

# International Symposium on Software Engineering Measurement 2010

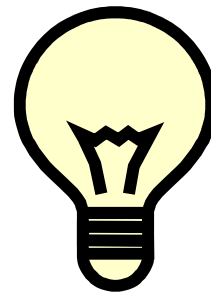
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## Evaluation of Software Process Assessment Methods for Very Small Enterprises

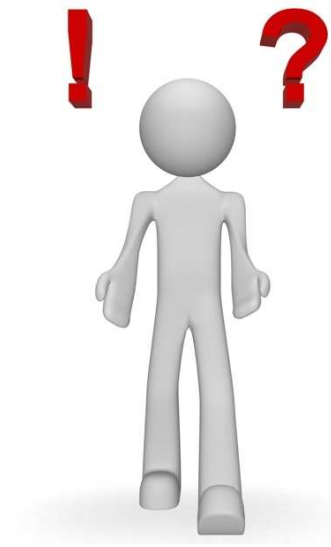
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# Software Development Methods

What methods we have to develop the software?



Which one is the best/optimal method?



## What is the benefit of software process improvement?

- **Increase software process maturity.**

## Why we want to increase process maturity?

- **Provide customer with products that meet their requirements**
- **Deliver the product on time**
- **Deliver the product within budget**
- **To reduce software projects failure**
  - **No more than 16% of SW projects were successful in 2003-2004**
  - **Failure cost is at least 50-80 billion dollar annually**
  - **Some experts estimate the IT projects failure in 2009 around \$6.2 Trillion**

# What is the solution???

## No Magical Solutions

Work with what you have ...

Use the available software development methods...

Choose the one suitable for your needs...

Improve your software development process → You need  
an SPI program → improve your product quality

