

# Value Engineering:

Applied to Public Procurement of Innovative Solutions  
in the EU legal framework

Ana Lucia Jaramillo

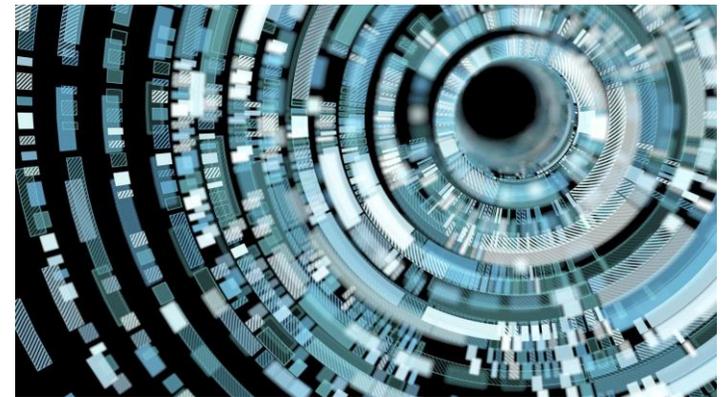
**Corvers Procurement Services BV**

**iProcureNet Conference**

Lisbon, 21-22 June 2022

# Objective

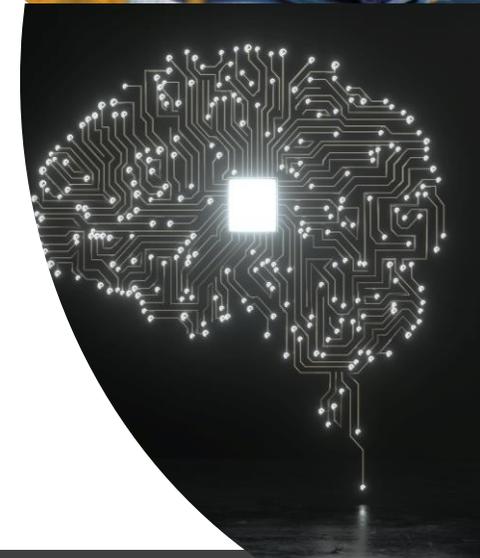
- The objective of the presentation is to explore the use of the Value Engineering (VE) technique in the context of Public Procurement of Innovative solutions (PPI).
- With this purpose, the presentation will:
  - (i) provide a backdrop on the cycle of innovation and the **taxonomy** of Innovation Procurement based on the **EAFIP methodology**, and the **conditions to apply VE in PPI** thereof;
  - (ii) define the **fundamentals of the VE technique** looking at its history, to show proven advantages;
  - (iii) explain the application of VE within the EU legal framework; and
  - (iv) show **case studies** of the use of VE contractual clauses.



# Outline

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1. Introduction to Innovation Procurement (IP) and the EAFIP methodology
2. Definition and history of Value Engineering (VE)
3. Value Engineering Change Proposal (VECP) clauses in the EU framework
4. Case studies of the use of VE in PPI



# Question to the audience



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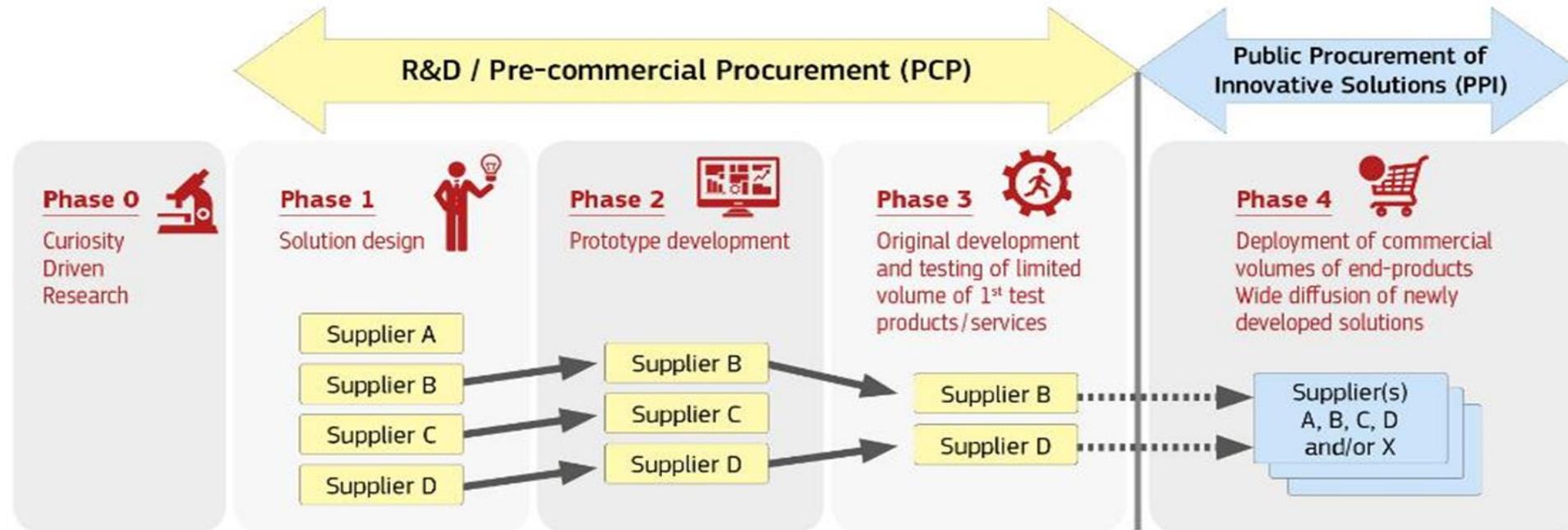


# 1. Introduction to Innovation Procurement (IP) and the EAFIP methodology

- The innovation cycle and the taxonomy of IP
- The EAFIP step-by-step approach
- When and how to use VE in PPI

# Innovation Procurement

*Innovation Procurement happens when public buyers acquire the development or deployment of pioneering innovative solutions to address specific mid-to-long-term public-sector needs.*



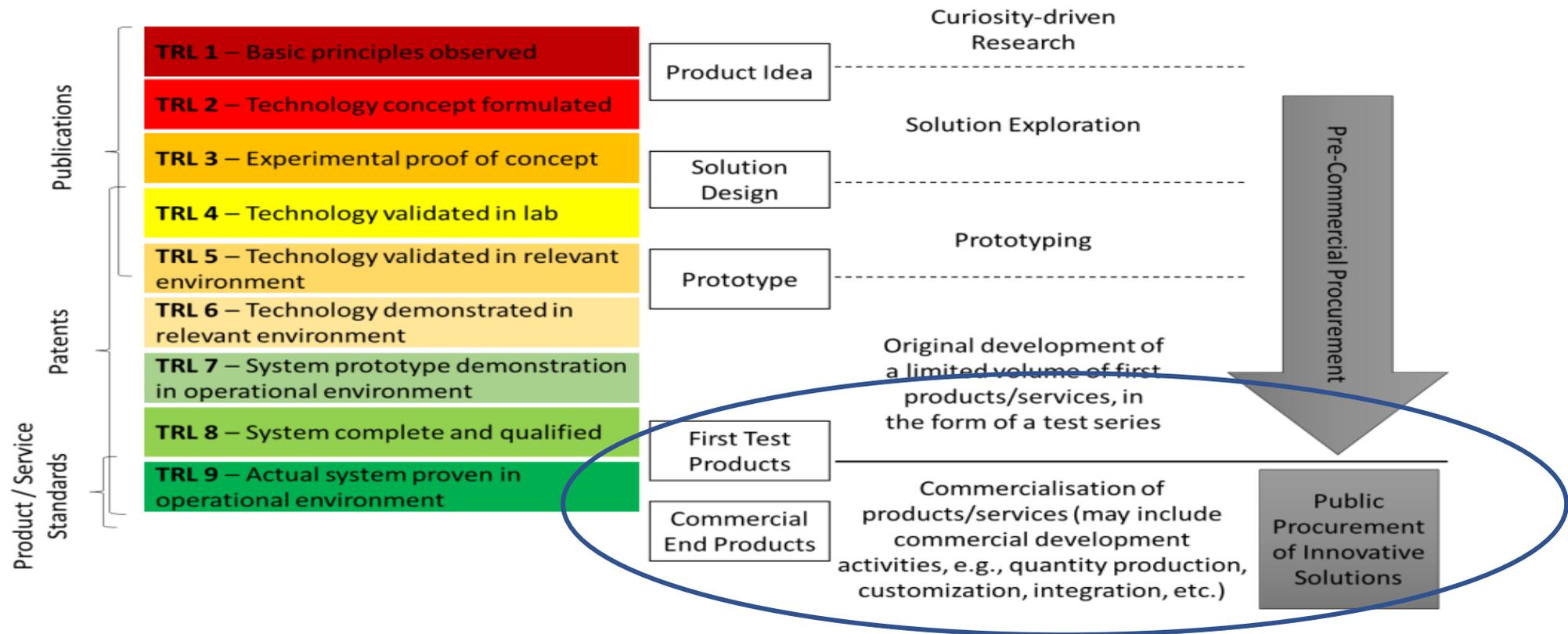
Source: European Commission

# Innovation definition

*‘Innovation’ means the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth; ...*

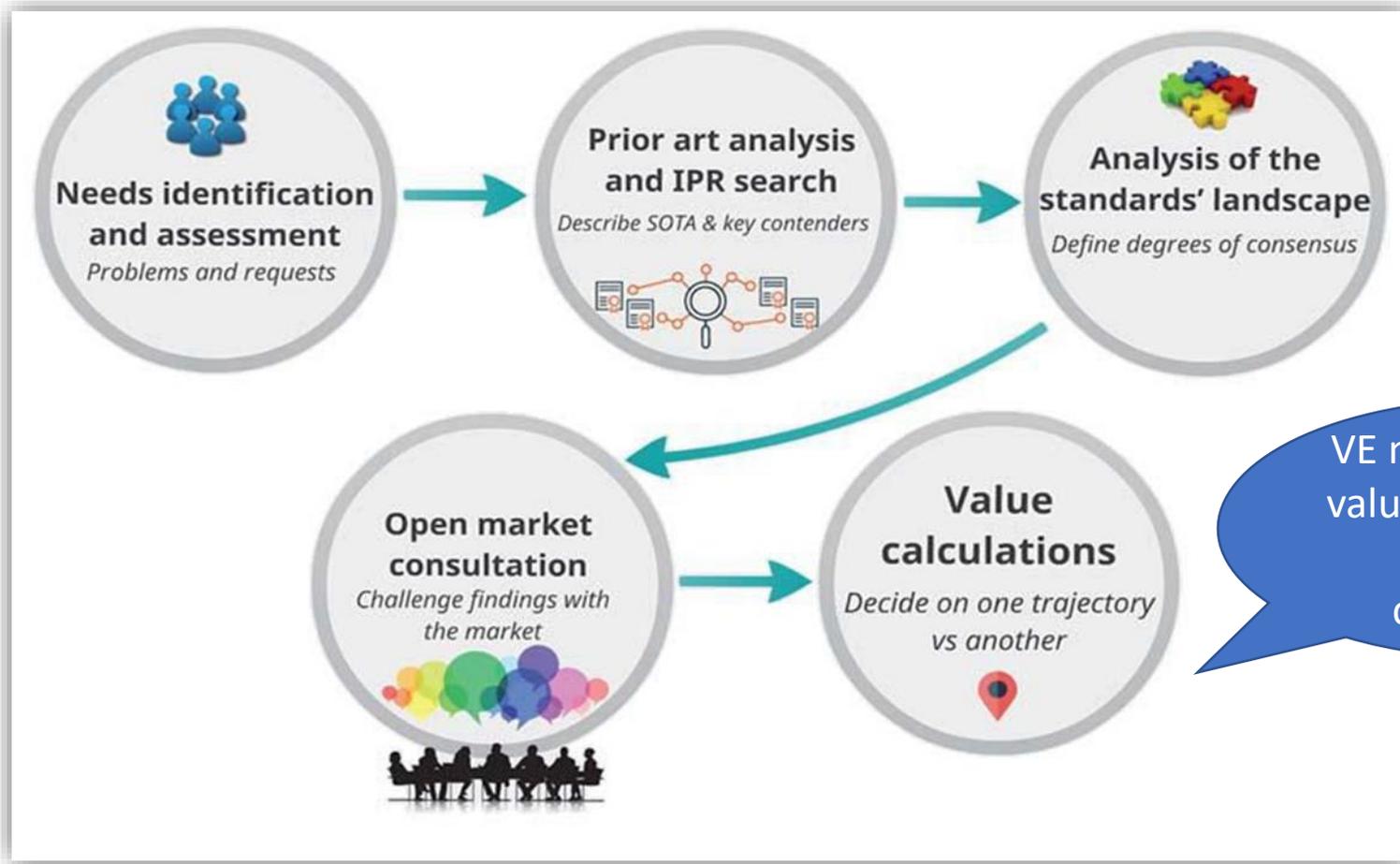
Directive 2014/24/EU Art. 2 (22) Definition

