



# ICSP 2009

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## A Process for Driving Process Improvement in VSEs

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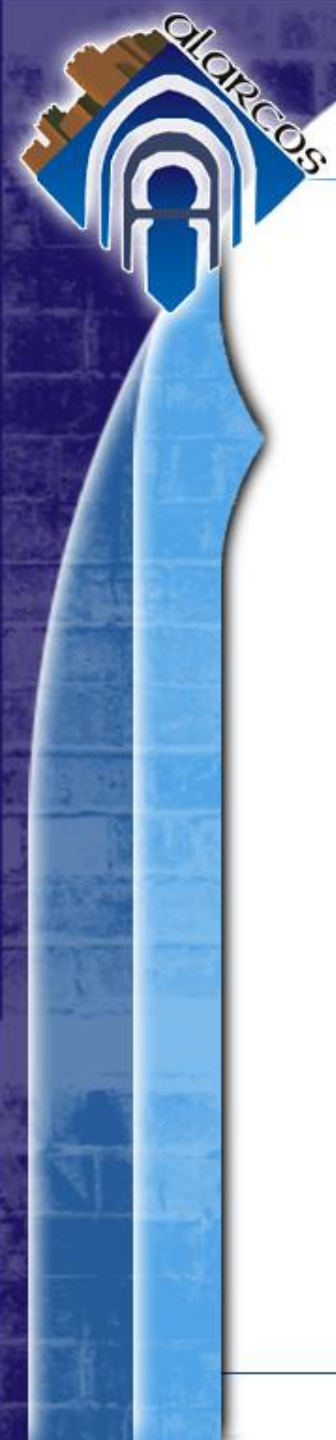
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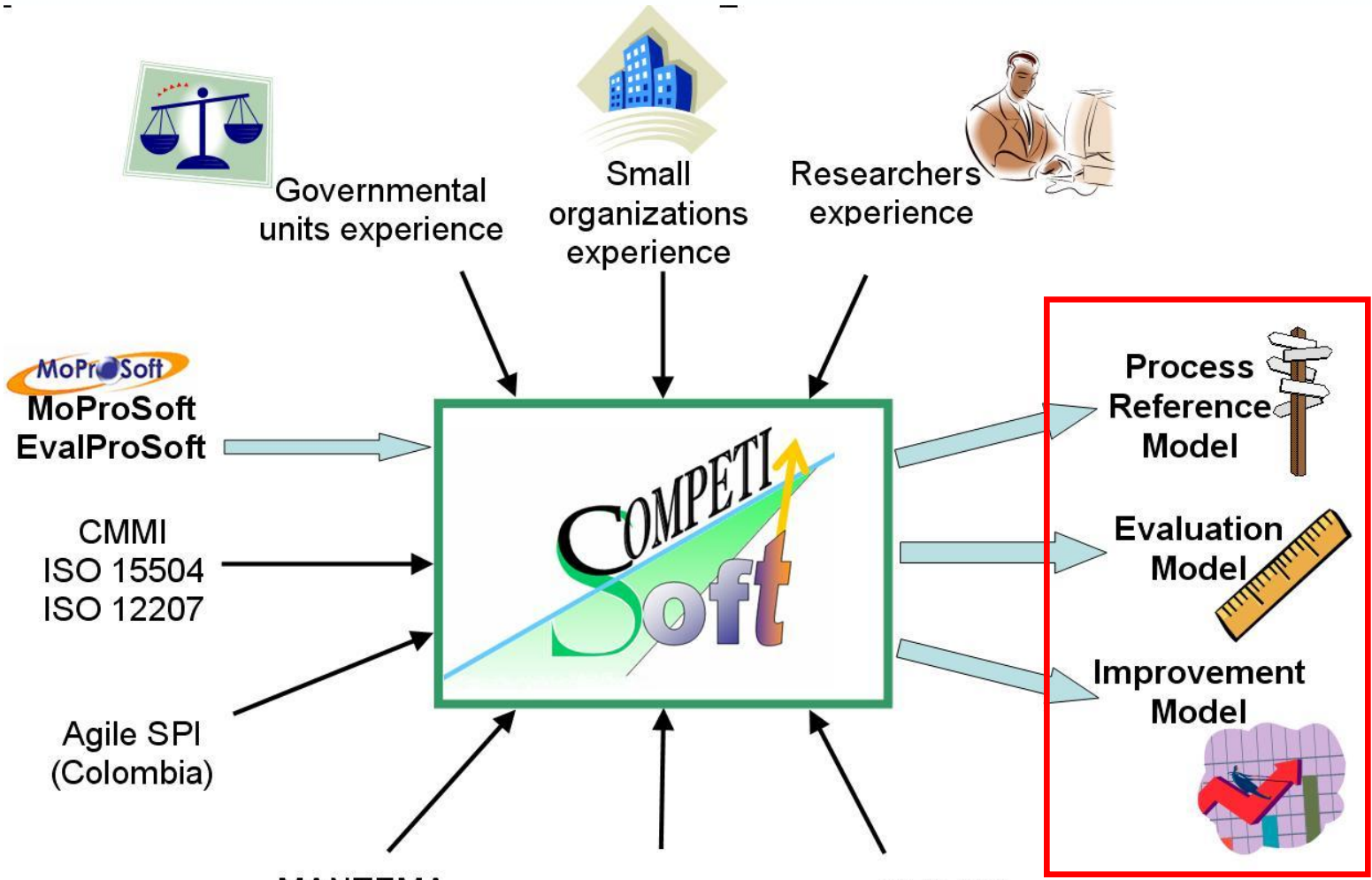


