

State of the Art on User Story Mapping and Scenarios to Specify Software Requirements

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Abstract. Requirements engineering is vital to software development, by ensuring software products comply with clients' needs. However, it faces significant challenges, such as failures due to deficiencies in requirements specification, accounting for up to 47% of all failures in software projects. In order to mitigate these problems, adequately capturing the user's domain knowledge and needs through Natural Language models, such as User Story Mapping (USM) and Scenarios becomes essential. This paper presents the state of the art on these two tools for software requirements specification. First, a systematic mapping study (SMS) is conducted and this is complemented by an exploratory study based on a survey in order to collect evidence on the current state of practice on the use of the *User Story Mapping* and Scenarios tools for requirements specification in the software industry. The results of both studies showed that USM and Scenarios are key tools in requirements specification and that using them complementarily enhances accuracy and clarity. Their direct relationship makes it possible to efficiently structure and prioritize needs, by optimizing communication between teams and enhancing the ability of projects to be adapted to the client's requirements, thus establishing an innovative path in requirements engineering.

Key words: User Story Mapping, scenarios, requirements specification, systematic mapping study, survey.

1 Introduction

Requirements engineering is a key discipline in software development. Its main goal is to ensure the developed products meet the clients' needs and the objectives of the organization from the initial stages of a project [1]. Despite its relevance, this area faces multiple challenges. According to the Project Management Institute (PMI), up to 47% of project failures are caused by deficiencies in requirements specification [2]. In

addition, it is estimated that 20% of all failures in a software project originate during this stage [3], which might account for up to 48% of all general errors [4].

The high incidence of requirement-related failures stresses the need to accurately capture the users' domain knowledge and needs. The mistakes made during this stage not only create ambiguities, but they may also have a significant impact on the project's costs and timelines. An effective strategy to address these challenges is to avoid tecnicisms which may generate confusion and rather use approaches that promote clear communication among stakeholders.

Among the most popular methodologies used to mitigate requirements engineering problems are scenarios, which consist of narratives describing specific interactions and usage situations [5]. Scenarios facilitate communication between stakeholders and developers, promoting a shared understanding on how the system should work.

Another methodology is *User Story Mapping* (USM), which organizes the system's features according to the final user's needs [6]. USM provides a clear and structured view of the product, allowing teams to prioritize these needs effectively.

We consider that the combination of Scenarios and USM offers a more thorough approach to describe complex requirements. Such integration might help overcome the individual limitations of each method, thus ensuring a deeper understanding of the user's needs and their interaction with the system.

In order to conduct a research work aimed at improving the requirement management process, particularly in the initial stage of discovery of the software product to be developed, a long-term objective established was to design a method to describe, improve and maintain scenarios through the use of User Story Mapping. Before starting with the method design, a comprehensive analysis of the state of the art was carried out.

This paper expands on the work presented at CACIC 2024 [7], which was selected as one of the best of the conference. This extended version includes an exploratory study based on a survey, with the purpose of collecting evidence on the current state of practice on the use of the *User Story Mapping* and Scenarios tools for requirements specification in the software industry.

It is important to point out that although there is a number of SMS analyzing similar aspects to those presented at CACIC 2024 [7], these studies do not answer all the research questions posed in our research work. Below, we mention the related works addressing various aspects of user stories and requirements engineering in agile environments. Raharjana *et al.* [8] analyze the use of Natural Language Processing (NLP) to enhance the creation and management of users' stories, while Schön *et al.* [9] highlight the importance of collaboration with stakeholders and the permanent adaptation of the requirements. Soares *et al.* [10] explore how the Sprint History technique, an adaptation of User Story Mapping, may be used in software project management. Tomaselli *et al.* [11] propose the AQF framework, which combines the QuAM software quality model with the QuAGI tool in order to improve requirements management in agile projects. In turn, Romera *et al.* Proposes a guide for the management of nonfunctional requirements in agile teams, enhancing effective identification of these requirements as well as communication with the client [12].