# Innovation cycle & Taxonomy of Innovation procurement



# EAFIP methodology – preparation steps

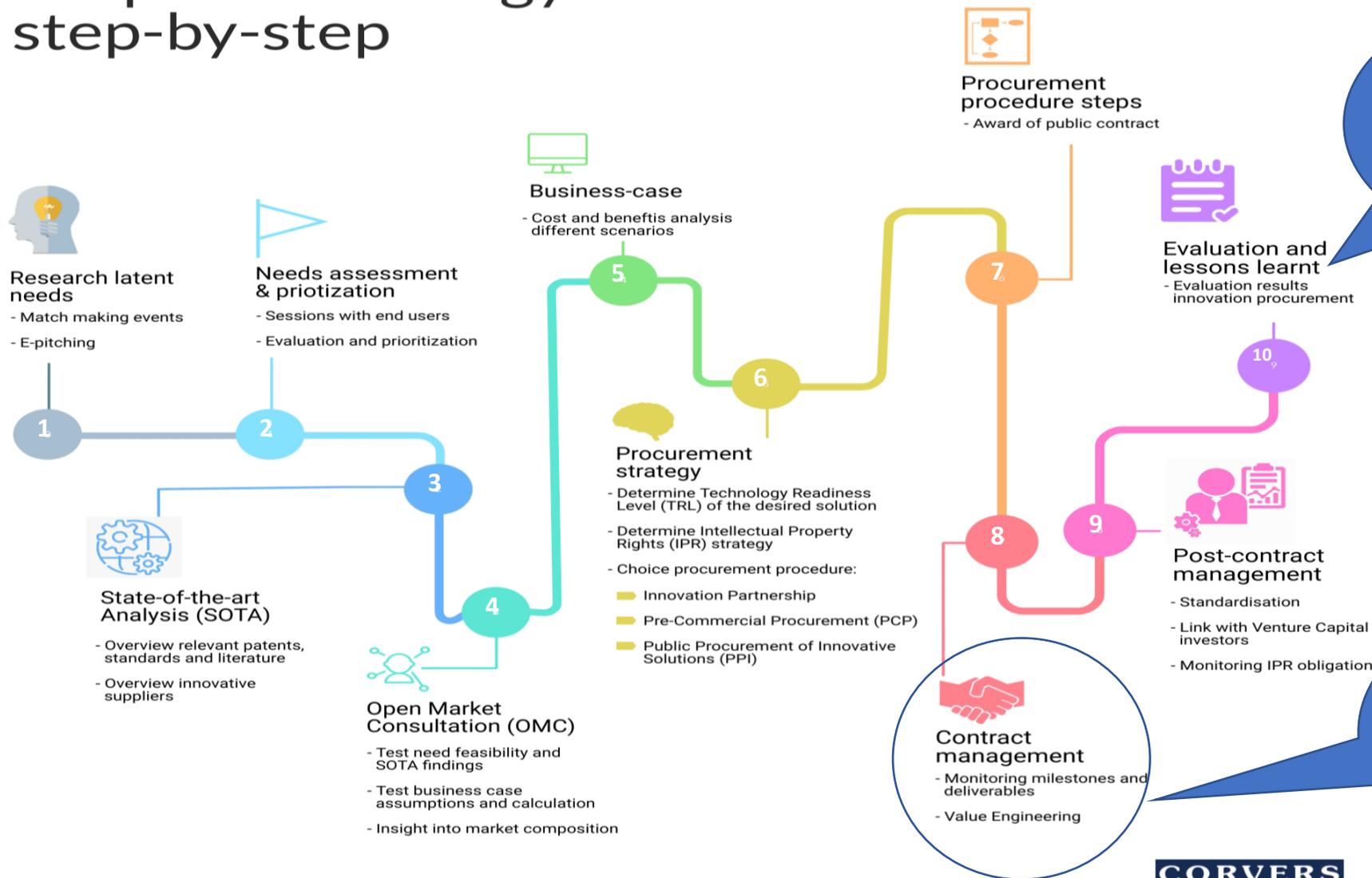
VE method used for needs analysis



VE method use for value calculation & alternative comparison

# eafip methodology step-by-step

VE method use for needs analysis



VE used to evaluate results for improvements

Contract management

VE as a condition to present VECP in a contract clause

CREATED BY CORVERS PROCUREMENT SERVICES BV



# When and how to use VE in IP

- VE applied as a **needs analysis** tool
- VE applied for value calculations and **comparison of alternatives** in the development of a business case.
- VE applied as a **special condition relating to the performance of a contract: VE clauses** that incentive innovation and savings -risk/benefit sharing tool.
- VE applied to **monitoring and improvement**.

- Compliance with principles of transparency, equal treatment, non-discrimination, proportionality.
- Inform of VE in OMC and Contract Notice.
- Avoid substantial modifications of contracts.

# Contract performance - Directive 2009/81/EC

## Article 20 Conditions for performance of contracts

Contracting authorities/entities may lay down **special conditions relating to the performance of a contract, provided that these are compatible with Community law and are indicated in the contract documentation** (contract notices, contract documents, descriptive documents or supporting documents). These conditions may, in particular, concern subcontracting or seek to ensure the security of classified information and the security of supply required by the contracting authority/entity, in accordance with Articles 21, 22 and 23, **or take environmental or social considerations into account.**

# Contract performance - Directive 2014/24/EU

## Article 70 Conditions for performance of contracts

Contracting authorities may lay down **special conditions relating to the performance of a contract, provided that they are linked to the subject-matter of the contract within the meaning of Article 67(3) and indicated in the call for competition or in the procurement documents.** Those conditions may include economic, **innovation-related**, environmental, social or employment-related considerations.

Art. 87 in Directive 2014/25/EU

## 2. Definition and history of Value Engineering

- The US experience: from trade secrets to game-changing systematic approach.
- Procurement technique in the Federal Acquisition Regulation
- The case of Japan and The Netherlands

# Definition of VE and VECP

- **Value Engineering:** A systematic process of reviewing and analyzing the requirements, functions and elements of systems, project, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required levels of performance, reliability, quality, or safety. The process is generally performed in a workshop environment by a multidisciplinary team of contractor and/or in-house agency personnel (such as an IPT), which is facilitated by agency or contractor
- **Value Engineering Change Proposal (VECP)** A proposal submitted by a contractor consistent with the VE clause(s) in the contract that, through a change in the contract, would lower the project's life-cycle cost to the Government without impairing essential functions, characteristics, or performance. The contract change requirement can be the addition of the VECP to the contract with attendant savings. VECPs are applicable to all contract types, including contracts with performance-based specifications.

[52.248-1 Value Engineering. | Acquisition.GOV](#)

# Origin of VE

- **In 1957, the Navy's Bureau of Ships became the first DoD organization to establish a formal VE program based on earlier work at General Electric (GE) during World War II.**
  - Two GE employees, Lawrence D. Miles and Raymond Fountain, set up the Bureau of Ships program to help reduce the cost of ship construction, which had nearly doubled since the end of World War II. The Bureau of Ships asked that the technique be called "Value Engineering" and staffed the office with people under the general engineer position description.
- **In 1959, the contractual requirement for VE was added to the Armed Services Procurement Regulation** the forerunner of today's Federal Acquisition Regulation (FAR).
- VE was initially used only with command approval, **but in June 1962, the Defense Department's procurement regulations were modified to establish VE as a mandatory program** both for the Department and for its contractors



Lawrence Miles  
Foundation

# History of VE

Time	Milestone
<b>World War II</b>	There was a need to find substitutes for critical materials due to shortages resulted in products, to accomplish their function at reduced cost,
<b>1947</b>	Lawrence D. Miles, GE staff engineer was assigned to the purchasing division to study a new proprietary concept which successfully comprised a new package of techniques named "Value Analysis" (VA).
<b>1952</b>	Lawrence D. Miles conducted the first VA workshop seminar.
<b>1954</b>	The US Navy's Bureau of Ships applied VA to cost avoidance during design. Because the technique was used by the Navy's engineers, it was called "Value Engineering". The Navy was the first governmental organisation to use the new VE technique.
<b>1958</b>	Lawrence D. Miles was awarded the US Navy's highest civilian honor, The Navy Distinguished Public Service Award, for his service to the bureau of Ships in VE.
<b>1959</b>	The Society of American Value Engineers (SAVE) was founded in Washington, D.C., to unite all practitioners and promote the growth of the profession.
<b>1960s</b>	Charles Bytheway developed a diagramming tool used during VE analysis called the "Function Analysis Technique" (FAST), which can identify, classify, and denote the functions upon which the team should focus. The diagramming technique is useful for building teamwork and achieving a consensus from a team on a problem and identifying potential areas for improvement.
<b>1962</b>	The Department of Defense (DoD) announced that it was making VE a prerequisite for all DoD contracts over \$100,000.
<b>1964</b>	The US Army Corps of Engineers initiated its VE program.
<b>1965</b>	A Japanese delegation visited SAVE for assistance to solve problems, making the start of VE programs in Japan.
<b>1967</b>	US Congress hearings

<b>1970</b>	The US Congress endorses VE by recommending its use on federal-aided highway projects.
<b>1971</b>	The US Department of Health, Education, and Welfare (HEW) adopted the use of VE on its construction projects.
<b>1972</b>	The Veterans Administration (VA) joined the VE group.
<b>1973</b>	SAVE established a program for the certification of value specialists.
<b>1974</b>	The use of certified value specialists for value work in General Services Administration (GSA) construction projects became a requirement. The Federal Highway Administration (FHWA) established an office to administer the VE program on federal-aid projects.
<b>1975</b>	The US Department of Transportation's (DOT's) Federal Highway Administration (FHWA) awarded a contract to a private firm to conduct its national training program "Value Engineering for Highways".
<b>1976</b>	The Florida Department of Transportation established a VE Program, realizing the benefits from VE. Other states established programs too.
<b>1982</b>	The Department of Defense (DoD) established its honorary VE award programs.
<b>1993</b>	The Office of Management and Budget (OMB) issued a circular calling for government wide use of Value Engineering.
<b>1997</b>	FHWA expanded the rule by publishing the 23 CFR Part 627 requiring VE analysis on all federal-aid highway projects on the national highway system with an estimated cost of more than \$25 million
<b>2013</b>	OMB Circular A-131 is updated to include more detail on the VE method phases. It also requires to designate a senior accountable official (SAO) in Agencies subject to the Chief Financial Officers Act of 1990 and includes additional reporting obligations on VE in a matrix..
<b>2017</b>	Revision of Circular No. A-131 2013 of 2017 to reduce the reporting burden on Federal agencies.

# What Value means

## THE VALUE OBJECTIVE

PROVIDE THE REQUIRED FUNCTION  
(OPERATIONAL PERFORMANCE) AT  
THE DESIRED TIME WITH THE ESSENTIAL  
QUALITY AND RELIABILITY AT MINIMUM  
TOTAL COST.

Source: Miles Value Foundation

6th ANNUAL INLAND EMPIRE QUALITY CONTROL CONFERENCE

Sponsored by

San Bernardino Section

American Society for Quality Control

January 27, 1962

TECHNIQUES OF VALUE ANALYSIS AND ENGINEERING

by

L. D. Miles

Manager - Value Service

General Electric Company

As the technology of Quality Control rose from economic need, so has the growing technology of Value Analysis.

As the objective, in very general terms, of the Quality Control Program has been to assure that the product accomplishes the functions the customer wants--well and reliably--so the general objective of Value Analysis is to assure that the functions which the customer wants are accomplished at appropriate costs.

In preparing for this discussion with you, I asked a sampling of people two questions:

1. What do you mean when you say a product has good quality?
2. What do you mean when you say a product has good value?

The consensus of the answers was this:

1. If a product...

"does what I expect it to  
as long as I expect it to..."

it has good quality."

2. If a product...

"does what I expect it to  
as long as I expect it to...  
and - costs what I think it should..."

it has good value."

These simple statements will confirm the more sophisticated charter which started the research work resulting in the techniques of Value Analysis a few years ago.

# Federal Acquisition Regulation - FAR

The VECP shall include the following:

- 1) **A description of the difference between the existing contract requirement and the proposed requirement, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, the effect of the change on the end item's performance, and any pertinent objective test data.**
- 2) **A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.**
- 3) Identification of the **unit to which the VECP applies.**
- 4) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. **The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under the Subcontracts paragraph of this clause.**
- 5) A description and **estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.**
- 6) A **prediction of any effects the proposed change would have on collateral costs to the agency.**
- 7) A statement of the **time by which a contract modification accepting the VECP must be issued** in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.
- 8) **Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.**

ACQUISITION.GOV Covid 19 Section 889 Regulations Tools Policy Network

Home > Regulations > FAR > 52.248-1 Value Engineering.

FAR FAC Number: 2022-06 Effective Date: 05/26/2022 Part 52 52.2 52.248

Contract Type	Incentive (Voluntary)		Program Requirement (Mandatory)	
	Instant Contract Rate	Concurrent and Future Contract Rate	Instant Contract Rate	Concurrent and Future Contract Rate
Fixed-price (includes fixed-price-award-fee; excludes other fixed-price incentive contracts)	*50	*50	25	25
Incentive (fixed-price or cost) (other than award fee)	(**)	*50	(**)	25
Cost reimbursement (includes cost-plus-award-fee; excludes other cost-type incentive contracts)	***25	***25	15	15

\* The Contracting Office may increase the Contractor's sharing rate to as high as 75 percent for each VECP.

\*\* Same sharing arrangement as the contract's profit or fee adjustment formula.

\*\*\* The Contracting Office may increase the Contractor's sharing rate to as high as 50 percent for each VECP.

[52.248-1 Value Engineering. | Acquisition.GOV](#)

## 48.201 Clauses for supply or service contracts.

(a) *General.* The contracting officer shall insert a value engineering clause in solicitations and contracts when the contract amount is expected to exceed the simplified acquisition threshold, except as specified in paragraphs (a)(1) through (5) and in paragraph (f) of this section. A value engineering clause may be included in contracts of lesser value if the contracting officer sees a potential for significant savings. Unless the chief of the contracting office authorizes its inclusion, the contracting officer shall not include a value engineering clause in solicitations and contracts-

- (1) For research and development other than full-scale development;
- (2) For engineering services from not-for-profit or nonprofit organizations;
- (3) For personal services (see [subpart 37.1](#));
- (4) Providing for product or component improvement, unless the value engineering incentive application is restricted to areas not covered by provisions for product or component improvement;
- (5) For commercial products (see [part 11](#)) that do not involve packaging specifications or other special requirements or specifications; or
- (6) When the agency head has exempted the contract (or a class of contracts) from the requirements of this [part 48](#).