# What are the main SPI approaches?

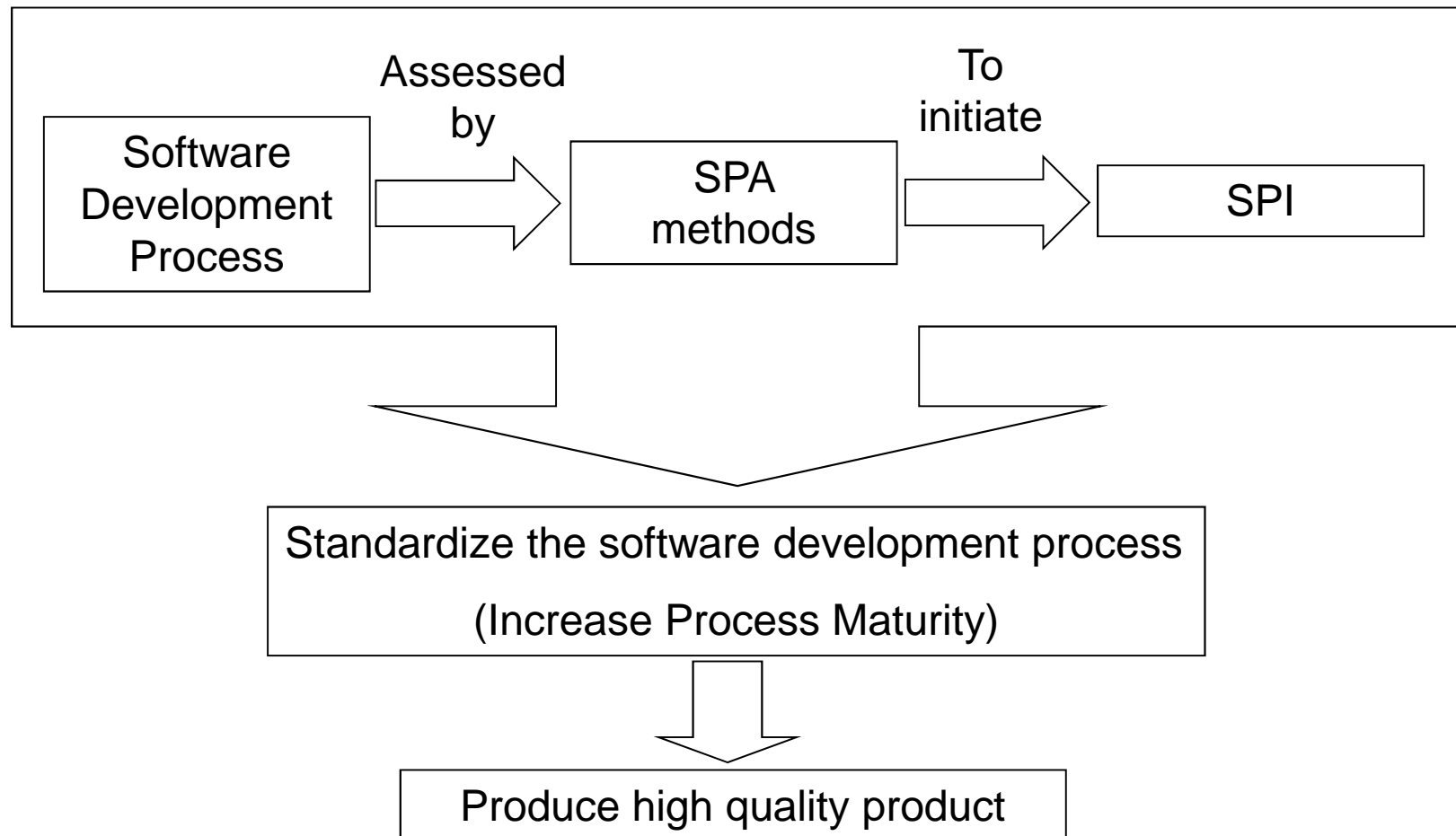
## ● **Top-down approach**

- Compare the organization's process with a generally accepted standard process
- Eliminate the differences between the existing process and the standard one.
- Examples: CMMi, ISO 15504

