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## **Methodology Behind Implementations**

A Process Improvement Analysis

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Dissertation

presented as partial requirement for obtaining the Master's Degree Program in Information Management

**NOVA Information Management School**  
**Instituto Superior de Estatística e Gestão de Informação**

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# **METHODOLOGY BEHIND IMPLEMENTATIONS: A PROCESS IMPROVEMENT ANALYSIS**

By

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Master Thesis presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Knowledge Management and Business Intelligence.

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*For my Grandma Teresa who didn't get to see me graduate but who I know would be proud of me anyway*

*For my Grandma Lígia who gets to see her older granddaughter be the first fully educated woman in her family*

*For my Grandpa Fernando for being the example of reason and logical mind that I aspire to be*

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## ABSTRACT

An organisation's success is as good as its ability to maintain and improve its processes. For the contemporary organisation this might mean the outsourcing of a Business Process Improvement project to a consulting company. The classical BPM lifecycle doesn't apply to most of these projects, so a new Line of BPM Events is presented in its stead. This thesis is a study of a possible methodology of work for a successful BPI project, with a field work as an extensive example of all the activities inside each step. A BPI project is only successful if the organisation keeps the TO-BE model as their new standard process. To guarantee the success of the implementation of the new process, the whole methodology has into consideration change culture. Organisations are made by people and processes are run by people; therefore the collaborators of the organisation might be the "make it or break it" of the process. If the collaborators are not willing to change their ways, once the consulting team finishes its job in the organisation the collaborators will revert to their old habits, or they might raise problems in the implementation of the changes to begin with. On the other hand, an organisation with a positive change culture might not have these problems. All this will influence the implementation plan and application. The thesis studies a BPI project from beginning to end, including change culture.

## KEYWORDS

Business Process Management; Business Process Performance; Business Process Reengineering; Information Systems; Knowledge Management; Business Process Improvement

### Sustainable Development Goals (SGD):



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## LIST OF ABBREVIATIONS AND ACRONYMS

<b>BPM</b>	Business Process Management;
<b>BPR</b>	Business Process Reengineering;
<b>BPI</b>	Business Process Improvement;
<b>BPMN</b>	Business Process Management Notation;
<b>ABPMP</b>	Association of Business Process Management Professionals;

# 1. INTRODUCTION

Business Process Management is a fairly recent area of studies having emerged in the late 1980's (Dumas et al., 2013) with the appearance and growing usage of digital technology, in fact it was only in 2003 that the Association of Business Process Management Professionals comes to existence.

It has taken other areas of study and science centuries to evolve hold significant value to the society. Like Physics. The science that explains everything as it is in the universe has roots that go so far back that the beginning of it is no longer chronologically clear. There were studies of Physics in Ancient Greece, which is the main branch Physics has evolved since, but there is evidence that physics and the study of the universe goes back to Mesopotamia a period that can go as back as four millennia B.C.E. (Cusack, 2018) or six thousand years ago. And yet, it is only about the 16<sup>th</sup> century that physics starts to gain some momentum and one can even discuss that the full value of it only starts to be appreciated in the 20<sup>th</sup> century.

So, how does such a new area of studies gain popularity and social value in such a short amount of time? While Physics took centuries to demonstrate its true value Business Process Management inserts itself right into the society ready to show itself and its capabilities. Not only telling but showing organisations that they can do better, and they can be better at doing better.

That said, Business Process Management (BPM) is an area that holds immense potential. It's already an area that shows its value on application. Society is on exponential technological growth; machines get more sophisticated and complex at a fast pace. A good example is the computer machine, how it used to be and what uses it had to what it is today. BPM accompanies the growth, it accommodates the organisations to it and even promotes it, hence why the value of BPM was so easily perceived (Schmidt et al., 2020).

BPM, as the name suggests, focus on the processes of an organisation for managing it and keeping it organized. Like explored further on this thesis, the application of BPM comes in a form of a cycle therefore it's a never-ending job. Again, like the name suggests, it's the management of the processes. If the organisation can be sectioned into processes for organisation, then the management of those processes is in reality the management of the organisation. A foundation definition for it is: "Business Process Management (BPM) is a management discipline that integrates the strategy and goals of an organisation with the expectations and needs of customers by focusing on end-to-end processes." (Association of Business Process Management Professionals, 2013, p. 27)

Improvement is intrinsic to this area of studies, BPM, as the processes change to accommodate the needs and to keep up with the consumer standards. However, at some point it is necessary to go beyond just management and small improvements. That's where Business Process Improvement comes to play. It is a smaller area within BPM that can be seen on two different variants, in this author's opinion.

If improvement is intrinsic to BPM, then it is logical that Business Process Improvement (BPI) is intrinsic to BPM as well. Just like mentioned, BPM ensures the processes change and get upgraded according to the rising standards and renewed needs of the consumer (Kreuzer et al., 2020). BPI is going to be foundation in these changes, or improvements. On another hand, the management of the processes and these small improvements to the processes might not be enough,

something better discussed in the next chapter, bigger improvements must be done from time to time. This as the second variant of how one can see BPI. An isolated venture to shake the process anew.

So, while BPM is supposed to be continuous work, management work, BPI can be a singular assignment from time to time when evolving technology so have need. This thesis dwells into this form of BPI and the implementation of a project that improves the processes of an organisation.

A successful Business Process Improvement project requires attention to several overall characteristics of the business. Just like in process management, the processes need to be identified and evaluated as well as the profile of said business needs to be considered, as well, including and not limited to business goals, business communication culture, management culture, etc.

To assess how a process is structured and running within the business, it needs to be analysed in a quantitative and qualitative manner. Changes made will have to have into account how said process fits others in cases of steps overlaps and intercommunication. These cases will make possible automatization and resource management more complex, but never sacrificing the level of efficiency in the other processes.

The collection of data necessary for the process' structure understanding has to be thought out in such a way that allows the evaluation of quantitative and qualitative analysis of the processes as well as their modelling (i.e. a detailed description representative of the processes in a, usually, graphic mean). In the case of this thesis, the data was collected through a series of interviews to the agents of the process at work.

The information that is retrieved in these interviews will allow the modelling of the processes and it will allow the analysis of it. Through simulations and other methods, points of possible improvement will be identified to proceed with the proposal of a process improvement solution.

The thesis will partly fall on this part of a BPI project, but also the following step. After there's a proposal for a process improvement modification it is necessary to implement it in the organisation. Modifying the present process as it exists to the newly designed modelled process.

And of course, talking about implementation, immediately refers to the practicality of this subject. Business Process Management or Improvement do not, and cannot, exist only on paper. They are highly practicable areas, already in use across the globe in diverse industries and businesses. Implementation is the application of the analysis and the new processes and the make-or-break factor in the success of the Business Process Improvement. A rupture point in any process improvement project includes the undermining of the business culture and how well its collaborators will embrace change. While collecting data, a study of the business' culture must and will be conducted so in this final step, the implementation, a proper plan can be lined up.

The thesis won't follow the implementation itself as the focus is the study and proposal of a methodology adapted to the current business' structures and functionalities. Hence, the scope is broad enough to include all the process modelling, analysis, redesign, culture change assessment and preparation plan for implementation.

This thesis is not meant to be just theoretical, but empirical for BPM is such a practical area, hence the thesis takes on a case of study to serve as an example of the proposed methodology.

The work accomplished through the thesis and documented in said, sets itself apart by taking on the culture study as part of the process. There is already literature that dwells into BPI (Page, 2010) and the various steps to be followed, and there is literature that dwells into change culture (McInnes, 2012); however it is rare to find literature that combines both right into the practicality of the issue.

Therefore, the addition to the average literature work should be the added methodology to treat change culture. How to collect the data, how to view it and take the best of it so the plan for the implementation of the new process with the improvement is applied smoothly and successfully. The thesis is not to be applied specifically to one industry or one organisation but to be general and broad enough to be applied in any Business Process Improvement endeavour.

To make the thesis coherent and comprehensive for the reader, it will follow a structure of several chapters divided by needed sections.

The thesis starts with the present chapter, an introductory chapter to the thesis.

The following chapter addresses all concepts which are crucial to the thesis, by reviewing existent literature. There are five pillars in the foundation of the knowledge essential to the work, each is going to be contemplated in its own section. The first one: Data. Data is the bedrock of any area of Information Systems and it is important to not only understand what it is but how one can extract value from it, the latter part being undertaken in its own subsection. The second section: Processes. What are they, how can we differentiate a business process from a process and what do processes mean in the whole sphere of an organisation. The third: Business Process Management. Given that the thesis is centred around this area of studies, it is very important to facilitate to the reader the understanding of the area, this section will have a subsection with BPM's Lifecycle, this will be introduced in this chapter so later on, during the methodology chapter there's the knowledge foundation for the modifications needed for the proposed model that is to be applied. The fourth: Business Process Improvement. To separate BPM from BPI and explain the importance and applications of this area. The fifth and final section of the first chapter falls on change culture. It is going to be explained, what is meant by change culture in an organisation, why it influences the implementation of the process change and how to gain some control over this variable of the implementation process.

In the third chapter the thesis moves on to the methodology that is going to be applied to the case of study. As such, this chapter imposes the proposed methodology for the successful implementation of a BPI project in an organisation. This chapter is divided into four sections, the first will introduce the organisation that is the example focus of the thesis proposed methodology. The second section will demonstrate and explain the new lifecycle model and the third will be the method for collecting the data and why it was done the way it was done to justify the methodology. Finally, the fourth section will introduce the tools and methods that are going to be used in the analysis, redesign, modelling etc.

The fourth chapter will be the development of the Business Process Improvement project. Each step of the project will have its own section, and each step is going to be defined in the previous chapter in the section that treats the adaptation of the BPM's Lifecycle, what is expected from each section will also be explained in the previous chapter by describing the steps of the process. This project will contain the models, analysis and implementation plan including the takes on change culture for the organisation.

The fifth and final chapter is the conclusion and prospects of future work. As the thesis doesn't pose a specific question the conclusion cannot be expected to have an answer, however it will sum up the work made to create the proposed methodology for the successful implementation of a Business Process Improvement project in a contemporary organisation and explore possibilities for future projects.

## **2. FOUNDATION AND LOGICAL FRAMEWORK**

### **2.1. A UNIVERSE OF DATA**

In a world where technology is an ever-evolving mean, businesses that learn to adapt are prone to much faster and efficient growth and success (Lammi & Pantzar, 2019). Nowadays, the raw material that moves technology forward is data. Data is the purest form of facts that one can have at hand. By making sense of it, creating patterns, working it, analysing it, we can extract its true value. It is with this newfound value that an organisation can make educated and sensible decisions to push themselves move forward, to adapt to new times and growing societies.

Data is everywhere, and with the digital era in prime growth, the volume of existing data expands daily at rates that are difficult to conceive in the human mind. As of 2015, 90% of existing data was estimated to have been created in a space of two years and by then it was up to 4.4 Zettabytes (Lohr, 2015).

To put this into perspective, 4.4 Zettabytes is exactly  $4.4 \times 10^{21}$  Bytes (or 4.4 trillion Gigabytes). If the age of the universe is about 13.8 billion years, which is equal to about  $4.4 \times 10^{16}$  seconds, there is around ten Megabytes of data for every second of our universe's existence. There are more bytes of data in the cyber world than seconds ever passed in our universe.

In this universe of data, one must ask himself: Does every byte of data have the potential to be turned into value? The answer is no. There's a lot of created data that has no value or interest on a business point of view.

There's data created every day by the general population, for example, by exchanges of texts, images, emojis, etc. This data holds no real value and, in some cases, can be the repetition of data, like the chain sharing of one image. Even when looking into the data generated daily by a business, most of it might not be useful for growth for similar reasonings.

This way, it becomes imperative for organisations to first understand what kind of data is valuable for them and what should be left aside. One could have a lot of data but if this data is referring to something not within the scope of the organisation, or, when within the organisation, within the scope of the department, this data will bring no new information and therefore has no value in this context.

At the same time there is such a thing as too much data. Too much data can be a problem if the organisation ends up holding more data than they can handle (Sherman, 2015). Organisations generate and collect a very high volume of data on the daily basis and if it isn't sorted into what can be useful and not it might become too much to handle.

### **2.2. WISDOM IN DATA**

When talking about the value of data there's something very important to note; data standing on itself has no value. Raw data, untreated data, is just a collection of random bits of facts, expressed through numbers or words. Data has no significance or meaning on itself.

However, once taken and processed, data is given meaning. Let it be through finding patterns, putting it into context or finding relations between itself. We then have information. Information is the interpretation of data in a presentable way (Mahmood & Abdullah, 2021). Information has meaning and can be utilised, structurally does not need to be different from data but functionally it will be. Information is contained in the answers to the where, when, what, who and how many (L. Ackoff, 1999).

Information can also be processed and taken forward. The application of information, getting the answers to the how-to questions, brings us knowledge. Value can be promptly taken out of information; knowledge is just the step ahead. Knowledge is a mix of getting the collection of relevant information and understanding. Understanding being the process in which one can create knowledge out of knowledge (Bellinger et al., 2011).

Finally, there's one more step after knowledge; wisdom. Wisdom is the capability to use knowledge, experience and judgement to make informed decisions in order to achieve goals (Mahmood & Abdullah, 2021).

A simple example of the relation between data, information, knowledge, and wisdom to make it more understandable can be presented. Given the dataset:

0 0 0 1 0 1 1 0 1 0 1 0 0 0 1 1 1 0 1 0

1 1 1 0 1 0 0 1 0 1 0 1 1 1 0 0 0 1 0 1

C C C H C H H C H C H C C C H H H C H C

Each data point is a symbol, either the numbers 0 or 1 or the letters C or H, but as to what they refer to, or what they mean, data does not transpire anything else.

Of the data, after processed, the information taken out of it was:

- Out of the twenty lamps in front of the subject, nine are on, eleven are off,
- There are twenty switches, one in front of each lamp,
- The switches that appear to be off have their correspondent lamp on,
- The switches that appear to be on have their correspondent lamp off,
- The bulbs that are off are cold and the ones that are on are hot.

Knowledge one can take from the information at hand:

- If a switch is clicked to turn on a bulb, it will light up and warm up,
- The switches are backwards in relation to the bulb's lighting status,
- Light generates heat.

And finally, wisdom is knowing that to warm up a space, one can turn on a light, for light generates heat, which is why day is warmer than the night.

So even if data has no value on itself, it is the very foundation of it. Without data there's no value, no growth, no evolution. The rest of the elements crucial for value and growth (information, knowledge, and wisdom) have a clear hierarchy, like given by Ackoff:

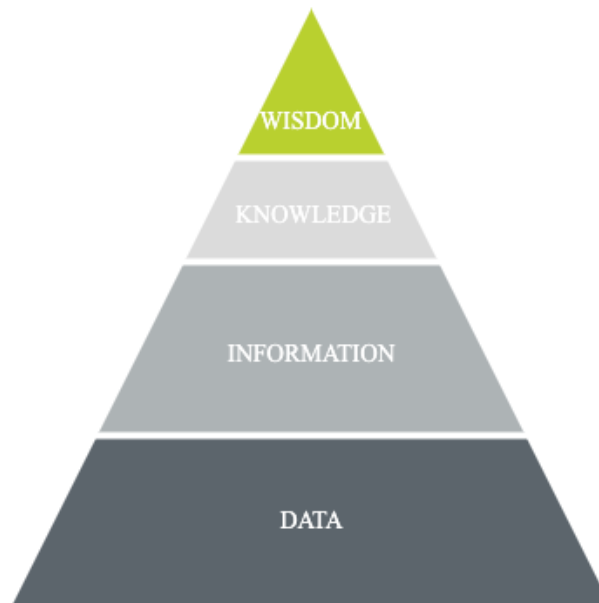


Figure 1 - Ackoff's pyramid of Data Information Knowledge Wisdom Hierarchy

It is important to keep all this in mind for any area of Business Intelligence, data is the very core of everything. Data is the motivator and fuel for the analytics necessary in the area and the same will be applied to Business Process Management. In fact, in Business Process Management there's the appendage of the process which depends and is built on the data at hand. The process will only be as good as the quality of the data that supports it.

### **2.3. PROCESSES**

The first notion to have in mind when thinking of BPM is the fact that every organisation that seeks profit, such as organisations, and even some non-profit organisations, such as foundations, offer products or services (Lohr, 2015). Products are essentially palpable assets, manufactured or sourced at some point in time and then sold. A final product from one organisation might be just a product's component of another. Services, on the other hand, are not palpable assets but the provision of needs.

For example, Canon sells cameras, cameras are one of their final products, and to manufacture them Canon has their own suppliers for materials and parts which would be the final product of other organisations. At the same time Canon offers service shops, where the consumer can go to if in need of repair on one of Canon products, the repair is a service Canon offers.

So, whether a business offers services and products or only one of those, there's a clear line of events that must happen to establish the delivery of either. These lines of events are not universal through organisations for the same products or services, though they might be similar.

What are these lines of events then?



They are sets activities that must be performed in chain and in a certain order. The activities in these sets can be broken down into tasks, for example, in a soda factory an activity can be the making of the soda cans and tasks for the activity could be to prime the metal for the can, cut the metal into the desired pieces, fold the metal, etc...

In the end, there's a clear chain of tasks within activities that must be performed for the delivery of the product, over and over again. The set as a whole, from beginning to end, is then denominated a process. Processes can be separated into categories for organisation and efficiency. An organisation is expected to have different processes for different purposes, and not only for the delivery of the products but also for the good functioning of the organisation.

Processes are the key for organising the needed activities to achieve the wanted business goal, which includes and is not limited to human resources processes, marketing processes, logistics processes, etc... In the meantime, processes are, also, the key to the understanding of how all the different activities relate and depend between one another (Weske, 2007).

## **2.4. BUSINESS PROCESS MANAGEMENT**

As seen in the previous section, processes are one of the core elements of an organisation's structure. They indicate how the products and services are delivered and what resources are needed for said. By studying how the processes work and the relations between each other, there's a foundation for possible improvements and modifications to the processes as well as the management of resources for said process. The processes are the ones to determine tasks, jobs, and responsibilities within the activities and, as a direct consequence, they shape the work of every employee. The failure of a process could bring the whole organisation to a halt or, in worse cases, into a dump. So happens for processes are set across and within the organisation in such a manner that they integrate its systems and manage its resources and data. It is easy to see, then, how processes have a direct impact in the revenue and why they have such a big influence in the shape of the whole organisation (Dumas, et al, 2013).

However, not all processes should be considered for the analysis in BPM. Only business processes should be considered when looking into process management, hence the name: Business Process Management. The reason for this lies on the definition of a business process. The combination of ideas given by Dumas, La Rosa, Mendling and A. Reijers (2013) and Weske (2007) in their respective books as to define what a business process results in the one considered for this thesis.

Much like a process, a business process, consists in a number of activities, performed in a certain order, as the means to the pretended end. In the less generic case of the business process, the pretended end is directly related with the business goal of the corporation, for the outcome of the processes must be a mean to achieve a defined business plan goal for a particular customer or market. The business processes of an organisation are the core assets of said. Therefore, these processes have a direct impact on the products delivered by the corporation and how the market receives them.

In his book, Michael Porter affirms "Every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product." (1998, p. 50). Since every organisation can operate one or more industries, activities that are performed for the end result to compete in a certain industry, can be grouped into categories (Mozota, 2010). The categorised activities are then part of a value chain. For the scope of this thesis the model for the value chain from the

previously mentioned scholar, Michael Porter (1998), in the Porter's Value Chain Model is going to be the foundation of the designation and categorisation of the processes.

