A Compliance Analysis of Agile PBB Method Practices with the Expected Results of the Requirements Engineering Process of the MPS.BR Maturity Model

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Abstract: The Brazilian software market has shown significant growth, with a 7.9% increase in 2022, as indicated by the Brazilian Association of Software Companies. To meet the growing demand for high-quality technological solutions, many companies have adopted agile methodologies. However, the adoption of these methodologies, especially in requirements engineering, presents significant challenges, since this is a fundamental area for the final quality of software. This paper proposes an analysis of adherence between the agile Product Backlog Building (PBB) method and the Expected Results of the Requirements Engineering Process of the MPS.BR (Brazilian Software Process Improvement) model. The objective is to evaluate how the PBB meets the rigorous criteria established by the MPS.BR to obtain quality certification. The analysis revealed that, of the seven Expected Results, four were partially met and three were not met, highlighting the need for adjustments to the PBB method so that it can fully satisfy the MPS.BR requirements and allow companies to achieve certification without compromising the agility of their processes.

1 INTRODUCTION

The Brazilian software market has shown significant growth, with a 7.9% increase in 2022, as indicated by the Brazilian Association of Software Companies (ABES, 2023). This growth reflects the strategic importance of the sector and the increased demand for high-quality technological solutions. To meet this demand, many companies have adopted agile methodologies, which emerged as an alternative to traditional approaches, which are inadequate to deal with rapid technological evolution (Larman, 2004).

According to Silva and Oliveira (2020), agile methods emerged as an alternative to minimize some of the problems of traditional approaches. Among these problems, issues related to requirements engineering stand out, such as lack of stakeholder involvement, excessive changes in requirements, and poor specification of requirements, among others. The adoption of these methodologies brings challenges, especially in the requirements engineering area, which is fundamental to the final quality of the software developed.

Silva and Oliveira (2020) mention two studies. One of them states that around 21% of the main failure factors in software projects are related to requirements, which have a direct impact on the quality of the final product. In the other study mentioned, more than 100 software development projects were analyzed, and it was concluded that 35% of the requirements of these projects changed, 65% of the features described by the requirements are never or rarely used, and around 50% of the team's time is spent on requirements, architecture and product specification.

MPS.BR, the Brazilian model for improving software processes, establishes strict guidelines for creating high-quality software. This model is widely recognized and adopted by the software market, including the Requirements Engineering process, whose objective is to define, manage and keep the requirements of stakeholders and the product up to

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date, ensuring that inconsistencies between requirements, plans and work products are identified and addressed (Softex, 2024).

However, agile methods such as Product Backlog Building (PBB), although innovative, do not fully meet the criteria established by MPS.BR. According to Cunha and Oliveira (2022), PBB facilitates the collaborative understanding of requirements, but when used in isolation, it does not allow companies to achieve MPS.BR certification. This limitation raises the question of how companies can adapt their agile practices so as not to compromise quality and still obtain certification.

The importance of this research is justified by the constant search by organizations for methods that increase the efficiency and quality of software development, especially in an environment where agility and precision are crucial to the success of projects (Sommerville, 2015).

In this context, it is valid to establish a relationship between the MPS.BR quality model and existing agile methods. The objective of this paper is to perform an adherence analysis between the Expected Results of the Requirements Engineering Process (REQ) of MPS.BR and the agile PBB method, that is, to analyze how the PBB meets the REQ expected results. Among the results of this adherence analysis, four of the seven Expected Results were partially met and three were not met. A more detailed description can be found in Section 4.

This paper is organized as follows: Section 2 describes the background, Section 3 presents the results obtained in the adherence analysis, Section 4 presents the evaluation of the analysis, and, finally, Section 5 presents the conclusions of this research.

2 BACKGROUND

This section addresses a general understanding of the method and model adopted in this research.

2.1 MPS.BR (Brazilian Software Process Improvement)

According to Softex (2024), MPS.BR, Brazilian Software Process Improvement, is a program that began in 2003 with the support of the Ministry of Science, Technology and Innovation (MCTI) in Brazil and seeks to improve the development of software, services and human resource management practices in the ICT (Information and Communication Technology) industry. “The objective of the MPS.BR program is to increase the competitiveness of organizations by improving their processes” (Softex, 2024, p. 3).

