

## **Tool for Managing IS Benefits**

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**Information Systems and Computer Engineering**

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# Resumo

A maioria das organizações dependem de sistemas de informação e tecnologia (SI/TI) para atingir os seus objectivos de negócio actuais e futuros. A crescente complexidade dos SI/TI resulta em grandes investimentos. Como tal, é essencial justificar os benefícios dos investimentos e garantir que eles são alcançados. No entanto, quando se considera o retorno dos investimentos, o alcance dos benefícios identificados inicialmente continua desafiante. As organizações estão muito preocupadas com a redução de custos e não se concentram em como o investimento em SI/IT pode criar valor de negócio e proporcionar benefícios significativos. Propomos o desenvolvimento de uma ferramenta colaborativa baseada na nuvem que fornece um serviço que permite uma melhor e mais fácil adopção de uma metodologia de gestão de benefícios com foco no aumento da motivação e participação das partes interessadas. Utilizou-se a metodologia Design Science Research para guiar a nossa investigação. Demonstraremos a nossa proposta através do desenvolvimento da ferramenta que implementa as características mencionadas na proposta. Por fim, avaliaremos através de demonstrações de utilização, comentários e opiniões obtidas a partir de entrevistas e questionários.

**Palavras-Chave:** Gestão de Benefícios, Sistema de Informação, Colaboração, Realização de Benefícios, Gamification, Proposta de Valor.



# Abstract

Most organizations rely on the commitment of information systems and technology (IS/IT) to achieve their current and future business objectives. The growing complexity of IS/IT results in large investments. As such it is essential to justify the benefits of investments and ensure that they are achieved. However, when considering the return of the investment, the completion of the benefits initially identified remains challenging. Organizations are too concerned about reducing costs and fail to focus on how the investment in IS/IT can create business value and deliver significant benefits. We propose the development of a cloud-based collaborative tool that provides a service to allow better and easier adoption of a benefits management methodology with focus on increasing motivation and improving stakeholders' participation. We will use the Design Science Research Methodology to guide our research. We will demonstrate our proposal by developing the tool that implements the features mentioned in the proposal. Finally we will evaluate it through feedback gathered from demonstrations, interviews and questionnaires.

**Keywords:** Benefits Management, Information System, Collaboration, Benefits Realization, Gamification, Value Proposition Canvas.



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# List of Acronyms

<b>DSRM</b>	Design Science Research Methodology
<b>BDN</b>	Benefits Dependency Network
<b>VPC</b>	Value Proposition Canvas
<b>IST</b>	Instituto Superior Técnico
<b>ISGB</b>	Instituto Superior de Gestão Bancária
<b>IT</b>	Information Technology
<b>IS</b>	Information System



# 1. Introduction

Over the past few decades IT has been positioned as a strategic investment that can bring about the achievement of superior performance through innovative ways of conducting business and increased agility for organizations. Despite the consensus about the importance and the considerable investments that organizations continue to make in their purchase and implementation, the realization of the benefits initially identified remains challenging.

With the growing complexity of organizations, the required information systems are also increasingly complex and sophisticated, which demands increasing levels of managerial and employee skill to deliver and use them effectively. Often information technology vendors suggest that all an organization needs to do to improve its performance is to implement a given application or set of hardware, frequently ignoring the complexity of an organization and its work practices. However, considerable research has shown that such implementations should not simply be exercises in technology deployment, but, to be successful, must be accompanied by complementary changes in business processes, the working practices of individuals and groups, the roles of individuals and even the culture of the organization [1].

Research has found that a large group of organizations fail to deliver the expected benefits from their projects (about 57% [1]). When considering investments in information systems and technology (IS/IT), most organizations focus on the implementation of technology not on the achievement of expected business benefits, which has consequences, such as benefits not being attained even though projects are considered a technical success [2]. When organizations consider the return of the investment, they are too concerned about reducing spending and are failing to focus on how the investment in IS/IT can create business value and deliver significant benefits to the organization [2].

Even though there are methodologies that allow organizations to adopt a benefits management approach for their projects, they require good expertise regarding the benefits management process, the participation of all stakeholders in the process, the initial benefits plan with the least possible errors (high accuracy), ability to perform workshops with all stakeholders at a certain time and location, ability to extract all the necessary information from the workshops and effectively share that information, and monitor the benefits and changes progress. The achievement of those changes and benefits are essential for the IS/IT components so that they are able to achieve the initially proposed objectives.

With our work we intend to develop a collaborative tool in the cloud, which will allow a better and easier adoption of benefits management methodology and motivate and improve stakeholders' participation in the benefits management process. We intend to do this by starting from a macro process that has already been developed, but setting some of the activities inherent to the process states. Some of these activities make use of gamification techniques that are allied to a method of effective parallel thinking, which helps people to be more productive, focused, and mindfully involved.

This study was conducted by using the Design Science Research Methodology (DSRM) and the steps of DSRM are reflected upon in the sections of this report. We will start by presenting a brief description of DSRM followed by the identification of the problem we aim to solve. Next, we will describe the state of the art on the research area, benefits management, collaborative software, gamification, the Six Thinking Hats method and Value Proposition Canvas. Based on the study of literature we will present our proposal to solve the identified problem. Afterwards, we will discuss the demonstration and evaluation. Finally, we will draw some conclusions about our work and future work.

# 2. Research Methodology

The research methodology chosen to use during the development of this thesis is Design Science Research (DSRM), where we plan to develop and validate a proposal to solve our problem.

In order to clearly understand the DSRM it is important to be aware of the concept of methodology. According to Hevner et al., a methodology is *a system of principles, practices and procedures applied to a given branch of knowledge* [3]. It is also relevant to grasp the concept of information system that according to Laudon is defined as *a set of interrelated component that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization* [4].

The methodology aims to overcome research paradigms such as the traditional descriptive research, where the outcomes are mostly explanatory and, one could argue, are often not applicable to the solution of problems encountered in research and practice [3].

DSRM requires the building and evaluation of an artifact designed to solve an identified problem in a certain domain, in the context of Information System. The artifact can be broadly defined as a construct (vocabulary and symbols), a model (abstractions and representations), a method (algorithms and practices), and an instantiation (implemented and prototype systems).

DSRM is based on an iterative process, composed of six steps [5] that need to be executed in order to build and evaluate the artifacts. In Figure 1 the six steps of the process are described.

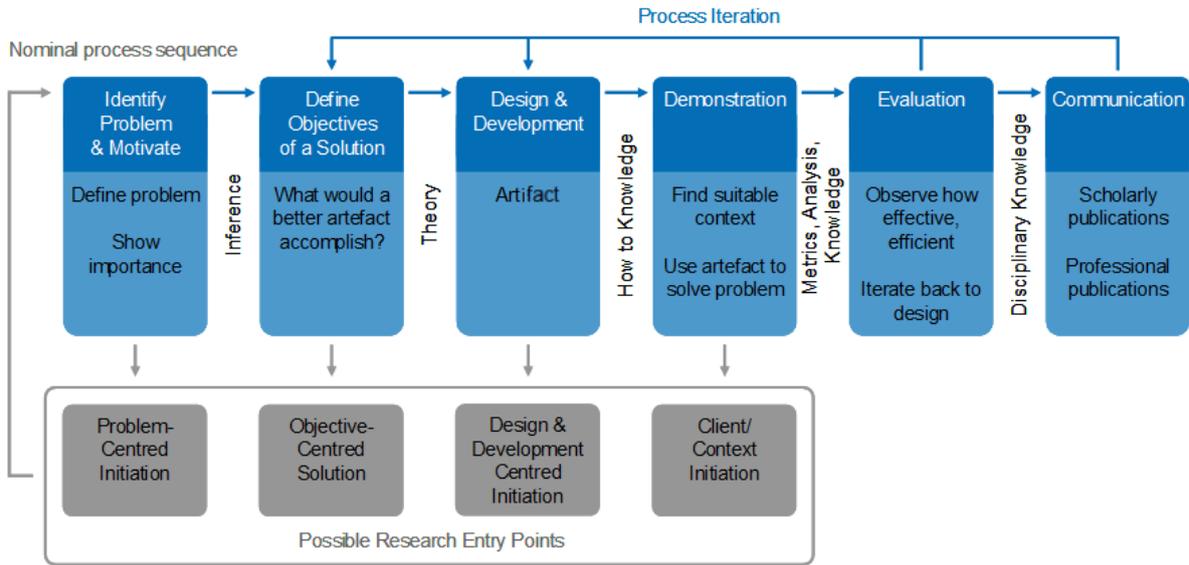


Figure 1 – DSRM process [5]

The six steps shown in Figure 1 will be explained in the following topics [5]:

1. **Problem identification and motivation.** Define the specific research problem and justify the value of a solution. To capture the solution's complexity it is useful to atomize the problem conceptually. The problem definition will be used to develop an artifact that can effectively provide a solution. The knowledge of the state of the problem and the importance of its solution are required in order to complete this step.
2. **Defining the objectives for the solution.** Derive the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative, in which a desirable solution would be better than current ones, or a description of how a new artifact is expected to support solutions to problems not presently addressed. The resources required for this included knowledge of the state of problems and current solutions.
3. **Design and Development.** Create the artifact. The artifacts are potentially constructs, models, methods, or instantiations or even new properties of technical, social and informational resources. The design research artifact can be any object in which a research contribution is embedded in the design. This step involves the determination of the artifact's functionality and its architecture, and then building the artifact itself. To achieve this step one needs to be familiar with the knowledge of theory that can be brought to bear in a solution.
4. **Demonstration.** In this step we have to demonstrate the use of the artifact to solve one or more examples of the problem. It could involve its use in simulation, experimentation, case study, proof, or another appropriate activity. In order to complete this step we need the knowledge of how to use the artifact to solve the problem.
5. **Evaluation.** This step involves the observation and measurement of how well the artifact supports a solution to the problem. It involves comparing the objectives of a solution to actual observed results from the use of the artifact in the demonstration. It requires knowledge of relevant metrics and analysis techniques. Evaluation can be done in many ways and it could include items such as a comparison of the artifact's functionality with the solution objectives, from step 2, quantitative performance measures or quantifiable measures of system performance.
6. **Communication.** To communicate the problem and its importance, the artifact's utility and novelty, the rigor of its design and its effectiveness to researchers and other relevant audiences such as practicing professionals, when appropriate. This step can be done by submitting papers or in any other way to reach those who are interested on the research.

This process has to be executed in a sequential order, but the starting point varies according to the starting point approach. There are four different starting points:

1. Problem-centered: when the research begins from the definition of a problem;
2. Objective-centered: when a set of objectives is define previously;
3. Design and Development-centered: when there is an artifact that needs to be more formally analyzed in the domain of the problem;
4. Client/Context initiated: when it is about the performance evaluation of a solution already applied.

Since we start by identifying a problem, our research started the DSRM process with a problem centered starting point. The DSRM process provides the guidance needed to conduct our research. The following figure shows the mapping of our work with the DSRM process.

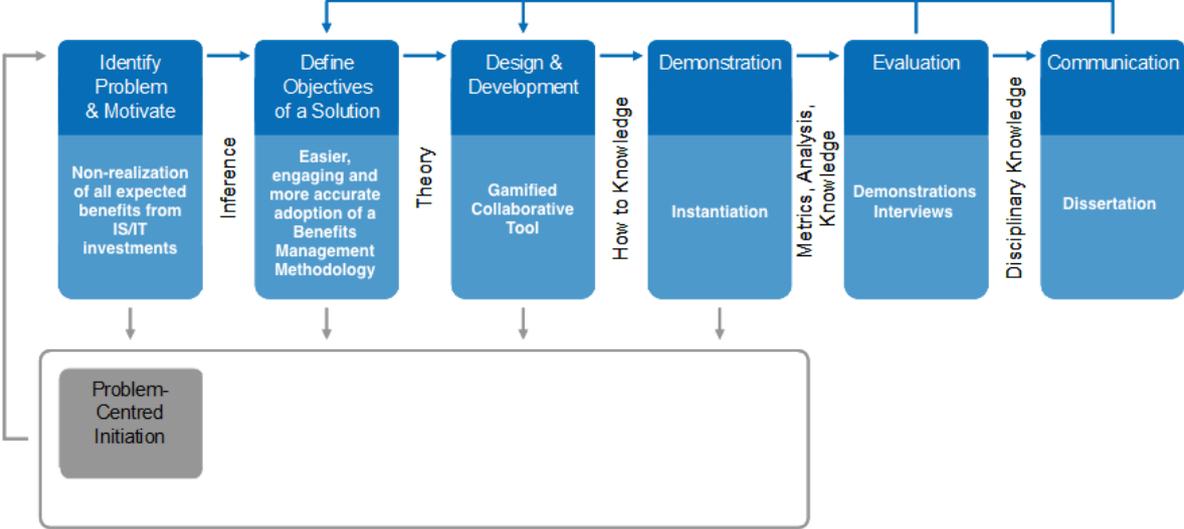


Figure 2 – The DSRM process mapped to our work (adapted from [5])



### 3. Research Problem

This section corresponds to the first step of DSRM. This first step involves the problem identification and motivation. In this section we will describe the problems that originated this research plus the motivation behind its resolution.

Organizations nowadays face some issues and challenges when they have to select the most appropriate projects and then manage them successfully. Information systems and technology (IS/IT) are essential components of the majority of businesses, allowing them to improve their efficiency of operations, their agility in responding to changing market demands and the ability to develop innovative products and services [1]. The average organization spends about 5% of their revenues on IT [1], it is a large investment that managers have found increasingly difficult to justify. Managers are often under immense pressure to find a way to measure the contribution of their IS/IT investments to the improvement of business performance as well as to find reliable ways to ensure that the expected business benefits from IS/IT investments are actually achieved [6].

Research has found that a large group of organizations fail to deliver the expected benefits from their projects (about 57% [1]). There are several reasons that lead to this: Organizations are implementing more complex information systems and other IT applications, which require more management expertise and employee skill to deliver and use them effectively; the expectation created by the IT industry is not realistic in terms of proven benefits or the time it takes to obtain them; the systems are often enterprise-wide and impact more people inside the organization and also relationships with external partners and customers; the types of benefit that the investment can deliver are increasingly diverse and harder to identify, measure and quantify; it is difficult to relate business performance improvements to specific IS/IT projects, as they usually result from a combination of improved technology and other changes in the ways of working; organizations neither consistently undertake benefit reviews at the end of projects nor transfer lessons learned to future projects [1].

When considering investments in information systems and technology (IS/IT), most organizations focus on the implementation of technology not on the achievement of expected business benefits, which has consequences like benefits that are not fulfilled despite projects being considered a technical success [2]. When organizations consider the return of the investment, they are too concerned with reducing spending and are failing to focus on how the investment in IS/IT can create business value and deliver significant benefits to the organization [2].

Another worrying aspect is that the traditional investment appraisal process is seen as a ritual that must be overcome before any project can begin, with many benefits being amplified or overestimated in order to get the investment approved. This is not new since early in the 90s Kit Grindley reported that 83% of IT directors that participated in his study admitted that the cost/benefit analysis supporting proposals to IS/IT investments were a fiction [2]. Since they already know that many of the benefits identified in the investment proposal are unlikely to be achieved, this is why few companies engage in the reviews after the implementation. In addition, without a serious and clear identification of the

expected benefits, it is quite difficult to measure the success of the IS/IT investment. Usually it would be successful if it were delivered on time, within budget and whether it met the technical specification or not [2].

Furthermore, the evaluation of IS/IT investments requires multi-dimensional measures like financial, organizational, social, procedural and technical, many of which are currently either avoided or dealt with ineffectively [7].

Even if the company adopts a benefits management methodology, there are some issues that can affect the success of the methodology, and consequently the lack of benefits delivery. One key reason that can lead to the lack of benefits delivery may be due to misjudgments or lack of knowledge in preparing the benefits plan [1]. Knowing that is essential to the benefits management process; the benefits dependency network and benefits plan are made with the highest accuracy. The identification of all the BDN components is not trivial because you can never be sure you will get all the components from the stakeholder by just asking them what the objectives, benefits and changes to implement the system are.

The benefits plan development is based on intense communication between stakeholders, therefore cooperation and collaboration are vital in this process. The traditional way to do this is through workshops but this has some limitations: lack of stakeholders participation, lack of collaboration and discussion, dominant participants, biased opinions, high logistic costs and difficulties in gathering stakeholders at the same time and place.

**Problem: It is difficult to achieve all the expected benefits from IS/IT investments.**

According to Laudon [4] to solve a problem through an information system, and achieve a business solution it is necessary to define and describe the information system with an integrated structure with three major components: Management, Technology and Organization Behavior (figure 3).

The work done by John Ward and Elizabeth Daniel in developing the benefits management methodology, aiming to solve the benefits realization problem, corresponds to the management and organization component (figure 3). For the management component, the methodology fits the objectives of the investments with the drivers and strategy of the business. The methodology can also be useful in the selection of information systems and technology. Regarding the organization component, the methodology defines a process, which must be carried out so that the method is successful, and the various process steps define business activities and processes that must be adopted by the organization in order to perform the methodology.

According to this definition by Laudon [4], the missing piece to achieve a business solution that solves the previously identified problem is the component of technology. Our proposal is mostly related to the technology component but also affects the organization component when it comes to the processes of

interaction with the technology, replacing some presential activities (e.g. workshops) suggested by the author of the methodology, which we will follow.

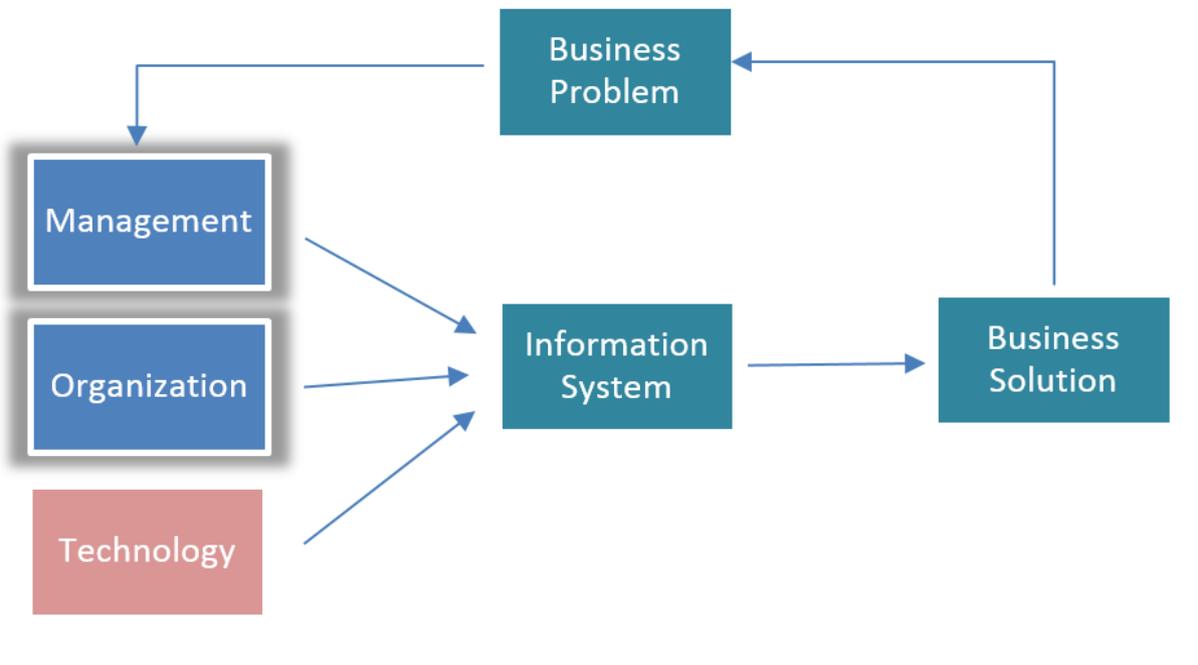


Figure 3 – Socio-technical Approach to Business Problems and Solutions (adapted from [4])

We propose to develop a collaborative tool, a software as a service, that will allow a better and easier adoption of benefits management methodology and motivate and improve stakeholders participation in the benefits management process. We intend to do this by starting from a macro process that already exists, but setting some of the activities inherent to the process states. Some of these activities make use of gamification techniques that are allied to a method of effective parallel thinking, which helps people to be more productive, focused, and mindfully involved



## 4. Related Work

In this section we will present the topics related to the subject of our work. We will start by presenting the benefits management approach, in which we give an overview of concepts and then we will explain more details of the process behind the approach. Later, we present some related work about social collaboration, gamification, the Six Thinking Hats and Value Proposition Canvas that we will use in this work to help overcome the identified problem.

