

# Function Points in Contracts - the good and the bad

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# Objectives

To describe

- What Function Points in a contractual agreement can do for you.
- What you need to investigate and create before the agreement is signed.
- What happens with the Function Points when the agreement has been made?
- How Function Points can and should be linked to price.

# Why use Metrics in contracting

## Fixed Price for total delivery

Client organisation Win...

Delivery organisation Loose...

- Advantages
  - If product definition is adequate and change minimal - When is this ever the case?
  - There is incentive for the supplier to control and manage the product size, and to deliver in a cost effective way
- Disadvantages
  - The supplier absorbs the risk arising from the initial estimate – to compensate, the client pays a higher price
  - Changes to requirement are usually the subject of a separate quotation – prices may be loaded if initial estimates of cost were low.

## Body shopping

Delivery organisation Win...

Client organisation Loose...

- Advantages
  - Changes to Requirement are easily absorbed into the Project Contract
  - Lack of pressures associated with pricing constraints means that the project team is free to focus on delivering the software solution
- Disadvantages
  - Client is asked to absorb the risk associated with both the product definition and the estimation of delivery cost.
  - There is no cost incentive for the supplier either to deliver in the most cost effective way or to control product size.

# Price model based on Metrics

Delivery organisation Win...

Client organisation Win...

**BUT only when done correctly**

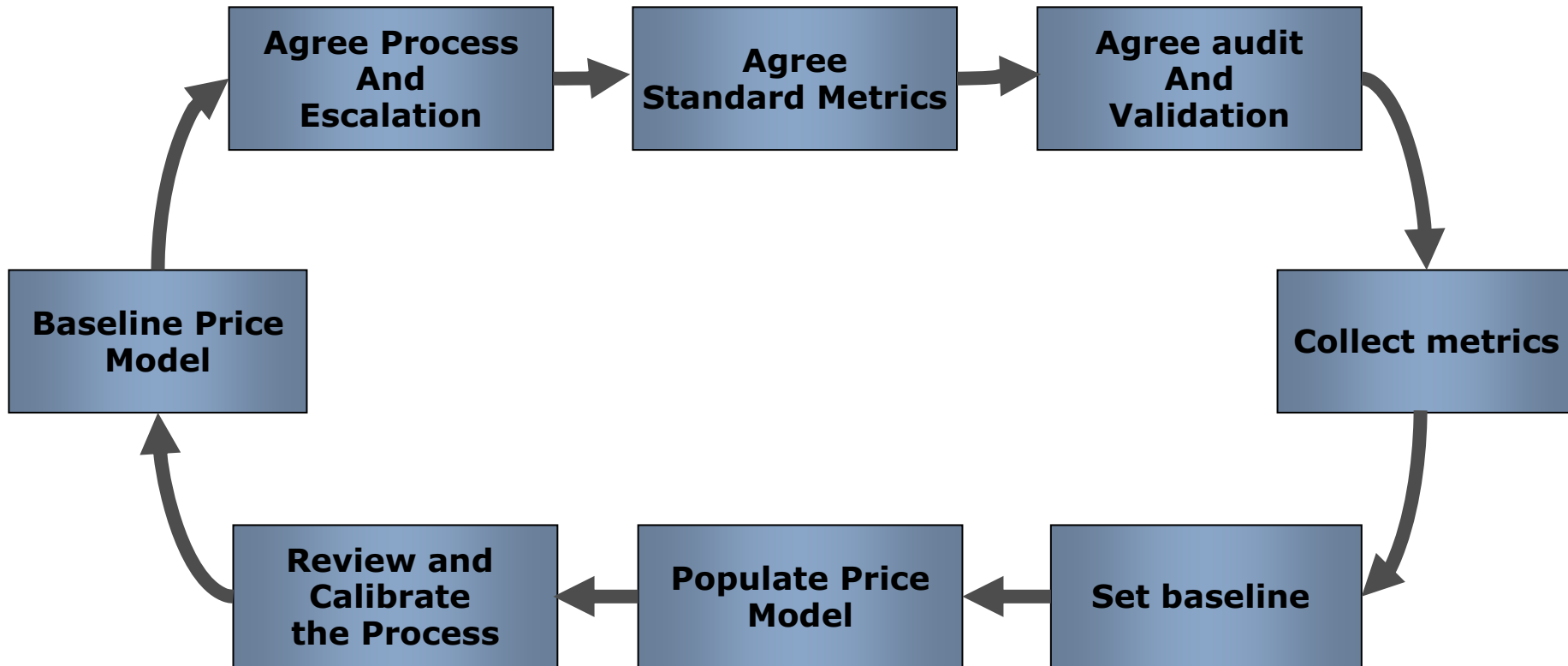
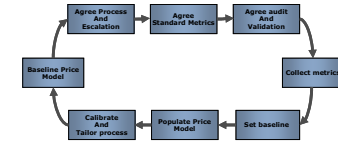
- Advantages

- The client understands how the fee is derived and how it will vary with changed requirements.
- The client can compare pricing against published industry databases
- 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.

- Disadvantages

- The unit on which the pricing is based is not a 'hard' or 'physical' measurement
- On Functional requirements – the unit is as close as possible to a objective measure – and can be duplicated by others using IFPUG FPA

# Price Model Life Cycle



There are links to process such as Portfolio Management, Scope & Requirement Management, Change Management and Measurement & Analysis

# Price Model - Definition

- A Price model based on Metrics
- Units defined as the Core Metrics
  - Function Points (FP)
  - Effort Hours
  - Mean Cost per Effort Hour
- A baseline sets the Price per FP
- Baseline Price needs to be evaluated and monitored
- Improvement to the model as Metrics Maturity Grows
- The model must be comprehensive but workable
- The price model is best considered draft at first due to the following factors
  - Poor or inaccurate definition of influences
  - Poor or inaccurate Measurement Data particularly effort data
  - Poor or missing processes
  - Poor documentation
  - Lack of historical data
  - Poor process control
  - Non-sizeable items in projects
- Setup formal Requirements Documentation Process
- Escalation and calibration are built into the contract

# Functional, Technical or Quality

## Functional Req.

Those requirements that can be Function Point Counted

**ISO** - sub-set of the user requirements. The Functional User Requirements represent the user practices and procedures that the software must perform to fulfil the users' needs.

**IEEE** Functional - A requirement that specifies a function that a system or system component must be able to perform.

**IEEE Interfaces** – Only covered partly

**IFPUG FP** –

Boundary – logical

User/Business Definition - ILFs, EIFs, EI, EO and EQ

- But only when recognized from a user perspective

## Technical Req.

Those requirements that can be sized or assessed using an internal approach.

Grouped by Category or Evaluated criteria

**ISO** - requirements relating to the technology and environment, for the development, maintenance, support and execution of the software

**IEEE** – Combination of Design, Implement and interfaces

Size or assess these requirements by themselves

Not Suitable for FP Size measure

## Quality Req.

Those requirements that can NOT be Function Point Counted or sized using Technical Size approach

Quality Req. are hidden in the productivity and Quality rating

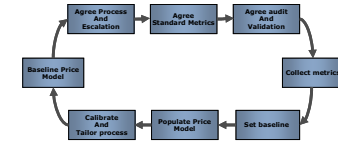
Productivity and Quality rating are impacted by org. maturity, testing requirement, Quality of the product etc.