According to Porter's Value Chain Model, the activities can be separated into three different levels of value: primary or core processes, support, and value system support processes. The three can be differentiated by the roles they take within the organisation.

Primary or core processes are going to be those which directly relate to the production, marketing, delivery and servicing of the product to the consumer. For organisations with physical products, these sets of activities might include the design of the product itself, the packaging design and the retail design.

Support processes are then the activities that provide assistance through technology, human resources and infrastructure inputs. Support activities can include corporate graphic design, office space design and research and development product design. And within this category there's also the latter level of the value process levelling, value system support processes, which are those that affect the environment of the organisation and mainly deal with suppliers and distributors.

From this, it can be averred that not all processes have the same importance, nor should all processes be given the same amount of time and attention. Handling the processes implies commitment, ownership and investment.

In the *Fundamentals of Business Process Management* (Dumas, et al, 2013) it is discussed how coarse or fine grained the view of processes must be. In agreement with the authors, the division given by Porter doesn't seem to be enough, extra subdivisions seem to be needed for a organisation that strives to thrive.

There are pos and cons to having the processes on a coarser or a finer view. On a coarser view, the processes are going to be broader, ampler, and are going to include many operations in the organisation and a larger portion of the staff. For this, the process becomes harder to manage, having to consider communication between the collaborators, resources, dependencies, etc. Also, the process gains a much bigger impact in the organisation, making any changes to it much more complex. However, a coarser view reduces probability of redundancy between processes creating opportunities to increase efficiency (Dumas, et al, 2013).

The solution to this is then to keep both views, by identifying both narrow and broad processes. An example to this can be how in a toy manufacturer and retailer organisation, processes can be narrowly separated between the manufacturing of mechanical toys, electrical toys, plushies and board games but then have a boarder process that incorporates the packaging of stock and distribution of all the products.

With this in mind, Business Process Management (BPM) is the discipline that deals with the organisation's processes and ensures all of the above (Dumas, et al, 2013; [Chang, 2006](#)). It is a discipline that assumes that an organisation can reach its business goals and thrive in their revenue through the proper definition, engineering, control, design, and continuous dedication to the improvement of business processes (ABPMP, 2013). BPM includes all the methods, concepts and techniques needed to support components it deals with.

Through the lenses of business process management an organisation is not composed by functional categories or departments but by systems of processes. Here enter the previous notions on process value and categorisation already expressed in this section and their due importance.

## **2.5. BPM LIFECYCLE**

In the implementation of a BPM project of any kind, there's a methodical process that should be followed to achieve the wanted end results. The scheme that represents the method behind the process is called the BPM lifecycle. Independently of the method, the lifecycle consists of phases that relate to each other through a cyclic structure enlightening dependencies between each phase (Weske, 2007). Also, due to technology growth and social culture change, the lifecycle is expected to be dynamic and change with time (Szelągowski, 2018).

In the context of BPM, working methods have been defined as the techniques and tools used as support and enablement of all activities in BPM projects or operations. Different methods can be applied to different stages of the process (Rosemann & vom Brocke, 2015).

There are various models for BPM lifecycles, some have similarities, some have differences. In some cases models present implementation of the same steps, however each model has a particularity original to it (Macedo de Morais et al., 2014). The lifecycle's model presents an illustrative approach to how the management and implementation of processes is going to be run. The traditional, or classical, BPM lifecycle given by Dumas, et al. (2013) still remains broadly accepted in the area of BPM for its continuous success given the optimization and automation the model allows through the continuous routine with high pace and low costs (Szelągowski, 2018).

For this thesis, and the case of study that supports it, one model needs to be picked. The model is going to set the methodology of work, which will be discussed further down in the next section. For this section, however, rises the need to set the model and discuss how it's constructed from a research and literature reviewing point of view.

The chosen model that is going to be the foundation for the on-field application case is the classical BPM lifecycle, given all the academic research supporting it.

Consequently, the best fit would be the lifecycle model by Dumas, La Rosa and Mendling in their book (2013):

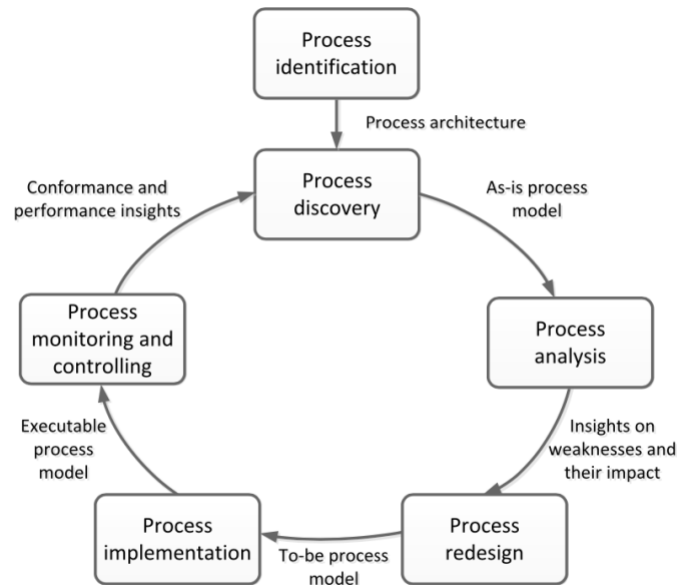


Figure 2 - The BPM Lifecycle  
 Source: Dumas, et al 2013 p. 21

As it can be seen in Figure 1, the model is a cycle as expected, but besides that, it's important to note that the first step of the lifecycle "Process Identification" does not necessarily happen every time the cycle repeats. This happens for a simple logical reason; for the first time implementing the cycle it is indeed needed to construct the organisation's process architecture and the AS-IS model and precedingly proceed with the step of "Process Identification". However, as seen on Figure 1, after "Process Redesign" there's a new process model at hand, the TO-BE model, which will update the architecture without, in most cases, rising the need to repeat the step "Process Identification".

In sum, BPM can be seen as a continuous cycle with different stages each with its steps, the stages follow a certain working logic which for the sake of the thesis, it was kept the one by Dumas, La Rosa, Mendling and Reijers (2013):

- *Process Identification*: Stage in which the business problem is presented. The processes relevant to the problem are identified and the relations between each other delimited. The result of this stage should present the process architecture of the overall processes of an organisation or the processes within the scope of the business problem
- *Process Discovery*: In this stage the identified processes are documented, usually in the form of models. For this stage the model is usually called AS-IS model as it represents the processes as they are in the present moment, and it's the result of this stage.
- *Process Analysis*: Through analysis, both quantitative and qualitative, all issues associated with the AS-IS model are going to be documented in this stage. Issues such as resource overflow, bottlenecks, unnecessary complexity, etc... In this stage these issues are identified and quantified, if possible. The result of this stage should be a structured collection of the issues at hand.

- *Process Redesign*: This stage has a possible second name that is relevant for this thesis; “Process Improvement”. The goal is, with the structured issues from the previous stage documented, to determine changes in the process that move towards improvement of the performance and move towards the business goal of the project. Many change options can be analysed and compared in order to assess the type of improvement (resources, time, profit, performance, etc...) and how or if they can co-exist between themselves. Eventually there’s a redesign of the AS-IS model, the resulting model has into account the changes that were picked through analysis techniques and is thus named TO-BE model. The changes mentioned in this stage, can be achieved through many techniques, the mains ones in this thesis will be simulation techniques and process concepts (or “what if” scenarios”)(Kettinger et al., 1997).
- *Process Implementation*: After the TO-BE model is fixed, this stage sees the implementation of the alterations of the AS-IS to the TO-BE model in the actual processes. First the implementation must be prepared for there are two aspects to it; the organisational change management and process automation. Organisational change refers to the activities required to change the habits of the workers into the new processes while automation refers to the development and deployment of IT solutions to support the new process.
- *Process Monitoring and Controlling*: After the process sees its changes enforced into the TO-BE model that was previously designed, data is continuously collected in order to determine the performance of the processes according to the expected measures and business goals. In this stage new issues may arise, unforeseen in the redesign stage, and to correct and evolve the whole cycle repeats.

## **2.6. BUSINESS PROCESS IMPROVEMENT**

Business Process Improvement (BPI), has the final intention the overall improvement of business processes within an organisation. An improvement can be categorised as any change which is implemented to better the process in some way or another.

So, when a process has been implemented in a corporation for a long time, the performance of said process has the tendency to the decrease its efficiency (Andersen, 2007), which implies more usage of resources for the same previous outcome. Resources which could either mean the need of more financial means, time or even personnel working the same process. In order to maintain the performance of the process there needs to be some degree of implemented change or renewal and that is maintenance. It is important to note that maintenance is not part of improvement. Although necessary, maintenance only allows to stay at the same level of performance (Andersen, 2007).

This means that not all changes are improvements and it’s important to understand that a business to stay alive must go beyond just maintenance. Maintenance implies the stagnation of the process’ performance but that doesn’t mean that the organisation’s value in the market stays stagnant, for the competitors will improve (Harrington et al., 1997).

Hence, an organisation which decides to purposely not change and improve themselves to keep up with the evolving society is an organisation signing on its own end. The competitor organisations will improve their services and products and in the unlikely event of the competitors deciding to still their development and proceed to not improve their processes, surely there will

be a third-party actor ready to get into the sector to sweep the business (Andersen, 2007). In addition, the standards of the consumer are ever growing (de Pádua et al., 2014) and the best in the market will earn the profits. Nowadays, the consumer expectation is very high due to increasing supply quantity and quality demand (Harrington, 1991), which facilitates the points above.

Next thing one must ask is, what sort of situations prompt the need for improvements?

On one hand, as already discussed, there's the evolution of technology which creates new knowledge and therefore the need to accommodate it within the processes.

On another hand, the performance of a process tends to decrease with time. And as said, the standards of the consumer tend to rise with time. Consumerism has also increased the number of products that are being bought (Lammi & Pantzar, 2019). The elevation in expected quality and quantity is going to make the old processes unfit to fulfil the current demand. In that sense, it's not as if the process itself decays, but the needs of the organisation will not be met in the future. Simultaneously, if the processes depend on mechanical and or technological resources, these might need updating which may lead to a need of process alteration.

To this extent, whether an organisation has processes that depend on machinery or only on personnel, the performance of the process is a declining line (Andersen, 2007). The maintenance of the processes will stabilize the performance of the processes; however, the optimal situation is the enhancement of performance which is done through the continuous improvement of processes.

It is, finally, important to note that change for the sake of change might not be what the organisation needs and what will make it grow, meaning that not all changes are improvements and the line that separates these is the growth the change will bring. An improvement implies adding value to the processes and therefore the organisation (Page, 2010).

Business Process Improvement fits with the ideas presented above as the binder. Business Process Improvement is the area of Business Process Management that finds the methodologies needed for all the steps of the improvement process and exercises them. From the analysis of the current processes to the identification of processes in need of improvement, the targeting of the type of improvements needed to the methodology used for the implementation (Harrington et al., 1997).

Reminding BPM's lifecycle, from the previous section, BPI is going to be achieved through the repetition of the cycle, it is, afterall, an area of BPM itself. When reaching the "final stage" of the cycle, Process Monitoring and Control, not only new issues may occur, like mentioned, and the fixing of these is going to be maintenance and management of processes, but also the analysis made during this stage may lead to new insights on changes that can be made to enhance the performance of the process. Maybe, at this point new technologies may have come out and can be implemented to better the process.

## **2.7. CHANGE CULTURE**

So far, this thesis has mostly been focused on the theoretical points behind the practice. During the sub-section of BPM's Lifecycle there was a mention of organisational change management but even the authors of the book specify that they won't be dwelling into that side of process implementation. Organisational change management encloses the activities needed for the

implementations of the process changes and deals directly with the collaborators of the organisation (Gošnik, 2019).

When working on a BPM project, and the project gets to this stage, there's a big wild card which is going to fully impact the success or failure of the implementation of the processes' changes. The people.

Processes are run by humans and for that reason, collaborators of an organisation are the key to successfully implement changes of the processes. One can have a brilliant redesign of a faulty process but if the collaborators are not up to accepting the changes, sooner or later the redesign will fall through (Page, 2010). In this scenario there's two options, either the collaborators are resistant to change right from the beginning and will not take the modifications in the processes or they will take the modifications while being watched and then revert to their old habits.

The human being is prone to fear of the unknown, changing a habit is driving the being to the unknown and that on itself might cause distress and plausible resistance.

To prevent the implementation from failing due to these variables, it is vital to understand why collaborators might be against change and under what conditions might certain anxieties rise (Schmiedel et al., 2015).

Studying the change culture of the organisation is the ticket to implementation success. Through some easy questions made to various collaborators of the organisation in several different departments one can get a grip of the culture on change within the organisation (Hribar & Mendling, 2014).

In some organisations the change culture is so positively charged, deep in the organisation's work ideologies, that this point will never pose a problem (Rosemann & vom Brocke, 2015). An example is an organisation like Apple Inc. which has the slogan "Think Different". Year by year Apple relies on change and evolution within itself to thrive. Every year they launch new versions of the same products (phones, tablets, laptops, etc...), therefore change is the key to their business, change is welcomed and not feared.

Contrary, there's organisations that do not have change culture as embedded and those are the ones who call for a more in dept culture analysis.

There's four main points that make people resist change: fear, feeling powerless, too much effort or pain involved and no self-interest in the matter (Attong & Metz, 2016).

Once again, the fear comes from being afraid of the unknown and being asked to step out of one's comfort zone. As broken and cracked as the process might be, the collaborator knows the way to step around the issues, the easy fixes, but in the new process? The collaborator doesn't know what issues to expect, and the easy fixes might not even work. This brings up the next point, feeling powerless. Comfort brings the feeling of power, facing the unknown with no apparent hand on what's coming makes the collaborators feel powerless (Attong & Metz, 2016).

The other two focus points are also related between each other and with the points above. The change implies adjustments which can go in three different levels: emotional, physical, and mental, before the collaborator will once again feel comfortable in the process. These mentioned adjustments might present too much effort for the collaborator, and it may not even feel worth it at the end of the day (Page, 2010). Furthermore, since the changes usually come from a higher

hierarchy, and targeted towards the greater good, the individuals in lower levels will lose interest. It is easier to capture interest in change if it directly benefits those who have to apply said change, whether it helps towards self-improvement or towards the reach of personal achievements (Attong & Metz, 2016).

To keep collaborators engaged and interested in change there are, of course, methods that later come from psychology, such as involve collaborators in the change process, make the change process visible for everyone as to keep interest and so teams can follow along what is being done, give them a sense of control (Page, 2010; Rohloff, n.d.).



### **3. THE METHODS BEHIND THE RESULTS**

#### **3.1. THE BUSINESS**

The thesis is going to follow a practical approach through the study of a case. For the sake of fluidity and coherence the organisation shall be named Doe Consulting as of now, or Doe for short.

Doe Consulting, as the name indicates, is a consulting company that offers many services as their main product. Besides consulting, Doe Consulting offers services in Application Services, Enterprise Solutions, Infrastructure Services and Software Development and their clients are within a big variety of industries. Doe works, between others, in the Health, Telecommunications, Media, Retail, Transports, Travel and Finance services and acts in about twenty-six countries including Portugal.

The project that is going to be the centre of the case is made through a partnership between Doe and Nova IMS' own junior consulting enterprise; Junior Data Consulting, also known as JDC.

The proposed project by Doe Consulting does not apply to a specific industry or organisation that Doe works with but to Doe itself as the goal is the study and proposal of improvement for their organisation's recruitment process.

#### **3.2. LIFECYCLE**

As visited on the prior chapter, the main model that determines the line of events this thesis follows, and the method of work is going to be set up by the BPM lifecycle.

However, there are many changes that are going to be applied to this lifecycle for in many BPM projects the whole cycle is not necessary. In this thesis' case, it demonstrates that for many projects the cycle ends up not being a cycle. For the reality of the work that is being done in and for organisations in the current work society.

The beginning of the cycle starts with two steps, Process Identification and Process Discovery. In the case of Doe Consulting, the process was pre-chosen by the organisation to be worked on. This eliminates the need for that first step, in fact it shows that the organisation has a pre-existing effort to somewhat keep track of their processes, many organisations nowadays do. The organisation has already identified the different processes within it.

So, without Process Identification, the first step becomes Process Discovery in which the modelling of the process as it functions in the moment.

Also, as mentioned, the project for Doe Consulting is for a proposal of improvement in the recruitment process, therefore the last two steps of the original model don't apply. There can be a certain preparation for the process change implementation but the implementation itself is only in case Doe decides to move on with one of the proposed alterations.

In fact, generally, when projecting process management and improvement projects into today's business reality the lifecycle is no longer viable. Most organisations don't have the means, or do not want to allocate the means, to have a Business Intelligence department in their structure, with

a team diverse and big enough to deal with all diverse BI subjects in the organisation. Instead, the organisations prefer to outsource these needed projects to consulting companies.

Additionally, the organisations usually divide the whole BPI project needs into two projects. This will mean that they might have two different consulting companies handling each project. This division is made by the implementation step. The consulting company that wins the BPI proposal for the project, comes into the organisation, takes the data they require to work on the deliverables, which for a BPI project includes at least the AS-IS and TO-BE models, as well as supporting documentation for the models (this is discussed with the organisation but it is normal to leave written documentation on what each step entails, what inputs the process needs and what outputs it will produce, responsibilities, etc...), and an implementation plan for the TO-BE model, in case the consulting company that wins the implementation project is not the same, or the team differs, there will be a written plan conceptualized for the changes in the TO-BE, which the implementation team can choose to follow or to ignore.

This way of conducting projects changes the dynamic of the work as the consulting company gets in, retrieves the data, works the data, builds the deliverables, presents them to the organisation and the project is finished. If in the future the organisation finds itself in need of process mining or process management, they will have to require the services of a consulting company once again.

In this sense, for an isolated BPI project, like the one at present, one is no longer likely to find a cycle but a line of events:



Figure 3 - Line of BPM Events for consulting projects based on the model by Dumas et al. (2013).

As discussed in the previous chapter Process Implementation refers to the stage where the implementation of the changes is planned and then executed, however in this perspective it will be just the preparation, culture change management and IT viability planning.

### 3.3. COLLECTING AND TREATING DATA

With all that has been discussed and explained on this thesis, it is known that the first stage of the project is Process Discovery, therefore, the main result to be expected from this stage is the AS-IS model of the recruitment process from Doe Consulting.

To be able to document this process in an AS-IS model, first there's data to collect. Since the organisation does not keep up digitally or even on paper with its process from a functional point of view (timings, costs, etc), the method that was chosen to retrieve all needed data to build the model and analyse it on the following stage, Process Analysis, was through interviews to the collaborators that are also part of the process. The collaborators that see it through from beginning to end.

With the right questions the AS-IS model can be designed and with the implementation step in sight a couple more questions were added to make a small study of the change culture of the team.

Knowing the collection of data is made through interviews and given the data definition from the previous chapter, there's a slight correction to me made. The answers to the questions of the interviews are not going to be raw data but information. There's already context to the questions, there will be structure to the answers.

Here are the questions that were asked in each interview and their purpose:

1. *In Doe Consulting the recruitment process is initialised only when necessary or periodically?*

This question will help in the flow analysis as it gives an idea if the arrival of CVs (*curriculum vitae*) is constant or in batches. It will be mostly important for simulations.

