

Stakeholder Management Strategies in Information Systems Projects

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Abstract

The Information Systems (IS) projects conducted in companies are increasingly important to the fulfillment of their business objectives. This results in more relevant stakeholders, who have certain interests in these projects and their outcomes.

Project managers face major challenges concerning how to engage those stakeholders. There are existing software solutions that assist project managers, but none were identified that assist in identifying and managing the involvement and expectations of project stakeholders. Due to inadequate processes and methods for stakeholder management, stakeholders may not be properly involved in projects.

It is proposed to develop a solution to address this identified problem by introducing a framework through which project managers may identify, plan, and document engagement with project stakeholders.

The proposed solution was demonstrated in an ongoing project of the Department of Technology and Systems of Brisa, and its validity assessed.

Keywords: Information Systems, Projects, Stakeholders, Management, Engagement

1. Introduction

The Information Systems (IS) projects conducted by the software development teams in long-established companies, such as Brisa, are becoming increasingly important to the fulfillment of their business objectives. This has resulted in a regularly increasing number of requested projects and more relevant stakeholders who have certain interests in them and their outcomes. In these scenarios, project managers face major challenges: to identify and implement better management processes and methodologies that are suited for these IS projects and engage those stakeholders so that the entire organization supports a more digital-friendly approach.

Working as a IS project manager at Digital Transformation team of Brisa's Department of Technology and Systems (DTS) is a challenge that requires multiple skills, such as communication and negotiation. This role should provide the project leadership that aligns the technical know-how of IS projects with the strategic goals of the business.

While performing this role, it was found that project managers had no clear and well-established methodologies or processes to follow and implement across the multiple projects we were managing. The methods applied across multiple projects by me and each of my colleagues

depended on several constraints: project scope, size, type (directed towards external costumers, or for internal use in the organization), who performs the implementation (in-house software development team, or a consulting firm), among others factors.

To assist in Project Management (PM) activities, some software tools are in place - such as Jira for issue management and tracking. However, no tool is in place that can to assist any of us overcome one of the main challenges identified by myself and my colleagues when managing IS projects: identifying and managing the involvement and expectations of existing project stakeholders.

1.1. Problem Statement and Objectives

Stakeholder management is a topic that has been increasingly discussed in the broader literature of project management, which is relevant concerning how best to satisfy and involve stakeholders properly in projects. The success of a project may depend greatly on the perceptions and expectations of its stakeholders. It was found that due to the lack of adequate processes and methods for management and control of stakeholder engagement, in many projects and companies (such as Brisa), stakeholders are not properly involved in projects, and their expectations are not properly managed,

ending up dissatisfied about IS project results.

The objectives of this dissertation are to analyze the problems and existing methods through which project managers plan and control stakeholder engagement in Brisa's IS projects and implement an alternative solution - aligned with some of the best practices on stakeholder management. Lastly, validate the solution through the feedback of an inquiry to fellow project managers and other IS practitioners, as well as the results of its demonstration on an ongoing project. Ultimately, this research attempts to contribute in exploring the requirements in order to make a successful application of stakeholder management processes for IS projects.

2. Problem Analysis

Historically, IS projects have very high failure rates. By 2014, the Chaos Report, elaborated by the Standish Group by surveying IS executive managers, found that only 16.2% of software projects in American companies were completed on-time and on-budget. Adequate user involvement and executive management support are the top two project success factors. Lack of user input and involvement, as well as unrealistic expectations of stakeholders were some of the identified top factors that caused projects to be impaired and/or canceled [9]. Several other researchers assert that the lack of effective stakeholder management is one of the major factors for project failure [10, 3].

While many project managers associate failures in the timely delivery of projects to scope problems and poorly defined requirements, these problems may be associated with failure in the stakeholders' management. For example:

- A relevant stakeholder that was not identified early on project initiation has a chance of raising a new requirement when finally engaged,
- A neglected stakeholder (for example, one with perceived low power/influence) that was not properly engaged during the identification of requirements, that will be a recurrent user of the project result after a transition to operation, may end up requesting a substantial amount of changes due to the delivered project not fulfilling his needs/expectations.

