

Comparative Analysis of Software Process Improvement Frameworks for the MSMEs: A Study from Academia

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Abstract

The micro, small and medium enterprises do important activities for all the countries in the world; in particular the scope of the software industry, representing the 99%. However, those enterprises present some resource problems on their delivery times and their product quality. In spite of the existence of frameworks, usually those enterprises do not incorporate them into their processes. In this article, we present a comparative study around the similarities and differences shared between 16 software process improvement frameworks for the MSMEs identified in the literature; the analysis is made with 9 proposed criteria that could be useful for the enterprises looking to incorporate frameworks into their workflows.

Indexing terms/Keywords

Comparative Analysis, Software Process Improvement in the MSMEs, comparison, criteria

I. INTRODUCTION

At present, software has a significant impact in the processes control of the enterprises and the creation of the necessary competition for a global market at its peak. This is why every time more enterprises become interested in the acquisition of enterprise software packages in compliant versions to their needs; related to that increasing demand, the software industry has grown and it has been fortified during the last 2 decades, to such a point that, currently it represents an important economic activity for all the countries in the world.

Micro, small and medium enterprises (MSMEs) are commercial, industrial and independent organizations, conformed by a reduced number of employees, a moderated invoicing volume and a limited market; in the case of the software industry in the majority of the countries, it is mainly conformed by MSMEs, according to [1], they represent the 99% of the total of enterprises at worldwide level (see Figure 1).

Software Development MSMEs at World Wide Level

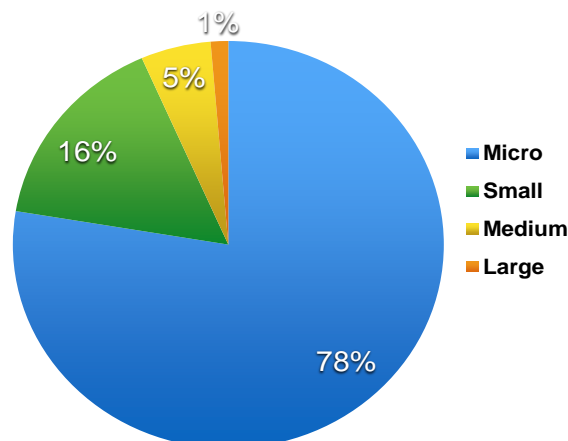


Fig 1: Percentage of software development MSMEs at worldwide level.

The software developments MSMEs are characterized by their limited resources and their success usually reside in the excellence of a market niche. However, worldwide market pressures and imposing incentives, that see the software industry as an important foreign currency source, have taken many of this MSMEs to seriously evaluate the implementation of frameworks such as, MoProSoft, EvalProSoft, COMPETISOFT and the IDEAL Model, headed to processes quality; as well as development methodologies as XP, SCRUM and DSDM, in order to improve the software process.

As a result of a previous study with the purpose of identifying development and software process improvement frameworks, centered in software development MSMEs [2], a need of a deeper analysis and characterization of a group of selected frameworks in this study has been identified, in order to contribute with a comparative study focused on the

similarities and differences between those frameworks, through which organizations can discern and select those that fits better to their workflow, in order to allow their processes control and generate major competition.

This paper is structured as follows: Section II provides the antecedents of our study. Section III describes the methodology used. Section IV provides the comparison criteria generated to compare the selected frameworks. Section V provides the results from the comparative table applied to the selected frameworks. Section VI then concludes the paper by summarizing the results of this comparative study.

II. ANTECEDENTS

In the literature we can find comparative studies where similarities and differences between the characteristics of the frameworks for the software development MSMEs are observed, such as the comparative study presented by Bharti Sharma et al. [3], where he provides a simulation of the frameworks (CMM, ISO, SPIQ and Bootstrap), analyzing the advantages and disadvantages of each one, using as comparison criteria: Origin/Geographic Extension, Scientific Origen, Development, Prescriptive/Descriptive, Adaptability, Assessment, Comparative, Certification, Perspective, Improvement Initiation, Improvement Focus, Main Goal, Process Artefacts and Empirical Validation; Aedah Abd Rahman et al. [4], where he identifies the structural relations between the frameworks (CMMI, ISO/IEC 15504 and ISO/IEC 20000), using as comparison criteria: Discipline and Work Orientation, Improvement Paradigm, Improvement Entity, Rating Scale, Certification and Qualification Schemes and Structural Component; and A. Qumer et al. [5], applying an analytic framework called 4-DAT to the frameworks (XP, Scrum, FDD, ASD, DSDM and Crystal), finding the agility degree of each one, using as comparison criteria: Scope Project Size, Team Size, Development Style, Code Style, Technology Environment, Physical Environment, Business Culture and Abstraction Mechanism.

