



# Proposal of a Computer Supported Collaborative Work Model for E-Commerce Web Sites Based on a Quality Guiding Framework

ICSEA 2017

October 8 - 12, 2017 - Athens, Greece

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*"Quality is never an accident; it is always the result of an intelligent effort"*

*John Ruskin*

<http://evene.lefigaro.fr/citations/john-ruskin>

*Quality focuses on an ultimate goal of customer satisfaction*

- 
- 1) Context & Motivation
  - 2) State of art
  - 3) Methodology
  - 4) Production
  - 5) Validation

## **PLAN**

# Context & Motivation > Context

- E-Commerce Web sites
- Quality / Continuous quality
  - ✓ Customer satisfaction
  - ✓ Attracting customers
  - ✓ Increasing traffic
  - ✓ Gaining customer trust
  - ✓ Retaining customer
  - ✓ Efficiency
  - ✓ Improving the turnover of e-commerce
  - ✓ Quality measurement tools
  - ✓ Generating competitive success.
  - ✓ Reaching Sustainability

# Motivation > e-Commerce Observers

- OECD (*Organization for Economic Co-operation and Development*),
- FEVAD (*Federation of e-commerce and distance selling*),
- WTO (*World Trade Organization*),
- eMarketer
- newmediametrics



They disclose statistics.

# Motivation > e-Commerce Indicators > Tunisia

- In 2014, the turnover of e-commerce in Tunisia is estimated at more than 100 million dinars, its annual growth is 2 digits.
- It is not in its real growth despite the technological and socio-economic infrastructures that are getting ready. The strong predisposition is proved by the following figures of 2015:
  - ✓ 5.8 million Internet users out of a population of one can over 11 million.
  - ✓ 78% of Tunisians who say they are ready to buy online.

*(Jumia.com.tn) (Haddouk Y. 2015)(babnet2014)(Turess 2013)*

# Motivation > e-Commerce Indicators > France USA

- Fevad 2015 to 2016 :

- ✓ e-commerce in France an increase of 15% of turnover, ie. € 72 billion
- ✓ 835 million of transactions online in 2015 | an increase of 19% compared to 2014.
- ✓ 1,029 billion online transactions in 2016 | + 23% compared to 2015

*(fevad 2016~2017)*

- eMarketer:

- ✓ Worldwide sales of BtoC e-commerce amounted to \$ 1,671 billion in 2015, an increase of 25% compared to 2014.
- ✓ It weighs 7.4% of total retail sales worldwide.
- ✓ The eMarketer even has predicted turnover for e-commerce until 2019 where it will exceed \$ 3500 billion.

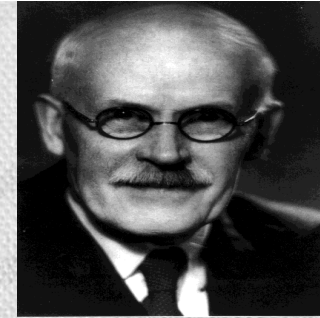
*(journaldunet 2016)*

# State of art

- Quality in Management
- Quality in Software Engineering
- Quality according to Web Marketing Scholars and Practitioners

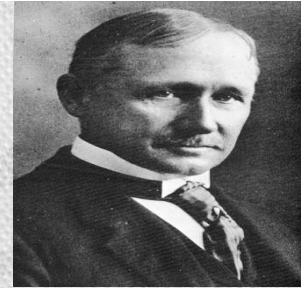


# State of art > Quality in Management



- It is the industrial revolution and mass consumption that have raised management issues in terms of quality management
  - ✓ **Walter Andrew Shewhart** (a physicist and statistician researcher at Bell Laboratories), sought to understand the quality control of a mass-produced product.
  - ✓ He invented in 1924 a method that statistically controls variations in the characteristics of a product and their impact on customer satisfaction.
  - ✓ He had to specify in detail all the phases of production in order to stem the causes of the variations.

# State of art > Birth of Quality



- At the beginning of the 20th century the quality appeared as one of the functions of the company among the theories advanced by **Frederick Winslow Taylor**.
- ✓ At that time, a person called quality controller had the responsibility of inspecting the quality of the employees' work.

# State of art > Birth of Quality

- Quality has been hatched in the United States by the works of **Walter A. SHEWART** and **W. Edwards DEMING**.
- But it flourished in Japan, its pioneers are **Kaoru ISHIKAWA**, **Shoji SHIBA** and **Genichi TAGUCHI**.



**W. A. SHEWART**



**W. E. DEMING**



**G. TAGUCHI**



**K. ISHIKAWA**



**S. SHIBA**

# State of art > Quality in Software Engineering

- "The ability of a set of intrinsic characteristics to satisfy requirements".  
(ISO 9000 )