(b) *Value engineering incentive.* To provide a value engineering incentive, the contracting officer shall insert the clause at [52.248-1](#), Value Engineering, in solicitations and contracts except as provided in paragraph (a) of this section (but see paragraph (e)(1) of this section).

(c) *Value engineering program requirement.* (1) If a mandatory value engineering effort is appropriate (*i.e.*, if the contracting officer considers that substantial savings to the Government may result from a sustained value engineering effort of a specified level), the contracting officer shall use the clause with its Alternatell (but see paragraph (e)(2) of this section).

(2) The value engineering program requirement may be specified by the Government in the solicitation or, in the case of negotiated contracting, proposed by the contractor as part of its offer and included as a subject for negotiation. The program requirement shall be shown as a separately priced line item in the contract Schedule.

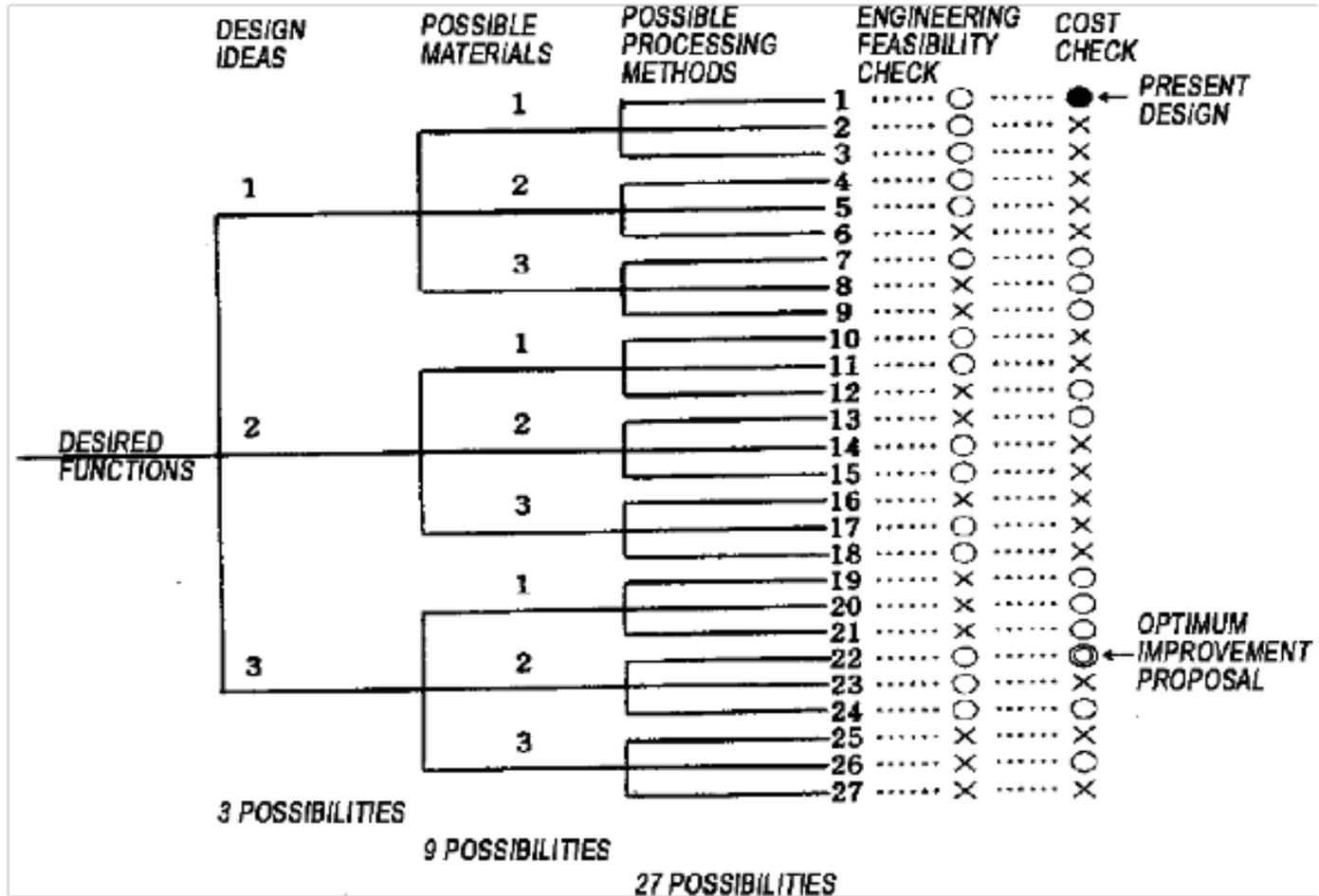
(d) *Value engineering incentive and program requirement.* (1) If both a value engineering incentive and a mandatory program requirement are appropriate, the contracting officer shall use the clause with its Alternatell (but see paragraph (e)(3) of this section).

(2) The contract shall restrict the value engineering program requirement to well-defined areas of performance designated by line item in the contract Schedule. Alternatell applies a value engineering program to the specified areas and a value engineering incentive to the remaining areas of the contract.

# Japan – history of VE

- **Value Engineering was introduced to Japan in 1955**, but it was not until 1960 that industry began utilizing the system. Mr. S. F. Heinrich of the National Association of Purchasing Agents visited Japan in February 1960, for the purpose of conducting Purchase Engineering Seminars at various locations throughout Japan.
- **In December 1960, the SANNO Institute of Business Administration introduced the Value Analysis Planning Course (VAP)**. SANNO had begun already in 1957, conducting the Creative Thinking Course (CTC), a training program that incorporated many of the underlying principles of VE concepts. In May 1969, SANNO pioneered Japan’s first in-company VE training courses as VE Workshop Seminars, which are regarded the genesis of the development of VE in Japan.
- Society of Japanese Value Engineering (1971) “VE KATSUDO-NO-TEBIKI” Guidebook for VE Activities. See also: <https://www.sjve.org/eng/value-engineering>

# Design concept and alternatives - SJVE



Society of Japanese Value Engineering (1971) “VE KATSUDO-NO-TEBIKI” Guidebook for VE Activities. See also: <https://www.sjve.org/eng/value-engineering>

# Japan – history of VE

- **In 1963**, the VE system was adopted by shipbuilders, railroad and heavy vehicle manufacturers, and electrical and communications machinery makers.
- **By 1964**, the system had extended to basic machinery industries.
- **From 1965**, it spread from the fabrication industries to process industries, then to metal, fiber, food, chemical, and steel industries. Later on, the VE system was taken up by architectural and construction companies.
- **VE was also reported to be effective at the research and development and design stages and** applied not only to hardware but also to processes, office routines, methods of organization and “software”.



# VE in Japan

- **In 1981** at the International Conference of the Society of American Value Engineers in St. Louis, Missouri, Mr. Shoichi Akazawa, Executive Vice President of Fujitsu Limited based in Tokyo, Japan, in his speech **“Producing Results by Using Value Engineering in Japan”** recognised that the technologies for improving productivity and the concepts of Value Analysis, Value Engineering and quality control have their origin in the United States.
- **In early 1970**, the Japanese Ministry of International Trade & Industry, MITI, adopted national measures to emphasize knowledge intensive industry and directed the entire business establishment in that direction. **The priority target was the electronics industry encompassing computer, integrated circuit, and software technologies. In addition, telecommunications technology was considered of high importance, and "mechatronics" started to become more significant, while energy-saving technology flowered in the wake of the 1973 oil crisis.**

# The Netherlands, VE clause and contract management

In 2015, the Temporary Committee of the Dutch Parliament for the evaluation of ICT projects studied the possibilities to turn perverse incentives into positive incentives, and the use of a “Value Engineering clause” whereby a **contractor submits savings proposals in a way that he participates of the savings** actually made as a result of that proposal. This within a much broader context stressing the need of more control over the central government ICT projects.

*“Bij het onderzoek zijn de mogelijkheden gezien om de door de Tijdelijke commissie ICT-projecten geconstateerde perverse prikkels om te zetten in positieve prikkels, zoals het hanteren van een bonus/malus regeling en een «value engineering clause», waarbij een opdrachtnemer die besparingsvoorstellen doet op enige wijze meedeelt in de daadwerkelijk gerealiseerde besparingen als gevolg van dat voorstel.” 26643 Informatie- en communicatietechnologie (ICT); 33326 Parlementair onderzoek ICT-projecten bij de overheid. Nr. 389 Brief van de minister voor Wonen en Rijksdienst Aan de Voorzitter van de Tweede Kamer der Staten-Generaal, Den Haag, 12 februari 2016. Letter No. 389 from the Minister for Housing and the Civil Service To the President of the House of Representatives of the States General, The Hague, 12 February 2016.*

<https://zoek.officielebekendmakingen.nl/kst-26643-367.html>



# VE as decision-making tool at ProRail, NL

- **ProRail is a rail manager responsible for maintenance, renewal, expansion and safety of the Dutch rail network.** ProRail divides the space to 7,000 kilometers of track as an independent party, arrange all train traffic (1.4 million rides per working day) and builds and manages stations with attention to society and with an eye for future.
- **Value Engineering (VE) is used by ProRail as a decision-making tool in various stages of projects, and in many cases, market parties are also expected to have in-house knowledge of VE which offers the possibility to optimize designs and to arrive at competitive offers.** Each project would go through the analysis of whether the application of VE is useful and if so, at what time and for what purpose.
- When applying VE, a multidisciplinary team in workshop form strives for cost-effective solutions for the required functionality within the project with success. **The results of VE for projects are an average saving of 5 to 10 percent and for a number of projects even an average performance improvement of 18 percent.** ProRail also offers VE training based on practical experiences.
- Value Engineering was introduced within **ProRail as a part of the 2002 Timme Hendriksen's thesis on how VE could be implemented within the organization.**
- **In 2004, Value Engineering became a part of corporate policy and started to grow into a Program.** Nowadays, 80% of capital projects within ProRail, which cost more than €10 million, apply Value Engineering in concept or preliminary design phase of the projects. Their application of VM is based upon constrained resources, creating value awareness and building trust between stakeholders.

# What Value means

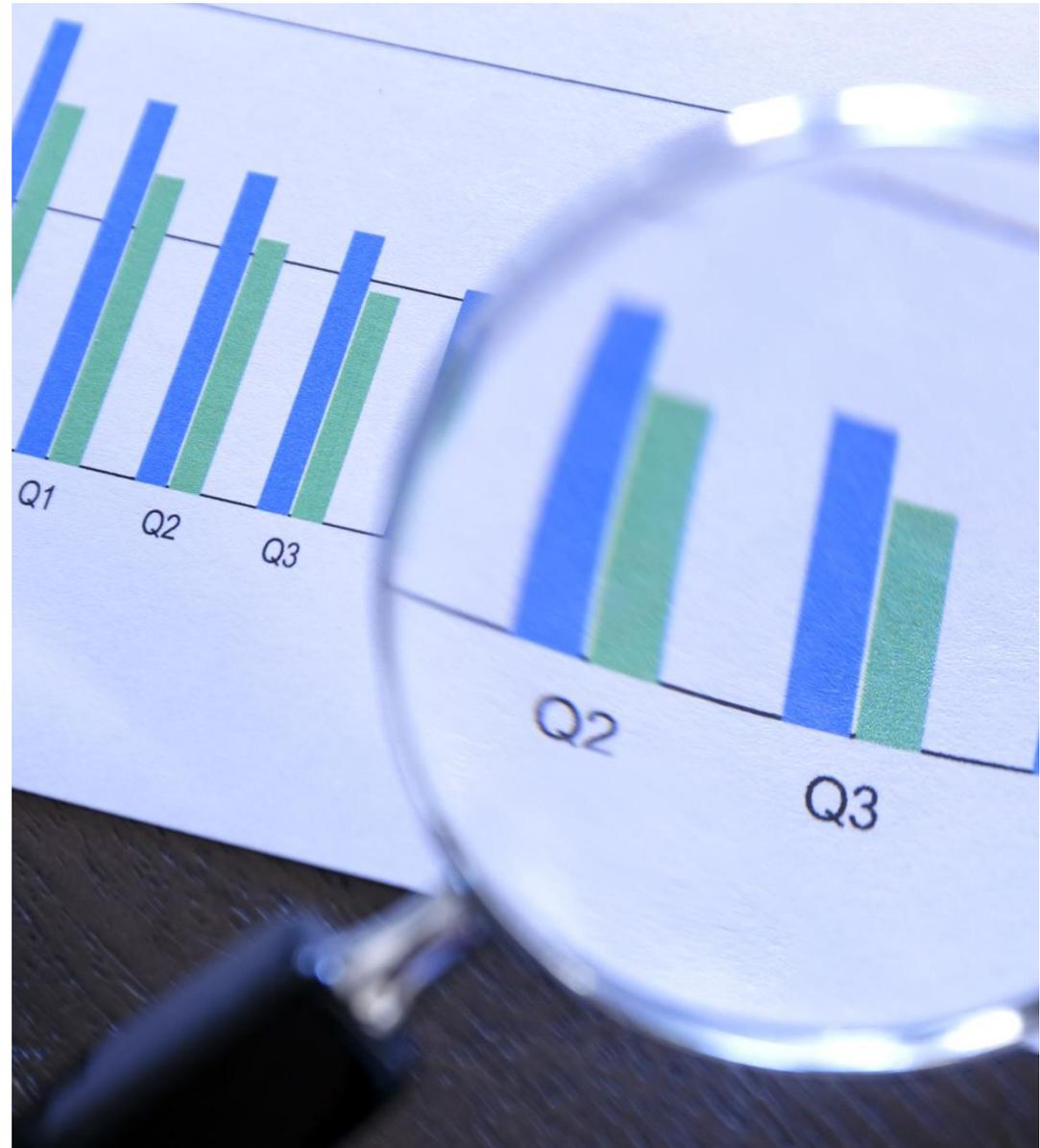
- $V = (\text{Performance} + \text{Capability})/\text{Cost}$
- $V = \text{Function}/\text{Cost}$
- $V = \text{Customer satisfaction} / \text{resources}$

Value Management is concerned with the creation of sustainable value, whether that is focused on a product, a process, a project, an organisation or on wider society issues.