However, even though there is a large proliferation of frameworks for software development MSMEs, they hardly have a development or software process improvement framework integrated in their workflow. At the same time, there are comparative studies focused on the similarities and differences between those frameworks; however, those studies are outdated, heading organizations into a hard decision make when selecting the best framework for them [6].

III. METHODOLOGY

Based on the systematic review applied to documents related to software process improvement frameworks in the MSMEs [7], we get a total of 49 documents related to software process improvement. From those, a filter was applied in order to know which ones were specifically related to frameworks, leaving a total of 20 documents. Those were grouped in folders depending of which framework they were referring, generating a total of 16 folders referring 16 different frameworks. The selected frameworks and their description are presented in table 1.

The next step was the definition of the comparison criteria, where the following activities were made: 1) Identification of the comparison criteria from previous studies; 2) Analysis and extraction of the common problematics in the MSME documented in the software process improvement frameworks selected; Additionally, in order to get the major information available of each framework, we made a search to find all documents related to each one. The results of these activities gave us the guideline for the definition of 9 comparison criteria, which were used as a base for the comparative analysis of the 16 frameworks obtained.

Finally, we provide each one of the 9 defined criteria with the following format:

- Base Question: Question associated to the criteria to be applied into a framework.
- Description: Detailed explanation of what is the base question about; clarifying what information is desired of the framework.
- Justification: Support of why the criteria were considered for the study, exposing the current problematic in the MSME referenced in the framework documents.

Table 1. Description of the software process improvement frameworks selected

Selected Frameworks Table		
Name	Description	Reference
Adept	An evaluation method that combines two evaluation methods (one based on planning and the other based on the agility), supported by the project: Global Software Development for the Small and Medium Enterprise of the Ireland Science Foundation as part of Lero—The Research Center for the Ireland Software Engineering.	[37]
Klas et al Framework	A framework focused on achieve an improvement balance in the quality assurance strategy, taking as base and refining, the activities included in the QIP (Quality Improvement Paradigm) framework, supported by the Federal Ministry of Education and Research from Germany.	[27]
Lina Zhang et al Framework	A framework looking to integrate CMMI into the small and medium enterprise by adapting the key practices from the CMM.	[38]

Name	Description	Reference
Robert W. Ferguson et al Framework	An evaluation method focused on verify the progress and the quality during the project, in order to make decisions that mitigate the problems that show up and reduce quality risks, supported by the United States Federal Government within the Carnegie Mellon University.	[39]
CBPA	A framework that priorities the software process requirements obtained from multiple stakeholders by incorporating inter-perspective relations among the requirements, supported by the United States Software Engineering Center within Toshiba Corporation from Japan.	[40]
MECA	A framework focused on the continuous monitoring and the software process improvement.	[41]
METvalCOMPETISOFT	An evaluation methodology focused in the software processes diagnostic, in order to identify strengths, weaknesses and risks on the small and medium enterprise software processes.	[42]
Micro-Evaluation	An small enterprise software processes evaluation framework, as support for the evaluation questionnaire: Micro-Evaluation, defined in the OWPL framework.	[43]
MPS Model	An evaluation and software process improvement model, capable of defining rules for the small and medium enterprises for the evaluation and implementation of their software processes.	[34]
Organizational Maturity Model	A software process improvement model, based on the maturity levels from the ISO/IEC 15504 norm and the processes from the ISO/IEC 12207 norm (adapted for the small enterprise).	[35]
OWPL	A Framework that allows to advertise the small enterprise about certain software quality aspects to considerate, as well as, starting a software process improvement mechanism that produce quickly and concrete results with minimum resources.	[44]
QRP	Enterprise software processes evaluation platform that allows establishing relations between their processes and the CMMI processes, in order to head into the desired CMMI level.	[45]
RAPID	An evaluation method for the small enterprise software processes, based on the SPICE framework.	[32]
SPI-LEAM	An evaluation method that allows evaluating the performance of the enterprise processes, in order to take continuous actions for the performance improvement.	[46]
SysProVal	A web tool for software process improvement that allows comparing the enterprise practices with the CMMI-DEV practices (adapted to the small enterprise).	[47]
Tutelkan SPI Framework	Framework used in the Tutelkan Implementation Process Model that prescribes the guideline for implementing CMMI and ISO 9000 practices. Carrying the enterprise in consequence to the capacity of certificate in both of them.	[48]

IV. PROPOSED CRITERIA

In this section, the 9 proposed comparison criteria are described:

1. Applicative Approach

Base Question: Is the framework looking for the evaluation of the current state of the processes of an enterprise, the definition of their processes or their processes improvement?