Curcio *et al.* [13] suggest integrating agile techniques with traditional practices, focusing on improving document management as well as the management of changes in requirements. Dos Santos *et al.* [14] explore the use of artificial intelligence and NLP to generate user stories automatically. Other works, such as those by Ciancarini *et al.* [15] and Amna *et al.* [16], address users' stories as a form of narrative and their use in agile development, although they do not delve into tools such as User Story Mapping (USM) or Scenarios. Finally, Coutinho *et al.* [17] offer a general view on requirements and test management in agile teams, indicating areas for improvement.

This article is structured as follows: Section 2 presents a systematic mapping study; section 3 describes an exploratory study based on a survey; and section 4 includes the conclusions of the state of the art and future works.

2 Systematic Mapping Study

In the planning phase of the systematic mapping study (SMS), the review protocol is defined: research questions (RQs), search strategy, inclusion and exclusion criteria, data synthesis. The objective of the SMS is to answer the research question (RQ): *What is the state of the art on User Story Mapping and Scenarios for software requirements specification?* This main question can be broken down into a series of sub-questions, which are shown in Table 1 below. In order to conduct the SMS, the guidelines proposed in [18] and [19] were followed.

Table 1. Research questions (RQs) and motivation.

Questions (RQ)	Motivation
<i>RQ1: What contributions have been made in the area of software requirements specification?</i>	To discover the different kinds of contributions that have been made in relation to software requirements specification as defined in ISO/IEC/IEEE 24765:2010 [20]
<i>RQ2: In what domains have the contributions been made?</i>	To identify the types of domains where the contributions were made according to the categories proposed by the Helena survey [21].
<i>RQ3: What models are used to specify software requirements?</i>	To discover the types of models used to specify software requirements.
<i>RQ4: What frameworks and methodologies are used in software projects?</i>	To explore what frameworks and methodologies are used in software projects according to the categories proposed by the Helena survey [21].
<i>RQ5: What type of research works have been conducted in the papers?</i>	To identify the types of research according to the taxonomy proposed by Wieringa <i>et al.</i> [22].

The search for conference and journal articles was carried out in the *IEEE Xplore*, *ACM* and *Springer* digital libraries since these are the most widely used libraries in software engineering research. The search period for conference and journal articles was from January 2014 to June 2024. The year 2014 was established as the starting date for the search because this is the year of the first edition of Jeff Patton's book, where

the User Story Mapping technique is explained [6]. The following string was used for the search:

("User Story Mapping" OR "Story Mapping" OR "User Story Map") AND
("Scenarios" OR "Scenario") AND ("Requirements Specification")

The inclusion and exclusion criteria used for the article selection process are presented in Table 2.

Table 2. Inclusion and exclusion criteria.

Inclusion criteria.
I1. In the event that several articles by the same author address the same research work, the most complete and recent article will be considered.
I2. Articles written in English.
I3. Articles published between January 2014 and June 2024.
I4. Articles containing candidate strings in the title and/or key words and/or the abstract and/or the full text
Exclusion criteria.
E1. Articles which are not oriented to software requirements specification.
E2. Gray literature, master's degree theses, doctoral theses, course material, PowerPoint presentations.
E3. Duplicate articles or partial versions when there is a final version available.

The study selection process consisted of the following steps: 1) conducting the search in the defined sources by applying the string to the title and/or abstract and/or full text, 2) excluding duplicate articles, 3) applying the inclusion and exclusion criteria to the title, abstract and key words, 4) applying the inclusion and exclusion criteria to the full text. This process made it possible to select the primary studies which were analyzed to answer the research questions (RQs) posed. In order to answer each of the research questions (RQs), a classification scheme was defined (See Table 3) together with the data extraction form. A thematic synthesis based on the classification scheme is used, which will be represented through tables.

Table 3. Data extraction form.