It also will help determine what kind of trigger will start the whole recruitment process. Is it the arrival of a CV? Or a request to fill in a position which then leads to the request of CVs. It is known the end of the process. There are two options only, either an applicant is contracted or rejected, but the beginning is still uncertain.

2. *From beginning to end, in steps, how does the process occur? Since the arrival of a CV until the rejection or contract of the applicant?*

This will be the longest answer. The one that will allow the design of the model with all the steps, it's important to ask this to everyone and not just one collaborator to make sure the process is being carried harmoniously through the team (i.e. one collaborator does task a, b and c a certain way and another collaborator of the team does it differently). Also, it is possible that not everyone has full knowledge of the recruitment process from beginning to end so several answers will allow the puzzle in of the model to a whole.

3. *Inside the process what are your activities or tasks?*

This question will allow during the analysis to do resource management. Check if a task is being performed by too many or if a task is needing more collaborators on it. And again, it will be vital in the simulations to know how to distribute resources.

4. *If you need to contact someone who works in the recruitment project in tasks before yours or after yours, who are those people?*

This question will try to identify if a collaborator might feel overwhelmed or burdened as too many of their colleagues rely on them for their work. Situations like this might cause knowledge bottlenecks and other problems.

5. *Is it usual to have to wait for something that you cannot move along without?*

- a. *[For positive answers only] In that case which impediment do you usually have? How long do you usually have to wait?*

These questions will point right away to issues in the process, where there might be backlog in the process, and with the second part of the question, the issue is pinpointed and is a good prospect for an improvement and it will allow to understand actual delays in the process and proper timings to use in the simulations.

6. *Is there a common and/or known issue in the process that causes you disarray directly?*

No one knows the processes better than the people who work with them, as well as the problems that already exist. If there's a problem with a software, hardware or any type of resource that is common, the solution will bring relief to the collaborators.

So not only it will help with Process Analysis as it gives a known issue to be resolved but also it shows the team that the changes that the BPM team has in mind are for their benefit as well, it might make them less weary of the changes in case collaborators are reluctant.

7. *In average how long does each step of your activities or tasks take? [For situations in which the tasks are quantifiable, ask how long it takes for 1. Example: How long does it take to evaluate 1 CV? How long does it take to schedule 1 interview with an applicant?]*

Again, this is a question that refers to the possible existence of backlogs, bottlenecks, etc. It will give timings to be used in the simulations, as it gives an understanding of how long it takes to complete each task. It's expected that people will give intervals of times (i.e. "I could take from 5 to 10 minutes to read a CV, depending on the size") which is not unfavourable. That way there's a perception of the deviation in the task timings.

8. *For activities that require scheduling how long does it take, in average, between a first contact and the event itself? Is it hours, days, months? [Example: Call to express interest in an interview and interview itself]*

This question might sound redundant after the 7<sup>th</sup> question but in reality the data is different and the information detained from it as well, because this question focus on tasks that are always dependable on more than one person. It might be the applicant, or other collaborators in the organisation.

9. *Was there any change applied to the processes of the organisation lately? How do you feel about the end result?*

This question leads straight into the change culture assessment. If there haven't been any changes to the processes in the organisation, the collaborators are more likely to be hesitant to change, in this case, it's a deep change of routine and habits. If there have been changes and they haven't stuck, then it shows that this team tends to revert to old habits and there must be found a way to make the implementation stable even after the project is long done. If there have been changes but they were disturbing to the flow of the process and the work of the collaborators instead of making it more efficient and smoother, then it will be likely that a new BPI project will not be received well or even be welcome. However, if there have been changes to the process that have made it better and have been accepted by the collaborators, it is likely they will be open to a new BPI project.

10. *Is there any additional comment you want to make about the process? Anything that you would like to see changed?*

Like the rationale behind the 6<sup>th</sup> question, the ones who know the process the best are the ones that work with it, and sometimes they even might have their own ideas, it is important to include the team in the process to get their acceptance later during implementation.

### **3.4. RETRIEVING INSIGHTS AND PERFORMING SIMULATIONS**

It has been referred in the previous section of this thesis the use of simulations for the analysis of the processes, these will allow the reproduction of the workflow's behaviour for a better understanding of the process and to retrieve valuable qualitative and quantitative insights (Reijers, 2003).

The reason for the choice of this functionality lies behind the amount of information one can retrieve from a simulation run. It will return data about the process which through analysis one can earn some insights on bottlenecks, resource use and time management (how long the process runs for, how long does it stay in the same task waiting for resources). This will facilitate the creation of different "what if" scenarios that will lead to the new TO-BE model.

The simulations follow the process as modelled, for each step one must input data for the program to compute and deliver the simulation results. The data to be inputted depends on the type of event on the process.

#### **Trigger Events**

*Maximum Arrival Count:* It will be the number of instances that will be ran by the simulation, for this project the number comes from the information retrieved from the interviews to all the collaborators in scope.

*Arrival Interval (in minutes):* This interval between instances, which will follow a deviation since the interval will not be always the same. For this on field project, all the trigger events and tasks will follow the Normal Deviation, or Gaussian Distribution, for this is the deviation most used in social and natural sciences to represent the distribution of real and unknown values of a variable. From energy of particles to the time a certain task needs to be performed, this distribution is most valuable. It will then need the interval in minutes and the standard deviation.

#### **Tasks**

*Resources:* It will be set all the resources to be needed throughout the process and then in each task it is necessary to indicate how many of each resource are needed. The number can be zero, if the resource is not involved in the task and it can go up to the maximum of resources available in the organisation.

*Time:* Time has two different inputs waiting time and working time. Waiting time refers to the time that a task must stand by after the previous one is complete in order to be started. However, for this type of process the waiting times between tasks are not exactly waiting times but delays. For example, if I am working a process for a fast-food delivery system, a waiting time will be the waiting period between putting in an hamburger on a grill and waiting for it to be cooked, or the fries in the fryer, these will have specific times to follow and are waiting times that one cannot go around of.

This process however won't have any of these types of waiting times, it might have delays and those are reflected in the times given for the expected needed time to perform each task. Bizagi Modeler has limited possible choices for the time interval, between them: fixed duration, floating and numeric which are not distributions and are fixed values and then normal distribution, truncated normal distribution and triangular distribution.

Given this, the waiting times are going to stay at zeroes, and as for the performing task time the first thing to do is to choose what type of probability distribution the instances will follow regarding their performing time, discarding right upfront fixed values, since they seldomly represent reality of events.

Therefore, the way time is inputted varies with the type of distribution chosen for the tasks, each instance will go through the task with a different performance time. Likewise, does happen in reality of day-to-day work (sometimes it might take ten minutes to write the interview report, and then some other times it might take fifteen or even less than ten).

Bizagi Modeler has limited possible choices for the time interval inputs, between them three are of fixed values, and the other three are then the normal distribution, truncated normal distribution and triangular distribution.

The Normal Distribution or the Gaussian Distribution is a distribution that is often used in the natural, exact and social sciences to represent real values or events with random variables which their probability distributions are not known. This is usually the distribution that better represents the predictability of events (*Distribution, Normal*, n.d.; *Normal Distribution | Encyclopedia.Com*, n.d.; Lyon, 2014).

There's however there's one detail of the Gaussian Distribution that is to note. Both ends of the curve extend endlessly without touching the axis which means when using this distribution to describe the time of an event it can go as lower and as higher as negative and positive infinite. To avoid these situations, Bizagi has its Truncated Normal Distribution in which one can set the minimum time required and maximum time it could possible be needed to perform the task. This is the distribution chosen, so there's more control over the times for each task.

Each task will then have a value for a mean and a standard deviation, the minimum needed to perform the task and the maximum it could possibly take to perform it.

## **Gateways**

*Percentage of Options:* Each gateway has more than one option for the continuation of the flow, so it becomes necessary to provide each option, or event, the percentage of its probability.

## **Results**

With this data, the program will be able to perform the simulations and deliver results. Bizagi returns a lot of information from the simulations so it's important to know exactly what to look for. Since the costs are not in scope of this project, the two main points that will be important is resource use and times. The overall duration to run the process, time waiting on resources, total time for tasks, etc...

With these, bottlenecks and other issues can be identified. On the foundation of these issues, "what if" scenarios can be built. Each scenario procures to solve or ease one of the issues identified and then by mixing different scenarios the TO-BE model rises. The TO-BE model will be a mix of different scenarios, not all of them, for there's a point where the process will be optimal and then the addition of more scenarios will make the performance decline. Also, it is important to keep these scenarios do-able. It cannot be expected, for example, for a small retailer to completely change their assembly line with new machinery and such, not only they might not have the financial means, but even if they do, it might not make business sense.

The scenarios also go through simulations in order to assess how and how much they help and change the process.

## **3.5. TOOLS**

For this thesis the main software used was Bizagi Modeler. This is a software constructed for the purpose of documenting business processes and it is through it that the modelling of the AS-IS model and the TO-BE model are to be done. This tool was chosen for its simulation capabilities which at the moment of writing the thesis were unpaired with other BPM tools. At the same time Bizagi Modeler was a tool the author had contact with during the first year of the master's degree's classes, which also meant, the university already had the licensing for usage of the tool, making it accessible.

As well as process modelling, Bizagi Modeler offers analysis through simulations. In these simulations, each step of the process has several parameters to fill, all these are going to be filled with the information gathered through the interviews. The main parameters are resource allocation, time spent per step and what deviation can it have (the normal deviation was applied). The simulation with this scenario will be the baseline, the process as it is running in the organisation, and the goal is to improve from there.

Afterwards, several scenarios will be designed with different "what if" situations to assess how the process is affected. These scenarios will be walked through on the next chapter for first it's necessary to have the AS-IS model and a first analysis of it. However, an example of a what-if scenario can be to move resources from a team to another, automatization of part of the process, an actual change in the way the process is ran, etc...

By exploring these scenarios and combining them into new ones, there will be a point in which the process will be at its best performance, combining too many scenarios can have the contrary effect as the scenarios might have conflictions between each other.

While building each scenario it is important to keep it doable and not aim for goals or ideas that cannot be fulfilled.

Finally, through Bizagi Modeler, and gathering all the relevant scenarios, one can build the TO-BE model which is the final model to be proposed as the improved model to the organisation.



## 4. ON FIELD APPLICATION OF THE THEORY

### 4.1. PROCESS DISCOVERY: RECRUITMENT PROCESS

It has already been explored in this thesis the line of events that have been proposed to be followed for the application of the theory. It is also the line of events that is going to be used in the field work ahead. The process is already identified, the recruitment process of Doe Consulting.

The method of data retrieval, as specified, was through interviews. The questions were already presented in the thesis. The target interviewees in order to assure the quality of the data are all collaborators that have tasks and responsibilities within the recruitment process. To all collaborators that were part of the interview step, the questions were kept the same for all of them, that way coherency can be ensured. The overall objective was to perceive how each collaborator sees the process and how each collaborator contributes to the conclusion of the process, as well as the personal view over what could be improved in the process to better their day-to-day tasks regarding the process.

Through the interviews and the assessment of the information resultant, the overall recruitment process was separated into two: the insourcing recruitment and outsourcing recruitment.

Insourcing recruitment refers to all situations in which there is an opening within Doe Consulting for a resource. Outsourcing recruitment, however, is for the situations in which an external organisation (a client) hires Doe Consulting to recruit a resource for a position in need in their own organisation. These processes were separated and will be treated separately since the agents for both processes are not all the same.

Both processes have the Recruitment Team and the Employee Support Team (from Human Resources) in common. On the other hand, the agents that relate to more technical and decision-making tasks in the process are different. From these established agents the Insourcing Process has the addition of the People Manager and Administration and the Outsourcing Process the addition of the Client and Delivery Manager.

Now that the interventions of the processes are settled, let's explore a bit into the general responsibilities of each profile, keeping in mind these are about the process as they existed in the moment AS-IS.

*Recruitment Team:* This team will be responsible for finding all the prospect candidates for the open positions, whether they are for an insource or outsource resource. Within their responsibilities the Recruitment Team must, after finding candidates, interview them to deem them able to continue the process. This part of the candidate assessment focuses solely on the candidate's soft skills.

*Employee Support Team:* This team only intervenes in the process for the writing of the contract; therefore, this team holds the delivery of legal responsibilities in the process, making sure the contract will be up to the organisation's standards.

*People Manager (For insource resources only):* The people manager is commonly one person, the person who will be responsible and the immediate hierarchical superior of the prospect new collaborator. In that sense the People Manager will be responsible to assess all the able candidates in their technical knowledge and choose the candidate that should fill in the position.

The People Manager will also be responsible for the elaboration and presenting the financial proposal to the Administration and later to the candidate.

*Administration* (For insource resources only): This team will only intervene in the process with the responsibility of analysing and approving the financial proposal by the People Manager.

*Delivery Manager* (For outsource resources only): The Delivery Manager holds the same responsibilities as the People Manager in the process, the only difference would be that once employed the candidate will have another direct manager at the client's.

*Client* (For outsource resources only): Not only is the client the recipient of the new candidate (in the outsource process), but the client holds the responsibility of analysing and approving the financial proposal by the Delivery Manager.

#### **4.1.1. AS-IS: Insourcing Recruitment Process**

The model for the process, designed in Bizagi Modeler can be found in the Appendix (figure 4).

The Process is first triggered when the People Manager sends a request for a new resource, this e-mail must contain information regarding the needs of the position in need of fulfilment such as the department, business role, responsibilities and tasks expected.

The Recruitment Team receives this request and registers it on Doe's data base. The recruitment part of the process then starts when the Recruitment Team searches within the organisation a collaborator who has a matching profile and is free in the moment of search, if none is found then the Recruiter has to do a second search but outside of the organisation. The second search counts in channels such as LinkedIn and others, however it takes much longer, Doe Consulting has found that the work market is quite saturated in Portugal, with lots of search but not enough offer, delaying the process of finding someone who is interested and available for the position.

After the recruitment team has their pool of candidates, the first interviews start. In this first interview, each candidate has a conversation with a Recruiter in which the candidate's soft skills are assessed. From this interview the Recruiter must write an interview report and send it along with the candidate's *Curriculum Vitae* to the People Manager.

Before the candidate is taken further in the process the People Manager analyses the information given by the Recruitment Team and decides if the candidate is appropriate for the position, if so, the process continues and the People Manager conducts a Technical Interview where they can assess if the candidate is a good fit, like the first interview the People Manager is expected to write an Interview Report. In case the candidate is not a good fit for the position taken into consideration but is a good fit for another position open in the organisation, his file is transferred to the People Manager or Delivery Manager in charge of that position.

If the candidate hasn't been discarded and is still being considered for the position, the People Manager will draft a financial proposal (called financial within the organisation) and present it to the Administration Board who approves it and gives their final approval on the candidate or not. If the proposal is not approved, it goes back to the People Manager who will alter it and present the new one until it's approved. Once the financial proposal is approved the People Manager calls the candidate to make the offer. The candidate either accepts it or not, in the latter case the candidate is still entitled to a counteroffer before they is no longer considered for the position.

From this point forward the process was **not** standardized in the organisation and the modelling was made taking into account the interviews that were conducted in the retrieving data phase.

If the candidate accepts the offer given the process moves on to the hiring phase, in which the recruitment team sends an e-mail to Employee Support with all the personal information and documentation needed for the writing of the contract. An important detail to make note of was that at the point of the process modelling Doe Consulting did not have any template for their contracts.

After the contract is written with all due information, the Human Resource's Recruiter sends an e-mail to the candidate to schedule the time and date for the contract signing. This last task leads to the end of the recruitment process and initiates the organisation's joiner process, which is outside the scope of this thesis.

#### **4.1.2. AS-IS: Outsourcing Recruitment Process**

The model for the process, designed on Bizagi Modeler, can be found in the Appendix (figure 5).

The Outsourcing Recruitment Process is very similar to the insourcing. In this process Doe Consulting is recruiting a resource for a client instead for themselves. In consequence, like already mentioned, the active agents of the process are not the same of the last process. However, the process is triggered similarly, the profile of the of the wanted candidate is written by the client therefore what triggers the process won't be the writing of the profile but the reception of the profile by the Human Resources team.

The few following tasks are going to be the same as the insourcing recruitment process. The Recruiter first looks within the organisation for a resource fitting the profile and then through the outside channels. After that the Recruiter will conduct the soft skills interview with the prospect candidate and write the report to send the Delivery Manager who based on said report decides if the candidate is appropriate to fulfil the open position or not. In negative case, there is still the chance the candidate might be appropriate for another open profile in the organisation, his file is transferred to the People Manager or Delivery Manager in charge of that position.

Like the previous process, in case the candidate is taken further in the process, the Delivery Manager will proceed with the technical interview for which they must write the interview report with all important notes and details on said interview. From this interview the Delivery manager will decide if the candidate is appropriate for the position.

For the candidates that move forward the Delivery Manager will write the financial proposal. For this process the Delivery Manager will have a wage level table given by the client from which they should consult for the draft of the financial document.

The proposal is finished the Delivery Manager sends it to the client to be approved, in most cases the proposal is approved, given the Delivery Manager used the values in the wage level table. In the off chance the client does not accept the financial proposal the Delivery Manager will have to re-do it until it is accepted by the client.

The Delivery Manager contacts the candidate to offer the proposal, in the outsourcing recruitment process, opposed to the insourcing recruitment process, if the candidate does not accept the offer there is no space for change except in very rare occasions. Hence, if the candidate doesn't accept the financial proposal they will no longer be considered for the position.

On the contrary, if the candidate accepts the financial offer, the process moves to the contractual phase of the process, which is made on the client's side, so the last step on Doe Consulting side is to send all the information the client needs to proceed with the contract.

#### **4.1.3. AS-IS: Early Insights**

Process insights at this point in the project are too premature for no analysis has been made. However, there are certain points that can be noted for the build of the TO-BE and the analysis ahead.

First, the process is in dire need of a standardized and design of the end of the process. Once again, it was presented one of the ways the process is being conducted but it is important to set a way to proceed so all collaborators can follow the same steps in the process. This minimizes problems in the process such as delays.

Second, it is important to also note that the interviews showed that the standardized part of the process is being followed homogeneously throughout the organisation, which made the design of the processes a smooth task and eases as well the implementation plan for the TO-BE versions of the processes. It also indicates a certain health in the organisation's process management.

Lastly, the two processes are very similar, with very small changes between the two. The two main changes between the Insourcing Recruitment Process and the Outsourcing Recruitment Process are that for the latter there is one less resource in use from Doe Consulting: the Administration Board Member, since it is the client the one in charge of approving the financial kit and also the gateway that exists right after the evaluation of the financial kit proposal will also be different since for each client the Delivery Manager will have a table to guide themselves from, making the veto of the financial kit less likely to happen.

However, one important thing to have into account is that the exchange with the client will take time, so even if Doe Consulting is not spending their own human resources the time resource is still a variable. The time that will take the client to give an answer is roughly the same time than it takes the Board Member to answer the proposal. According to Doe Consulting collaborators the clients usually do take a little longer but it is less likely the Delivery Manager has to re-do the financial kit, evening out the time differences.

Therefore, when considering the simulations for process analysis the Insourcing Recruitment Process can be the sampler model for the application of scenarios and simulations in order to best assess the changes needed in the process and consequently build a TO-BE model. It should then be possible to extrapolate these changes to the Outsourcing Recruitment Process and build the TO-BE model.