**IEEE Quality** –

The degree to which a system, component, or process meets specified requirements.

The degree to which a system, component, or process meets customer or user needs or expectations.

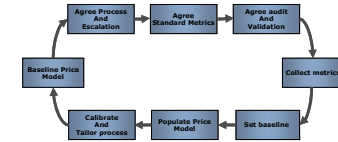
# Agree the Process and Escalation



- Meet with the process owner
- Brainstorm and agree the process
  - The process is straightforward but you must tailor it to the client or delivery group
  - Determine scope of affected teams
  - Determine the key stakeholders internal and external
  - Agree standard communications routes including single points of contact
  - Agree the business priority – you need to ensure key stakeholders actively participate
- Agree clear escalation routes with identified leaders who agree to be responsible for owning issues and who have the power to solve them

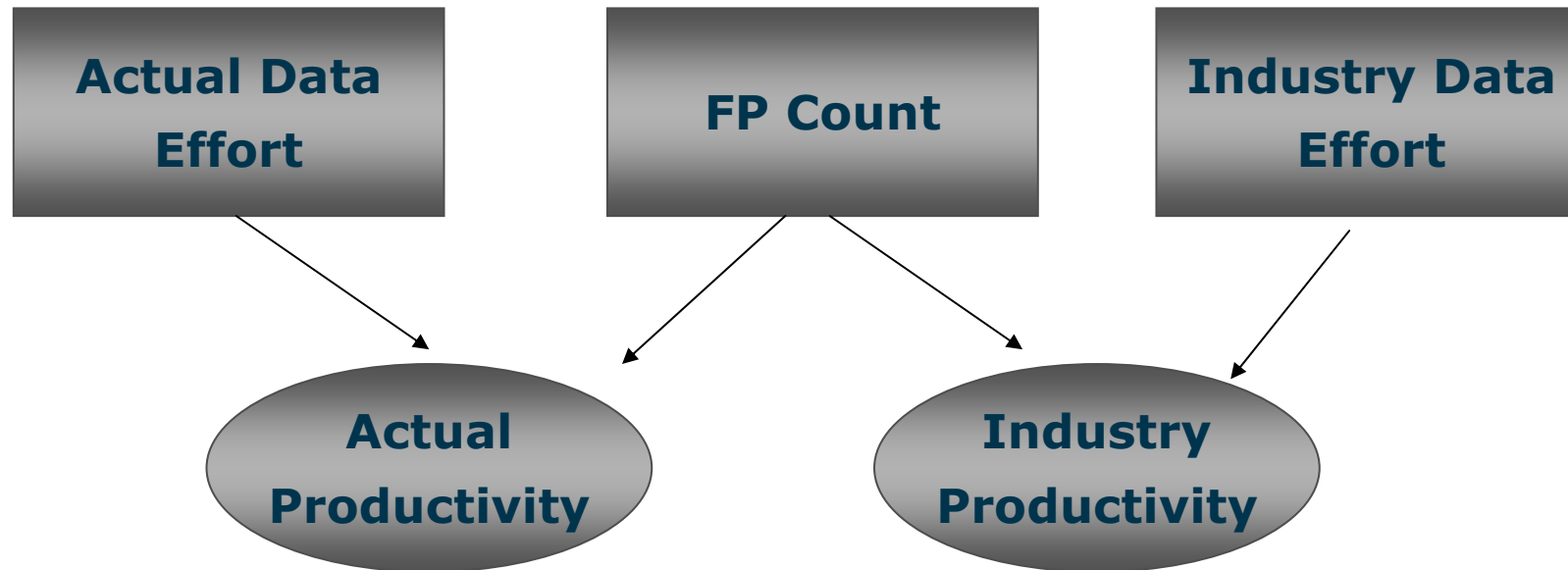


# Agree Standard Metrics



- Determine the software metrics to be used
- Define the standards to be applied
  - For function points IFPUG v4.x or Cosmic as required
  - Define standard guidelines for effort collection including granularity
  - Agree the lifecycle phases to be included
  - Agree the finances – how to price the effort – to-day versus to-morrow
- Agree levels of openness – the process must be transparent and verifiable
- Agree any benchmark comparison database which may be applied
- Agree application of any other metrics such as SLAs which may affect the productivity achievable

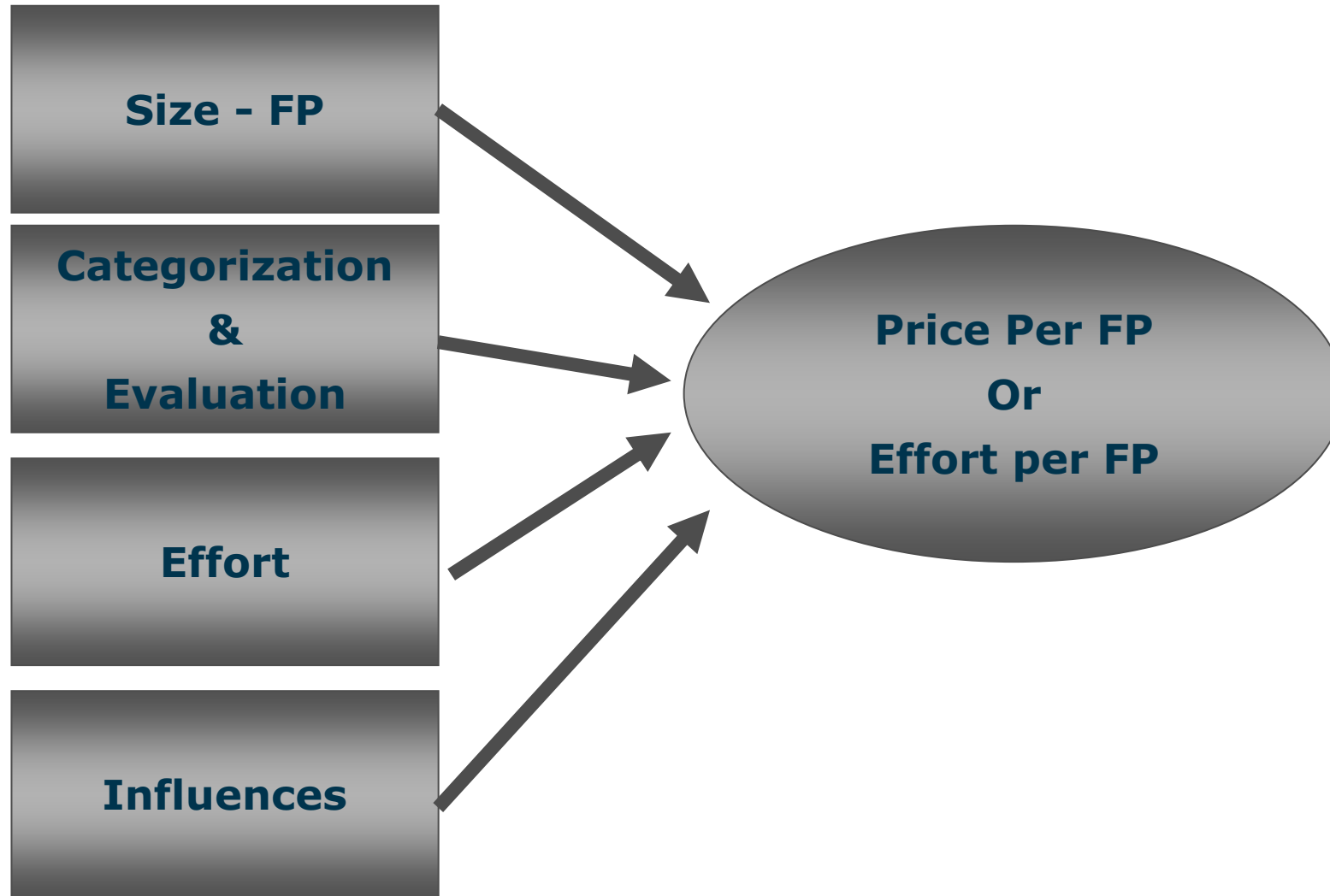
# External versus Internal Benchmark Open Door versus Closed Door