Description: Criteria for classifying the purpose (evaluation, definition or improvement) of a framework in the software process, where:

- a. Evaluation is the classification for those frameworks that analyze the current state of the processes (formal or informal) in an enterprise in order to detect improvement opportunities.

- b. Definition is the classification for those frameworks that allows other enterprises that do not have software processes, create a group of new processes adapted to their capacities and needs, in order to generate the competence

.Improvement is the classification for those frameworks that allows other enterprises that already have software processes (formal or informal), give guidelines that increase their control, capacity and quality when producing software products.

Justification: At present, it is not enough to develop software. In order to be more competitive or simply survive, the enterprises have to improve their software processes looking to increase their quality and their productivity. One of the success keys in the software improvement is the correct definition of the processes that better fits the enterprise [8]. For that, it is necessary to have frameworks capable of evaluate the effectiveness of their software processes. Those software processes evaluations are considered the best way of start in a software process improvement program because they provide the strengths and weakness of the current processes [9].

2. Incorporated Guide

Base Question: Does the framework has a guide for its use?

Description: Criteria for classifying if it has or not, a guide for its implementation and execution of the framework.

Justification: It is important to have a guide that provides practical assistance about the framework desired to use, either for evaluation, definition or software process improvement. If the framework does not have an effective and efficient guide, its implementation could be more expensive in matters of time and money [8].

3. Guide Content regarding the MSME

Base Question: Does the incorporated guide for the framework include document templates, checklist and processes flow charts?

Description: Criteria for classifying if it has or not, the elements commonly used by the MSME to follow processes guides.

Justification: There are methods for the definition of process guides, however few has been created thinking of the MSME context. Among the main elements used by the MSMEs to follow processes guides are: document templates, checklists and processes flow charts [10].

4. Success Cases

Base Question: Are there documented success cases about the use of the framework?

Description: Criteria for classifying if it has or not, success cases where the framework has been used by other enterprises.

Justification: We try to select a framework that contains documented success cases about its use in the MSME. In order to evaluate and validate the use of the framework in an enterprise, provide case studies is needed [8].

5. Base Frameworks

Base Question: On which other frameworks is the framework based?

Description: Criteria for listing which frameworks related to software process improvement were used as a base for the creation of the framework.

Justification: At the moment of choosing a framework, it is important to know if the selected framework has references to other frameworks related to software process improvement. In this fast innovating technology and changing era, the key for the survivability of a software enterprise is the improvement of their processes. This can head into the search of a model that can cover the needs of the enterprise, and it is common that the software development enterprise thinks first of the most popular models such as, ISO 9000, CMM, CMMI, and others [11].

6. Experience

Base Question: Is it required that the enterprise has a staff with experience in the application or formalization of software quality processes?

Description: Criteria for classifying if it requires or not, that the enterprise has a staff with experience in the application or formalization of software quality processes.

Justification: Opposite to the big enterprises, the MSMEs tend to have limited resources, and they do not have a staff specialized in the software process area that can support in the implementation of the framework that requires a certain knowledge level. Therefore, concrete and easy to instantiate frameworks are needed [12].

7. Defined Processes

Base Question: Does the framework require defined processes in the enterprise?

Description: Criteria for classifying if it requires or not, processes (formal or informal) in the enterprise for the use of the framework.

Justification: For the correct implementation of the framework, it is commonly required that the enterprise has defined processes to work, refine and achieve the improvement. However, it can not be discarded that the context of many MSMEs is about not having defined processes, and this must not become an obstacle for defining and implementing software processes. There are case studies where experiences confirm that it is possible to define and implement software processes even in the context of MSMEs that does not have defined processes, in a beneficial and cost efficient way [13].

8. Training

Base Question: What are the certified organisms for the framework training?

Description: Criteria for listing the certified organisms available for the framework training.