2.1. Stakeholder Management in Brisa IS Projects

The perceived successful completion of IS projects in a company such as Brisa will greatly depend on how its stakeholders view it. There are many relevant stakeholders in IS projects - each with their own different agendas and priorities. These agendas motivate the political nature of the work the project manager must perform concerning its stakeholders. The project manager may also have

to recognize danger signs connected to stakeholders that can exert more power over the project. Some of these signals include:

- Stakeholder interference in the project without consulting the project manager;
- Stakeholders not providing support when needed;
- Stakeholders making groundless promises or promises without support.

This requires the project manager to build credibility and insert himself in the power structures of his company (through thorough knowledge of the stakeholders and their potential for influence) and recognize these warning signs and defuse the risks.

An early analysis on the topic was performed through my own, personal experience as a project manager in Brisa and by inquiring some of my peers, as well as a few stakeholders of existing projects. The main causes identified for improper stakeholder engagement were:

- Lack of effort in the consistent identification of all relevant project stakeholders and the key stakeholders among them;
- Lack of creation and implementation of a structured stakeholder management plan and/or methods to manage the stakeholder engagement during the project;
- No evaluation of the stakeholder engagement and satisfaction during the remaining project life-cycle, after the analysis and design phase.

The proposed hypothesis is that the identified problems can be attributed to the lack of specific tools that assist in performing effective stakeholder management. A prevalent example is that of stakeholder identification, in which valuable information about project stakeholders is scattered between countless spreadsheets, emails, and other tools, requiring substantial effort on collecting information from multiple sources.

3. Literature Review

The Project Management Body Of Knowledge (PMBOK) defines stakeholder as *"an individual, group or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity or outcome of the project"* [2]. Regardless of how well project deliverables are defined and achieved, scholars, practitioners, and professional institutes share a common view that failure to manage the needs of clients, users and other stakeholders is one of the most common causes

of project failure [12, 4], and that effective stakeholder management is a key factor for project success [4]. A project cannot be considered successful when it fails to achieve its objectives, but also when it fails to meet (or exceed) the expectations of its stakeholders.

The PMBOK also defines Stakeholder Management as *"including the processes required to identify people, groups or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution"* [2]. Through stakeholder management, a project manager implements processes and activities that result in effective participation of relevant project stakeholders and consequently in opportunities to benefit a project from their engagement, resources, and influence [11]. However, there is little consensus on what constitutes effective stakeholder management strategies [7].

IS projects are complex in terms of technological innovation, may differ greatly in size and in number of interfaces between the stakeholders involved. For an effective application of stakeholder theory in IS projects, organizations require stakeholder management strategies that are adapted to this specific industry [14]. It is essential to have a formal process to identify, manage, and understand how project stakeholders may be impacted by project decisions and react to them, interact with each other and with the project manager - in short, how these stakeholders can affect the chances of project success [5].

3.1. Stakeholder Management Body of Knowledge

Four international standards and frameworks were selected to analyze relevant processes and methods that can be applied to better engage with stakeholders and manage their requests and expectations. These are considered by professionals and academics alike as some of the best practices in the field of project management - the PMBOK [2], ISO 21500 [8, 1], Project Management Methodology (PM²) [6] and the IPMA Individual Competence Baseline (ICB)⁴ [13]. All four of these standards include mentions on the subject of Stakeholders, each with its own approach, but with clear similarities as well - see Table 1.