Nevertheless, let's not assume that the processes are intrinsically so similar in their analysis that the prior hypothesis can be applied. With the insights from the AS-IS processes it shall be confirmed if the processes will have to be treated separately or if everything can be applied to the Insourcing Recruitment Process and then extrapolated to the Outsourcing Recruitment Process.

Either way, it is important to keep both processes similar in their tasks in the TO-BE model as to make it smoother and easier for the agents of the process. If the processes wind up being too different it will only bring more work to the collaborators and more friction when trying to implement the changes, especially since the models as they are, are quite similar (task wise).

## **4.2. PROCESS ANALYSIS**

### **4.2.1. Simulations: The Set Up**

The simulations of the AS-IS of the recruitment process, like mentioned, needed some data input before getting any sort of results back.

Starting from the beginning of the process. The trigger event should have a maximum entry number of thirty instances (30) for it was the average told that the process would have per week by the recruitment team in the interviews. However, the way the process must be modelled in addition to how Bizagi Modeler works, thirty instances in the beginning of the process will not translate into thirty employed candidates. The main reason being the gateways where the process might lose some instances. Therefore, when analysing the process through the simulations it's important to keep in mind that the thirty instances are a base line and it's the number of finished instances (the ones that reach the desired end) that in fact reflect the process from beginning to end and the employment of a new collaborator.

Henceforth thirty shall be the number used for the trigger events of all simulations in this process, to make the comparative analysis coherent. The arrival interval in minutes was done through a simple math of how many minutes a week does the teamwork (2 400) divided by the thirty instances as to have an average of time in minutes between instances (80). Reminding that the interval is going to be given by a Gaussian Distribution there's also the need to indicate a standard deviation which was set at forty (40) minutes.

For the tasks, each was seen individually, and using the information retrieved in the interviews it was decided the times and resources that translated the process as best as possible for the reality of Doe Consulting. One thing to note is that even though Bizagi Modeler has the possibility to input costs in every step and waiting time these functionalities will not be used. The first for Doe Consulting decided not to share this data since that was a point there was no need to deeper analyse and the latter because there's seldomly waiting time between tasks, it is more likely to have delays in the tasks themselves. To resolve this problematic the possible delays in the tasks were included in the ponderation of average times and standard deviations of the tasks.

Next, follows the tables with the tasks' times and resources input data for simpler reading and comprehension, differentiated between the two AS-IS processes. In addition to the data presented, a calendar was set in Bizagi Modeler to make results easily comprehended and to make time data input easier. For example, one day of work is eight hours in Doe Consulting, since the time must be presented in minutes it will be 480 minutes, if there's need to represent two days of work, it will be double that time. Because there's a calendar in place, when the results come in and the process needs x days to be performed, it is already a given that these are x working days and no more number transformation is needed to relate them so.

The calendar itself follows the work calendar of Doe Consulting. Forty (40) weekly working hours, starting at nine every weekly morning.

Table 1 – AS-IS Insourcing Recruitment Process simulation data input for all tasks

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)	Resources
Receive Request			0,1	1	1 Recruiter
Register Request	30	5	15	45	1 Recruiter
Search Candidate within organisation	60	20	40	120	1 Recruiter
Search Candidate through outside channels	2400	960	960	4320	1 Recruiter
Contact Candidate	2400	2400	480	4800	1 Recruiter
Soft Skills Interview	960	480	480	1440	1 Recruiter
Send Interview Report and CV	480	480	240	960	1 Recruiter
Technical Interview	2400	960	1440	3360	1 Recruiter 1 People Manager
Draft and Present Financial Kit	960	480	480	1440	1 People Manager
Approve Financial Kit	120	90	30	480	1 Board Member
Send Email with info	480	240	60	920	1 Recruiter
Write Contract	2400	480	1440	3840	1 Employee Support

Table 2 – AS-IS Outsourcing Recruitment Process simulation data input for all tasks

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)	Resources
Register Request	30	5	15	45	1 Recruiter
Search Candidate within organisation	60	20	40	120	1 Recruiter

Search Candidate through outside channels	2400	960	960	4320	1 Recruiter
Contact Candidate	2400	2400	480	4800	1 Recruiter
Soft Skills Interview	960	480	480	1440	1 Recruiter
Send Interview Report and CV	480	480	240	960	1 Recruiter
Technical Interview	2400	960	1440	3360	1 Recruiter 1 Delivery Manager
Draft and Present Financial Kit	960	480	480	1440	1 Delivery Manager
Receive E-mail with Answer to Financial Kit	960	480	240	1440	1 Delivery Manager
Send Email with info	480	240	60	920	1 Recruiter

There is only one more set of data input left to define, the percentages of the gateways' outputs. The gateways in the process were all defined to have an output of 'Yes' or 'No', and each was evaluated to define a percentage fitting for each decision based on the information from the interviews but also sensible judgement. Again, there will be a table for each AS-IS process.

Table 3 – AS-IS Insourcing Recruitment Process simulation data input for all Gateways in percentages

Gateway	Yes Percentage	No Percentage
Available Candidates within organisation?	25	75
Interested in a Interview?	95	5
Candidate Suitable for Position?	90	10
Is Candidate a Good Fit?	70	30
Good Fit for Another position?	30	70
[Financial Kit] Approved?	60	40
Does Candidate Accepts Offer?	85	15

Does Candidate Accepts Counteroffer?	90	10
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Table 4 – AS-IS Outsourcing Recruitment Process simulation data input for all Gateways in percentages

Gateway	Yes Percentage	No Percentage	No But is Fit Elsewhere Percentage
Available Candidates within organisation?	25	75	-
Interested in a Interview?	95	5	-
Candidate Suitable for Position?	90	6	4
Is Candidate a Good Fit?	70	30	-
Good Fit for Another position?	30	70	-
[Financial Kit] Approved?	90	10	-
Does Candidate Accept Offer?	85	15	-

**4.2.2. Simulations: The Results**

With the input data given, the simulation was run, Bizagi Modeler responds with a lot of information and at this point it is very important to distinguish what is necessary for the needed analysis.

Bizagi Modeler offers, for example, the times (means, maximums, minimums, totals) for each task, incoming instances and completed instances, and although that information might be interesting for a qualitative analysis, it is too easy to get lost in too much information.

Therefore, the main information to take into consideration won't be the values for each task but for the overall process.

To clear a possible ambiguity when looking at the information in the tables, the average time calculated to complete the process considers all instances, the started instances, whilst the minimum and maximum times only consider the instances completed. Therefore, it might happen the average is higher than the maximum time.



Table 5 - AS-IS Processes Simulations' Results; Instances completed and started, minimum and maximum time required

Process	Instances Completed	Instances Started	Minimum Time Required	Maximum time required
Insourcing	23	30	10d 21h 26m	22d 17h 51m
Outsourcing	18	30	9h 19h 38m	18d 15h 3m

Table 6 - AS-IS Processes Simulations' Results; Average time required, total time and total time waiting for a resource

Process	Average Time Required	Total Time	Total Time Waiting for a Resource
Insourcing	23d 20h 45m	548d 21h 32m	289d 29m
Outsourcing	24d 19h 59m	432d 8h 35m	224d 18h 45m

At a first look there's a few differences but when considering the few differences, or rather, the strong similarities of the processes, the results also transcribe those similarities. It can then be confirmed that in the process redesign phase the changes and different scenarios and tries can be applied to one of the processes and extrapolated to the other. In this case the process used will be the Insourcing Recruitment Process for it is the one that takes the longest and is slightly more complex for Doe Consulting, so then the extrapolation works better than if otherwise.

The results of the AS-IS simulation are now the baseline of which the goal is to improve. It is important, however, to keep a critical mind, it is evident that Doe Consulting does not take almost two years to employ twenty-three new collaborators. This is not the target of Doe Consulting; the target is to fill every open position within their own organisation and fulfil as many recruitment projects as they can for their clients. The recruitment process is one of their products and Doe Consulting employs for their clients more than the simulations show.

Ergo, the simulations are a tool to have an idea of problems and situations in the process, which tasks are causing longer waiting times and why, for example.

Looking at the simulations in a whole, a lot of time is being held at the search for candidates in various channels, this is a step that cannot be removed for the indisputable reasons. A lot of the resource waiting time for the following tasks comes from this task alone since it holds the Recruiters for a long time, such as fifty four (54) days to contact the candidate in addition to the already twenty-nine (29) days of waiting time for the task of finding the candidates.

The technical interview is also a big delayer in the process, the resource waiting time goes up to thirty (30) days. This could be because of the calendar coordination that is done between the People/Delivery Manager, the Recruiter, and the candidate. This interview is essential to assess the knowledge and technical skills of the candidate and shall not be simply removed.

Finally, something that affected the time input for the tasks and was brought up frequently was the poor communication within the organisation. The communication was to be done only through e-mail which was prone to many delays between “haven’t answered yet” and “haven’t read yet”.

### **4.3. PROCESS REDESIGN**

With the insights at hand, there’s a clear idea of what issues can be tackled for the redesign of the process. Seven different scenarios are to be presented in this thesis and each one will tackle one issue. The upcoming sections of the thesis will go through the scenarios: contextualise, explain the solution, show the possible pros and cons of each scenario and by the end a summary with the simulation results for all scenarios.

#### **4.3.1. Scenarios**

##### **4.3.1.1. Scenario 1: Introduction of CV software**

An issue that was raised both in the interviews and in the previous step’s insights, is the time that the team needs to find candidates and resume to the validation of their CVs. This portion of the process is necessary and there is no way around it, the collaborators need to find relevant candidates and then validate their CV to make sure they are adequate for the open position. This last part consumes a lot of time in the Recruitment Team.

A solution to ease this step for the Recruiters is the creation of a software for internal use only that can make an initial validation of the CVs. The software will then be able to not consider the candidates whose profile does not fit into the open position.

The software can be, for instance, created as a script that reads the files (CVs) for validation and scans it for key-words, fills in fields with information already in the CV. With some mandatory restrictions inputted by the Recruiter the software can spew out the CVs that are within the restrictions.

If Doe Consulting wanted to fill in a position for a Business Process Manager, with a bachelor’s degree in any business, natural sciences or technology area and a master’s degree in a relevant area of Information Systems, with at least one year of experience, the Recruiter can gather CVs from anyone who applies for the job and anyone they find within the organisation or outside the organisation and run them through the software. The script will actively look for the education portion of the CV and analyse if it is within the bounds of the search and return the CVs in scope. So, for example if an History major applies for the job the software will discard the candidate but keep the Physics’ major with a Masters in Knowledge Management.

This kind of software is not too complex if used a programming language that handles files and data with some ease, such as, Python, JavaScript, R, C/C++, etc.

The model for scenario one (S1) can be found in the appendix with the hypothesis of this existing software already in application as Figure 6.

#### **Pros Vs Cons**

- CV reading and validating is faster,
- Script will need maintenance,

- Recruiters will have more time to find a bigger pool of candidates,
- Does not require too much implementation effort,
- Low-cost solution.
- Bugs in the Script,
- Might occur that a potentially good candidate will be overlooked if their CV written as expected by the script.

### Data Input Changes

All the tasks that are equal to the AS-IS model keep their data input in terms of time resources. The tasks that differ can be found in the following table:

Table 7 - Data input for the specific tasks in Scenario 1

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)
CV Gathering	1920	480	480	2880
Run CV Validation Script	0,5	0,15	0,05	2
Search For New Candidate	1920	480	480	2880

#### 4.3.1.2. Scenario 2: Introduction of a Software for Technical Interviews

The second “what if” scenario was thought to address the time spent by the People Manager (or Delivery manager in the outsourcing recruitment process) in the technical interviews. This collaborator’s tasks go way beyond the recruitment process and through the interviews with the collaborators it was perceived that often these technical interviews suffer some delay on the scheduling because of the People Manager’s other responsibilities. In addition, it does take some active time from the Recruiter who is expected to be at the meeting as a mediator.

The goal of this scenario is to reduce the time spent on this task by the collaborators of Doe Consulting, as well as automatise part of the process and give some autonomy to the candidate. The candidate will have to keep the contact and answer to an online test for technical evaluation.

The idea is to provide a link to the candidate to an online platform to perform a technical competence test according to the position this candidate is applying to. The candidate will have a fixed time frame to answer the test and the results get sent directly to the People Manager for him to analyse the answers. The People Manager can always have a less formal conversation with the candidate, if needed, to fine tune some details, and proceed with the process in case the candidate is adequate.

There are some technological solutions already in the market, for example:

**Hacker-Earth:** For Developers and others, it allows the realization of small exercises in an online integrated development environment in the chosen programming language by the candidate and the People Manager. After submission the People Manager has access to the answers given.

**SHL:** Allows a personal and technical validation of the candidates' cognitive and logical capacities with some exercises from mathematical tests to personality tests. After submission the People Manager will be given an input related to the candidate's answers.

These two solutions are quite different in their functionalities but useful in their own manner, however a software like SHL is more versatile.

The model for scenario two (S2) can be found in the appendix with the hypothesis of this software already in application as Figure 7.

#### Pros Vs Cons

- Eases the People Manager's tasks giving them more time,
- Automates the process making it more efficient.
- No longer scheduling issues between the People Manager, the Recruiter, and the candidate
- Additional costs through technological solution costs,
- Not everyone tests well which might cause the loss of potential good candidates

#### Data Input Changes

All the tasks that are equal to the AS-IS model keep their data input in terms of time resources. The tasks that differ can be found in the following table:

Table 8 - Data input for the specific tasks in Scenario 2

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)
Sends Link For Assessment	10	2	5	15
Reviews Technical Results	1440	960	480	1920
<b>Gateway</b>		<b>Yes</b>		<b>No</b>
Does the candidate meet the base requirements set?		90		10

#### 4.3.1.3. Scenario 3: Resource Reallocation

After the quantitative analysis of resources, more specifically resource utilization, it was observed that the Employee Support team has a low utilization rate. Although there's the acknowledgement that this team's daily tasks go beyond this process, both the Recruitment Team and the Employee Support Team are part of the same department, so the idea is to move only one resource from one team to the other.

The Recruitment Team has high values of utilization rates so even just the addition of one resource might be a big game changer. With the extra resource the pressure on the Recruitment Team eases and so the process also becomes more fluid.

One of the major issues reported during the data retrieval interviews is that Doe Consulting loses a lot of potential candidates because of delays on the process, which lead to delays on contact and feedback to the candidate. Often, once Doe Consulting contacts the candidate again they are either already freshly employed elsewhere, or they are just no longer interested due to the long wait. Since this scenario sees the acceleration of the process this is a big issue that is going to be tackled. All the scenarios in their essence will help this issue but since this one allocates a resource to the team that is responsible for contacting the candidate and scheduling meetings and giving feedback, it will be the scenario that most influences this issue.

The model for scenario three (S3) can be found in the appendix as the same as the AS-IS. The only change will lie in the total number of resources for Recruiters (plus two) and Employee Support (minus two).

#### Pros Vs Cons

- Lower rates of candidate dropouts,
- Less pressure on the Recruitment Team,
- Faster process
- One less resource on the Employee Support Team,
- Collaborator training needed,
- Collaborators might not want to change their roles.

#### **4.3.1.4. Scenario 4: No Middleman**

Given the same circumstances that brought the necessity of the previous scenario to its creation, a different scenario which can stand on its own as an alternative or work simultaneously as the previous one was conceived. This scenario, unlike the previous one, doesn't rely on moving resources from one team to another, however it has into account the same Quantitative Analysis of resource use.

The tasks where these two teams must exchange information have been identified as bottlenecks for the time Employee Support takes on their tasks even if reduced in number. The Employee Support team needs for the drafting of the contract, the candidate's data, and the financial information, which have to be delivered by the Recruitment Team.

This scenario passes these tasks to the Employee Support Team. The People Manager will send the financial directly to the Employee Support Team (as well as the Recruitment Team) and then the Employee Support can retrieve the candidate's data from the database where the Recruitment Team stores it at the beginning of the process.

The model for scenario four (S4) can be found in the appendix with the hypothesis of the team of Employee Support taking on the task of retrieving/receiving the data directly already modelled as Figure 8.

#### Pros Vs Cons

- No necessity to move resources between teams
- Will ease the bottleneck and make the process more fluid
- The template for the candidate data input in the data base might have to be altered for these necessities

#### Data Input Changes

All the tasks that are equal to the AS-IS model keep their data input in terms of time resources. The tasks that differ can be found in the following table:

Table 9- Data input for the specific tasks in Scenario 4

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)
Add data to the DB	30	15	15	60
Send E-mail with Financial Kit	15	5	10	40

#### 4.3.1.5. Scenario 5: Introduction of Ticketing Pipeline Tool

The fifth scenario, it's the last one that offers the idea of the introduction of a new software. It comes in the succession of the previous scenario for it introduces the idea of having a software that helps manage the information of the candidates and even prospect candidates. The software would be able to integrate several of the tasks in the process. This was also an idea that was brought up by the collaborators that work in the process as an improvement needed in the process. A big justification for this need was the fact that a lot of the contact between agents of the process is still done by e-mail which is unsafe (in a cybersecurity point of view, since there are documents with sensible information sent between collaborators) and sluggish (a collaborator might not see the e-mail right away, or answer within an optimal time frame, further delaying the process itself).

On a side note, incorporating the ideas of the collaborators will make the implementation phase easier, not only because it brings them the needs, they ask for but also because it includes them in the whole Process Improvement process. Therefore, this is a scenario considered with much thought and credit.

In that sense, the big goal of this scenario is to find a technical solution that will integrate the activities of the process as a candidate activity pipeline, ensuring that all comments and information can be transmitted in a centralised manner, giving all process agents an overall vision of the process and its status. This way, it is possible to impact the efficiency heavy phases of the process, powering it up.

Even though, this project doesn't focus on costs, it is always important to take them into account as to not present the client (in this case Doe Consulting) a solution that is doable. The scenario lies the premiss of value versus cost. The cost of the software will be lower than the value that the software brings to the process and to the organisation. The value here not only as the functional and social value but also monetary value. The process will be faster, and more efficient, making the team be able to take on more requests (Martins & Zacarias, 2017).

Example of softwares that work for the needs of this scenario could be: Carerix, Atlassian, Agile, TalentNest and JazzHR.

The model for scenario five (S5) can be found in the appendix with the hypothesis of this software already in application as Figure 9.

#### Pros Vs Cons

- Swifter process
- Team will be able to take more requests with less hassle
- More direct profit
- Fulfils needs appointed by the team
- Cost of software
- Collaborators will have to learn a new tool

#### Data Input Changes

All the tasks that are equal to the AS-IS model keep their data input in terms of time resources. The tasks that differ can be found in the following table:

Table 10 - Data input for the specific tasks in Scenario 5

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)
Open Ticket	45	15	30	60
Contact the Candidate	240	200	20	480
Write and Attach the Interview Report and CV	480	480	240	960
Draft Financial Kit	900	400	400	1200
Attach Financial Kit	10	5	2	15
Pass Ticket	0,3	0,1	0,1	0,9

#### 4.3.1.6. Scenario 6: Financial Kit Approval Meeting

A qualitative analysis of the process can right away indicate that the loop of the approval of the financial is not very efficient. The communication between the People Manager and the board member is done by e-mail causing delays on its own. Then if the candidate or the salary kit is not approved the People Manager has to re-do the proposal with only the information that the board member gives in his response, if any.