1. Introduction
2. COMPETISOFT project
3. Improvement framework
  - PmCOMPETISOFT process
4. Case studies
5. Conclusions

- SPI in small software companies.
  - Software industry in many countries is composed mainly of SMEs
  - To carry out a systematic SPI initiative in SMEs is necessary:
    - Have good and available practices for software development (**processes reference model**),
    - Determine the state of the processes and discover opportunities for improvement (**process assessment method**)
    - Direct the process improvement activities towards the innermost part of the organization (**model to guide SPI**).

- Traditional SPI models and standards (CMMI, ISO 15504,..) do not suit well this kind of companies.
- The **model to guide SPI** is the used least.
  - It is a **great drawback** because this model provides the guidelines needed to carry out the SPI tasks.
- We have developed the **COMPETISOFT project [1]** in order to address the following issues:
  - To provide a strategy for **increasing** the level of **competitiveness** of Latin-American small firms.
  - To give great **importance** to the **model for guiding SPI activities**.

[1] Oktaba, H., F. Garcia, M. Piattini, F. Pino, C. Alquicira, and F. Ruiz, Software Process Improvement: The COMPETISOFT Project. IEEE Computer, 2007. Vol. 40(10) October pp. 21-28.



## Methodological Framework of COMPETISOFT

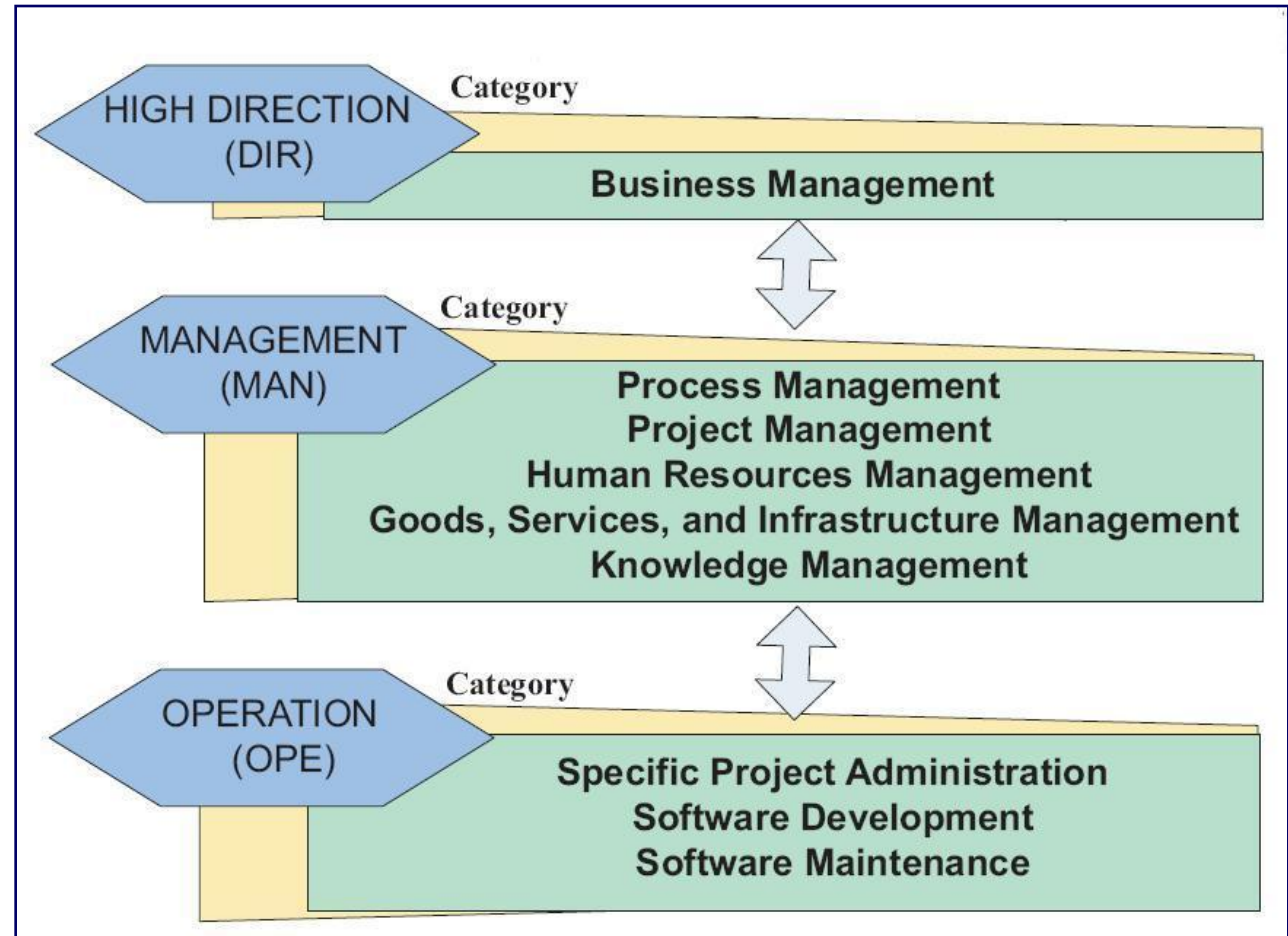
## Process Reference Model of COMPETISOFT