### 4.1. Benefits Management

Benefits management, benefits realization management or benefits realization are three different ways to describe the same phenomenon, with different authors using these slightly different terms. Benefits management refers to the process of organizing and managing, such that the benefits arising from the use of information systems or information technology are actually achieved [2]. The term 'benefits management' emphasizes the close relation between the realization of benefits and the change management, since benefits arise from the changes made by individuals or groups within or outside the organization [2]. Those changes have to be identified and managed successfully in order to achieve the benefits.

To identify the investments benefits it is common to create benefits maps that link benefits with other elements, such as the changes and the objectives of the investment. The benefits map or diagram has slightly different representations depending on the author. The map construction is usually made from right to left, with the objectives to be achieved being the starting point (the business goals or strategic outcomes) and then moving to the intermediate steps needed to achieve them.

Gerald Bradley [8] highlights the centrality of Benefits Realization Management (BRM), considering that it should be the driver for all change and program activities, [8] including mechanisms for stakeholders engagement, defining requirements and acceptance criteria, determining project boundaries, developing programme and project plans, identification of risks, information for the business case and ongoing monitoring and reviews.

Benefits Dependency Map is the name that Gerald Bradley adopted for the benefits map, and it has five types of objects [8]:

- Bounding Objective. Goals that support the purpose of what is being attempted.
- End Benefit. Represent the objective, what they achieve.
- Intermediate Benefit. An outcome of change necessary to achieve the benefit.
- Business Change. Changes in the business processes of the organization.
- Enabler. Something that can be developed/built/acquired and where the benefits will be fulfilled.

The figure 4 illustrates a simple diagram example according to Gerald Bradley's work.

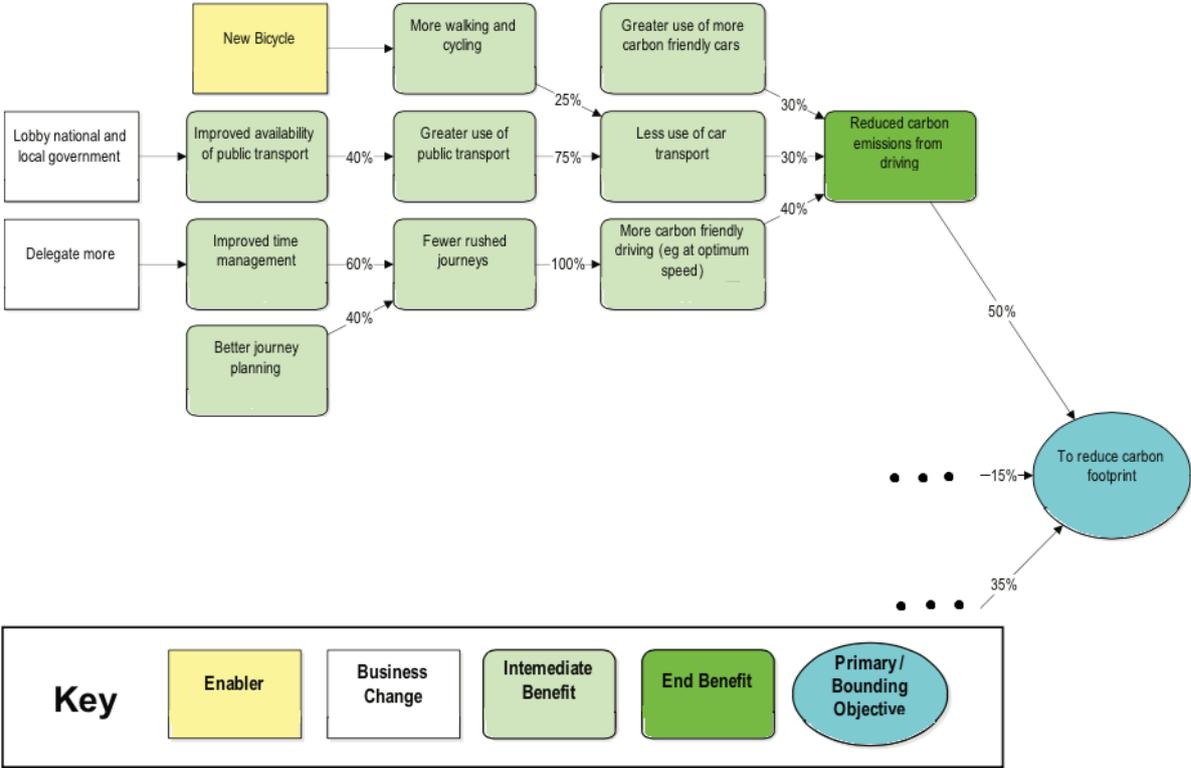


Figure 4 – Benefits Map example (adapted from [8])

John Thorp [9] emphasizes that the Benefits Management approach is based on the following premises [9]:

- Benefits do not just happen. They do not automatically appear when the technology is delivered, they appear gradually over time as people learn to use it.
- Benefits do not always happen according to plan. The forecast of benefits to support the business case for an investment is just an early estimation so they must be checked according to their evolution.
- Benefits realization is a continuous process of envisioning results, implementing, checking intermediate results and adjusting the path leading investments to business results.

The benefits map that John Thorp developed in his work is called Results Chain and has three type of objects [9]:

- Outcome. The results sought, intermediate outcomes and ultimate outcomes that are the ultimate benefits to be harvested.
- Initiative. Actions that contribute to one or more outcomes.

- Assumption. Hypothesis regarding conditions necessary to the realization of outcomes or initiatives which the organization has no or little control over.

A simple result chain example is illustrated in figure 5.

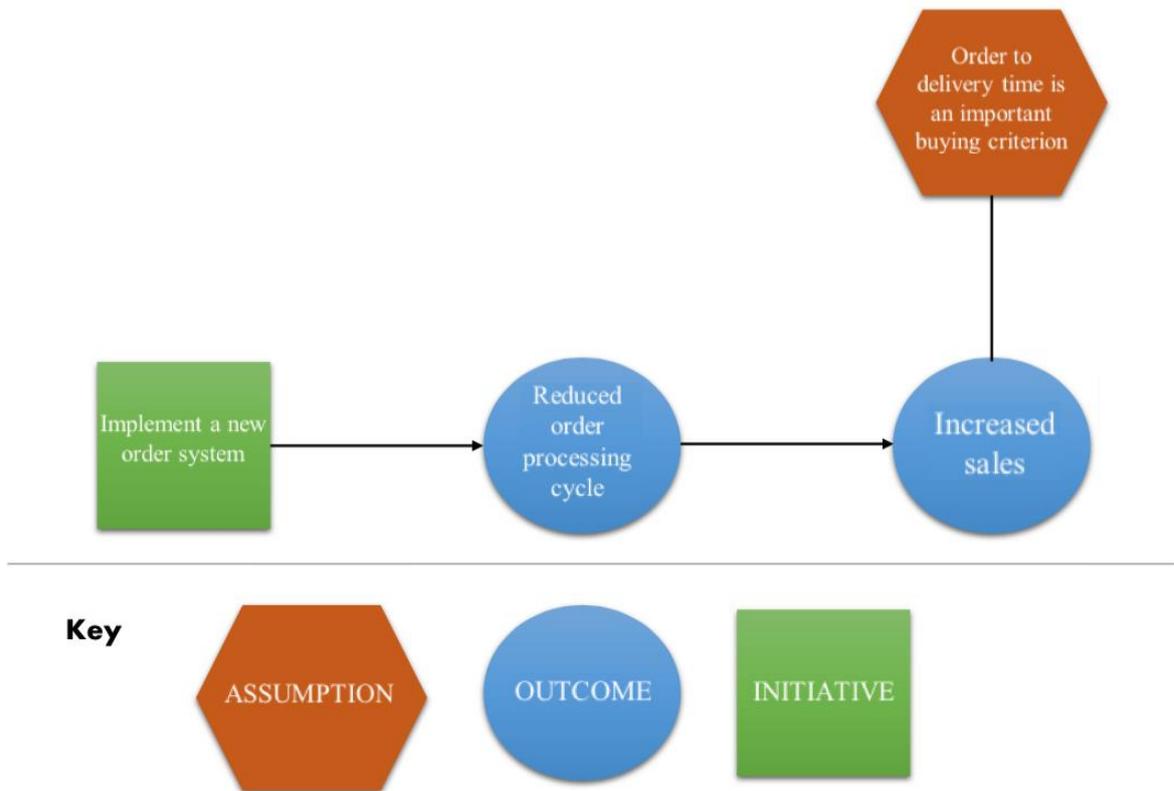


Figure 5 – Results Chain example (adapted from [9])

John Ward and Elizabeth Daniel propose a methodology that has a well-defined macro process for the implementation of a benefits management approach to IS/IT projects. We will not go into details now since this methodology will be better explained in the following topics.

Regarding the benefits management, our work is mainly based on John Ward and Elizabeth Daniel benefits realization approach since it was one of the most used in the community. John Ward and Elizabeth Daniel have some good papers that contribute to the understanding and use of a benefits realization approach. Since this was the work that provided us with more tools to contribute to the solution of our problem, we decided to follow it.

#### 4.1.1. Benefits Management Concepts

For a better understanding of the following topics, it is important to define some concepts [1]:

- **Benefits management** – The process of organizing and managing so that the potential benefits arising from the use of IS/IT are actually achieved.
- **Information systems** – Information systems are the means by which people and organizations utilizing technology gather, process, store, use and disseminate information.

- **Information technology** – Information technology refers to the technology on which information systems operate or run. Hardware, software and telecommunications networks that underpin information systems.
- **Business drivers** – Issues about which executive and senior managers agree; this means the organization needs to make changes – and the timescales for those changes. Drivers can be both external and internal but are specific to the context in which the organization operates.
- **Investment objectives** – A set of statements that describe what the organization is seeking to achieve from the investment. They should be a description of what the situation would be on successful completion of investment.
- **Business benefit** – An advantage on behalf of a particular stakeholder or group of stakeholders. This implies that the benefits are ‘owned’ by the individuals or groups who want to obtain value from the investment.
- **Benefit owner** – An individual who will take responsibility for ensuring that a particular benefit is achieved. This usually involves ensuring the relevant business and enabling changes progress go according to plan and are achieved. Due to the need to ensure that tasks get done, the benefit owner is usually a senior member of staff.
- **Stakeholder** – An individual or group of people that will receive the expected benefits and who are either directly involved in making or are affected by the changes needed to achieve the benefits.
- **Business changes** – The new ways of working that are required to ensure the desired benefits are achieved. These will be the new ongoing ways of working in the organization – at least until the next change initiative.
- **Enabling changes** – Changes that are prerequisites for achieving the business changes or that are essential to bring the system into effective operation within the organization. Enabling changes are usually ‘one-off’ activities rather than ongoing ways of working.
- **Enabling IS/IT** – The information systems and technology required to support the realization of identified benefits and to enable the necessary changes to be undertaken.
- **Change owner** – An individual or group who will ensure that an identified business or enabling change is achieved successfully.
- **Observable benefit** – By use of agreed criteria, specific individuals/groups will decide, based on their experience or judgment, to what extent the benefit has been achieved.
- **Measurable benefit** – This aspect of performance is currently being measured or an appropriate measure could be implemented. However, it is currently not possible to estimate by how much performance will improve when the changes are completed.
- **Quantifiable benefit** – Sufficient evidence exists to forecast how much improvement should result from changes (i.e. the size or amount of the expected benefit).
- **Financial benefit** – By applying a cost, a price or another valid financial formula to a quantifiable benefit, a financial value can be calculated.

## 4.1.2. Benefits Management Process

The Benefits Management Process defined in John Ward and Elizabeth Daniel work [1] is an iterative process that comprises five stages, which are shown in Figure 6 [1]. In the John Ward and Elizabeth Daniel benefits management approach, a very important artifact produced is the benefits realization plan, which serves as an input to develop a robust business case for the investment, and to develop a viable change management plan to deliver the benefits. The benefits realization plan will guide both the implementation of the project (mainly the early phases) and the subsequent review process. Next, we will explain each of the benefits management stages.

### Stage 1: Identify and Structure Benefits

This stage is based on the outcome of the IS/IT strategic analysis and planning activities where a new or improved IS/IT will have been identified and the overall nature of the business contribution expected (strategic, key operational or support)[1] from the investment can be determined. The objectives of this stage of the process are:

- To establish the objectives for the investment and ensure that these are related to one or more business drivers for changes to be done in the organization.
- To identify all the potential benefits that could be reached by achieving the investment's objectives;
- To understand how a combination of IS/IT functionality and business changes can cause the benefits to be achieved;
- To establish an owner for each benefit and determine whether they can be measured to prove that they have occurred;
- To identify organizational issues or implications for specific stakeholder groups that could hinder the project or even cause it to fail;
- To produce a summary business case to decide whether to proceed further on or stop the investment.

The identification of potential and achievable benefits is inevitably an iterative process since as new ideas and options are considered, they lead to modifications in the objectives and new benefits are identified. It is important to be as precise as possible about where in the business the benefit will occur in order to determine how it can be measured, and who should be responsible for its delivery.

The determination of the ownership of the benefit, in other words the responsibility for its delivery, is an important step to the realization of the benefit, and so, if any benefit does not have an owner, it should be removed from the list. A *benefits dependency network* is a key output from this step, which relates the IS/IT functionality via the business and organizational changes to the benefits identified [1]. The creation of such network requires knowledge to be shared among business managers and stakeholders, including the IT specialists, so that they all understand what benefits are and how achieving each of the benefits depends on specific changes being made.

As is done with benefits, ownership and responsibility for each change should be identified. In addition, how the change will be measured ought also to be established in order to guaranty that it is achieved successfully.

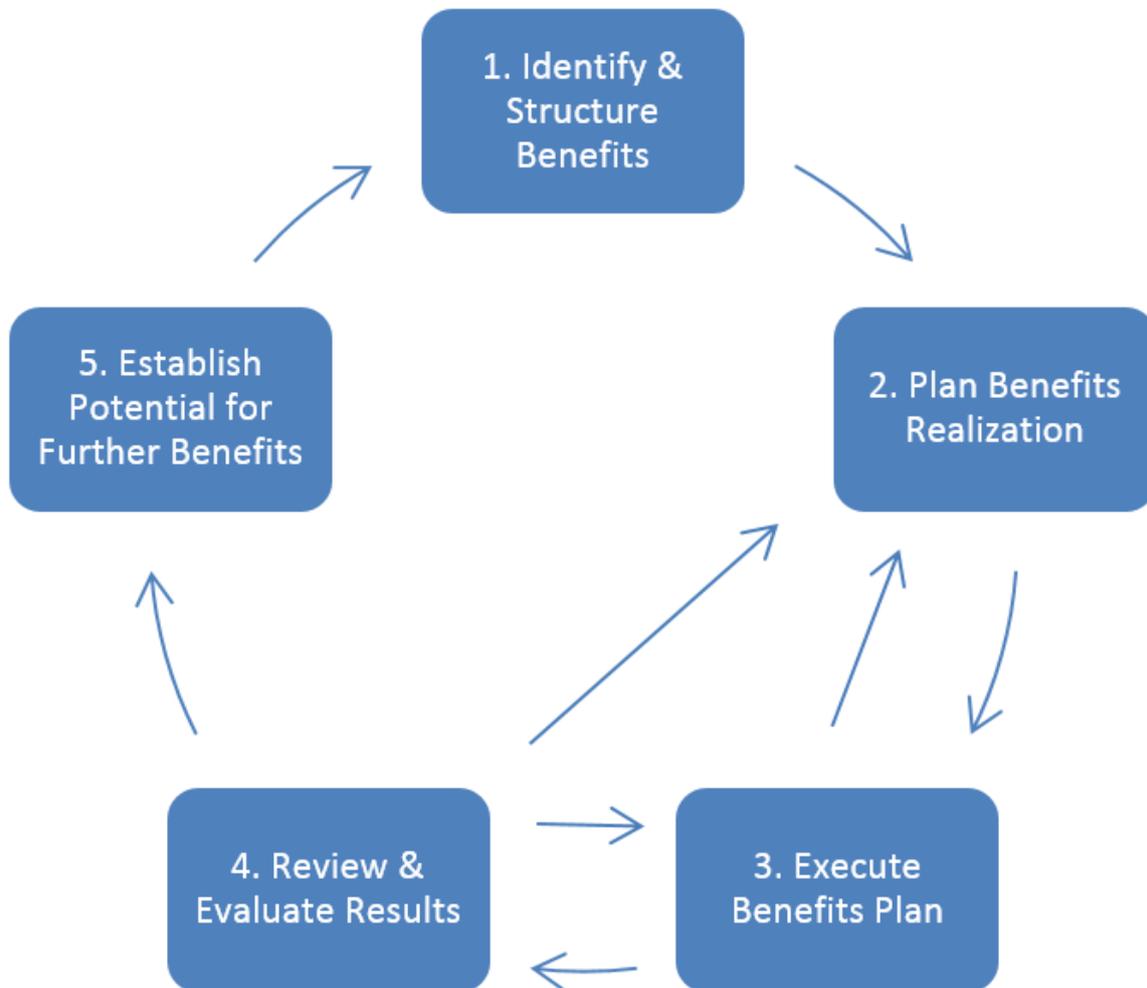


Figure 6 – Benefits Management Process [1]

### **Stage 2: Plan Benefits Realization**

The main objectives of this stage are the development of a full benefits plan and business case for the investment. The artifacts, the benefits plan and business case are submitted to the management in order to be approved. To build those artifacts, the following also have to be achieved:

- Full description of each benefit and change, with responsibility for delivery clearly defined and agreed upon;
- Finalize measurements of benefits and changes;

- Established ownership of all the changes and actions in place to address all the stakeholder issues that may affect the achievement of the changes;
- The evidence or criteria to be used to assess whether each change has been carried out successfully;
- A complete benefits dependency network that shows all the benefits and changes relationships.

This stage also considers the stakeholder perspective in the project. To address this concern a stakeholder analysis is done. The purpose of a stakeholder analysis is to understand the people factors that will affect the organization's ability to implement the changes required to achieve the expected benefits, seeing as some stakeholders will be mainly beneficiaries of the investment while others will mainly be involved in the changes.