Productivity targets that match the delivery Organisation  
Matching Client type of projects

Class Productivity  
A simplification of the data  
Not using Delivery org. Process  
Not using Delivery org. staff

# Metrics in the contract



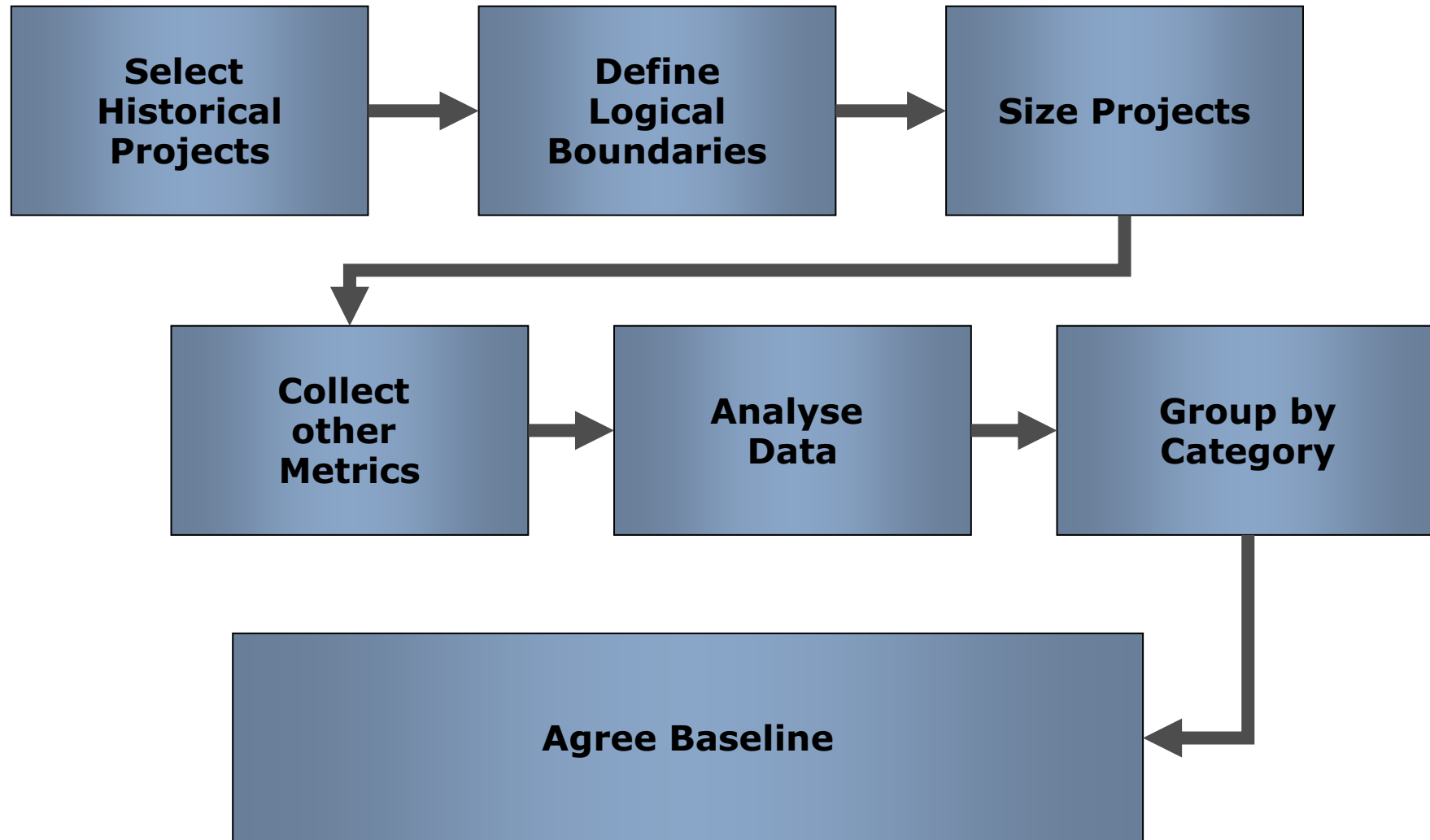
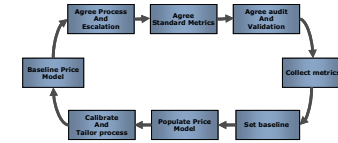
# Agree Process & Escalation

- Use independent third party for escalation of the Function Point Process
- Agree process for documentation of issues and escalation procedures
- Agree how to document Size and Measurement collections
  - Waivers
  - Outliers
  - Special requirements
  - Included & excluded effort and cost collection
  - Comparison definition with benchmark data

It is important that both Supplier and Customer have a good relationship with the third party vendor. They will be an important partner in ensuring a good contract with few major issues