Justification: In order to understand and adopt with success a framework, a training gave by a group of professionals about the framework is required. Among the main obstacles that has prevented enterprises from growing beyond the MSME is: the miss of processes culture, the processes complexity, and the miss of training in the use of processes and tools that supports its use [14].

9. Enterprise Size

Base Question: How many employers are needed for the implementation of the framework?

Description: Criteria for classifying the size of an enterprise (micro, small and medium) required for implementing the framework, where

- a. Micro is the classification for those frameworks that require from 1 to 9 employees for its implementation.
- b. Small is the classification for those frameworks that require from 10 to 50 employees for its implementation.
- c. Medium is the classification for those frameworks that require from 51 to 130 employees for its implementation

Justification: The Frameworks tend to require a minimum number of employees for its implementation. We use the term: MSMEs to classify enterprises according to the number of employees they have. However, it is the region or country that determines the values of those classifications. Based on that, the classification to be used for the MSMEs they are: Micro (from 1 to 9 employers), Small (from 10 to 50 employers) and Medium (from 51 to 130 employers) [15].

V. ANALYSIS OF RESULTS

In this section, we provide a comparative table (see Table 2), where the considered software improvement frameworks are listed within the defined comparison criteria. Additionally, an analysis and a discussion about the results are presented.

Table 2. Comparative table of the selected software process improvement framework

Comparative Table									
Framework/ Criteria	Applicative Approach	Incorporated Guide	Guide Content regarding the MSME	Success Cases	Base Frameworks	Experience	Defined Processes	Training	Enterprise Size
Adept	Evaluation	Does have	Does not have	Does not have	CMMI ISO/IEC:15504 EPA	Not required	Not required	Does not have	Micro
Framework de Klas et al	Improvement	Does not have	Does not have	Does not have	QIP(Quality Improvement Paradigm) GQM(Goal/Question/Metric) DFM(Defect flow models) QATAM(Quality Assurance Tradeoff Analysis Method) DCE(Defect Content and Effectiveness Causal Models) CMMI DCA(Defect Causal Analysis)	Required	Not specified	Does not have	Small and Medium
Framework de Lina Zhang et al	Improvement	Does not have	Does not have	Does not have	CMM CMMI	Not specified	Not specified	Does not have	Not specified
Framework de Robert W. Ferguson et al	Evaluation	Does have	Does not have	Does not have	Not specified	Not required	Not required	Does not have	Small and Medium
CBPA	Definition, Evaluation and Improvement	Does have	Does not have	Does have	QFD(Quality Function Deployment) CMM	Not specified	Not specified	Does not have	Not specified

Framework/ Criteria	Applicative Approach	Incorporated Guide	Guide Content regarding the MSME	Success Cases	Base Frameworks	Experi-ence	Def ined Pro-cesses	Training	Enter-prise Size
MECA	Evaluation and improvement	Does have	Does not have	Does not have	PDCM(Plan, Do and Check Act Model) IDEAL Model	Not specified	Required	Does not have	Not specified
ME TvalCO MPETI- SOFT	Evaluation	Does have	Does not have	Does have	Action-Research Method COMPE TISOFT	Not specified	Required	Does not have	Small and Medium
Micro- Ev aluation	Evaluation	Does not have	Does not have	Does have	OWPL(Walloon Observatory for Software Practices)	Not required	Not required	Does not have	Micro
MPS Model	Evaluation and improvement	Does have	Does have	Does have	ISO/IEC 15504 ISO/IEC 12207	Not required	Not required	SOFTEX	Micro, Small and Medium
Organizational Maturity Model	Evaluation and improvement	Does have	Does not have	Does have	ISO/IEC 15504 ISO/IEC 12207	Not required	Not required	Kybel Consulting AENOR Pryma	Micro, Small and Medium
OWPL	Definition, Evaluation and Improvement	Does have	Does not have	Does have	SPICE CMM	Not specified	Not required	Does not have	Micro and Small
QRP	Evaluation	Does have	Does not have	Does not have	CMMI-DEV SCAMPI	Not specified	Not specified	Does not have	Not specified
RAPID	Evaluation and improvement	Does not have	Does not have	Does have	SPICE ISO/IEC:15504 ISO/IEC:15505	Not required	Not required	Does not have	Micro
SPI-LEAM	Improvement	Does have	Does not have	Does not have	QIP(Quality Improvement Paradigm)	Not specified	Required	Does not have	Not specified
SysProVal	Evaluation and improvement	Does not have	Does not have	Does not have	QIP(Quality Improvement Paradigm) CMMI-DEV (adapted) IDEAL	Not specified	Required	Does not have	Not specified
Tutelkan SPI Framework	Definition and Evaluation	Does have	Does not have	Does have	CMMI-DEV v1.2 ISO 9001:2000 COMPE TISOFT	Not specified	Not required	Does not have	Micro and Small