### **Stage 3: Execute Benefits Plan**

This is the stage where necessary adjustments are carried out as issues and events affecting its viability occur. Normally the business project manager is the responsible for ensuring that the project is delivered to meet the business needs. One aspect of his role is to be the supervisor of the benefits plan and to ensure that each stakeholder carries out his or her responsibilities as defined in the plan.

During the implementation further benefits may also be identified and the business project manager should obtain agreement on appropriate action in order to revise the plan to accommodate the benefit. It may also become apparent that intended benefits are no longer feasible or relevant. Therefore, the benefits plan should be modified accordingly, along with any consequent reduction in the IS/IT functionality or business changes.

### **Stage 4: Review and Evaluating Results**

In this step the benefit review aims to assess the investment itself and gain organizational learning. The objectives are:

- To determine and confirm which planned benefits have been achieved;
- To identify the expected benefits that have not been achieved and to decide if remedial action can be taken to still obtain them or if they have to be foregone;
- To identify any unexpected benefits and any unexpected 'disbenefits';
- To understand the reasons why certain types of benefits were or were not achieved and learn lessons for future projects;
- To understand how to improve the organization's benefits management process for all projects.

The evaluation should involve all key stakeholders and focus on what has been achieved, what has not been achieved and why, and, if possible, identify further action needed to deliver outstanding benefits.

#### **Stage 5: Establish Potential for Further Benefits**

Stage five is the last stage of this interactive process, and its purpose is to identify additional improvements through business changes, initiate action and, finally, to identify additional benefits from further IT investment. It should involve the main stakeholders and any others who may be able to contribute, using the increased knowledge now available to identify new opportunities and the benefits they offer. These benefits may be achievable through further business changes alone or may require more IS/IT projects.

### **4.1.3. Benefits Dependency Network**

The central framework in the benefits management process is a framework called a benefits dependency network (BDN). The framework is shown in figure 7.

The framework is designed to enable the investment objectives and their resulting benefits to be linked in a structured way to the business and IS/IT changes required to achieve those benefits.

The construction of the network starts by understanding the business drivers. Afterwards, an agreement on the objectives for the particular investment should be identified together with the business benefits that will result if the objectives are achieved. It is then necessary to consider the changes to the business activities, structures and ways of working, which are necessary to achieve the potential benefits.

For each benefit we have to identify and describe the changes needed to obtain it. The identified changes may be of two types, *business changes* or *enabling changes*. Business changes are new or different ways of working that will be required permanently to achieve and sustain the benefit (business processes, sourcing options for some activities, roles and responsibilities, performance measures, etc.). Enabling changes are one-off changes that are necessary to allow the enduring business changes to be brought about or to introduce new technology (training in how to use a new system or technology, education in how the new systems can improve the performance of individuals, groups or the whole organization, etc.)[1].

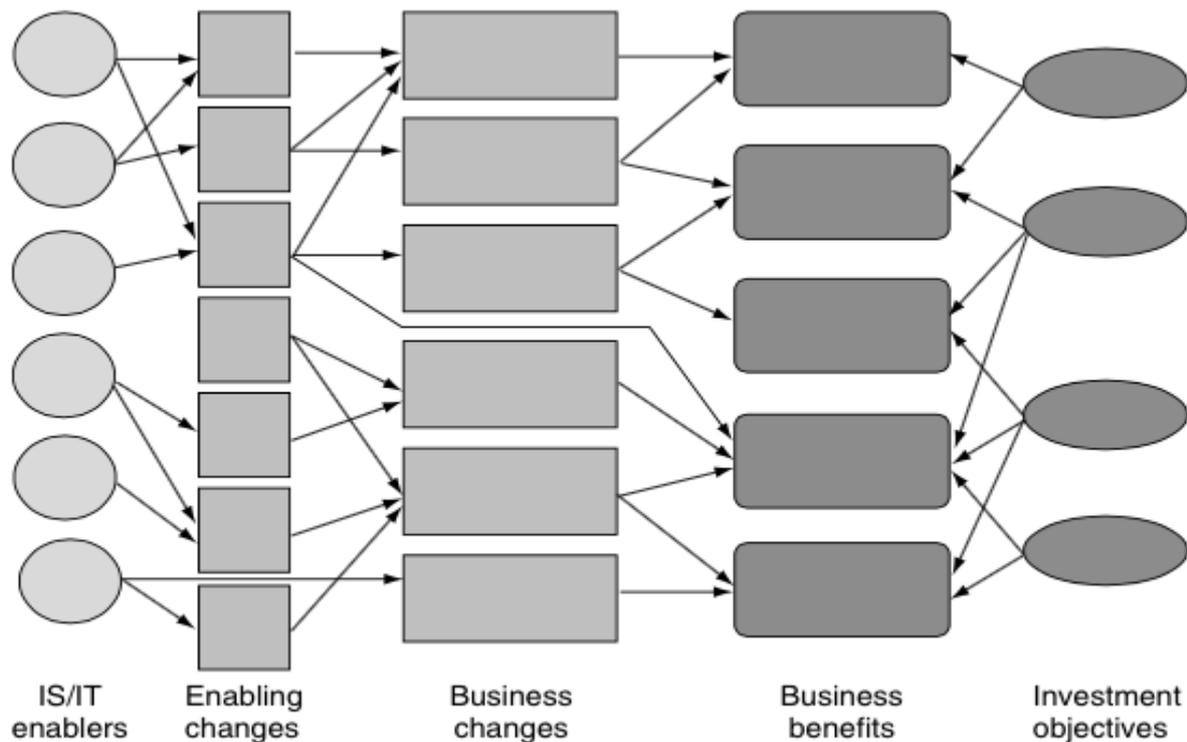


Figure 7 – Benefit Dependency Network [1]

IS/IT enablers are the information systems and technology required to support the realization of the identified objectives and enable the necessary changes to be undertaken, this may require the purchase or development of new systems or changes to existing applications and infrastructure [1].

#### 4.1.4. Benefits Management Tools

We will here briefly present the tools we found on the market that somehow implement a benefits management realization and then compare their features (table 1).

BRMTool was developed by a Canadian company called P3M. BRMTool is a web based application, it requires no client installation, and so it can be accessed through the browser. This tool was specifically designed for organizations in a process of transformation, but also supports operations in more stable environments<sup>1</sup>.

Strategydotzero is an integrated platform that combines Strategic Planning, Benefits Management, Program and Portfolio Management and Enterprise Architecture. Its aim is to provide organizations with a consolidated platform to execute strategy. It is based in Australia<sup>2</sup>.

Unlike the other two, Realisor is not web based and requires a Windows computer to be installed. Its aim is to fully support a Benefits Realization process. It is based in the UK<sup>3</sup>.

<sup>1</sup> <http://www.p3mconsulting.ca/index.php> IP3M home page.

<sup>2</sup> <http://www.strategydotzero.com/> Strategydotzero home page.

<sup>3</sup> <http://realisor.com/> Realisor home page.

Table 1 – BM tools features comparison

<b>Features</b>	<b>Realisor</b>	<b>Benefits Architect</b>	<b>BRMTool</b>
<i>Benefits Dependency Network</i>	✓	✗	✗
<i>Result Chain</i>	✓	?	✓
<i>Benefits Dependency Map</i>	✓	✓	✗
<i>Discussion about the mapping objects</i>	✗	✗	✗
<i>Automated notifications</i>	✗	?	✓
<i>Software as a Service</i>	✗	✓	✓
<i>Enterprise</i>	✓	?	✓
<i>Business Cases</i>	✓	✓	?
<i>Benefits Plan</i>	✓	✓	✓
<i>End-to-End Benefits Management</i>	✓	✓	?
<i>Cost control</i>	✓	✓	✓
<i>Benefits realization scheduling</i>	✓	✓	?
<i>Portfolio Management</i>	✓	✓	✓

## 4.2. Collaborative Software

Collaborative software is a computer system that is primarily designed to assist a group of users in communicating, collaborating, and in coordinating their activities [10]. Also called groupware, collaborative software is an integral component of a field of study known as Computer-Supported Cooperative Work (CSCW). Collaborative software services can include the sharing of calendars, email handling, shared documents, etc. Collaborative software provides an essential support for creation and knowledge maintenance in organizations as such its use has become increasingly important to them [11].

There are two general types of collaborative tools, asynchronous and synchronous. In asynchronous tools, activities take place outside real time so there is a lag time between the activities done for the participants, even if the lag time is short. The message (post, comments or any other way of communicating) can be added at any time, and the responders can take as much time as they need to respond to the message [12]. The asynchronous way is more flexible and some key advantages to asynchronous collaboration tools are:

- Participants can receive the information when it is most convenient for them;
- There is less pressure to act on the information or immediately respond in some way;
- People have time to digest the information and put it in the proper context and perspective [12].

The disadvantages of asynchronous collaboration are that they can lack a sense of immediacy and less immediate interaction. Sometimes the response or feedback to shared information can take some time. Email is an example of an asynchronous collaboration tool [13].

Synchronous or real-time communication takes place like a conversation. Some advantages are:

- Its immediacy, the response must be done right away;
- More closely resembles face-to-face communication;

- It is generally more interactive than asynchronous [12].

The drawback of synchronous collaboration is that it is not as flexible as asynchronous collaboration so all the parties involved must be ready and willing to collaborate at a given time otherwise the session does not work as well. In addition, not everyone does well with this kind of collaboration, especially people who like to think over what they want to communicate [13].

Despite the general types, there are tools that share some features of both groups, like the chat feature, which is a real-time type but is often included in asynchronous collaborative tools [14].

The features could be divided in four categories: communication, information sharing, group calendar and collaborative management [14].

**Communication** features enable users to send messages to one another. Examples of communication features are email announcement, chat rooms and instant messaging. Information sharing features allow users to share various forms of information, for example file sharing, discussion board, and Wiki, where ideas are exchanged using discussion threads.

**Group calendar** is one of the most common collaboration features. It stores upcoming events and the participants of the events. This feature can also include reminders, which are sent to the participants when a new appointment is scheduled or an upcoming event is imminent. The common method of reminding is typically done by email.

**Collaborative management** or project management is a sophisticated process in which typically the tools provide only a part of the project management requirements. The common features include tasks, milestones, time sheet and Gantt charts. For the task feature we can normally include start date, end date, progress, status and participants [14].

## 4.3. Gamification

Gamification is the process of incorporating game play elements into non-gaming applications, such as product, services, websites, processes, marketing and communities in order to drive participation, engagement and loyalty. The idea of using game design elements in non-game contexts to motivate and increase user activity and retention has rapidly gained traction in interaction design and digital marketing [15].

Gamification environments are an important response from the technologist to the digital generation that was raised on interactive games and expects the same kind of interactive experiences in other systems [16]. Some vendors now offer gamification as a software service layer of reward and reputation systems with points, badges, levels and leader boards [15]. These mechanics, such as points and levels, aim at increasing motivation and engagement, and allow the development of “gamified” tools at a lower cost when compared to the traditional video-games [17].

### 4.3.1. Origins

Gamification as a term originated in the digital media industry, and the first documented use goes back to 2008<sup>4</sup>. Parallel terms continue being used and new ones are still being introduced, such as “productivity games” [18], “funware”<sup>5</sup>, “playful design” [19], “surveillance entertainment” [20], “behavior games” [21] or “game layer”<sup>6</sup>. Still “gamification” has arguably managed to become the most common term.

The current uses of the term by the industry fluctuate between two related concepts. The first is the increasing adoption, institutionalization and ubiquity of games in everyday life [22]. The second more specific notion is that since video games are designed with the primary purpose of entertainment, and since they can demonstrably motivate users to engage with them with unparalleled intensity and duration, game elements should be able to make other no-game products and services more enjoyable and engaging as well [23][24].

Vendors and consultants have contributed to describe “gamification” practically and in terms of client benefits, such as “the adoption of game technology and game design methods outside of the game mechanics to solve problems and engage user”, or “integrating game dynamics into your site, service, community, content or campaign, in order to drive participation” [15].

### 4.3.2. Gamification Engagement

Games are a much bigger part of our everyday life than we can even comprehend. We spend time watching sports games, making bets with friends and coworkers about various items. The matter of fact is people enjoy games. Games give a sense of pride and ownership. Tracking points or levels gives a person something to focus on. Gamification is a great way to increase participation and best of all to maintain that participation. Normally, it helps if the gamification results in some sort of ‘goal’, not a permanent goal, but a goal that once reached, can be increased or reached again. Gartner<sup>7</sup> has identified four key means of driving engagement using gamification:

- **Accelerated feedback cycles.** Feedback loops are slow (e.g., annual performance appraisals) with long periods between milestones. Gamification increases the velocity of feedback loops to maintain engagement.
- **Clear goals and rules of play.** On the one hand, goals are typically difficult to perceive clearly and rules selectively applied. On the other hand, gamification provides clear and well-defined rules of play to ensure players feel empowered to achieve goals.
- **A compelling narrative.** Real-world activities are rarely compelling, so gamification builds a narrative that engages players to participate and achieve the goals of the activity.

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<sup>4</sup> R. Pahara: Who coined the term “gamification”? - Quora, <http://www.quora.com/Who-coined-the-term-gamification>.

<sup>5</sup> Takahashi, D.: Funware’s threat to the traditional video game industry | GamesBeat | Games, <http://venturebeat.com/2008/05/09/funwares-threat-to-the-traditional-video-game-industry/>.

<sup>6</sup> Priebatsch: Seth Priebatsch: The game layer on top of the world | Talk Video | TED.com, [http://www.ted.com/talks/\\_priebatsch\\_the\\_game\\_layer\\_on\\_top\\_of\\_the\\_world?language=en](http://www.ted.com/talks/_priebatsch_the_game_layer_on_top_of_the_world?language=en).

<sup>7</sup> Gartner Gamification Report 2011, [http://badgeville.com/wiki/Gartner\\_Gamification\\_Report\\_2011](http://badgeville.com/wiki/Gartner_Gamification_Report_2011).

- **Challenging but achievable tasks.** While in the real world there is no shortage of challenges, they tend to be large and long-term. Gamification provides many short-term, achievable goals to maintain engagement.

## 4.4. The Six Thinking Hats

The Six Thinking Hats is a method developed by Edward de Bono [25]. It is a simple, effective parallel thinking process that helps people to be more productive, focused, and mindfully involved. This method can be used in situations such as meetings, discussions and brainstorming sessions. The method separates thinking into six clear functions and roles, each thinking role is identified with a colored symbolic thinking hat that you mentally wear and switch hats (Figure 8). By doing that you can easily redirect the focus of the meeting or discussion [25].

The hats are:

- **Blue hat:** It is used to manage the thinking process. It focuses on a global vision and on the problem definition. Making decisions and conclusions are also done while wearing the blue hat.
- **White hat:** The focus is on the data available, the information you have and see what you can learn from it. Neutral, objective information, without feelings and opinions, just facts. The main goal is to get facts without any additional opinions or the arguments that support those facts.
- **Green hat:** This hat is about creative thinking, focused on new ideas, more alternatives and proposals to solve some problems. The finding of alternatives is a very important aspect of this hat, which asks people to go beyond the well-known.
- **Yellow hat:** This hat focuses on positive, optimistic thoughts. It is the optimistic viewpoint that helps you see all the benefits of the decision as well as the value in it, and spot the opportunities that arise from it. It helps you to keep going when everything seems gloomy.
- **Black hat:** It is related to negative judgments and why something may not work. This is important because it highlights the weak points in a plan or course of action. Therefore, it allows you to eliminate them, alter your approach, or prepare contingency plans to counter problems that might arise.
- **Red hat:** The red hat signifies feelings and intuition. When using this hat you can express emotions and feelings and share fears, likes, dislikes, loves and hates. Opinions given with this hat do not need to be supported with justifications or reasons for that opinion.

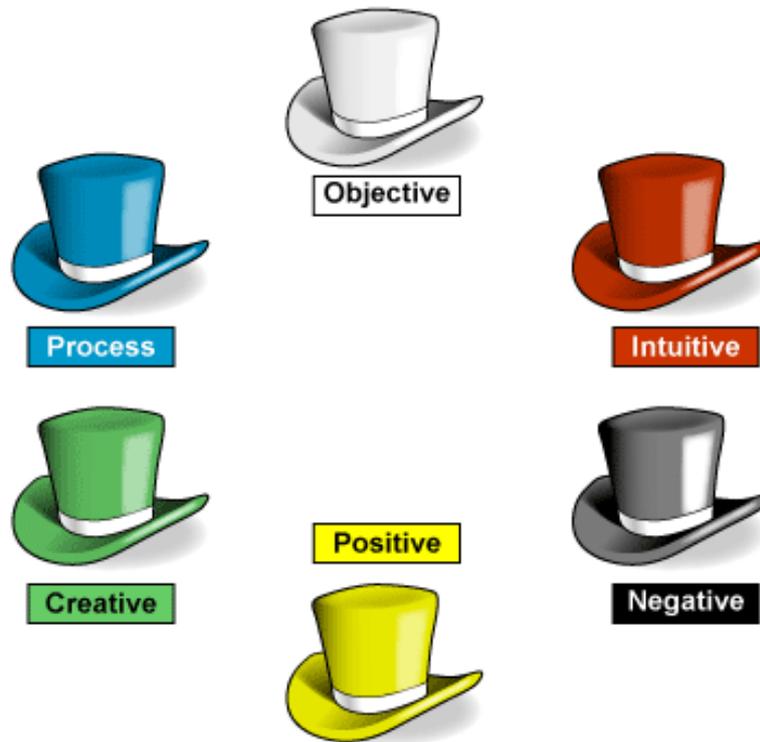


Figure 8 – Six Thinking Hats <sup>8</sup>

The group of six hats allows the analysis of each topic that needs to be discussed, separating logic from emotion or creativity from information [26]. The decisions and plan done with this method will mix ambition, skill in execution, sensitivity, creativity and good contingency planning.

## 4.5. Value Proposition Canvas

The Value Proposition Canvas (VPC) is a model that helps understand the value that a product or service create to a specific customer. The VPC design addresses the relationship between customer segments and value propositions [27]. The VPC focuses on two aspects, the “Customer Segments” and “Value Propositions”, which provides a simple and accessible way of researching whether the value propositions of a company’s business model correlates with the actual needs of the customers it wishes to serve.

Whereas the Business Model Canvas [27] focused on how to create value for businesses, the Value Proposition Canvas focuses on how to create value to customers. The VPC is a quick introduction to the Business Model Canvas (BMC), meaning that people who do not know the BMC can follow and understand the premise of the VPC and its context. The VPC focuses more in-depth into the way

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<sup>8</sup> Image from: <http://www.triz-journal.com/innovation-methods/innovation-brainstorming-brst/triz-debonos-six-thinking-hats/>

organizations function and create value, and the design of the VPC enables you to create Customer Profiles and Value Maps [28].

### **4.5.1. Customer Profile**

The Customer Profile describes a specific customer segment in the business model in a more structured and detailed way. It breaks the customer down into its jobs, pains, and gains.

Customer jobs should describe an important issue customers are trying to solve in their work. The jobs could be a task they are trying to perform, the problems they are trying to solve or the needs they are trying to satisfy [28].

Customer pains describe anything that annoys the customer before, during and after getting a job or task done. It could be undesired costs or situations, negative emotions or risks [28].

Customer gains describe the outcomes and benefits your customers require or desire. The gains include functional utility, social gains and cost savings [28].

### **4.5.2. Value Map**

The Value Map describes the features of a specific value proposition in your business model in a more structured and detailed way. It breaks your value proposition down into products and services, pain relievers and gain creators.

