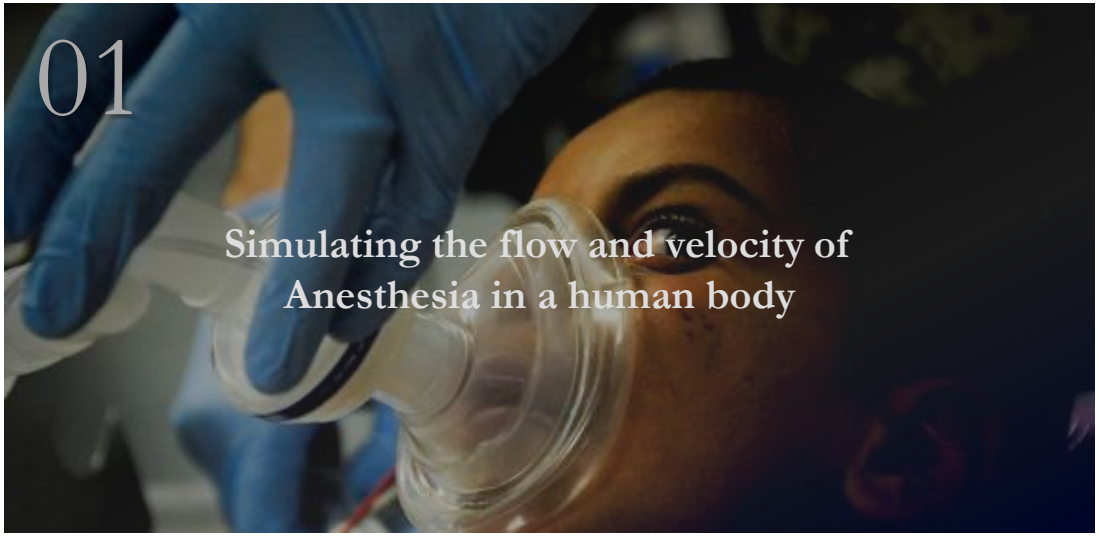
46% of all Software project is challenged

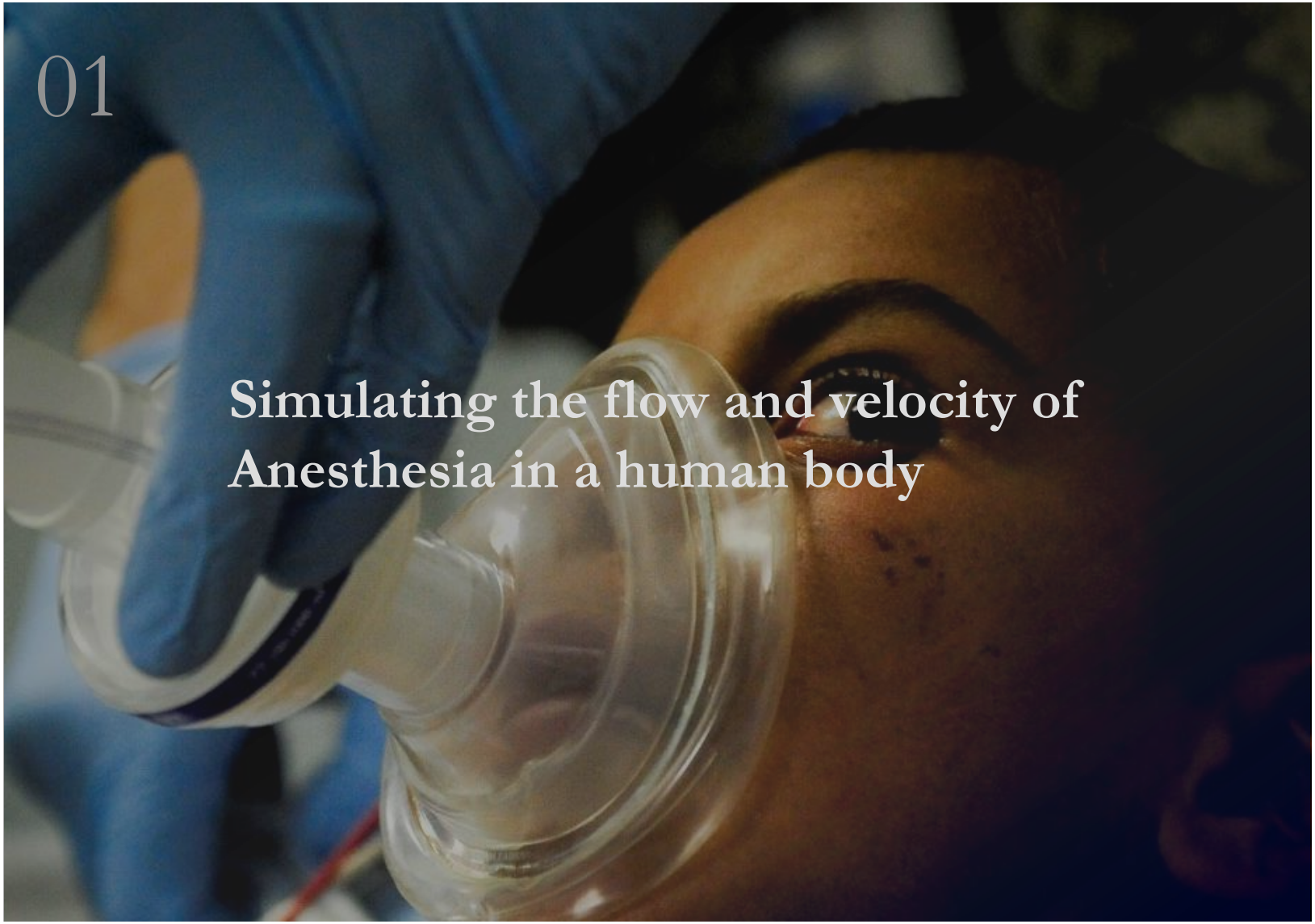
Not meeting budget, time or delivering the value expected to the business

Successful projects requires the use of a combination of Art and Science

Looking at other industries from a software Project perspective

In retrospective





01

Simulating the flow and velocity of Anesthesia in a human body

02

Cost estimation and planning of a cement fabric with all its complexities - and similarities


03
Moving a lighthouse
70 meters

Looking at other industries from a software Project perspective

In retrospective

Why are these cases relevant?

Why do IT projects fail?

What could support the success of software projects?

The single most important task of a project:

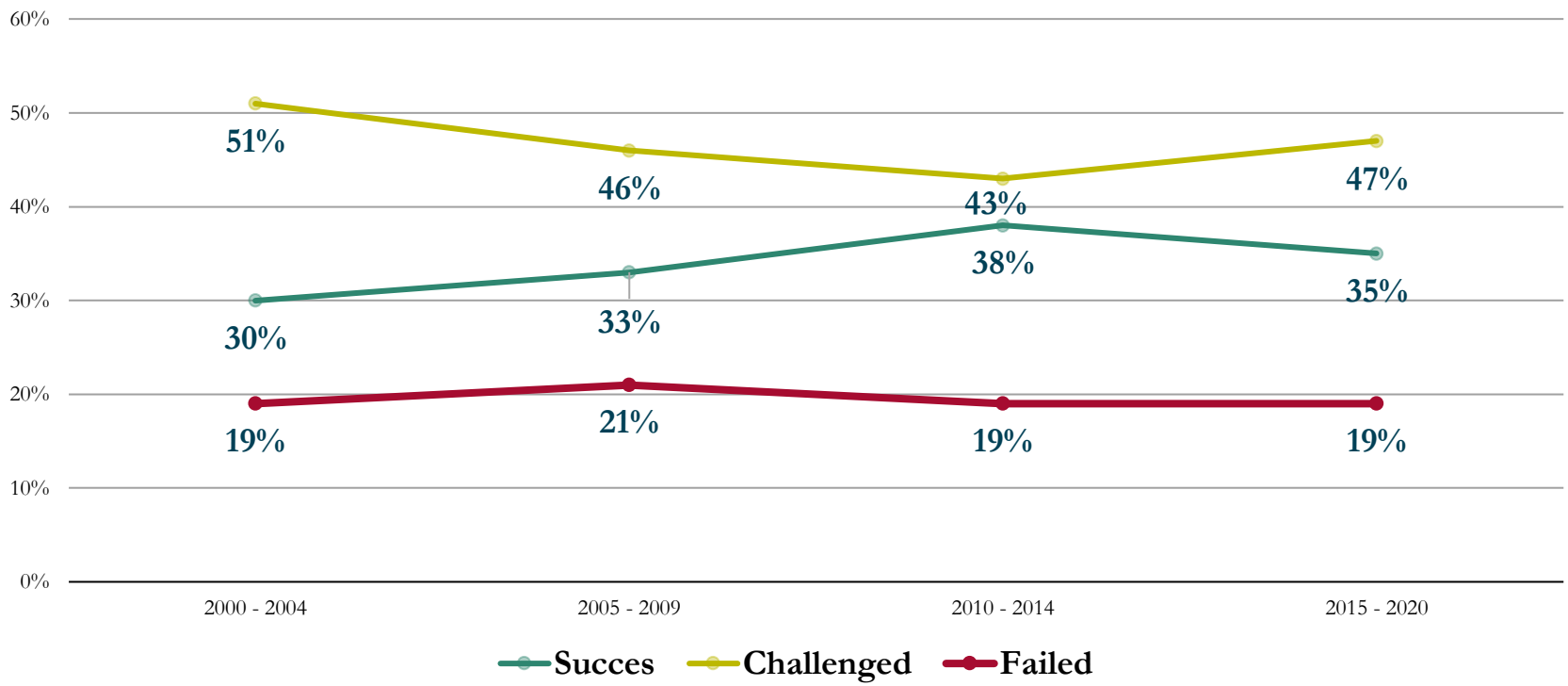
setting realistic expectations.

