Implementation of the process-based management approach: modelling and optimization of business-processes for KazTemirTrans Company

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DECLARATION

We hereby declare that this report entitled “Implementation of the process-based management approach for optimization and control of business-processes for KazTemirTrans Company” is the result of our own project work except for quotations and citations which have been duly acknowledged. We also declare that it has not been previously or concurrently submitted for any other degree at Nazarbayev University.

 / Ardana Aldonggarova

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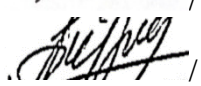 / Tomiris Abdulmanova

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Abstract

The widely known concept of the process-based management approach is based on understanding the work of any company as a set of processes that increases the value of the company's product or service. Thus, by 2017 JSC "Samruk Kazyna", the mother company of KazTemirTrans, has decided to transform its daughter company's management approach and switch from a function-based management approach to a process-based management approach. Immediate change of management approach resulted in problems in a workflow. Therefore, the Company has contacted the Capstone team to perform documentation of Business Processes (BP) for further elimination of critical moments in the workflow.

In this paper, business processes of project management office were analyzed. The work is performed in several phases. First, all business processes were identified based on unique features. After comprehensive interview conducted with the company, optimization method and critical business processes for optimization were selected. The selected processes were documented according to ISO standards and modelled in Bizagi Business Process Modeler. When the Capstone team received the "as is" model of business process, improvement plan was based on BPI methodology. And finally, "to be" models of business processes were drawn with expected results of implemented improvements along with KPIs for control.

Furthermore, recommendations were provided for KazTemirTrans based on the findings of the current paper. It was recommended to create a structural unit for business process documentation according to ISO standards. Moreover, there are 16 more departments of KazTemirTrans, business processes of which also needs to be documented and optimized accordingly. There is a need to revise the package of corporate templates, analyze and substitute when it duplicates one another. Besides, the company needs to buy the licensed and extended versions of Bizagi Modeler and MS Project. For such a big company, the integration of abovementioned software will not bear enormous costs, instead the company will benefit from increased efficiency and productivity.

Acknowledgments

First of all, we would like to express special appreciation and thanks to our supervisors Prof. Ali Turkyilmaz and Prof. Dimitrios Emiris for tremendous mentor on us. We would like to thank you, for encouraging our research and for allowing us to grow. Your advice on capstone have been invaluable.

A special thanks to our families. Words can not express how grateful we are to our families for all of the sacrifices that you've made on our behalf.

Contents

List of abbreviation

BP – Business Process

BPE – Business Process Engineering

BPI – Business Process Improvement

BPR – Business Process Reengineering

BPRD – Business Process Redesign

CSF – Critical Success Factors

JSC – Joint Stock Company

KPI – Key Performance Indicators

PM – Project Manager

PMBOK – Project Management Body of Knowledge

PMO – Project Management Office

WBS – Work Breakdown Structure

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1 Introduction

The concept of the process-based management approach has been used in business for almost 40 years: since the 80s of the 20th century. This approach is based on understanding the work of any company as a set of processes. Moreover, each of these processes increases the value of the product (or service) created at the enterprise for the client. The reason for the emergence of the process-based management approach was the predominance of supply over demand. The shortage is over, buyers have become picky, and in order to sell something, it is needed to convince the client to buy it. Customer focus has become the factor that has forced many companies to “expand" their activities by 180 degrees, putting the interests of the client at the center. Hence, this resulted in growing competitiveness on the market.

Hence, by 2017, JSC “Samruk Kazyna”, the mother company of KazTemirTrans, has decided to transform its daughter company’s management approach and switch from a function-based management approach to a process-based management approach. Immediate change of management approach resulted in the embarrassment in the communication and cooperation between interdisciplinary departments and confusion in the workflow among local managers of KazTemirTrans up to date. Nowadays, the Company has started to perform documentation of Business Processes (BP) for further elimination of critical moments in the workflow.