Outmoded definition of quality



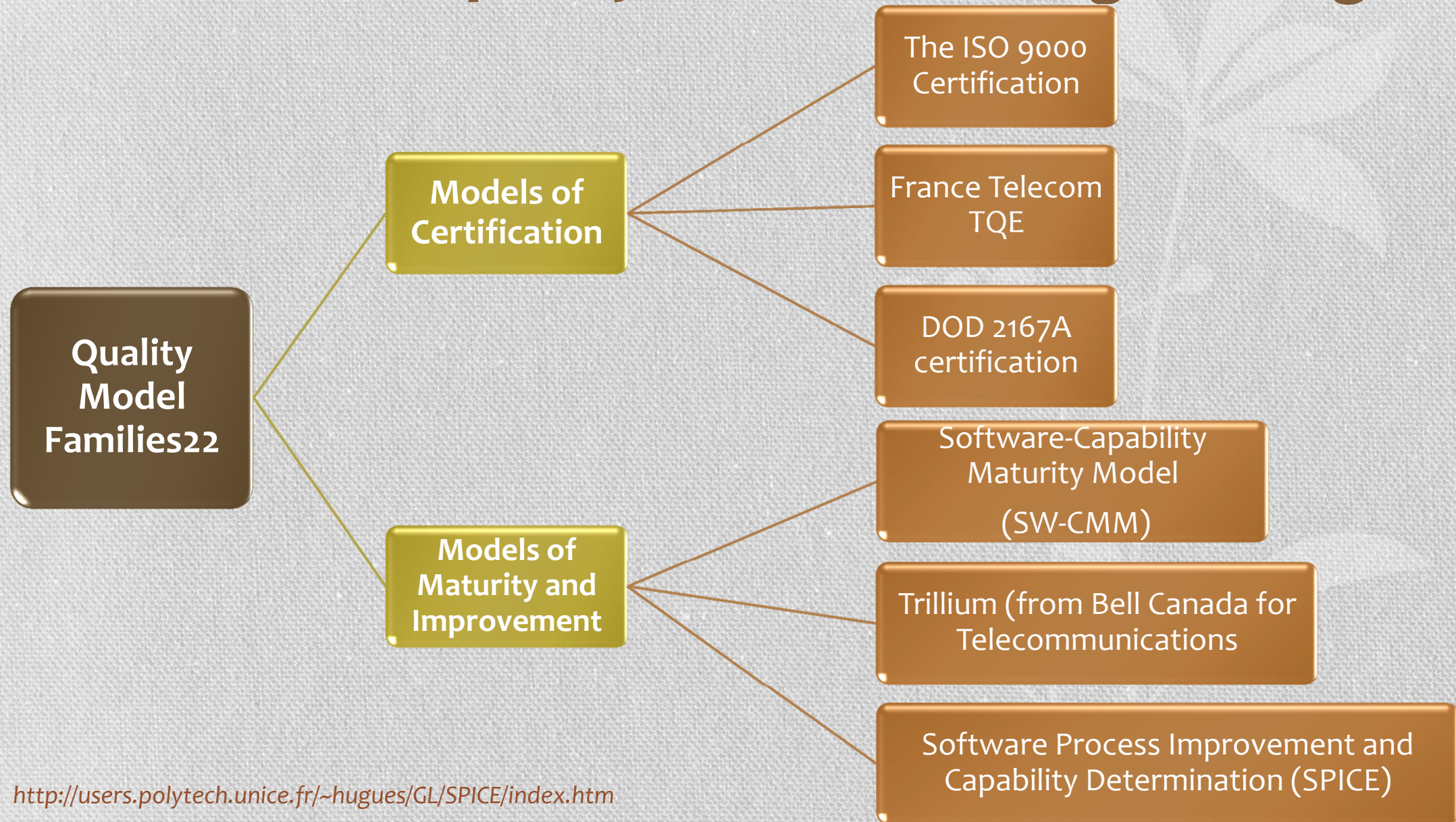
Subjective and Personal Vision



Demands (Requirement Engineering)

- ISO / IEC 9126, "Evaluation of Software Products - Quality Characteristics and Instructions for Use", was published by AFNOR in October 1992 (classification index Z 67-133).

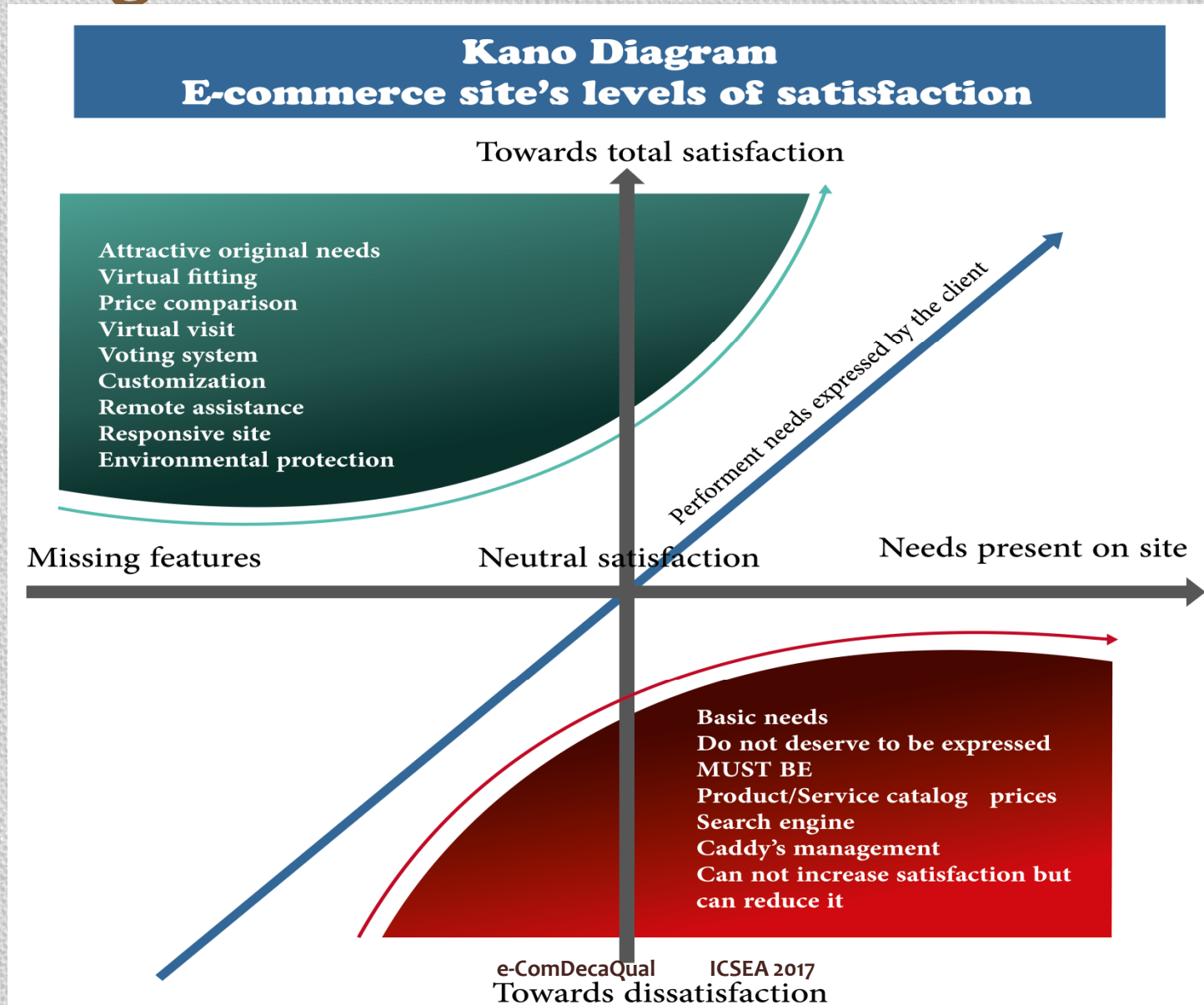
# State of art > Quality in Software Engineering