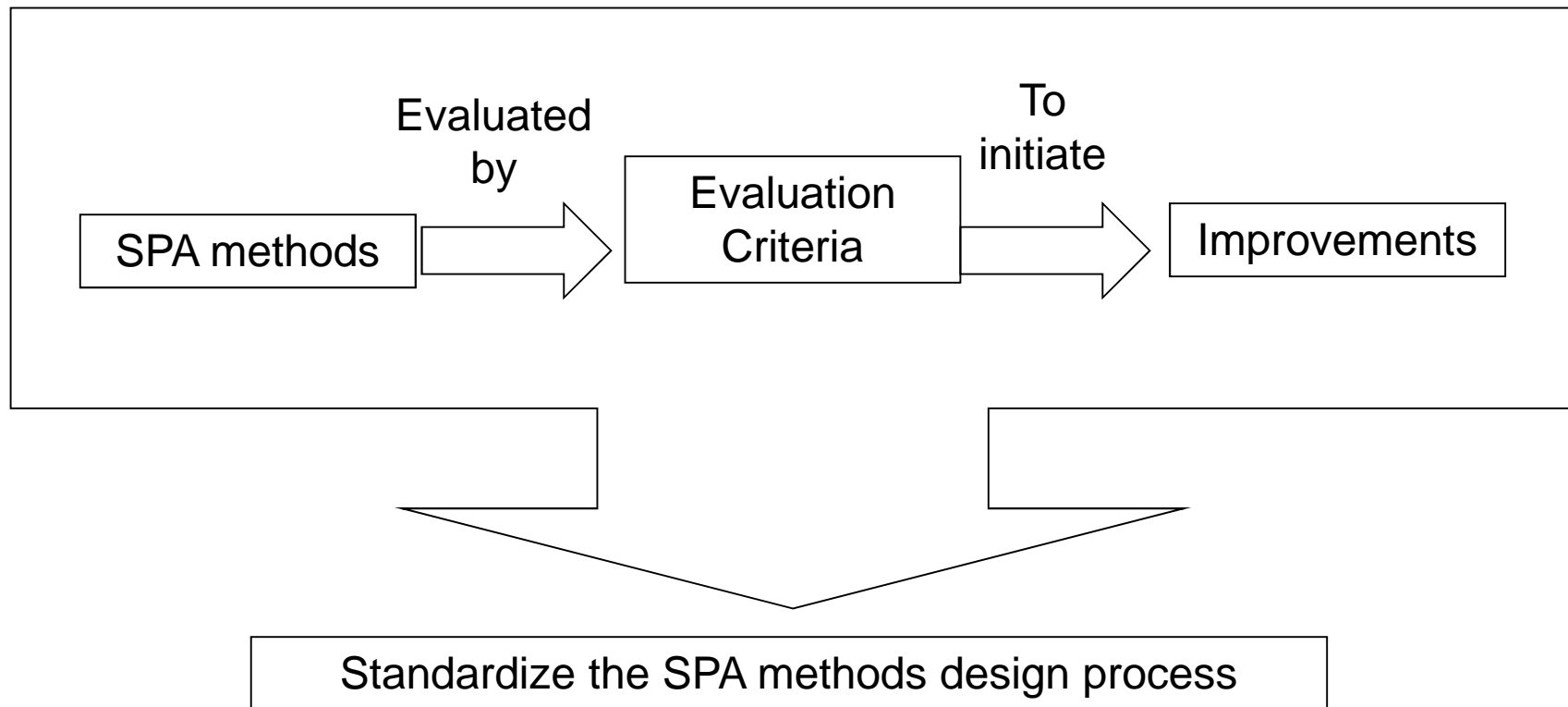
## ● **Bottom-up approach**

- Process improvement is driven by the organization's goal, characteristics, product attributes and experience.
- Change is defined by a local domain instead of universal set of accepted practices
- Examples: Six Sigma.

## View 1: Software Process improvement



## View 2: SPA Process Improvement

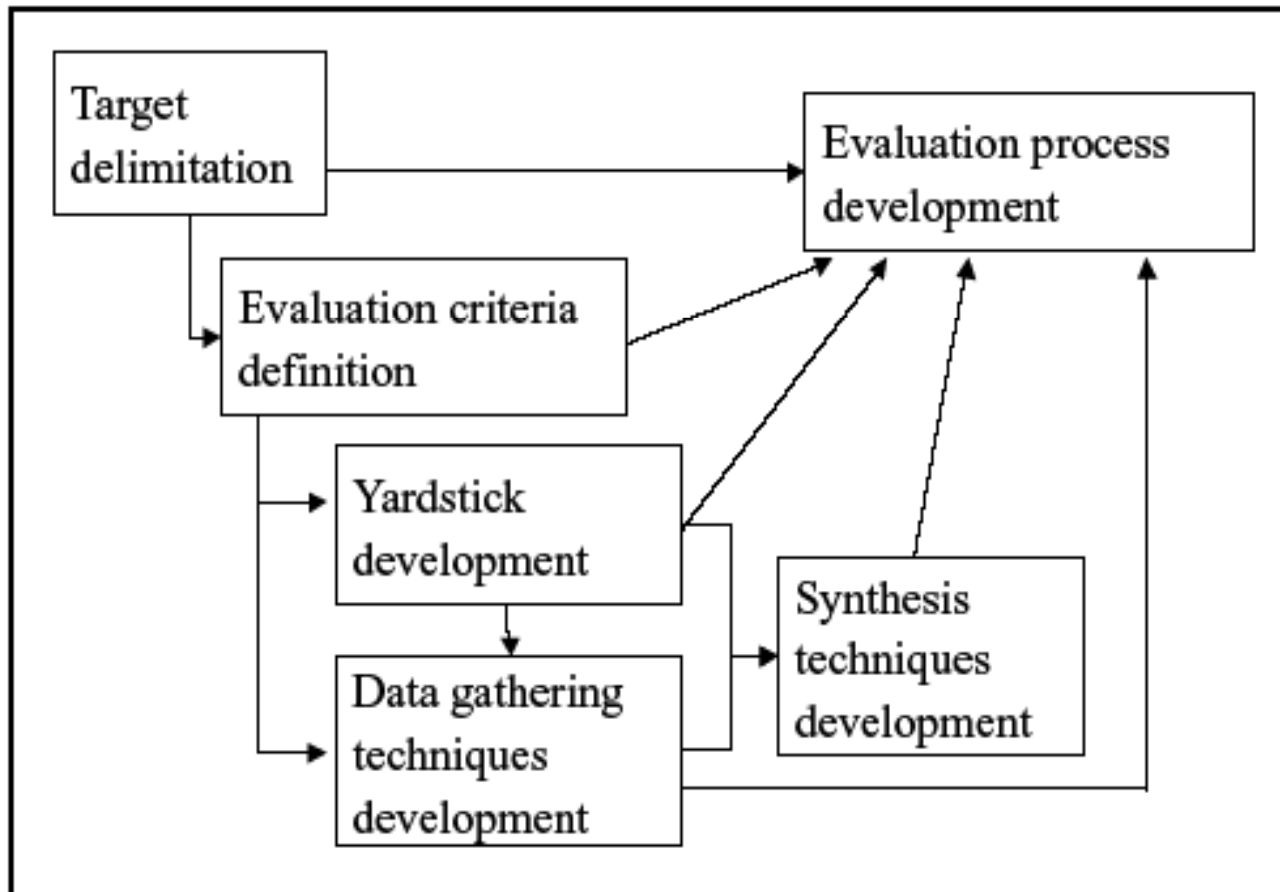


# Evaluation Theory Concepts

- **An evaluation can be defined as the process of determining the quality, value or importance**
- **In the software engineering (SE) field, usually, evaluations are developed and performed without taking into account the efforts and lessons learned in other software and non-software disciplines**
- **Evaluation theory concepts can be used to elaborate more detailed, complete and systematic evaluation methods for application in the diverse SE areas**