The Capstone team has analyzed the Project Management Office (PMO) of KazTemirTrans, which has project-based management approach by its nature, but process-based management approach by its repetitive workflow. The first phase of the capstone work was to perform the documentation of BP. The next phase is aimed at realizing the set goals and contains measures that eliminate the identified problems at previous phase. These may include too many control levels, downtime, unused capacity, duplication of work orders, errors in the transfer of information, loss of information, errors in documentation etc.

This capstone work is aimed to model the BP of PMO of KazTemirTrans in order to provide clear vision to managers, identify critical moments in the workflow and eliminate issues through further optimization and automation.

1.1 Company Background

Joint-stock company (JSC) “KazTemirTrans” company was established on October 21, 2003 as part of the reform of railway transport in Kazakhstan and is a 100% subsidiary of National Company Kazakhstan Temir Zholy, which is the largest operator of the freight car fleet of the Republic of Kazakhstan. The company's own car fleet is about 57 thousand units including covered wagons, platforms, tanks, grain carriers, and fitting platforms.

The Company’s activities cover such areas as provision of freight cars for operation, leasing of special rolling stock, storage and sale of scrap metal. Business partners of JSC "KazTemirTrans" in the field of cargo transportation are the largest transport and logistics enterprises, mining companies, small and medium-sized businesses.

1.1.1 Company’s mission and vision

KazTemirTrans represent themselves as a leading company of high standards for operating wagons, which highlights the main accent as “the needs of our customers”, based on the guarantee of the fulfilment of their contractual obligations, optimal logistics solutions and pricing policy, using the latest organizational IT solutions. The company has positioned itself as the leader in safety, leadership, ambition, pride, and responsibility for its clients.

2 Literature review

In the following section three management approaches analysis of business processes are reviewed: functional, in which the delegation of authority and responsibility occurs through functions; project-based management, where the project is a “one-time” activity; and process-based, in which the delegation of authority and responsibility is carried out using business processes. An integration of international standards for management has been studied in this section. Furthermore, the literature review on the features of business processes, general rules for business process modelling along with basic methods of business process optimization are represented.

2.1 Management approaches

Before starting the analysis of process-based management approach, it is helpful to define what is meant by the term “management approach”. A management approach is a way or method of delegating authority and responsibility (Engwall et al., 2016). There are three approaches to management: functional, project, process. In the practical work of a manager, almost always, a superposition of these three approaches to management is used (Paim et al, 2008).

Functional approach to management is the delegation of authority and responsibility through functions. Function - a subsystem of the organization, allocated according to the principle of similarity of work performed by employees (Ahmady et al., 2016). Accordingly, within the framework of the functional approach to management, the system (e.g. organization) is divided into functions, at the head of which are functional managers who are vested with the authority and responsibility for their management. Then the functions are divided into subsystems - subfunctions (divisions), headed by managers who are empowered and responsible for managing the divisions entrusted to them, and so on. Thus, a system of delegation of authority and responsibility is created that permeates the entire organization (Jacobides, 2007). The functional leader is responsible for the most effective and efficient operation of the subdivision entrusted to him. This management approach is used to manage regular (repetitive) activities.

The project-based management approach is the delegation of authority and responsibility through projects, where the project is a “one-time” activity, for the implementation of which a cross-functional team is created, one of the members of which

is appointed as the project manager. Authority and responsibility related to the achievement of project objectives (effectiveness and efficiency) is delegated to the project manager (PMBOK, 2006). In this case, the members of the project team fall under dual management: the project manager (project, “one-time” activities) and the functional leader (regular activities), a matrix organizational structure is created, associated with the implementation of two approaches to management simultaneously (Hobday, 2000).