- EU Directives refer to:
    - ✓ Value of procurement
    - ✓ Value of contract
  - Subject matter & Thresholds:
    - ✓ Article 5: Methods for calculating the estimated value of procurement (life-cycle)
    - ✓ Functional specifications
- 🔗 Functional specifications to favor innovation (Recital 74, Art. 24 Directive 2014/24/EU)

# Value

- **Value can take a number of forms (Kliniotou, 2004), for example:** exchange value, use value, esteem value, the open market price of an item, the usefulness value of an item, the attractiveness or desirability of an item.
- **Value is often synonymous with cost but it is important to keep in mind that the value of something is not what it is, but what it does.** The value of lies in what the item brings to the project and not what it is. “Value Engineering is about delivering more of the right things for less resources” (Dallas, 2006).



# Function & Cost

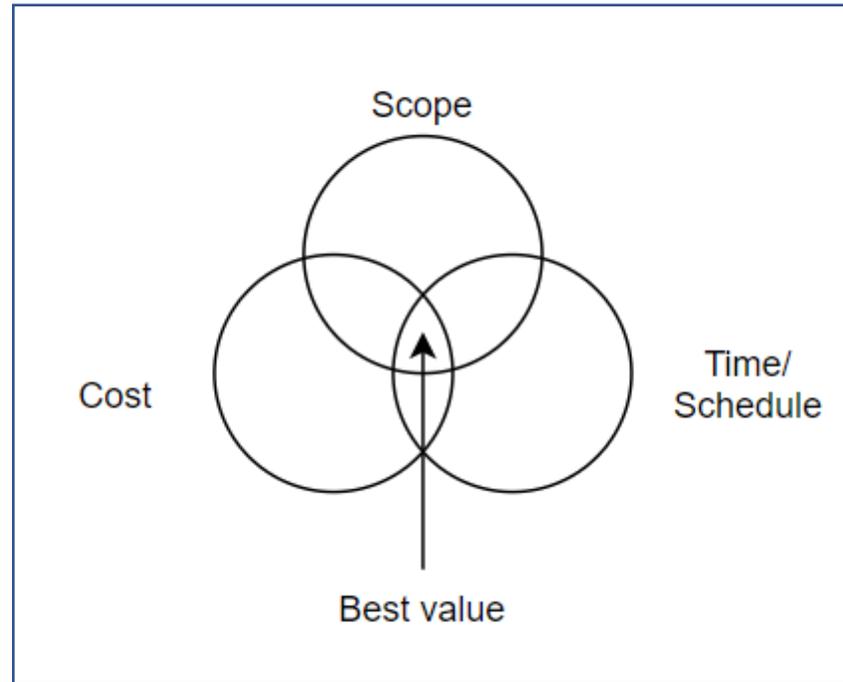
- Function is the measurement expressed in currency, effort or exchange
- Cost is the price paid or to be paid

The definition of function, its evaluation and the development of alternatives are essential to the process of VE and the calculation of cost effectiveness.

The cost effectiveness of VE is calculated as follows:

- i. the percent cost reduction =  $\frac{\text{present cost} - \text{cost after improvement}}{\text{present cost}}$  (e.g. 30% to 70% reduction)
- ii. benefit cost ratio =  $\frac{\text{annual net savings due to VE}}{\text{cost of VE operations}}$  (e.g. 10 to 20%)

# Best Value



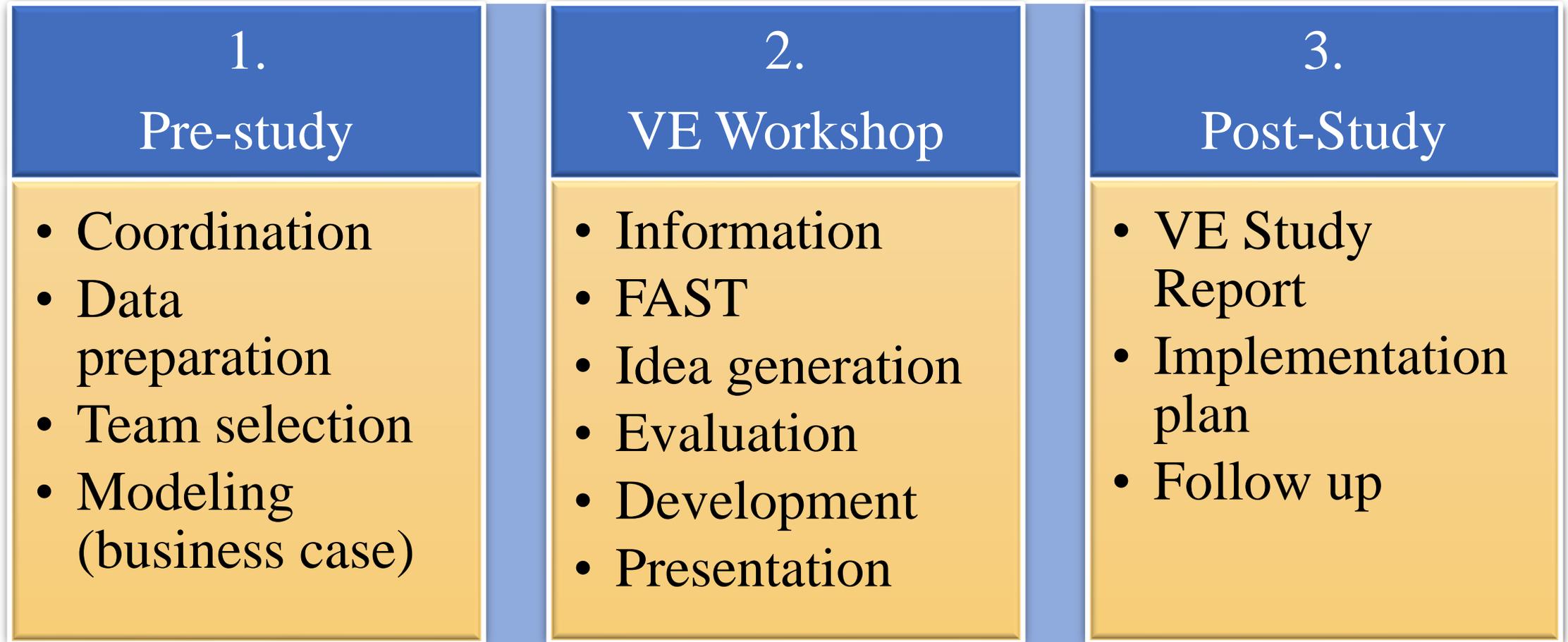
*Best Value based on R. Steward (2005) Fundamentals of Value Engineering.*

# Achieving Best Value



- Value Engineering is a **systematic process for achieving best value.**
- VE is **multi-disciplinary in nature and applicable to all functional areas of an object or process.**
- Using the equation of **function/resources**, the primary objective of Value Engineering is to achieve best value, not simply cut costs.
- Methods by which **value can be increased:**
  - **Increasing the function** of the product or service while keeping resources constant;
  - **Maintaining the function** of the product or service while reducing required resources; or
  - **Increasing the function of the product or service while proportionately reducing required resources.**
  - **Increasing the function while increasing resources to a lesser degree** (i.e., a 50% increase in function produced by a 10% increase in resources).

# VE method



# VE method insights

1

Focus on function rather than the item

2

Avoid confusion from combining functions

3

Encourage creativity

4

Free the mind from specific configurations

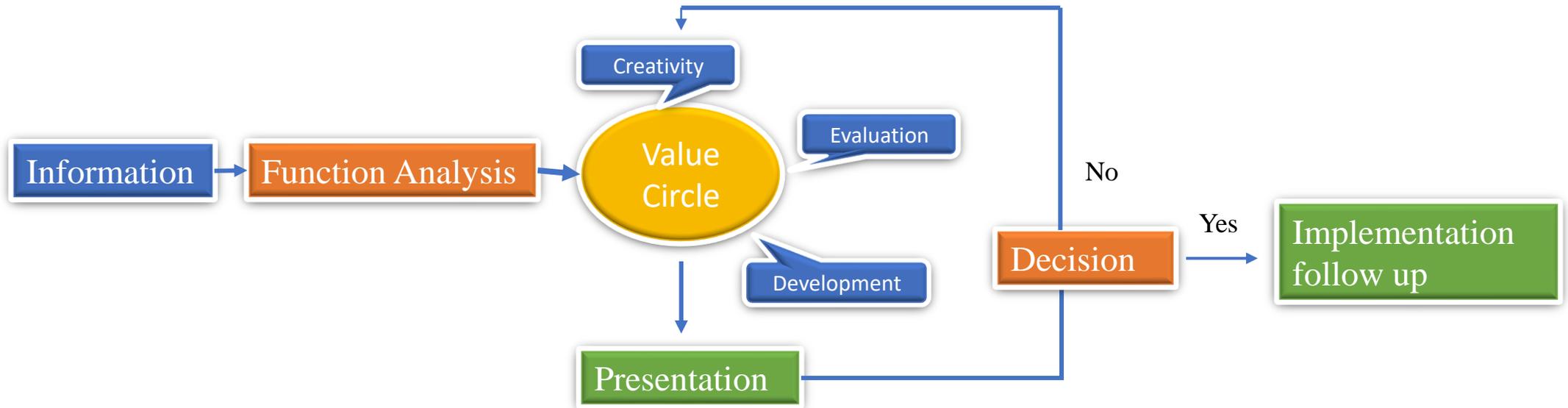
5

Reveal unnecessary costs

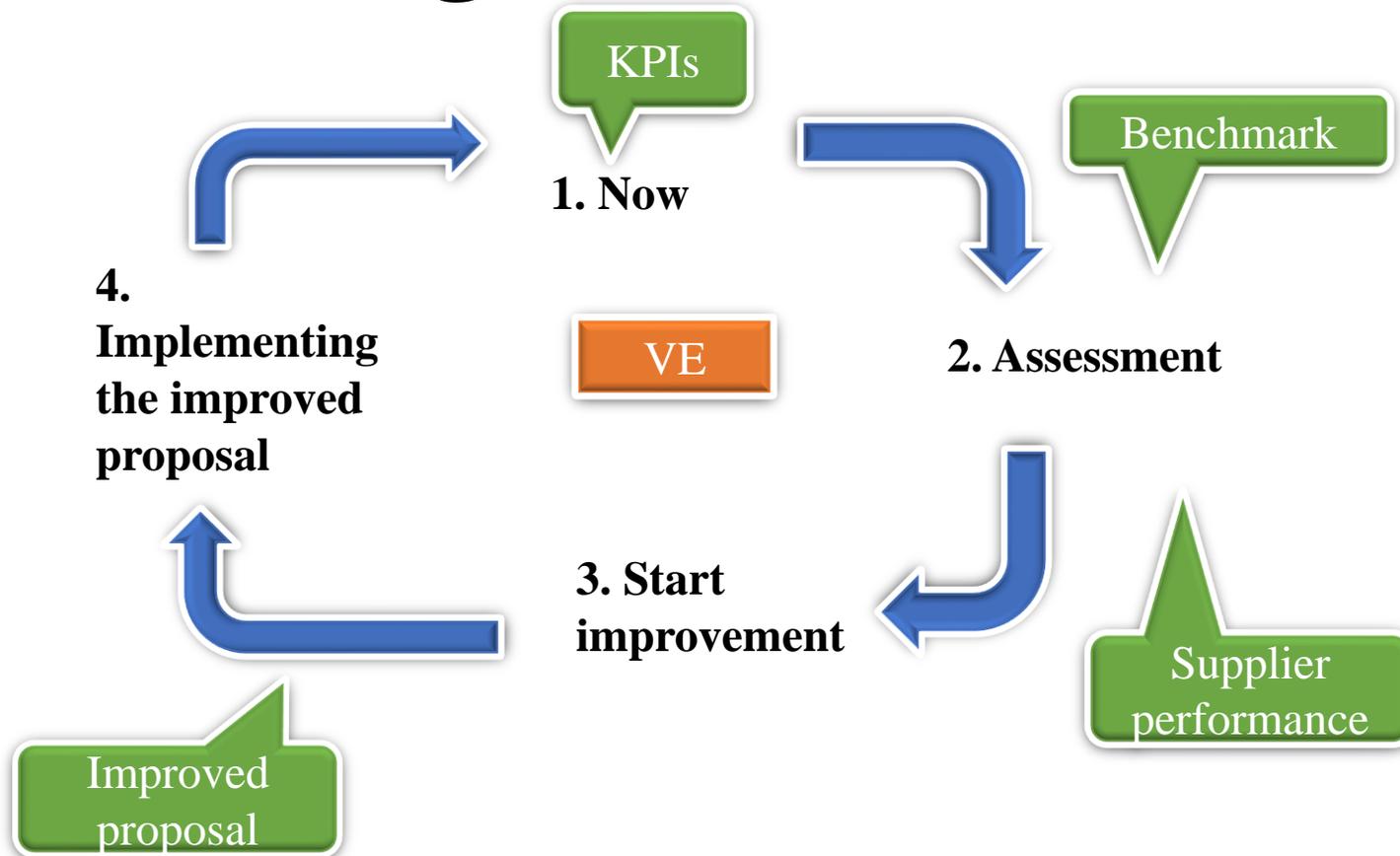
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Facilitate comparison

# VE method



# VE in monitoring



## Value Methodology Standard Reference

- Value Management standard NEN-EN 12973: <https://www.nen.nl/nen-en-12973-2020-en-267484>
- <https://www.en-standard.eu/bs-en-12973-2020-value-management/>
- SAVE Value Methodology Standard Reference: [https://cdn.ymaws.com/www.value-eng.org/resource/resmgr/education/vm\\_standard\\_reference\\_202092.pdf](https://cdn.ymaws.com/www.value-eng.org/resource/resmgr/education/vm_standard_reference_202092.pdf)

The Value Methodology (VM) Standard Reference is intended to provide the basic guidance required for applying VM as recognized by SAVE International®. VM can be applied to a wide variety of subjects, including industrial or consumer products, construction projects, manufacturing processes, business procedures, services, and organizations. VM is commonly referred to by the terms value analysis, value engineering, and value management. These terms may be used interchangeably with Value Methodology throughout this standard.