Unrealistic expectations based on inaccurate estimates are the single largest cause of software failure.

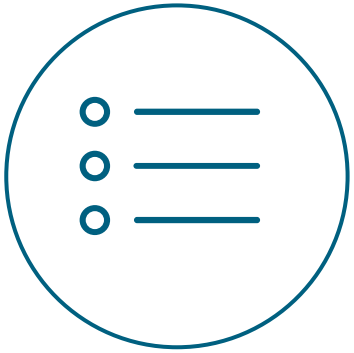
Source: Futrell, Shafer and Shafer "Quality Software Project Management", 2002

What are *realistic* estimates?

The improvement of successful project is missing



Scope as the Influencing Factor



Scope

…they fail to deliver within the combined objectives and requirements needed to complete a project

Time as the Influencing Factor

Time

Scope

…they fail to deliver within the planned time and schedule

Budget as the Influencing Factor

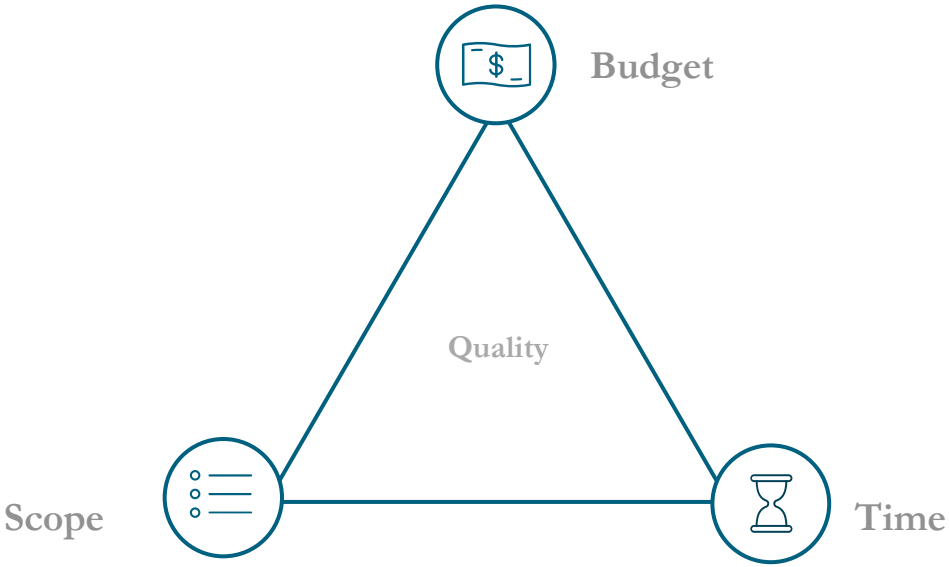
Budget

Time

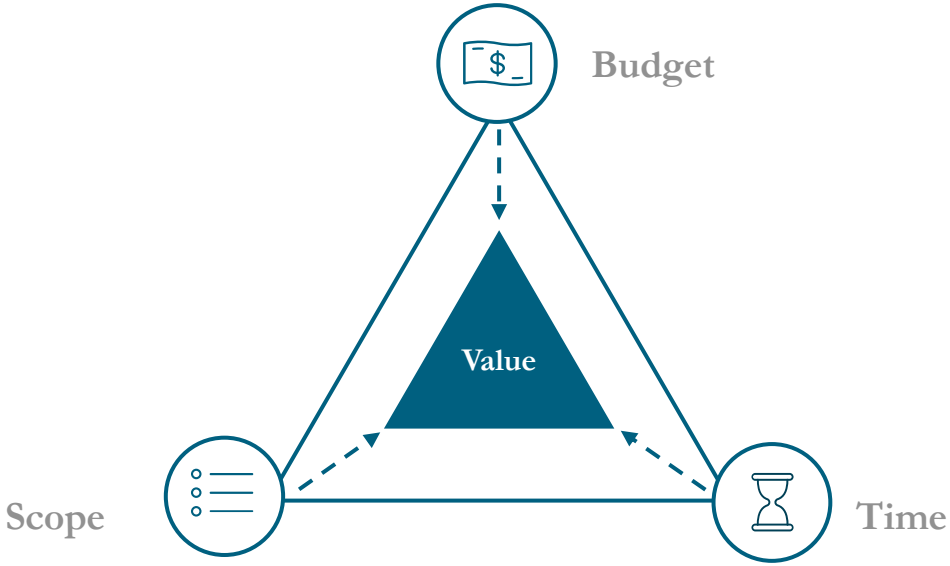
Scope

…and they fail to deliver within the estimated budget

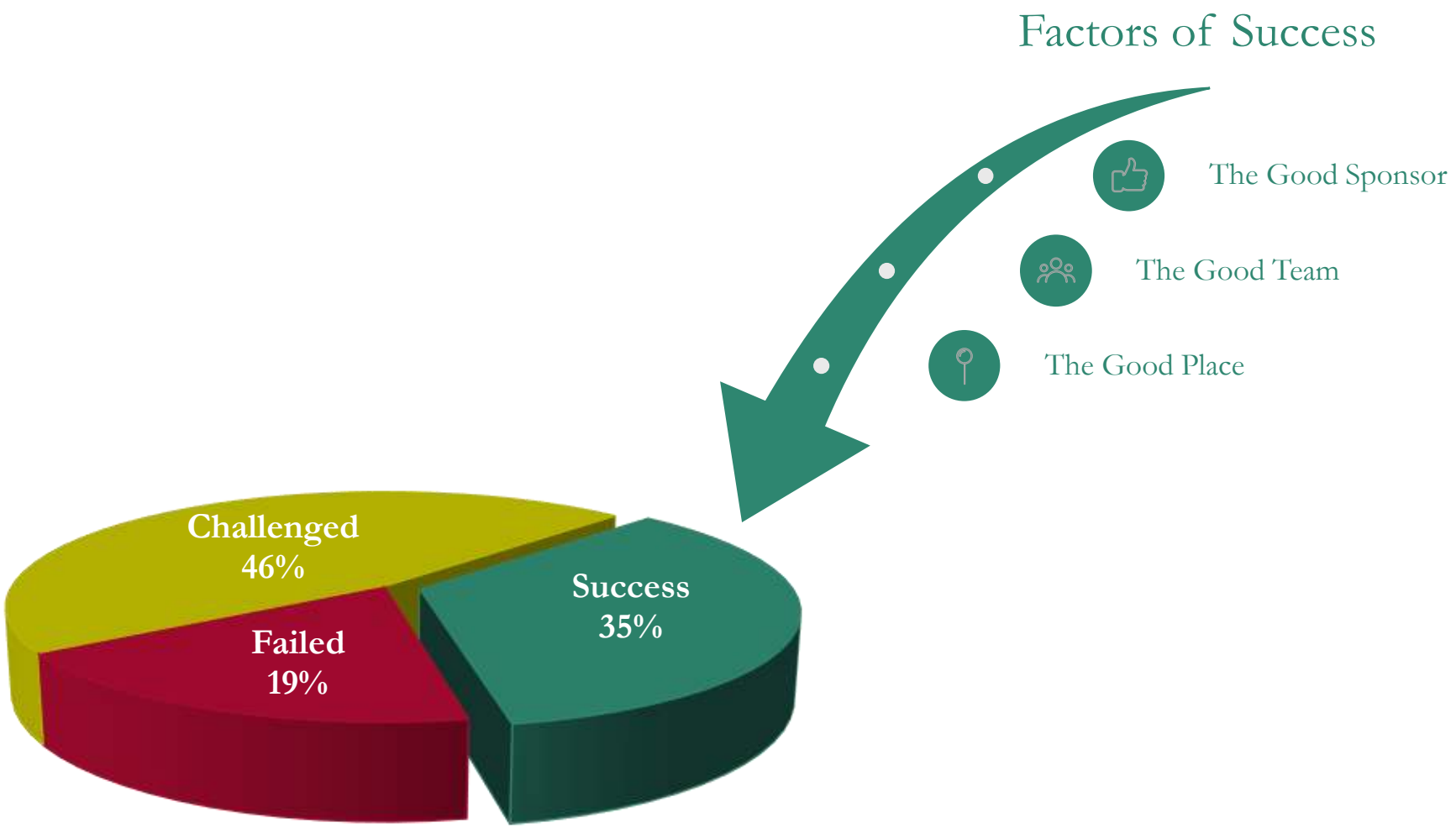
Which all together diminishes the expected value and quality of a project