The process-based approach to management is the delegation of authority and responsibility through the Business Processes (BP), where the Business Process is a stable (repetitive) activity that transforms resources into results. Within the framework of the process-based approach, participants and the owner of BP are identified. The authority and responsibility for managing this BP is delegated to the owner of BP. A matrix structure emerges in the management of regular activities. The participant of the BP is subordinate to the functional manager and owner of the BP, which is associated with the simultaneous application of two approaches to the management of regular activities: functional and process-based (Bandara et al., 2007). Which, by the way, does not exclude triple subordination, if the employee is also a member of the project team.

With the growing competitiveness on a market, the number of companies engaged in increasing quality of the product and services has been escalated. This leads to companies being involved in assessing their productivity, efficiency of work and improvement of operations. This involves increased need for rapid transfer of information, instant response to market changes and speedy decision making (Seethamraju and Marjanovic, 2009). Therefore, in the middle of the last century, management began to actively apply the principles of a systems approach, which considers the world around us as a set of interacting components. One of the basic laws of the systems approach: the point of “optimal operation of the entire system” does not correspond to the "sum of points of optimal operation of subsystems" (Kohlbacher, 2010). While a functional approach to management involves maximizing the effectiveness and efficiency of all individual participants in the BP, the overall BP will be far from maximum efficiency and effectiveness (McCormack et al., 2009).

Each of the abovementioned management approaches has its own advantages and disadvantages, therefore the use of one or another method of management depends on the specifics of the company's activities. However, in modern practice, all three methods

begin to closely interact with each other, which makes it possible to increase the efficiency of achieving the set strategic goals and increasing the manageability of the organization (Liu et al., 2009). Obviously, it leads to some implications like implementation of process-based management approach to Project Management Offices (PMO) as the capstone team has faced in KazTemirTrans company. Although PMO has project-based management approach by its nature of work, the project managers (PM) and project engineers still perform "routine" and "repetitive" work (process-based management) and has a "stable" functionality of PMs within company's organizational structure (function based). Torremans et al. argues that process-based management should be used as an additional structural dimension above existing functional organizational structure.

2.2 Integration of ISO standards

ISO 9001 is a well-known package of standards created by an International organization for standardization. Majority of the ISO standards are not regulatory but have recommendatory character. In some of the countries these standards are approved in the framework of official state standards. ISO 9001 specifies a minimum set of requirements applied to quality systems and for certification purposes.

Originally ISO standards were developed as criteria according to which enterprises could evaluate the ability to stable release of products that correspond to customer requirements.

The following is the fundamental principles of ISO standards (ISO, 2005):

- Customer orientation: organizations depend on their customers; hence they must understand customer's current and future needs, meet their requirements and strive to exceed their expectations.
- Leadership of the top managers: leaders ensure the identity of purposes and direction of the organization. They should create and maintain an internal environment in which people can be fully involved in the task's resolution of the organization.
- Involvement of workers: people at all levels are the framework of the organization, and their full engagements enables the organization to capitalize on their capabilities.

- Process approach: the desired result is achieved more efficiently, when activities and associated resources are managed as a process.
- A systematic approach to management: identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.
- Continuous improvement: continuous improvement of the organization should be seen as its immovable purpose.
- Fact-based decision-making: effective decisions are based on data analysis and information filtering.
- Mutually beneficial supplier relationships: an organization and its suppliers are interdependent, and a mutually beneficial relationship enhances the ability of both parties to create value.

Referring to the ISO Introduction and Support Package, integration of process approach based on ISO standards within the organization gives the benefits listed below:

- quality improvement of goods and services
- increased efficiency of the companies
- growth of the enterprise image
- growth of labor productivity of personnel and economical use of resources
- growth in competitiveness
- increased investment attractiveness
- growth in the number of customers or buyers.

It should also be noted that integration of ISO 9001 can help to increase the understanding and involvement of personnel in business processes that as a result increases the productivity of employees and their interest in improving the efficiency of the company.