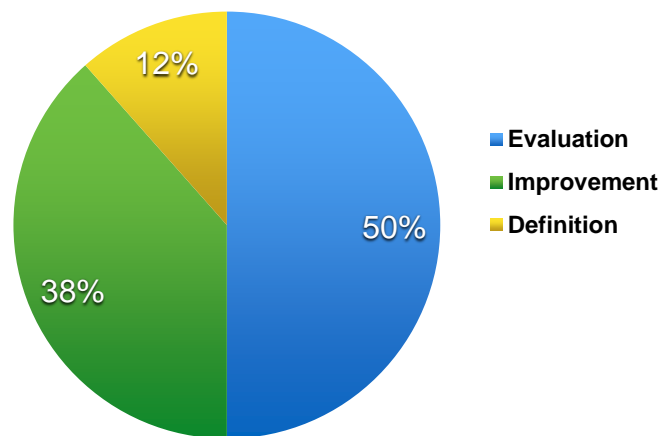
1. Applicative Approach

In the analysis of the frameworks applicative approaches, we considered all the selected framework of the comparison table. We considered too that a framework can have more than one approach. In the cases where studies got more than one approach, those were counted for each approach.

As presented in figure 2, the 50% is focused on evaluation, followed by a 38% on improvement, and the 12% left on definition.

These results suggest that the software engineering community is prioritizing to know the current state of an enterprise and from that point, apply the improvement in their processes using frameworks as references, also considering that some enterprises still require attention when defining their processes. This could be explained as it is incipient the use, knowledge and application of evaluation methodologies. Also, before we can implement a tailored framework that looks for the effectiveness and efficiency of the software development MSME processes, it is necessary to know the state of their processes and identify the enterprise available resources, in order to have elements that allows the improvement and definition

Some past studies about the software improvement implementation have demonstrated a continuous knowledge insufficiency coming from the enterprises, about their effectiveness, turning vital to understand the current state of the processes inside an enterprise, as well as the framework to be implemented, in order to prevent the time, money and effort invested in the framework implementation of becoming a waste [16].

Applicative Approach of the Selected Frameworks**Fig 2.** Percentage of the frameworks according to their approach

2. Incorporated Guide

In the analysis of the software process improvement frameworks that have an incorporated guide, we considered all the selected frameworks of the comparison table.

The 69% does have an incorporated guide, while the 31% left does not.

These results suggest that a big part of the software engineering community consider important to provide a guide that allows understanding the way to implement and execute the steps of the framework. This could be explained as the enterprises (mainly MSMEs) have many complications at the moment of the framework implementation.

There is an assumption at the moment that the enterprises are trying to implement the framework, about the time cost that it could take, especially in the context of the MSME [17][18]. This cause the focus change from the software engineering community for the creation of new processes guides that provide a practical assistance to implement and execute the processes in an effective and efficient way [19][20]. It is possible to mention that the majority of the software process improvement framework guides are written inside the framework definition document.

3. Guide Content regarding the MSME

In the analysis of the framework guide contents, we considered all the selected frameworks of the comparison table.

The 91% does not have a content thought in the MSME, while the 9% left does.

These results suggest that, even though there are implementation guides for the frameworks, these have been documented in a low detailed and informal way.

This could be explained as, even though processes guide definition methods has been developed, these are mainly focused on the digitalization of their documents that traditionally were made in paper for the bigger companies [19][20], whereas from the MSME side, there are only studies about the aspects to be considered before creating a processes guide regarding the MSME [21][22][23].

4. Success Cases

In the analysis of the success cases of the software process improvement frameworks, we considered all the selected frameworks of the comparison table. Also, we only considered as success cases those case studies that showed up a positive impact in an enterprise.

The 50% does have success cases, while the 50% left does not.

These results suggest that the software engineering community is divided the same between those that provides at least one success case about their framework, and those that do not.

This could be explained as, even though the making and presentation of the success cases about the application of a framework are needed in order to validate, accept and improve a framework [24][13][25][26], a big part of the selected frameworks are still in a development phase, showing limitations in the execution of their case studies in order to support their implementation success in the MSME [27].