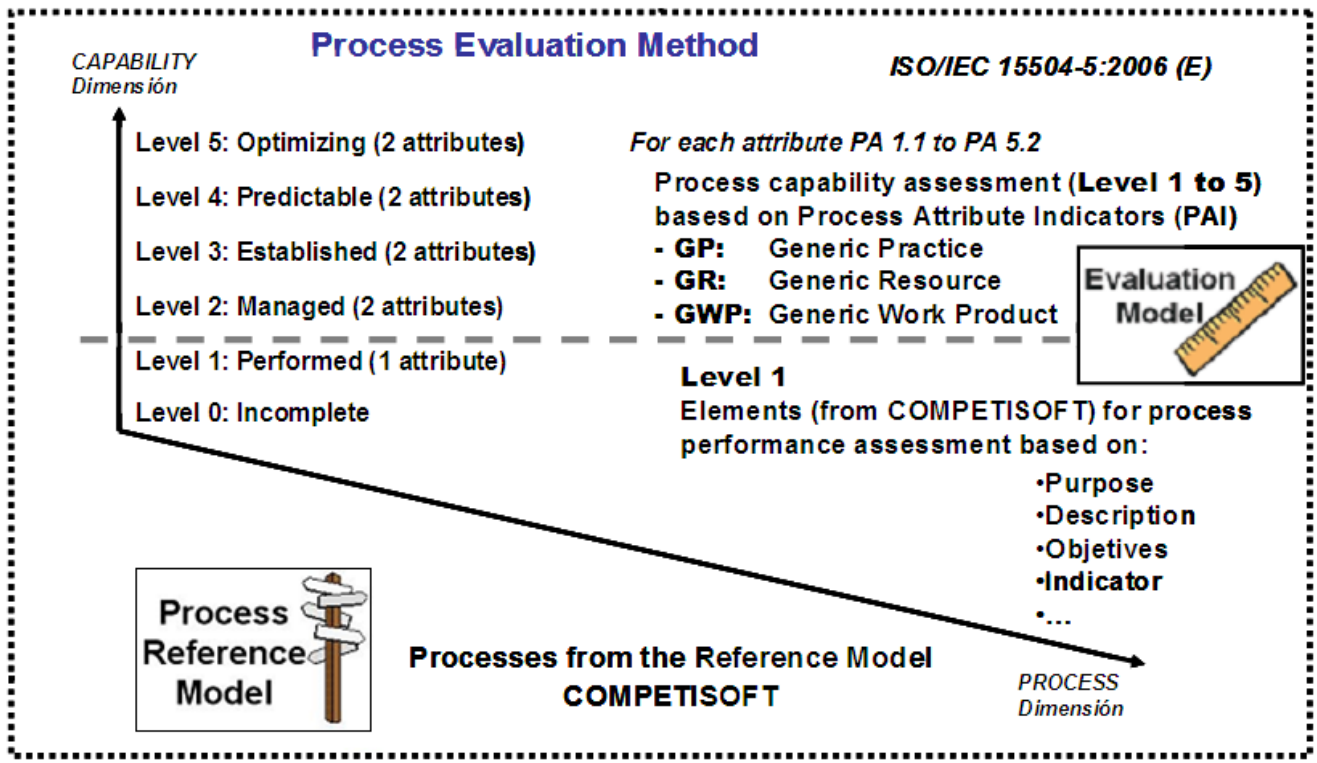
**Process Reference Model**

**Evaluation Model**

**Improvement Model**



## Evaluation Model of COMPETISOFT