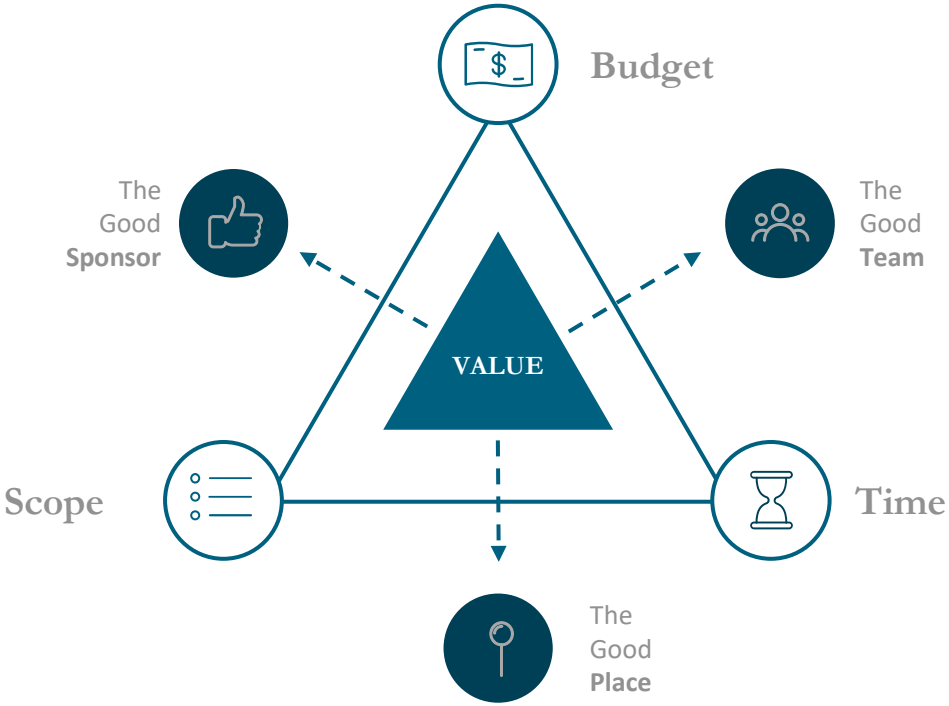
Which all together diminishes the expected value and quality of a project



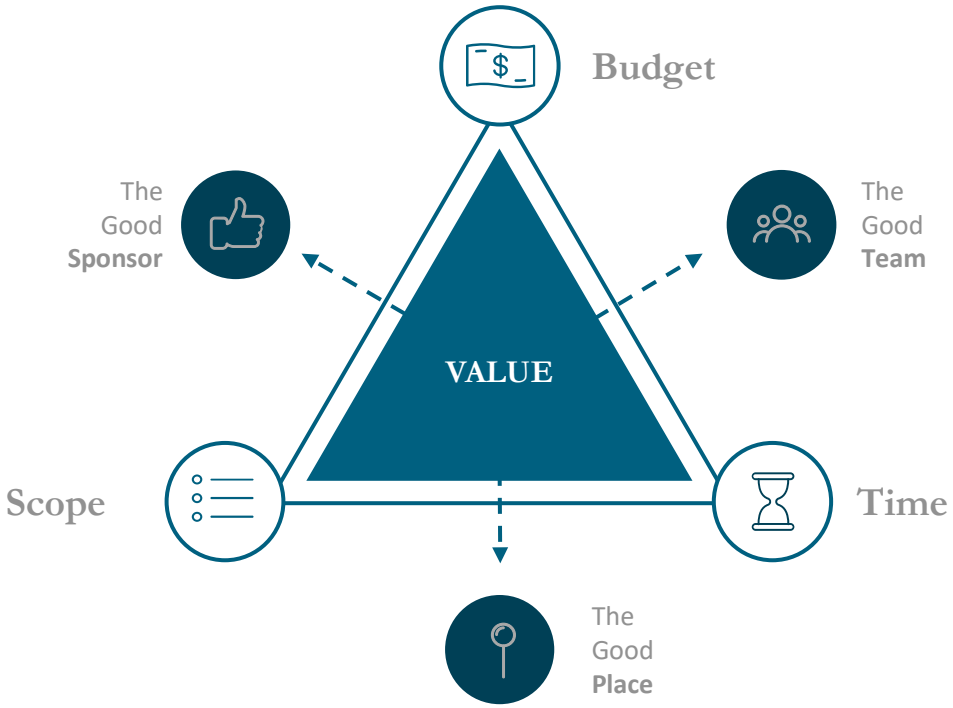
What makes the 35% of all IT projects turns out as a success?



The improvement needs to focus on the factors of success and reason for failure

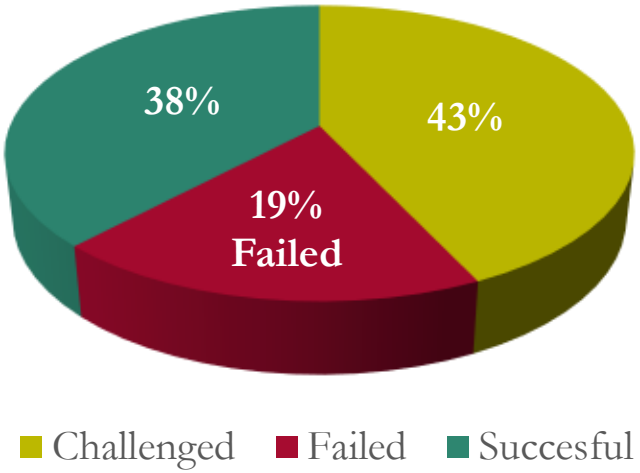


Having the good sponsor, the good team, and the good place can *unlock* more value of an IT project



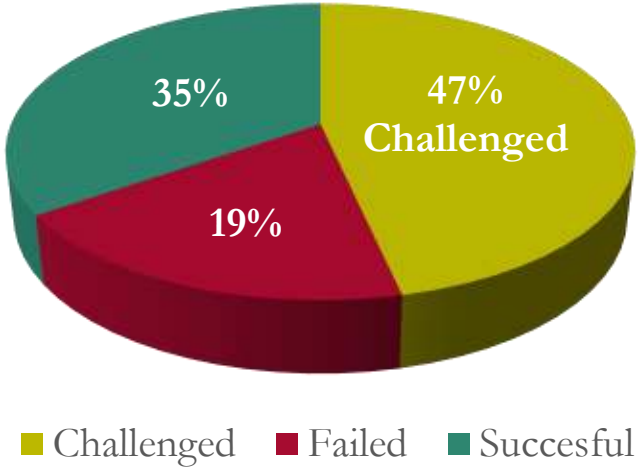
Chaos Results

CHAOS Results 2010 - 2014



Results from 25,000 detailed software project cases in the CHAOS Database

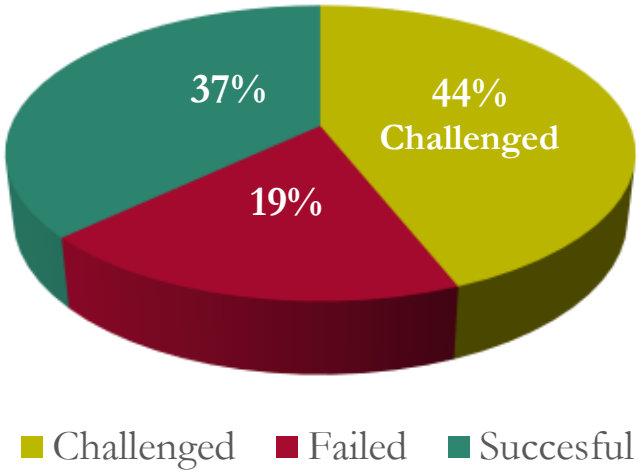
CHAOS Results 2015–2020



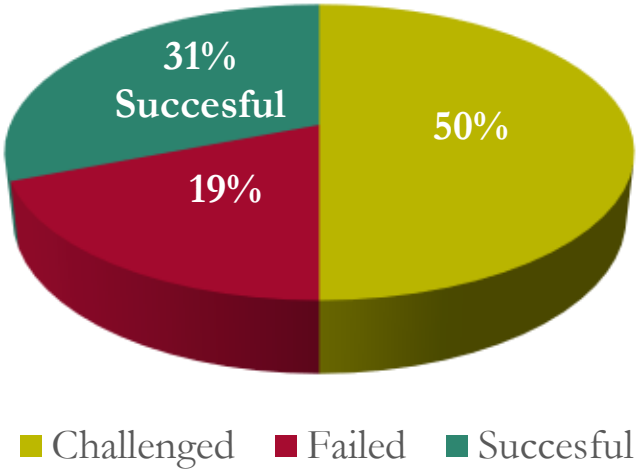
Results from 20,000 detailed software project cases in the CHAOS Database

FACTORS OF SUCCESS

Traditional Measurement



Modern Measurement



Benchmark by Project Size

Resolution/Size	Successful	Challenged	Failed
Grand	6%	52%	42%
Large	12%	58%	30%
Medium	18%	56%	26%
Moderate	26%	61%	13%
Small	61%	33%	6%

Size Description	Size
Less that 10,000 Hours of Productive Labor	Small
10,000 to 30,000 Hours of Productive Labor	Moderate
30,000 to 60,000 Hours of Productive Labor	Medium
60,000 to 100,000 Hours of Productive Labor	Large
More than 100,000 Hours of Productive Labor	Grand

Why do we keep on "Failing"

- Sponsorship ability to influence and lead
- Complexity of the "Projects"
- Size of the Project (Team, Duration, Scope)
- Team skills and productivity
- Lack of professionalism on Estimation and Control
- Uncontrolled or invisible Scope changes
- Agile - Risk for large scale
- Process, Tools & Methods not mature


How to unlock more value?