MPS.BR focuses on process management, indicating what the organization must do to achieve the expected results of the model, without detailing the step-by-step tasks. The model presents maturity levels ranging from level G to A, whose requirements are cumulative from the lowest level to the highest level. Each maturity level is composed of a set of processes (which are the areas of software engineering), which have expected results (which are the requirements that a company must meet to achieve the objective of a process).

In this study, the MPS General Software Guide (MR-MPS-SW) is used, which aims to implement software engineering principles in a way that is appropriate to the context of companies, in accordance with international approaches for defining, evaluating and improving software processes. Likewise, in this work, the Requirements Engineering process is used, which establishes the process of defining software requirements, which involves eliciting, modeling and analyzing.

“The purpose of the Requirements Engineering process is to define, manage, and maintain up-to-date stakeholder and product requirements, ensuring that inconsistencies between requirements, plans, and work products are identified and addressed” (Softex, 2024, p. 22). An expected result refers to the objectives specific and measurable that an organization must achieve when implementing a process to the MPS.BR model. The expected results of the Requirements Engineering process are described below.

REQ 1 - The needs, expectations and constraints of the stakeholders, both in relation to the product and its interfaces, are identified and the understanding of the requirements is confirmed: in this expected result, the initial contact with the customer and the identification of their needs occurs. Based on these needs, the product's features are defined. The customer's expectations reflect the desired ideal scenario, generally related to the product quality and performance. Constraints refer to the limitations imposed by the solution, such as compatibility with specific operating systems.

REQ 2 - Requirements are specified, prioritized, refined, allocated for implementation and kept up to date based on the identified needs, expectations and constraints, which includes the specification of operational concepts, scenarios and internal and external interfaces: this step involves translating the customer's needs into a technical language, covering the definition, prioritization, refinement, allocation and maintenance of requirements, based on the needs, expectations and constraints identified in REQ 1. It includes the specification of operational concepts,

scenarios and internal and external interfaces. An interface is the means by which communication occurs between two distinct parts of a system that cannot connect directly. Operational concepts are linked to the prototyping of requirements, which can be demonstrated by means a BPMN (Business Process Model and Notation) diagram, illustrating how requirement steps are operationalized. A scenario is a sequence of events that can occur during the use of the product.

REQ 3 - The commitment of the technical team to the implementation of the requirements is obtained: this expected result refers to the commitment of the technical team to the implementation of the requirements, evidenced by meeting minutes, emails or other appropriate documentation methods.

REQ 4 - Bidirectional traceability between project requirements, activities and work products is established and maintained: a system must be established and maintained to track the relationship between requirements and work products in a software project, ensuring that each requirement is linked to the corresponding work products and vice versa. This process is crucial to assess the impact of changes to requirements and manage changes.

REQ 5 - Plans, activities and related work products are reviewed to identify and address inconsistencies in relation to requirements: it is essential to ensure that all project elements are aligned with the defined requirements, performing reviews, monitoring and control of the project, and implementing corrective actions whenever necessary. Whenever there are changes in the requirements, it is necessary to verify that the other project work products are consistent with these changes.

REQ 6 - Requirements are understood and analyzed to ensure that they are necessary and sufficient and to balance the needs of stakeholders with the existing constraints: this expected result emphasizes the importance of understanding and analyzing the requirements to ensure that they are clear, necessary and sufficient, balancing the needs of stakeholders with the existing constraints. It is mandatory to present evidence to prove these points. Balancing means reviewing, improving and evolving the product so that, each time this procedure is executed, a new version of the product is created.

REQ 7 - Requirements are validated: validation verifies that the requirements meet the customer's needs, ensuring that the project team and stakeholders share a common understanding of these requirements. This expected result requires a more specific and descriptive validation method, such as Use Case Analysis, Prototyping, among others.