It is a partnership – to ensure accurate and correct sizing and measurement

# Collect Metrics and Set baseline

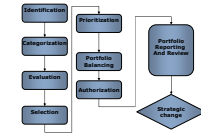


# Collect Metrics and Set Baseline

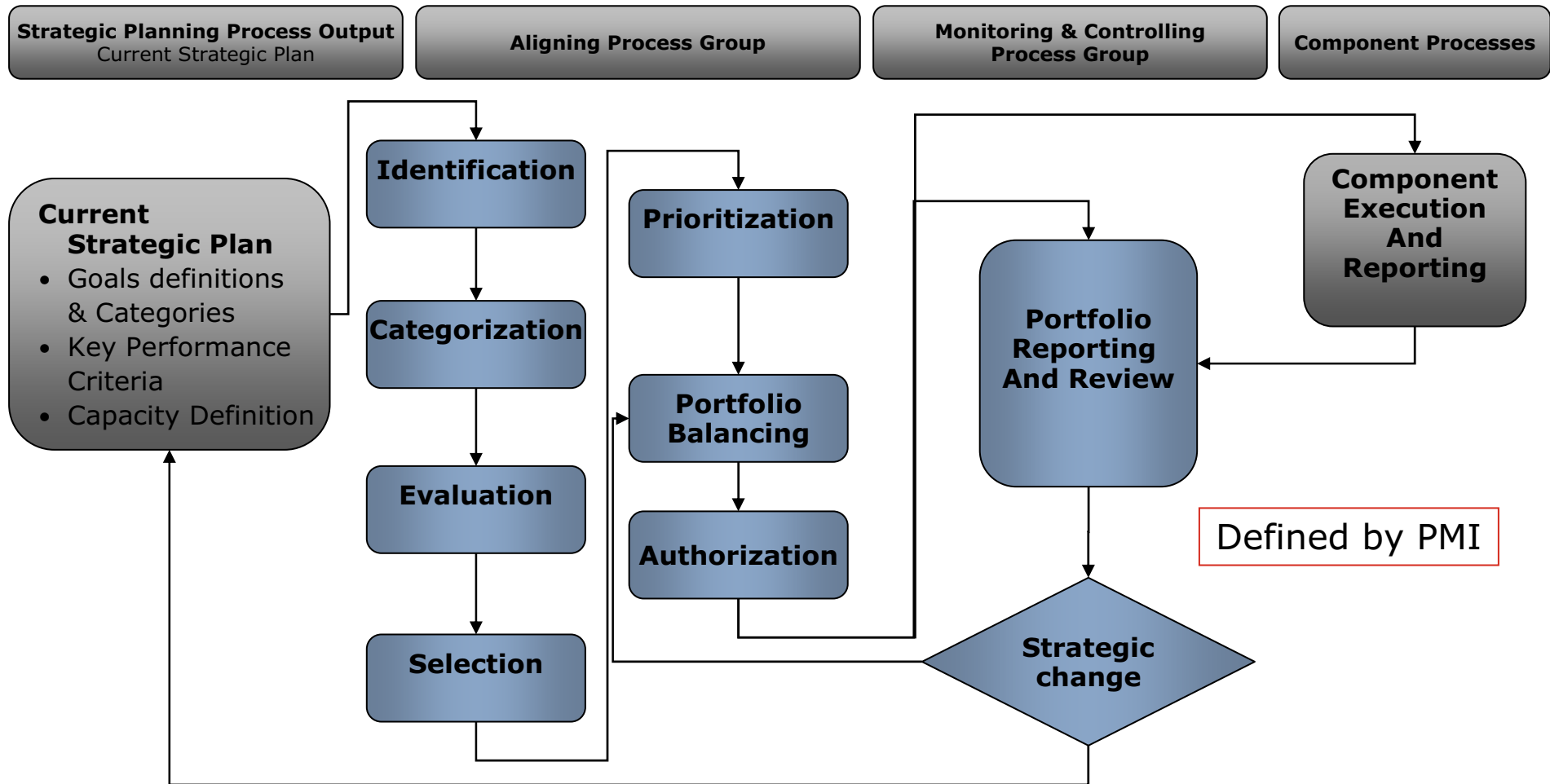
Use Portfolio Management Process for doing this...

- Categorize projects using influences
- Prioritize using characteristics
- Be aware to agree boundaries and agree approach for updating boundaries definition.
- Agree on measurement approach
  - How to collect cost/effort – this must be transparent and verifiable
  - How to identify waivers
    - Projects that are not suitable for a FP Price Model
    - Requirements that are not suitable for a FP Price Model

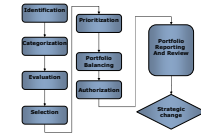
# Portfolio Management – Life Cycle



## Portfolio Management Process



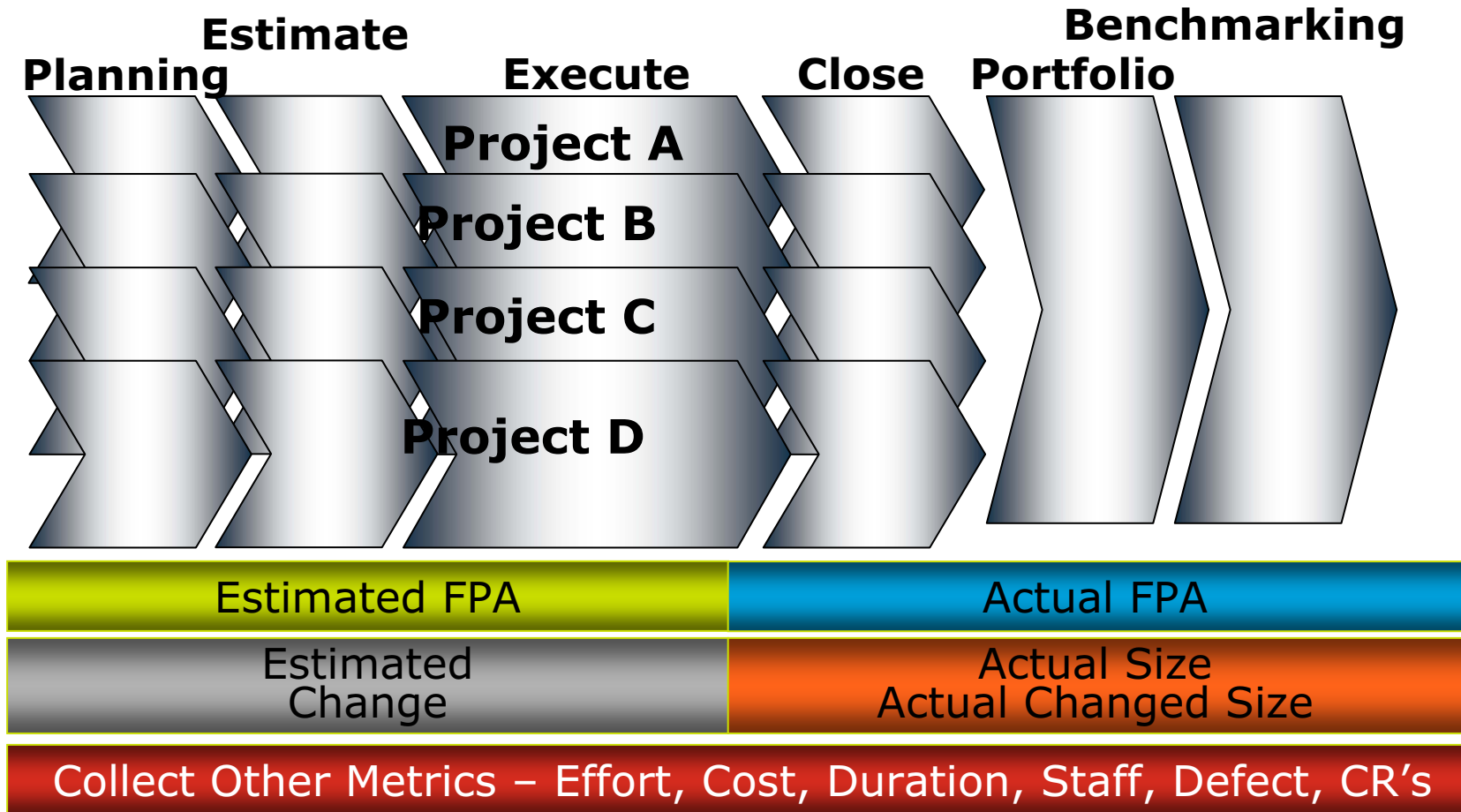
# Portfolio Management Metrics



- The metrics of portfolio management include aggregate measures.
- Metrics describe progress toward established targets.
- Milestone measures could include such indicators as
  - Budget vs. actual costs
  - Performance to schedule
  - Estimated size versus actual size
- Metrics describe the value and benefit realization of the portfolio as a whole, as interpreted by the organization.
- As appropriate, metrics may be made available for individual programs or projects
- Portfolio metrics can be used to improve Project and Program Process such as estimating process
- Portfolio metrics can be used for performance and Quality monitoring
- Portfolio Management sets the measures to be collected based on organizational goals



# Measurement For Portfolio



# Categories - Influences and Characteristics

## Influences

- Influences are things that make their class of project unique
- Analyse data to find influences
- If possible use historical information about Risk and Issues