Metadata	Paper ID, year, title, authors, type of publication (conference or journal), country, key words
RQ/Dimension	Categories
Contribution	Metrics, Tool, Model, Method, Artifact, Methodology, Practices defined in: ISO/IEC/IEEE 24765:2010 [20]
Types of Domains	Web Applications, Financial Services (Banking, Insurance, Trading), Mobile Applications, Cloud Applications and Services, Other Types of Information Systems (ERP, SAP, etc.) <i>The first 5 most significant domains were selected from the Helena survey since it is an internationally renowned survey [21].</i>

Metadata	Paper ID, year, title, authors, type of publication (conference or journal), country, key words
RQ/Dimension	Categories
Types of Models	LEL, Scenarios, User cases, User Story Mapping, Users' stories, others.
Types of Frameworks and Methodologies	Scrum, Interactive Development, Kanban, Classic Cascade Process, Crystal Family. <i>The first 5 most significant frameworks and methodologies were selected from the Helena survey since it is an internationally renowned survey [21].</i>
Types of research	Evaluation, philosophic, solution proposal, validation, personal experience, opinion [22].

In the execution activity, the search in digital libraries and platforms was carried out and the primary studies were selected in accordance with what was defined in the SMS review protocol. Due to space restrictions, the search strings used in each of the digital libraries are presented in the appendix [23].

The article selection strategy was applied in a total of 33 articles found, and finally 13 primary studies were analyzed. Due to space restrictions, the list of the analyzed studies is presented in the appendix [23].

Table 4 presents a summary of the results obtained from the analysis of the primary studies based on the classification scheme defined in Table 3 to answer the research questions (RQs) defined in the review protocol.

Table 4. Summary of the results obtained.

Id	Results for each RQ				
	Contribution (RQ1)	Types of Domain (RQ2)	Types of Models (RQ3)	Types of Frameworks and Methodologies (RQ4)	Types of Research (RQ5)
[EP1]	Model	Web Applications Cloud Applications and Services	LEL Scenarios	Not mentioned	Proposed Solution
[EP2]	Method	Other Types of Information Systems (ERP, SAP, etc.)	User Story Mapping User Stories Others	Scrum	Proposed Solution
[EP3]	Model	Cloud Applications and Services	LEL Scenarios Use Cases	Others	Proposed Solution
[EP4]	Tool	Mobile Applications	LEL Scenarios	Not mentioned	Evaluation
[EP5]	Method	Mobile Applications	Scenarios	Others	Proposed Solution
[EP6]	Model	Web Applications	Scenarios	Others	Evaluation

Id	Results for each RQ				
	Contribution (RQ1)	Types of Domain (RQ2)	Types of Models (RQ3)	Types of Frameworks and Methodologies (RQ4)	Types of Research (RQ5)
[EP7]	Tool	Cloud Applications and Services Other Types of Information Systems (ERP, SAP, etc.)	Scenarios Others	Others	Evaluation
[EP8]	Artifact	Financial Services (Banking, Insurance, Trading)	Scenarios User Story Mapping User Stories Others	Scrum Iterative Development Kanban Classic Cascade Process Others	Validation
[EP9]	Method	Mobile Applications	Use Cases User Story Mapping User Stories	Scrum Iterative Development Kanban	Proposed Solution
[EP10]	Artifact	Financial Services (Banking, Insurance, Trading)	LEL Scenarios Use Cases User Story Mapping User Stories Others	Scrum Iterative Development Kanban Classic Cascade Process	Validation
[EP11]	Model	Web Applications Cloud Applications and Services	Use Cases User Story Mapping User Stories	Scrum Iterative Development Kanban	Personal Experience
[EP12]	Practices	Other Types of Information Systems (ERP, SAP, etc.)	User Story Mapping User Stories Others	Scrum Iterative Development Kanban	Validation
[EP13]	Model	Cloud Applications and Services	Scenarios User Story Mapping User Stories	Iterative Development	Proposed Solution

RQ1: What contributions have been made in the area of software requirements specification?