<http://users.polytech.unice.fr/~hugues/GL/SPICE/index.htm>

# State of art > Quality in Software Engineering

## > Kano Diagram



# State of art > Quality according to Web-marketing Scholars

- The predecessors are Parasuraman, Zeithaml and Berry
  - ✓ Off-line Quality Measurement Scale
- SERVQUAL:
  - ✓ Promulgated and promoted as a technology through a series of publications:
    - (Parasuraman et al., 1985; 1986; 1988; 1990; 1991a; 1991b; 1993; 1994);
    - (Zeithaml et al., 1990; 1991; 1992; 1993).;
    - (Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1994)
- They had to adapt it later for the on-line context



A. Parasuraman



Valerie Zeithaml



Leonard Berry

# State of art > Formal Scales

Scales/Author(s)	Scales' Domains
<b>Webqual™</b> Loiacono et al., 2000	(1) accommodation of information to the task, (2) trust, (3) response time, (4) attractiveness of design, (5) intuitiveness, (6) visual attraction, (7) creativity, (8) empathy, (9) integrated communication, (10) interactivity, (11) business process and (12) availability.
<b>SiteQual</b> Yoo and Donthu 2001	(1) ease of use of the site, (2) site design, (3) speed of the order process and (4) security.
<b>WebQual</b> Barners and Vidgen's 2002	(1) quality of interactivity and service (trust, empathy), (2) site usability (design), (3) quality of the information presented on the site.
<b>PIRQUAL</b> Francis and White 2002	(1) online store features, (2) design of the product sheet, (3) conditions of sale, (4) conformity of delivered products, (5) customer service, (6) security.
<b>e-ServQual</b> Parasuraman et al., 1994	(1) reliability, (2) liability, (3) access, (4) flexibility, (5) navigational facility, (6) efficiency, (7) insurance / trust, (8) security, (9) knowledge of prices, (10) aesthetics, (11) customization.



# State of art > Formal Scales

Scales/Author(s)	Scales' Domains
<b>eTailQ scale</b> Wolfinbarger and Gilly 2003	(1) reliability and compliance with commitments, (2) site design, (3) security / privacy, (4) services provided to consumers.
<b>E-S-QUAL &amp; E-RES-QUAL</b> Parasuraman, Zeithaml and Malhorta 2005.	<b>E-S-QUAL</b> (1) efficiency of the site, (2) compliance with commitments, (3) system availability, (4) respect for the privacy of users. <b>E-RES-QUAL</b> contains (1) reactivity, (2) compensation and (3) contact.
<b>NetQu@I</b> Grégory Bressolles 2006	(1) quality and quantity of the information presented on the site, (2) ease of use of the site, (3) design or the graphic style of the site, (4) reliability and compliance, (5) security and privacy of personal data, (6) offer proposed on the site, (7) interactivity and customization. 54 items were generated for these domains.
<b>eTransQual</b> Bauer et al., 2006	functional and hedonic elements : (1) features and design, (2) enjoyment (Pleasure), (3) business process, (4) reliability and (5) reactivity (responsiveness).
<b>PeSQ</b> Cristobal et al. 2007	(1) website design, (2) customer service, (3) insurance and order management.
<b>E-SELFQUAL</b> Ding et al. 2011	(1) Perceived control, (2) Service convenience, (3) Customer service, (4) Service fulfilment

## State of art > Synthesis and classification of quality domains

Quality Domain	Rate	Quality Domain	Rate	Quality Domain	Rate
1- Design /Ergonomics	26	11-Privacy	7	21-Maintainability	2.5
2- Information variety	22	12-Access	6.5	22-Customer support	2
3- Reliability	17	13-Insurance	5.33	23-Customer loyalty/Fidelity	2
4-Security	17	14-Feeling	4.5	24-Incitement	2
5- Ease of use	16	15-Trust	4.16	25-Ease of terms	1
6- Reactivity	14.33	16- Ease of ordering	4	26-Ease of responding	1
7- Service quality	12.33	17-Structure	3.5	27-Speed of delivery	1
8- Performance/Efficiency	11.5	18-Interactivity	3	28-Community for e-reputation	1
9- Reputation	10.33	19-Web store policies	3	29-Storage capacity	1
10- Customization	9	20- Ease of contact	2.5	30-Low prices	0

# Methodology for a Quality Approach

- Step 1 Gathering domains and items
- Step 2 Structuring domains in a scale
- Step 3 Enriching the scale (slide 20)
- Step 4 Associating control tools to job profiles (slide 21)
- Step 5 Integrating in PDCA wheel (slide 22)