## Improvement Model of COMPETISOFT

## Process for driving process improvement in VSEs

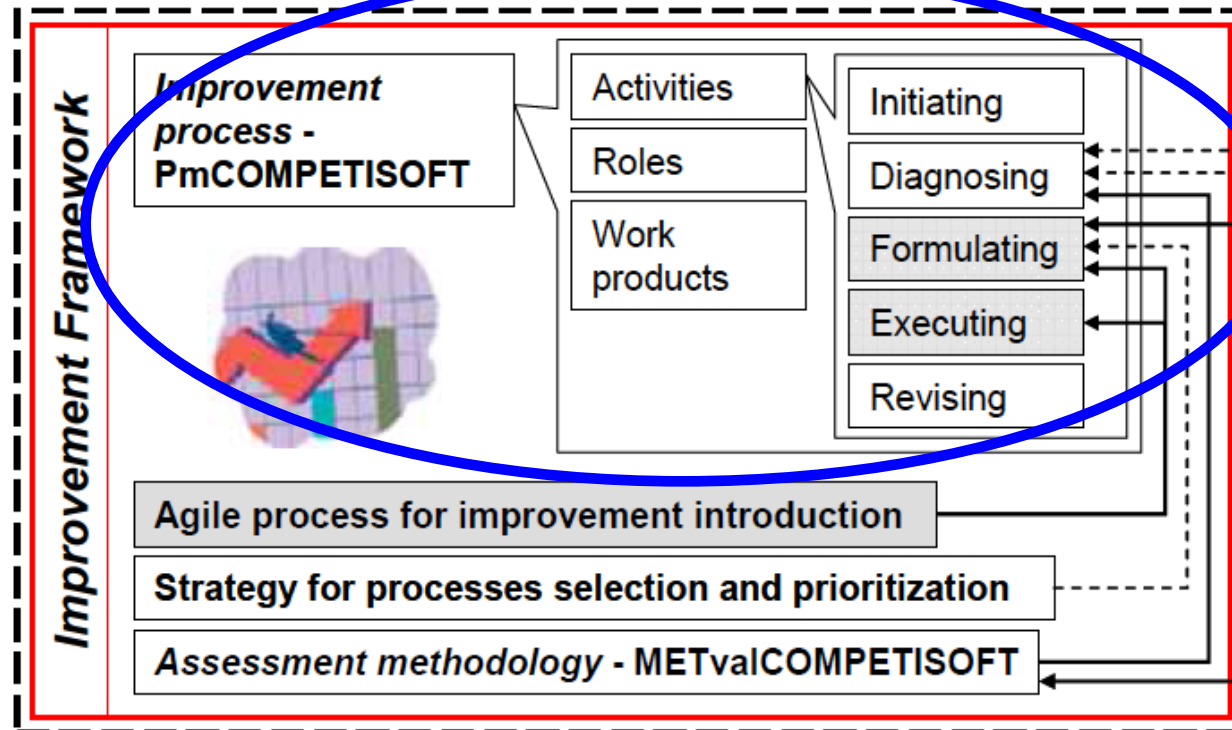
Process Reference Model