The Identify Stakeholders step is consensual among each framework, each stating the importance of determining any individuals, groups, or organizations affected by, or affecting, the project and documenting them as stakeholders (in a Stakeholder Register or Matrix) with sufficient detail. This step should include a thorough analysis of

these stakeholders, knowing their power/influence, involvement, support, interests, main expectations, and major project requirements. Since project managers have limited resources and time to allocate to their stakeholders, they are compelled to make decisions based on prioritization, by identifying which stakeholders can contribute the most to the fulfillment of project activities and commit to meeting their expectations.

The following steps are not so well-aligned, even though they share many of the same ideas. PMBOK prescribes a Plan Stakeholder Management process, involving the development of appropriate strategies to involve the identified project stakeholders, based on the raised stakeholder information and their perceived engagement. This is approximately aligned with the proposition of the ICB of planning how to engage, keep informed, involve, and commit each of the various stakeholders.

Meanwhile, the ISO 21500 Manage Stakeholders process is mostly focused on acting upon the identified stakeholders by identifying their concerns and resolving issues, which can be considered more in line with the PMBOK's following process, Manage Stakeholder Engagement, which involves acting on the elaborated plan by communicating and working with stakeholders to meet their needs and expectations, address issues as they occur and foster their stakeholder involvement. Both of these are aligned with two of the key competence indicators of ICB⁴ which splits the engagement of stakeholders between executives, sponsors and higher management (to gain commitment and to manage interests and expectations) and users, partners, suppliers and others (to gain their cooperation and commitment).

PM² bundles several of the mentioned processes/competences in a single Manage Stakeholders activity, including the analysis, planning of communications, engagement of stakeholders, as well as monitoring the reactions and attitudes of stakeholders. The PMBOK also includes a Monitor Stakeholder Engagement process, meant to analyze the established stakeholder relationships and communications and use that feedback to review and modify the implemented engagement strategies and plans.

Lastly, the ICB includes a competence indicator to organize and maintain networks and alliances, both formal and informal, a concept that is not referred in the remaining standards.

These steps should be aligned with proper communication, for with specifies three processes ISO 21500: Plan Communications (determine the information and communication needs of the stakeholders), Distribute Information (make required information available to project stakeholders) and Man-

PMBOK	ISO 21500	PM ²	ICB4
Identify Stakeholders	Identify Stakeholders	Elaboration of a Project Stakeholder Matrix	Identify stakeholders and analyze their interest and influence
Plan Stakeholder Management			Develop and maintain a stakeholder strategy and communication plan
Manage Stakeholder Engagement	Manage Stakeholders	Managing Stakeholders	Engage with executives, sponsors and higher management to gain commitment and to manage interests and expectations Engage with users, partners, suppliers and other stakeholders to gain their co-operation and commitment
Monitor Stakeholder Engagement			Organize and maintain networks and alliances

Table 1: The Processes/Activities/Competence Indicators of each of the four reviewed standards - PMBOK, ISO 21500, PM² and ICB4.

age Communications (ensure that the communication needs of the project stakeholders are satisfied).

In summary, the reviewed project management body of knowledge prescribes the implementation of stakeholder management processes and strategies, such as:

- Identify and document stakeholders, and in particular key stakeholders;
- Analyze their power, influence, main expectations, and requirements;
- Assess their current engagement and plan to act on it if a different level is desired;
- Engage with them to ensure their commitment and/or participation;
- Monitor the effect of these actions;
- Be prepared to implement corrections to the plan and consequent actions if the desired outcome isn't being achieved.

3.2. Project Management Software

Project Management Software (PMS) encompasses a range of software used by many industries to help project managers and teams collaborate to meet goals on time while managing resources, costs and maximize the teams efficiency.

Two commonplace project management applications, Scoro and Jira, were reviewed, focusing on their ability to assist in the previously mentioned processes for the management of stakeholder engagement.

Both Scoro and Jira have several pros when it comes to their ability to assist project management activities, with Jira having a strong prominence regarding issue boards that are prevalent on Agile methodologies, while Scoro seems a more business-oriented tool that assists with invoicing and maintaining a client list. Scoro was the closest to have similar features, but may be considered limited if we appraise it under the aforementioned stakeholder management processes, as it is incomplete in its assistance for Stakeholder Identification, and with no features to assist in Stakeholder Analysis.