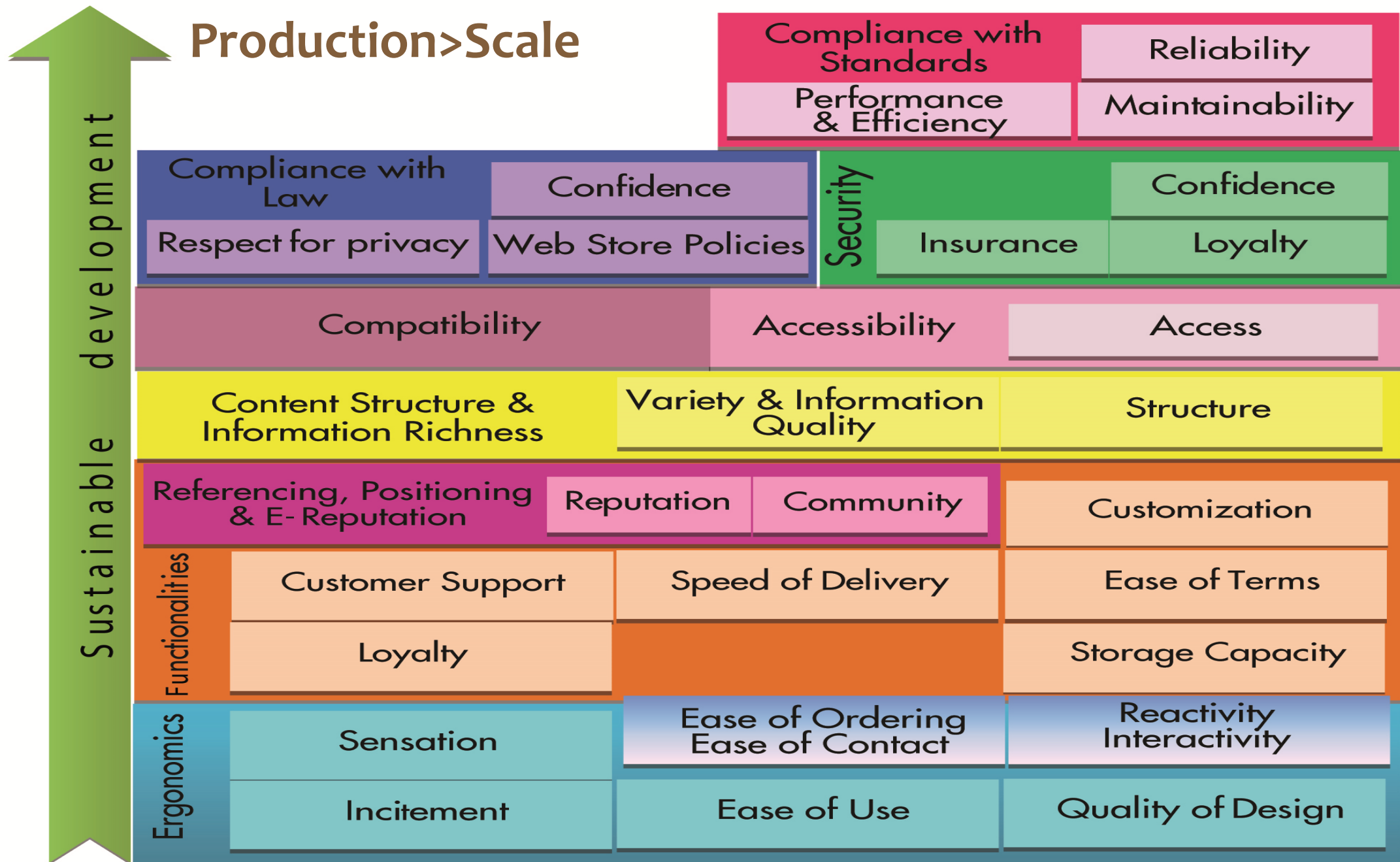
**Model**

**Two Axes**

## Production

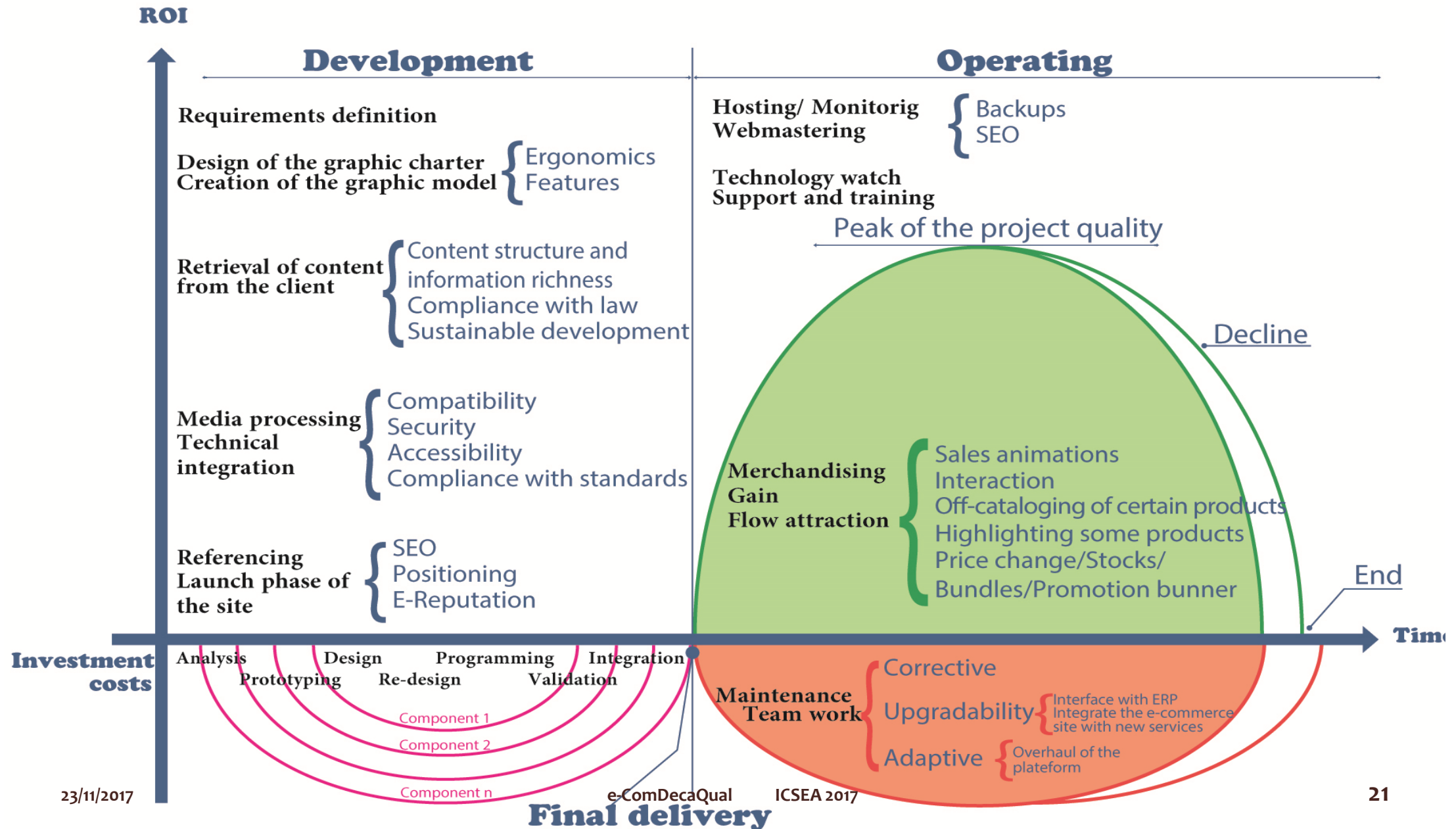
- A Framework composed by :
  - ✓ A scale e-ComDecaQual
  - ✓ Two axes
- An Object Model Abstraction (Slide 23)
- A Detailed Specification of e-ComDecaQual Scale
- One Prototype of a Groupware