Products and services are the ones a value proposition is built around. They represent the products and services that help the customer get their jobs done. In other words the supporting product or services that help customers perform their jobs or tasks [28].

Pain relievers describe how the product and services alleviate specific customer pains, they explicitly outline how to eliminate or reduce some of the pains that customers have before, while and after they are trying to get a job done [28].

Gain creators describe how the products and services create customer gains, explicitly outline how you intend to create benefits that customers expect and desire [28].

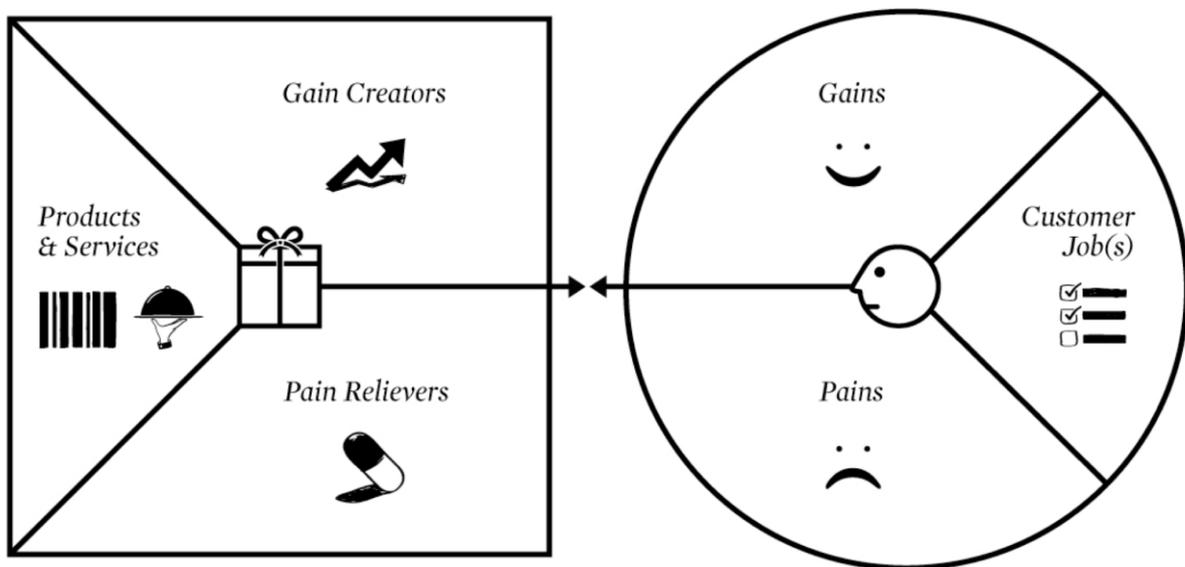


Figure 9 – Value Proposition Canvas [28]

### 4.5.3. Fit

The fit is achieved when customers get excited about the value proposition, which happens when important jobs are addressed, extreme pains are alleviated, and when essential gains that customers care about are created. In other words, fit happens when products and services produce pain relievers and gain creators that match one or more jobs, pains and gains that are important to the customer [28].

## 5. Objectives

This section corresponds to the Objectives Definition step of Design Science Research Methodology, through the problem definition and knowledge of what is possible and feasible considering the related work analysis and discussion.

Returning to the research problem, we stated that it is difficult to achieve all the expected benefits from IS/IT investments within organizations. As mentioned in the problem section even though organizations aim to apply a benefits management methodology, there are some issues that can affect the success of the methodology, and consequently the lack of benefits delivery. An issue causing the lack of benefits delivery may be related to misjudgments or lack of knowledge in preparing the benefits plan. Therefore, it is essential to the benefits management process that the benefits dependency network and benefits plan are made with the highest accuracy and with all of the stakeholders' participation.

The development of a benefits plan is based on intense communication between stakeholders, therefore cooperation and collaboration are vital in this process. The common way to do this is mainly through workshops, but this has some issues and limitations: lack of stakeholders' participation, lack of collaboration and discussion, dominant participants, biased opinions, high logistic costs and difficulties in gathering stakeholders at the same time and place.

The main objective of this proposal is to present a cloud based tool that implements some activities of a benefits management process approach in a simpler way, with more collaboration and stakeholder engagement in order to solve the above mentioned problems. We will use an already existent and well-defined benefits management process and we will implement some activities in a web based tool, making use of some gamification techniques and a method of parallel thinking in order to increase and facilitate collaboration and stakeholders' engagement in the process.

Outlining the objectives in a more detailed way, our tool must be easy to use; it must enable the elaboration of a benefits plan with more collaboration and reduce the number of face-to-face meetings between stakeholders; and, finally, it must enable the benefits plan discussion in an easier and more collaborative way.



# 6. Research Proposal

This section maps the design and development step of Design Science Research Methodology (DSRM). Its output is an artifact description that aims to solve the identified problem and the objectives defined earlier in this document.

As we previously identified in the problem chapter, organizations often fail to achieve all the benefits originally planned for their projects. With this proposal our goal is to provide the means and the tools needed to help the implementation of a benefits management process approach in a simpler way, with more collaboration and stakeholder engagement. We will use the benefits management process described in the Related Work section (section 4), and define some activities needed to execute the process, especially for the first two steps. In order to do that, we will develop a web based collaborative solution that implements activities, which support the benefits management process, making use of some gamification techniques and a method of parallel thinking.

Considering this we can briefly describe our proposal as **a web based collaborative tool that implements activities that help to execute a benefits management process, making use of some gamification techniques to increase the stakeholder engagement and improve their participation.**

As mentioned in the problem section, in order to have a business solution to a problem through an information system, we intend to develop a tool that uses cloud based technologies and defines some activities, which must be incorporated in the organization to allow the implementation of a benefits management methodology (figure 10).

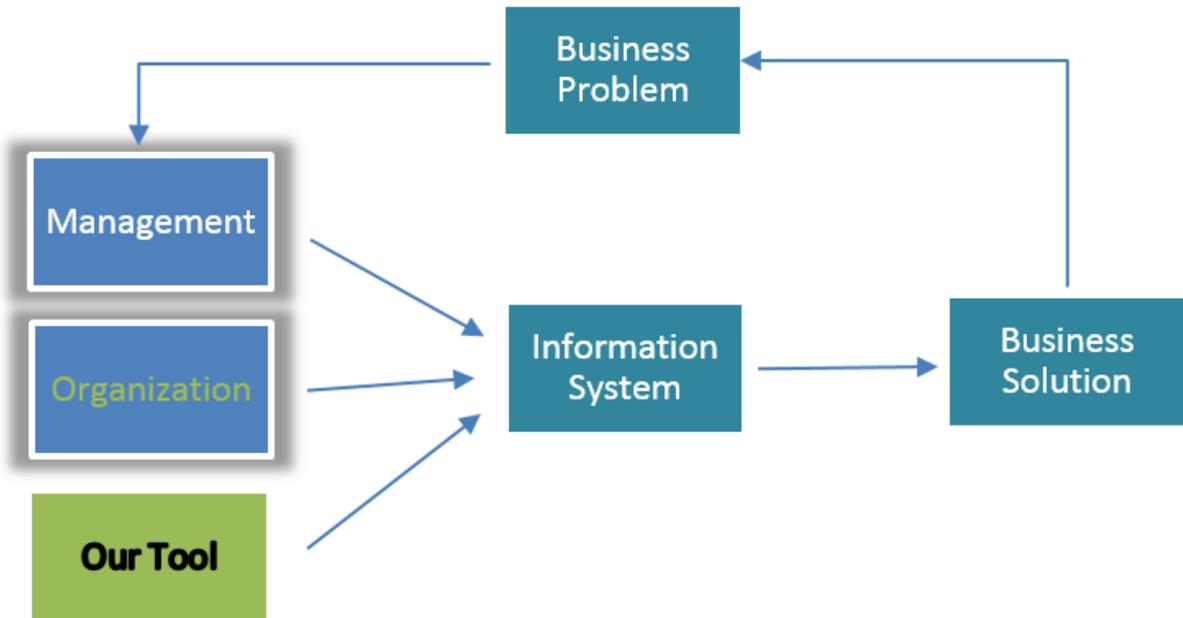


Figure 10 – Socio-technical Approach to Business Problem and Solutions (adapted from [4])

## 6.1. Main Features

We will explain the features that our solution must have in order to address the objectives defined earlier. Afterwards, we will discuss with in more detail some of the features.

- **Collaboration:** Teamwork is one of the most important aspects for the project to be successfully executed. However, it is hard to gather all stakeholders, since they may be separated by a long distance and also because it is necessary that all of them are available at a certain time. An asynchronous collaborative tool solves all of these difficulties. Therefore, for collaboration to be effective, it is important to adopt modern work practices and technologies that will help the stakeholders, wherever they are, share their contribution to the successful execution of the project.
- **Portfolio management:** To help managers decide which are the most important projects for the organization based on the benefits and objectives each one has. Improvements in the decision of which projects should be taken can have a big impact on the success of the organization [1]. In addition to using the benefits plan to decide the viability of the project, an earlier selection can be made taking into account the project's proposal.
- **Value proposition to justify project proposals:** In order to make the project proposal, we mapped the Value Proposition Canvas concepts in a dynamic form, thus allowing the proposal to be much clear and more detailed, addressing important aspects (like customer pains, gains, etc) to consider the feasibility and value of the project. The responsible for reviewing the proposals has an easier job because the proposal has many details; those being structured in a simpler way allow an easier understanding of the project. This early stage can give us some information, which can be used to build the Benefits Dependency Network, such as the gains that can correspond to the project benefits.
- **Multiple Projects:** Since the same user could be a stakeholder for more than one project, the tool supports the benefits management activities for multiple projects at the same time, which means users have access to all the projects they are involved in and can choose what project they want to participate in at any time.
- **Propose BDN elements:** For each project it is necessary to build a benefits plan. To achieve this it is essential for all stakeholders to discuss what the objectives, the benefits, and the changes are as well as the IS/IT components necessary to execute the project/investment successfully with all the expected benefits achieved. The involvement of all stakeholders is a crucial factor to the success of the project, since each stakeholder must understand their contribution to the project.
- **Benefits Dependency Network:** This is the central framework of the benefits management approach. The tool provides a benefits dependency network diagram editor to create, edit and share diagrams with all the stakeholders. As stated in section 4, it is important for each stakeholder to view their role in the involvement of the project. This BDN visualization is

crucial to motivate the stakeholders since they can see the common objectives to which all are contributing. The network shows that for the project to be successful everyone has to ensure success in the component in which they are directly involved.

- **Gamified process:** In the process of building a benefits plan, we will use gamification technics aiming to increase the stakeholder participation in the creation and discussion of the elements that will be part of the benefits plan. In order to build the list of elements, which will be part of the benefits plan, we propose a set of activities, like propose new elements (objectives, benefits, enabling changes, business changes and IS/IT components), discuss them (positively or negatively) and rank them (in a scale of one to five). Those activities will be associated to points, since we are making a point-based system where the goal is to encourage the creation of new elements, and to promote a discussion about the existing ones created by others. A more detailed explanation about this feature is done in the next section.
- **Benefits Plan:** After the components' list (IS/IT, changes, benefits and objectives) has been approved, a BDN and its respective benefits and change tables are automatically generated. When the BDN and the tables are completed, we have the benefits plan, which can be visualized by all stakeholders, and be exported and downloaded. This benefits plan should be the basis for the business case.
- **Monitoring the changes and benefits state:** Regarding steps 3 and 4 of the benefits management process adopted by us (section 4), we will provide a feature to control the execution of the project, which will be done by making monitoring tables available. In these tables all stakeholders can insert the state of the change or benefit that they are responsible for. These submissions should have specific deadlines.

We believe that, by implementing a solution with these characteristics, we will be able to provide a tool that helps organizations to implement a benefits management approach and thus obtain the benefits expected from investments.

## 6.2. Game design

Regarding the “gamified” process more details about it are needed. Therefore, next we will explain the game design and the scoring scheme for our points based system. The game design has some similarities with one that was developed for the requirement elicitation [16].

The process of building and reviewing the benefits plan involves the discovery of the elements of the BDN and their discussion. The Six Thinking Hats method can be used during this process, seeing as it is the basis for the definition of the several game mechanics.

The Six Thinking Hats method has to be adapted taking into account the given context. Hence, each thinking hat will be mapped into an activity in the building process. The performance of those activities

will contribute to obtain points, generating the BDN elements and their discussion. Having said that, the mapping of activities and hats are:

- **Blue hat.** Manages the process, have permissions to edit and delete all contents generated in the activities of other users. It is also responsible for automatically generate a BDN with the content that was previously discussed.
- **Green hat.** Propose new BDN elements. Suggest specific change or adjustment (e.g. name, owner, measure or relations) for proposed components.
- **Red hat.** Rating the element with stars. Vote (up or down) in suggested change or adjustment for the element.
- **Yellow hat.** A positive comment.
- **Black hat.** A negative comment.
- **White hat.** Concrete or statistical comment.

The blue hat is used by the project manager while the remaining hats are used by users or by stakeholders involved in the project. The goal of this point-based system is to encourage the proposals of BDN elements and to promote the discussion about them. For that purpose we provide the following scoring scheme in table 2.

Table 2 – Activities, related points and hats

<b>Activities</b>	<b>Points</b>	<b>Hats</b>
Propose new BDN elements	55	Green hat
Rating the element with stars	20	Red hat
Voting in suggested adjustment	15	Red hat
Positive comment	30	Yellow hat
Negative comment	30	Black hat
Concrete or statistical comment	40	White hat
Suggest specific change/adjustment	45	Green hat
Proposed element receives a five-star rating (bonus)	10	-
Suggested change receives one vote up (bonus)	10	-
A complete round with all hats (bonus)	60	-

When we consider the points to be allocated to each activity, we consider several factors, such as the difficulty in performing the task and the relevance of the task, according to the objectives we want to achieve.

A more complete table where we justify the points assigned to each activity, taking into account the factors difficulty and importance to the objectives, which the point based system aims to achieve, can be seen in table 3.

Table 3 – Activities, hats and points in more detail.

Activities	Hats	Dificulty (0-6)	Importance (0-6)	Dificulty+Importance	coeficiente	Points
Create/propose new BDN elements	Green hat	5	6	11	1.1	55
Rating the element with stars	Red hat	1	3	4	0.4	20
Voting in suggested adjustment	Red hat	1	2	3	0.3	15
Positive comment	Yellow hat	3	3	6	0.6	30
Negative comment	Black hat	3	3	6	0.6	30
Concrete or statistical comment	White hat	4	4	8	0.8	40
Suggest specific change/adjustment	Green hat	4	5	9	0.9	45
Proposed element receives a 5star rating (bonus)		0	2	2	0.2	10
Suggested change receives one vote up (bonus)		0	2	2	0.2	10
A complete round with all five hats (bonus)		6	6	12	1.2	60

The creation of elements is the second highest rewarded activity since this is one of the main objectives of the game and probably one of the most difficult tasks.

Positive and negative comments are important to this process and maybe easier to express, so the points associated to them are some of the most rewarded activities.

Rating elements and voting in suggested changes is a pretty straightforward action so the points are lower, but easy to obtain.

Concrete or statistical comments as well as suggest specific changes/adjustment have been assigned roughly the same points, but since a suggested change is more important, the user can obtain more points if the suggestion receives one or more vote up by other users.

In order to reward the more valuable contributions, the participants in the discussion also get a bonus when a component created by them receives a five star rating.

Finally, if a stakeholder completes the discussion of the component using the five hats, a bonus is given to encourage the use of all hats. This activity has a high reward because one of our goals is for the stakeholder to use all the hats in order to help them think clearly and thoroughly. This is done by directing their thinking in one direction at a time, contributing to the development of benefits plan with critical thinking, collaboration, communication and creativity.



# 7. Demonstration

This chapter corresponds to the demonstration step of Design Science Research Methodology in which we will demonstrate that the proposal stated in the previous step can be used to solve the identified problem.

As a demonstration of our proposal we developed a web based tool that helps the implementation of a benefits management methodology, as stated in previous sections. In this section we will extensively describe the developed tool according to the features we proposed in the proposal section.

After the development of the tool, it was used by students enrolled in Organization and IT Function Management at Instituto Superior Técnico Taguspark and by students enrolled in Investment Analysis in IS at Instituto Superior de Gestão Bancária. In addition, we also conducted some demonstrations of the tool with an example of a project in order to show its functionalities and their usefulness. We did that with experts in the field and with potential users. However, we will talk more about that in the Evaluation section.

This master thesis and its artifact were part of a project with the company Newbridge<sup>9</sup> and associated with a scholarship at INOV-INESC.

## 7.1. Benefits Management Tool

The next topics describe our artifact, which demonstrates what we proposed in the previous section (section 6).

### 7.1.1. Projects Proposal

One of the goals by completing a project proposal is to do an initial screening of project proposals. This feature is useful because it can immediately allow the decision-maker to make a decision about the project, either considering it approved or rejected right away. This feature comes to meet one of our objectives, which was to help a company choose the most important projects. Projects that are immediately accepted are projects that, for legal reasons (pain, not law enforcement), must be implemented, or mandatory projects, like a project involving the replacement of old systems that jeopardize the normal function of an organization.

The benefits management methodology can also be used as a way of seeing which projects have more value and help you decide what projects to invest in. What is more, this feature allows an early stage. By completing a form that maps the Value Proposition Canvas, you can have a better understanding of the proposed project, only moving to the benefits management process if is worthwhile.

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<sup>9</sup> <http://newbridge.pt/pt/>

We choose the Value Proposition Canvas (VPC) due to the fact that it is a simple way of characterizing a project and at the same time also allows you to gather enough information about it. Once the information is structured and clearly organized, it allows the decision-maker to have a more informed analysis of the proposal.

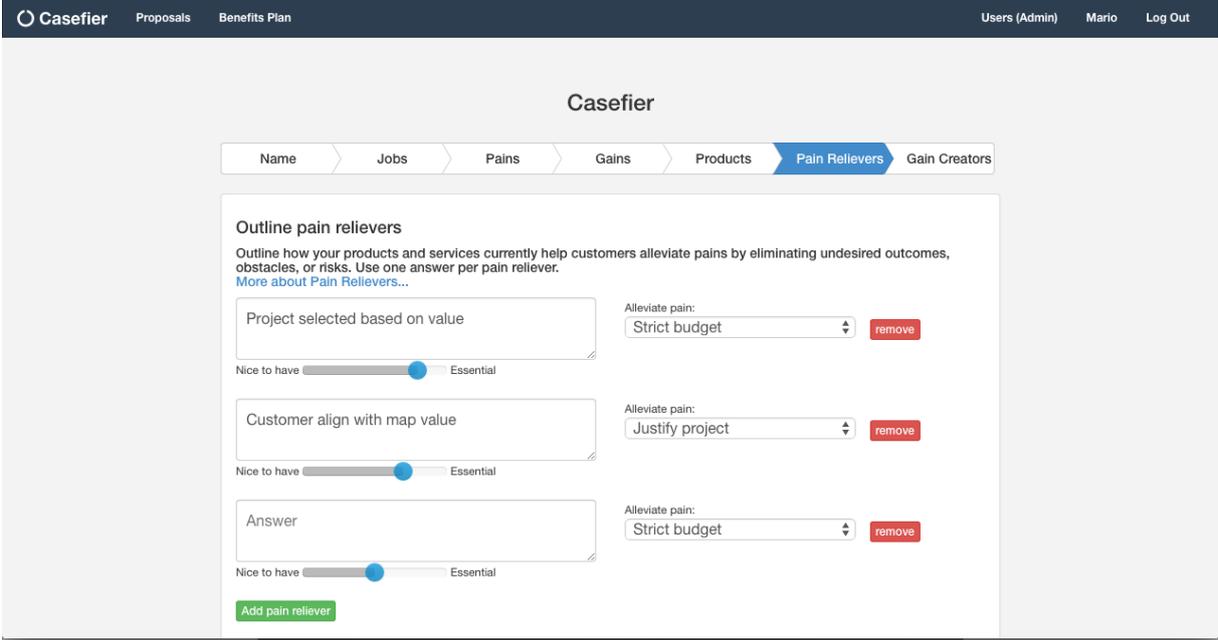


Figure 11 – Value Proposition Canvas dynamic form.