The basis of a quality management system is the process-based approach. In the first turn, it is required to describe those business processes, managing of which are considered as the most important in QMS. The described BPs then must be optimized in terms of eliminating all in correspondence to standards, removing duplicating processes, as well as development of new processes that meet the standards requirements. Most often, companies stay away from the “Customer satisfaction Assessment” process, that is

a requirement referring to ISO standards. Therefore, it is necessary to develop a system of indicators, as well as the procedures necessary for the implementation and monitoring of this process (Optimization of business processes according to ISO standard, 2011).

2.3 Business Process features

The features of business processes and its structures are as follows (Lobanova, Dolganova and Vinogradova, 2016):

- The process is focused on a specific consumer who is the recipient of the product. For this the expectation of the consumer should be known, that is represented by product description with the indication of guarantee quality indicators.
- Consumer requirements, which are presented as a set of features, generate the beginning of the processes - input of the process.
- Client order launches the process, while the provided services or products finish it.
- The process is formed as a collection of interrelated and completed work. Results of one work is the start of another one, which creates a chain of internal suppliers and customers. Thus, each participant of the process is simultaneously a consumer of results of the previous work and a supplier for the next performer.
- Each work is usually performed individually or by departments. The departments can participate in several processes.
- The processes are repeated in time.

Description of business processes is the development of BP models that include short description of BP characteristics, flow chart of the sequence of actions within the implementation of particular processes, and performance criteria.

Lobanova, Dolganova and Vinogradova (2016) in their textbook specified a list of questions to which the BP model should answer, depending on the aim of the modelling. For instance, BP should respond what work needs to be done to achieve the goals, what is the sequence of actions, who is the responsible for the BP implementation, what are the input and output flow of information and materials are used and created during the process realization, how the monitoring and control of the process is carried out, what normative legal, organizational-administrative and instructional materials are

used for guidance during the implementation; what resources are required and what are the key performance indicators.

Moreover, the main characteristics of BP are demonstrated in the textbook, which are the name of the process, its objective, owner, input, output, resources needed for the BP implementation (Figure 2.1)

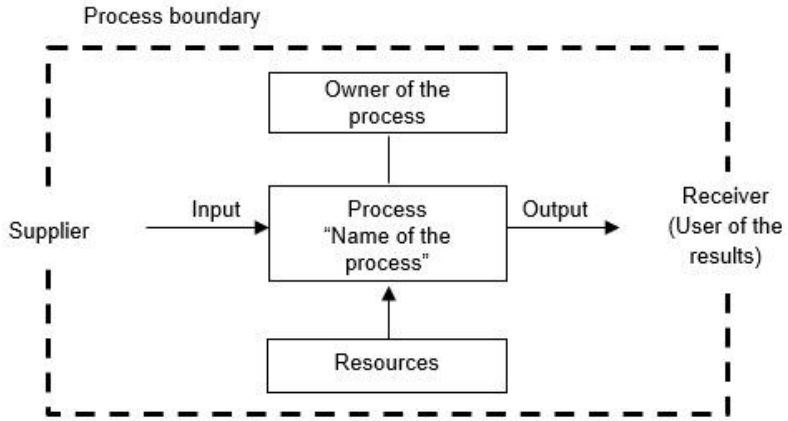


Figure 2.1. Scheme of business process

Source: Lobanova, A., Dolganova, O. and Vinogradova, E., 2016. The modelling of business processes:. Academic Bachelor Textbook and Workshop. Moscow: Urait, pp.14-28.

Correctly formulated name of the BP explains the primary goal of the BP. The BPs can be described in a tabular form below:

Table 2.1. Main characteristics of Business Processes

Column 1	Column 2	Column 3	Column 4	Column 5
BP name	Owner	Input	Output	Resources

Each company independently chooses an approach to activities to improve business processes in accordance with assigned tasks and selected processes. In general, there are 3 main approaches, depending on the cardinality process changes (Zaini and Saad, 2019):

1. Improvement of business processes (BPI)
2. Redesign of business processes (BPRD)
3. Reengineering of business processes (BPR)

BPI is the least dramatic a way to improve business processes (Syes Najamuddin Aftab, 2020), which is a method to improve the way business operations are organized and managed. An example would be improving the management of some process that has already existed successfully in the company. In this case, innovation and creativity are subordinated to rationalism and appear consistently and progressively in accordance with traditional approach. At the same time, the sequentially introduced innovation can be significant.