Sarmiento *et al.* [EP1] propose a model based on scenarios for the verification and validation of software requirements specification, emphasizing consistency,

correctness, and completeness using NFR patterns. In turn, Silva [EP3] proposes a scenario-based model to guarantee quality in mobile applications.

Ali *et al.* [EP4] present a tool that uses LEL to improve requirements specification in mobile applications under agile methodologies. Sarmiento *et al.* [EP7] also present a tool, which can be applied in different contexts, and which facilitates the creation and management of software requirements.

Jacobson and Cockburn [EP10] discuss the implementation of an artifact for financial services, highlighting its relevance using LEL. Moedt van Bolhuis *et al.* [EP8] propose the validation of an artifact for requirements specification in financial services using *User Story Mapping*.

Kiritsis *et al.* [EP2] present the User Story Mapping (USM) method to structure the backlog and facilitate the communication and definition of domain knowledge. Holl and Elberzhager [EP6] propose a method for generating specific scenarios for the quality of mobile applications. Meanwhile, Neto *et al.* [EP9] focus on the use of a specific method for mobile applications, emphasizing the importance of user story mapping for better requirements management.

Schön's article [EP12] focuses on highlighting the relevance of applying practices such as user stories regarding system implementation.

Ferreira [EP5] and Wirfs-Brock and Hvatum [EP11] present specific models for both web application development and cloud application and service development. They focus on best practices and methodologies to improve efficiency and discuss applicable scenarios.

In addition, Caldwell [EP13] explores the integration of requirements specification and model-based testing in agile development, presenting approaches to combine these practices in order to improve quality and efficiency.

RQ2: In what domains have the contributions been made?

Most primary studies focus on the Cloud Applications and Services domain, totaling 31.3%. In addition, homogeneity is observed between Web Applications, Mobile Applications, and Other types of Information Systems (ERP, SAP) with a total of 18.8%.

Finally, the Financial Services domain (Banking, Insurance, Trading) accounts for 12.5%. It is important to note that no studies were found that did not specify in which domain contributions were made to software requirements specification.

RQ3: What models are used to specify software requirements?

Of all the studies analyzed, Scenarios is the most widely used model to specify requirements, which was found in 9 publications: Sarmiento *et al.* [EP1], Silva [EP3], Holl and Elberzhager [EP6], Ferreira [EP5], Ali *et al.* [EP4], Sarmiento *et al.* [EP7], Moedt van Bolhuis *et al.* [EP8], Jacobson and Cockburn [EP10], and Caldwell [EP13].

The other two models mentioned, User Story Mapping and User Stories, were found in the following 7 publications: Kiritsis *et al.* [EP2], Moedt van Bolhuis *et al.* [EP8], Neto *et al.* [EP9], Jacobson and Cockburn [EP10], Wirfs-Brock and Hvatum [EP13], Schön [EP14] and Caldwell [EP15]. On the other hand, Use Cases for the specification of requirements are mentioned in 4 publications. Finally, LEL, which is another of the models used, is mentioned in 4 publications.

P14: What frameworks and methodologies are used in software projects? Most of the primary studies, 24%, mention that the methodology used in software projects is Scrum,

which is considered an agile work methodology. The other methodologies mentioned in the articles are Kanban and Iterative Development, accounting for 20% of the studies.

On the other hand, 16% of the studies analyzed mention that Other types of methodologies are used that were not specified in the taxonomy of this research question.

In addition, it should be noted that 12% of the studies did not mention the methodology used.

Finally, it was observed that the Classic Cascade Process methodology is mentioned in only 8% of the articles, that is, in 2 articles.

RQ5: What type of research works have been conducted in the papers?