2.2 PBB (Product Backlog Building)

According to Aguiar and Caroli (2022), Scrum is the most widely used agile framework for building products. “However, the Scrum framework does not define how to build the backlog. This is why PBB complements Scrum, helping teams to develop and create an effective Product Backlog” (Aguiar e Caroli, 2022, p. 35).

There are three fundamental aspects when we talk about backlog (Schwaber and Sutherland, 2020): (i) the product backlog is an ordered and emergent list of what is needed to improve the product, (ii) the backlog is the only source of work performed by the Scrum team, and (iii) the Product Owner is responsible for effectively managing the backlog.

According to Aguiar and Caroli (2022), the main objective of Product Backlog Building (PBB) is to help build and refine the Product Backlog collaboratively. This method promotes a shared understanding of the product among all those involved and prepares the backlog for the team's agile and effective work, using the PBB Canvas as a facilitation tool. "PBB clarifies and prioritizes user stories and items to be added to the Scrum team's backlog" (Aguiar e Caroli, 2022, p. 46).

According to Aguiar and Caroli (2022), the benefits of the PBB method include: (i) it helps to build and refine a backlog in an effective and collaborative way, (ii) it builds a shared understanding of the customer's business, facilitating the discovery and understanding of the product, (iii) it describes the user's experience with the product, (iv) it facilitates the discovery and writing of the user story, (v) it defines a minimum of alignment and initial planning, and (vi) it produces a Product Backlog fully aligned with the customer's needs.

“The PBB method uses Canvas as a facilitation tool. It provides a simple and easy-to-understand flow, which makes it easier to understand the customer's needs and build the product backlog” (Aguiar e Caroli, 2022, p. 51). Aguiar and Caroli (2022) state that building a backlog in PBB should follow the following flow:

1. Contextualize the Product: it is essential to clarify and understand what the product is, identify the problems and challenges that need to be addressed, and highlight expectations, in addition to clarifying the desired objectives. To do this, the product name, problems and expectations of stakeholders must be defined. Product Name, “identify the product that will be built. Instruct participants to name it as follows: imagine this product in a box, what name would be written on it?” (Aguiar e Caroli, 2022, p. 52).

Problems, in this item, it is necessary to identify and understand the current state of the product, highlighting the problems and challenges. It is

interesting to instruct participants to collaborate in the analysis of the current scenario. Expectations, this is the stage where the desired state of the product is identified, adjusting the expectations listed in relation to the problems presented to understand the current state. Ask participants to list the possibilities that help solve the problems and pains of the current state.

2. Describe the personas: "A persona represents a product user and this description should speak not only of the role, but also of their needs and objectives. This creates a realistic representation of the users, helping the team to describe features from the point of view of those who will use the product" (Aguiar e Caroli, 2022, p. 55). In Canva, the persona is listed with their activities.

3. Understand the features: "Feature is the description of an action or interaction of a user with the product. For example: requesting a shared transport, consulting the detailed statement and making an online purchase. The description of the feature should be as simple as possible" (Aguiar e Caroli, 2022, p. 57). In Canva PBB, each feature should be described with a brief explanation, highlighting the "Problems" it aims to solve and the "Benefits" it provides.

4. Identify the PBIs: Caroli and Aguiar (2022) state that PBIs (Product Backlog Items) are elements of the Product Backlog that represent the development work to improve the product, meeting the needs of the customer or stakeholders. After describing features, listing their problems and benefits, you can identify the PBIs, dividing the features into smaller and more precise items. Asking what the first, second and next work items are can help you write the PBIs.

The process that is responsible for identifying and creating a PBI is called Step Maps. "In PBB, the breakdown of features into PBIs is done by means the Steps Map, a technique that helps to break down a feature into small steps, and each of them will be a PBI" (Aguiar e Caroli, 2022, p. 62). The Steps Map is applied in two stages: Defining the step-by-step process of the feature, at which point a work flow is defined. If the feature was "Register Book", for example, what would be the first step? Evolving each step with questions, comments and ideas, complete each step of the feature with questions, comments and ideas. Reevaluate each one of them. A question can eliminate an unnecessary step, just as a comment can improve a useful step, and an idea can generate a new step.