# Production > Scale



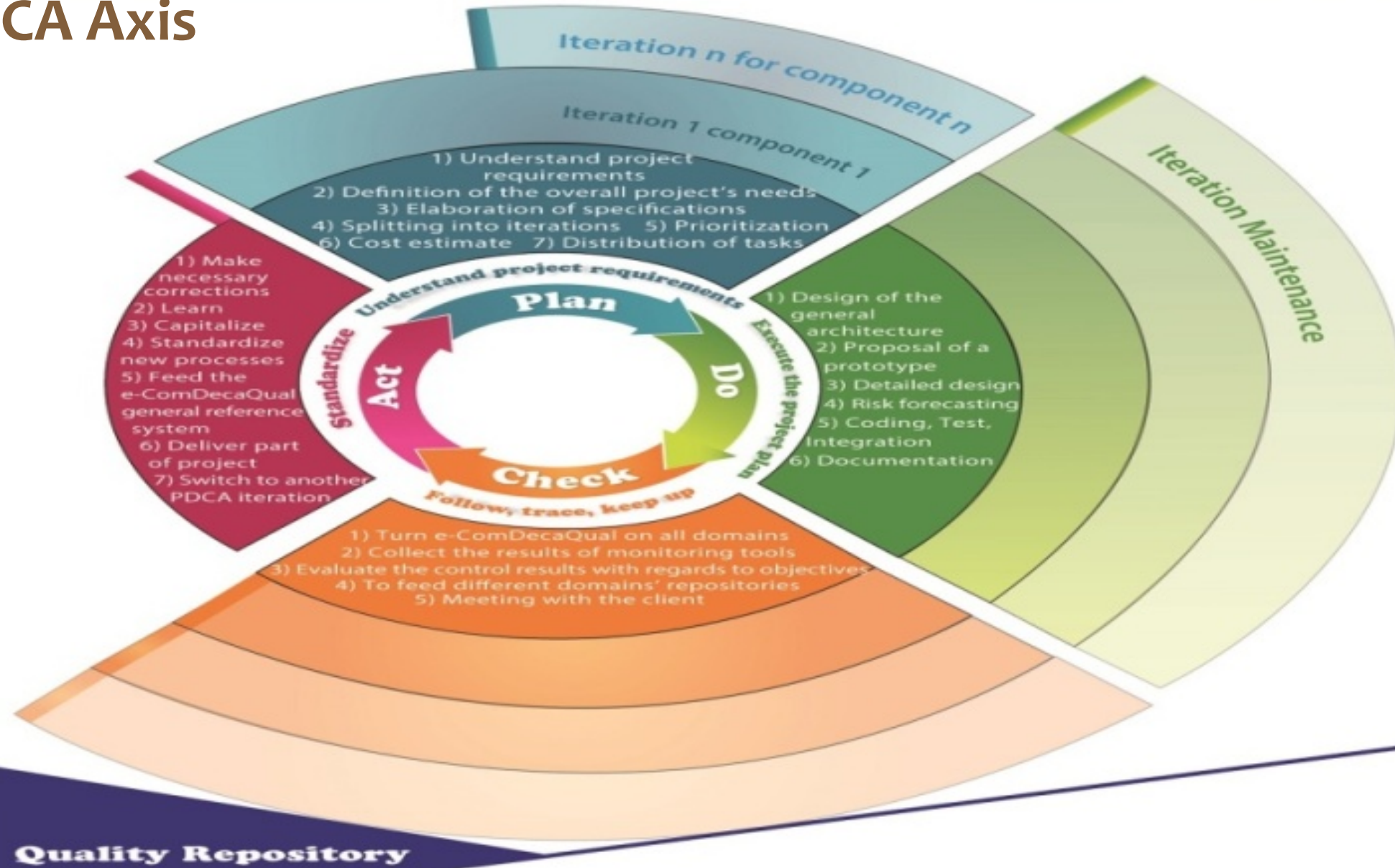
# Life Cycle Axis

## E-commerce site's life cycle

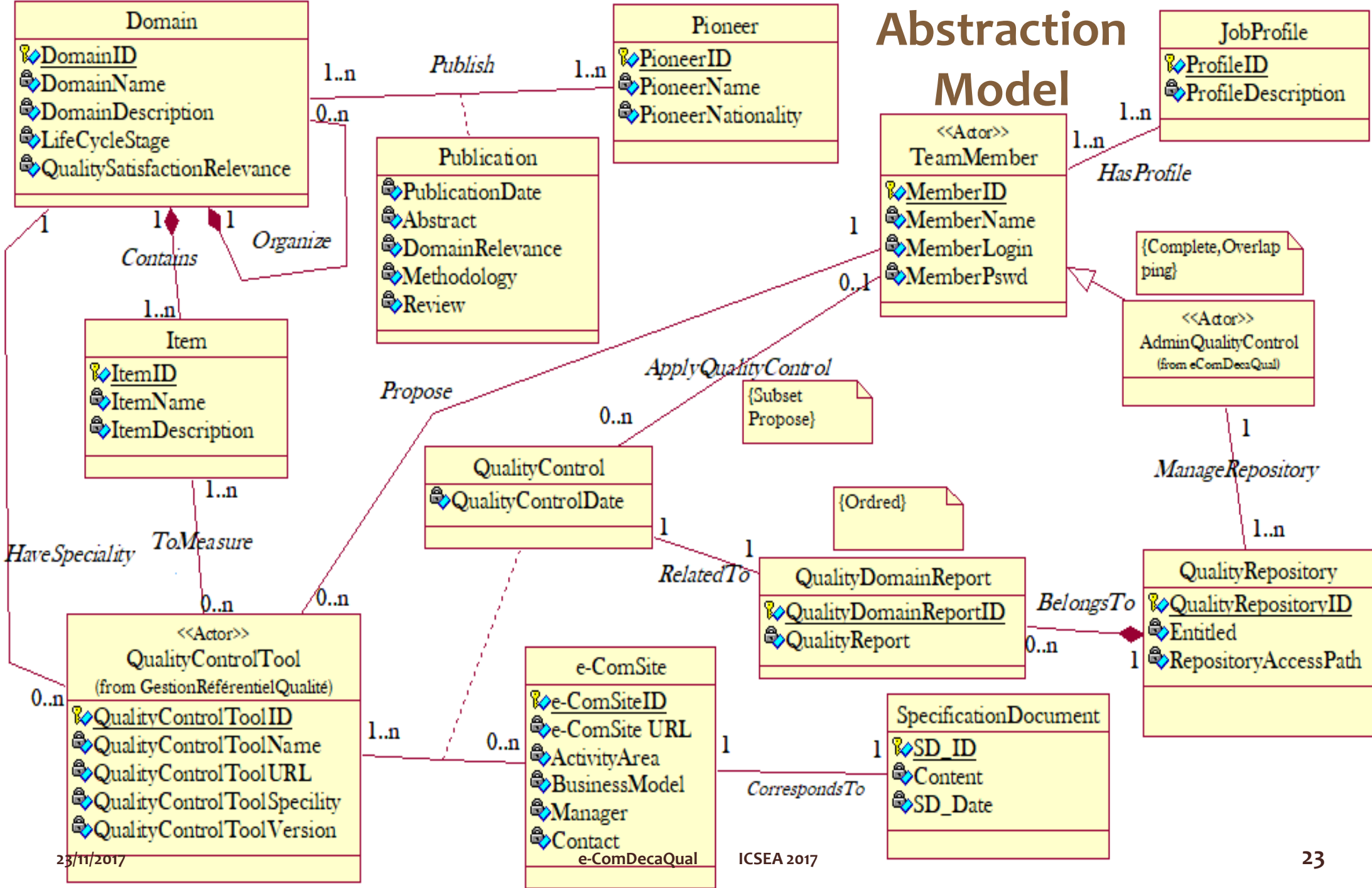


**PDCA : E-commerce site's continuous improvement cycle**

**PDCA Axis**



# Abstraction Model

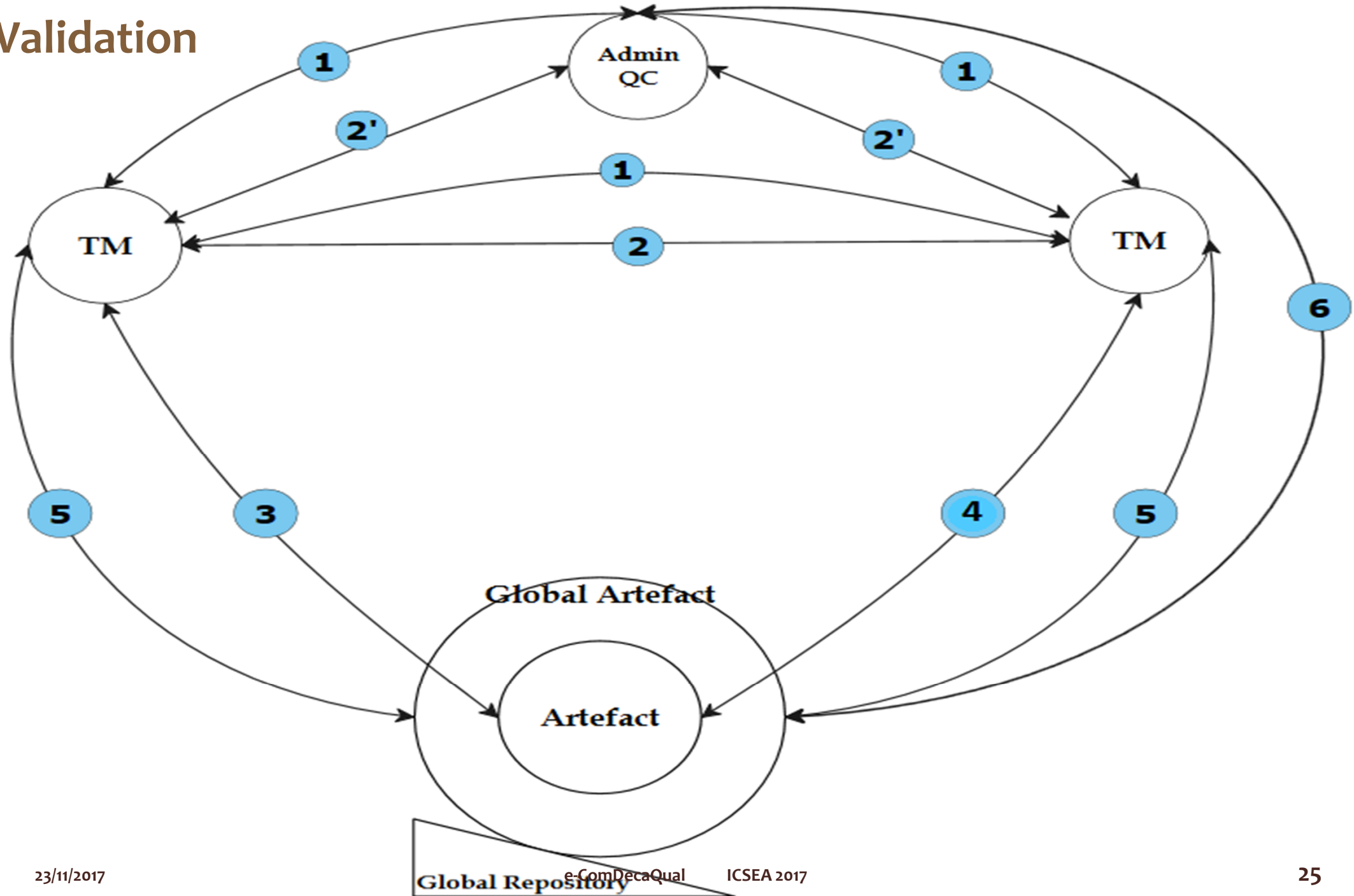


# Validation

- Validation of quality guidance Framework by a Computer Supported Collaborative Work
  - ✓ Computer-Supported Cooperative Work (CSCW)
  - ✓ Groupware
- *Collaboration, Cooperation, and Communication (3C) specification of e-ComDecaQual's CSCW*