## Characteristics

- Characteristics are standard aspects of software delivery and they will determine how projects are grouped

## Possible Characteristics

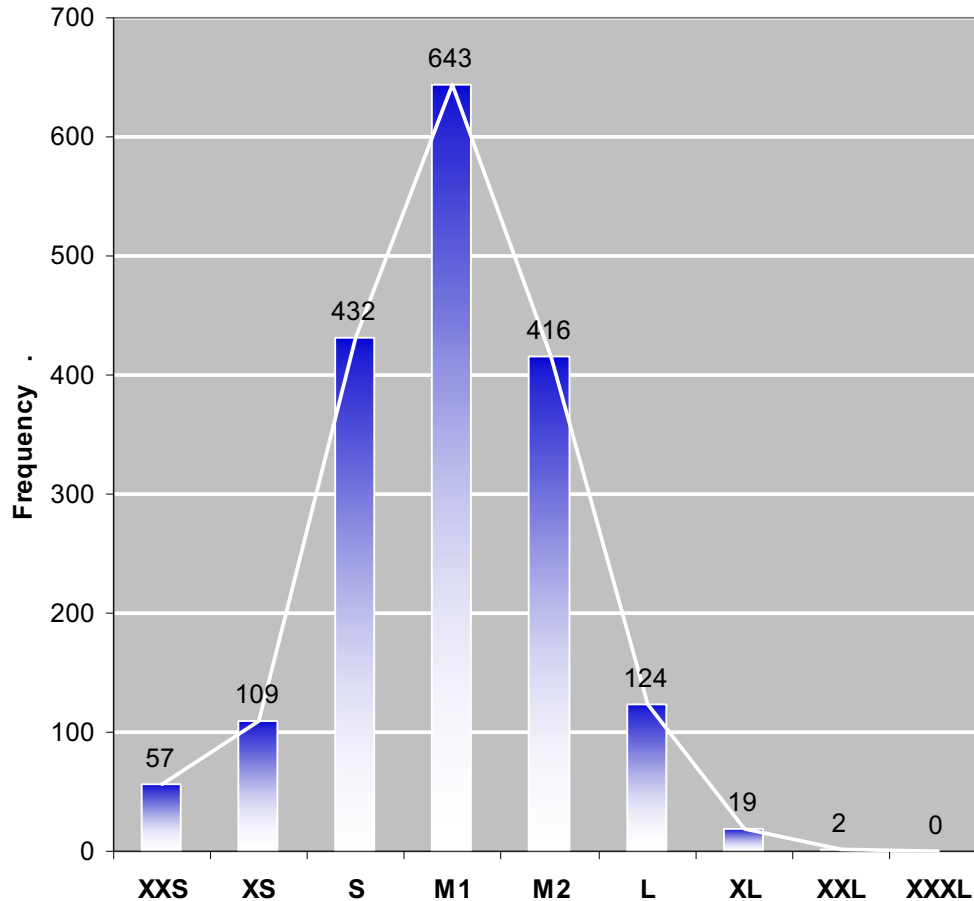
- Platform
- Language
- Industry
- System type
  - Billing
  - CRM
  - MIS etc.

## Possible influences

- Product Size – range or absolute
- Technology - e.g. Platform or Language
- Testing requirements
- Documentation stability and quality
- Build versus buy
- Complexity of the problem
- Complexity of the perceived solution
- Project constraints and goals - schedule, cost and quality
- Project interruptions and delays
- Risk
- Staff skills
- Historic data
- Defect density

# Size – Relative Size as a category

Relative Size Scale - ISBSG r10 - All IFPUG projects .



Size	Bin	Frequency	%
XXS	10	57	3,2%
XS	30	109	6,0%
S	100	432	24,0%
M1	300	643	35,7%
M2	1000	416	23,1%
L	3000	124	6,9%
XL	9000	19	1,1%
XXL	18000	2	0,1%
XXXL	More	0	0,0%

IFPUG function points Total = 1802

This shows only projects counted using IFPUG Counting Practices Manual version 4.2

# Metrics – The Ultimate Goal

Ultimate step for the organization is to use Metrics to form Strategic Decisions

Collect Measurement on Project/application level.  
Use the metrics for productivity and process improvement  
Use the metrics in portfolio management



# Boundary Definition

- Unambiguous Boundary definition is important to avoid issues in the counting approach

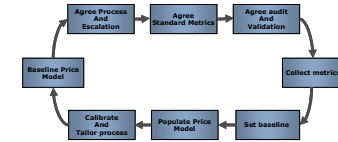
Be aware of applications with a lot of configuration

- Be aware of physical applications that are within a logical boundary
- Agree waivers or define other metrics to support work that are not counted by Function Points
- Divide your requirements to accommodate the FP Price Model

Create two outputs

- Spreadsheet with details such as logical boundary name, physical application name, VAF, Business purpose, alias names, technical definition
- Boundary diagram with most important interfaces – if possible include technical layer definition

# Agree Baseline with Client



## Tools and Techniques

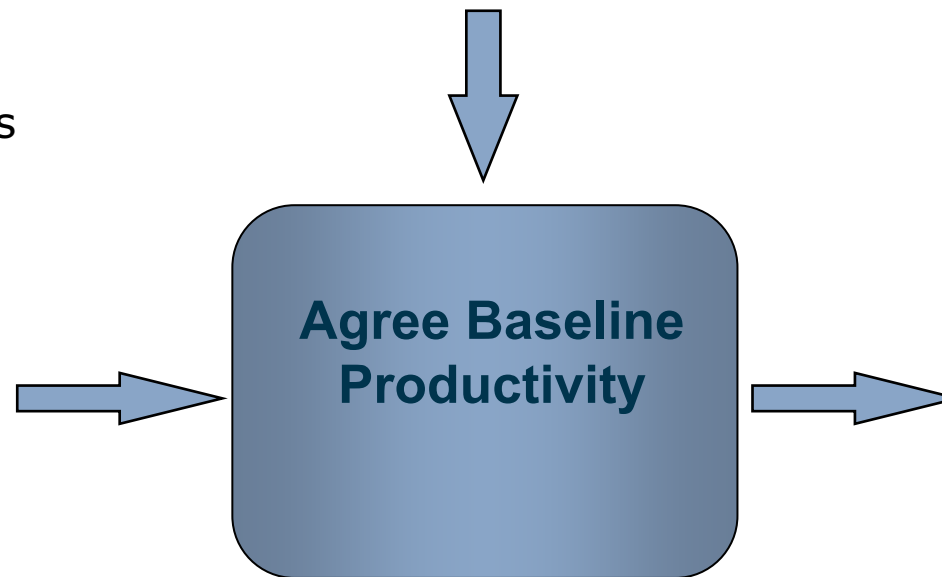
- Expert judgment – including external Experts engaged by Client
- Criteria reweighing
- Graphical representations

## Inputs

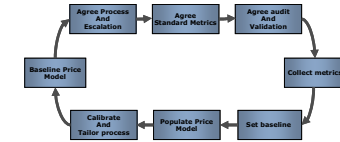
- Functional Size Measures
- Effort data
- Influences
- Characteristics
- External Databases