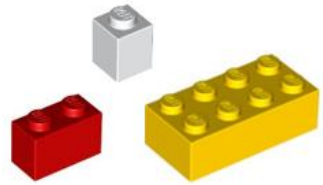
One method is
Function Point Analysis

FUNCTION POINT ANALYSIS (FPA) IS A METHOD FOR MEASURING AND/OR ESTIMATING THE FUNCTIONALITY OF A SOFTWARE PROJECT

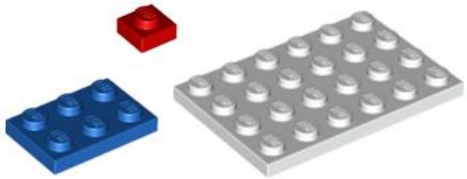
What does it take to build a LEGO construction?

Simple construction ⟷ Complex construction

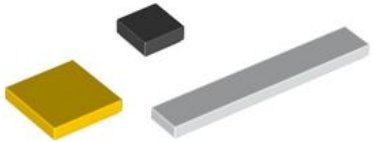
…it certainly depends on the requirements



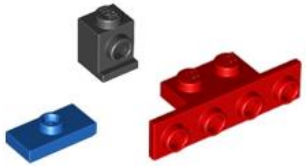
Bricks



Plates



Tiles



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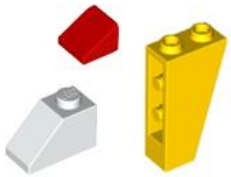
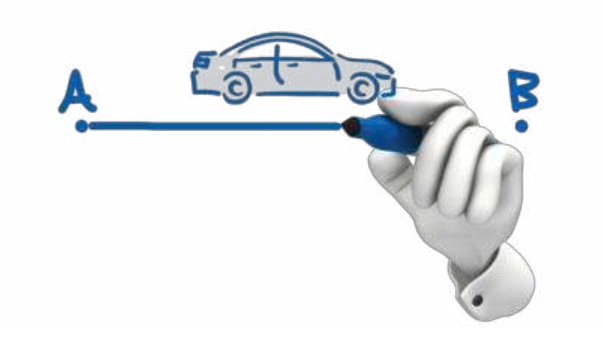
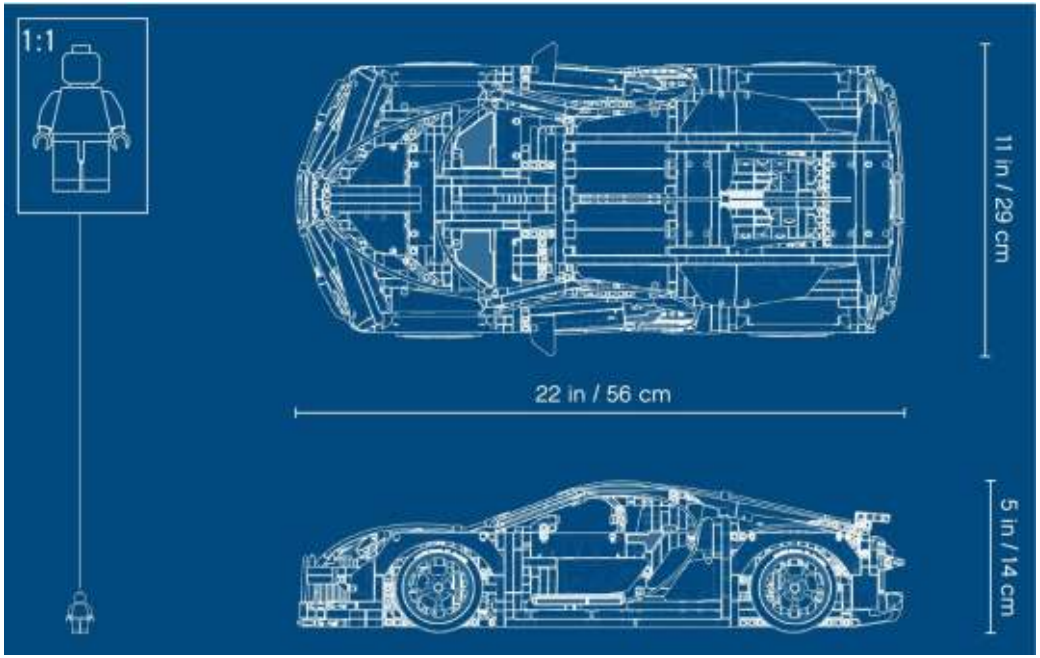


Slope

Technic

How accurate you know the requirements





…and the expertise at hand

Low expertise

High expertise

The Technology & Methodology you use

FUNCTION POINT ANALYSIS USED AS A RELEVANT METHODOLOGY?

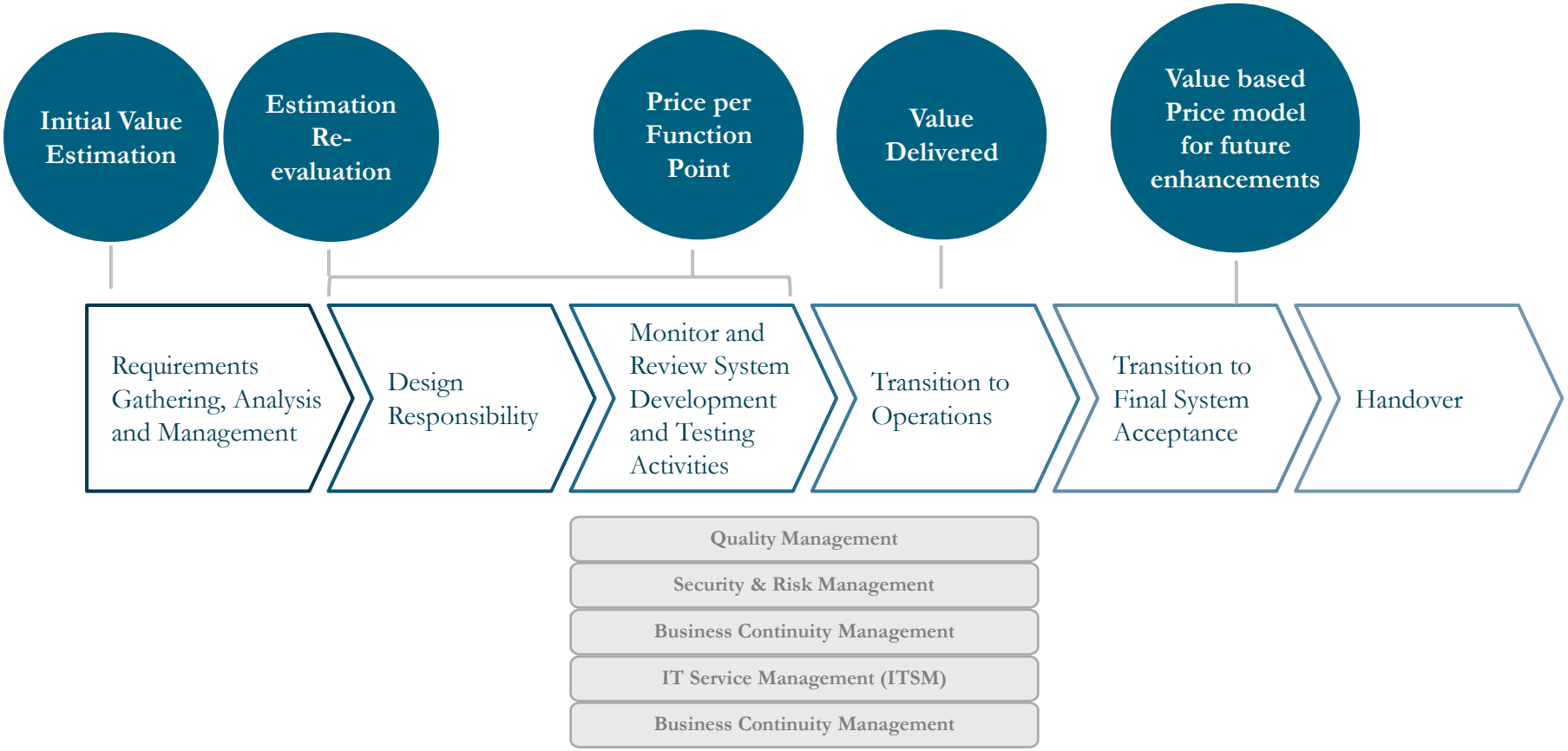
Governments' Usage

- Request for Proposal Evaluation
- Competitive pricing Evaluation
- Monitoring and Control of deliverables
- Quality Assurance Measurement
- Scenario Evaluation

EU uses FPA

- Competitive Price evaluation
- Price per FP
- Monitoring and Control of Scope
- Scenario analysis