To make a proposal for a new project, you must complete a dynamic form comprising seven steps as can be seen in Figure 11. The user may access more than one project proposal (figure 12) since the proposal can be shared (figure 14) so that more than one user can view and edit.

#	Proposal Name	Submitted		Go to BDN Discussion	Go to BDN Generator
1	Certificação ISO-20000	about 1 month ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
2	Proposta de teste	30 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
3	BCAPO08	29 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
4	APO13 - Security Management	27 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
5	Instituto de Informatica-BAI06	26 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
6	BAI06	26 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
7	Business Case DSS01	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
8	APO12 - Manage Risk	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
9	Implementação do processo BAI07 do COBIT	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
10	DSS03	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
11	DSS03 - Manage problems	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>
12	DSS03 - Manage problems	25 days ago	Trello	<a href="#">BDN Discussion</a>	<a href="#">BDN Generator</a>

Figure 12 - List of proposals accessible to the user.

In Figure 13 we can see part of the proposal, which resulted from completing the form we saw before. Here we have a more organized global view of the proposal.

Casefier Proposals Benefits Plan Users (Admin) Mario Log Out

## Proposals ▶ APO12 - Manage Risk

### Customer Profile

**Jobs**

- ▶ Functional Jobs (5)

**Pains**

- ▶ Falta de adaptação do processo ao contexto do Instituto (8)
- ▶ Benefícios do projecto pouco claros (8)
- ▶ Falta de suporte, orientação e compromisso por parte do responsável do processo do IIESS; (8)

**Gains**

- ▶ Aceitação do processo por parte de terceiros e entidades reguladoras (8)
- ▶ Garantir boas práticas e standards nos processos a serem implementados (7)
- ▶ Satisfazer as necessidades principais dos stakeholders (7)
- ▶ Atingir os principais objectivos de negócio do IIESS (7)

### Value Map

**Products & Services**

- ▶ Intangible (8)
- ▶ Financial (7)

Figure 13 – Proposal in a structured view according to VPC.

Finally, in figure 14, we can see the functionality of sharing project proposals with other users. This feature is very important since it is here that collaboration begins, and collaboration has great importance for this process. Users who have access to the proposal will also have access to this proposal's discussion of the BDN and to all the BDN generated from it.

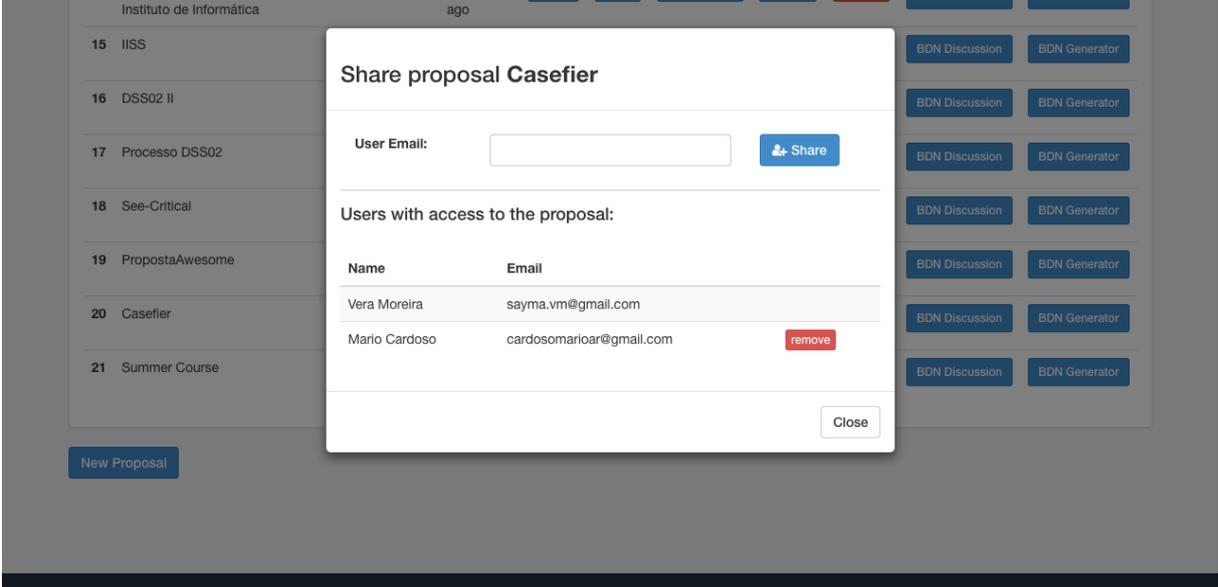


Figure 14 – Share proposal with other users.

**7.1.2. Benefits Dependency Network Discussion**

This topic will describe the discussion functionality of the tool. We implemented a set of functionalities in the tool that enables a group of users to discuss the Benefits Dependency Network elements, which leads into the end feature that enables the automatic generation of a BDN diagram. This can later be changed and adapted in the BDN editor.

In our process, this follows the project proposal step. All the users who had access to the project proposal now have access to the BDN discussion section of the tool. In order to invite new users for the discussion, you have to share the project proposal with them. There are five types of elements, so we have one tab discussion for each type of element.

A large part of the project proposals will lead to a BDN, as such the elements of the BDN have to be created and discussed by the stakeholders of the project. A feature that lets you create elements and connect the BDN to VPC is the feature that allows you to create benefits through the gains identified when the proposal was made (figure 15).

This discussion section of the tool corresponds to steps one and two of the Benefit Management process we are following (section 4.1), but the traditional way to do this is by face-to-face meetings and workshops. We do not think that the face-to-face meetings are not important, but we intend to

reduce their number, thereby facilitating the process of construction and discussion of a Benefits Dependency Network.

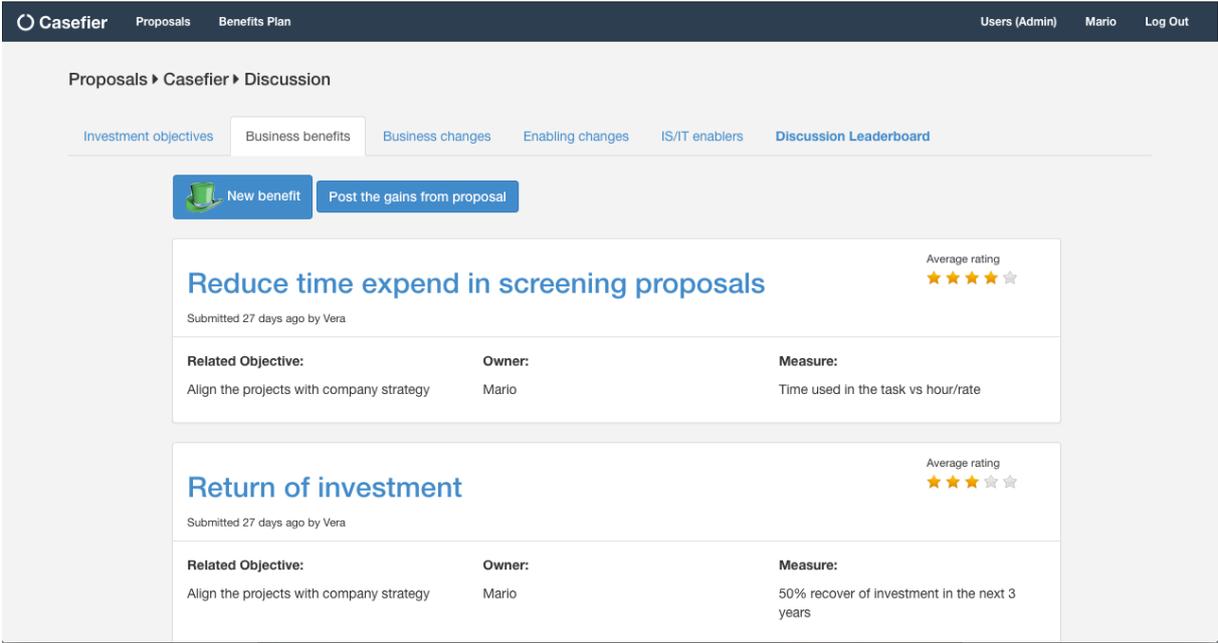


Figure 15 – Benefits plan discussion.

In this part of the tool we have five tabs, one for each type of element of the BDN. In each tab the elements are proposed and discussed. All stakeholders should hold this discussion.

With regard to notifications, whenever a user is associated to a benefit or change, the user will be notified by email. This allows all users to be aware of all the responsibilities assigned to them. If the user does not agree with the assignment, he or she must suggest another user that he/she finds more appropriated (green hat) or even make a negative comment about the element or any other type of comment. The point here is that the user is notified and this leads him/her to actively participate in the process by agreeing or not with the assignment.

Casefier Proposals Benefits Plan Users (Admin) Mario Log Out

Proposals > Casefier > Discussion > Align Casefier with Project Manager tools

### Align Casefier with Project Manager tools Average rating ★★★★★

Submitted 4 days ago by Vera

Related Benefits:	Owner:	Measure:
Simpler way to implement a Benefits Management Metodology	Vera	

Your rate ★★★★★

**4 Comments**

Submitted 2 days ago by Mario

If done properly this could be very very useful.

Delete

Submitted 2 days ago by Vera

Measure: Number of project managed with standard PM tools + Casefier

👍 1 👎 0 Delete

Submitted 2 days ago by Vera

It adds a more complete way of managing projects and they realization

Delete

Submitted 2 days ago by Mario

On the other hand this benefits management process adds more work to do, and it can be an obstacle.

Delete

White hat - Cor ↕

Figure 16 – The six thinking hat in discussion.

One of the main activities that can be performed in this section is to propose BDN elements. After the elements are proposed, it is possible and recommended that they are discussed by other participants. In figure 16 we can see an element being discussed.

In order to debate the elements proposed, for each element there is a set of activities that can be performed. These activities include: to classify the element with stars (0-5), comment the elements, and in some specific comments, it is possible to vote up or down the comment, which we will explain later.

In order to increase participation and engagement of stakeholders, this process of discussion uses some gamification techniques associated with a method of parallel thinking as mentioned in the Research Proposal section (section 6). As we can see in the figure 18 the activities and the respective mapping with the hats and associated points can be found in various places throughout this discussion part.

In this discussion process, we implemented a points based system, as mentioned in the proposal, and as such we also implemented a leaderboard (which is associated with each discussion) where it is possible to see all the people who are participating in the discussion and their classifications (figure 17).

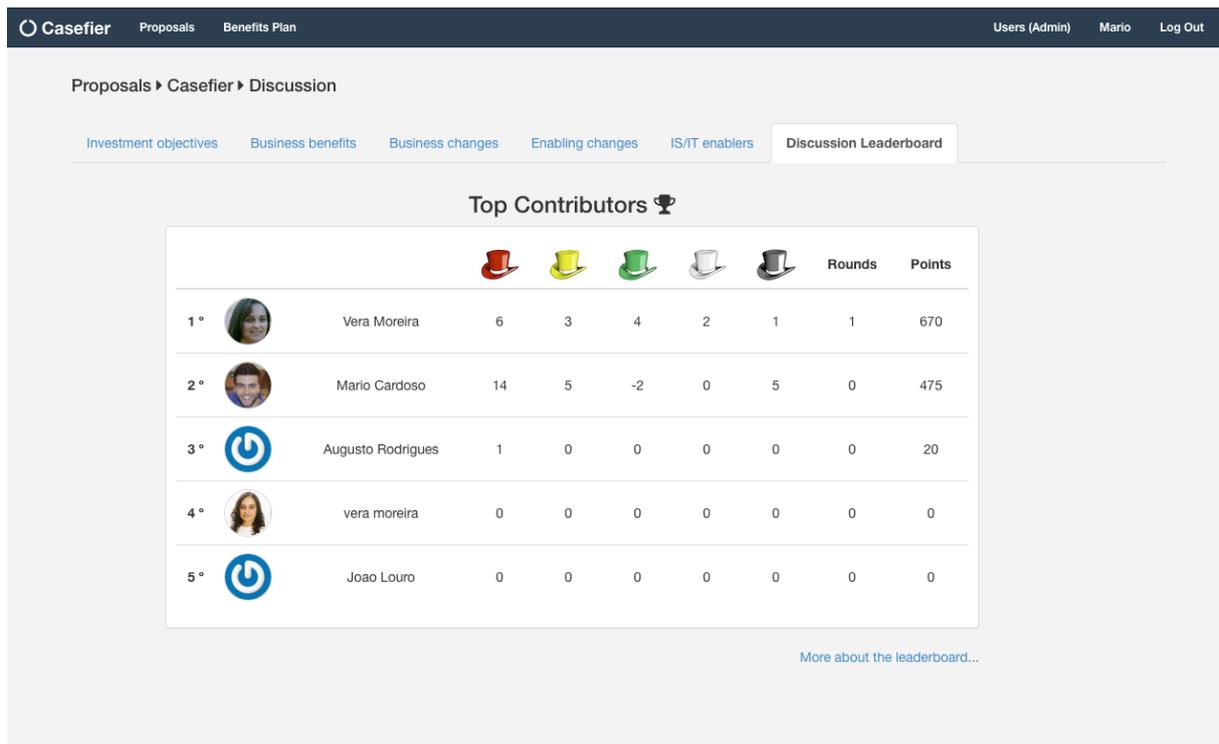


Figure 17 – Leaderboard.

In this ranking, beyond the total number of points, we thought it was also important to show the information about the use of each hat individually as well as the number of complete rounds (the use of all hats).

We find it relevant to show the number of hats individually so we can analyze the behavior of each user in the discussion in more detail. As there are hats associated with criticism, hats associated with creative thoughts, and also hats that are easier and others more difficult to wear, this enables us to outline the profile of each user in the discussion.

In this discussion we intend for the hats to be used in the same number but the degree of difficulty is different. As such we thought it was important to show the number of complete rounds. Since this is a difficult task to do, and we mean to promote it, we attributed a greater bonus when a full round of hats is completed. A full round of hats means that a user uses all the hats, at least once. If the user performs a complete round, in addition to the points associated with the tasks performed during the round, he or she also receives 60 additional points, as can be seen in figure 18.

Thinking Hats		
	Activities	Points
	1. Create/propose new BDN elements	55
	2. Suggest specific change/adjustment	45
	1. Rating the element with stars	20
	2. Voting in suggested adjustment	15
	1. Positive comment	30
	1. Negative comment	30
	1. Concrete or statistical comment	40
	1. Proposed element receives a 5 star rating	10
	2. Suggested change receives one vote up	10
	3. A complete round with all five hats	60

Figure 18 – Mapping between activities, hats and points associated.

### 7.1.3. Benefits Dependency Generator

After the discussion is completed we can then automatically generate a BDN. This feature allows you to select the elements that have been discussed previously and then automatically generate a BDN with those elements and their relationships. Part of this functionality can be seen in figure 19.

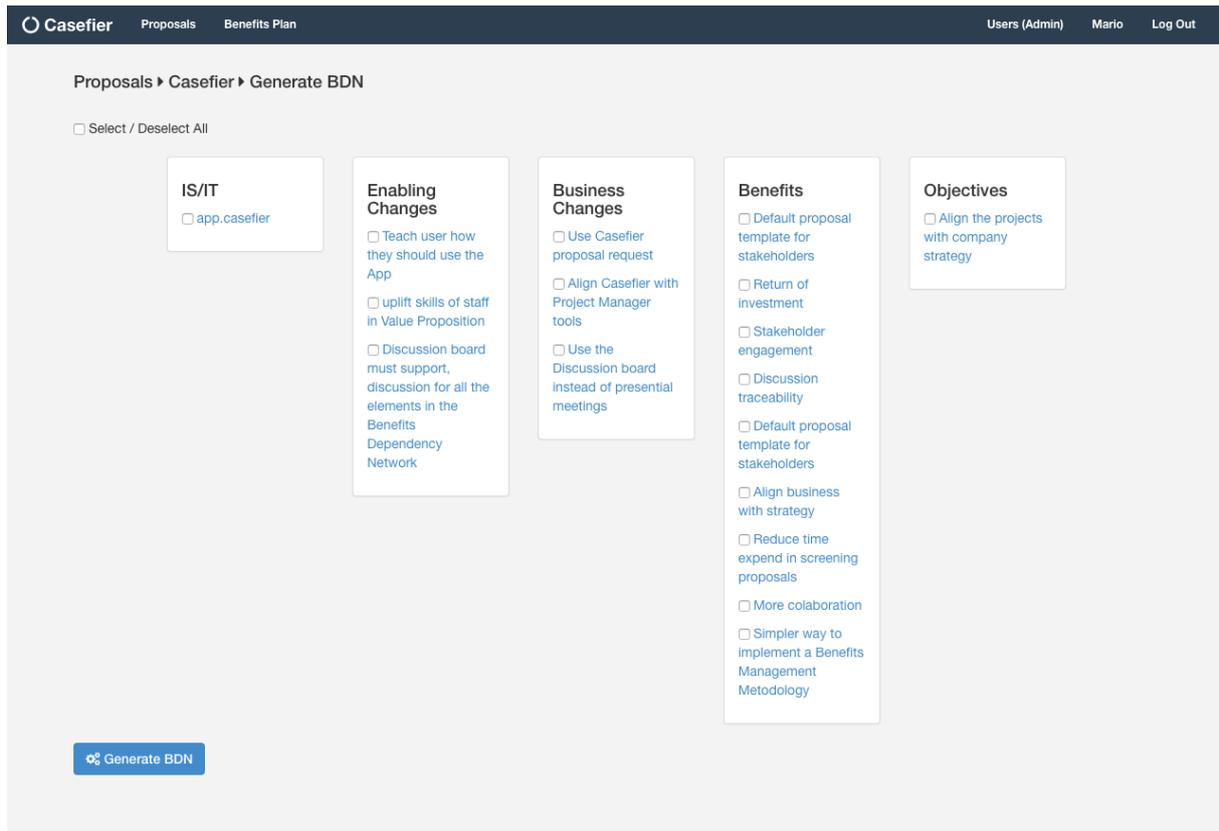


Figure 19 – BDN generator from discussion.

After the generation of the BDN the user is automatically redirected to the section of the tool where the benefits plan are displayed.

#### 7.1.4. Benefits Plan Editor

In the benefits plan editor it is possible to create, edit and view Benefits Plans. A Benefits Plan comprises a Benefits Dependency Network (figure 20) and benefits and change tables. In the template tables in addition to information that is already in the BDN, which is presented differently, there is also additional information regarding the type of benefit and also information on the monitoring of benefits and changes.