# Validation

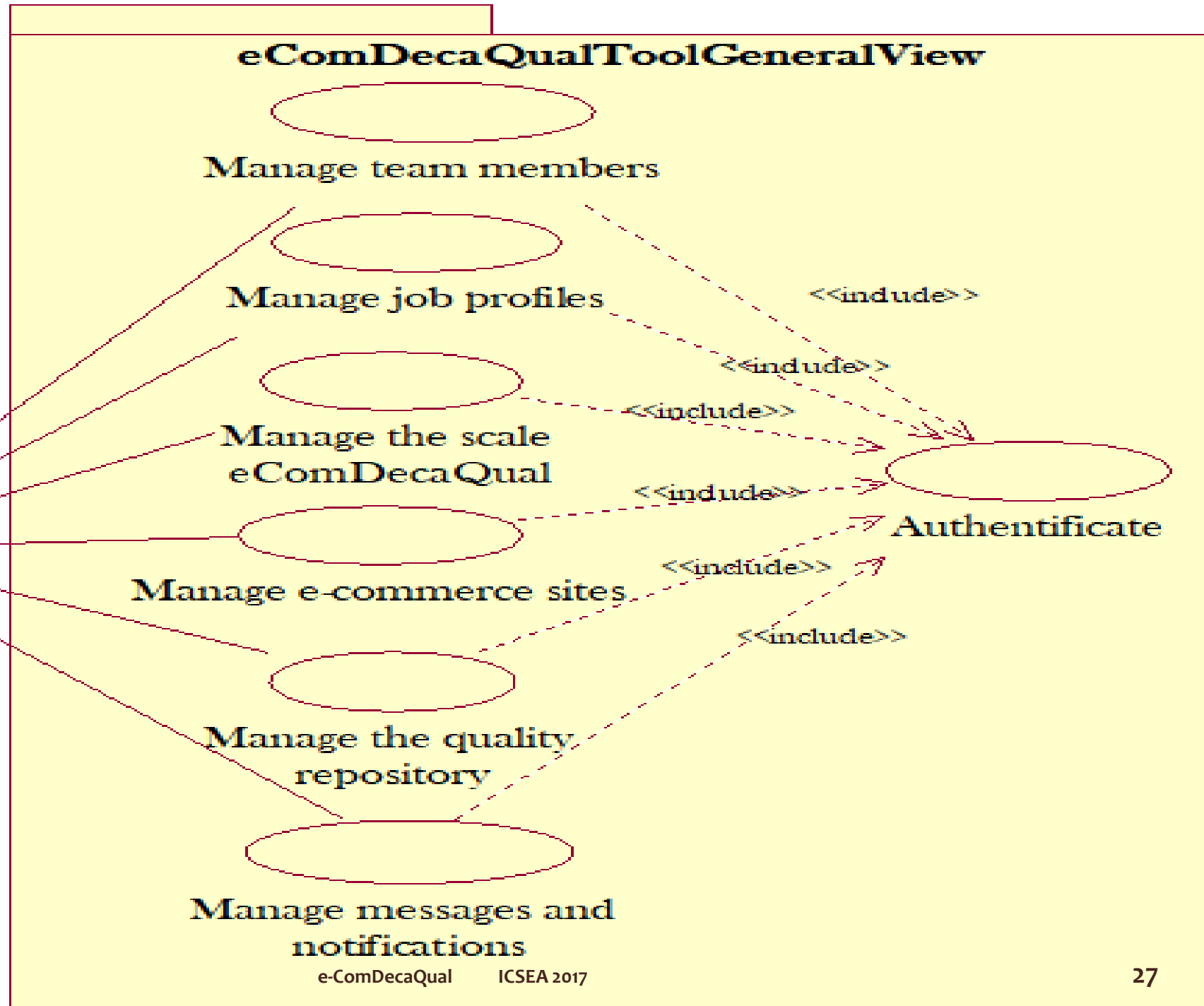


## Legend

<b>Admin QC</b>	Quality Control Administrator /Project Manager	<b>2</b>	2- Direct communication between team member with the same profile: Computer-Mediated communication (CMC)
<b>TM</b>	A Team Member : can have different or same speciality with another TM	<b>2'</b>	2'- Coordinate
<b>Art</b>	Art: Artefact of work of domain and its items	<b>3</b>	3- Collaboration: Working using platforms, APIs, languages, design tools, frameworks etc...
<b>GA</b>	Global Artefact	<b>4</b>	4- Control quality with dedicated tools, retrieving control report and feedback with shared work objects (versioning Domain quality report) (feedback mistakes weaknesses and warnings)
<b>QDR</b>	QDR: Quality Domain Repository. To be verified	<b>5</b>	5- Cooperate
<b>GR</b>	GR: Global Repository: to be verified and to feed through for communication of awareness.	<b>6</b>	6- Knowledge management by gathering and collecting final quality control reports to constitute the Global Repository
<b>1</b>	1- Understanding: meeting and decision support systems for common understanding		