In the end, by following the sequence of steps of the Canva PBB, the list of PBIs will be obtained, this is the list with the items of the Product Backlog. Each PBI describes a user action in the product. Caroli and Aguiar (2022) explain that the actions are written in textual way to provide context and uniquely identify an item. The authors also suggest that PBIs be written in the ARO model. "Development work to improve the product by meeting the needs of the customer or stakeholders" (Aguiar e Caroli, 2022, p.60). In the ARO model, each PBI is described as an action, result, and object.

The product backlog is an ordered and emerging list of what is needed to improve the product (Schwaber and Sutherland, 2020). Thus, an "ordered and emerging" product backlog is a prioritized and continuously updated list of product needs.

Every project requires prioritizing work items. Agile teams, in particular, need to do this carefully, as they perform incremental deliveries. The prioritization of work items determines the order in which they will be developed. COORG is the PBB prioritization technique, responsible for prioritizing PBIs (Aguiar and Caroli, 2022). It is an acronym for classify, order, and organize. COORG helps the team prioritize the backlog, with the aim of planning and aligning the work flow and/or the next sprints.

COORG has a few steps: (i) Classify, the first step of COORG is to classify each PBI, establishing criteria and classification scales with the team, according to the product context. According to the authors, it is crucial to align and decide on these criteria before classifying the PBIs, (ii) Order, the second step of the COORG method is to order the features in a logical sequence, like a narrative, also moving their respective PBIs to be below them, and (iii) Organize, is the last step of the COORG method, organize the PBIs of each feature from top to bottom by priority, after that place the PBIs with the highest score in the first row, and so on, in descending order.

Aguiar and Caroli (2022) state that the result of COORG activities should not be definitive. It is an initial prioritization that can and should be updated as the backlog evolves and new items emerge.

3 THE COMPLIANCE ANALYSIS

The analysis of the fulfillment of the Expected Results of the MPS.BR Requirements Engineering Process and the requirements construction stages of the agile PBB method revealed significant insights. In the following subsections, we present a summary of the findings, highlighting whether the results were fully met, partially met or not met at all.

The results are organized as follows: Expected Result (acronym for the expected result of the MPS.BR process defined in section 2.1), Description of the Expected Result (detailing what is requested in the expected result), PBB Corresponding Techniques (PBB technique applicable to the MPS.BR expected

result) and Fulfillment Status (PBB's compliance level to MPS.BR).

3.1 REQ1

Description of the Expected Result: in order for REQ1 to be met, the needs, expectations and restrictions of the stakeholders, both in relation to the product and its interfaces, must be identified. The customer's need is what solves the problem. It is from the needs that the product's features arise. As for the customer's expectations, they are related to the quality of the product, the ideal scenario. The restrictions are characteristics of the solution. For example, if the customer's company only uses MacOS operating systems, the application that will be developed must run on that platform.

PBB Corresponding Techniques: the Product Contextualization Stage, which includes the Name, Problems, and Expectations sessions, helps the team understand where they are in relation to the product and where the customer wants to go. The Definition of Personas, responsible for identifying the users of the product, whose description should address not only the role, but also list their needs and objectives.

Fulfillment Status: Partially Met, because the REQ1 asks for the formal description of needs, expectations, and constraints. However, in the PBB Product Contextualization process, only expectations are formally described, along with the needs from the discovery of stakeholders in the Definition of Personas stage. Since there is no corresponding technique that identifies and lists the constraints of stakeholders, REQ1 is partially met.

3.2 REQ2

Description of Expected Result: REQ2 asks that product requirements be specified, prioritized, refined, allocated for implementation, and kept up to date based on the needs, expectations, and constraints identified in REQ1. This includes specifying operational concepts, scenarios, and internal and external interfaces. Interface is the name given to the way in which communication occurs between two distinct parts of an application that cannot connect directly. Operational concepts are related to the prototyping of the requirement, which can be shown by means a diagram, showing the steps of how the requirement is operationalized. A scenario is a sequence of events that can occur when using a product.