Evaluation Model



Improvement Model

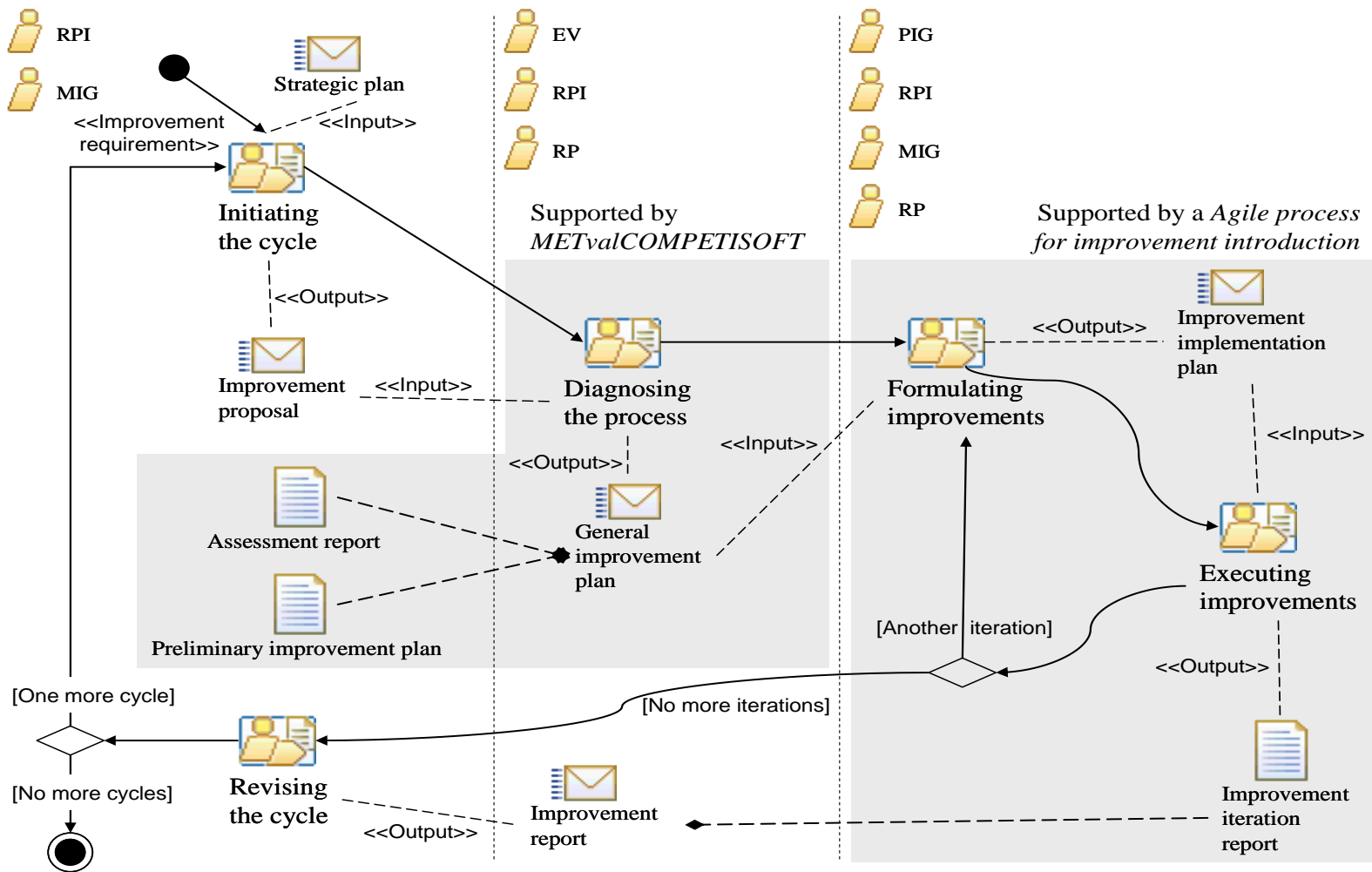



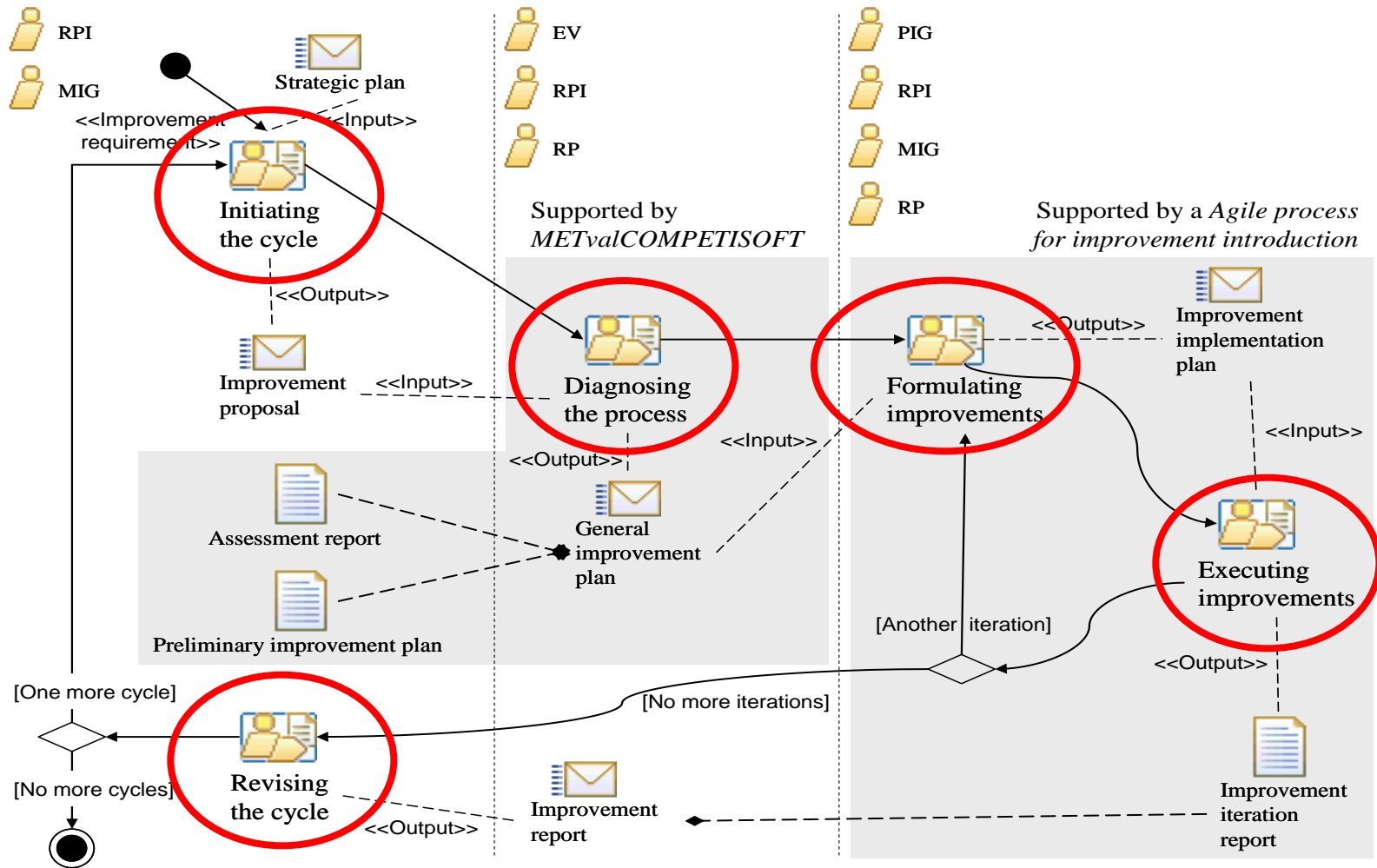
In this paper:

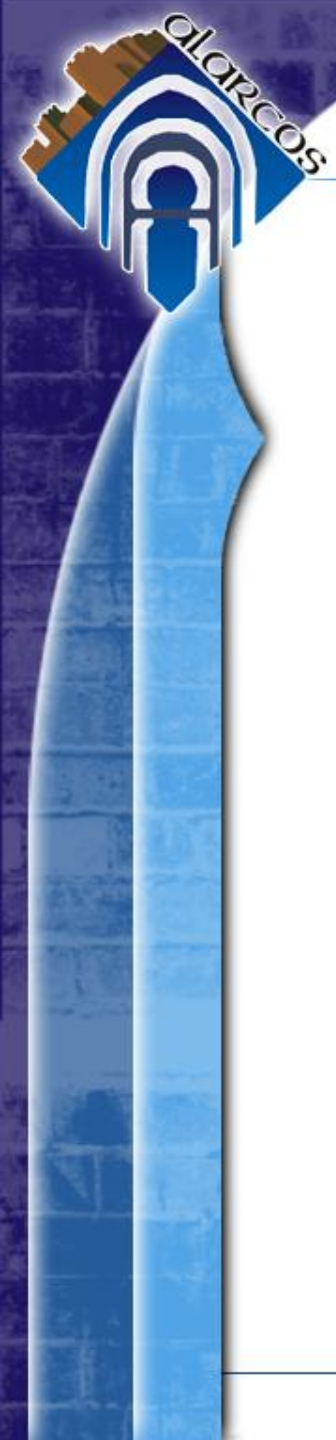
- An explicit process which will be a step-by-step guide to the implementation of process improvement is presented (**PmCOMPETISOFT**)
- PmCOMPETISOFT constitutes the **backbone** of the improvement framework

- PmCOMPETISOFT process **encourages**:
  - Early and continuous achievement of improvements.
  - Continuous and rapid process diagnosis.
  - Elemental process measurement.
  - Effective group collaboration and communication.
  - Continuous learning.
- **Influenced** by: ISO/IEC 15504-4, IDEAL and SCRUM
  - We analyzed, integrated and tailored several improvement practices of these models,
  - **Goal**: to create a specialized and suitable guide which meet the needs of VSEs to carry out SPI.

- PmCOMPETISOFT defines:
  - **Roles:**
    - Responsible for process improvement (**RPI**)
    - Management Improvement Group (**MIG**)
    - Process Improvement Group (**PIG**)
    - Responsible for process or Participant (**RP**)
    - Evaluator (**EV**)
  - **Work products:**
    - Improvement proposal
    - General improvement plan, it make up of:
      - The Assessment report
      - Preliminary improvement plan
    - Improvement implementation plan
    - Improvement report, it make up of the different improvement iteration reports