**TeamMember**  
(from Gestio...)

**AdminQuality Control**



<b>Table 1 Domain 1 Quality control scale of Ergonomics</b>		Ergonomics	Sensation	Ease of Ordering Ease of Contact	Reactivity Interactivity
<b>1- Sub-Domain : Behavioural study</b>			Incitement	Ease of Use	Quality of Design
<b>Techniques</b>	<b>Items Tools (Hardware / Software) / Tips</b>				
<b>User tests</b>	<b>Tools / Tips</b> <a href="http://www.userzoom.co.uk/">http://www.userzoom.co.uk/</a> <a href="http://www.loop11.com/">http://www.loop11.com/</a> <a href="http://theclicktest.com/">http://theclicktest.com/</a> <a href="http://www.keynote.com/">http://www.keynote.com/</a>				
<b>Statistics analysis</b>	<b>Items</b> Bounce rate / Abandon rate / Click rate / Loyalty rate / Redemption rate / Renewal rate / Transformation rate / time spent on site / Unique visitors / Loyal visitors / Most viewed pages / Keyword <b>Tips</b> The correct correlation between keywords entered and proposed content is the guarantee of obtaining quality visits.				
<b>Eyetracking</b>	Assiduous / Distracted / Stealthy <b>Tools / Tips</b> TOBII, Eye Tracking Glasses: Eyetrackers based on contrast analysis algorithms, colours and human faces, record jerks, movement and duration of each eye fixation. The analysis of the look on a screen allows the software to subsequently produce several types of interpretable graphs (Nicola B. 2011). As a user manual, it is necessary to make a copy of the web page and then upload the image file to the feng-gui site.				
<b>Mousetracking</b>	<a href="https://www.clicktale.com/">https://www.clicktale.com/</a>				
<b>Stage of approach :</b> During design / Immediately after hosting and publishing the site <b>Responsibility of whom?</b> Designer/ Web analyst / Marketer					

2- Sub-Domain: Structural study	
Structures / Objects	Items Tools / Tips
<b>The site tree</b>	<p>Organization and presentation of the headings must be reasoned according to user's logic.            Intelligent distribution of contents according to the zones (customer space right up just below caddy, just below sharing social networks, sharing redundancy on the footer)            Grouping and intuitive theme and according to the user's expectations            Catalog Categorization Logic behind categorization redundancy  <b>Tools</b> Microsoft Visio allows you to represent the site tree <a href="https://www.microsoft.com/fr-fr/evalcenter/evaluate-visio-professional-2016">https://www.microsoft.com/fr-fr/evalcenter/evaluate-visio-professional-2016</a></p>
<b>The home page</b>	<p>Logo / Attractive and distinctive hook line in comparison to other pages            The perceptible and obvious zoning (or cutting header, footer, center, advertising areas, poll area ...) /            Promotions at the central block / Main functions accessible by links / Actuality and useful information up to date  <b>Tools</b><a href="https://www.screamingfrog.co.uk/seo-spider/">https://www.screamingfrog.co.uk/seo-spider/</a></p>
<b>The structure of the site</b>	<p>The e-commerce sites are generally not deep; all the expertise lies in the design of the template and the presentation of the catalog in an intuitive form.  <b>Tools</b> Alyze<a href="http://alyze.info/">http://alyze.info/</a></p>
<b>The structure of the page</b>	<p>Consistency of page blocks / Optimized width / Standard nomenclature for graphics / Standard nomenclature for text / Left block for navigability and advanced search function / Right block if available for advertisements or for survey actions / Le Zoning or blocking respects the associated content.  <b>Tools</b> Alyze<a href="http://alyze.info/">http://alyze.info/</a></p>
<b>The navigation system</b>	<p>Possibility of returning to the homepage always present. Breadcrumbs offer (for user experience) / Sitemap locator. Evident main navigation / Distinguished secondary navigation / Ubiquitous search engine  <b>Tools</b> Majestic<a href="https://fr.majestic.com">https://fr.majestic.com</a><b>ScreamingFrog</b></p>
<b>Stage of approach : Design / Retrieval content/ Media processing/ Integration</b>	
<b>Responsibility of whom? Graphic Designer / Web Designer / Model Designer / Content Editor / Project Manager</b>	

**Table3 Domain 3 Quality Control Scale of Content Structure and Information Richness**

1- Sub-Domain: General aspect of informational content		
Items	Characteristics	Tools / Tips
Page titles	Short, distinguished and eye-catching	<a href="http://www.yakaferci.com/analyse-seo-site/">http://www.yakaferci.com/analyse-seo-site/</a> seoyastwordpress plugins semrush seo majestic
First paragraph	Presentation of the company's activities Legal Notice Product datasheet	<a href="http://www.yakaferci.com/analyse-seo-site/">http://www.yakaferci.com/analyse-seo-site/</a> seoyastwordpress plugins / semrush / seo majestic / google tendances / google analytics / google keyword tool
Internal titles		seoyastwordpress plugins / semrush / seopowersuite seo quake / seo majestic
Paragraph length	One idea Use the link read more	<a href="http://www.yakaferci.com/analyse-seo-site/">http://www.yakaferci.com/analyse-seo-site/</a> seoyastwordpress plugins / semrush / seo majestic
Employed tone	Not too professional Do not require the user to open a dictionary to understand	google keyword tool / semrush / bing keyword
Length of sentences	Short sentences Writing in columns	<a href="http://www.yakaferci.com/analyse-seo-site/">http://www.yakaferci.com/analyse-seo-site/</a> seoyastwordpress plugins / semrush / seo majestic
Visual	Provide qualitative complement to textual content	getblueshift
Length of pages	If the site has an abundant product catalog it's recognized to categorize it well to spread on pages of suitable size (e.g. two screens )	Getblueshift

Content Structure & Information Richness	Variety & Information Quality	Structure
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<b>Visual</b>	Provide qualitative complement to textual content	getblueshift
<b>Length of pages</b>	If the site has an abundant product catalog it's recognized to categorize it well to spread on pages of suitable size (e.g. two screens )	Getblueshift
<b>Responsibility of whom?</b> Content Writer / Editor-in-Chief / Journalist / Marketer		
<b>Stage of approach</b> Writing the presentation content of the company during the development of the site or at the time of change of its activities Writing of product sheets throughout the life cycle of the merchant site		
<b>2- Sub-Domain : Effort to highlight information content</b>		
<b>Items</b>	<b>Characteristics</b>	<b>Tools / Tips</b>
Pace of updates	Important to date publications and deadlines of promotions and offers	analytics
Content Grouping	It is a relevant aid for searching	getblueshift
Cross-sectional links	Help for navigation/ Do not let run away the surfer Assistance with learning and improving the user experience	widget wopdress
Proximity Links	Like "Know more", "Related subjects", "Those who saw it also consulted ..." These links are used to implement cross-selling and Up-selling	getblueshift



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