PBB Corresponding Techniques: among the techniques corresponding to REQ2 are Feature Definition, Step Maps, COORG, PBI, and, finally, the Product Backlog itself. In PBB, by means the Personas needs, each action or interaction of them with the system is described by a Feature. The feature names the user action and needs to be detailed and specified, as requested by REQ2. This process is performed using the Step Map, which breaks down the feature into smaller steps and sequentially maps the user actions, generating the PBI (Product Backlog Item). Finally, the set of PBIs constitutes the Product Backlog. The Step Map, by sequentially mapping the user actions to generate the PBI, also creates an internal interface between these PBIs, which is related to the operational concept of REQ2, as it shows the operationalization of the requirement. COORG (acronym for Classify, Order and ORGanize) is a technique that helps the team prioritize the PBIs of the Product Backlog for planning a Sprint.

Fulfillment Status: Partially Met, because PBB does not cover the specification of scenarios and external interfaces. In addition, the requirements are not allocated during the techniques mentioned above, nor are they kept up to date (versioned).

3.3 REQ3

Description of Expected Result: this is the commitment of the technical team to implement the requirements, which can be evidenced in many ways, including meeting minutes, emails or other appropriate documentation methods. **PBB Corresponding Techniques:** Not applicable. **Fulfillment Status:** Not Met, because the PBB does not have a step in which the commitment of the technical team is evidenced.

3.4 REQ4

Description of Expected Result: a system must be established and maintained to track the relationship between requirements and work products in a software project. This means ensuring that each requirement is linked to its corresponding work product, such as documents, source code, and test cases, and that the work products are linked back to the requirements. It is about maintaining a clear connection between what is needed and what is produced in the software project.

PBB Corresponding Techniques: PBB has vertical traceability in the process of creating Step Maps from a Feature, that is, from the feature, steps are identified that represent smaller units of a Feature.

Fulfillment Status: Partially met, because PBB does not have a horizontal traceability mechanism, which represents the dependency relationship between the steps defined from the creation of a Step Map. Although there is a vertical traceability mechanism.

3.5 REQ5

Description of Expected Result: this means that it is necessary to ensure that all project elements, such as plans, activities, and work products, are aligned with the defined requirements. Reviews, such as project monitoring and control, must be performed. During these reviews, inconsistencies must be recorded and corrective actions must be taken to solve them. Whenever there are changes in requirements, it is necessary to examine whether the other project work products are consistent with these changes. For example, it is necessary to verify whether the project estimates, scope, and schedule have been updated to reflect the changes in requirements. The actions to correct inconsistencies must be monitored until they are completely solved, thus ensuring consistency between the requirements and the project work products.

PBB Corresponding Techniques: Not applicable. **Fulfillment Status:** Not Met, because PBB does not review everything that was generated, consequently it does not identify inconsistencies and does not address them.

3.6 REQ6

Description of Expected Result: requirements are understood and analyzed to ensure that they are clear, necessary, and sufficient; this guarantee must be evidenced by means work products.

The analysis of software requirements is performed in collaboration with stakeholders. Requirements must be balanced against existing needs and constraints. For this reason, they must be clear.

PBB Corresponding Techniques: the process of building the Product Backlog in PBB is collaborative; stakeholders and customer needs are defined by the Description of Personas. The following techniques in the process, such as Feature Definition, Step Maps, COORG, and PBI, build the Product Backlog, which is the list of requirements that will be analyzed. Although these steps refine the requirement, they do not formally guarantee that the requirement is clear, necessary, and sufficient.

Fulfillment Status: Partially Met, because the process steps do not guarantee that the requirements are clear, necessary, and sufficient. There is also no balancing or versioning mechanism in the PBB method.

3.7 REQ7

Description of Expected Result: validation is a process that evaluates whether the requirements are in accordance with the customer's needs. The objective of this result is to ensure that the project team and the requirements providers have a common understanding of the requirements. This expected result requires a more specific and descriptive validation method, such as Use Case Analysis, Prototyping, INVEST (Independent, Negotiable, Valuable, Estimable, Small and Testable) criteria, among others.