The VM Standard Reference will assist managers, value program managers, practitioners, and trainers in applying VM in their organizations in a consistent, standard manner. It may also assist those who procure VM services to develop proposal requests that ensure they receive good results conducted in a professional manner. Key terms include:

**Value** – An expression of the relationship between the performance of functions relative to the resources required to realize them. This can be expressed as

$$\text{Value} = \frac{\text{Function Performance}}{\text{Resources}}$$

**Value Methodology (VM)** – A systematic process used by a multidisciplinary team, led by a qualified VM facilitator, to improve the value of a project, product, process, service or organization through the analysis of functions.

**VM Job Plan** – A sequential approach for applying the Value Methodology, consisting of the following eight phases:

**Preparation Phase** – A pre-study meeting is held to identify the VM study subject, goals and objectives, participants, schedule, information, and logistics.

**Information Phase** – The VM study team reviews the study subject's scope, schedule, cost, performance, quality, and risk. Various modeling techniques are applied to develop an understanding of this information.

**Function Analysis Phase** – The VM study team defines the project functions using a two-word abridgement. The VM study team reviews and analyzes these functions, using recognized techniques such as random function identification, FAST diagrams, function resource allocation, and function performance specification to define functions, allocate performance and resources, and select functions for value improvement.

**Creativity Phase** – The VM study team employs creativity techniques to generate ideas to perform the subject's function(s).

**Evaluation Phase** – The VM study team follows a structured evaluation process to select those ideas that offer the greatest potential for value improvement while delivering the project's function(s) considering performance, quality, schedule, cost, and risk.

**Development Phase** – The VM study team develops the selected ideas into VM proposals with enough documentation to allow decision makers to determine if they should be implemented.

**Presentation Phase** – The VM facilitator develops a report and/or presentation that documents and conveys the conclusions and results of the VM study.

**Implementation Phase** – The sponsoring organization reviews the results of the VM study and decides which VM proposals to implement. An implementation plan is developed and executed in order to actualize the value improvements.

**VM study** – A structured effort to improve the value of a project, product, process, service, or organization through the application of the Value Methodology by a multidisciplinary team facilitated by one who is competent in VM techniques, ideally a Certified Value Specialist® (CVS®).

The VM Standard Reference has not been prepared as a legal document. If the user intends to use the VM Standard for procurement purposes, the user should consult expertise familiar with contract language, including seeking legal guidance.

# Quiz to the audience



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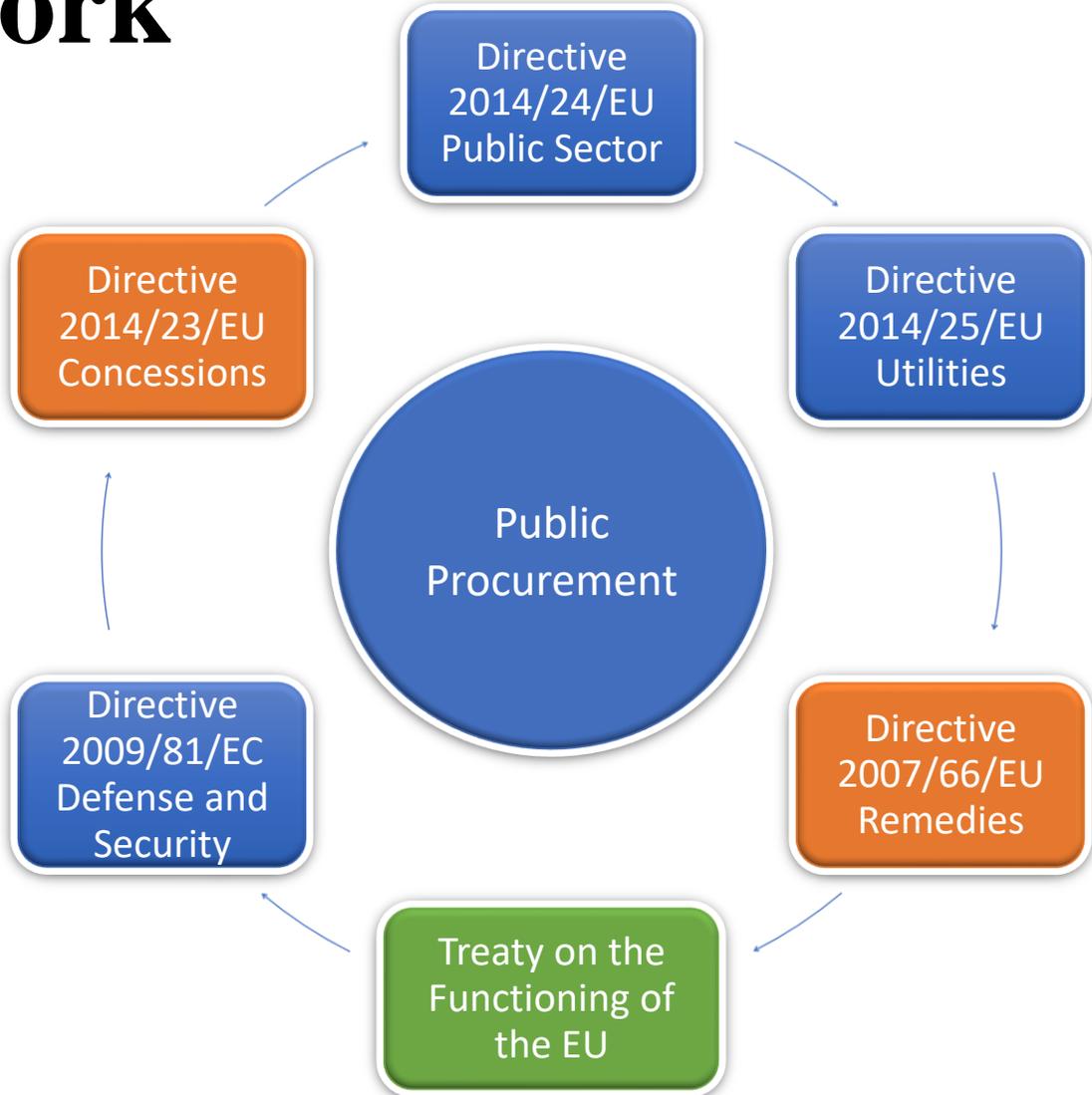
Or use QR code



## 3. VE in the EU framework

- Innovation in the Public Procurement Directives
- Adaptive Public Procurement and VE in the digital era
- VE Change proposals and the Modification of Contracts  
(VE clauses and EU case law)

# EU legal framework



# Directive 2009/81/EC

(12) This Directive should take account of the needs of the contracting authority/entity **throughout the whole life cycle of the product**, i.e., research and development, industrial development, production, repair, **modernisation, modification, maintenance**, logistics, training, testing, withdrawal and disposal. These stages include, for example, studies, evaluation, storage, transport, integration, servicing, dismantling, destruction and all other services following the initial design. Some contracts may include the supply of parts, components and/or subassemblies to be incorporated in or affixed to products, and/or the supply of specific tools, test facilities or support.

# Life cycle definition - Directive 2009/81/EC

## Article 1

**26. 'Life cycle' means all the possible successive stages of a product, i.e. research and development, industrial development, production, repair, **modernisation, modification, maintenance**, logistics, training, testing, withdrawal and disposal;**

# Contract performance - Directive 2009/81/EC

Article 20 Conditions for performance of contracts

Contracting authorities/entities may **lay down special conditions relating to the performance of a contract, provided that these are compatible with Community law and are indicated in the contract documentation (contract notices, contract documents, descriptive documents or supporting documents)**. These conditions may, in particular, concern subcontracting or seek to ensure the security of classified information and the security of supply required by the contracting authority/entity, in accordance with Articles 21, 22 and 23, or take environmental or social considerations into account.

# Contract performance - Directive 2014/24/EU

## Article 70 Conditions for performance of contracts

Contracting authorities may lay down **special conditions relating to the performance of a contract, provided that they are linked to the subject-matter of the contract within the meaning of Article 67(3) and indicated in the call for competition or in the procurement documents.** Those conditions may include economic, **innovation-related**, environmental, social or employment-related considerations.

Art. 87 in Directive 2014/25/EU

# Modification of Contracts – Directive 2014/24/EU

## Article 72 Modification of contracts during their term

1. Contracts and framework agreements may be modified without a new procurement procedure in accordance with this Directive in any of the following cases:
  - (a) where the modifications, **irrespective of their monetary value, have been provided for in the initial procurement documents in clear, precise and unequivocal review clauses, which may include price revision clauses, or options.** Such clauses shall state the **scope and nature of possible modifications** or options as well as the conditions under which they may be used. They shall not provide for modifications or options that would alter the overall nature of the contract or the framework agreement;

Art. 89 in Directive 2014/25/EU

# Substantial changes of contracts

A **modification of a contract or a framework agreement during its term is considered substantial** where it renders the contract or the framework agreement materially different in character from the one initially concluded. A modification is substantial where one or more of the following conditions is met:

- the **modification introduces conditions which, had they been part of the initial procurement procedure, would have allowed for the admission of other candidates** than those initially selected or for the acceptance of a tender other than that originally accepted or would have attracted additional participants in the procurement procedure;
- the modification **changes the economic balance of the contract or the framework agreement in favour of the contractor in a manner which was not provided for in the initial contract or framework agreement**;
- the modification **extends the scope of the contract or framework agreement considerably**;
- where a **new contractor replaces** the one to which the contracting authority had initially awarded the contract **in other cases than those provided in specific circumstances**.

A **new procurement procedure is require**



# VE prerequisites

- The **intention to use VE should be advertised upfront**, in the contract notice, and clearly established as part of the technical specifications, **in compliance with the principles of equal treatment, non-discrimination and transparency.**
- The VE approach and its application should be in line with the European Public Procurement Directives and the case-law of the European Court of Justice, particularly in what concerns to the **modifications of a contract and the limitations regarding the material or substantial changes of the contract.**

# VE in compliance with TFEU Principles

## Transparency

- Publication of a contract notices to inform the potentially interested suppliers

## Equal treatment

- Prohibition to modify requirements after submission of proposals

## Non-discrimination

- Competition for the contract is open to all European suppliers

## Proportionality

- Requirements should not be onerous or unreasonable (e.g. exclusion due to non-compliance with tax payment obligations)

# EU case law translated in the EU Directives

- In **Case C-496/99 P Commission v. CAS Succhi di Fruti**, the Court ruled on the principles of transparency and equal treatment establishing that **all the conditions and detailed rules of the award procedure must be drawn up in a clear, precise and unequivocal manner in the notice or contract documents** so that, first, all reasonably informed tenderers exercising ordinary care can understand their exact significance and interpret them in the same way and, secondly, the contracting authority is able to ascertain whether the tenders submitted satisfy the criteria applying to the relevant contract.
- In **Case C-337/98 Commission v. France** the Court stated that **amendments to the provisions of a public contract during the currency of the contract constitute a new award of a contract “when they are materially different in character from the original contract** and, therefore, such as to demonstrate the intention of the parties to **renegotiate the essential terms of that contract”**.
- In **Case C-454/06 Presstext Nachrichtenagentur GmbH v. Republik Österreich** the Court ruled that an amendment to a public contract during its currency may be regarded as material when: **(i) it introduces conditions** which, had they been part of the initial award procedure, would have allowed for the admission of tenderers other than those initially admitted or would have allowed for the acceptance of a tenderer other than the one initially accepted; **(ii) when it extends the scope of the contract considerably** to encompass services not initially covered, and **(iii) when it changes the economic balance of the contract in favor of the contractor** in a manner which was not provided for in the terms of the initial contract.