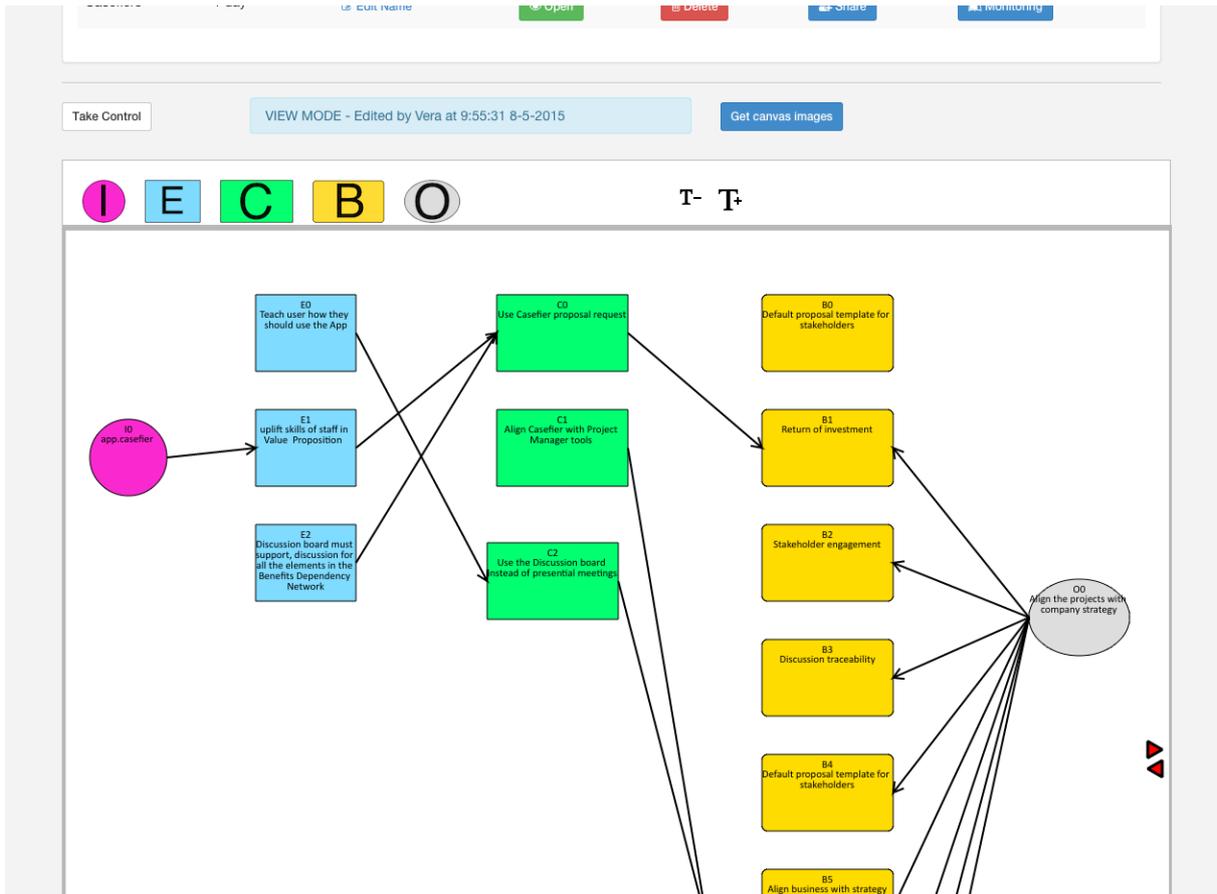


Figure 20 – BDN editor.

To build a BDN, we can do it automatically through the BDN generator functionality, through the discussion or we can do it manually simply by doing drag and drop the respective elements. Then, proceed to edit each field and also make the necessary connections between elements interactively with the mouse. In addition, it may also be done by a combination of the two, that is, after the BDN is generated through the discussion, it is fully modifiable and you can create or delete elements, the same goes for the relationship between elements.

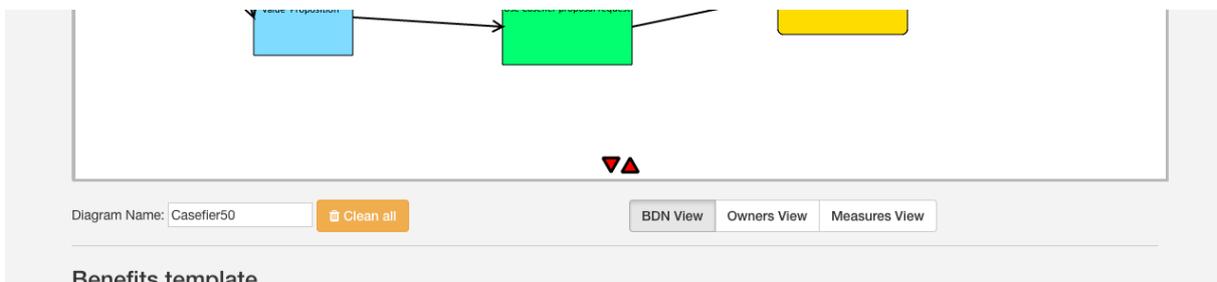


Figure 21 – Change between BDN views.

The BDN diagram editor allows you to switch between three views by just clicking on the corresponding view button (figure 21). The BDN can be seen in three different ways, standard view with the description of the elements, view of the owners with the names of the owners of each element, and the measures view where the measure of each benefit and change are seen. It is also possible to switch between the three views in only one element by clicking on the icon in the upper left corner of each element.

In the benefits plan, when assigning an owner to a benefit or change, this user is automatically notified by email, regardless of the allocation made in the table template or in the diagram (tables and diagram are automatically synchronized).



Figure 22 – View mode and take control action.

Since a major goal is collaboration, the benefits plan can be viewed and edited by all stakeholders. If the diagram has been generated through discussion, all users who had access to the discussion will also have access to the benefits plan. Furthermore yet here you can add new users that had no access previously.

Regarding collaboration, stakeholders who have access can edit the benefits plan, but only one at a time can edit. There are two ways to access the benefits plan, “view mode” and “edit mode” (figure 22).

In “view mode”, it is not possible to edit the benefits plan, you can only view it, but it is possible to see who the user that edited it the last time was and at what time. It is also possible to see the editions made in real time (3 seconds delay) if someone is editing. If you want to edit, go to “edit mode”. To switch to “edit mode”, just click on the “take control” button and the “edit mode” will be guaranteed in a few seconds. Who was in “edit mode” switch to “view mode” automatically. The user who went to “view mode” can see the user who requested the “edit mode”, because you can always see the name of the user that has “edit mode”.

Once in “edit mode” it is possible to make the necessary changes, edit the information elements, create new element or delete old ones. The permissions to edit are the same for BDN editor and template tables (figure 23, 24). All common information between the template table and the diagram is always automatically updated no matter if it was made in the diagram or in the template tables. There is no “save” button, changes are automatically saved whenever a change is detected.

Benefits template							
Benefit number and type and related objectives	Benefits description	Benefits owner(s)	Dependent changes and responsibilities	Measures	Expected value (if applicable)	Due date	Milestones
B0 Observable undefinednull	Default proposal t emplate for stakehol ders	Mario Cardoso			--	05/10/2015	1
B1 Financial O0	Return of investm ent	Mario Cardoso	C0 - Vera Moreira	50% recover of in vestment in the next 3 years	--	06/07/2015	5
B2 Measurable O0	Stakeholder enga gement	Vera Moreira			--	--	1
B3 -- O0	Discussion tracea bility	Vera Moreira			--	--	1

Figure 23 – Benefits template table.

Note that in the template tables it is possible to insert due date values and milestones, this information will be used to benefit monitoring and change monitoring, which we will talk about later.

Changes template							
Change or enabler number and dependent benefits	Description	Responsibility (and involvement)	Prerequisite (P) or consequence (C) changes	Evidence of completion	Resources required	Due date	Milestones
E0 B7	Teach user how th ey should use the A pp	Vera Moreira	P: None C: C2 Use the Discu ssion board instead of presential meetin gs	User feedback usin g the App	undefined	--	1
E1 B1	uplift skills of staff in Value Propositio n	Vera Moreira	P: None C: C0 Use Casefier proposal request	% of projects usin g value proposition	undefined	--	1
E2 B1	Discussion board must support, discu sion for all the elem ents in the Benefits Dependency Networ k	Vera Moreira	P: None C: C0 Use Casefier proposal request	% of stakeholders participating in the project and using C asefier	undefined	--	1
C0	Use Casefier propo sals	Vera Moreira	P: E1 uplift skills of e mployees	Reduction by 70% t ime to complete	undefined	--	1

Figure 24 – Change template table.

This editor allows all stakeholders to have access to the most up-to-date information of the benefits plan at any time and any place, which is critical since for a benefits management process to succeed, collaboration and participation of all stakeholders is key. This tool will facilitate the sharing and creation of this information, thus facilitating its use and implementation.

### 7.1.5. Benefits Plan Monitoring

When the benefits plan is completed, we can then go to the monitoring section. This part is used on steps 3 and 4 of the Benefits Management Process.

In the monitoring section we will have a table for each benefit and for each change. Each of these tables will have a certain fixed number of lines corresponding to the number of milestones previously entered in the template table of benefits and changes.

The screenshot shows the 'Listing milestones for Casefier3 Benefits' page. The page header includes 'Casefier', 'Proposals', 'Benefits Plan', 'Users (Admin)', 'Mario', and 'Log Out'. The main content area is titled 'Listing milestones for Casefier3 Benefits' and contains three tables of milestones.

**Benefit: Default proposal template for stakeholders** Due date: 05/10/2015

#	Milestone date	Expected result	Result on the date (owner input)	Notes(owner input):	
1	05/10/2015	100%			<a href="#">Edit</a>

**Benefit: Return of investment** Due date: 06/07/2015

#	Milestone date	Expected result	Result on the date (owner input)	Notes(owner input):	
1	05/10/2015	25%			<a href="#">Edit</a>
2	05/17/2015	40%			<a href="#">Edit</a>
3	05/24/2015	50%			<a href="#">Edit</a>
4	05/31/2015	70%			<a href="#">Edit</a>
5	06/07/2015	100%			<a href="#">Edit</a>

**Benefit: Stakeholder engagement** Due date: --

#	Milestone date	Expected result	Result on the date (owner input)	Notes(owner input):	
1					<a href="#">Edit</a>

Figure 25 – Monitoring Benefits and Changes.

These monitoring tables have different edit permissions depending on the role of each user. The user with the project manager role can edit the whole table, but a normal user can only edit the data “Result on the date” and “Notes” (“owner input” as can be seen in the figure 25). The project manager must first complete the fields “Milestone date” and “Expected result”. In a real life context monitoring is very important because it is here that we effectively check if the benefits and changes are reached.

### 7.1.6. Other Features Implemented

In addition to the main features, we have added a few more that deserve to be referenced, some to improve application management and others to explore and provide different ways to use some features of the tool.

We implemented a simple way to integrate with Trello<sup>10</sup> application. This feature allows you to associate a Trello board to a project. For this to work, the board email (which can easily be extracted from the trello board) has to be associated with the project proposal (figure 26) and each user must have his or her Trello nickname stored in their account profile. Once the association is made as described, whenever a benefit or change is associated with a stakeholder, a card is automatically

<sup>10</sup> <https://trello.com/>

created in the Trello board with a description of the element and associated with its respective user. This feature can be useful for those who want to monitor benefits and changes through Trello and can also serve as another way of notifying users. This feature is optional, it is only used by those who so desire, so it is independent of other features.

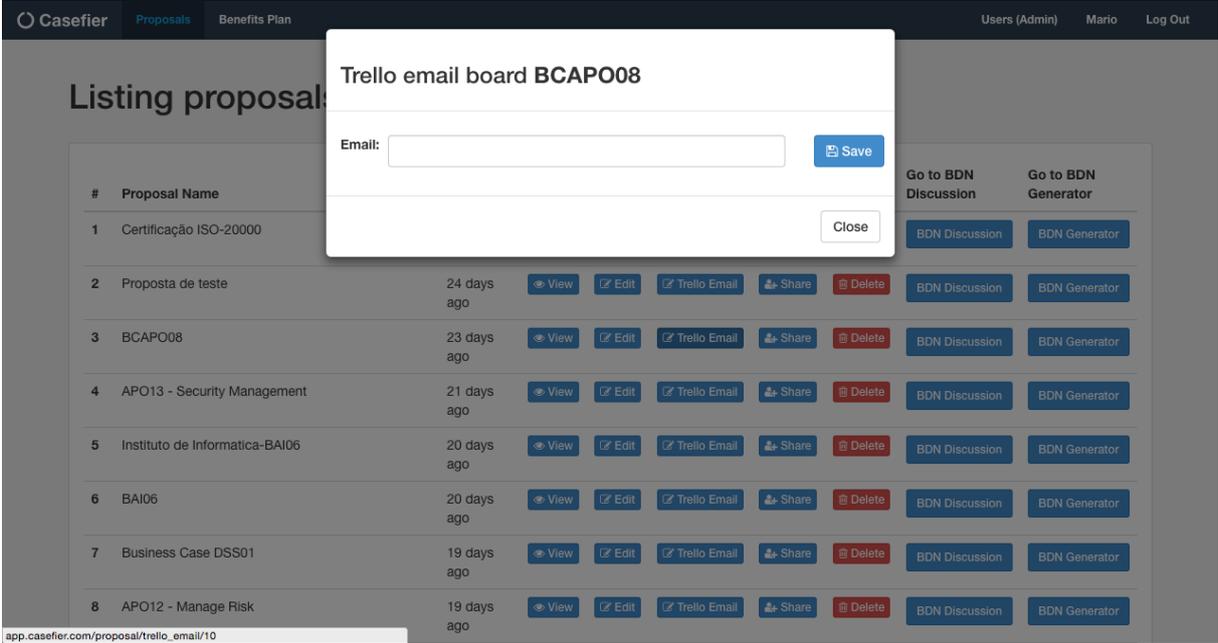


Figure 26 – Send change and benefit cards to Trello.

In order to control the participation and utilization of the tool, it is possible for an admin user type, to see in the tool the user profile with some useful information, which can also be used to analyze the behavior and participation of each user (figure 27).

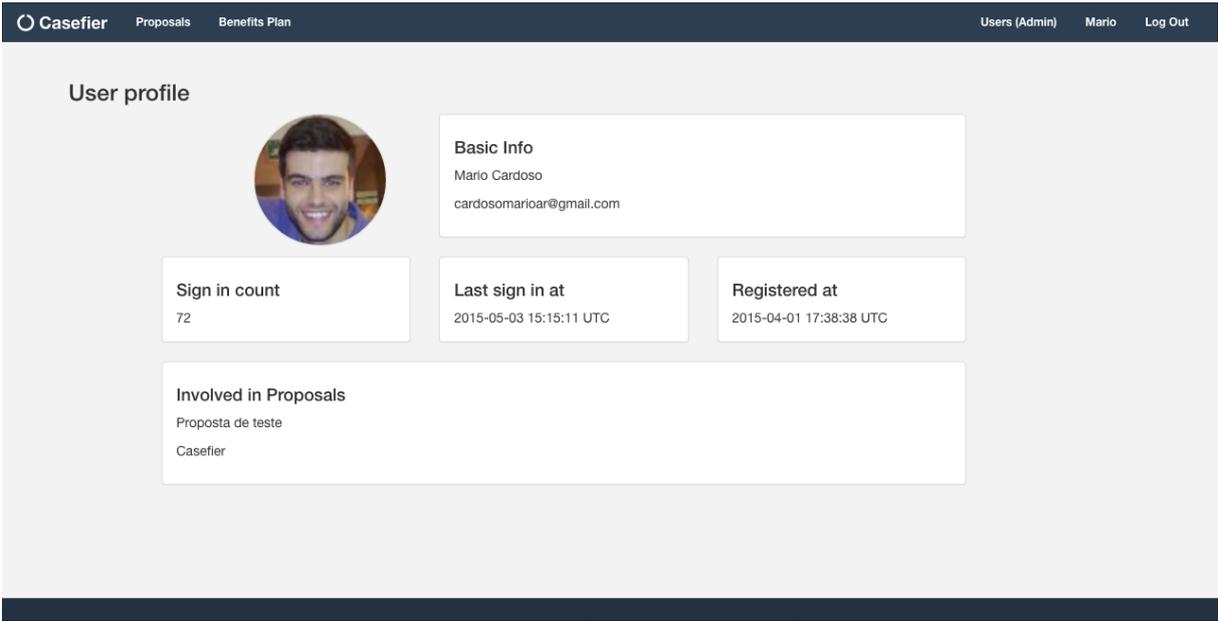


Figure 27 – User profile.

To continue on the management of users, it is possible for admin users to manage those who use the application, changing their role in the application and deleting their accounts, as can be seen in figure 28.

Name	Last sign in	Email	Role	Change Role	Delete
Joao Louro	5 days	jcilouro@gmail.com	Admin	Change Role	Delete
Vera Moreira	2 days	sayma.vm@gmail.com	Admin	Change Role	Delete
Mario Cardoso	about 4 hours	cardosomarioar@gmail.com	Admin	Change Role	
Mario2 Cardoso2	27 days	mario.mrc96@gmail.com	Pm	Change Role	Delete
Filipe Correai	27 days	filipe.m.correia@tecnico.ulisboa.pt	User	Change Role	Delete
Joana Gomes	26 days	joanalexgomes@hotmail.com	User	Change Role	Delete
João Eduardo	23 days	joepedro2008@gmail.com	User	Change Role	Delete
João Sousa	20 days	joapedro.csousa@gmail.com	User	Change Role	Delete
Helder Titosse	20 days	helder.titosse@gmail.com	User	Change Role	Delete
Nuno Roboredo	20 days	nroboredo@gmail.com	User	Change Role	Delete

Figure 28 – Users management.

As mentioned in the research proposal and in the objectives section, we think that a tool with the features we presented helps the implementation of a benefits management process since it allows and improves participation and discussion, but mainly so for the development of the benefits plan as the active participation of all stakeholders is fundamental. Discussing the BDN development in an asynchronous collaborative tool with those features allow a greater participation quantitatively and qualitatively, such as our demonstrations of use and interviews confirmed.

### 7.1.7. Technical Details

To develop the application we used several open source languages and frameworks. We used Ruby language with Ruby on Rails framework using an MVC architecture (Model View Controller). Ruby is a dynamic language focusing on simplicity and productivity. It has an elegant syntax with a natural reading and it is easy to write. Ruby on Rails is a framework built on top of Ruby that is based on rapid prototyping and sustainable productivity, favoring the use of conventions instead of extra settings.

Another relevant language we used was JavaScript, especially the KineticJS framework build on top of JavaScript. The KineticJS framework was very important to develop the diagram editor. KineticJS is an HTML5 Canvas JavaScript opensource framework that enables high performance animations, transitions, node nesting, layering, caching and event handling for desktop and mobile applications.

Other technologies also used include HTML5, AJAX, JSON and CSS3. HTML5 and CSS3 were used for the frontend part of the application. AJAX calls make the application more dynamic, especially in the diagram editor in which all changes are automatically saved, making AJAX calls to the server. It was also important for the collaborative features when editing and viewing the benefits plan where AJAX requests are made to the server to verify the right of editing (edit mode) and to do the automatic updates when the user is in “view mode”. Communication between the server and the web browser used JSON.

With regard to the database used in production, we used PostGRES. An image with more details about the database schema can be seen in figure 29.