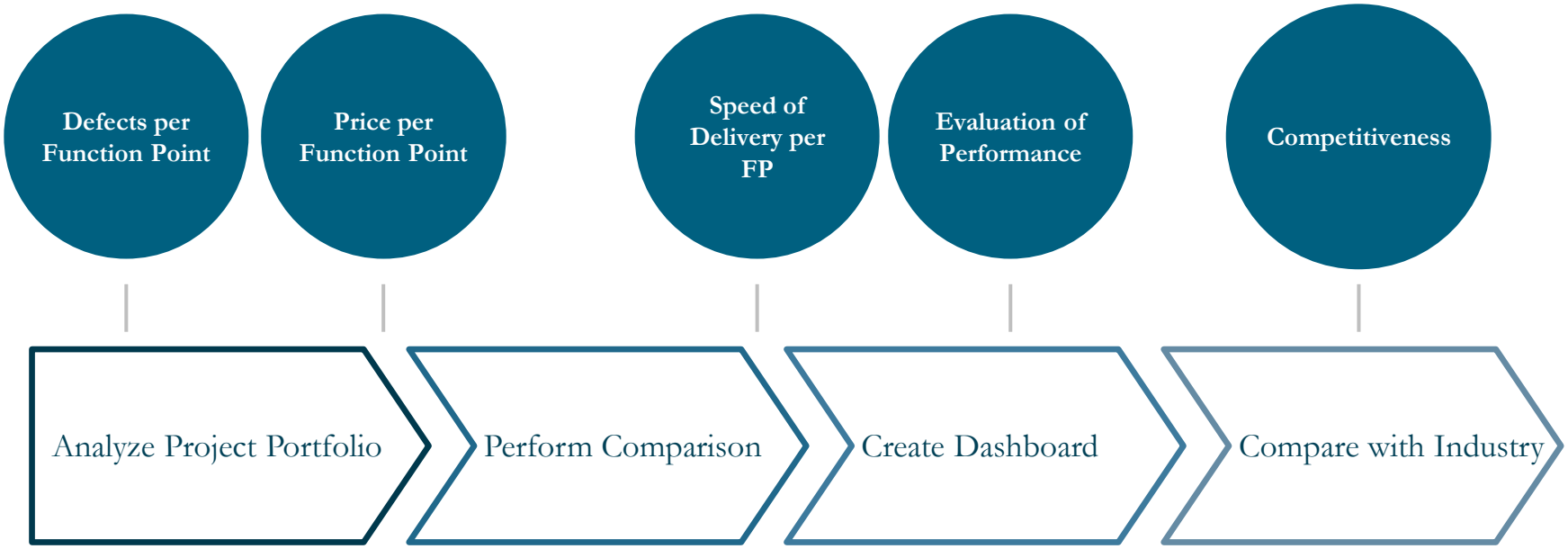
Realistic Schedule and Competitive Pricing



Private Sector Comparison

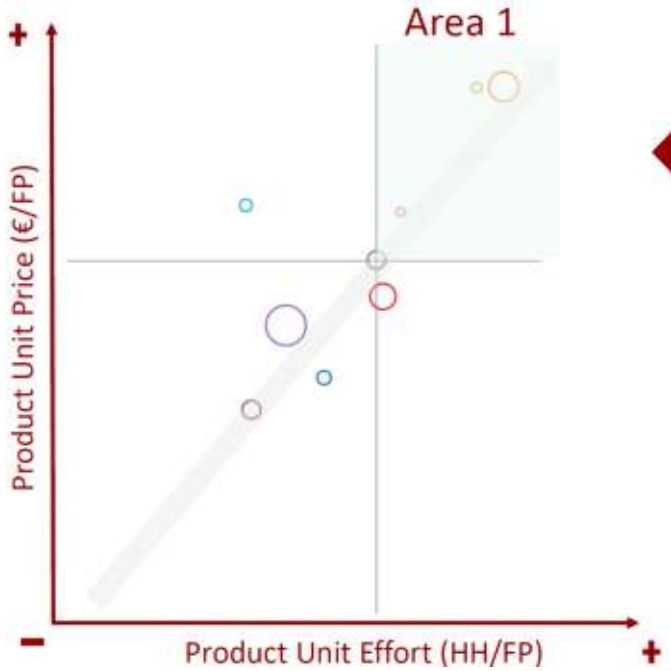
- **Estimation comparison on RFP**
- **Monitoring and measuring of software**
- **Supplier Evaluation**
- **Price negotiation**

How the private sector companies perform FPA



Evaluating suppliers through FPA

You can analize if your rates are (or aren't) well balanced with the effort required by the vendors.



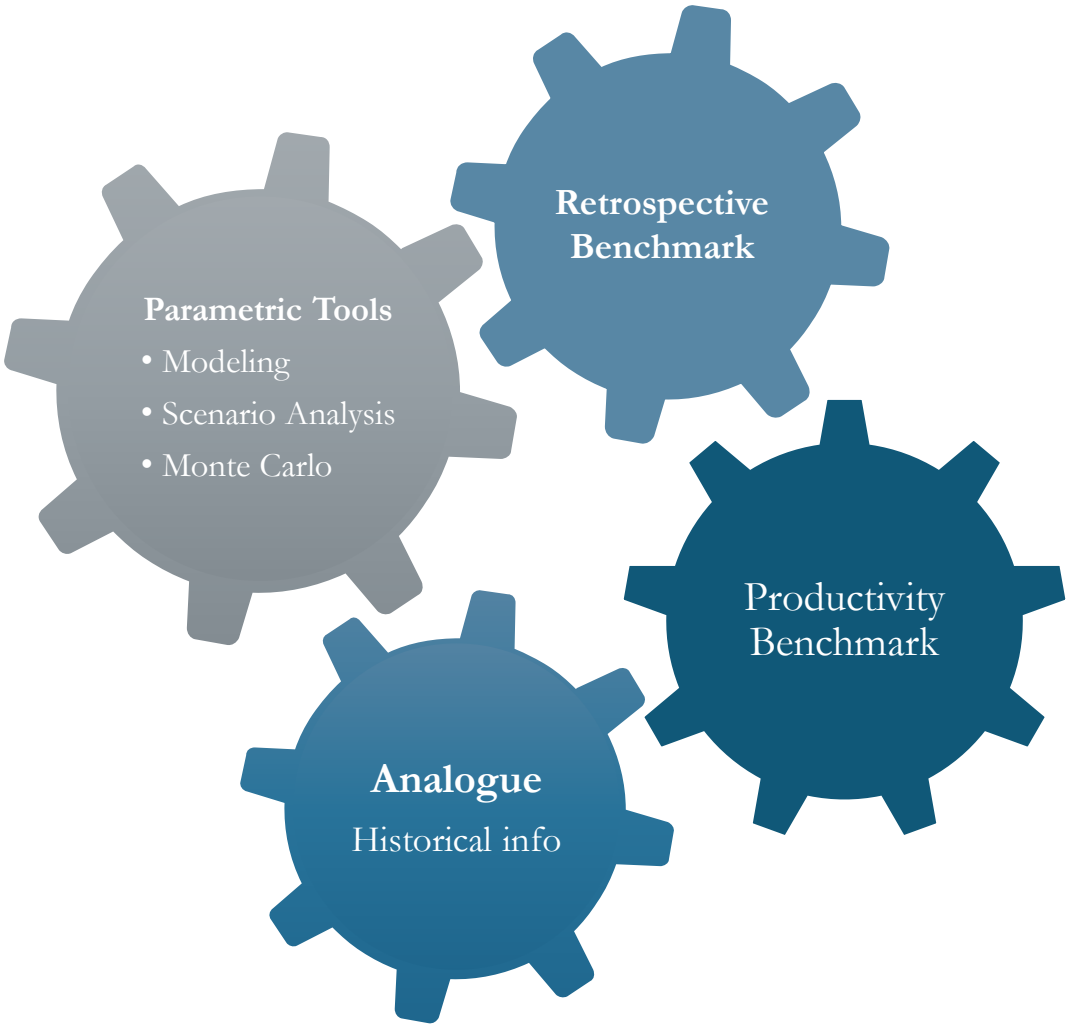
Vendors who require more effort and price per FP.

They should improve their productivity.

Source: LEDAmc

Example – a reduction of 32% of Yearly IT Budget

Usage of FPA for Project Budget



Parametric Estimation Tool

NATO Case

With its initial proposal the vendor requested a project budget of **€7.2Million**. Using the risk-based estimates generated from SEER, NATO were able to negotiate a project cost **€4.1Million**, a saving of 43%. Instead, the usual **5%-10%** expected through traditional negotiations.

Data-driven estimation is seen as a fundamental part to the success of project delivery within NATO.

Source: Galorath

Value & Velocity measures

The Project Specific

Specific Adjustment Factors & Expectations
- Could be organizational defined, SNAP, Risk, etc

The Functional Scope

The Size of the Business Process – The Functionality as seen by the user

The Teams Performance

The effectivity level of your teams – The delivery capacity in total.