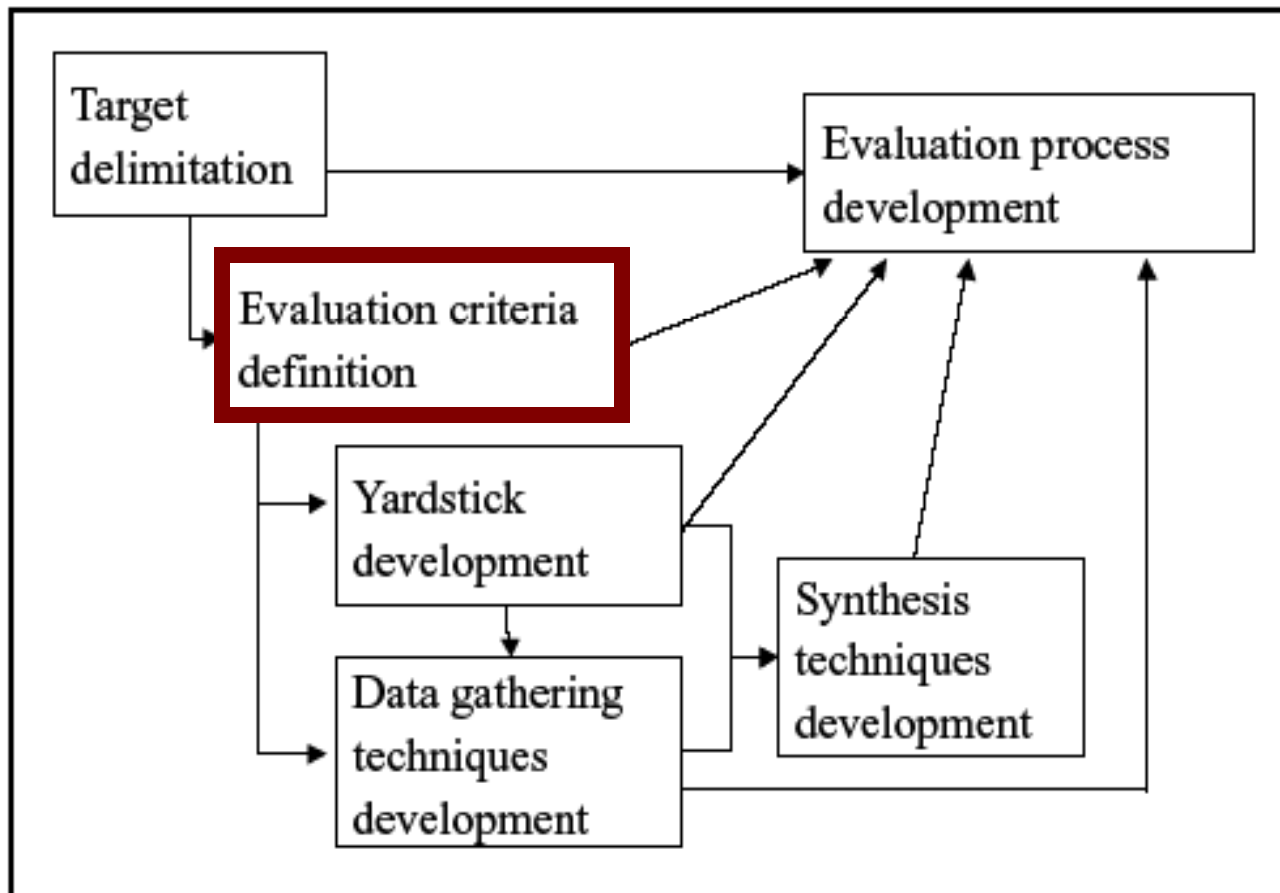
# Evaluation Theory Concepts - continued