In conclusion, this review found that, when it comes to PMS, there appears to be a lack of commercially available options that help fulfill the studied stakeholder management processes and/or activities.

4. Solution Proposal

Building upon the conclusions resulting of the problem analysis and the knowledge acquired from literature review, a solution is proposed with the objective of establishing a framework that orients the project managers' identification and engagement of project stakeholders and all of the activities that

it entails. This framework is meant to materialize the processes of stakeholder identification, analysis, plan the strategies for stakeholder engagement that will be used followed during the project lifecycle, as well as registering the monitored results and adapt those plans if necessary.

This solution was implemented in the form of an Information System, structured in such a way that it can assist in the identification and documentation of all relevant information, as all of this insight is invaluable as long as it can be tracked and accessed properly. The fields specified by this tool should also help orient the project manager by specifying which relevant information about each stakeholder should be obtained. All gathered information should be treated as a personal approach to stakeholders, from the perspective of the project manager. These stakeholder documents should remain confidential and not appear in public repositories, except in case of a Project Management Office that shares this information, such as in cases of shared projects and common stakeholders.

The proposed solution was developed emphasis on potentially solving the problems previously detailed in the management of IS projects of Brisa's DTS department, but was designed and implemented in such a way that it could be adopted in other IS departments of companies that share the same difficulties.

The development of this IS solution was performed through evolutionary prototyping. These prototypes are intentionally incomplete systems, that capture the essential features of a later system. The proposed solution is the result of 3 iteration of development and re-assessment - where additional functionalities were developed and then instantiated and used in an ongoing IS project. This resulted in a demonstration during development that provided valuable feedback to identify limitations and the necessary requirements that can improve the prototype in the following iteration. This allowed the software development process to be flexible, progressing while adapting the prototypes to new requirements.

4.1. Iteration n.1

There was no attempt to capture extensive requirements in advance of the first iteration. The focus was developing a first prototype with the intent of gaining feedback and identify requirements for the following iterations. Taking into account the templates proposed by PM², as well as the descriptions of a Stakeholder Register from the PM-BOK, ISO 21500, and the remaining references analyzed in the literature review, a model of the relevant information that should be retrieved and recorded was established. This model was then

implemented in the form of template Excel spreadsheets.

The two defined spreadsheets constituted a template for a Stakeholder Register and Stakeholder Analysis. Both documents are editable at any moment after they have been filed out based on the proposed template, which facilitates changes as the project manager monitors stakeholder engagement. To make these spreadsheets accessible in collaborative work (more than one involved project manager - as is the case with Brisa's segmented PMO's), the defined document templates were placed on a shared network drive.

4.1.1 Conclusions

While the early results with this iteration were encouraging for future work, by providing a first sample on what information could be relevant, the solution proposed in this iteration was overly simple and quite limited. To be used on a new project, this solution should be copied from the template folder to the Project folder containing the remaining project documentation. Only then could the documents be filed with the relevant information, which proved to be inefficient. Folder organization may also end up being chaotic, especially if managing file versions. Another identified limitation was that of recurrent stakeholders, of which the contact and non-project related assessments and information could potentially be reused between projects, but not trivially using this solution, requiring the project manager to go through previously filed out documents (of other projects) and finding the same stakeholder to copy and paste the row to a new document

4.2. Iteration n.2

Building upon the insightful conclusions gathered from the first iteration, the second iteration sought to build system with a more robust approach and technological choice that could help improve user experience and resolve the identified limitations of the first solution iteration. As was decided based on the conclusions of the previous iteration, this iteration will be implemented as a web application, which will be called ProiectStakeholders. To choose the technology used to construct this second iteration, the focus was on two factors - accessibility and user experience. OutSystems was the technology chosen to implement it.