## Outputs

- Agreed Baseline



# Populate the Price Model



## Tools and Techniques

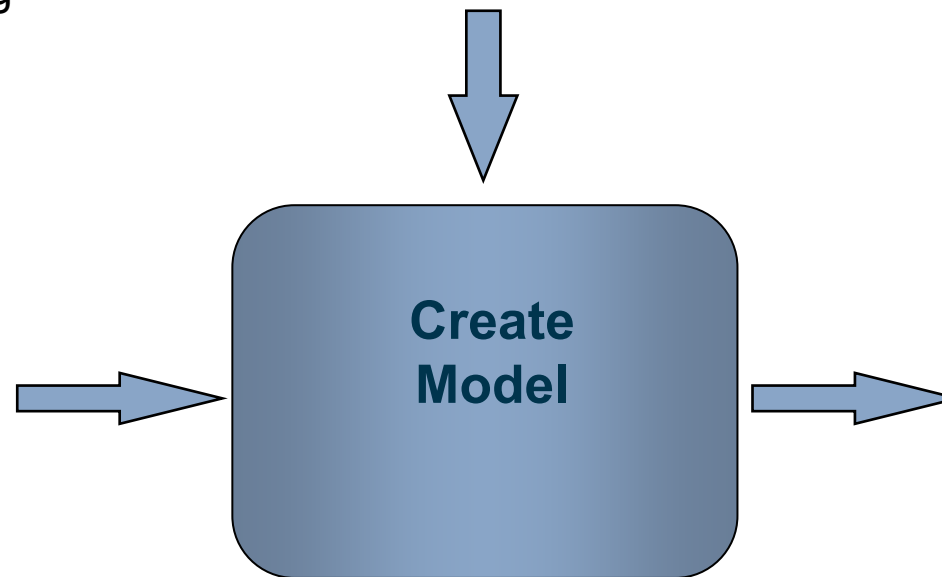
- Expert judgment
- Criteria reweighing
- Graphical representations

## Inputs

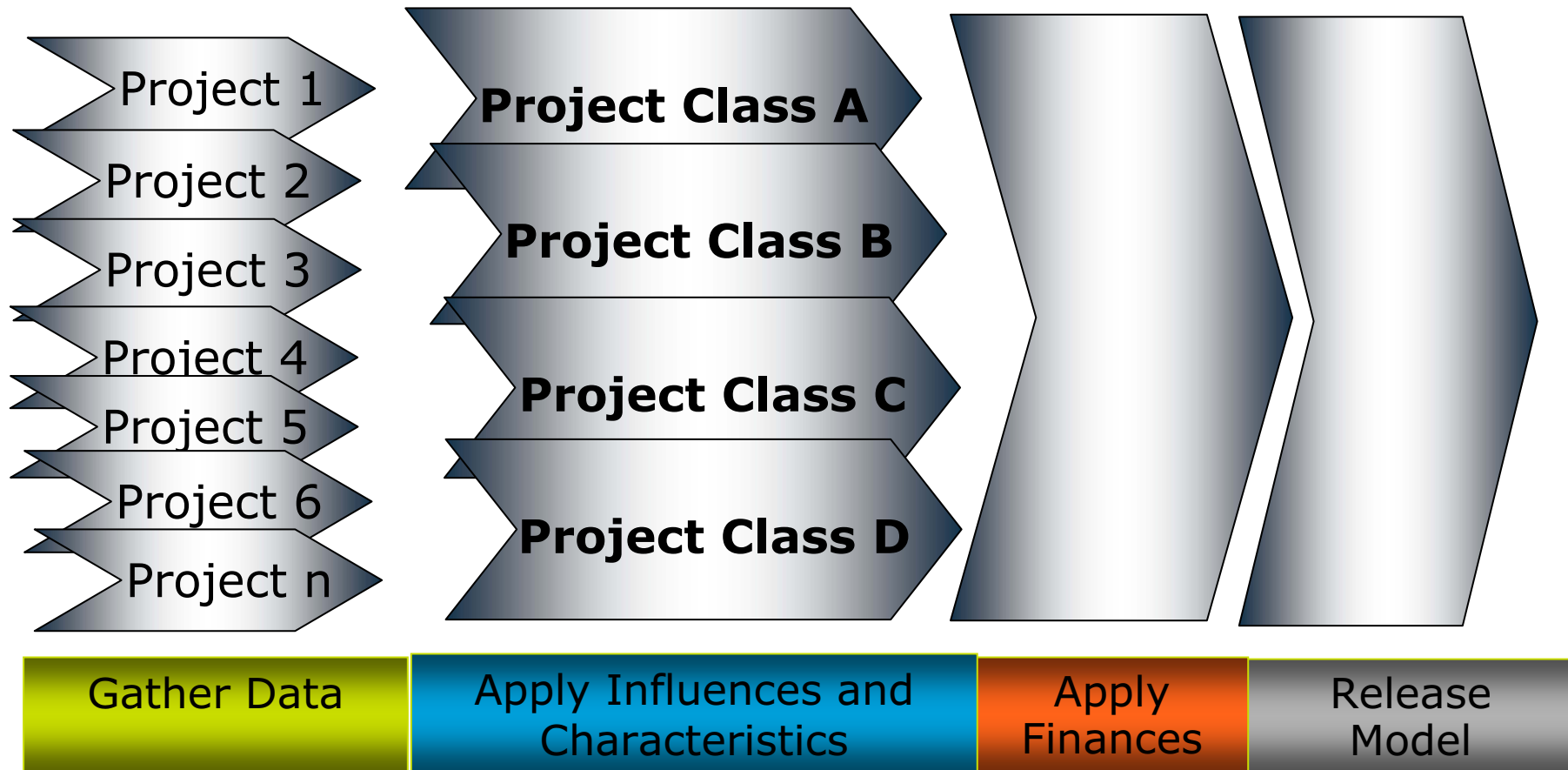
- Functional Size Measures
- Effort data
- Costing and Pricing approach
- Influences
- Characteristics

## Outputs

- Populated Price Model

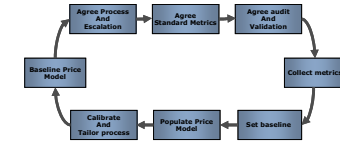


# Applying the model to a Portfolio





# Review and Calibrate



## Tools and Techniques

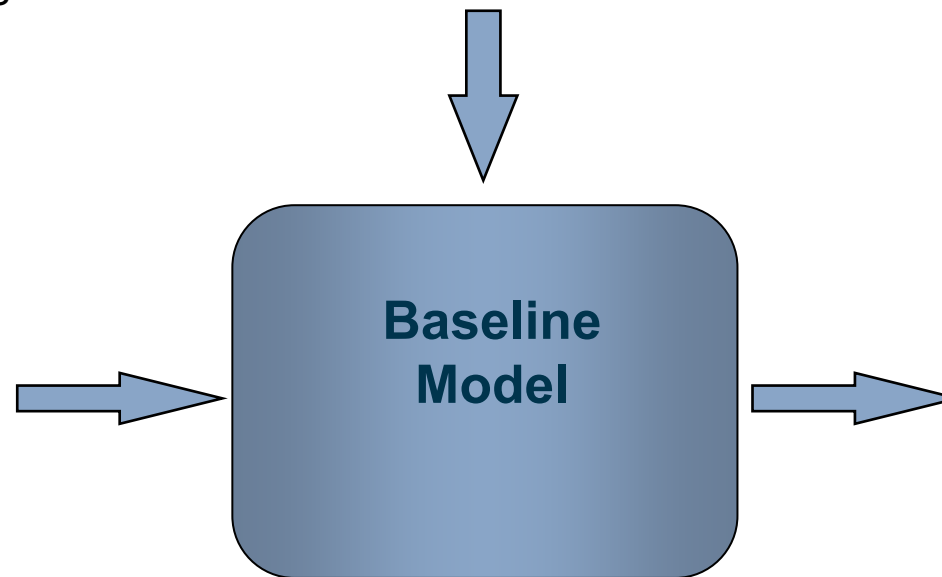
- Expert judgment - including any external experts who may be engaged
- Criteria reweighing
- Graphical representations