BPRD method of developing a new process or process, significantly superior to the existing one in terms of customer satisfaction (Yoo, Suh and Kim, 2007). Process redesign is usually more difficult in implementation than just an improvement, since includes an analysis stage process consumer requirements and process change considering identified requirements. Processes created as a result of redesign may differ significantly from existing ones. In this case, the already rational design process is subordinated to the creative and innovation process: which implies more ambitious innovation. As examples of redesign, the following can be cited sequence of actions: separation of a separate process "quality control" based on Total Quality Management (TQM), which will apply to everything business process “from order to delivery”, or the appointment of the owner of the process. Also, a good example of a process redesign is the transfer process for outsourcing or creation of shared service centers (SSC - Shared Service Centers).

The third and most cardinal of all known at the moment the moment of methods for improving business processes is reengineering (Timane, 2012). It includes serious, sometimes radical, process innovation and assumes the most creative approach of the participants reengineering to redesign processes. Basic principles of business process reengineering in general case boil down to the following:

1. Process orientation
2. Strategic objectives of the project
3. Lack of transitional stages in the implementation of the project
4. Expanded use of information technology and information systems

One of the main objectives of reengineering is to eliminate “bottlenecks” of business processes, namely, the most problematic areas. Often such a procedure involves the application of the method either vertical or horizontal “compression” of business

processes. Vertically "shrinking" a business process means shrinking levels of functional hierarchy involved in the execution of the process. Horizontal “compression” of a business process includes reduction of time and increase of efficiency.

3 Methodology

The following sections describes the methodologies used for selection of BP for optimization and BP modelling. Moreover, the software used for BP modelling along with its characteristics and notation used for modelling are described.

3.1 Methodology to select BPs for optimization

It is important to understand what processes should be analyzed and optimized at first instance, and what parameters should be controlled. Therefore, the primary aspect of BP optimization is the selection of processes for description, regulation, optimization and automation. The second essential aspect is analysis and optimization of selected business processes. Basic optimization recommendations can emerge from a logical analysis of the process description. From the first analysis factors such as duplication of operations, ineffective distribution of job responsibilities and the frequent transfer of results from department to department can be observed. Moreover, it is important to conduct the studies with the involvement of IT specialists and others not engaged in the process. Many recommendations can be proposed only based on the knowledge of new technologies and having an independent “outside view of point” to the BP (Optimization of business processes according to ISO standard, 2011).

Below is the list of common ways to optimize business processes in accordance with ISO standards:

1. Elimination of ineffective procedures
2. Allocation of responsibilities for the implementation of the business process and delegation of decision-making authority
3. Linking parallel jobs
4. Fixing information at the source and including information processing in real work
5. Cost analysis
6. Time analysis: Determination of the frequency of execution of functions and the duration of operations.
7. Improve every process.

To answer the question of how to choose the foreground business processes, Kizikov and Savchenko (2012) proposed their authorial methodology for selecting business processes for optimization. The methodology covers four criteria that are considered while the identification of business processes to be optimized:

1. The importance of the business process
2. The problematicity of the business process
3. The possibility and cost of change execution to business processes'
4. The cyclical nature of homogeneous business processes at all levels of the holding

To evaluate the importance of the business processes authors state that it is better to gather the data from company top managers. They should individually fill the questionnaire at each step of the methodology. The next step is to compare with the critical success factors to determine the level of the business processes importance. The key point of aligning with the critical success factors (CSF) is to answer the question: what business processes support the critical success factors (Table 3.1).