Other Benefits of FPA

FPA
Function Point Analysis
CONSISTENT AND STABLE SOFTWARE SIZE

A Certified FP Specialist is an expert in bridging between User, Technical and Planning needs

- **Consistent and Stable Software Size**
- **A process more than a single number**
- **Strengths in its definition and usage**
- **The best scope management and control methodology in the world**
- **The high-level perspective of landscape and business coverage**
- **The Requirement traceability and control from a user's perspective**
- **The visibility that is required from Business Process to Software testing**
- **The quantitative measure between Purchaser and Delivery organization**
- **Strength is in the consistency**
- **Early, detailed and controlled – can evolve and change**
- **The visibility from Business Process to Software delivery acceptance**

The Process for scope illumination, control and measurement

How to start using Function Point Analysis in your organization?

Recommendations for achieving successful IT Projects

PROFESSIONALISM	Estimation & forecast with a professional approach
SIZE AND PRIORITIES	Size and priorities the project requirement and value
CONTROL	Control your project and process – quantify and validate

Remember

Successful IT Budgets is a combination of Science and Art

I believe that by using Function Point Analysis we can improve the success rate of software projects

Add a Certified FP Specialist (CFPS) to your team

Function Point Analysis (FPA)

A Technical Introduction

Functional Sizing Measure

The perspective of FPA

- is the measure of the functionality that an application provides to the user
- provides a size measure that depicts the software requirements by functionality
- a visual technique - breaking down complex projects into smaller components
- a method to quantify the size of these components from top to detail level
- the size of the estimated scope, the actual scope, the changes to the scope

Function Point Analysis – the Process

FPA

Function Point Analysis

CONSISTENT AND STABLE SOFTWARE SIZE

- A Process more than a single number
- Strengths in its definition and usage
- The best scope management and control methodology in the world
- The high-level perspective of landscape and business coverage
- The Requirement traceability and control from a user's perspective
- The visibility that is required from Business Process to Software testing
- The quantitative measure between Purchaser and Delivery organization
- Strength is in the consistency (Choose qualified resources)
- Early, detailed and controlled – can evolve and change based on needs
- The visibility that is required from Business Process to Software delivery acceptance

The Process for scope illumination for Management

User View

User

- Any person or thing that communicates or interacts with the software at any time.

User recognizable

- Requirements for processes and/or data that are agreed upon, and understood by, both the user(s) and software developer(s).

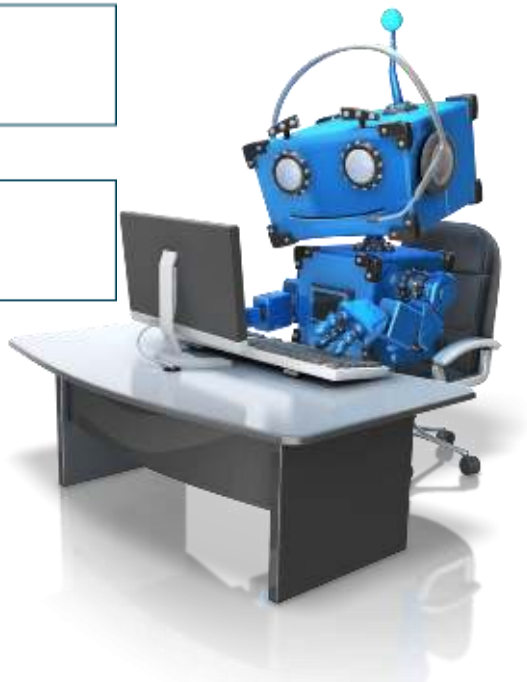
User view

- Functional User Requirements as perceived by the user.

Meaningful.

- User recognizable and satisfies a functional requirement.

From the user view



Function Point Analysis – the Method

FPA

Function Point Analysis

CONSISTENT AND STABLE SOFTWARE SIZE

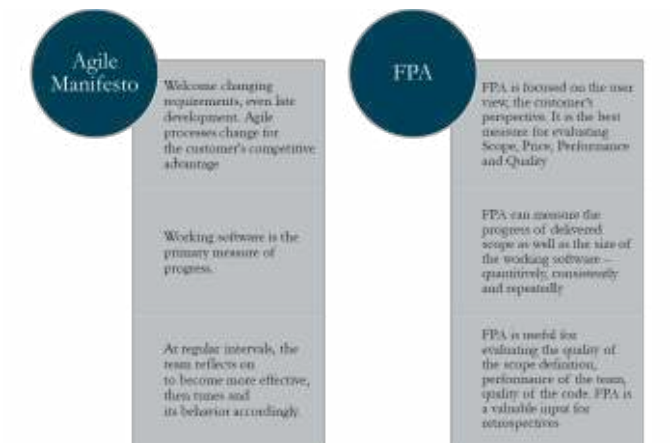
- Business Process & Software Requirements Breakdown
- Scope Control from a Business perspective
- Scope analysis and control from a user's perspective
- Scope of work for Teams and Projects
- List of deliverables
- List of transactions to be tested
- Measure of impact
- Key Performance normalization factor
- The Functional Size Measure of a project or software component

Using an experienced CFPS gives you much more than JUST the size and process

The Process for scope illumination, control and measurement

Busting Myth about IFPUG FPA

Works Perfectly in Iterative projects (Agile)



It is not difficult to use!

As a technical resource, the method requires you to think logically and from a user perspective. That can be hard for some! But easy for others…

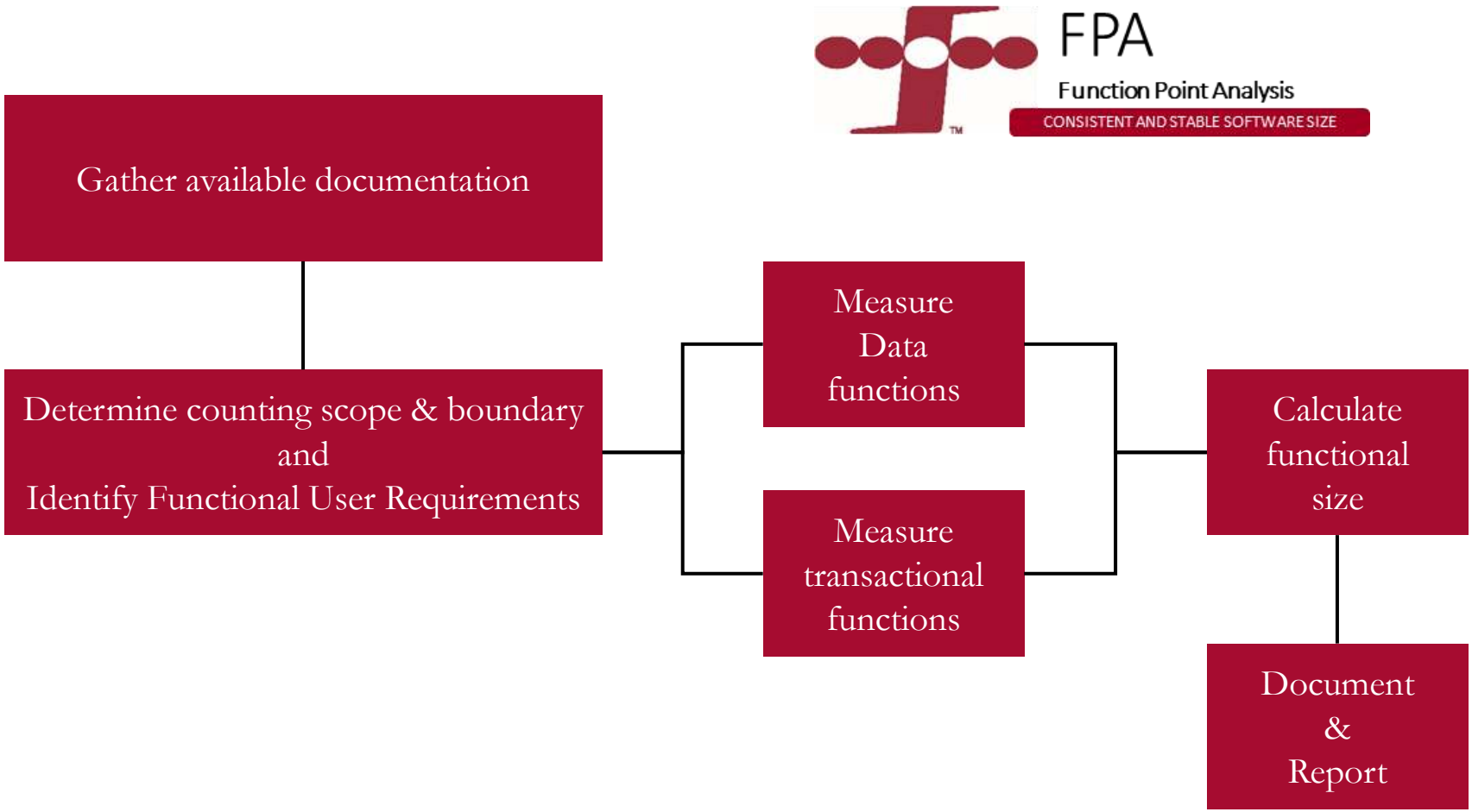
It is not old and outdated

Old – Yes, but for sure not outdated. It is stable, consistent and continue to show its value in the organizations embracing it. Old is wise and fresh if you keep exercising…

It is usable on all types of technology or business areas

Yes, sometimes a twist is required in order to map from Scope to Effort – but "twisting" the right way can be done without compromising the FPA for external references.
FPA is changeable and remain consistent when changes are applied with attention