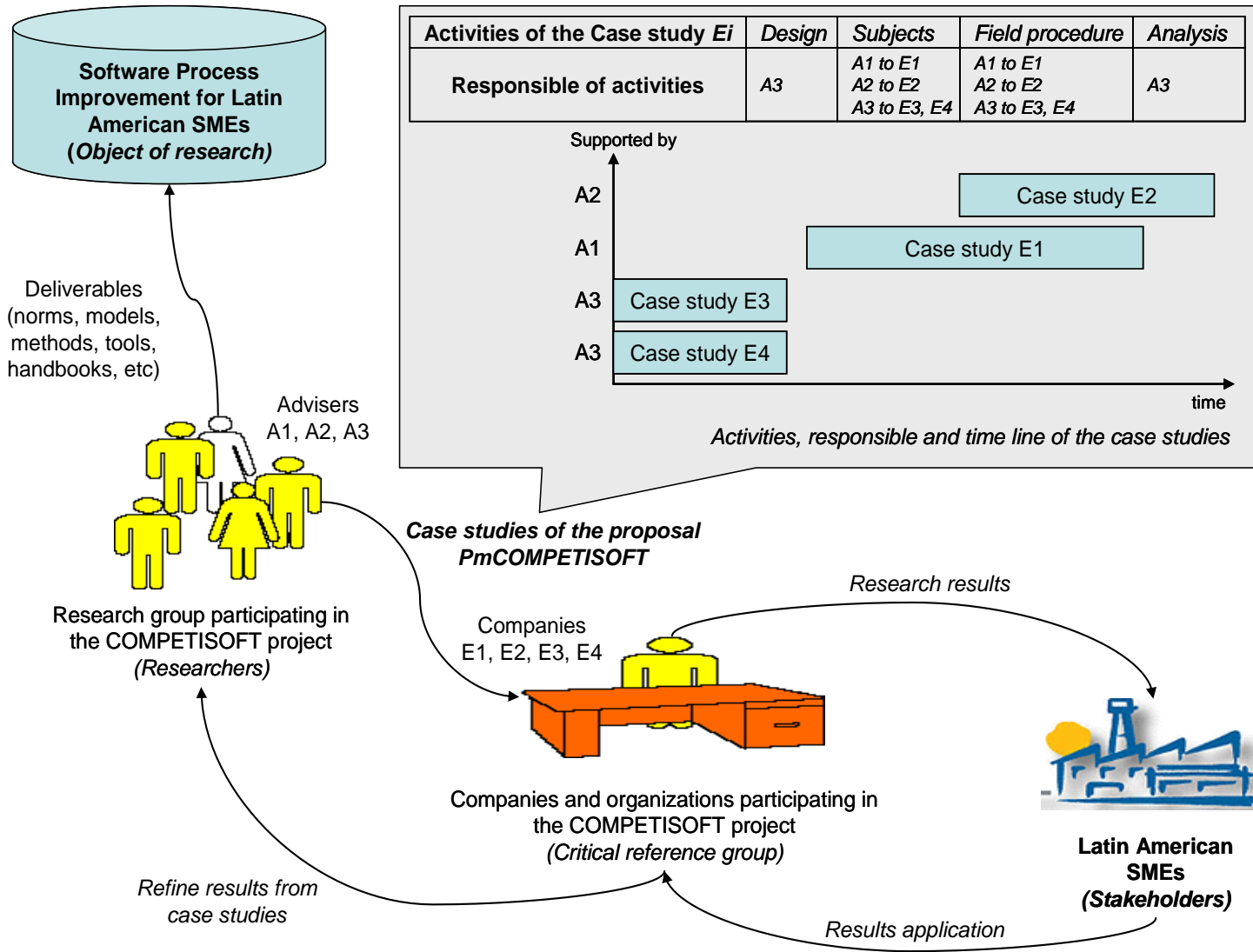


– Five activities:

- Initiating the cycle
  - A **Improvement Proposal** aligned to the organization's strategic planning is created
  - This proposal guides the organization through each of the following activities of the improvement cycle
- Diagnosing the process
  - A **no formal internal evaluation** to discover the general state of the organization's processes is carried out.
  - The results are analyzed to **establish improvement opportunities** of processes and to define their priority.
  - **Preliminary and general planning** for the improvement cycle is carried out.



- Formulating improvements
  - The **general improvement plan** is validated.
  - The **current iteration** is planed and designed.
  - The **strategy** to be followed to improve the process is defined.
- Executing improvements
  - The **improvement opportunities** which correspond with the current iteration are managed and executed.
  - If the improvement opportunities has been **satisfactorily implemented** in the process, it new process is **accepted and established** in the company
  - The **performance and evaluation** of the current iteration and the **analyzes of the improvements** introduced are registered
- Revising the cycle
  - A **post-mortem analysis** of the work carried out in the entire improvement cycle is performed



- **Research question:** Is the PmCOMPETISOFT process suitable for carrying out SPI efforts in VSEs?
- **Design type:** Multiple cases - holistic
- **Measures:**
  - Effort of carrying out the activities of PmCOMPETISOFT.
  - Capability level of the processes under analysis of each company.
- **Companies involved** in the case studies

Company	Country	Employees	Path	Main areas of professional activity
E1	Argentina	8 (7)	15 years / N&I	Development of new tailored information systems with ongoing integration of new technology
E2	Chile	18 (12)	9 years / N&I	Computer Engineering projects for the agricultural (wine and food) industry.
E3	Spain	7 (6)	4 years / N	Software development on WEB.
E4	Spain	21 (15)	12 years / N	Software development through contracts and agreements with public organizations.