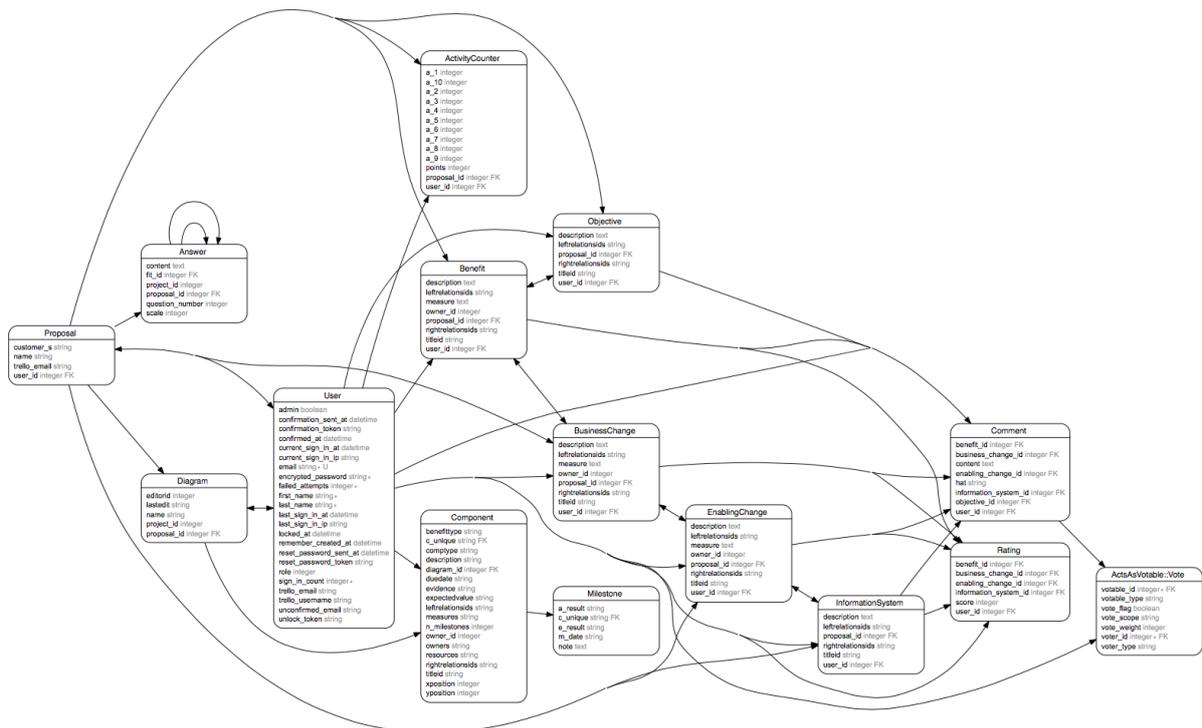


Figure 29 – Database schema.

We would like to point out that the tool does not replace other tools of project management or change management, but rather aims at being a complement and bring more value to help the benefits achievement, i.e. to decrease the difficulty in implementing a benefits management methodology.

# 8. Evaluation

This section refers to the evaluation step of the Design Science Research Methodology process, where the evaluation of the research proposal is done and confirms the added value it brings to the subject.

About the evaluation criteria we intend to measure the solution regarding goal efficacy and environment consistency with people and organization [29]. Goal efficacy will measure the degree to which the artifact produces its desired effect, if it achieves the goal of reducing the difficulty in implementing a Benefits Management methodology in organizations [29].

Environmental consistency will measure the degree of consistency of the IS artifact with people and organizations. The utility for people and organization criterion measures the quality of the artifact in practical use. The ease of use for people measures how well a user can perform a specific task using the artifact [29].

The criterion will be assessed by an evaluation method. The evaluation method will consist in the following steps:

1. **Demonstrations:** evaluate the proposal through its artifact use and simulations of use, with feedback and criticisms obtained
2. **Interviews and Questionnaires:** gather feedback and quantitative data of the proposal through approaching the people involved in the demonstrations and simulations and identify possible improvements.

## 8.1. Demonstrations

As we have stated, the artifact was used and tested once developed and also during the development. It was instantiated by students enrolled in Organization and IT Function Management at Instituto Superior Técnico Taguspark (IST-T) and by students enrolled in Investment Analysis in IS at Instituto Superior de Gestão Bancária (ISGB). In addition to the students, during the development and after being developed, we carried out interviews to gather feedback about our work.

In these interviews we demonstrated the functionalities of the tool through examples of the use of the artifact. That way we could see if the features met the objectives of our work. Those interviewed included IT directors of Portuguese hospitals, insurance company, demand management director in a telecommunication company, and university professors in more technical parts, like gamification, but also a teacher with expertise in benefits management. The feedback from the interviews was very positive and encouraging as interviewees recognized value in our work and showed interest for its use.

The students enrolled in Organization and IT Function Management at IST used the application in the context of the work they had to perform for the course. They began by using the initial part where they had to map the Value Proposition Canvas (VPC) to the project they had in order to justify it and realize which were the gains (pains, jobs, etc) and its purpose. The goal here was for them to have a better understanding of their project since they were required to meet the various steps of the value proposition, which led them to think and better understand what they were doing. Because VPC is a more structured way of characterizing a project, according to the structure and important aspects proposed by Alexander Osterwalder [28], we think that it has a great compromise between complexity and utility, which is why we have chosen it. According to the feedback we will describe in the next section, we conclude that we have succeeded in making these choices and implementation.

In the second part, each group had developed a BDN for their project, continuing the work already done in the first part. Once again the value of the tool was recognized, especially the collaboration features since the group could see each other's work, contribute without a face-to-face meeting and all the data was in one place only.

In Investment Analysis in IS at ISGB, we have a presentation showing the features and showing an example of the tool's user. Afterwards some students used the tool in order to build a benefits plan for their project in the course. They also started by the VPC part, which was followed by the discussion, and then finally the benefits plan. The feedback obtained was very good, the value of the tool was recognized and we had a lot of positive feedback. We found out that the tool could have great utility for educational purposes in courses about benefits management, which was the case of Investment Analysis in IS. Since the methodology is quite complicated, the tool helped and engaged the students in discussing the BDN development in a simpler way. Furthermore, as the tool is collaborative and easy to use, all the group members could contribute and see the other's contributions. Again the collaborative features were highlighted positively.

## 8.2. Interviews and Questionnaires

To obtain a more structured feedback, we made a questionnaire that was answered by people who were involved in the demonstration of our artifact's use. Some of the interviewees who watched a demonstration made by us with an example, in which we demonstrate the features, also answered the questionnaire.

The questionnaire was divided in two main parts:

1. Understanding the problem and the solution
2. Rating the solution's usefulness.

The first part aims to validate the evaluator's understanding and agreement about the problem and the solution we proposed in our work. The questions made were:

- 1. Benefits Management complements Project Management**

Benefits management allows one to think about how the outcome of a project/investment will benefit the organization, aligning projects with the company strategy. This does not substitute the Project Management, but extends it.

**2. Benefits Management ensures value delivery**

Benefits management done effectively ensures that a project delivers value to the business and the appropriate return on investment. In benefits management, you have a benefits dependency network, which relates the IS/IT functionality via the business and organizational changes to the benefits identified.

**3. Benefits Management is not easily implemented**

During benefits management implementation some issues may arise regarding the objectives's ambiguity (different interpretations), cause-effect along the benefits chain is usually complex and the assumptions being made at each stage are often unclear.

**4. A collaborative tool can help the Benefits Management implementation**

A web base collaborative solution that implements activities, which support the benefits management process by making use of gamification techniques, a method of parallel thinking and the Value Proposition Canvas that can help the implementation in a simpler way, with more collaboration and stakeholder engagement.

The possible answers for each question were "strong disagree", "disagree", "agree" and "strongly agree".

In the second part the evaluator rates the solution's usefulness, regarding the system dimensions goal efficacy and environment consistency.

The questions made were:

**1. Goal efficacy: Implementing Benefits Management methodology**

The web based tool implements activities needed to carry out a Benefits Management process in a simpler way, with more collaboration and stakeholder engagement.

Thus, it facilitates and improves the implementation of the Benefits Management methodology.

**2. Environmental consistency: Utility for people**

The solution is useful as it provides a collaborative place in the cloud where you can discuss and interact with other stakeholders at any time. The information is shared so everyone can analyze it.

**3. Environmental consistency: Utility for organization**

It allows stakeholders to have a better and greater participation in the benefits management process, without the disadvantages of not being able to bring allstakeholders together in the same place at the same time. Frees resources of the organization since some of the process activities are performed asynchronously in the tool through a web browser.

**4. Environmental consistency: Ease of use**

The software is available as a service, with a modern, minimalist interface and it is easy to use.

The possible answers for each question were “strong disagree”, “disagree”, “agree” and “strongly agree”.

We believe that these questions address the topics needed to correctly evaluate our research. The next subsection will detail the results of this questionnaire.

### 8.2.1. Evaluation Results

The questionnaire results were very positive and gave us feedback in different aspects needed to evaluate our research. While presenting and summarizing the results by question, we also provide some comments related to the feedback obtained. In order to present the average answer, we mapped the answers “strong disagree”, “disagree”, “agree” and “strongly agree” with the values 1, 2, 3 and 4 respectively.

The results from the first part of the questionnaires are the following (as shown in figure 30):

- **Question 1:** the answer average in this question was 3,7, which means that the participants agreed that the benefits management could complement the project management, helping to deliver value from their investments. This validates our assumptions and our research proposal.
- **Question 2:** the answer average in this question was 3,6. The results in this question confirm that the participants recognize value and advantages in using a benefits management methodology. However, we have found that there is a great lack of knowledge on the subject, and most of the respondents did not know the methodology, which is an obstacle to the use of the tool.
- **Question 3:** the answer average in this question was 3,3. This confirms the problem that the methodology is not easily implemented. There are several reasons for this and we mention some in our problem section. In fact, this was one of the motivations for our proposal and solution.
- **Question 4:** the answer average in this question was 3,6. The results of this question were great since our solution attains the answer to this question.

## First Part

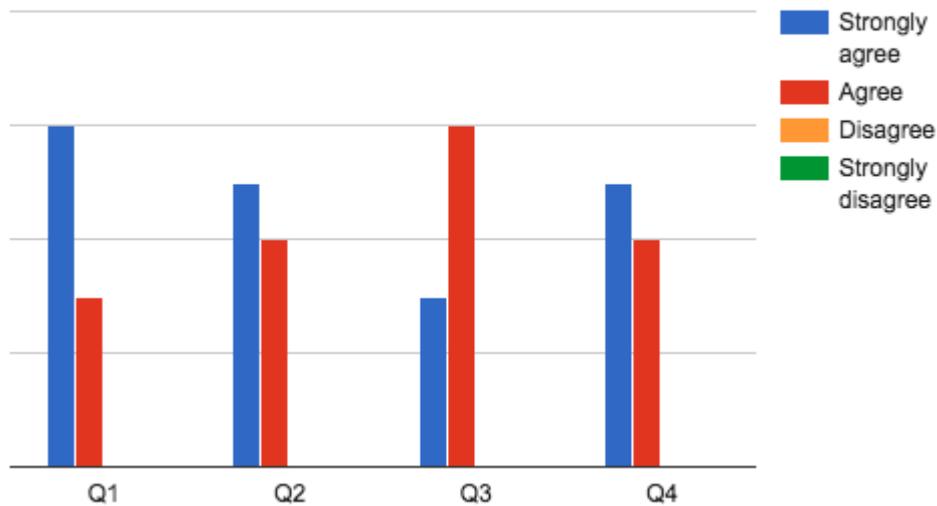


Figure 30 – First part of the questionnaire's results

The results from the second part of the questionnaires are the following (as shown in figure 31):

- **Question 1:** the answer average in this question was 3,6. The benefits of the proposal are then evident. Even though most users do not have experience in using a benefits management methodology, they recognize that it is a complex process which requires considerable collaboration. It became clear that a tool with these collaborative and gamification characteristics could be extremely useful to facilitate the implementation of the activities that comprise part of the process.
- **Question 2:** almost all the participants answered “strongly agree” (average was 3,8) meaning they confirm the usefulness of our solution from the users point-of-view. Through the feedback we had it was indisputable that our solution was useful for the participants, given the simplicity and the collaborative way the tool presents to its users.
- **Question 3:** the answer average in this question was 3,7. In this case the goal was to evaluate the usefulness from the organization’s view-point. Although we do not intend to replace all face-to-face meetings, since we think they have value, we think this tool in addition to centralizing information can also reduce the number of face-to-face meetings, and thus be a great benefit to the organization since it frees resources. The feedback we got from the interviews confirmed that: it was recognized that the face-to-face meetings had value but this number could be reduced and the fact that the meeting could continue in the tool, after the meeting was over, was seen as a useful factor, because these meetings had limited time and some great ideas and contributions could be lost. With the tool the “meeting” discussion is available 24/7.
- **Question 4:** the answer average in this question was 3,7. The objective here was to measure the ease of use to the tool’s current users. The overall feedback was very positive, but we also

had some minor criticisms regarding some simple adjustments that we could perform in the interface of the tool in order to better display some content.

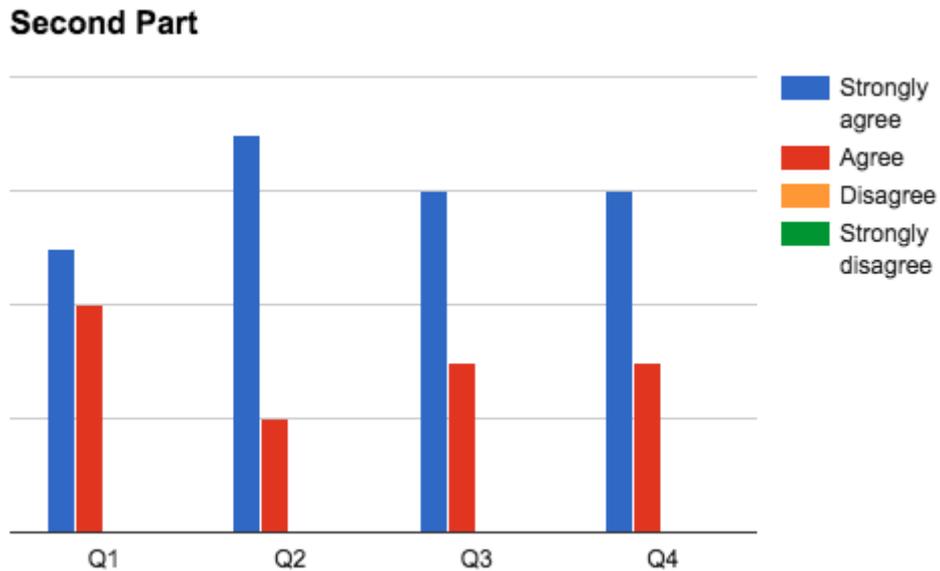


Figure 31 - Second part questionnaire results

These interviews and questionnaires gave us very important feedback to evaluate our proposal.

### 8.3. Summary

In this chapter we described the evaluation strategy. This strategy comprises a process and criteria that must be defined. As a process for evaluation, we decided to start by evaluating our demonstrations of use of the artifact and do interviews with experts, participants and potential users of the solution. In the first section, demonstrations of use of the artifact, we intended to globally evaluate our proposal with the feedback we received throughout. In our interviews and questionnaires, we looked to find the answers to those criteria and to see if our solution achieved the intended purpose. In both steps of our evaluation method the feedback was positive as it was expressed, and the criteria were met.

## 9. Conclusion

The importance of technologies in almost all types of organizations has grown, and the need for better and more complex IS/IT has followed that growth. In this document we described the difficulties in realistically justifying those investments and also the hardships in realizing the benefits originally foreseen for the investment. We have also described some of the existing solutions and their issues. Based on the related work, we propose a solution that aims at completing existing solutions, trying to eliminate or reduce some of their issues.

To assess the usefulness, evaluate it and test it we made some demonstrations of its use and collected feedback in order to validate and improve our solution. We know that in order to evaluate the best scenario would be in a real life organization with real projects, but since this methodology follows the complete development cycle of a project, the duration of the evaluation phase of a master thesis were not compatible. However, demonstrations and simulations with experts in the fields and more practical demonstrations of the tool's use with students were a great and valid way to test the concept and the tool as well as to evaluate results and draw conclusions for improvements and future work.

In the next subsections we will draw some conclusions by presenting which were the lessons learned during this research and the limitations identified. Lastly, we mention the future work related to the context of this research, which we think will bring extra value to the field. Prior to that, we describe the last step of DSRM, the research communication.

### 9.1. Communication

The last step of DSRM is communication, where the developed artifact is presented to the proper audience and its contributions exposed. We presented our solution to academics, experts in the field, and also potential users of our artifact. The collected feedback was incorporated in the thesis and also in the limitation's reflection presented in this document.

Some of these presentations and simulations of the artifact's use were made in order to show the benefits of our proposal to professionals interested in benefits management. The potential for organizations was clear through the exchange of ideas and interest shown by the participants.

We conclude the communication step by the writing and delivery of this document and its subsequent presentation and discussion.

## 9.2. Lessons Learned

There were several points raised during this research that are important to mention. Some resulted from the related work and the design phase while others resulted from the experience obtained during the demonstration of use, interviews and evaluation phase.

During the related work research and design phases, we observed there are many companies that have difficulties in achieving all the benefits originally planned for their investments. The benefits management methodology attempts to solve the problem but, as the methodology is not easy to apply, this is a barrier to adoption. In addition, it also depends on various assumptions such as the good execution of project management and change management.

During the demonstration of use, and especially in the interviews we found that the maturity of communication and collaboration within companies is not always enough to implement methodologies that require a high level of collaboration and communication as a crucial factor. This may be one of the causes for the failure of both the implementation and the adoption of methods of this kind. As such, initiatives like ours, which try to facilitate communication and collaboration and aim to increase the engagement of their participants, were much appreciated.

We believe that our proposal could bring a valuable contribution in the context of choose the best projects for the company, especially with the initial assessment with the Value Proposition Canvas to characterize the proposed projects. This relation between the VPC and Benefits Management, which allows one to capture common aspects, could bring value to the Benefits Management approach as was confirmed by the positive feedback we received.

Regarding the feedback we obtained we think that our proposal brings contributions to the area of collaborative tools with the discussion features we proposed allied with gamification and the Six Thinking Hats. We learned that this mechanism could be applied to other types of situations where it is necessary to collectively generate ideas and information needed to achieve a certain goal.

## 9.3. Limitations

We identified some limitations associated with our proposal, especially related to the demonstration of use and some concepts that we explore in our thesis.

One of our biggest obstacles was the fact that few of the people we contacted knew the benefits management methodology. This made our task more difficult since we normally had to start by first explaining what the methodology was, how it works, and then we explained our work. However, after doing so, the value of the methodology was recognized and, of course, what our work added to the methodology.

The companies' maturity regarding organization could also be a limitation since for this methodology to work it is essential that the project management and change management are working perfectly, otherwise it is much more difficult. Furthermore, many companies are still at the stage of making the project management and change management work well.

## **9.4. Future Work**

Regarding future steps we believe that they go through test more the artifact developed and applying it in some organizations to verify if it is really suited for their use. We should also do some modifications according to the feedback we collected (modifications historical for the benefits plan, some corrections and improvements in the interface, and also in some features).

It could be interesting to use the application in medium-sized and large projects with increased complexity and evaluate the impact of implementing a benefit management methodology with our artifact in those projects.

Regarding the tool's functionalities it could be interesting to integrate it with project management applications, and verify in what parts of the project management it makes more sense to integrate it as to bring more value to the success of project implementation and value delivery.