In this scenario, instead of the back and forth of e-mails (and please note that for the outsourcing recruitment process this is not such a big issue since the collaborators have a table from where they can guide themselves), and quite possible denial of proposal, the People Manager meets with the board member in order to present the results of the technical interview and his own insights of the candidate and propose the financial kit. In this way both collaborators can reach a decision together. If all is okay the process moves forward, if the board member sees fit, there are changes that can be applied but the People Manager will have the tools to change whatever is necessary and proceed with the process instead of having to go back to the board member.

In terms of scheduling the many board members can take once a day in turns one hour for the meetings with the People Managers in order to make it easy to schedule.

The model for scenario six (S6) can be found in the appendix with the hypothesis of the meeting between the People Manager and the board member already in place as Figure 10.

### Pros Vs Cons

- There will be no need to go back and forth between the People Manager and the board member for the decision of the candidate and the approval of the financial, cutting time in the overall process
- Will force the People Manager and board member to align schedules

### Data Input Changes

All the tasks that are equal to the AS-IS model keep their data input in terms of time resources. The tasks that differ can be found in the following table:

Table 11 - Data input for the specific tasks in Scenario 6

Task	Time Mean (mins)	Standard Deviation (mins)	Minimum Time (mins)	Maximum Time (mins)	Resources
Technical Interview	120	90	30	480	1 People Manager
Results Brief Meeting					1 Board Member
Changes Financial Kit	40	10	30	60	
<b>Gateway</b>	<b>Yes</b>			<b>No</b>	
Software returns any suitable candidate?	70			30	
[Financial Kit] Approved?	40			60	



### 4.3.1.7. Scenario 7: Standardised Process Ending

This scenario has been, since the beginning of the modelling phase, a scenario that is necessary. The organisation does not have a standardised manner to work the last steps of the process. Even some past scenarios, one of the reasons they are easily do-able is because Doe Consulting doesn't follow a defined process, therefore anything that is implemented will be a change from what it is now.

This scenario is then as simple as, defining the ending of the process for everyone to follow. This scenario will follow the good practices in addition to what the collaborators "usually" do, that way it will be in conformity with inside norms, efficient, functional and easy to implement.

The model for scenario seven (S7) can be found in the appendix with the ending modelled as a finished proposal for the TO-BE model.

#### Pros Vs Cons

- For this final scenario there's only pros:
- The process will be standardised,
- The process will be easier to learn for new joiners,
- The process will be homogeneous throughout time,
- Everyone will follow the same guidelines for the process.

### 4.3.2. Comparing Scenario Results and Preparing the TO-BE Model

After all the preparation needed to reach this point, the simulations have been run and the results have been summarized in a table for convenient reading. The AS-IS simulation was also included to make comparison with said model easier.

Table 12 - Table with results from the scenario simulations

Scenario	Instances Completed	Instances Started	Minimum Time Required	Maximum time required	Average Time Required	Total Time	Total Time Waiting for a Resource
AS-IS	23	30	10d 21h 26m	22d 17h 51m	23d 20h 45m	548d 21h 32m	289d 29m
S1: Introduction of a CV Software	20	30	8d 10 3m	28d 6h 25m	26d 18h 9m	557d 5h 18m	259d 2h 27m
S2: Introduction of Software for Technical Interviews	21	30	6d 4h 6m	16d 14h 5m	16d 20h 40m	354d 2h 14m	146d 17h 53m
S3: Resource Reallocation	23	30	9d 15h 20m	22d 18h 55m	22d 12h 40m	518d 3h 41m	239d 6h 45m
S4: No Middle Man	17	30	9d 23h 51m	20d 22h 14m	26d 10h 3m	501d 23h 10m	266d 15h 26m
S5: Introduction of Ticketing Pipeline Tool	25	30	5d 5h 32m	21d 14h 26m	19d 6h 7m	481d 9h 7m	233d 17h 52m
S6: Financial Kit Approval Meeting	20	30	2d 2h 31m	17d 21h 46m	8d 15h 55m	251d 5h 57m	125d 7h 44m

At first sight the changes made that affect the gateways in the second and sixth scenario (S2 and S6) do

not have a lot of impact in the completed instances. For the analysis, this has a very important take; for whenever in a scenario a gateway that leads to an end event is introduced there's the risk of losing extra instances in the process, making it less effective and therefore the exact opposite of what one is looking for. In this case it would be discarding potential candidates that otherwise could be suitable.

The introduction of these scenarios, S2 and S6, which lead to changed gateways or extra gateways, do not really affect the exclusion of candidates, one can see that the completed instances is well within the mean range of the rest of the scenarios, with a slight dip for the fourth scenario (S4) which upon closer inspection was just a case of chance, for there were no outlier values in the full simulation. The gateways are, after all, set with percentages.

Going forward, the instances completed are going to give a helping hand on the timing comparisons, these are not as straight forward as just looking at what models took more or less time overall as it is going to be influenced by how many instances were completed.

When it comes to the minimum and maximum time, yes, but for the total times no, and why is that? Because the number of instances ran was different. At the end of running the simulation for S1, twenty candidates had gone through the whole process of recruitment and signed their contracts while for the simulation of S5, twenty-five candidates had done so. Therefore, the total time of the process for twenty or twenty-five people is expected to be different.

So, from here what do to? How to go from six different scenarios to a uniform, efficient TO-BE model? There's a lot of numbers transcribing a lot of timings but what do we do with these?

The answer is: assessment of what seems to work.

Looking at the table, one of the scenarios that quickly stands out is S2, the introduction of a software that substitutes the technical interview with a human resource, just this small change, and this is one of the scenarios that the model itself does not change much, drops all the timings. The attention goes especially to the Average Time Required and Total Time Waiting for a Resource. These are two of the most critical fields, the more the process waits for a resource the more it stays still, not moving forward, just stalling, just waiting. And the average time, reflects a better idea of how the process is going rather than the minimum and maximum, take this scenario as an example, the minimum time it took an instance to run through the whole process was approximately six days, the maximum needed was approximately sixteen almost seventeen days, the average time approximately sixteen as well. This reveals that even though there was at least one instance that took six days, most the rest of them, of most of them took longer. Also, to note that for the minimum and maximum time Bizagi Modeler only considers completed instances but for the average it considers all instances, hence why for S2 the average is higher than the maximum, this means that some instances that met their ends as "No longer being considered for the position" took longer than the maximum to be contracted by Doe Consulting.

Because the People Manager and the Recruiter don't have to find a slot together to meet the candidate, for a meeting that is long already by itself, it is not much of a surprise that this scenario returns such good results. Therefore, this is a scenario to keep close when designing the TO-BE model.

The second scenario that pops up for the same reasons as the previous scenario, a low average running process time and a low total time waiting for resources. This is the scenario that has the lowest times for these fields. The maximum time required, is of seventeen days which is within the range of the rest, further stabilising its effectiveness. This scenario makes a big change in the process, since it forces a board member of the administration to meet with the People Manager, instead of the back and forth of e-mails for the approval of the financial kit.

However, when thinking in long term this is easily remedied with a pre-scheduled weekly meeting or even a daily meeting, in which each day a different board member attends and one People Manager books that hour, as to not overwhelm the schedules of any of the collaborators. When not needed, the meeting won't take place and the collaborators just move about their workday.

It is important to note that the simulation had this taken into consideration, hence why it is not too surprising it did so well. This is a scenario in which the implementation might face some concern and friction at first for the changes it brings, but it's still an interesting one to contemplate.

Scenario 1 (S1) is also expected to do better over time, as the recruitment team builds a CV database from which to look their first pool of possible candidates (excluding the ones that apply from their own desire). For now, in the AS-IS and scenarios, the input values are for the beginning perspective when the database is still being built, then in the TO-BE the values may be toyed a bit.

Overall, all the scenarios bring some improvement to the process, but before moving on to the next step of the process redesign before reaching the TO-BE model, let's bring S4 into conversation. This scenario barely changes anything from the AS-IS model, and any changes can even be assigned to all the distributions and probabilities involved in the process. Nonetheless, this scenario will stay for the next phase, because even if it doesn't stand by itself, when mixed with others, it's true potential might surface.

Another scenario like S4 is scenario 3 (S3). The reallocation of resources did not do much for the efficiency of the process. In practical terms, even if the recruitment team could use some of the help, the fact that Doe Consulting would have to take resources from the Employee Support ends up delaying the process later on. All in all, the stand-alone use of this scenario, does not facilitate the life of the collaborators, and in return up the efficiency of the process.

The following part of the process redesign with improvement in scope is quite subjective, just like the coming up of the scenarios, there's no formula for mixing the scenarios into the first drafts of the TO-BE models. Each person will have their own ideas, their own way of logical thinking. The numbers are concrete, exact, but the way one takes them and uses the information from the simulations to build the TO-BE will change from person to person.

For this thesis there will be three intermediate TO-BE models; Mix 1, Mix 2 and Mix 3. Less than three won't explore all scenarios properly, more than three will become too many and just like the scenarios it will be too many to understand what works and what doesn't.

#### **4.3.2.1. Intermediate Model Mix 1: All Technologies and Automatizations**

The most common path when doing a Business Process Improvement project is to automatize everything that can be automatized, not to say there's no merit in automatization, in some cases

it proves to be necessary for the thriving of the organisation. Here in this project, there's seven scenarios in which six require their own models. Out of those, three are about introducing technologies but not all three are automatizations. Scenario 5 escapes this label since the idea of the software to be introduced is to ease the communication within the organisation and made classified information more secure. Opposite, scenario 1 will help automatize the part of the process of finding CVs and scenario 2 will automatize the technical interviews on Doe Consulting's side.

Given this, the first intermediate model before the TO-BE, the first mix, has been decided to be the mix of all the scenarios with technologies. The scenarios are then S1, S2, S4 and S5. It is fully expected that the S1, S2 and S5 work together and that they do end up in the TO-BE model, in which when supported with other scenarios non-tech based, will make them stronger. That will be explored with the other intermediate models. S4, however when added to S5 might be redundant in terms of modelling and not in terms of concept, because in S5 there's a ticket with all the information, it is no longer necessary for the Recruiter to put the candidate's information into a database for later use, because it should be in the ticket. Conceptually, the middleman is cut and there's a ticketing tool in use. S4 ends up being unavoidable, in concept.

For now, when using scenario 5, the databases shall be kept in the models for S4, however in terms of simulations these won't have any influence in the simulations.

All the input values were kept the same as the parent scenarios.

The model for this mix of scenarios can be found in the annex as Intermediate Model Mix 1 (Fig 11).

#### **4.3.2.2. Intermediate Model Mix 2: Enforcing a Pipeline with New Resources**

It has been discussed and explained before in this thesis that scenario 1 is a scenario that sees improvement in the long term and why and for that, that scenario will be kept in the present intermediate model and the next one as a way to verify this scenario is compatible with all the others. This because this scenario presents great potential for the final TO-BE model and is being considered as such.

Besides the use of S1, this intermediate model tries to reach the potential of S3, it was seen in the simulations that moving resources around didn't do much for the efficiency of the process, but that can change when combined with other scenarios that pull the potential of this scenario.

For this scenario specifically, the scenarios that could better pull the potential could be S4 and S5. Like said, S4 is unavoidable due to the automatizations and new technologies that are being brought into the process. However, these scenarios are important to highlight the potential of scenario 3 because they ease the task that falls on Employee Support, not in terms of work itself, but in terms of communication and information retrieval. When the Employee Support team is assigned the ticket, they automatically have access to all the information they need, already structured and ready to use, unlike before when sometimes they'd receive copies of documents, and they would have to take the information they needed from them.

The model for this mix of scenarios can be found in the annex as Intermediate Model Mix 2 (Fig 12).

### 4.3.2.3. Intermediate Model Mix 3: Optimising Communication

With the final intermediate model, the goal is to try to complement scenario six into a more optimal situation since this was a scenario that showed already great promise.

The logic to pull the potential out of this S6 is the same as the previous intermediate model for scenario 3, therefore the scenarios that are going to be used to support the model are: S1, S4, S5 and, as stated, S6.

The model for this mix of scenarios can be found in the annex as Intermediate Model Mix 3 (Fig 13).

### 4.3.2.4. Intermediate Models Mixes: Results and Insights

Table 13 - Table with results from the intermediate model simulations

Intermediate Model	Instances Completed	Instances Started	Minimum Time Required	Maximum time required	Average Time Required	Total Time	Total Time Waiting for a Resource
AS-IS	23	30	10d 21h 26m	22d 17h 51m	23d 20h 45m	548d 21h 32m	289d 29m
Mix 1: All Technologies	20	30	3d 6h 52m	12d 9h 24m	11d 2h 22m	221d 23h 22m	101d 7h 53m
Mix 2: Pipeline with new Resources	24	30	3d 2h 25m	14d 12h 56m	9d 19h 16m	235d 6h 34m	74d 14h 39m
Mix 3: Optimising Communication	22	30	3d 17h 23m	10d 23h 6m	9d 21h 9m	217d 9h 22m	103d 18h 56m

First thing to notice, and a quite positive result, is that all the intermediate models improve on the scenarios alone and consequently on the AS-IS model itself. This reveals that the scenarios work together and complement each other for the most part.

All the mixes use the same number of scenarios and all three improve overall on the AS-IS, and on the scenarios as a standalone, which means that the intermediate models didn't reach the decline line of optimization. For the TO-BE model, this is the goal point, to not go over the decline line with the new mix of scenarios.

From this point on, the TO-BE model's values don't need to improve from the intermediate models, since they might be close to efficiency decay, in fact, from this point on there must be a certain care on the TO-BE built to not go over this efficiency decay line.

Therefore, the idea from here, is to choose the scenarios to use in the TO-BE model based on the results of the simulations for the standalone scenarios and the intermediate models but also now it's important to look at the TO-BE model not just from a diagram and numbers perspective but also from what it is going to be. The new work line for the collaborators of the recruitment process.

The idea is always to make the job for these collaborators easier, and more straight forward so they can be more efficient. It is very rare that these collaborators only have one process in which they work in so any help that can be done in each process the better. Usually when changing one

process it's important to look at the processes around, that communicate with the one at work to make sure everything links together, in this case, there was no access given so the focus was given just to the recruitment process.

By helping the collaborators in their tasks, and making it less frustrating, it will improve the collaborator's work life, and overall mood when facing their profession and work. It will give them more motivation and paired with other organisation functional characteristics it will keep the turnover at a low rate. However, the happiness and content of the collaborators of an organisation is not what fuels it so let's move to the main consequences of employee satisfaction.

With the collaborators more motivated and with a process that is more efficient and easier to work with, the collaborators will be able to fulfil a lot more requests, most importantly, they'll be able to accept a lot more requests from clients bringing in more revenue for the organisation.

All in all, the belief is to make the life of the collaborators better and bringing a healthier work life in the organisation and through that give the organisation what it wants and needs, profit.

With all of this in mind, the TO-BE model will be a composition of all of the results, like mentioned, and what could be the best potential optimiser for the work line, on a collaborator point of view, possible.

### **4.3.3. TO-BE: Rationale**

Up until now, all of the scenarios' potential has been explored and explained, next, in this subsection there's the presenting of the scenarios that are in the TO-BE model and an explanation for why they were used. Additionally, afterwards, for the scenarios that are left aside, there will be an explanation why.

**Scenario 1 (S1):** A software (script) that from a pool of CVs returns those which are within the requirements for the open position. This includes CVs from potential candidates that the Recruiters find in channels such as LinkedIn and the CVs received from the open position post that the organisation does on their own website.

With time, the Recruiters will feed the database of CVs with more and more CVs, not only from the candidates they find but from those that apply and do not get hired but have potential. Given that the database will be well maintained, when there's a new open position and the Recruiter looks in the database for the CVs that fit in the profile, the database will answer will candidates and the Recruiter will need less and less to look in alternative channels for candidates, which takes a whole lot of the Recruiter's time. It is also a very frustrating step of the process for the Recruiter as mentioned many times in the interviews.

The inclusion of this scenario will see better results with time, but hopefully it will improve the process for the collaborator. In terms of efforts to implement the scenario, there's the writing of the script, which should be a fairly simple search for key-word script (could be, for example, in python, which is a programming language that is highly functional when treating data), and teaching the Recruiters how to input the requirements so they can have their, wanted output, the CVs. This last part should also be easy, as the interface should be quite straight forward.

**Scenario 2 (S2):** Introduction of a software for technical interviews. The candidate receives a link to a test like logical and technical quiz, and once they finish it the People/Delivery Manager

receives the results and answers in order to analyse them, however only if the candidate passes the minimum requires by the organisation.

This scenario is straight forward in its end game. These interviews run for about 45 minutes to one hour and a representative from the HR (usually the Recruiter) needs to be present. It was conveyed in the interviews that it was difficult on itself to conciliate the three participant's schedules, but then it also takes one hour of two resources (per candidate) for the interview and afterwards the Manager needs to review their notes, write the report, and analyse the results anyway. This way, it's less that is put on the collaborator's shoulders and if the Managers find that it is needed, they can always require an extra interview with the candidate.

Implementation of this scenario will require the acquisition of a new tool and initial time investment to set up the test.

**Scenario 5 (S5):** Introduction of a ticketing pipeline tool to the process. A tool that allows the creation of a ticket per candidate that is being considered by for the open position with all important information that follows the candidate within the process.

This scenario helps several steps of the process, but mostly it will improve the communication between the agents of the process greatly. It also modernizes the whole process.

The implementation of this scenario also requires the acquisition of a new tool, like the scenario before. These tools have a cost, but it is expected that the profits that the improved process will bring will be worth the cost.

**Scenario 6 (S6):** Meeting between the People/Delivery Manager and a Board Member or the client in order to brief on the financial kit to get it approved and/or to discuss what changes are needed in order to move forward. This eliminates the previous existing loop when the financial kit wasn't approved and had to go back to the Manager, wasting twice as much time as needed.

The implementation might meet some struggle due to the scheduling of the meetings, but it has already been discussed in this thesis a solution for this obstacle which is the arrangement fixated of time slots for these meetings. In the implementation subsection of the thesis, there will be more detail about this solution.

Ultimately, there's solutions that don't give extra costs to the organisation and reduce massively the waiting time of that section of the process.

There is only one scenario bluntly not used, but before getting to that one, there are two that indirectly are going to be active in the TO-BE model, are these:

**Scenario 4 (S4):** Because the final steps of the process were not standardised this scenario was put up for consideration because it was a way to set part of those ending steps. In the interviews, the recruitment team homogenously informed that they were the ones who usually sent the information to the Employee Support team, but it could also be the Manager. This scenario cuts this middleman, so Employee Support does not have to wait on anyone to start their part of the work, also it keeps the information more secure, given that it's not being sent from collaborator to collaborator through e-mail.

When first this scenario was thought, the idea would be that the Recruiter would put the information into a database or other information system sorted by the organisation so then the Employee Support collaborator could go to the repository directly and retrieve the information needed to write the contract.

However, by implementing S5, the middleman ceases to exist. The information is aggregated to the ticket and the Employee Support collaborator has access to the ticket and therefore to the information, without having to ask and wait for it. Hence, this scenario is satisfied, but not exactly in the way it was first thought or designed.

**Scenario 7 (S7):** Standardised Process ending. This scenario is an unavoidable consequence of the project. By setting a TO-BE model that must be followed, the process is being standardised from the beginning to the end. Hence, the scenario is satisfied.