PBB Corresponding Techniques: Not applicable. **Fulfillment Status:** Not Met, because PBB does not have a validation step.

4 COMPLIANCE ANALYSIS EVALUATION

As described in (Elsevier, 2023), peer review is an evaluation process in which an author's work, such as a scientific paper/article, is examined by experts in the same field before being published. This process ensures the quality, accuracy, and relevance of the research, helping to identify errors, suggest improvements, and validate the results presented. It is a common practice in scientific journals and academic conferences to ensure that only high-quality work is accepted for publication.

To evaluate the results obtained in this study, a peer review was carried out with two experts, with the objective of validating the adherence of Product Backlog Building (PBB) to the Expected Results of the MPS.BR Requirements Engineering Process.

Expert1 has a degree in Data Processing Technology, a specialist in Systems Analysis, a Master's degree, a PhD, and a Post-Doctorate in Computer Science. He is currently an Associate Professor at a Federal University in Brazil and coordinates the a research project, which which conducts research on the development of solutions to support the software process improvement. He also works as a Consultant-Implementer, Evaluator and Instructor of the MPS.BR and CMMI quality models.

Expert2 is an Executive Consultant at Accenture, with over two decades of experience in software development. In recent years, he has focused on product management practices, specializing in complex product management in fast-growing global companies. He holds a Bachelor's degree in Information Systems, technical training in Systems Development, and is a Specialist in Software Process Engineering. Expert2 is the author of the book "Product Backlog Building (PBB) - A practical guide for creating and refining backlogs for successful products", and creator of the PBB method.

A review was initially conducted with the MPS.BR expert (Expert1) to validate the correct

interpretation of the Expected Results in the MPS.BR Requirements Engineering Process. After implementing the recommended adjustments, a second review was conducted to evaluate the PBB's compliance analysis with the Expected Results of the MPS.BR Requirements Engineering Process. Finally, a third review was carried out, this time with the participation of both experts, to jointly evaluate the compliance analysis.

4.1 Corrections Applied in the First Peer Review

Regarding the interpretation of the Expected Results of the MPS.BR Requirements Engineering Process, the following correction points were identified below.

In REQ 6, **Problems pointed out by the expert:** the text did not identify the obligation to present evidence proving that the requirements are necessary and sufficient. **Solution:** make adjustments to the text to make it clear that evidence proving that the requirements must be necessary and sufficient must be presented.

In REQ7, **Problems pointed out by the expert:** the text did not identify that the validation is thorough. **Solution:** make adjustments to the text emphasizing that this expected result requires a more thorough validation method, such as Use Case Analysis, Prototyping, INVEST criteria, among others.

The adjustments made in the first peer review aimed to emphasize details that require attention when organizing the evidence at the time of implementation.

4.2 Corrections Applied in the Second Peer Review

Regarding the analysis of PBB compliance with the Expected Results of the MPS.BR Requirements Engineering Process, the following correction points were identified below.

In REQ 1, **Problems pointed out by the expert:** REQ1 is not fully met because it does not cover the description of the Product's Needs and Constraints. Add the Persona Definition step, as it identifies the stakeholders. **Solution:** the fulfillment status was changed from "fully met" to "partially met". Persona Definition was added as a technique corresponding to REQ1, as suggested by the expert, since it was found that the customer's needs are listed together with the persona. Therefore, it was concluded that only the constraints are not met in the REQ1.

Initially, REQ1 had the fulfillment status of "fully met", as it is a requirement in which initial contact with the customer and the identification of their needs occurs. Due to the fact that the contextualization stage has a similar process, it was believed that this stage would be sufficient to meet REQ 1. However, REQ 1 makes it clear that the needs, expectations, and constraints must be described, as pointed out by the expert.