5. Base Frameworks

In the analysis of the base frameworks, we considered those frameworks that were took as a base for the selected frameworks of the comparison table. Also, we counted those frameworks that were based on more than one framework

into each of the correspondent categories. For their classification, we considered from the CMM series those frameworks based specifically on the CMM, CMMI or CMMI-DEV models; from the ISO series those that were based on the ISO 9001:2000, ISO/IEC: 12207, ISO/IEC:15504 or ISO/IEC: 15505; and for those that do not specified the CMM and ISO series as their bases, they were classified into a category called: Others. In the cases where the base frameworks specified were from the CMM series and also from the ISO series, they were counted for each category.

As followed in figure 3, the 47% is based on the CMM series, followed by a 29% based on the ISO series and the 24% left based on the category: Others.

These results suggest that the CMM series keep being the most used references for the creation of new frameworks, followed by the ISO series; however, other frameworks thought specifically of the MSME has been considered as the only reference for the creation of new frameworks.

These results could be explained as, according to the affirmation of the researcher: Mark Paulk all the enterprises (of every size) involved in the software process improvement, are looking to achieve the CMM series goals [28]. Also, in order to provide support on the definition, evaluation and improvement of their processes, the ISO series have a reference model considered as a standard base [29], explaining why a significant part of the selected frameworks took the ISO series as their creation base. On the other side, a part of the software engineering community consider that, in order to create new frameworks for the MSME, they should take as bases those frameworks that has been created regarding the MSME. For this, there is evidence about the need of implementing software process improvement approaches that could be used by the MSMEs that have a low software maturity level [30]

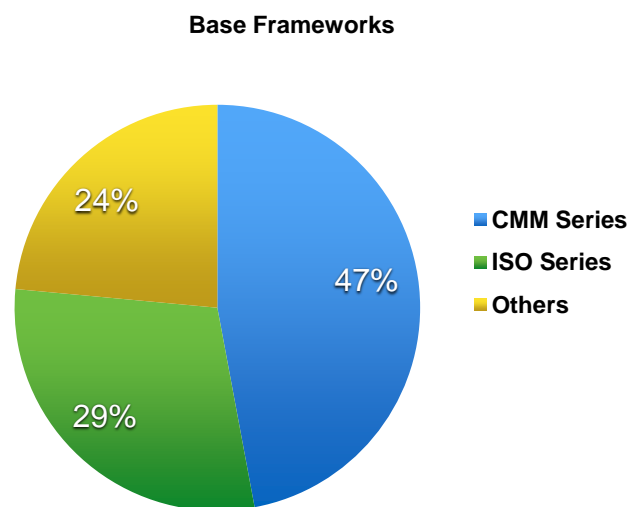


Fig 3. Percentage of the frameworks that were took like base for the selected framework

6. Experience

In the analysis of the experience required for the software process improvement frameworks, we considered only those frameworks in the comparison table that specified if they required experience or not.

The 86% does not require experience, while the other 14% does.

These results suggest that the majority of the software engineering community consider that previous experience is not necessary in order to implement a framework in an enterprise.

This could be explained as there is a clear understanding of how a framework that requires a lot of resources is little attractive for the MSME, considering its financial limitations [31]. Allowing the software engineering community to create their own frameworks, that can be implemented with a little experience, in order to invest as little time as possible and also little money on external entities dedicated to the training and supervision of the implementation. For this, there is evidence about the need of implementing software process improvement approaches that could be used by the MSMEs with a low software maturity level [30].

7. Defined Processes

In the analysis of the need of having defined processes in order to implement and execute a framework, we considered only those frameworks in the comparison table that specified if they required them or not.

The 67% does not require defined processes, while the 33% left does.

These results suggest that a big part of the software engineering community consider that it is not necessary to have a processes base in order to implement a framework in an enterprise.

This could be explained as the frameworks for the MSME has considered the low software maturity level of those enterprises [30]. However, there are studies that affirm that, in order to start a software process improvement initiative, it is necessary to have a visible and defined processes baseline [32].

8. Training

In the analysis of the availability of training for the software process improvement frameworks, we considered all the selected frameworks of the comparison table.

The 88% does not have at least one certified organism, while the 12% left does.

These results suggest that the majority of the selected frameworks are not affiliated to certified organisms responsible of its divulgation, importation and certification.