# EU case law after the 2014 Directives

- **Case C-216/17 ASST (Judgment of 19 December 2018)** While framework agreements allow some flexibility to carry out specific contracts, even for periods beyond the maximum duration of four years in specific circumstances, they constitute a closed system in which both contracting entities and suppliers must be determined from the beginning. In the same way, a **framework agreement must establish the value and volume of the contract, without substantial changes to the contract being possible. The conditions of the framework agreement, including those that expressly allow modifications should be established in the announcement of the tender**, in accordance with the principles of transparency and fair treatment.
- **Joined cases C 496/18 and C 497/18 (Judgment of 26 March 2020)** The Court concluded that the general principle of legal certainty is opposed to a new national regulation that (for reasons of protection of financial interests of the Union) establishes the possibility to initiate a procedure for the control of the legality of modifications of public contracts after the expiration of the regulations applicable on the date of said modifications. Therefore, **it is not possible to control the legality of modifications of public contracts after the expiration of the applicable legislation.**
- **Case C-263/19 T-Systems Magyarország** As provided by the 2014 Public Procurement Directives, which implemented the case law of the CJEU, the contracting authority will have to initiate a new award procedure if modifications **not defined upfront in the contract are introduced on a later stage.**

# VE – unnecessary costs

- **Failure to examine attributes** which cause no useful function
- **Failure to examine specifications** due to needlessly expensive materials/components
- **Poor build ability:** failure to consider construction implications during design
- **Lifecycle:** failure to consider future operational costs
- **Opportunity:** failure to consider the cost of losing potential revenue

*Potts (2008)*

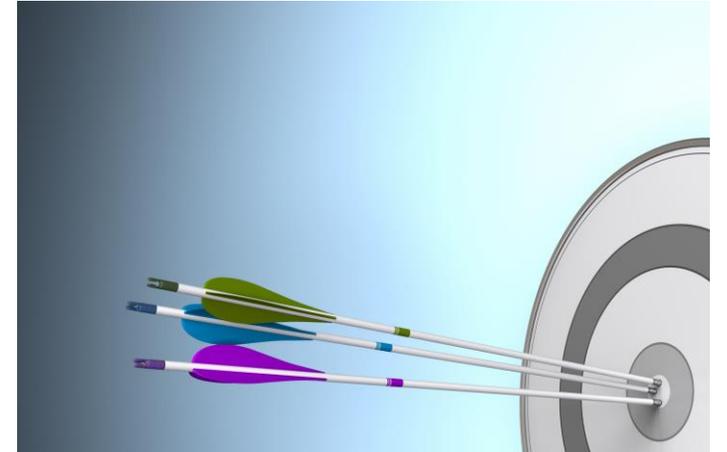
**A relationship between cost, value and function can be summarize as follows: “it is important to avoid confusing cost with value. If added cost does not improve quality or the ability to perform the necessary functions, then value is decreased.**

*Dell'Isola, (1997)*



# VE Benefits

- Improved performance
- Elimination of the unnecessary
- Standardization or simplification of operations
- Improved use of resources



# VE clause

## 1. Value engineering definition

The **sum of activities and actions**, aiming to ensure that the [Contractor] fulfils its obligations such as to **create added value** for the [Contracting Authority]; these activities and actions **target innovative development, effective and/or efficient organization of the project or similar.**

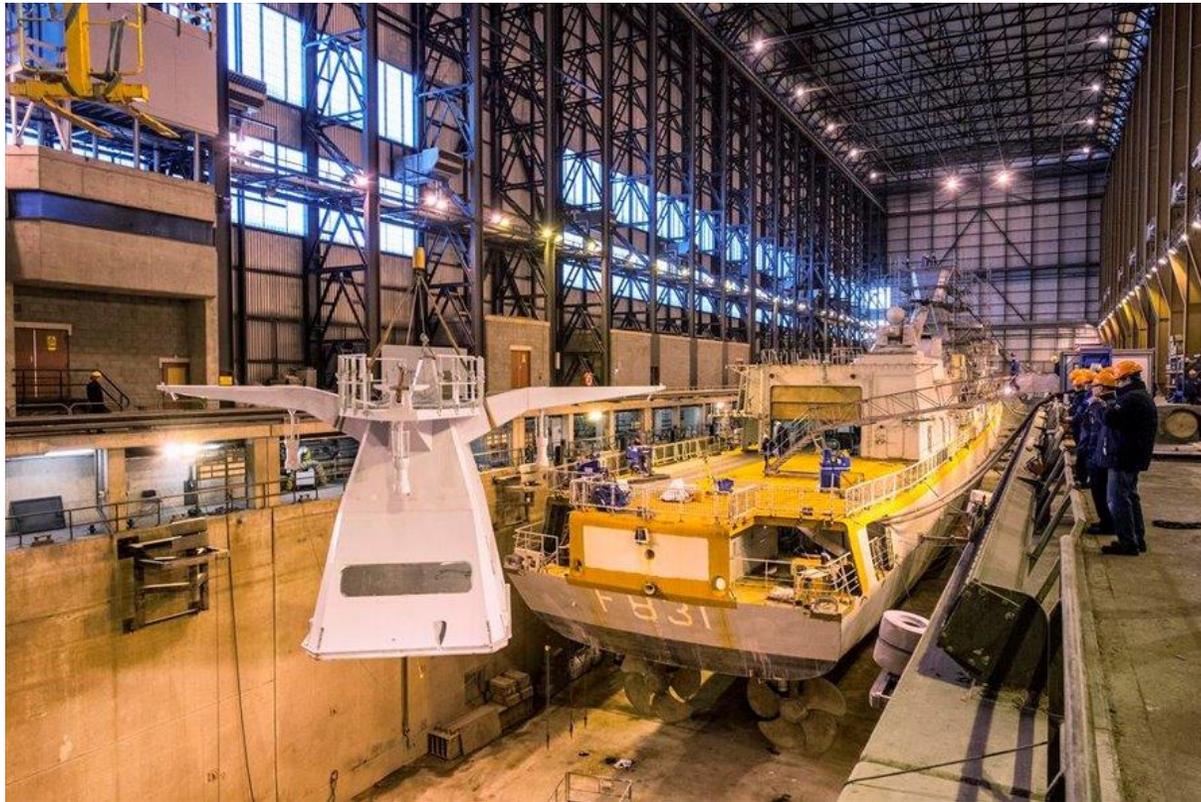
## 2. Change orders and Value Engineering change proposals (VECP)

- VECP: **activities, savings (TCO: Total Cost Ownership), risk analysis, contractual changes.**
- **Collaboration with other contractors and subcontractors**
- Proposal presentation and implementation (plan)

## **4. Case studies of the use of VE in PPI**

- Contract management requirements (Royal Netherlands Navy)
- VE used to implement R&D results in on-going contracts (WBL)

# Outsource maintenance of non-military vessels to specialized parties - VE



 Royal Netherlands Navy

Case Innovation  
Procurement

Bigger impact  
with less investment  
by value engineering

Royal Netherlands Navy  
Annemieke Selbach  
Bert Kloosterziel  
Marjo Brink-Koning

# Key aspects

- A specialized Contractor **advises and directs the Maintenance of the Vessels and necessary On-board Supplies and Consumables.**
- Relation between ‘**Smart**’ Advice/Business cases and the Bonus and Malus scheme.
- Relationship through the **Performance Indicator 'Collaboration & Flexibility’.**
- The Contractor submits **Advice as part of its management function (fixed contract price).** This Advice is discussed with the Contracting Authority and, if interesting, it is further **elaborated in a Business Case.** This business case is still part of the management function.
- **If this Business Case is approved by the CA, the Contractor will prepare a quotation containing the costs of the modification or a quotation** to work out one or more aspects of a Business Case in detail (Further Investigation).
- There is also the relationship between the availability of the ships. **Availability is part of the KPIs. The aim is to achieve a direct relationship between the interest of the CA and the yield of the contractor through Value Engineering for the entire implementation period (10 years),** so that the added value and yield of "smart" advice is shared between both parties.



# Approach

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- Define outline VE clause
- Define KPI's
- Process and organisation
- Implementation



# Key Performance Indicators (KPI's)

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- Availability
- Life Cycle Cost
- Cooperation and flexibility
- Sustainability



# KPI-2 - Life Cycle Cost (LCC)

Resources are scarce. Every saving in the maintenance of a system frees up resources that can be used to achieve greater effectiveness elsewhere within the same budget group. For valuation in terms of VE, a future-oriented approach to the LCC has been chosen, whereby the investment of the measure or modification is compared with the original amount or quantity produced or returned:

$$\text{KPI(2)} = \Delta\text{BO} + \Delta\text{CO} + \Delta\text{Tr} + \Delta\text{Op} - I \geq 0$$

Whereby:

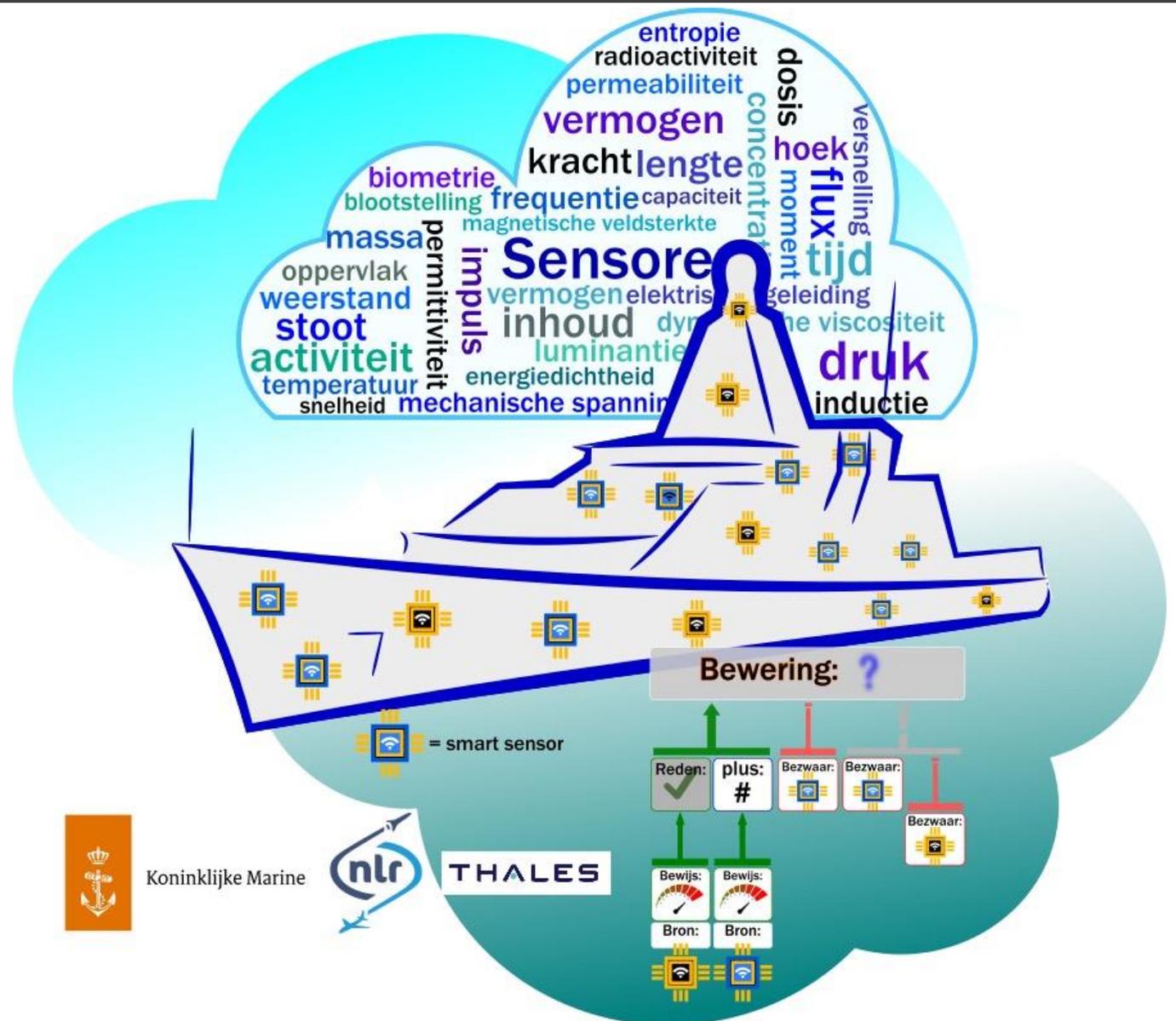
- **I** = the investment required for the proposed modification or planned maintenance measure, for the remaining lifespan per ship, summed up for all ships covered by the proposal
- **ΔBO** = Total savings on named (preventive) maintenance over the remaining lifespan
- **ΔCO** = Total savings on corrective maintenance over the remaining service life; a more reliable system with fewer components that can fail means fewer spares purchased, less spares stock, fewer direct repair hours, fewer tools required for the expired repair
- **ΔTr** = Total training savings over the remaining life; maintenance tasks that are needed less or no longer at all do not require training of personnel; for example, for a self-calibrating system, the calibration course can be omitted, no trainer and training material is needed.
- **ΔOp** = Total savings on the operation of the system where the improvement is made; example: with consistently implemented remote monitoring, inspection rounds can be omitted, saving direct crew hours.



**Example:** an innovative anti-fouling extends the effective term of this necessary protection from 4 to 8 years. The investment is the necessary engineering, adjusting drawings and work instructions, qualifying the process, training the personnel who will process the new anti-fouling and the extra material costs of the more expensive anti-fouling. Savings are made for dock days, the material, the hours of application with accompanying scaffolding, the environmental costs of disposal of residual material.