## Inputs

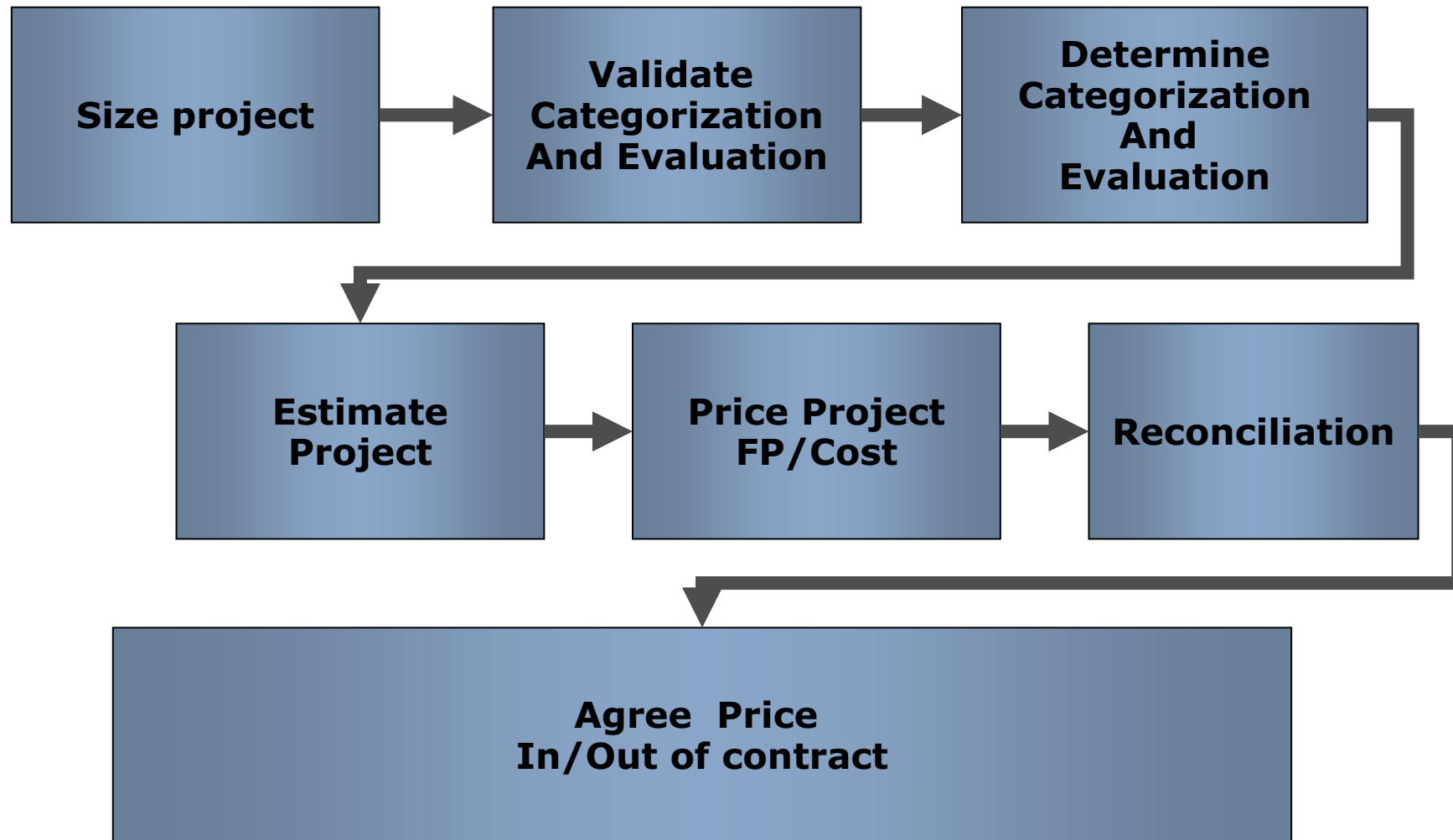
- Populated Price Model
- Corporate historical data
- External databases

## Outputs

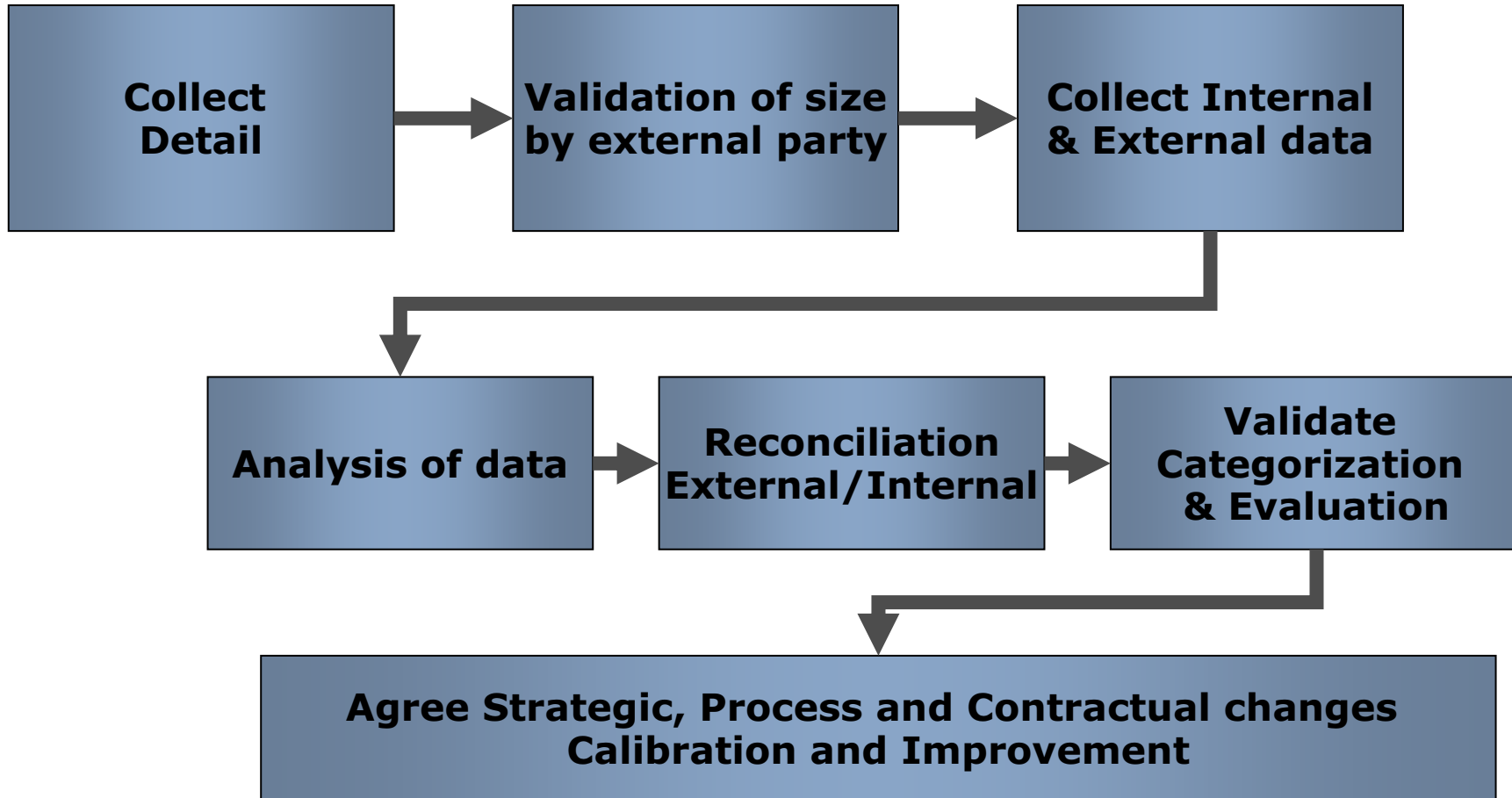
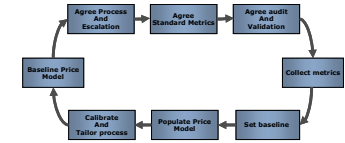
- Baselined Price Model