Function Point Counting Process



Part 1, sec 5.1, Figure 1

Function Point Analysis – the Usage

FPA
Function Point Analysis
CONSISTENT AND STABLE SOFTWARE SIZE

- Review & evaluate the scope
- Control Scope
- Break down scope for visibility
- Price & Cost
- Estimate & Plan
- Benchmark – Price, Cost, Delivery and Quality
- Competitive Measure

The Usage for Management Decision

Price model based on Function Point (FP)

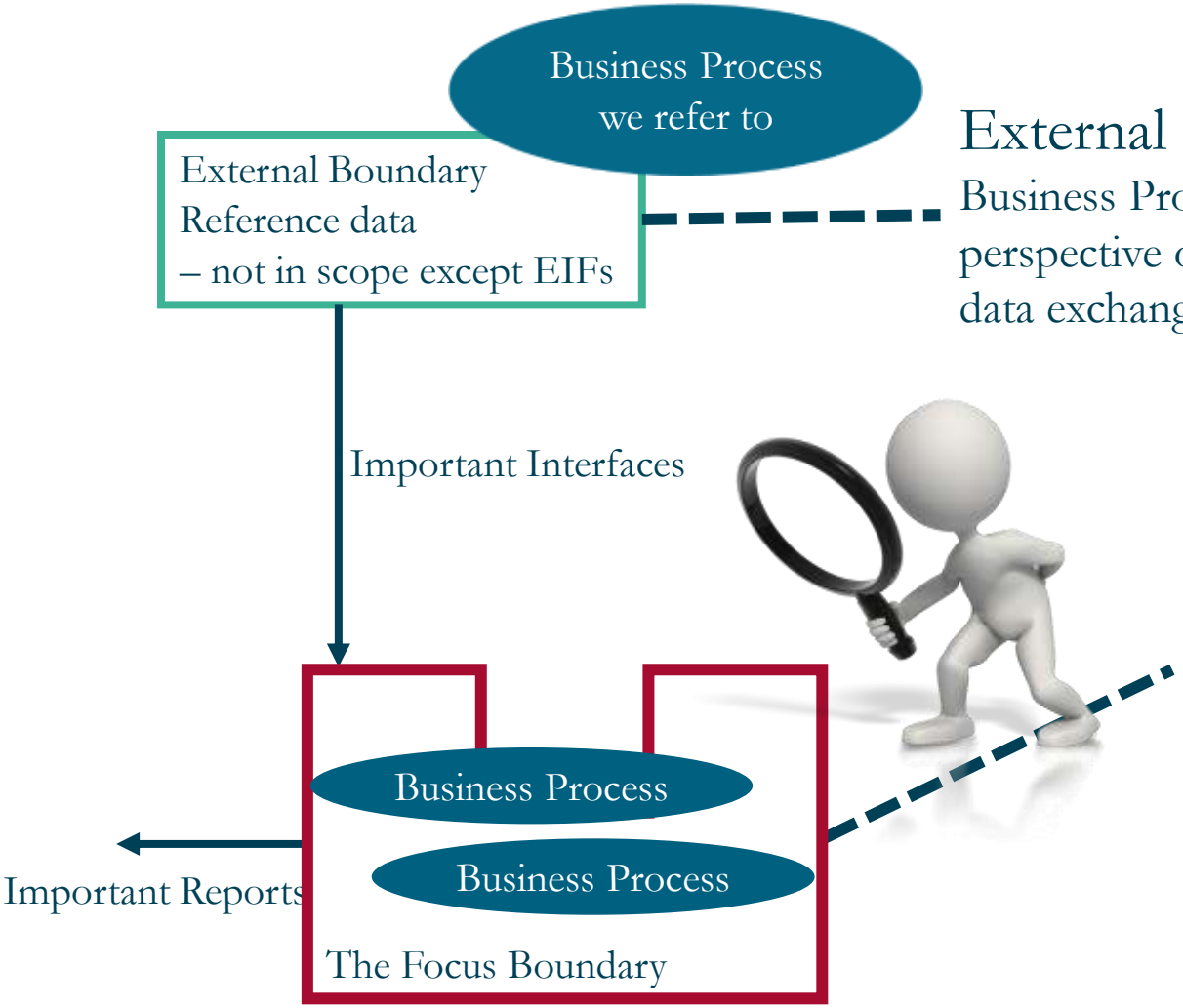
- Advantages
  - The client understands how the fee is derived and how it will vary with changed requirements
  - The supplier is not disadvantaged when additional functionality emerges as understanding of the stated requirement increases
  - The approach can be applied across the full development lifecycle, iterations or part of the lifecycle
  - The approach can be applied for changes and future enhancements

The client pays for the value they receive

The supplier gets payed for what they deliver

The competitiveness on price, speed and quality is easy to evaluate

Boundaries from a business perspective



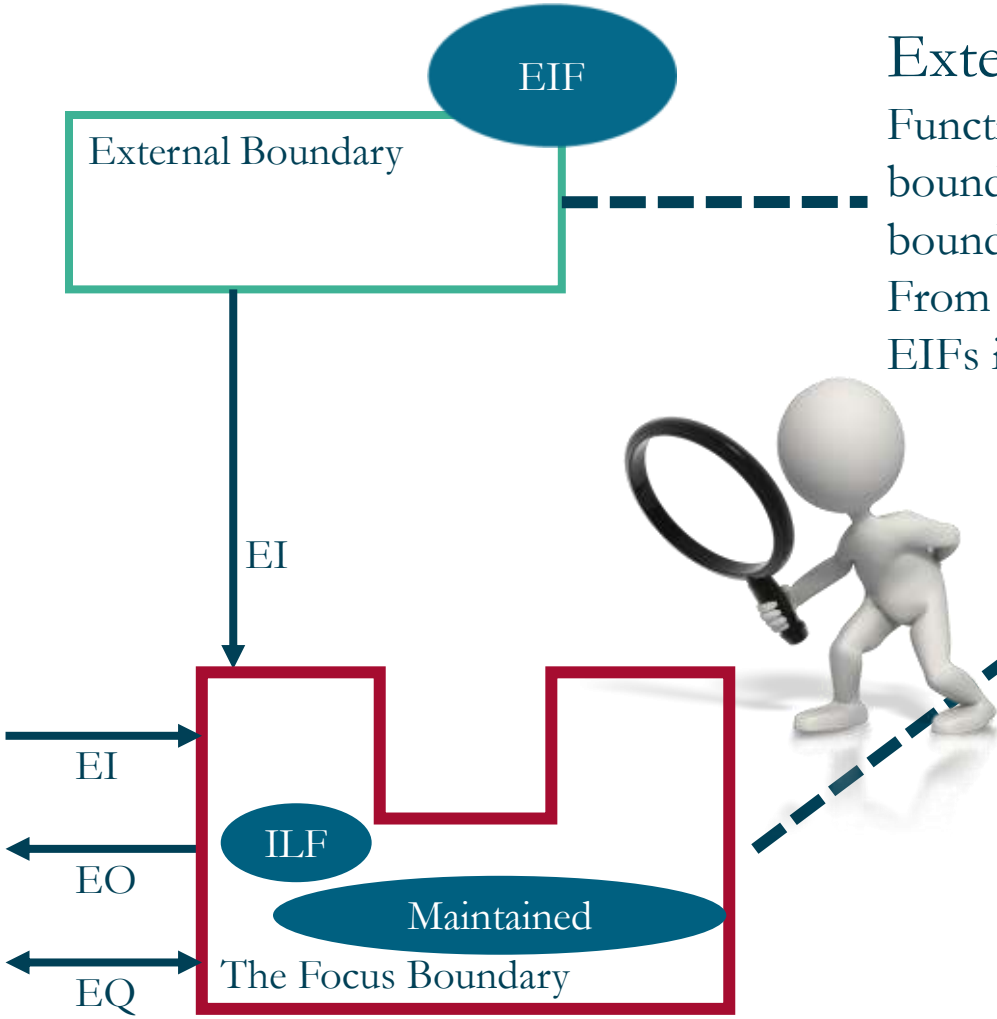
External Boundary

Business Process where the scope includes perspective of stakeholders, engagement or data exchange

The Focus boundary

Business Processes relevant for this boundary is identified. Do not consider how the business process is developed or delivered when considering boundaries.

Boundaries from a FPA perspective



External Boundary

Functionality required from External boundaries is sized with focus on that boundary.
From The focus boundary only inputs and EIFs is sized.

The Focus boundary

Functionality required within the focus boundary. Data functionality – data that are maintained – ILF's. Transactional Elements – EI's, EO's and EQ's

FP QRG

		Data function complexity		
		DETs		
		1 – 19	20 – 50	> 50
RETs	**1**	**Low**	**Low**	**Average**
	2 – 5	**Low**	**Average**	**High**
	> 5	**Average**	**High**	**High**

		Data function size	
		Type	
		ILF	EIF
Complex	**Low**	**7**	**5**
	Average	**10**	**7**
	High	**15**	**10**

		EI functional complexity		
		DETs		
		1 – 4	5 – 15	> 15
FTRs	**0 – 1**	**Low**	**Low**	**Average**
	2	**Low**	**Average**	**High**
	> 2	**Average**	**High**	**High**

		EO and EQ functional complexity		
		DETs		
		1 – 5	6 – 19	> 19
FTRs	**0 – 1**	**Low**	**Low**	**Average**
	2 – 3	**Low**	**Average**	**High**
	> 3	**Average**	**High**	**High**

NOTE An EQ has a minimum of 1 FTR.