Finally, there is the scenario that is going to be left aside.

**Scenario 3 (S3):** Resource reallocation, in which two human resources from the Employee Support Team to the Recruitment Team.

Although this scenario showed great promise and in the implementation phase and plan, advice can be left for the organisation as to get more resources to the Recruitment Team, the only issue with this scenario is the implementation. Taking two resources from one team and moving it to another implies a lot of training, changes in contracts and business roles. Implies that other resources must stall their tasks to train these new resources and these new resources have to learn their new tasks.

It might even occur that the resources do not want to move from one team to another.

In terms of implementation, it is a complicated scenario to implement, that might meet a lot of resistance. Therefore, the negative impact that this scenario might bring into the implementation, logistics, and later on in the collaborators, is not worth it for the small improvement it has in the process.

#### **4.3.4. TO-BE: Insourcing Recruitment Process**

With all the modifications decided, it is time to take the AS-IS model again and from there remodel it to the TO-BE model.

The Insourcing Recruitment Process model can be found in the Appendix along with the rest of the models as figure 14.

As for the TO-BE process the flow from the beginning through the end starts with the triggering event. The process is triggered when the People Manager opens a new request on the ticketing software with all the information for the needed profile.

The ticket is passed on to the Recruitment Team. A Recruiter picks up the ticket and starts gathering the CVs of potential candidates within the organisation, from their CV database, and at the same time CVs will be arriving from the wanted post that HR did in Doe Consulting's website and those are added to the pool of candidates. All those which are already in the database won't need to be added again, and those which aren't are added.



Once this part of the process is over, the Recruiter runs the CV validation script for the CVs in scope which returns from that pool only the ones that have the base requirements for the position.

If the script doesn't return any CV the Recruiter will have to go to secondary channels to find new candidates, these channels include LinkedIn, and other recruitment websites. However, this search is lengthy for the market is saturated and Recruiters seldomly receive a response from candidates.

As the pool of candidates is gathered, a ticket is created for each of them with a fixed set of information about the candidate that will be needed along the process, the ticket will go along the process through the tasks and every time it's needed, more information can be added to the ticket.

The candidate is contacted by the Recruiter to make sure they are (still) interested in an interview and if so, it is scheduled, if not the candidate is no longer considered, their ticket is deleted.

The Recruiter proceeds with the first interviews to the candidates, this interview is an interview to confirm and retrieve the personal information that the Recruiters need as well as to assess the soft skills of the candidate. After the interview the Recruiter will write the interview report and attach it to the candidate's ticket before passing it on to the People Manager. In the meantime, the Recruiter will send the candidate the link for the technical evaluation.

The candidate will have a deadline to complete the evaluation and once it is finished there's two options. If the candidate met the baseline requirements and expectations of the Doe Consulting the technical results will be forwarded to the People Manager, who can review them, organize them in a report and attach it to the candidate's ticket. Or, the candidate didn't meet the baseline requirements and therefore is no longer considered for the position, the People Manager is informed the candidate did not pass.

With both interview reports in hand the People Manager can decide if the candidate is a good fit for the position. It was not included in the model the possibility of the People Manager to get in direct contact with the candidate for any reason, since it is not expected to happen often enough to be relevant.

In case the People Manager discards the candidate for the open position they can still use the candidate for another open position they might have in hands.

From there, the People Manager drafts the financial kit proposal and during the next slot they has with a Board Member from the Board of Directors the meeting occurs so the Board Member can approve the kit or discuss what changes need to go into it.

If changes are needed the People Manager does them before calling the candidate, otherwise they'll just do it directly, to offer the position along with the financial kit. In case the candidate doesn't accept the offer the People Manager will have a counter offer ready to propose to the candidate.

If the candidate accepts the position along with the financial kit the People Manager attaches the financial kit to the ticket and passes it to the Employee Support team who will write the contract for the candidate. All the needed information is already in the ticket so after the contract is written the Employee Support collaborator will pass the ticket to the Recruiter again who only needs to send an e-mail to schedule the contract signing. The process finishes at this point, triggering the next process (not in scope of this project), Joiners from the identity life cycle.

For the simulations of this model here follows a table with all the input values needed for all the tasks and gateways:

Table 14 – TO-BE Insourcing Recruitment Process simulation data input for all tasks

Tasks	Mean Time	Standard Deviation	Minimum Time	Maximum Time
CV Gathering	1920	480	480	2880
Run CV Validation Script	0,5	0,15	0,05	2
Search on Outside Channels	2400	960	960	4320
Open Ticket in Ticketing Tool	45	15	30	60
Contact the Candidate	45	30	15	120
Soft Skills Interview	960	480	480	1440
Write/Attach interview Report	45	25	15	120
Send Candidate Technical Evaluation Link	10	2	5	15
Review Technical Results	1440	960	480	1920
Draft Financial Proposal	960	480	480	1440
Meeting for the Approval of the Financial Kit	120	90	30	480
Changes to the Kit	45	15	30	120
Attach Proposal to Ticket	5	2	2	15
Write Contract For Candidate	2400	480	1440	3840
Gateways	Yes	No		
Is there available candidates with matching profile?	95	5		
Available/Interested in an Interview?	75	25		
Does the candidate meet the base requirements?	90	10		
Is the Candidate a Good Fit?	70	30		
Is the Candidate a Good Fit for Another Position?	30	70		
[Financial Kit] Approved?	60	40		
Does the Candidate Accept the Offer?	85	15		

Does the Candidate Accept the Counteroffer?	90	10
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#### 4.3.5. TO-BE: Outsourcing Recruitment Process

Like it was discussed previously in the thesis, the alterations that were studied to be applied on the previous process are to be applied on this one.

The model for the Outsourcing Recruitment Process can be found in the Appendix in the figure 15.

The model follows the same steps as its predecessor, the Insourcing Recruitment Process, up to the technical evaluation.

In case the candidate doesn't meet the base requirements, during the soft skills interview the recruiter would assess the potential of the candidate for other projects and could possibly put the candidate on-hold for other projects instead of just not considering them anymore.

If the candidate does meet the base requirements the Delivery Manager reviews the results and writes the report, the Delivery Manager with both reports in hand assesses if the candidate is a good fit for the open position, unlike the insourcing process, if the candidate is removed from consideration at this point there is no further opportunities for them in Doe Consulting or in another client.

However, if the candidate moves on in the process the Delivery Manager drafts the financial proposal kit based on the Wage Level Tables provided by all the clients. Afterwards, the Delivery Manager will meet with the client for the approval of the financial kit. If the financial kit is not approved the Delivery manager will have on his side the changes needed to make to the financial kit, given in the meeting and he must proceed to do them, otherwise the financial kit can right away be attached to the ticket before the Delivery Manager calls the candidate to make the offer.

Unlike the Insourcing Recruitment Process the Outsourcing Recruitment Process does not have space for a counteroffer, only for very rare occasions, hence, if the candidate doesn't accept the offer he is removed from consideration. Otherwise, the Recruiter will send an e-mail to the client with all the information the client needs to write the contract and the process ends.

Table 15 – TO-BE Outsourcing Recruitment Process simulation data input for all tasks

Tasks	Mean Time	Standard Deviation	Minimum Time	Maximum Time
CV Gathering	1920	480	480	2880
Run CV Validation Script	0,5	0,15	0,05	2
Search on Outside Channels	2400	960	960	4320

Open Ticket in Ticketing Tool	45	15	30	60
Contact the Candidate	45	30	15	120
Soft Skills Interview	960	480	480	1440
Write/Attach interview Report	45	25	15	120
Send Candidate Technical Evaluation Link	10	2	5	15
Review Technical Results	1440	960	480	1920
Draft Financial Proposal	960	480	480	1440
Meeting for Approval of Financial Kit	120	90	30	480
Make changes to financial kit	45	15	30	60
Attach Proposal to Ticket	5	2	2	15
Send the Client	120	240	60	480
<b>Gateways</b>	<b>Yes</b>	<b>No</b>	<b>No, but they have potential for other projects</b>	
Is there available candidates with matching profile?	95	5		
Available/Interested in an Interview?	75	25		
Does the candidate meet the base requirements?	90	6		4
Is the Candidate a Good Fit?	70	30		
[Financial Kit] Approved?	80	20		
Does the Candidate Accept the Offer?	85	15		

#### 4.3.6. TO-BE: Discussion of Results

Before diving into the table with the final values of the TO-BE model, it is the important the acknowledgement that for the scope of this thesis the results on themselves are interesting but not overall the most important. It is interesting to see how much the process was improved, and that supports any implementation proposal and any model proposal that is presented to the organisation.

Nevertheless, this thesis seeks the study of a methodology that works for the needs of contemporary businesses and the field work is the support to demonstrate and back it, the results are therefore still relevant.

Finally, before presenting the result table, a reminder that Bizagi Modeler when calculating times, for the minimum and maximum times uses only the completed instances and for average uses the started instances, meaning that while the average counts all candidates, those that finish the process as employed collaborators and those that through the process get dismissed, the minimum and maximum only count the employed.

Following is the table with the TO-BE model results, both for the Insourcing Recruitment Process and the Outsourcing Recruitment Process.

Table 16 - Table with results from the AS-IS and TO-BE model simulations for both insourcing and outsourcing processes

Model	Instances Completed	Instances Started	Minimum Time Required	Maximum time required	Average Time Required	Total Time	Total Time Waiting for a Resource
AS-IS: Insourcing	23	30	10d 21h 26m	22d 17h 51m	23d 20h 45m	548d 21h 32m	289d 29m
AS-IS: Outsourcing	18	30	9d 19h 38m	14d 14h 38m	24d 19h 59m	432d 8h 35m	224d 18h 45m
TO-BE: Insourcing	20	30	3d 6h 7m	12d 7h 32m	11d 1h 46m	221d 11h 30m	96d 15h 12m
TO-BE: Outsourcing	21	30	3d 11h 51m	8d 16h 40m	9d 17h 6m	203d 23h 9m	100d 4h 33m

The TO-BE model presents good results, as expected, after the study with the intermediate models. It is also expected of the process to have a rising efficiency and prosperity line for a while as the data base for the CVs grows and the team settles into the rhythm of the new process. However, there is a limit to which the process will get better through its own cycles before stabilizing, and stabilizing in a world ever evolving, like said in the beginning is the first step to efficiency decay. In the simulations the inputs were already for this phase of the process maturity.

One thing that can be advised to Doe Consulting is to continuously take logs of their processes with vital information of the said ones to perform Process Mining. Process Mining will allow quick and informed action taking and problem solving.

The scope of the recruitment process was very precise and hence the modified BPM lifecycle to a BPM line of events, this methodology is valid for most contracted projects delivered by consulting companies and is important to highlight that ultimately the methodology presented in this thesis is for such type of projects. An outside resource comes into the client, takes the data they need, works the data, builds the models, and hands the deliverables.

Doe Consulting requested only as deliverables the TO-BE models, for this thesis, the deliverables were built but all the steps in between were also shown as they were as important for the methodology and practice of it.

Another step beyond what was asked of Doe Consulting, but which is vital for the wrapping up of this thesis is the implementation plan. In any project of Business Process Improvement, like already explored in this thesis, the implementation is the make it or break it. Either the project works and is a success or falls through and the organisation goes back to old habits.

## **4.4. PROCESS IMPLEMENTATION**

The planning for process implementation only starts after there's a TO-BE model to be implemented but change culture has been considered from the very first step of the project during Process Discovery.

It is during Process Discovery that interviews are made to retrieve the data necessary to build the processes and assess the overall change culture in the organisation. In Doe Consulting it became clear very fast that the collaborators were keen on seeing the recruitment process undergo changes. Not only was the team met with enthusiasm in the kick-off event, but the collaborators were vocal in the interviews about issues they had within the process and key points they liked to see improved.

Right away, one can see that Doe Consulting is an organisation with a receptive change environment. It won't be expected of the implementation to meet much resistance or inertia. However, it still needs to be considered that there are limits to this receptiveness and willingness to change. No one can be expected to react well to a "everything is wrong and needs to change" kind of approach, people tend to be defensive of their work even when they know changes are due.

Therefore, when conceptualizing the model nothing too drastic or too difficult to implement was chosen to be in the TO-BE model, but there were still a lot of liberties that could be taken and ideas that could be played with because Doe Consulting was so accepting of change.

This thesis does not follow the implementation step of the line of events, if it did, before working on the plan itself Doe Consulting would have to approve the TO-BE model, so for the purpose of the thesis the assumption is that the model was approved as it is presented.

### **4.4.1. Implementation Plan**

The implementation plan needs to be separated in several steps then, but while for an organisation that was reluctant on change the plan had to include motivation and positive change initiatives, extra meetings, and workshops to explain thoroughly the changes to the collaborators and in what ways these changes will help their day-to-day life, for an organisation like Doe Consulting these will not be necessary.

The implementation plan will be divided into three phases: Preparation, Dissemination, Launch and Support.

#### **4.4.1.1. Preparation**

This phase's goal is to prepare all the new technologies and tools that will be necessary in the new process. This phase of the plan does not depend directly on the agents of the recruitment process.

According to the normative and policies of the organisation the due responsible agents will have the task of choosing the ticketing tool and technology interview software and then passing on to the department in charge of purchasing to acquire the softwares. For the first, the ticketing tool, as it is a tool that will manage identities (potential candidates), and therefore has a security component to it, it is advised that the digital security department of Doe Consulting helps or is at least consulted on the choosing of the tool.

After the legal aspects and formalities of this phase are done, it is up to the IT department to prepare the softwares to be used in the process, create the accesses, users and accounts needed, etc...

In the meantime, the script for CV validation needs to be written and tested. Along with the CV script, the repository also needs to be set up so the collaborators can start putting in CVs as soon as the new processes go into production.

All in all, this phase prepares all the technologies so the move into the new process is as seamlessly as possible.

#### **4.4.1.2. Dissemination**

This phase of the implementation plan is all about informing, educating, and preparing the collaborators, agents of the recruitment processes, for the new processes.

First and foremost, the set-up of a communication meeting where the new processes will be presented to the collaborators affected. This meeting counts with the recruiters, employee support, delivery managers, people managers and the board of directors that approves the financial kits of new candidates.

In this meeting, both processes will be shown and fully explained, including connection to other relevant processes, like the joiner process. Collaborators can ask any questions they might have about the processes and after it is presented to all the teams the next steps in the implementation plan.

These steps include the workshops for functioning with the new tools, one workshop per tool with the collaborators that will be expected to be using the tool. For example, the ticketing tool will have the recruiters, employee support, people and delivery managers, while the CV validation script only requires the recruitment team.

In this phase of the implementation the weekly slots for the board members can be arranged so when the insourcing process goes live, the people managers will know what times they can book to discuss the financial kits.

By the end of this phase, the collaborators should feel confident and excited to start the new process with the new tools and softwares.

#### **4.4.1.3. Launch and Support**

The final phase of the implementation plan is the support of the launch of the new process and then support during the adaptation period, accorded with Doe Consulting. Any questions, troubles that might rise during this period will count with the support and problem solving of the implementation team.

This time is critical for the success of the project (Chang, 2006). Humans tend to stick to their habits and routines, so the creation of new routines and habits is very important to guarantee the collaborators keep the changes and do not revert into old, bad habits.

## 5. CONCLUSION AND PROSPECT WORK

From the start this thesis presents the importance for organisations and business to stay current to keep up with customer satisfaction and expectations. The expectations of the client and overall standard is always rising. Whether the client expects the product faster, cheaper, higher quality, etc...., there is always a business willing to answer to the demand, so any other that decides to stick to its ways and not evolve will lose its business and clients. Worse comes to worse, an organisation that refuses to improve might go bankrupt.

Given that any organisation to be functional is composed by a series of processes, the evolution of an organisation is the improvement of its processes, and those that directly impact the product or products the organisation offers are the business processes, the ones the area of BPM focuses on. Reminding that a product can be a manufactured object, like a book, or it can be a service, like the repair of a computer.

Ideally, every organisation would have its own Business Intelligence department, divided in teams, one being the Business Process Management team, who would be able to keep track of the processes in the company and perform improvement campaigns when needed. Yet, this is not the reality of the contemporary organisation, most don't have the means or do not want to assign the means to have these teams and hence they must outsource these campaigns, opening project proposal requests to consulting companies.

For this purpose, the thesis proposes the study of a methodology that is an adaptation of the classical BPM lifecycle given by Dumas et al., (2013) to fit the needs of a contemporary organisation. The cycle changes into a clear line of events that starts with Process Discovery. The step of Process Identification is no longer needed for this type of BPI project since the organisation in their request will identify the processes in scope for the project. The line of events moves on, through the steps of Process Analysis and Process Redesign.

These three first steps are equivalent in outcomes and activities as envisioned equally for the BPM lifecycle. The final step of the line of events, although it keeps the same nomenclature, Process Implementation, the outcomes, and goals are not the same. In the lifecycle this is the step where the implementation of the TO-BE model is applied, while in the line of events this step focus on working on a plan of implementation. A thought-out plan, for the implementation of the TO-BE model, with everything that needs to be done for the new process to work and be fully functional.

The needs that go into the planning are not just technical, like the acquisition of a new software, and teaching the collaborators the new process, but also the social needs. An organisation is run by people, people perform the processes, and people make the organisation work on a day-to-day basis. So, it is important to take them into consideration through the whole process. The improvement of the process should have in mind the improvement of the work life of the collaborators of the process. Making the collaborators happier, will consequently improve their productivity, without brooding into the productivity dilemma (Abernathy, 1978; Benner & Tushman, 2003).

The author of this thesis believes in the building of a healthy work environment with a well-balanced work life for the organisation employees, for the organisation to pursue any kind of success. In a long-term scenario, it will bring the best results for the organisation. Less turnover, more productivity, higher profits, less burnouts.



If the collaborators are then so important and such a key point in the operation of the organisation, it is of the most importance to assess how they see change and how the culture of the organisation supports change. The implementation of a BPI project must be entirely different if the organisation and its collaborators are in favour of change or against it. Being against change sometimes might not be something obvious, if in the past the organisation had changes that didn't go according to expectations, the collaborators may feel some reluctance in changing again.

The implementation plan is then only complete with the necessary inclusions to make the collaborators excited and motivated to work the new process and to make sure they stick to it once the implementation is done, and the collaborators no longer have any oversight from the consulting company that is doing the implementation. Going back to old habits is fairly easy and common, so it's important to create the new routines and habits in the collaborators so they do not revert.

This thesis had its limitations, such as not being able to test out the implementation plan or even being able to present the plan to Doe Consulting. The TO-BE model, scenarios and intermediate models of this thesis were not the ones delivered to Doe Consulting, therefore there was also a lack of approval from the organisation to be able to assess if the TO-BE model was practicable. Also, the two processes in scope were not of great complexity, especially in terms of inter-process relations.

For prospect work it would be interesting to map out a more detailed methodology given a process with more inter-process relations and dependencies, addressing the other limitations as well. Also, be able to not only draw the implementation plan but be there to apply the plan, and afterwards be able to follow the process and take logs of it to proceed to dwell into Process Mining (Lamghari et al., 2018).

Another interesting prospect work is the integration of Business Process Management and Improvement with other areas of Business Intelligence. For example, integrate Knowledge Management and social knowledge networking with BPM to find specific human resource bottlenecks, people that hold a lot of knowledge and the process depends on them because of that.