Evaluation theory components and their relationships

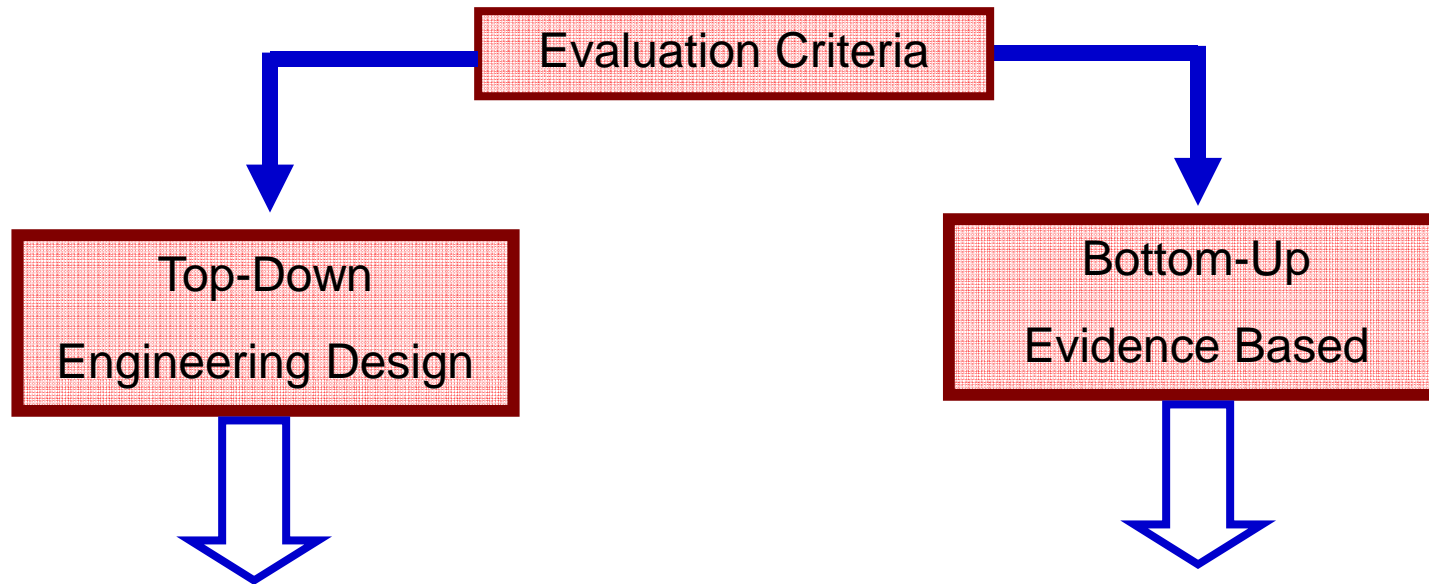


# Evaluation Theory Concepts - continued

Evaluation theory components and their relationships



# Evaluation Criteria Definition

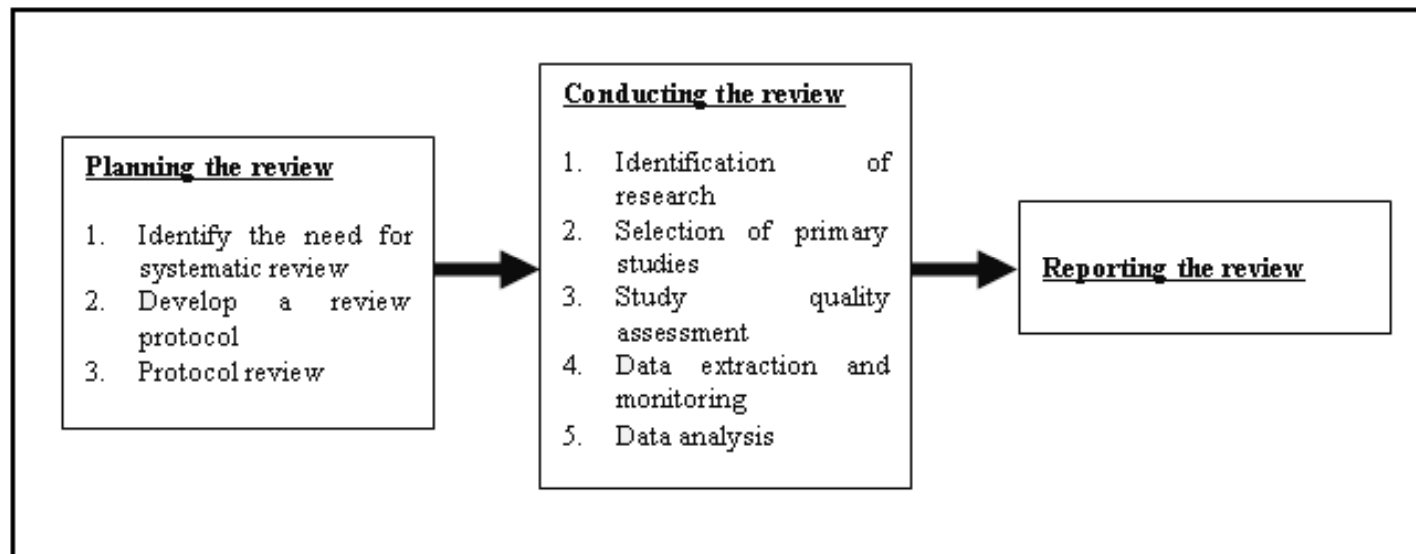


Mohammad Zarour, Alain Abran and Jean-Marc Desharnais, Analysis of the "Design of Software Process Assessment Methods from an Engineering design Perspective", Industrial Proceedings of the 16th EuroSPI2 Conference, 2-4 Sep., 2009, Alcalá de Henares, Spain, pp. 6.37 – 6.44.

Mohammad Zarour, Alain Abran, Desharnais J.M., Buglione L., Design and Implementation of Lightweight Software Process Assessment Methods: Survey of Best Practices , Proceedings of the 10th Software Process Improvement & Capability dEtermination conference (SPICE 2010), Pisa (Italy), 18-20 May 2010, pp.39-50

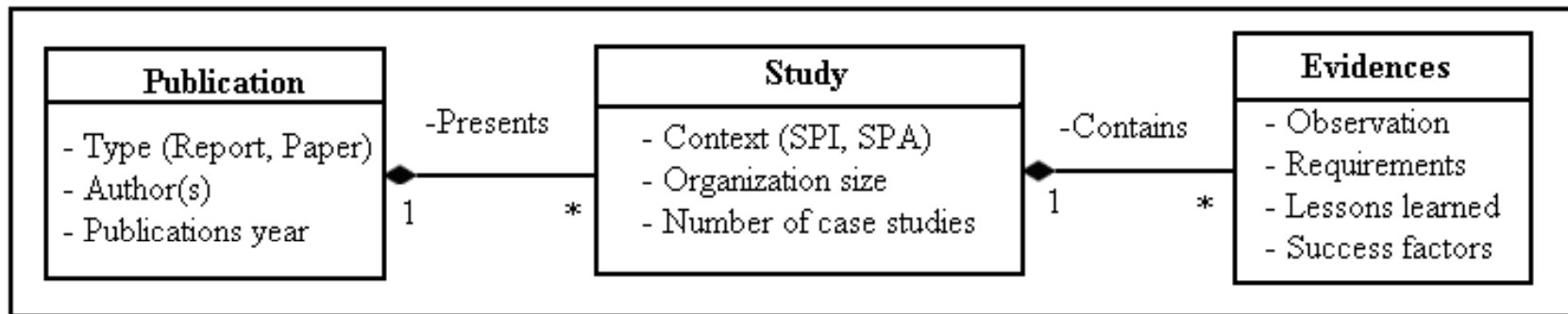
# Bottom-up Evaluation Method

## Systematic Review



## Bottom-up Evaluation Method - continued

### Data Extraction model



1. In the first phase more than 250 publication have been reviewed based on their titles and abstracts.
2. In the second phase a total of 29 publication have selected based on reading the whole article.
3. 207 success evidences have been collected, filtered down into 38 distinct success evidences grouped into five main classes

# Bottom-up Evaluation Method - continued

## Success Evidences resulted from SR and their frequencies

Frequency of <b>method success evidences</b> out of the total number of evidences (207)		
Evidence	Freq.	%
Data from interviews.	3	1.4
Data from documents.	2	1.0
Accuracy of assessment findings (data collected)	3	1.4
Flexible and customizable method focusing on principal high-priority processes.	13	6.3
Coverage of the process reference model.	1	0.5
Identification of strengths, weaknesses, risks and improvement opportunities.	5	2.4
The improvement action plan should be feasible and address the special needs of the company.	4	1.9
Available and usable for on-site assessment and self-assessment.	2	1.0
Comply with formal assessment method.	3	1.4
Simple well-structured questionnaire with no more than 150.	12	5.8
Duration of the interview should be minimum 2 hours.	3	1.4
Reliability and repeatability of the assessment result.	6	2.9
Completeness.	1	0.5