		Transactional function size		
		Type		
		EI	EO	EQ
Complex	**Low**	**3**	**4**	**3**
	Average	**4**	**5**	**4**
	High	**6**	**7**	**6**

Example - Elevator

Boundary A - Elevator Interface

The perspective of the elevator from the passengers' view.

The passenger are the main user

The software that controls the elevator from an engineering perspective

Boundary B – Elevator system that makes the movements

The ability to run the elevator using AI input. Data gathering, analysis and Algorithm.
The AI Analyst is the main user

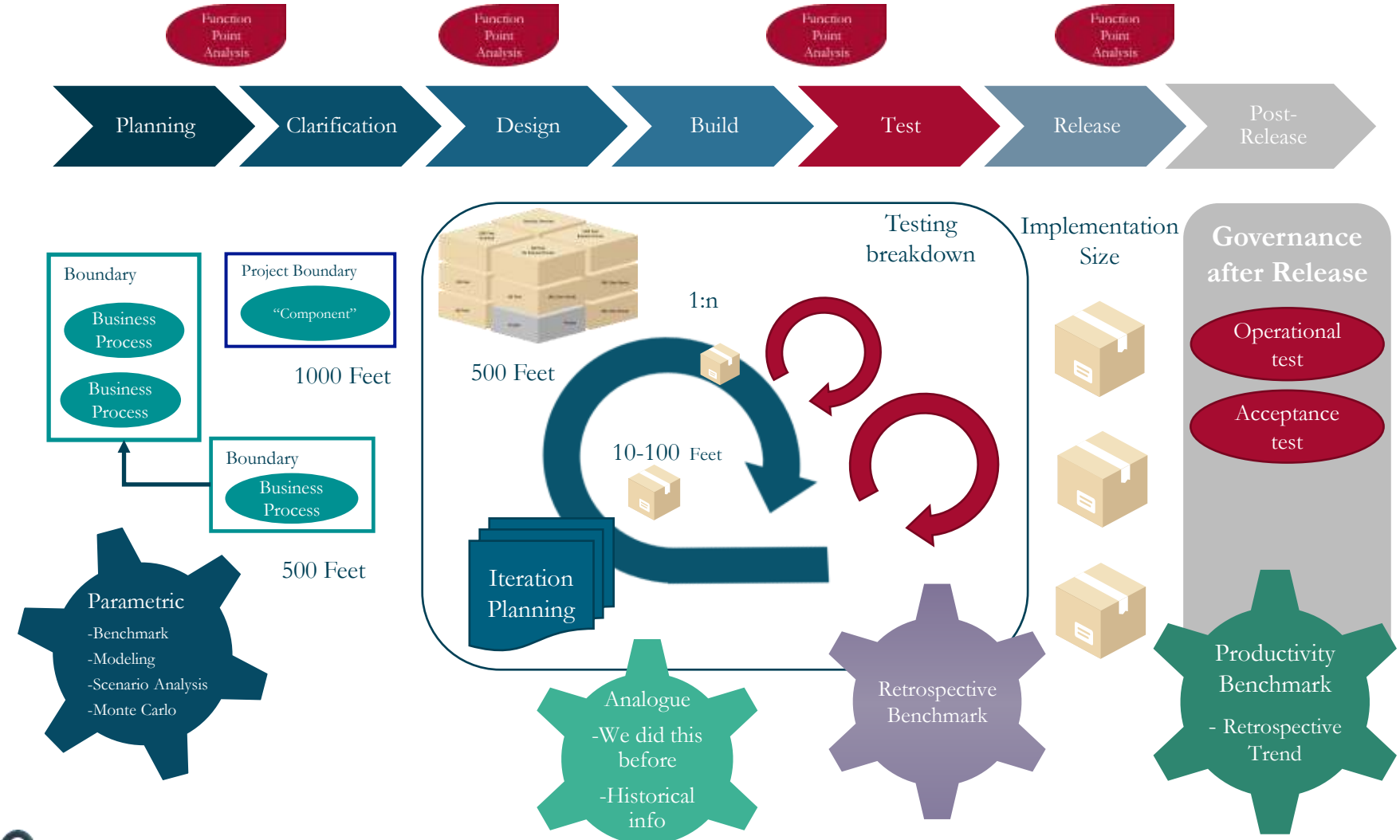
Boundary C – AI interface with AI algorithm and functionality

Not in focus

Security & Employee

UID	Description	Multiplier	Type	Complexity	DET	RET/FTE	FP	Final FP	Comment
1.1	Turn on the red light, Cap arrives, Turn off their lights, Info is saved	1	EI	HIGH	25	2	6	6	
1.X	Floor Information	1	ILF	AVG			10	10	Shared with all 1.x use cases
AI 1.X	Historical Information - maintain within AI	12.00	EI	AVG			4	48	Approximation - clarification required
AI 1.X	Historical Information's logical types	03.00	ILF	AVG			10	30	Approximation - clarification required

Usage of FPA Projects



FPA Validation Process

Verification Requirement to Size
- Reference and traceability
- Functional, Non-functional, Hybrid

Additional counting Rules
- Document as in CPM
- Agreement on validation rules
- Agreement on impact

Scope and Purpose
- Verify Type
- Verify Primary purpose
- Verify Boundaries

Verify Details using FPA Validation Sheet
- Validate using template
- Review in internal call

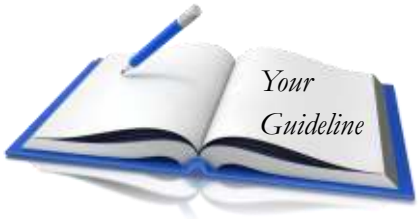
Verify and agreement - Client
- Validate and verify with Leadership
- Conscious decision making
- Document agreement

Update FPA Guidelines
- Document agreement

Final validation of Size
- Specialist Report
- Agree delta

Objective for Validation:

- Document additional counting Rules
- Structured and controlled process for validation
- Avoid future FPA dispute during contract life cycle
- Create Guidelines to be repeated regardless of FPA SME



Function Point Counting Practices Manual
Release 4.3.1

IFPUG Used in the Industry

Governance and Private

European Parliament Decision 2020

On May 13th, 2020, the European Parliament made a decision with recommendations to the eu-LISA Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice.

The decision of The European Parliament "welcomes the new organizational structure put in place by the Agency to reinforce the capabilities needed for operational planning and the associated procurement, … the Agency may consider using the methodology of the International Function Point Users Group (IFPUG), a standard methodology for determining the price of development activities".

IFPUG is honored to see its methodology as one of the resources recommended by the European Parliament to improve an agency's performance.

IFPUG news release 13th of May 2020
https://www.europarl.europa.eu/doceo/document/A-9-2020-0053_EN.pdf

IFPUG FPA for comparison

EU used IFPUG FPA in 2018 for the comparison between three options in the report:

Implementation analysis regarding the technical specifications and other key elements for a future EU system for traceability and security features in the field of tobacco products

"The nature of the different options (D1, D2 and D3) has a direct influence on the cost of software development. "

….

"The adoption of a complexity percentage delivers the required adjustment of option D1, due to the increase of function points effort estimation methodology (IFPUG, 2016), when compared with options D2 and D3."

Source: https://op.europa.eu/s/n9ML

eu-LISA usage of FPA

2017 – Usage of FPA for the VIS Project – VISA information System

From the 2017 Annual report statement - For the calculation of prices for the specific contracts, the Agency applies a combination of fixed price and quoted time and means approach aiming at sound cost control. For the VIS contract, the Agency also applied IFPUG (208), a standard methodology using function points for the determination of price for development activities. The agency may consider using IFPUG also for the other systems.

2017 – Annual Report General recommendation on usage of IFPUG FPA for revision of contracts

In the framework of the revision of its sourcing strategy, the Agency shall address contracting options, including the adoption of IFPUG-sponsored methodology, with a view at reducing reliance on a single contractor for evolutions.

Between 2017 and 2020 – Used in Call for tender with small variations depending on the Project Type and knowledge gained

Private Sector Comparison

- Estimation comparison on RFP delivery with Parametric tools
- Used for monitoring and measuring of software suppliers (outsourcing measure on software specifically)
- Down selection of supplier due to performance
- Price negotiation due to Competitive Price

Examples – savings of up to 32% of yearly software development and maintenance budget

Solving the tree foil knot

- Use Diagram to get the overview
- Use FP early
- Use the detail to monitor progress
- Use FPA to review what you do know
- Use FP to constrain what you do not know
- Trace scope using FPA
- Use proper resources for estimation and scope control
- Use FPA documentation to verify successful testing
- Use FPA to verify changes, additions and removal of functionality

How to get started

Contact us for details

Training RoadMap

FP Introduction

For leaders and Sales team

Start of Workshop trainees

FP Workshop

3 Modules, IFPUG Workshop
Function Point Analyst

Q/A Mentoring

Mentoring & Review
Ad hoc support

Available for all modules

Boundary Advanced

FPA Review Process

Advanced Modules: Relevant for experts

QUESTIONS?

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