**Employees:** Number of employees in the enterprise (People in software development and maintenance)

**Path:** Number of years of existence of the company / scope of the market for its products (National–N / International–I)


- **Analysis units**
  - Activities of PmCOMPETISOFT and processes to be improved in the firms
- **Field procedures and data collection**
  - The procedure governing field procedure and the data collection of the case studies is closely related to the activities, roles and work products of PmCOMPETISOFT.


## Initial and final process capability and effort

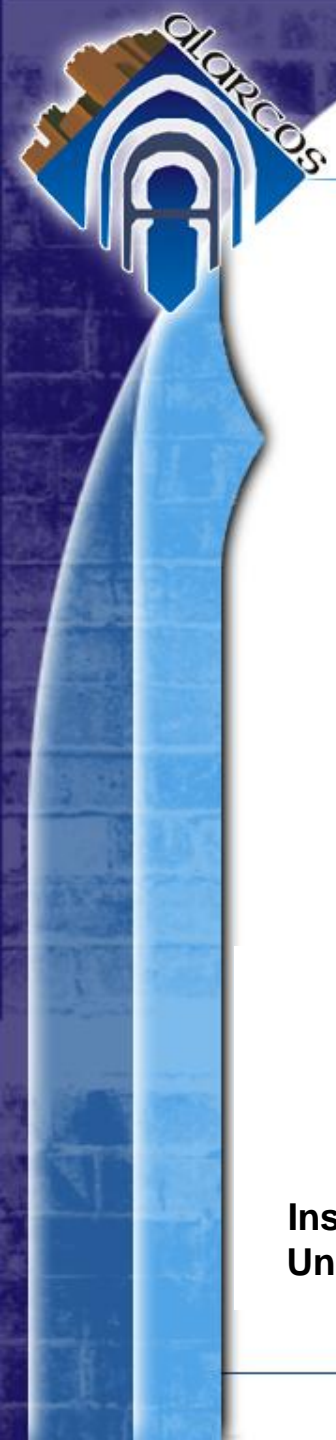
- At the **beginning** and at the **end** of each process improvement cycle an **internal capability assessment** was performed.
- How much **effort** spent to carry out the **improvement cycle** was also registered.

Com.	Assessment	Capability of Processes									Cycle length (months)	Effort (hours)		
		SD	SPA	SM	BM	PM	PjM	HRM	KM	IM		Adviser (A)	Comp. (C)	Total
E1	Initial	+1	2	0	-	-	-	-	-	-	6	40	264	304
	Final	+1	2	*	-	-	-	-	-	+1				
E2	Initial	+1	+1	0	-	-	-	-	-	-	5	89	255	344
	Final	+1	+1	*	*	-	-	-	-	-				
E3	Initial	+1	0	-	-	-	-	-	-	-	3	15	39	54
	Final	+1	*	-	-	-	-	-	-	-				
E4	Initial	+1	0	-	-	-	-	-	-	-	3	41	47	88
	Final	+1	*	-	-	-	-	-	-	-				

\* Base practices of this process have been implanted

- 
- Through the application of the PmCOMPETISOFT process the VSEs:
    - introduced new base practices to their processes,
    - increased the capability of their processes.
  - Effort spent on improvement initiatives:
    - It is approximately one person taking 10 hours/week.
    - We observed that employees of each company were able to take on this effort in SPI activities with no detriment to their daily activities.
  - The companies have reported several benefits of the application of SPI.

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- The VSEs have:
    - Moved from a **chaotic and unpredictable** software process to a **tangible** one
    - Generated a **knowledge base** of their processes
    - Perceived the benefits and they have realized the need to **maintain continuous and ongoing improvement**.
    - Been motivated about SPI:
      - E1 is conducting an **ISO 9001** certification
      - E3 is working in a formal assessment **CMMI level 2**
  - **The results, in terms of effort, increase of capability and benefits, are an indicator that PmCOMPETISOFT can be a practical and useful strategy when facing the difficulty of carrying out SPI in VSEs.**



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!!! Thanks !!!

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**COMPETISOFT**  
Mejora de procesos software para pequeñas empresas