Of the total number of primary studies, there were 6 studies (46.2%) whose research purpose was proposing a solution, mostly models. There are three articles (23.1%) corresponding to the classification and evaluation of the research. Another 3 articles (23.1%) were aimed at validating the research. In addition, 7.7% of the articles were of the personal experience type.

Once each of the research questions (RQs) were answered, the potential threats to validity that could affect the SMS were analyzed using the four categories suggested by Wohlin *et al.* [24].

- Construct validity. Based on recognized literature [5], [6] and [25], the definitions of requirements specification, *User Story Mapping* and Scenarios were established unambiguously.
- Internal validity. A review protocol was designed by the first author and reviewed by the other two authors. The reading of the articles was divided between the three authors to ensure a thorough and objective review. Each author read and evaluated the articles independently. A consensus meeting was then held in which the discrepancies found in the evaluations were discussed and resolved. This process ensured the consistency and validity of the conclusions obtained in the mapping and review of the articles.
- External validity. Three of the most widely used digital libraries in software engineering research (*IEEE Xplore*, *Springer* and *ACM*) were used. Grey literature, duplicate articles or partial versions, PowerPoint presentations, master's theses, doctoral theses or courses taught were not considered.
- Reliability. We attempted to mitigate publication bias by carefully defining (a) the inclusion and exclusion criteria to be able to select primary studies and (b) the exclusion criteria specifically, in order to select rules based on the predefined research questions in the paper. In addition, a form for data recording was designed using Excel and the research questions were mapped according to the classification scheme defined to meet the objectives of this study. The potential effect of this bias is considered to be less important in systematic mapping studies than in systematic literature reviews.

3 Exploratory study

An exploratory study through a survey of 112 software industry professionals according to the guidelines of Molléri *et al.* [26] was performed to collect evidence on the current

state of practice regarding the use of the *User Story Mapping* and Scenarios tools for requirements specification in the software industry and the relationship between them. In the Survey Planning activity, the following elements were defined: the objective of the survey, the research questions (RQ)s, the execution process, the population, the sample selection strategy and, finally, the design of the survey and the administration method.

To define the objective of the survey, the GQM (Goal-Question-Metric) template [27] was used, resulting as follows: “**To analyze** the use of the *User Story Mapping* and Scenarios tools **with the purpose of** understanding their use in the requirements management process in software development **with respect to** discovering the relationship between them **from the point of view** of software industry professionals.”

The research questions (RQs) that guided this survey are as follows:

RQ1: What characteristics do companies have in relation to requirements management?

RQ2: What knowledge does the software industry have about the User Story Mapping tool?

RQ3: What knowledge does the software industry have about the Scenarios tool?

RQ4: Do software industry professionals think that there is any relationship between the User Story Mapping and Scenarios tools?

The execution process consisted of the following steps: 1) Design of a form to keep a systematic record of the survey administration which consists of two parts: a) Survey sending process: number of deliveries and recipients; and b) Delivery tracking process: erroneous emails, number of answered questionnaires and response date; 2) Sending of survey by email. A presentation text was designed in which the purpose of the research, participants, acknowledgment for the collaboration and an invitation for the respondent to distribute the survey among their contacts are mentioned; 3) Daily review of answered surveys; 4) Response extraction and 5) Data extraction.

The population to whom the survey was sent are software industry professionals, including undergraduate and graduate students, researchers and teachers of engineering and requirements management subjects.

Different strategies were used to select the sample: one of them consisted of publishing the survey in *WhatsApp* and *Telegram* groups, another strategy was to publish the survey on *LinkedIn*, and finally the survey was sent directly by the authors.

A self-administered questionnaire was designed for respondents using the *Google Forms* tool.

For the design of the questionnaire, 2 questions were defined to contextualize the participants and 5 questions to gather information about the use of the tools proposed (*User Story Mapping* and Scenarios) and the relationship between them. The questionnaire and the correspondence between its questions with the RQs are found in an appendix due to space restrictions [23]. The complete questionnaire is available at <https://forms.gle/VFSfUxUJgZf6m1ua6>

Once the survey was designed, a pilot test was carried out with a small group of 10 participants, which allowed us to verify the initial estimated response time of 5 minutes, which was then reduced to 3 minutes. The terminology used was also validated; the pilot test participants confirmed its clarity and readability.