In REQ 2, **Problems pointed out by the expert:** the Persona Description technique is associated with REQ 1. The PBB does not keep the requirements updated and does not have a Canvas versioning mechanism. Add that the Step Maps process covers the operational concept and the operationalization of the requirements, but does not cover the scenarios of REQ 2. **Solution:** the Persona Description was allocated to REQ 1 and removed from REQ 2, as requested. It was inserted in the text explaining the status that the PBB does not have a versioning mechanism for the Canvas produced and that the Step Maps cover the operational concept of REQ 2. However, the scenarios continue not to be met.

In REQ2, adjustments were needed to the persona description due to the change in REQ1. Initially, it was believed that the PBB kept the requirements up to date. Although the backlog evolves and new items are added, this does not guarantee that the requirements "remain up to date", since the method does not mention any versioning mechanism to highlight the changes that occur in the PBB Canvas.

Another item pointed out by the expert, which had not been mentioned previously, is that the Step Maps encompass the operational concept, that is, the operationalization of the requirements, which consists of converting an abstract need or objective into specific actions and tasks that can be executed in the system development or operation. The Step Maps define the step-by-step functionality.

In REQ 6, **Problems pointed out by the expert:** add that the PBB method does not show whether the requirements are clear, necessary and sufficient. There is no adequate documentation. **Solution:** the suggested correction was inserted in the status explanation text, emphasizing that there is no adequate documentation or step to demonstrate whether the requirements are clear, necessary and sufficient.

Although in PBB the requirements are implicitly clear, necessary and sufficient, there is no work product, document or step that demonstrates this.

4.3 Corrections Applied in the Third Peer Review

The third peer review also focused on the analysis of the PBB's compliance with the Expected Results of the MPS.BR Requirements Engineering Process. This review was attended by two experts, where the mapping and compliance analysis were presented to

the PBB expert so that he could point out his considerations. In this review, a peer review was adopted with the criteria described below: (i) High technical (HT) - indicating that a problem was found in an item that, if not changed, compromises the considerations, (ii) Low technical (LT) - indicating that a problem was found in an item that would be convenient to change, (iii) Editorial - indicating that a grammatical error was found or that the text needs to be improved, (iv) Questioning (Q) - indicating that there was doubt regarding the content of the considerations, (v) General (G) - indicating that the comment is general in relation to the considerations.

The following considerations were raised: **Request** - No vertical traceability was detected in the PBB, **Type** - HT, **Correction Proposal** - Bidirectional traceability between requirements, activities and project work products is established and maintained. The PBB has vertical traceability in the process of creating Step Maps from a feature, that is, from the functionality, steps that represent smaller units of a feature are identified, **Status** - Done.

This issue was identified in REQ 4, which bidirectional traceability between requirements, activities and project work products is established and maintained. All items requested by the experts were considered for adjustments and the content presented in Section 4 includes all the adjustments requested by the experts.

5 CONCLUSION

The analysis conducted in this study demonstrates that, although the adoption of agile methods, such as PBB, has the potential to improve requirements engineering in software development, there are significant limitations when these practices are compared to the rigorous criteria established by MPS.BR model. The growth of the Brazilian software market and the need to quickly adapt to technological changes highlight the importance of methodologies that not only speed up development, but also ensure quality and compliance with reference models, such as MPS.BR.

The results of the compliance analysis showed that, of the seven Expected Results of MPS.BR, four were partially met by PBB. This is due to the fact that PBB is a method focused on requirements development, while the MPS.BR Requirements Engineering process involves both requirements development and management.

This research provides a detailed and updated analysis based on the MPS.BR General Software Guide in its 2024 version, which, unlike previous versions, addresses requirements development and management in the same process. PBB, recognized as an innovative method in Requirements Engineering, not only represents a technical advance, but also reflects the potential for Brazilian innovation. Therefore, it is gratifying to contribute to the software development community and have an analysis evaluated by the creator of the method.

Among the limitations of this research, it is worth highlighting that only a compliance analysis was performed, without investigating how to solve the gaps and non-compliance with the expected results. In addition, the research, although validated by means a peer review, was not tested in a real corporate environment.

For future research, it is suggested to focus on how to solve the gaps and non-compliance found by means the adaptations to the PBB, to fully meet the MPS.BR expected results.

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