Another interesting aspect would be how to integrate the tool with change management, since for this method to succeed it is highly dependent on the changes being successfully carried out. As such, to integrate the tool with a change management process would surely be a plus.



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# Appendixes

## Appendix A – Tool Screens

### Home page

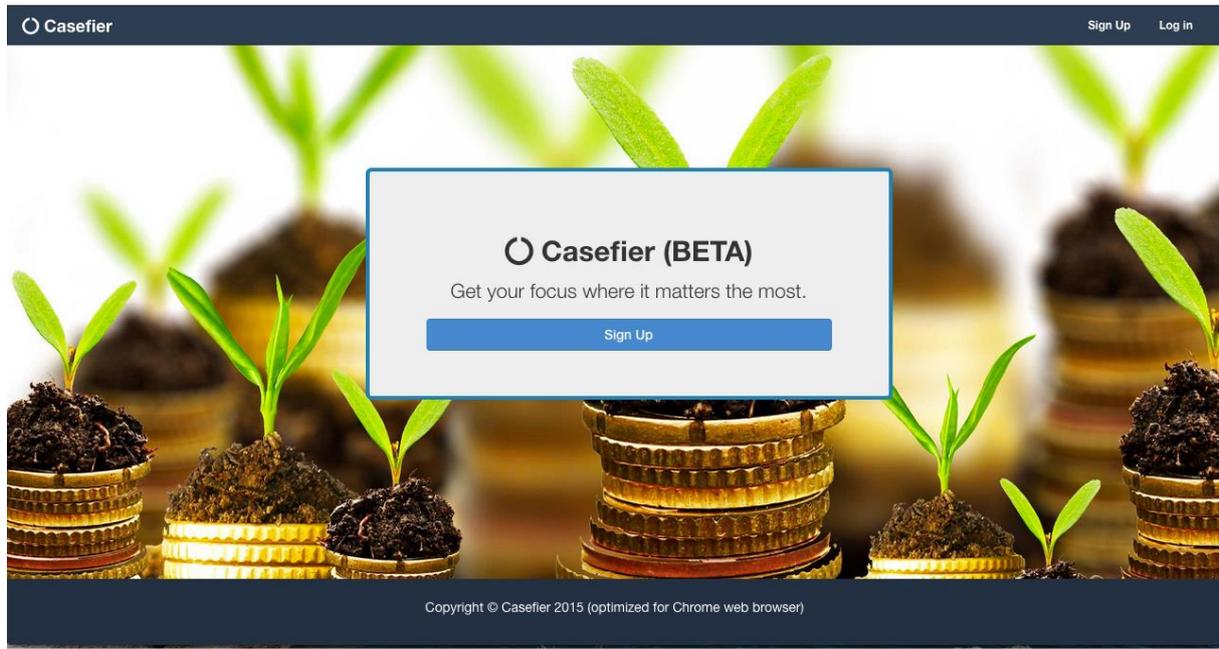


Figure 32 – Home page

### Sign up page

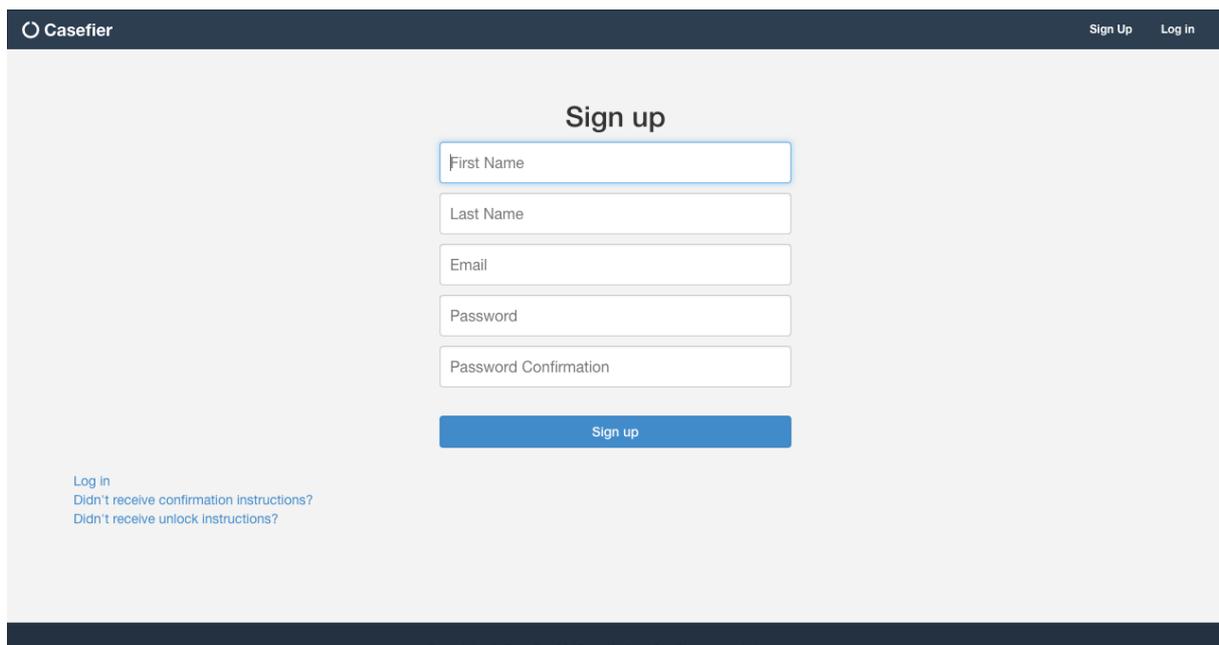


Figure 33 – Sign Up page

## Sign in page

The screenshot shows the 'Sign In' page of the Casefier application. At the top left is the Casefier logo, and at the top right are links for 'Sign Up' and 'Log In'. The main content area is titled 'Sign In' and contains two input fields: 'Email' and 'Password'. Below these fields is a blue 'Sign in' button. To the left of the sign-in form, there are four links: 'Sign up', 'Forgot your password?', 'Didn't receive confirmation instructions?', and 'Didn't receive unlock instructions?'. At the bottom of the page, there is a footer with the text 'Copyright © Casefier 2015 (optimized for Chrome web browser)'.

Figure 34 – Sign In page

## Account Settings page

The screenshot shows the 'Settings' page of the Casefier application. At the top left is the Casefier logo, and at the top right are links for 'Users (Admin)', 'Mario', and 'Log Out'. The main content area is titled 'Settings' and contains several input fields: 'Mario', 'Cardoso', 'cardosomarioar@gmail.com', and 'Trello Username'. Below these fields is a circular profile picture of a man. Underneath the profile picture, there is a text prompt: 'Fill in the two following fields if you want to change the password:'. This is followed by three input fields: 'New Password', 'Confirm New Password', and 'Current Password'. Below these fields is a blue 'Update' button. In the bottom left corner, there is a section titled 'Cancel my account' with a link: 'Unhappy? [Cancel my account](#)'.

Figure 35 – Account Settings page

## App administration 1

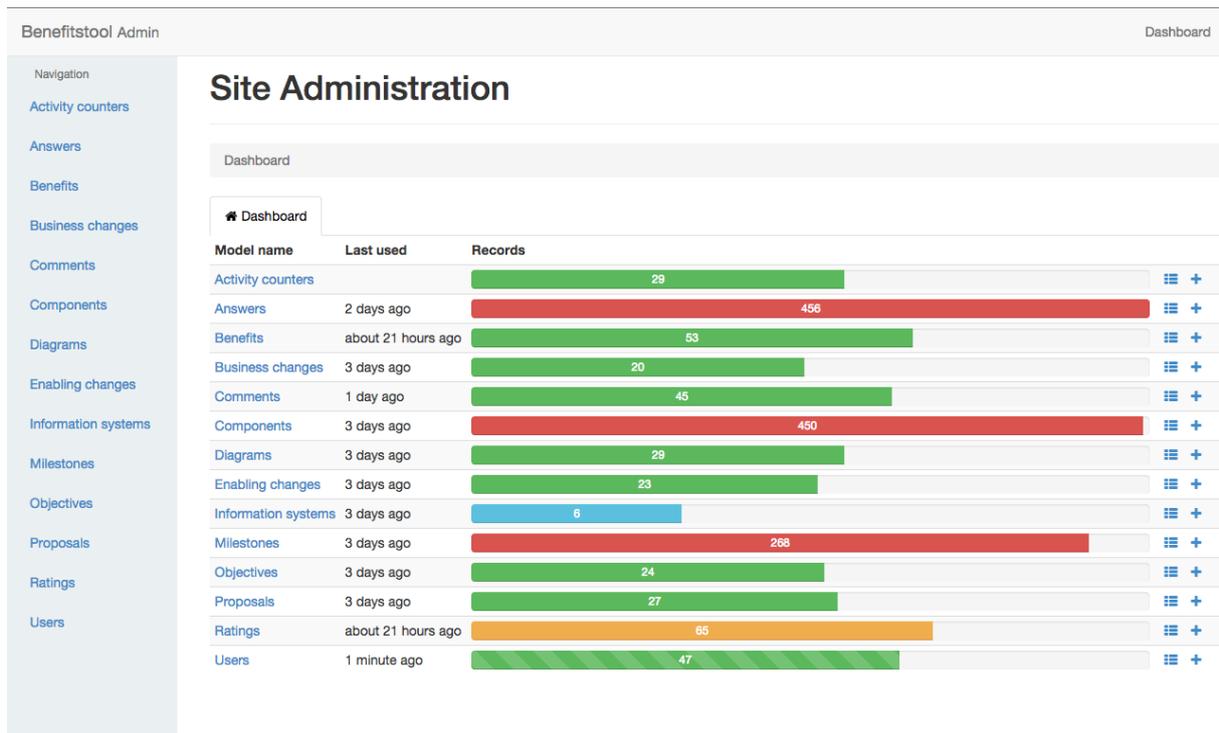


Figure 36 – App Administration 1

## App administration 2

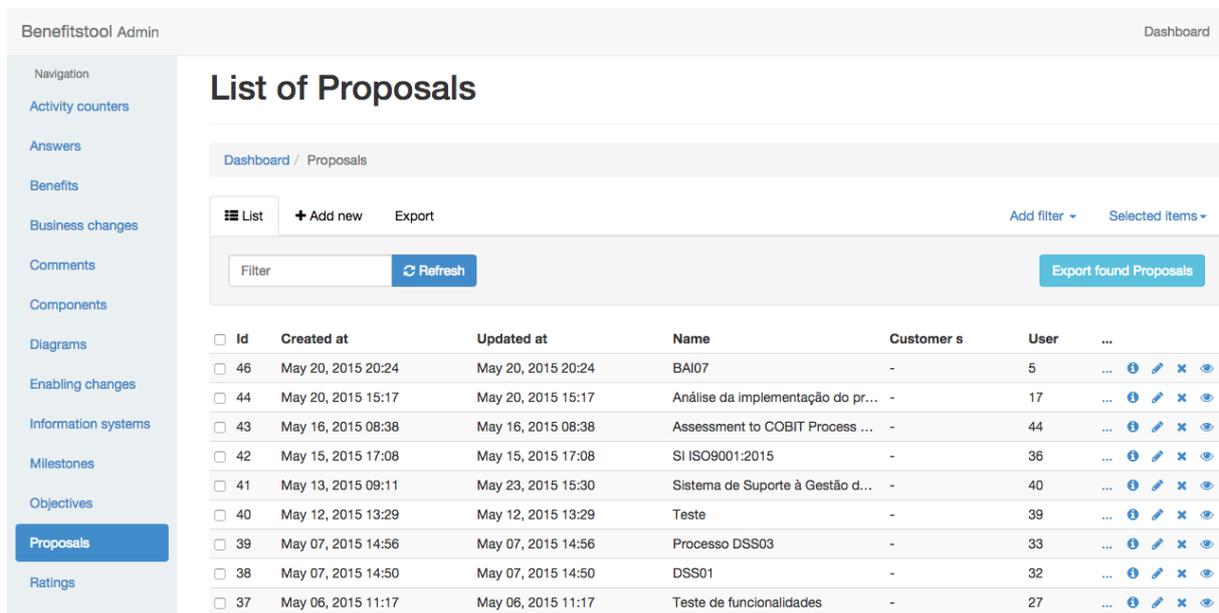


Figure 37 – App Administration 2

## App administration 3

Benefitstool Admin Dashboard

Navigation

Activity counters

Answers

**Benefits**

Business changes

Comments

Components

Diagrams

Enabling changes

Information systems

Milestones

Objectives

Proposals

Ratings

Users

### List of Benefits

Dashboard / Benefits

List  
 [+ Add new](#)  
 [Export](#)
Add filter ▾   Selected Items ▾

 
 [Refresh](#)  
 [Export found Benefits](#)

<input type="checkbox"/>	<b>Id</b>	<b>Description</b>	<b>Created at</b>	<b>Updated at</b>	<b>User</b>	<b>Proposal</b>	...
<input type="checkbox"/>	88	Operacionalização do proce...	May 25, 2015 15:58	May 25, 2015 15:58	User #31	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	84	Diminuir o prazo de validaçã...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	83	Registo dos problemas dos ...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	82	Acréscimo de utilizadores.	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	81	Aumentar o número de açõs...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	80	Aumentar a participação de ...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	79	Operacionalização do proce...	May 24, 2015 17:26	May 24, 2015 17:33	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	78	Gerir em tempo útil o risco d...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	77	Diminuir o consumo de papel.	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	76	Aumentar o número de audit...	May 24, 2015 17:26	May 24, 2015 17:26	User #37	Sistema de Suporte à Gestã...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	75	User's support	May 20, 2015 21:14	May 20, 2015 21:16	User #3	IISS	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	74	Users' rights guaranteed	May 20, 2015 21:03	May 20, 2015 21:03	User #19	IISS	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	73	Users' quality of life	May 20, 2015 21:03	May 20, 2015 21:03	User #19	IISS	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	72	Users' satisfaction	May 20, 2015 21:03	May 20, 2015 21:03	User #19	IISS	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	71	Some benefit	May 20, 2015 20:10	May 20, 2015 20:15	User #17	Análise da implementação d...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	70	Better Communication Struc...	May 20, 2015 13:07	May 20, 2015 13:18	User #4	APO13 - Security Management ...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	69	Better Data Protection	May 20, 2015 13:03	May 20, 2015 13:18	User #4	APO13 - Security Management ...	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	68	Aceitação do processo por ...	May 20, 2015 11:59	May 20, 2015 12:12	User #7	APO12 - Manage Risk	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>
<input type="checkbox"/>	67	Attingir os principais objectiv...	May 20, 2015 11:59	May 20, 2015 12:12	User #7	APO12 - Manage Risk	... <a href="#">i</a> <a href="#">p</a> <a href="#">x</a> <a href="#">e</a>

app.casefer.com/admin/benefit

Figure 38 – App Administration 3

# Appendix B – Questionnaire

Questionnaire Page 1

Research Topic:

*Tool for Managing Benefits*

- Evaluation Form -

May 2015

## Introduction

**Dear Evaluator,**

Thank you for participating in this research evaluation.

You will be evaluating a Solution which was designed to help organizations implement Benefits Realization Management .

Make sure that the **questions' context**, the **questions' meaning**, and the **ratings scale meaning** are clear and understandable.

In the end of the evaluation form, you will be able to rate the overall quality of this evaluation process, in terms of clarity, understandability, and representability of personal opinion, as well as provide critics and suggestions.

### Evaluator's Experience and Knowledge

In this section the Evaluator characterizes his/her work experience, regarding **roles** performed in business and IS/IT domains, currently or in the past:

**Business domains:**

- Board and Executive Management
- Business Management, Demand Management and Project Manager
- Audit, compliance, governance and risk management

**IS/IT domains:**

- CIO, IT Management and IT Directors
- Developer and IT support
- IT Consultant

Next, the Evaluator characterizes his/her skills and capabilities, regarding **practical or academic knowledge** in:

**Practical or academic knowledge:**

- IS/IT assessments
- Project Management
- Value Proposition
- The Six Thinking Hats
- Multilevel Service Design
- Benefits Realization Management

### Understanding the Problem and the Solution

In this section, the Evaluator rates his/her level of agreement regarding the synergies between Benefits Management, Value Proposition and Gamification.

Please rate the following statements:

#### ***Benefits Management complements Project Management***

Benefits management allows thinking how the outcome of a project/investment will benefit the organization, aligning projects with the company strategy. This doesn't substitute the Project Management, to deliver the project in time and budget but extends it.

Strongly disagree    Disagree    Agree    Strongly agree

#### ***Benefits Management ensures value delivery***

Benefits Management done effectively ensures that a project delivers value for the business and the appropriate return on investment. In Benefits Management you have a benefits dependency network, which relates the IS/IT functionality via the business and organizational changes to the benefits identified.

Strongly disagree    Disagree    Agree    Strongly agree

#### ***Benefits Management are not easily implemented***

During Benefits Management implementation some issues may arise regarding the ambiguity of objectives (different interpretations), cause-effect along the benefits chain is usually complex and the assumptions being made at each stage are often not clear.

Strongly disagree    Disagree    Agree    Strongly agree

*A collaborative tool can help the Benefits Management Implementation*

A web base collaborative solution that implements activities, which support the benefits management process making use of gamification techniques, a method of parallel thinking and the Value Proposition Canvas can help the implementation in a simpler way, with more collaboration and stakeholder engagement.

- Strongly disagree     Disagree     Agree     Strongly agree

### Rating the Solution's Usefulness

In this section, the Evaluator rates the Solution's usefulness, regarding the system dimensions:

- **Goal efficacy:** will measure the degree to which the artifact **produces its desired effect**, i.e. achieves the goal of improving Benefits Management implementation in organizations.
- **Environmental consistency:** will measure the degree of consistency of the IS artifact with people and organization. The **utility** criterion measures the **quality of the artifact in practical use**. The **ease of use** measures how well a user can perform a specific task using the artifact.

#### *Goal efficacy: Implementing Benefits Management methodology*

The web based tool implements activities needed to implement a benefits management process in a simpler way, with more collaboration and stakeholder engagement.

**Thus, facilitate and improve the implementation of the Benefits Management methodology.**

Strongly disagree    Disagree    Agree    Strongly agree

#### *Environmental consistency: Utility for people*

The solution is useful as it provides a collaborative place in the cloud where you can discuss and interact with other stakeholders at any time, and the information is shared so that everyone can analyze it.

Strongly disagree    Disagree    Agree    Strongly agree

*Environmental consistency: Utility for organization*

It allows stakeholders to have a better and greater participation in the benefits management process, without the disadvantages of not being able to bring together all stakeholders in the same place at the same time. Frees resources of the organization since some of the process activities are performed asynchronously in the tool through a web browser.

- Strongly disagree    Disagree    Agree    Strongly agree

*Environmental consistency: Ease of use*

The software is available as a service, with a modern, minimalist interface and easy to use.

- Strongly disagree    Disagree    Agree    Strongly agree

### Assertiveness of the Ratings

This section evaluates the Evaluator's degree of confidence, regarding the ratings provided above.

Please rate the following statements:

The evaluation form questions were clear and understandable.

Strongly disagree    Disagree    Agree    Strongly agree

I felt comfortable in providing the evaluation ratings. They represent my current opinion.

Strongly disagree    Disagree    Agree    Strongly agree

### Critics and Suggestions

Please feel free to express your opinion and to provide suggestions, for improving this evaluation process and evaluation form:

*(End of evaluation form)*

**Done. Thank you**