4.2.1 Use Cases

Use cases represent a set of actions that one or more actors request from a system in order to obtain a tangible result. For this solution iteration, eight use cases were identified, listed in Table 2.

ID	Use Case Name	Summary Description
01	Perform Login	When a Project Manager wants to access the application, he must enter his email and password pair to access the system. The system will authenticate the user based on those credentials.
02	Create Project Manager	The Administrator accesses the Users application to create a new platform User. This Administrator gives the User the role of Project Manager and attributes him to a Project Team.
03	Manage Project Manager data	The Administrator accesses the Project Managers page on the ProjectStakeholders application to edit the data of a Project Manager.
04	Manage Company data	The Project Manager can consult, edit and/or add a new Company to the system. When editing a Company, the Project Manager may add Company Departments.
05	Manage Stakeholder data	The Project Manager can consult, edit and add new Stakeholders to the system, and assign them to a Company and Department.
06	Manage Project data	The Project Manager can consult, edit and add new Projects to the system.
07	Manage Project Stakeholder data	The Project Manager can consult, edit and add new Project Stakeholders to one of the existing Projects.
08	Manage Stakeholder Engagement Activity	The Project Manager can consult, edit and add new Stakeholder Engagement Activities to one of the existing Projects. When managing an activity, the Project Manager must indicate which Project Stakeholders are involved and at what capacity.

Table 2: Use Cases Summary

Of these 8, 7 were implemented in this second iteration, and an additional one was introduced in the third iteration.

4.2.2 Database Schema

As a result of the proposed Use Cases, a database schema diagram was developed that represents all of the entities and attributes that must be represented or stored by the system. This schema represents the main entities of an IS project and of their stakeholders, as well as the attributes considered relevant to characterize them, based on the conclusions of the literature study.

4.2.3 Implementation

The implemented application supports identity management, defining two user groups associated with the user login: Project Managers and Administrators. Project Managers are the users of the application, having full use of the features of the Application, except for the creation of new Project

Managers, which is an exclusive power for an Administrator user. Project Managers may belong to a Project Team, meaning that their Project and Stakeholder information can be shared with other Project Managers of the same Project Team. Otherwise, all inputted information is only accessible to the respective Project Manager. Backoffice pages were created to define the applications' Project Managers, Companies, and Departments.

The Projects page is the application's defined landing page, listing the Projects created by the corresponding Project Manager, and the ones shared among the Project Team. Project Detail pages include a set of relevant information to characterize the project and lists the identified Project Stakeholders. The list includes the possibility of adding a new Project Stakeholder entity, as well as editing the data of the existing ones - see Figure 2.

The Project Stakeholder page, as previously mentioned, builds upon the generic information of the Stakeholder and frames the project manager's assessment of him/her towards the project. To

ing and recording activities that involve engaging stakeholders, as well as displaying the gathered information in such a way that assists the project manager to monitor the outcomes of those activities.

To support this added functionality, an additional Use Case was introduced - UC08, also present in Table 2.

4.3.1 Database Schema

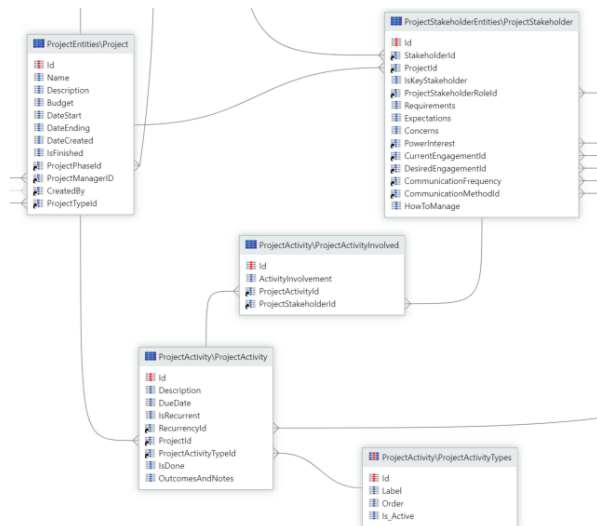


Figure 3: The additions to the previous database schema, now supporting the Stakeholder Engagement Activities.