Table 3.1. Assessment of connection between BP and CSFs

Business process	CSF 1	CSF 2	CSF 3	CSF 4	CSF 5	Number of CSFs	Problematicity level
BP1	+	+	+	+	+	5	D
BP2		+		+		2	B
BP3	+		+	+		3	C
BP4	+	+	+		+	4	D
BP5		+	+	+	+	4	B
BP6	+		+	+		3	E
BP7			+			1	C
……							

Source: Kizikov I.V., and Savchenko Ya.V., 2012. Method of choice of business processes for optimization in the integrated holding companies. Journal of Modern Problems of Science and Education, №6.

After identifying the critical success factors and establishing the connection with the business processes, the importance of BP can be evaluated referring to the total number of CSFs.

The methodology of Kizikov and Savchenko (2012) implies that the level of the BP problematicity can be identified with regards to the current condition and desired condition. The criterion provided in the Table 3.2 below is used to identify the degree of problematicity, which are A - perfect, B - good, C- satisfactory, D - bad, E - very bad.

Table 3.2. Criteria for assessing the degree of problematicity of BPs

BP problematicity degree	**Criteria**
A. Perfect	Customers, auditors and owners find that the process output is predominantly free from defects. There are no major operational drawbacks. A major improvement has been achieved in the work of the business process and additional changes are expected and planned in the late future.
B. Good	There has been a significant improvement in the quality of business process in comparison with already developed criteria absence of defects. Positive changes are expected and planned in the future.
C. Satisfactory	The procedures used in the business process currently are effective, there are no major problems. Measures are being taken to improve the quality of business processes.
D. Bad	The business process has some operational deficiencies that require corrective action. Issues can be corrected. The main activities for quality management are carried out.
E. Very bad	The business process is ineffective or almost ineffective. There are serious deficiencies requiring action for correction. The main quality management activities are not carried out.

Source: Kizikov I.V., and Savchenko Ya.V., 2012. Method of choice of business processes for optimization in the integrated holding companies. Journal of Modern Problems of Science and Education, №6.

Then the matrix should be constructed to indicate the priority of the business process to be optimized (Figure 3.1). The x-axis represents the total number of CSFs, while y-axis shows the degree of problematicity (Kizikov & Savchenko, 2012).

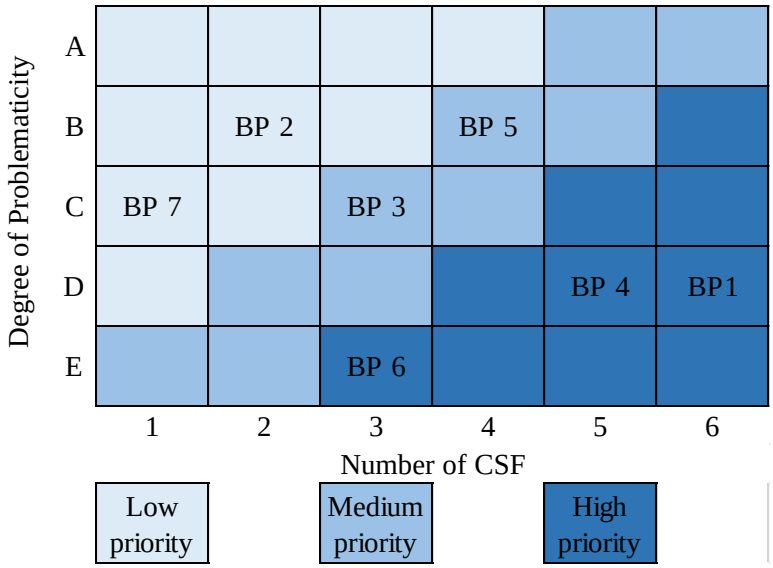


Figure 3.1. Matrix of priorities for the selection of BPs

According to the matrix, the BP located closer to the right lower corner are the most important and the most problematic, which demonstrate the highest priority for optimization. BP with the medium priority can also be selected for further optimization works. The low priority BPs can be taken into consideration after the successful completion of optimization of BPs at high and medium priorities.