Frequency of <b>supportive tools success evidences</b> out of the total number of evidences (207)		
Evidence	Freq.	%
Usable support tools which cover the different phases of the assessment process	19	9.2
Build and use database of historical SPA data.	5	2.4
(Semi-) Automatic assessment-report generation.	1	0.5
Adaptability/Flexibility.	2	1.0
Support confidentiality of assessment	2	1.0
Ensure repeatability of results.	1	0.5

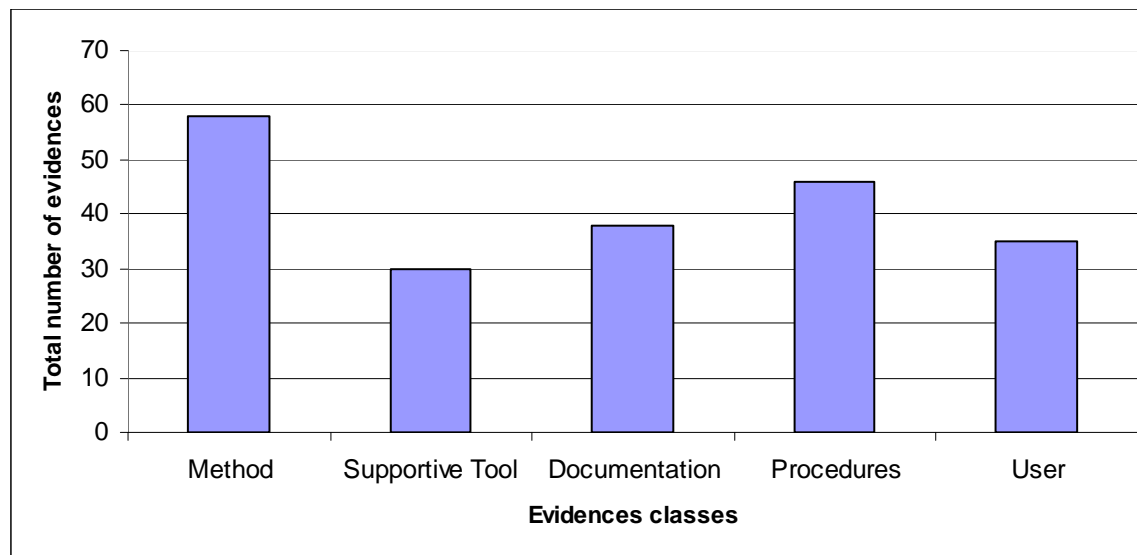
Frequency of <b>procedure related success evidences</b> out of the total number of evidences (207)		
Evidence	Freq.	%
Preparation of the assessment	25	12.1
Build confidence and trust relationships with participants	4	1.9
Produce assessment report delivered to the organization	3	1.4
Ensure confidentiality	6	2.9
Hold feedback session after each assessment.	8	3.9

Frequency of <b>documentation success evidences</b> out of the total number of evidences (207)		
Evidence	Freq.	%
Guidance for identifying assessment purpose, objectives and logistics	2	1.0
Guidance for identifying organizational unit	1	0.5
Guidance for assessment team	7	3.4
Guidance for ensuring confidentiality.	2	1.0
Providing document templates	4	1.9
Documentation of the assessment method and its implementation in practice	16	7.7
Documentation of results of data collection and ratings	5	2.4
Guidance to the follow-up assessors	1	0.5