The proposed database schema diagram was tweaked to include the additional entities and attributes necessary to implement the additional use case.

4.3.2 Implementation

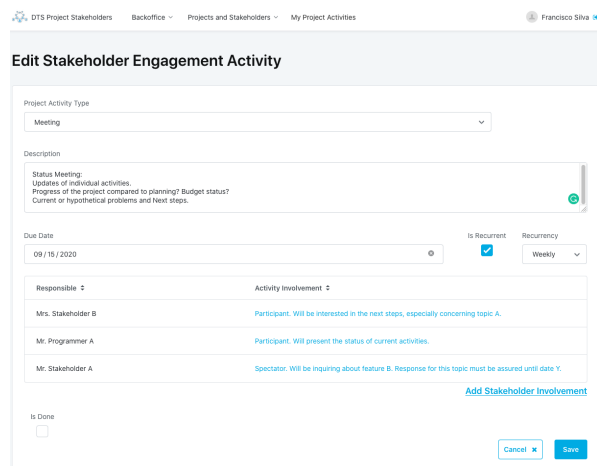


Figure 4: Engagement Activity Detail Page.

Complementing the Project Stakeholders list in the Project Detail page, this iteration introduces a

list of Stakeholder Engagement Activities that constitute the formal actions carried out by the Project Manager to engage with the identified Project Stakeholders and address them according to the identified communication needs, managing their involvement and expectations.

4.3.3 Conclusions

Having implemented this third iteration, it was concluded that this implementation presented a viable solution proposal that met all of the objectives set out for it.

5. Demonstration

Aiming to establish the use of artifacts in an attempt to solve the proposed research problem, the proposed *ProjectStakeholders* application was applied a IS project of Brisa starting at the Project Initiation phase, with ongoing use for 7 months, by this time this dissertation was submitted.

The solution was used to perform/register all of the stakeholder management processes and activities, according to the specified use cases, populating the application with real project data mapped to the relevant entities - the Digital Transformation team's with 2 Project Managers as users of the application and the companies involved in the project. The corresponding departments of these companies were added, totaling 6 companies and 7 departments.

Stakeholder identification was performed through the application, which resulted in 35 relevant stakeholders, of which 27 were external to the company. The corresponding stakeholder analysis and classification towards this project was performed. Of the 35 identified stakeholders, 13 of them were classified as key stakeholders, both due to their heavy participation and/or considerable political power.

The analysis data was used to plan how to engage with the identified stakeholders, by defining communication frequency and preferred method(s). This plan resulted in over created and undertaken 100 Engagement Activities.

5.1. Results

The application of this tool was considered useful during the project life-cycle, enabling an effective stakeholder management strategy that has assisted in the achievement of successful project results. It helped organize relevant project information, and it was found that at the disposal of an able project manager, it can assist in improved decision-making regarding stakeholder interactions and engagement.

As stated by João Fontes, head of the Digital Transformation team of Brisa's DTS, "by be-

ing aware of the importance of stakeholder management (...), the implemented tool allowed us to address and anticipate needs from both internal teams and external partners. We were also able to achieve a better than expected engagement, cross-functional teamwork, and expectations management”.

6. Validation

The validation process sought to make use of interviews with expert judgment. Eight IS practitioners from five different companies were contacted and asked to participate due to their field of work and experience in similar management positions in IS departments.