# Expectations and examples

- SMART supplier
- Examples
  - Innovation anti fouling
  - Monitoring engines
  - SMART sensors





waterschapsbedrijf  
limburg  
water. samen halen we er meer uit

## Artificial Intelligence

IOT / Big Data / Machine Learning

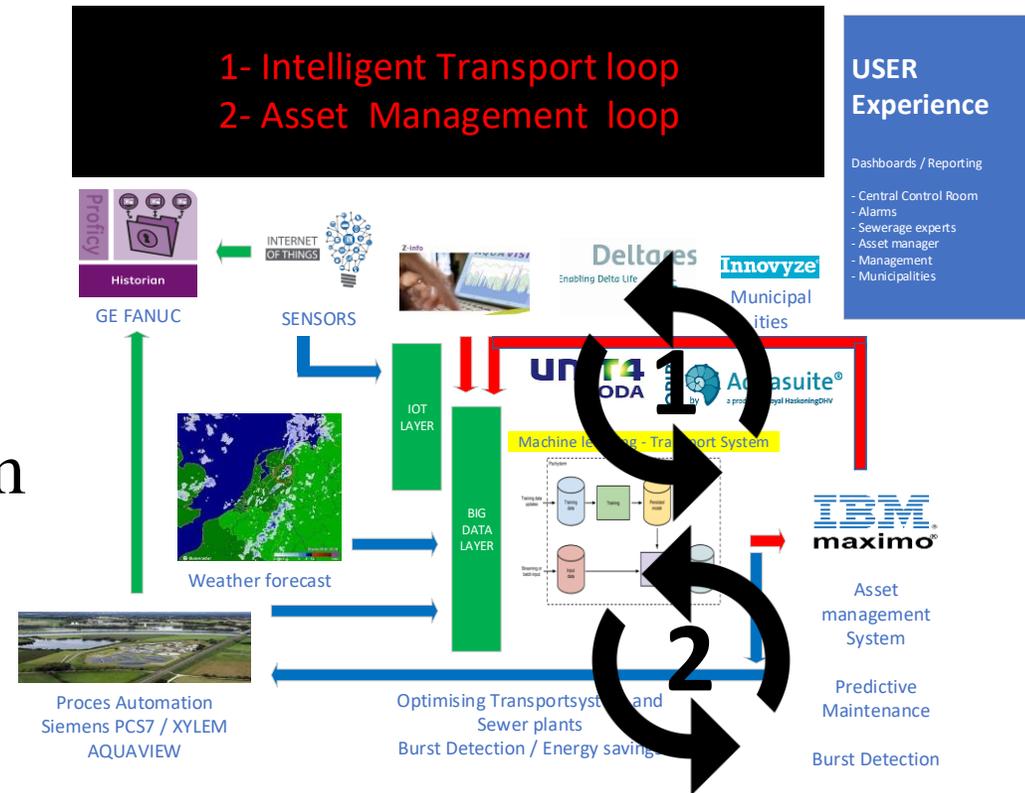
### Waterschapsbedrijf Limburg



**WBL WINS EUROPEAN  
INNOVATION  
PROCUREMENT AWARD  
2021**

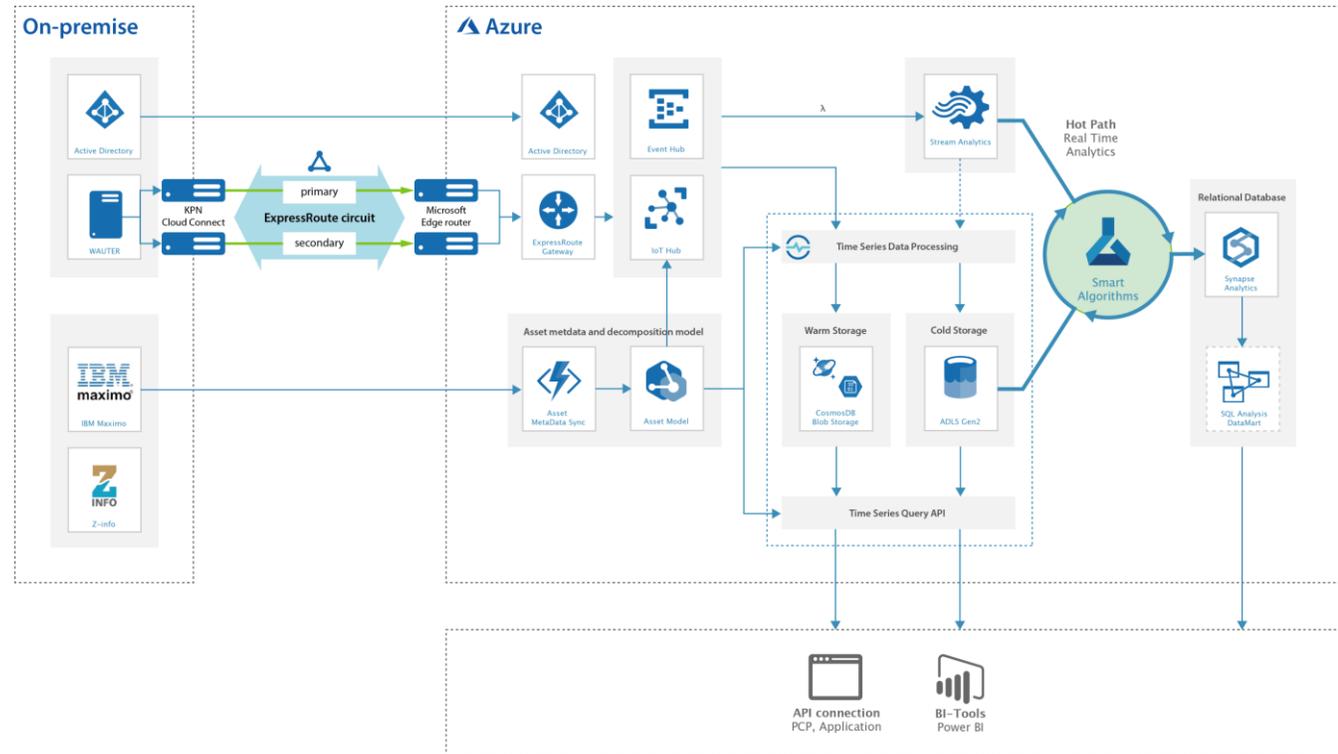
# Artificial Intelligence on Water Transport System

- Asset management
- Purchase obligation
- Pipe leakage
- Integrating rainfall
- Predict the working of the system



# Implementing and maintaining a Big Data platform

- Data Lake
- Business Analytics
- Artificial Intelligence
- Standards
  - Waterschapshuis
  - Waterpartners



# Cloud Computing

- No on-premise computers anymore
  - Flexible
  - Upscale / scale down
- Maintenance
  - From carry out to take control
  - Less IT knowledge necessary

## On-Premises

9%  
software licenses

Customization & implementation  
Hardware  
IT personnel  
Maintenance  
Training



## Ongoing costs

- Apply filters, patches, upgrade
- Downtime
- Performance tuning
- Rewrite integrations
- Upgrade dependent applications
- Ongoing burden on IT
- Maintain/upgrade hardware
- Maintain/upgrade network
- Maintain/upgrade security
- Maintain/upgrade database

## Cloud Computing

68%  
subscription fee

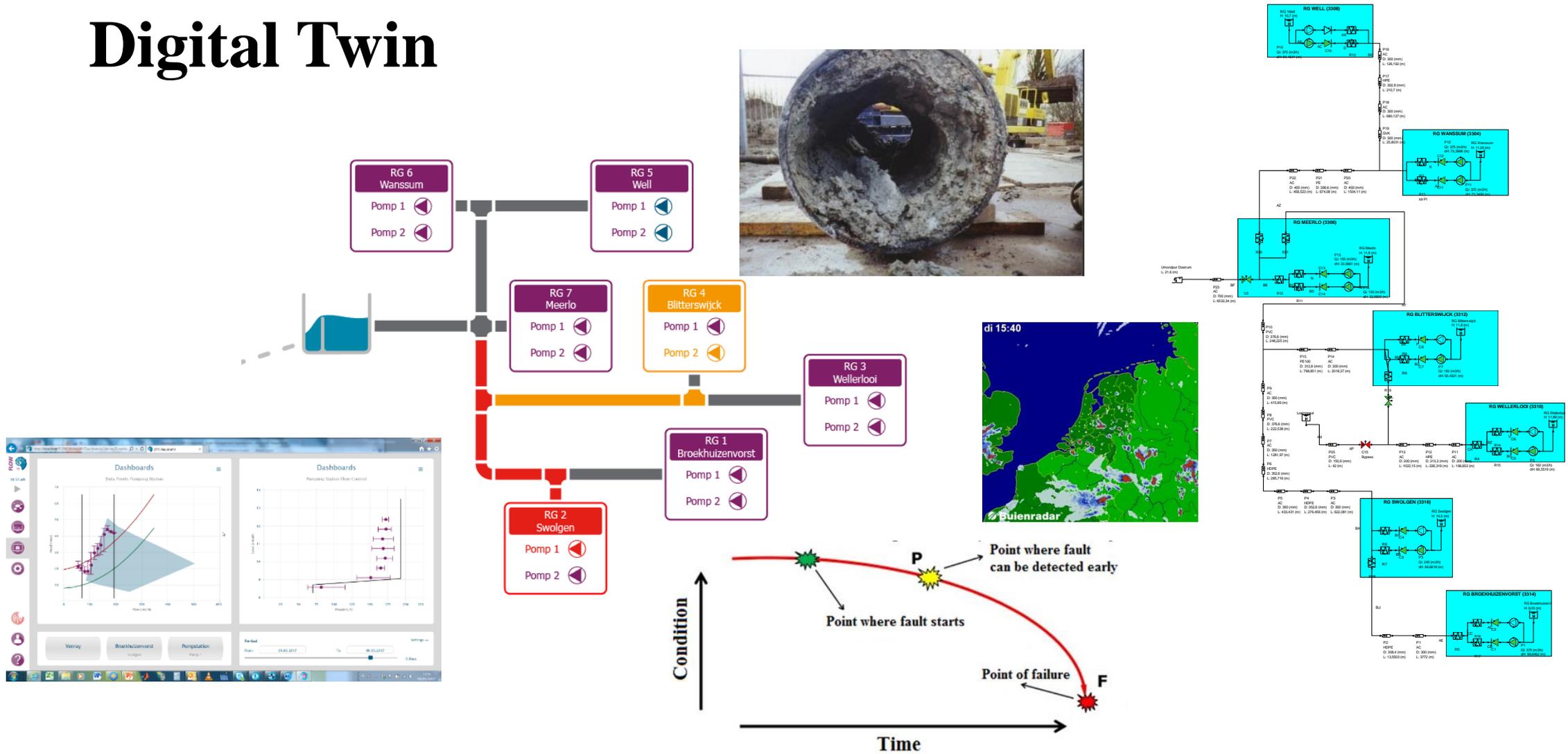
Implementation,  
Customization &  
training