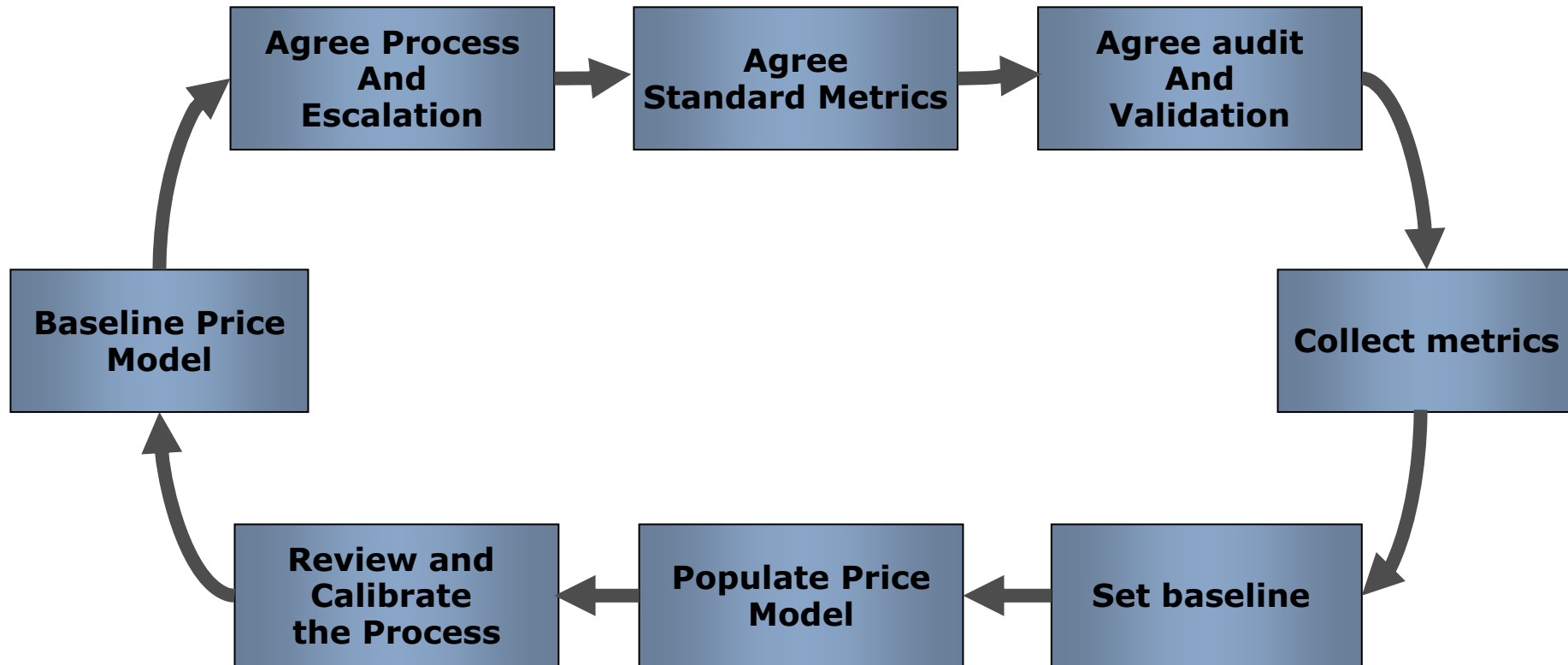
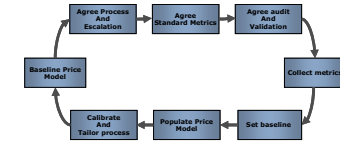
# Run - New Project



# Run - Improve (Validate & Audit)



# Price Model Life Cycle



An Iterative Approach.

Technology change, maturity change, Productivity change, Portfolio change – and we all get more knowledge about our partnership

The Price Model needs to be iterative to accommodate the changes

# Summary – Before the contract

- Using FP in contracts requires a level of maturity from both Customer and Supplier organizations.
  - At least CMMI ML2 on both Customer and Supplier
- Be careful in the selection of projects and setting the baseline
  - Projects needs to represent the types of projects that will insure in the future
  - Maturity of the data selection might be low and show unwanted variations.
  - Select benchmark data source that fits your environment
- Have a good with Client and independent Vendors
  - Apply escalation procedures and conflict resolution process
- If you know your portfolio well and already have an implemented process for Portfolio Management, a Price Model will be easy to implement.
- Goal are to measure correct – not more or less
- Define standards and process and agree on them..
  - You will all be wiser after a period and know more – so ensure a change approach for the price model and baseline number and the process is agreed

And remember – managing by numbers is never a bad thing...

# Summary – After the contract

- Change management process on project and portfolio level needs to be in place.
- Portfolio management process can support the Price Model definition and reporting structure
- Measurement process are institutionalized throughout all the projects that work under the Price model
- Using Experienced Function Point specialists is a must
- The Portfolio Management process will support you in the execution of the price model
- The more mature and metrics supported your Portfolio Management is the more stable the Price Model will be
- The two process work closely together
  - Metrics gathered for Portfolio Management are useful for creating a Price Model
  - Metrics gathered for your price model are invaluable in Portfolio Management

And remember – if you can not measure it – it is difficult to include it in the price model

*Data source:*  
*ISBSG Benchmark DB ([www.isbsg.org](http://www.isbsg.org))*

*References – Theory source*

*The Standard of Portfolio Management – PMI ([www.pmi.org](http://www.pmi.org))*

*Relative Size concept – Grant Rule, SMS. ([www.measuresw.com](http://www.measuresw.com))*

*Influencer concept – D. Garmus & D. Herron, DCG ([www.davidconsultinggroup.com](http://www.davidconsultinggroup.com))*

*Usage Of Function Points In Contractual Agreements – C. Green, EDS, ESEPG 2008*

*Metrics usage for Portfolio Management – C. Green, EDS, SMIF 2008*

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