At the survey execution stage, participants were recruited using *WhatsApp*¹ and *Telegram*² groups whose members are systems professionals, teachers, researchers, students and alumni of undergraduate and graduate computer science courses. In addition, the survey was sent directly to one of the researcher's contacts of software industry professionals and alumni of undergraduate and graduate computer science courses.

Response management was carried out in accordance with the procedure defined in the planning stage.

Finally, the authenticity of all the email addresses that responded to the survey was analyzed. Then, the responses obtained were analyzed quantitatively and relations between the questions that had the highest percentage of positive responses were established. Finally, a specific question was analyzed that indicates the direct relationship that exists between the Scenarios and *User Story Mapping* tools.

The analysis and interpretation of the results obtained from the survey allowed us to provide answers to the following RQs:

RQ1: What characteristics do companies have in relation to requirements management?

Most of the participants are developers (29.46%); with project leaders in second place (25.89%); thirdly, agile roles (16.96%); fourthly, BI analysts (10.71%); fifthly, functional analysts (9.82%); and finally, systems managers (7.14%). In addition, 81.25% of the participants work in private companies and have agile tools that allow them to manage requirements, while 18.75% work in public companies and know about both tools.

RQ2: What knowledge does the software industry have about the User Story Mapping tool?

Seventy-five percent of respondents indicated that they are familiar with the tool and that it helps them design and understand the workflow over time, describing the business processes of each of the actors that form part of the system through the tasks that must be carried out to complete each of these processes.

Additionally, 64.3% of the respondents said they found the technique easy to use because, in this map, it allows teams to create a dynamic schema of a representative user's interactions with the product, to assess which steps have the greatest benefit to the user, and to prioritize what to build.

Also, only 28.6% of the participants indicated that they are using the *User Story Mapping* tool in their software development projects to graphically represent the processes that comprise the project, the actors and the requirements they request.

RQ3: What knowledge does the software industry have about the Scenarios tool?

Scenarios were defined by 50.9% of the respondents at some point in their work and/or university experience using the Leite model [5], which consists of 6 attributes: (i) a title; (ii) a goal or objective to achieve; (iii) a context; (iv) the resources; (v) the actors and (vi) the set of episodes

¹ <https://chat.whatsapp.com/IuFnmCOIFF6HWuR0WYx1b9>

² <https://t.me/+TyoDjHuaOnJlYTgx>

RQ4: Do software industry professionals consider that there is any relationship between User Story Mapping tools and Scenarios?

Most of the survey participants (96.4%) believe that there is a direct relationship between the identification and definition of Scenarios and each of the main Activities (backbone) that comprise a *User Story Mapping*.

The validity analysis of the survey is described below using the classification proposed by Wohlin *et al.* [24]:

Construct validity. The research questions were carefully defined, as well as the outline of the question categories and the possible values of the answers. The entire process was agreed upon by the researchers so that the object of study was not biased. Other aspects that allowed this threat to be reduced were the fact that, in the invitation email sent to the participants, the purpose of the study and of the questionnaire itself were clearly explained. Participants were also expected to remain anonymous unless they were interested in being contacted to further discuss the questionnaire.