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# APPENDIX

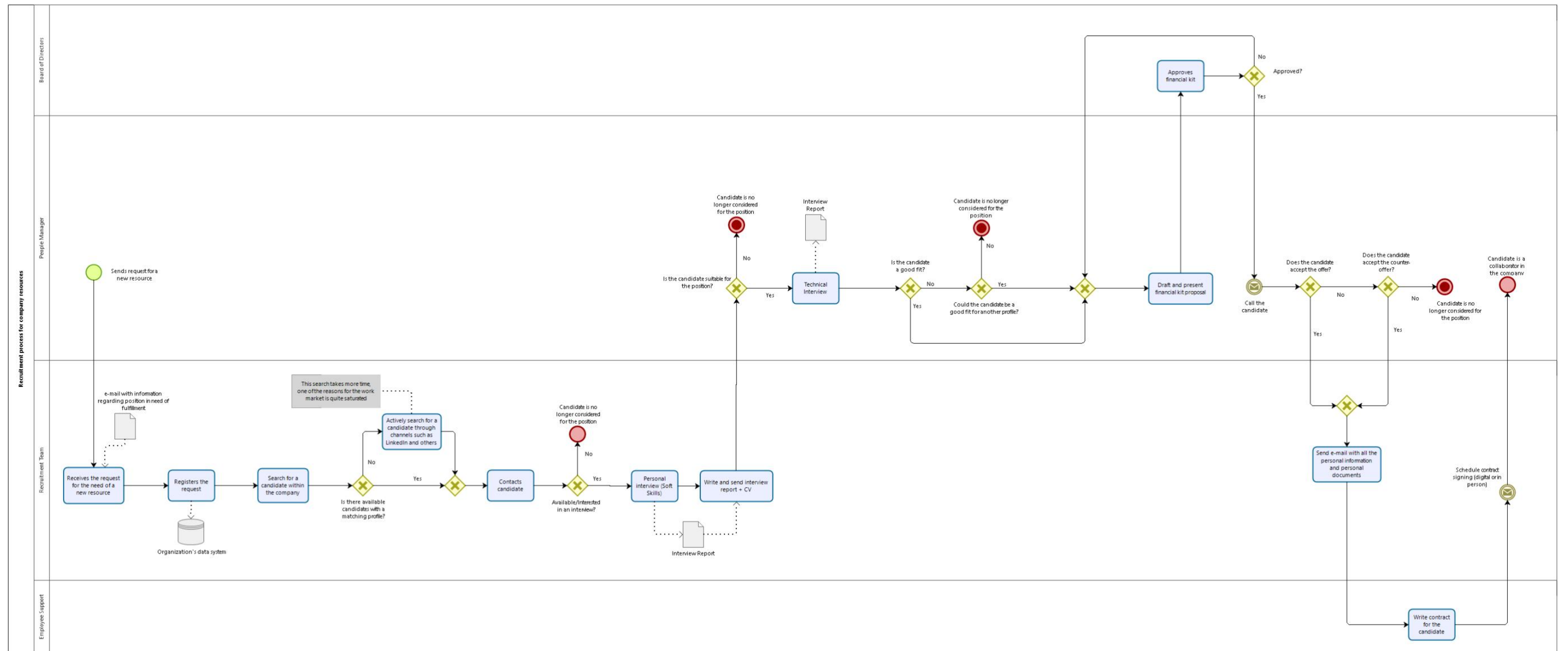


Figure 4 - Insourcing Recruitment Process AS-IS model

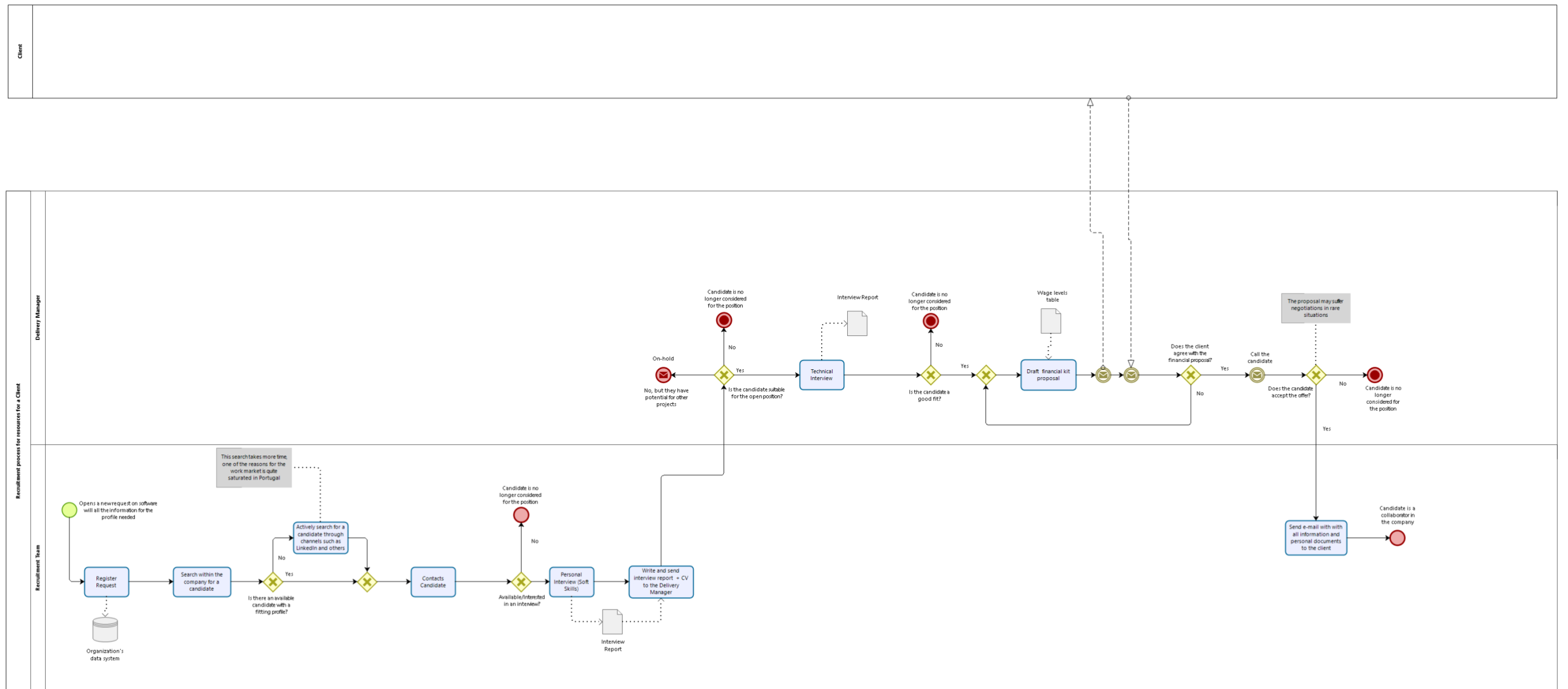


Figure 5 - Outsourcing Recruitment Process AS-IS model

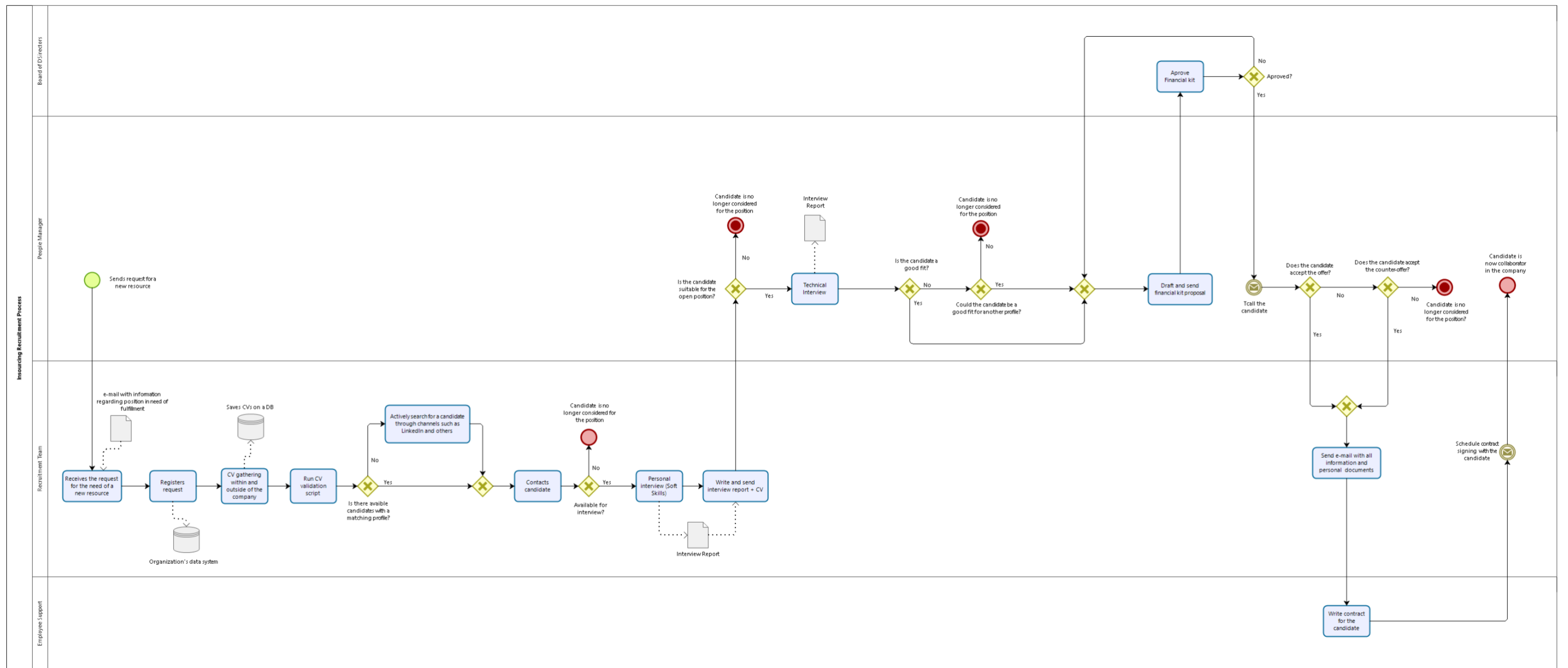


Figure 6 - Scenario 1 model (CV validation software)

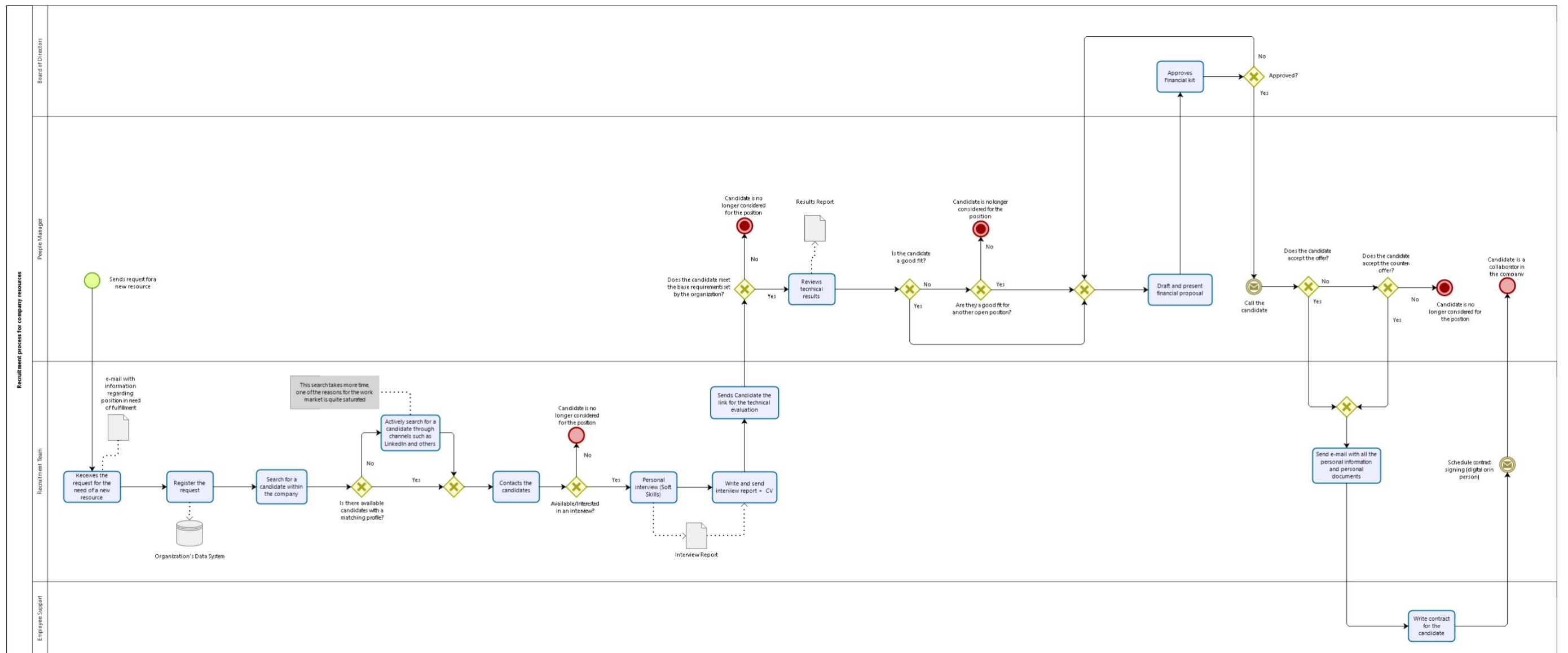


Figure 7 - Scenario 2 model (Introduction of Software for Technical Interviews)



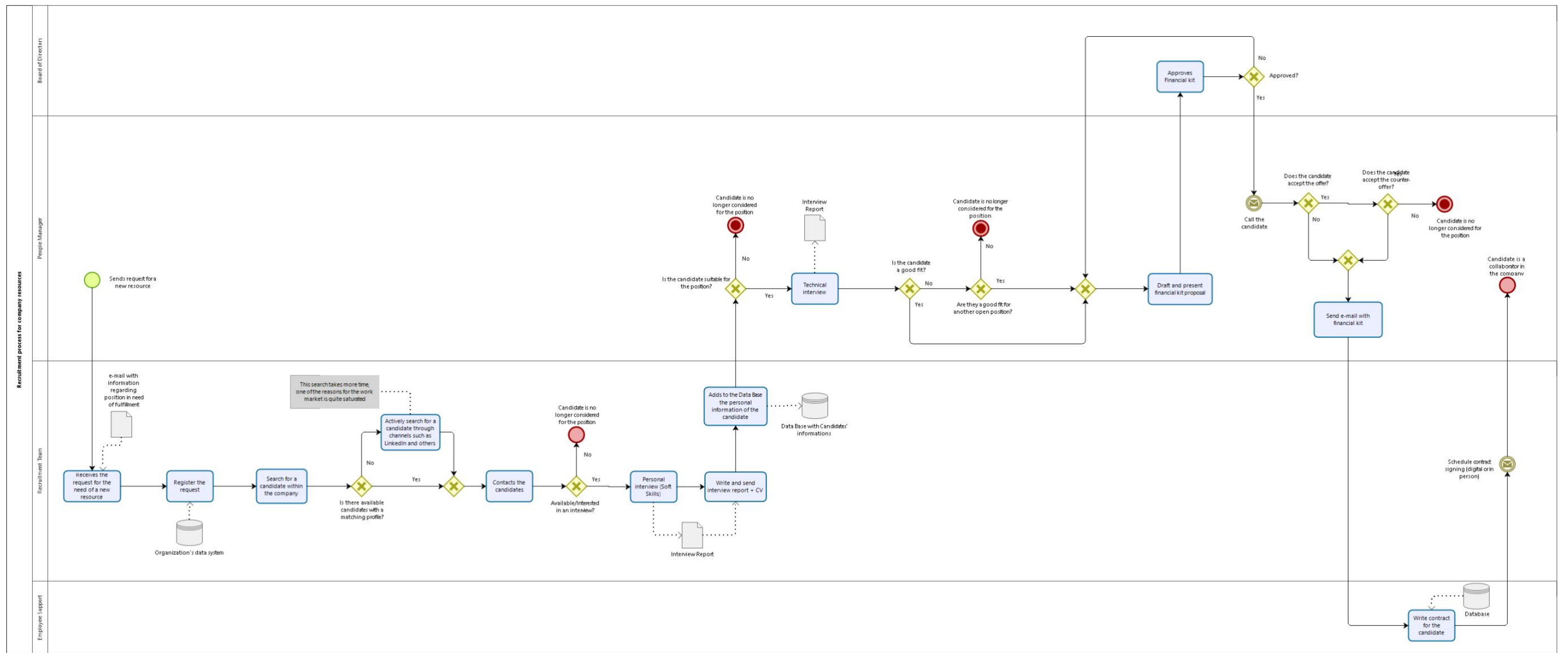


Figure 8 - Scenario 4 model (No Middle Man)

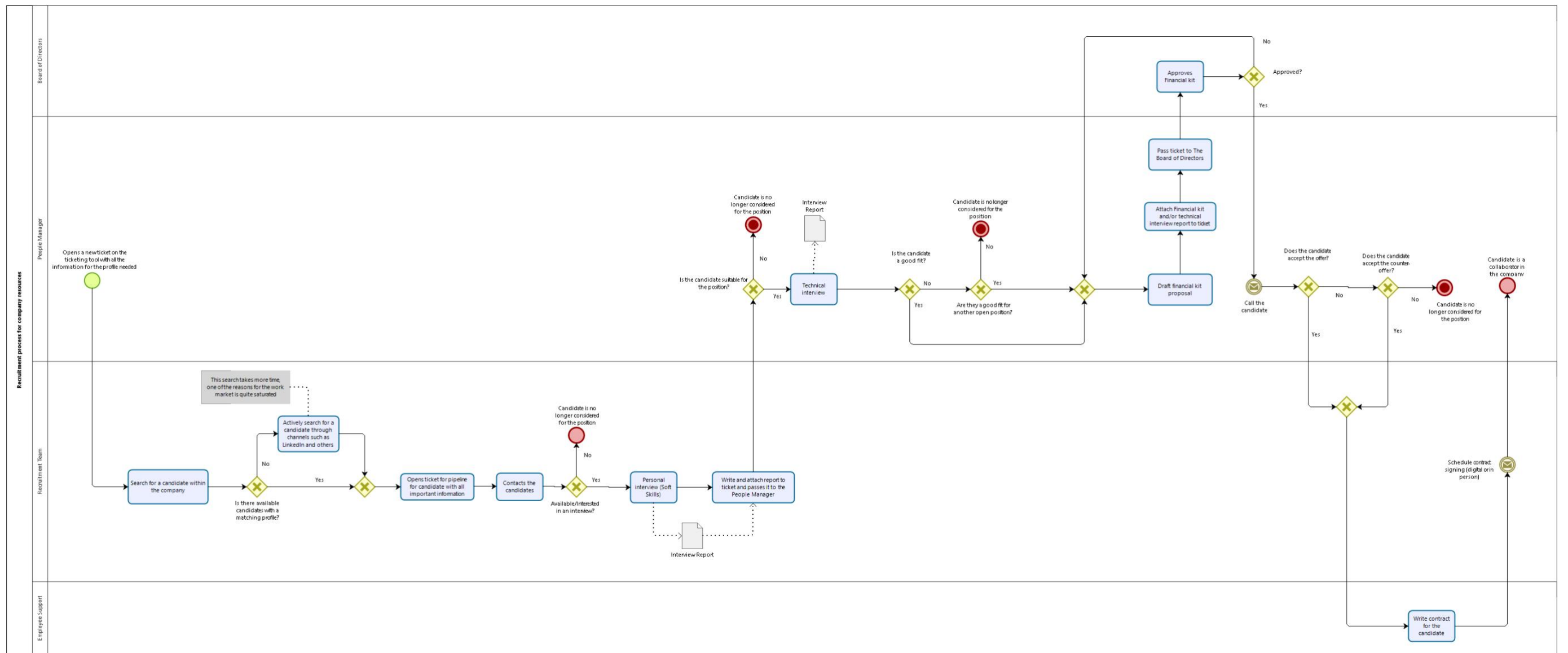


Figure 9 - Scenario 5 model (Introduction of Ticketing Pipeline Tool)