This could be explained as the popularity of the CMM and ISO series has caused that the majority of the available certified organism in the world being focused in the divulgation, importation and certification only of those series [33]. Those frameworks that has achieved other certified organism different of the CMM and ISO series, is because of their country government support that has invested time and money into the creation of supportive organisms around the framework [34][35].

9. Enterprise Size

In the analysis of the different enterprise sizes considered by the software improvement frameworks, we considered all the selected frameworks of the comparison table. As well, we considered that a framework can be in more than one size category. In the cases where it happened, those were counted for each category. From the other side, for those frameworks that did not specified their enterprise size, we considered them as for the small enterprise category as for the medium size enterprise category (due to its context).

As presented in figure 4, the 42% is focused on the small enterprise, followed by a 35% on the medium enterprise, and the 23% left on the micro enterprise.

These results suggest that there is a major concentration of contributions from the software engineering community to the small and medium enterprises.

This could be explained as at present, the software industry is one of the sectors with greater growth. Motivating the continuous creation of enterprise from 1 to 49 employees, due to the important role they have in the world wide economy taking up a market not considered by the bigger enterprises: the construction of components for products of other enterprises, the development of innovating products, or even offer services or maintenances of products produced by other enterprises [8]. However, the medium size enterprise also takes up an important percentage, due to its capacity of using the same frameworks applied in micro and small enterprises and even demonstrates a better performance in certain areas [36].

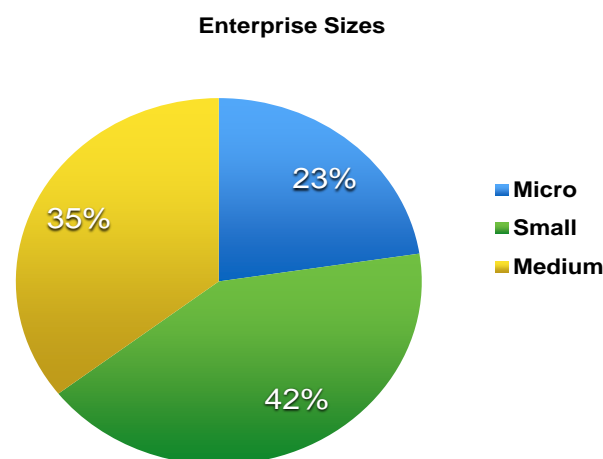


Fig 4. Percentage of the enterprise size considered by the selected framework

VI. CONCLUSIONS

In this research, we go deep into the characteristics that a framework must have, in order to be considered by the MSME. For it, we applied 9 comparison criteria over 16 software process improvement frameworks. From the results of the comparative study, we execute an analysis process that allowed us to obtain the individual conclusions of each criterion. In this context, the following general conclusions were made:

Many researchers affirm the importance of knowing the current state of the software processes in an enterprise and its available resources, in order to define correctly and improve their processes. For that, it is important to consider different

evaluation frameworks, in order to select the framework that better fits to the enterprise workflow considering its available resources.

The presence of an incorporated guide that provides a practical assistance to the MSME 's, can make the implementation times faster. For it, it is important that we count with a guide that provides detailed following steps as well as document templates to be filled.

The authors believe that providing case studies which describe the success of an implementation of the framework in the MSME proves the validity of itself. This could lead to other MSMEs to compare their current state with the enterprises presented by these cases study, in order to be certain that it can work.

Although that many frameworks has been created and has growth to the point of becoming a base framework for other software process improvement frameworks, the CMM and ISO series are still considered necessarily solid bases in the creation of the majority of the frameworks.

Due the MSMEs is characterized by having limited resources (personnel, time and money), the researchers are focused on offering framework that require few or even no experience in the software process improvement topic, as well as the lack of defined processes. In a way that, the MSME can be interested and start with a software process improvement initiative through a framework.

Due the CMM and ISO series has been strengthened to the point of becoming world widely recognized, the researchers used to require the intervention of a government entity from their origin country or the intervention of the software industry, in order to present their developed framework

At present, the software industry has been strengthened to the point of becoming one of the sectors with greater growth, increasing the number of existing development enterprises from 1 to 49 employees. Reason for why the researchers will keep developing more and better software process frameworks with support for the development MSMEs.

At moment to writing the report, the authors have been working on an instrument to measure the perception of the usability of the proposal in MSME 's in the region south-southeast of Mexico.

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