- Internal validity. Our participant recruitment strategy could have been biased by a high probability of similar profiles and by inexperienced professionals. Although there is a certain variety in the roles that participated in the survey, most of the respondents have more than 10 years of experience in the software industry. However, in order to make up for the fact that some of the participants do not know the *User Story Mapping* and Scenarios tools analyzed in this research, they were provided with the definition of both concepts. Another negative factor could have been the difficulty in understanding the questions, which was resolved with the pilot test carried out with 10 respondents. The respondents' motivations could also have affected the answers and, as a consequence, the results of the survey. This was resolved because the commitment to share the results of the survey with the participants was made explicit in the email that was sent along with the survey.
- External validity. Software industry professionals working in SMEs in Argentina were the survey participants selected. This allowed observations to be made on the current state of practice of the software systems deployment process.
- Reliability. The sample size (112 surveys) is considered small to consider the results statistically acceptable. Since this is an exploratory study which analyzes whether software industry professionals are aware of and use two representative tools of the product exploration stage such as *User Story Mapping* and Scenarios and which shows that there is also a relationship between them, it allowed us to fulfill the purpose defined for this survey. In addition, the process was applied in a systematic and rigorous manner in order to make it reproducible.

4 Conclusions of the state of the art and future work

This article presented the state of the art of *User Story Mapping* and Scenarios for specifying software requirements. On the one hand, an SMS was carried out in which 13 primary studies were selected from an initial set of 33 articles from *IEEE Xplore*, *Springer* and *ACM*, in the period between January 2014 and June 2024. Once the primary studies were analyzed, it was concluded that:

- The main domains in which contributions were made to requirements specification are: Cloud Applications and Services (31.3%) and Web Applications, Mobile Applications and Other types of Information Systems (ERP, SAP) with a total of 18.8%.
- The most commonly used models for specifying requirements are Scenarios, which were found in 25.7% of the publications. USM and User Stories are also mentioned in 20% of the studies. Use Cases and LEL are found in 11.4% of the articles.
- As for the methodologies used, Scrum is the most frequently mentioned one in 24% of the primary studies, followed by Kanban and Iterative Development, both in 20% of the articles. Other unspecified methodologies appear in 16% of the studies, while the Classic Cascade process is mentioned in 8% of the studies.
- In terms of types of research, 46.2% of the studies, mainly models, aim to propose a solution. 23.1% of the articles deal with research evaluation, and 23.1% also focus on research validation. In addition, 7.7% are classified as personal experiences.
- The above-mentioned findings highlight the importance of further research into the potential effectiveness of combining Scenarios and USM in software requirements specification.

In addition, in order to collect evidence on the current state of practice regarding the use of the *User Story Mapping* and Scenario tools in the software industry and the relationship between them, an exploratory study was conducted through a survey of 112 software industry professionals according to Molléri *et al.*'s guidelines [26]. In this survey, the following was observed:

- From a total of 112 respondents of software industry professionals, most of them are familiar with the *User Story Mapping* and Scenarios tools and have worked with both tools at some point in their work and/or academic projects.
- Most respondents find it easy to apply the *User Story Mapping* tool to define their software products, because teams create a dynamic schema of a representative user's interactions with the product, assess which steps have the greatest benefit to the user, and prioritize what to build.
- Most respondents have defined Scenarios at some point according to Leite's 6-attribute model to describe a domain situation and a set of actions derived from it must be carried out in order to achieve a goal.
- A direct relationship was established between each of the main activities that make up a *User Story Mapping* and the definition and identification of Scenarios. In other words, as many Scenarios as activities involved in the map could be identified.

Based on the results obtained in the SMS and in the survey carried out in the Argentine software industry, a method that fits the characteristics proposed by Leite was designed to define Scenarios through the use of *User Story Mapping*. This method will allow the specification, improvement and maintenance of scenarios, providing a more complete and detailed view of the behavior of the system over time.

One of the advantages of this method is its sequential approach, which takes advantage of the synergy between the business processes outlined by the USM and the conception of business-centric scenarios. This integration will not only facilitate a better understanding of the context and needs of the system, but will also allow for early

identification of gaps in requirements, optimization of communication between the teams involved and appropriate prioritization of the most relevant tasks.

This method will provide a practical and structured tool to manage scenarios throughout the entire product life cycle, enabling its initial development, evolution and adaptation to new requirements or changes in the business context.

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