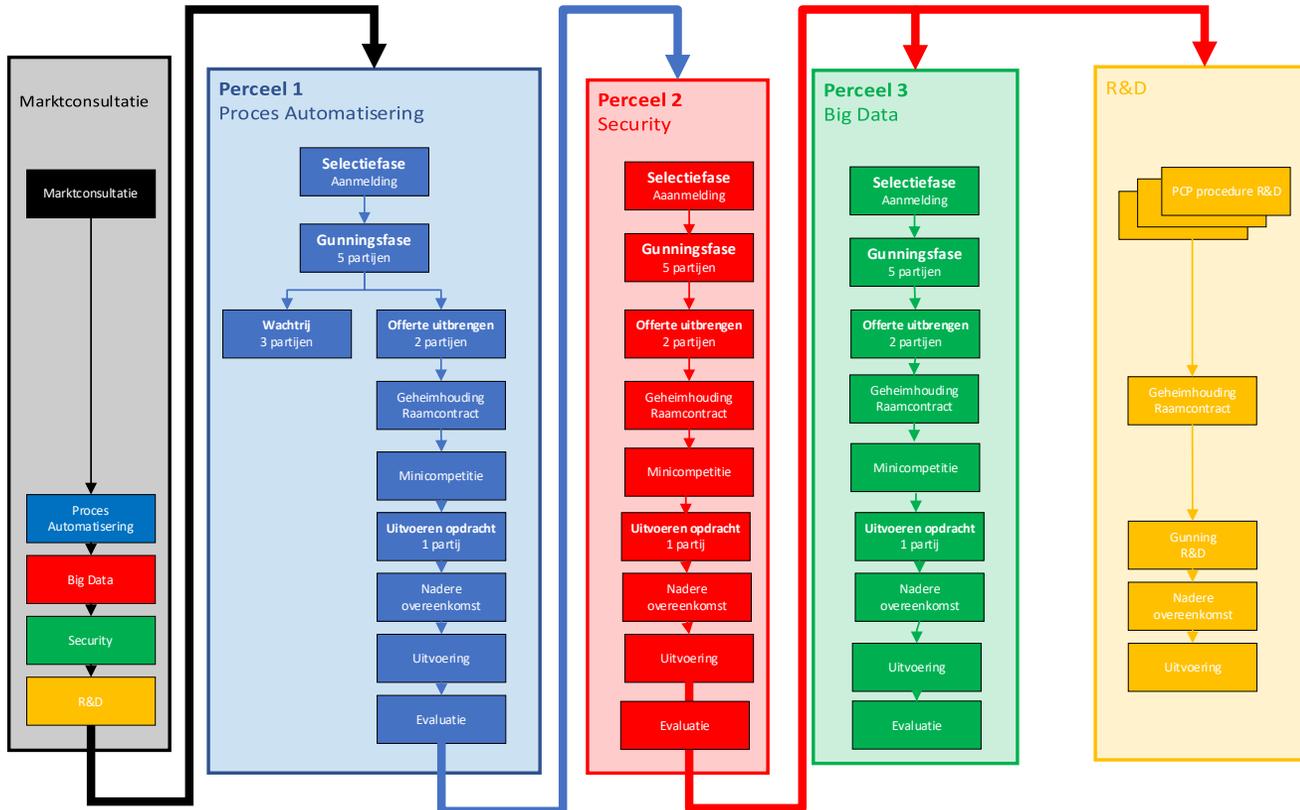
## Ongoing costs

- Subscription fee

# Digital Twin



# EU Tender PA – Security – Big Data – VE Clauses



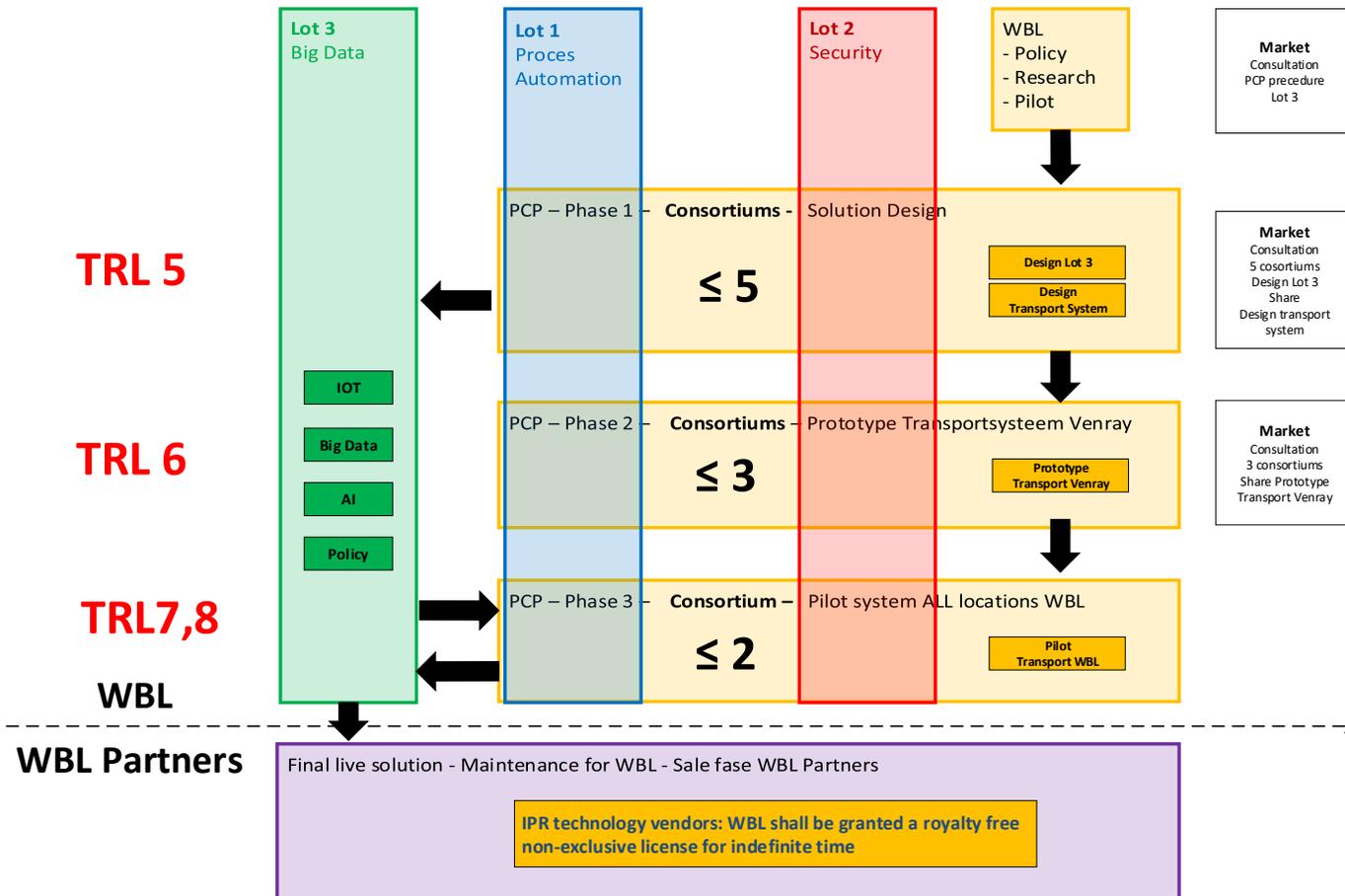
All contracts include VE clauses.

Contractors need to submit Value Engineering Change Proposals (VECP) consistent with the VE clause(s) in the contract that would lower the project's life-cycle cost to the contracting authority without impairing essential functions, characteristics, or performance.

The contract change can result in savings shared with the contractor.

Explored during the OMC and announced in the CN

# PCP – Artificial Intelligence Transportsystem – VECP

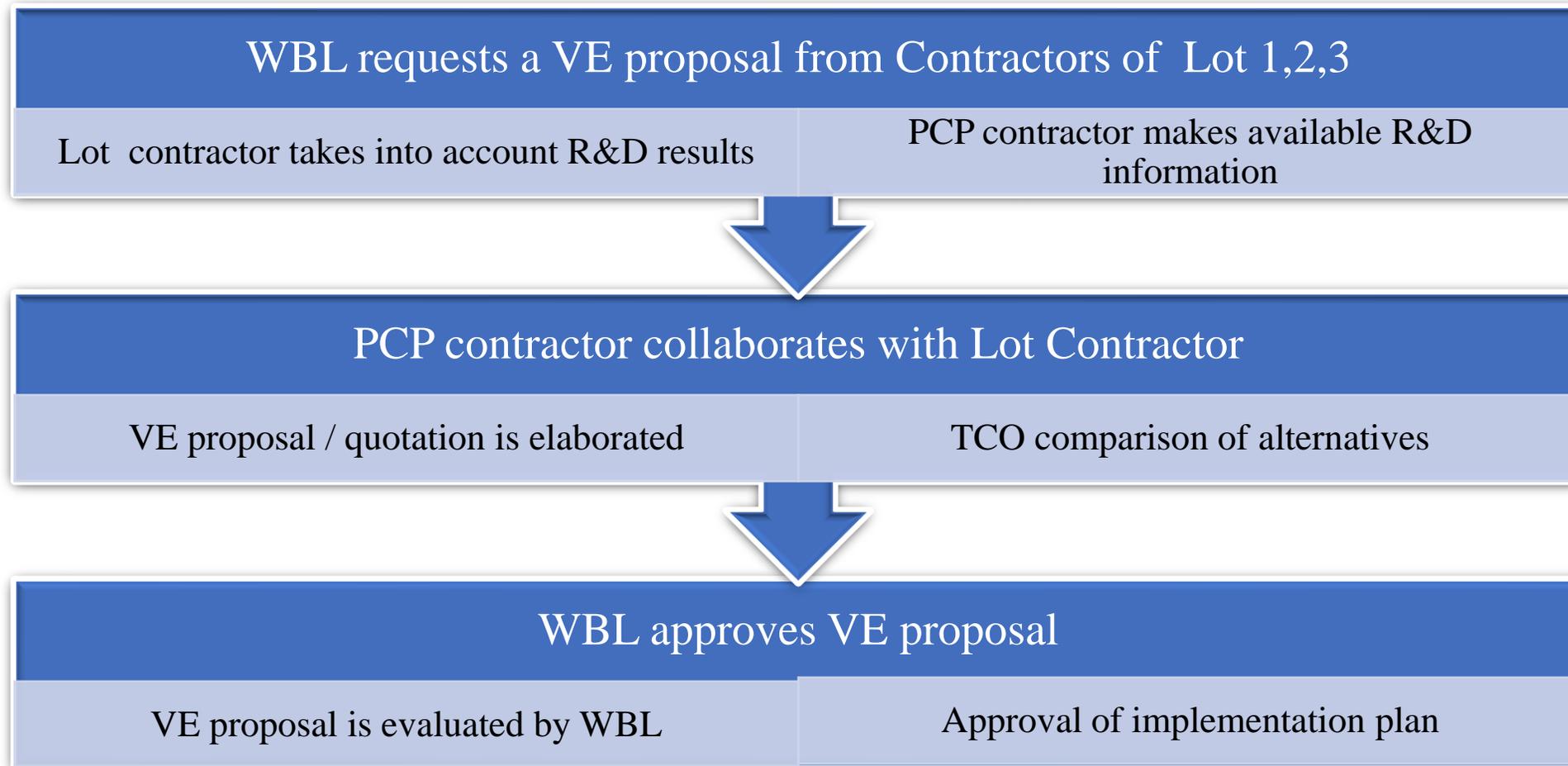


**PCP results are integrated in the different contracts/lots through Value Engineering clauses in all contracts.**

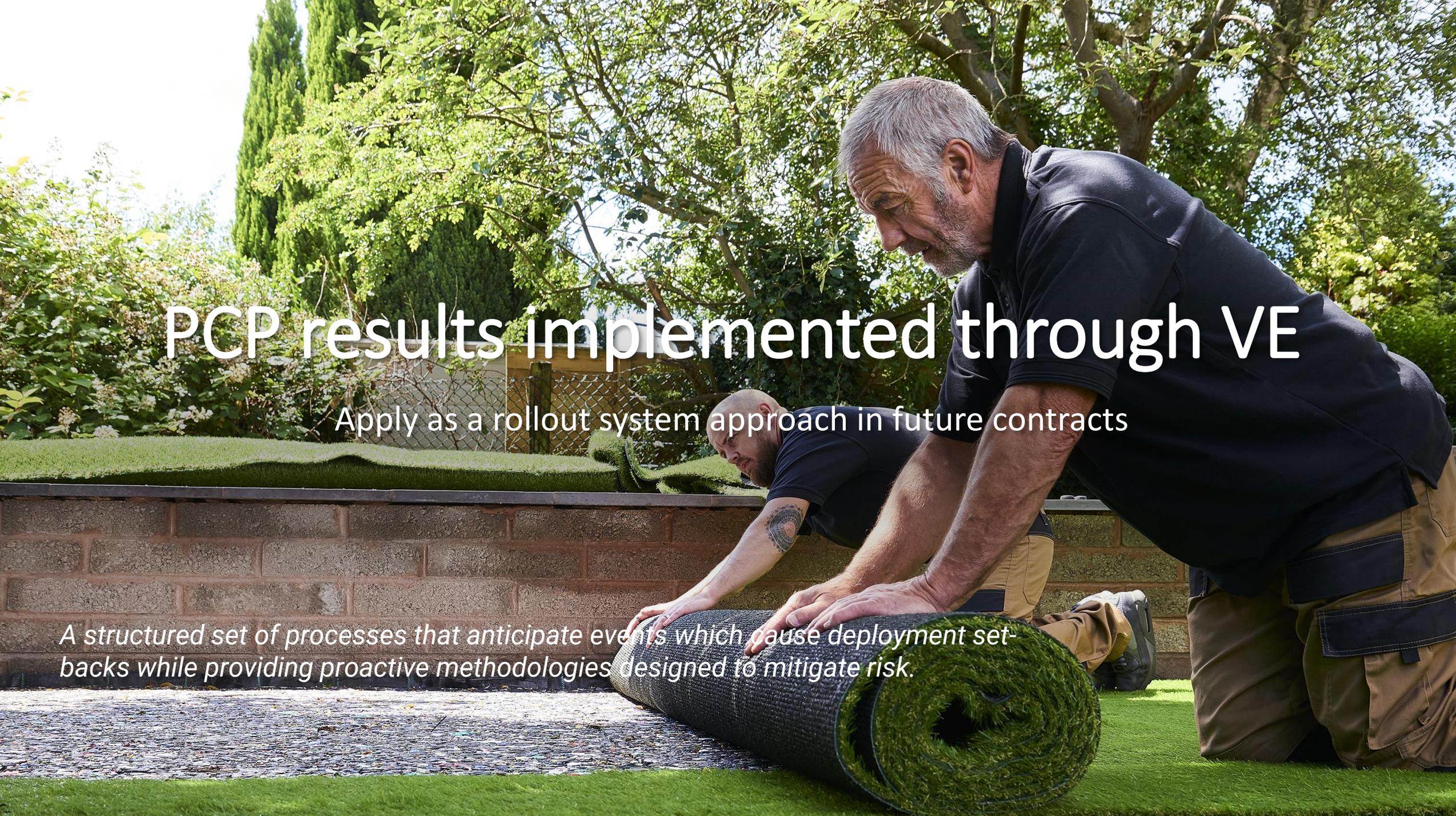
Contractors cooperate to present VECP to implement the new R&D results and technologies developed in the PCP. **The proposal lowers the project's life-cycle cost improving performance.**

The contracting authority approves the VECP.

# VE implementation example



*Summary of steps for a VE proposal*

A photograph showing two men in dark blue polo shirts and khaki pants kneeling on a lawn, unrolling a large roll of artificial grass. They are positioned in front of a low stone wall. The background is filled with lush green trees and foliage under a bright sky. The text is overlaid on the image in white.

# PCP results implemented through VE

Apply as a rollout system approach in future contracts

*A structured set of processes that anticipate events which cause deployment setbacks while providing proactive methodologies designed to mitigate risk.*

# Do's

- Specify clearly an **expected outcome and contract managementsystem**
- Define **incentives and clear contract performance conditions**, duly announced and compliant with TFEU principles.
- Establish performance measures: **a baseline and good performance measures**
- Secure **top management commitment**: sustain a partnership over time since relationships between the contractor/economic operator and public procurer can be tested in the face of changing market conditions, legal pitfalls, and other barriers.
- Establish where the money will come from: **the contractor/economic operator could be required to offer ways to share the savings and to share the risk that the savings will be achieved.**

# Question to the audience

Go to [www.menti.com](http://www.menti.com) and use the code 2028 7435



## Instructions

 Mentimeter

Go to  
**[www.menti.com](http://www.menti.com)**

Enter the code  
**2028 7435**



Or use QR code



# Resources

- **Interactive poll:**
- [Interactive presentation software - Mentimeter](#)
- **Videos:**
- [Legacy of Lawrence D. Miles - YouTube](#)
- [The Story of Value Analysis - Part 1 of 3 - YouTube](#)
- [The Story of Value Analysis - Part 2 of 3 - YouTube](#)
- [The Story of Value Analysis - Part 3 of 3 - YouTube](#)
- **Additional resources:**
- **Link to the FAR:** [52.248-1 Value Engineering. | Acquisition.GOV](#)
- **EAFIP Toolkit:** [www.eafip.eu/toolkit](http://www.eafip.eu/toolkit)



**Thank you for your attention!**

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