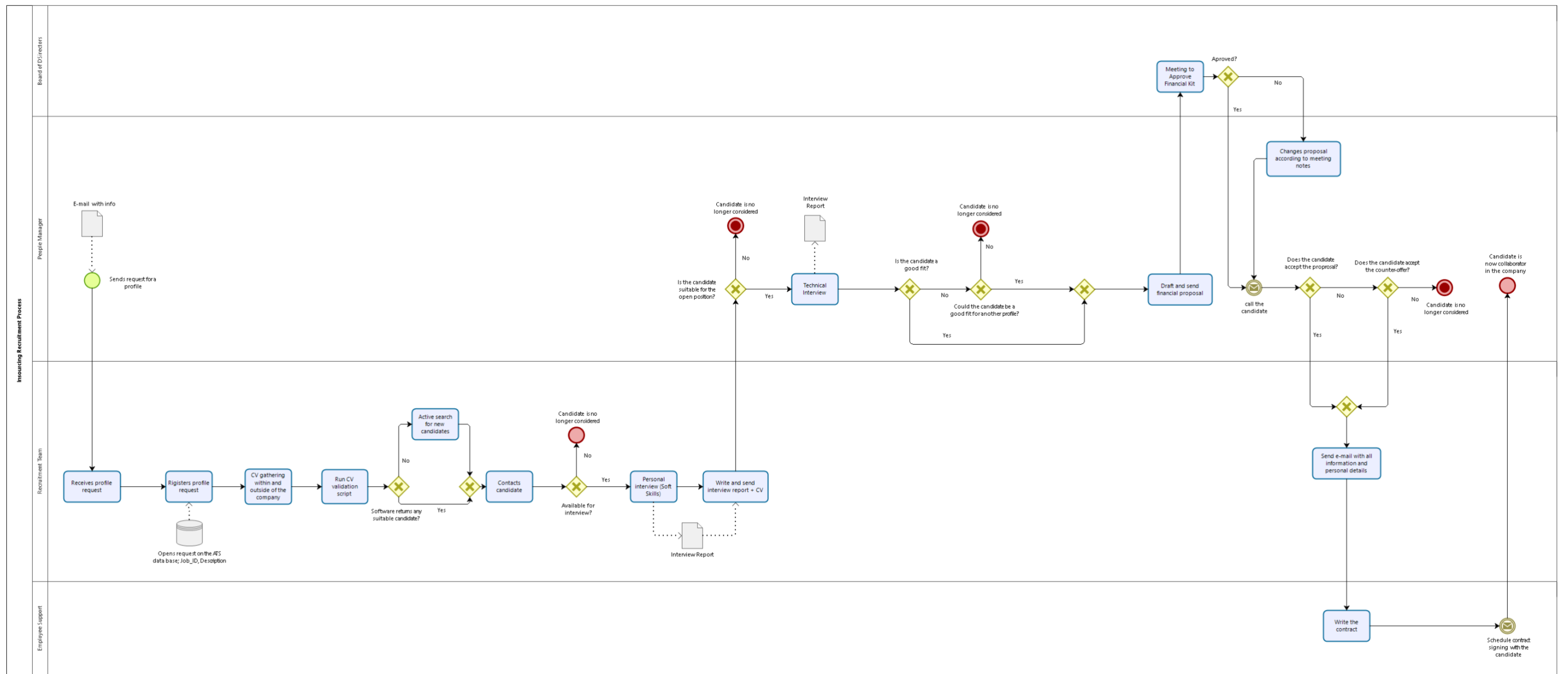


Figure 10 Scenario - 6 model (Technical Interview Result Brief Meeting)

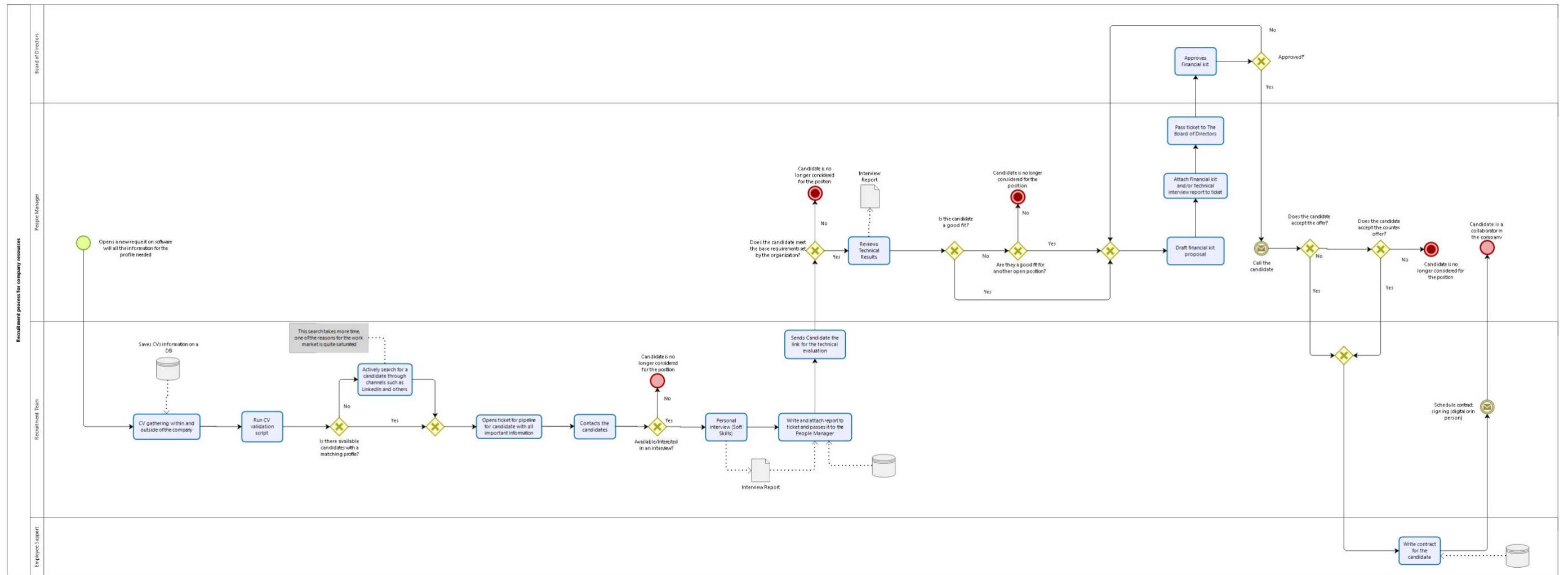


Figure 11 - Intermediate Model Mix 1 - Scenarios 1, 2, 4, 5

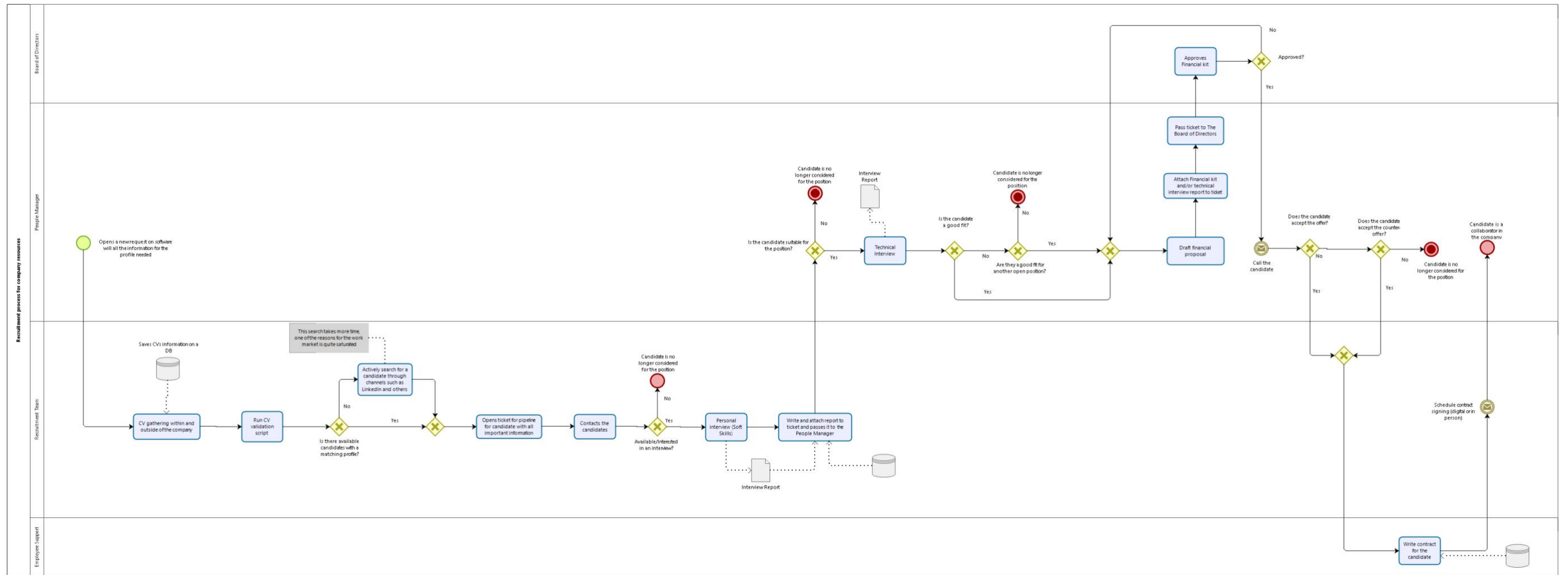


Figure 12 - Intermediate Model Mix 2 - Scenarios 1, 3, 4, 5

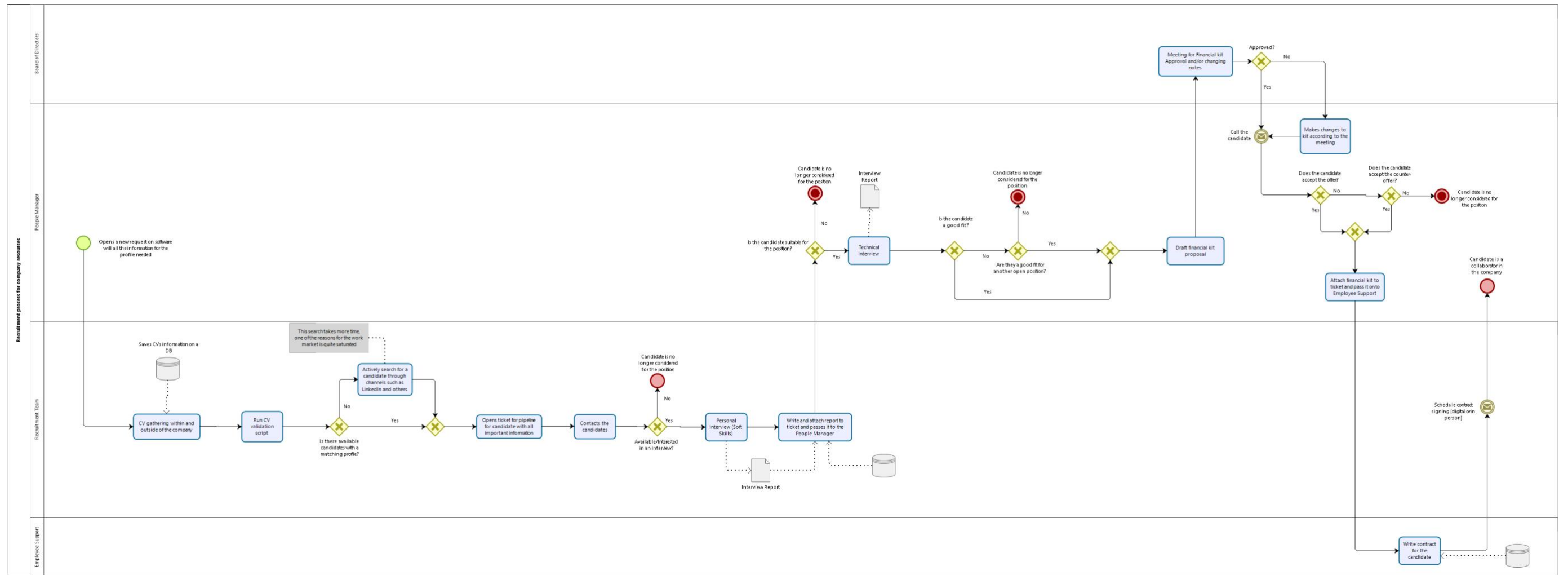


Figure 13 - Intermediate Model Mix 3 - Scenario 1, 4, 5, 6

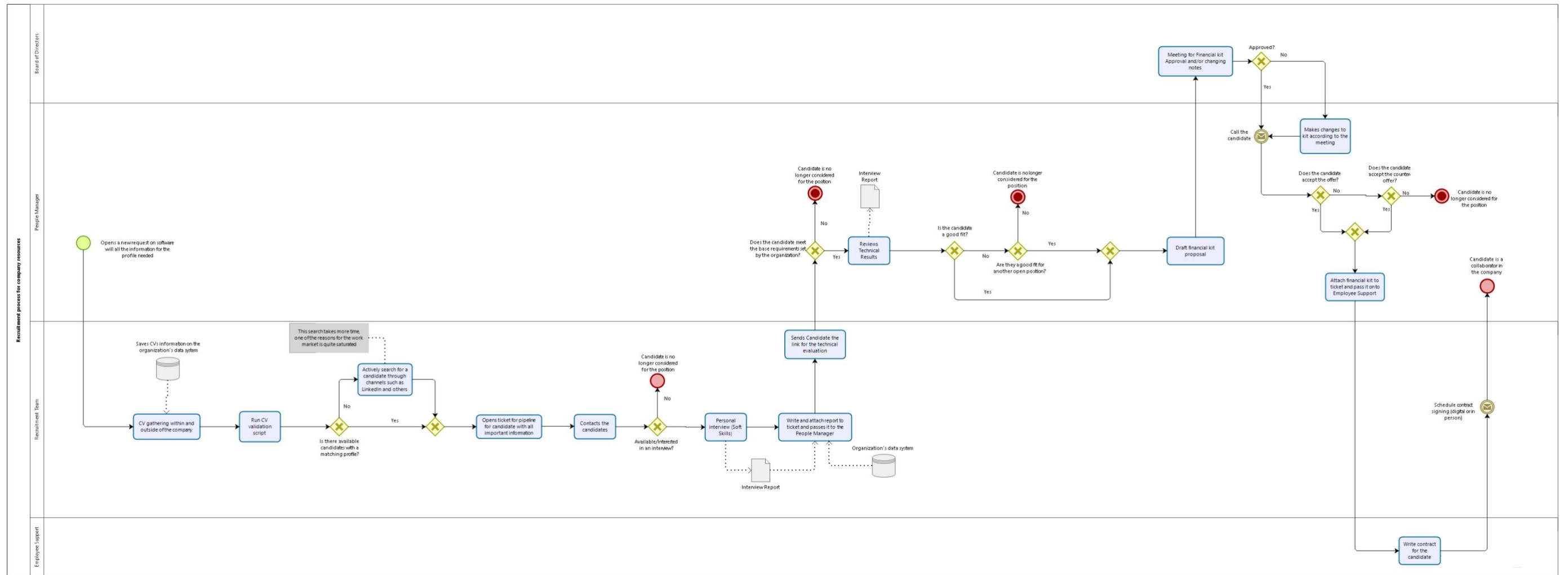


Figure 14 - Insourcing Recruitment Process TO-BE model

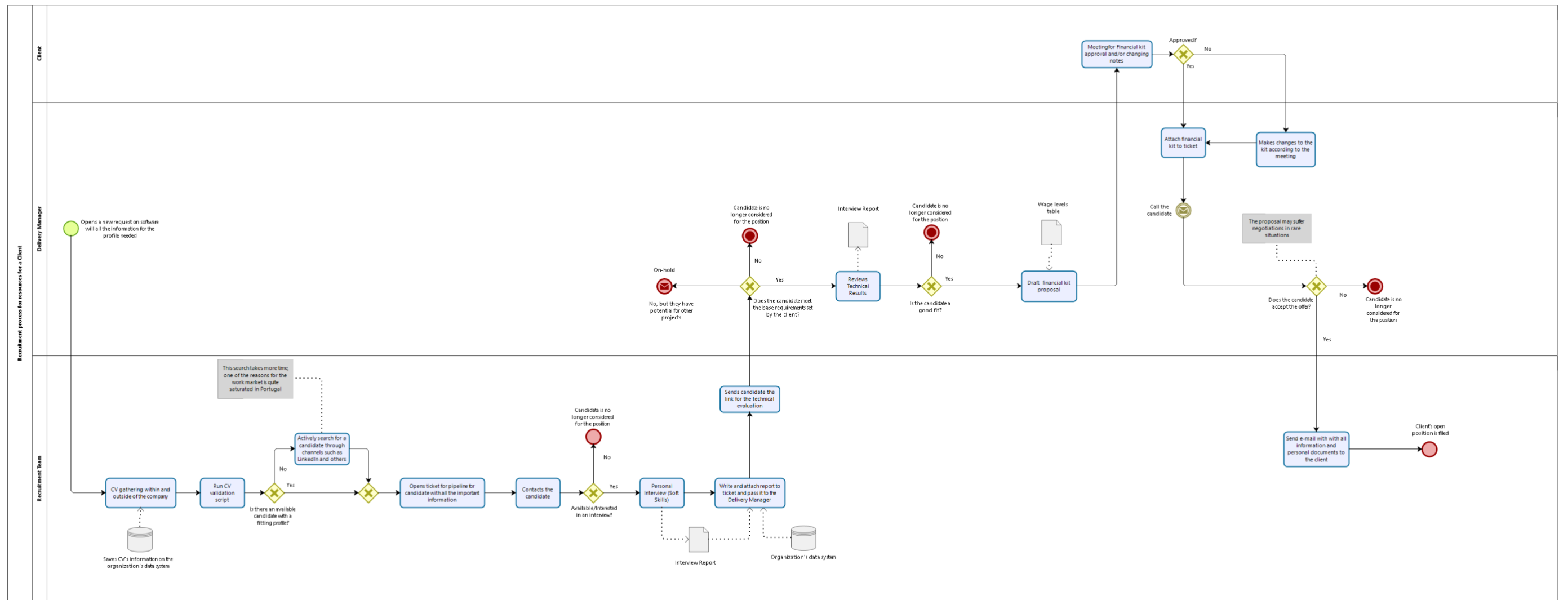


Figure 15 - Outsourcing Recruitment Process TO-BE model