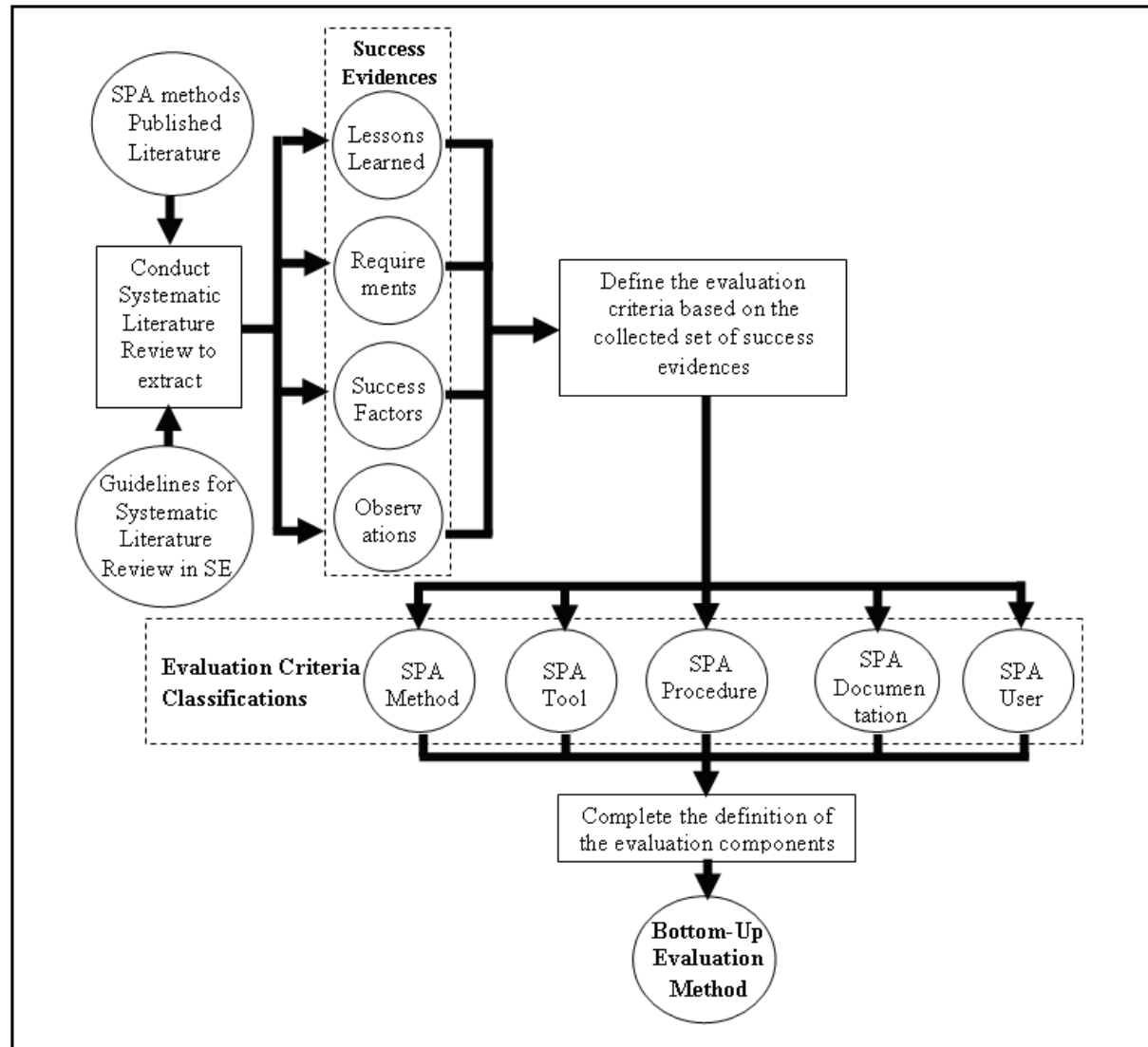
Frequency of <b>users success evidences</b> out of the total number of evidences (207)		
Evidence	Freq.	%
Organization participants' responsibilities.	6	2.9
Assessment team credentials and responsibilities.	5	2.4
Senior management and other staff members involvement.	7	3.4
Commitment.	8	3.9
Benefits: the participants should feel the benefits of the assessment.	5	2.4
Credibility: the sponsor and staff should believe that the assessment will give a result.	4	1.9

# Bottom-up Evaluation Method - continued

Frequencies of evidences per class



# Bottom-up Evaluation Method - continued



## Bottom-up Evaluation Method - continued

Sample of the evaluation method

SPA Method Evaluation			
No.	Question	Answer	Comments
SPA-MQ1	Does the method acquire assessment data from interviews?	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	
SPA-MQ2	Does the method acquire assessment data from documents?	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	
SPA-MQ3	Does the method ensure the accuracy of findings	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	
SPA-MQ4	Is the method flexible and customizable (i.e. possibility of adding new axes) by focusing on high priority processes using certain mechanism?	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	
SPA-MQ5	Does the method provide coverage to a process reference model?	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	
SPA-MQ6	Does the method identify strengths, weaknesses, risks and improvement opportunities?	<input type="radio"/> F <input type="radio"/> P <input type="radio"/> N	

## Conclusion

- SPI is crucial to improve the software quality by improving the software development process quality
- This research works to build a consensus in the process assessment and improvement community on the evidences necessary to achieve a successful SPA method implementation.
- The proposed evaluation method have been formally developed based on evaluation theory concepts and systematic Literature review.

Thank you...