These interviews were performed to further validate the conclusions of the conducted research and the proposed solution, as well as potentially adding relevant feedback about the effectiveness and usability of the proposed solution. Semi-structured interviews were chosen to stimulate the respondent to answer openly and flexibly, while still having an objective comparison of answers. The interviews started with introductory questions about the interviewees’ knowledge of stakeholders, their strategies, and methods to engage with them, followed-up by a demonstration of the proposed solution, led by the interviewer. Afterward, the questions are oriented to understand the interviewee’s feedback concerning the proposed solution.

6.1. Results

The gathered interview results were very positive overall, showcasing an interest by the interviewees in the proposed solution for the identified problem. They were unanimous in their impressions, considering both the concept of a framework to address stakeholder management and the proposed implementation very interesting, innovative, and potentially very useful to structure the information of existing project stakeholders. Some of its potential applications were referenced by the interviewees, noting that this proposal clearly addresses an acknowledged pain point concerning existing project management practices. Interviewees could not identify any alternative project management software with the proposed features addressed by this solution.

Plenty of constructive feedback was acquired, going as far as suggesting several extensions in detail, some of them addressed in future work. Interviewees were also unanimous in considering the proposed IS solution or an evolution thereof as a potential success factor for a project. Their answers did not consider the application as essential, but ranked it as potentially very important to access and make use of for the management of their projects.

7. Conclusions

This research sought to explore and better understand the problem background and the inadequate processes and methods for management and control of stakeholder engagement.

Concerning the problems with stakeholder engagement in Brisa’s IS projects, this research analyzed and identified them, which concerned the existing methods through which project managers plan and control stakeholder engagement.

A vast bibliography on project management and stakeholder management helped answer what are the some of the best practices for a project manager to effectively manage and control the engagement of a variety of stakeholders in projects, and especially in IS projects. The conclusions drawn from the reviewed project management body of knowledge prescribe the implementation of stakeholder management processes and strategies.

While carrying out this study, it was shown that there is a lack of available software alternatives that address this problem, unlike other areas of project management. A solution was proposed, consisting of a stakeholder management framework, in the form of a software application, that can assist a project manager identify project stakeholders, analyze and classify them and register the plan for their engagement in a project setting. This solution can also record the defined engagement activities and their outcomes, allowing the project manager to monitor the results and adapt his plans if necessary.

This solution was demonstrated and tested in an ongoing project of Brisa’s DTS during the iterations of its development. Based on the registered results, it can be considered that this solution supported the project in which it was applied, enabling an effective stakeholder management strategy that has assisted in the achievement of a successful project result. It was also validated through the feedback of interviewees to a group of IS practitioners.

7.1. Future Work

There are several opportunities identified for future work, in regards to this research. The validation chapter of this dissertation indicated that the defined solution may potentially be applicable for, not only in Brisa’s DTS, but also in other companies’ IS departments or in IT consulting. This possibility could be approached by a new or adjusted research in which the proposed solution is expanded and validated in other companies and scenarios other than IS projects.

There are a considerable amount of features that could be added to the proposed solution that could not be implemented in the time span that this dissertation allowed for. Those features include:

- Software integrations with solutions such as Active Directory (or other LDAP), that could automatically synchronize many of the relevant stakeholder information or with Microsoft's Office 365 (Outlook) allowing the application to be used to schedule meetings and integrate email data automatically,
- Development of an application dashboard, that can provide a better visual representation of existing metrics (for example, a calendar highlighting the date/time for the scheduled stakeholder engagement activities, or a cross-project kanban board to track and prioritize them).
- The introduction of additional tooltips that advise the project manager on how to handle certain stakeholder interactions, depending on the performed analysis. Introducing dynamic graphical representations of each and/or all project stakeholders depending on their classification (such as in the power/interest grid or introducing an analysis via salience model) is another possibility.

Another possibility would be a new iteration on the solution that is implemented as a plugin to an existing project management tool with widespread usage, such as the case of Jira which supports third-party plugin implementations and extensions, instead of the standalone application that this dissertation explored, as a proof-of-concept.

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