As the third step of BP selection for optimization, it is recommended to evaluate them in terms of possibility to make changes that shows how appropriate it is to carry out changes and what consequences might be. Business processes can be very important and problematic but modifying them might be inadvisable due to the high cost or other negative influences. Therefore, to assess the degree of possibility of making changes, a list of the main barriers that may be encountered on the way of making changes is formulated, which are then grouped by categories. After determining the group of main barriers for each selected business process, barriers need to be ranked on a scale from 1 to 5 (1 - the least possible to changes, 5 - the most possible to changes). The sum of all barriers should be normalized to the range from 1 to 5, when it reaches a value of several tens. The final obtained value is the degree of possibility of making changes in the business process (Kizikov & Savchenko, 2012).

Hereinafter, at the next step the cyclicality of processes is considered as the fourth indicator. The author recommends determining this indicator as the number of cycles or repetitions of processes in one accounting period. Then the total number of cycles in a

selected period for each BP should also be normalized to the scale from 1-5, where 5 displays the highest number of repetitions.

The last step in the methodology is calculating the sum of four previously discussed degrees of importance, problematicity, possibility of changes and cyclicity. The obtained value lists the selected business process in order and prioritizes for optimizations (Kizikov & Savchenko, 2012).

The abovementioned methodology is one of the mandatory stages to highlight the BPs to be optimized more accurately and efficiently.

3.2 Creating a business process model "as is"

To constantly monitor the business processes of companies or their subsequent management, the concept is applied business process engineering (As Is - To Be: The Essential Business Model for Process Improvement, 2021). Business Process Engineering (BPE) is the creation of a model of business processes “as is”, which displays the current state the functioning of the company, and its constant updating, which means maintaining the model in a form corresponding to changing the circumstances of the actual activities of the company. In accordance with Deming's P-D-C-A cycle, an engineering process, being a process management, is iterative in nature, sequentially passing through four stages: planning, implementation, control and analysis (PDCA Cycle - What is the Plan-Do-Check-Act Cycle?, 2021). The process, reflecting the current state in a company or chain supplies, in terms of their innovation/creativity or rationalism is a reflection of current business practices. But the very fact of the constant use of BPE shows a certain level as a tool innovation in the management of a given enterprise or chain supplies. The creation of the "as is" model is preparatory to a stage for the subsequent improvement of the company's business processes, or companies in the supply chain. The next stage is called improvement or optimization of the process structure. By the time it is completed, an updated “to be” model is created. The task of the final stage is the correlation of speculative solutions applied to the model with the actual work of the company or supply chain. Modelling and subsequent improvement of business processes involves a comprehensive description of business processes, enterprises and supply chains. For this, all business processes, and functions in the form of appropriate models for organizing activities, organizational charts of enterprises, structural diagrams of the supply chain, responsibility allocation models and management systems should gather into a single

flowchart (map/model) of business processes with the purpose of determining the order of operation of the company and the chain supplies.

3.3 Creating a “to be” model

After creating an "as is" model describing the state enterprises at the moment, you can go to the stage creating a model "as it should be". In general, the project for improvement of business processes can be represented by the following stages:

1. Setting goals for improving business processes
2. Prioritization: selection of business processes that will need to be improved
3. Creation of a system of performance indicators (KPI) incompliance with previously defined goals for specific processes. This stage is necessary so that it can be evaluated the results of the project.
4. The choice of the method of improvement implementation of the project to improve business processes in according to the chosen method.
5. Assessment of the project result

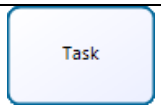
Optimized business process models or even just the more efficient model may be used to implement it in practice, where the actual execution of business processes can in turn be optimized with automation tools. In settlement approaches to improving business processes is manifested rationalism. At the same time, the decision on the scale of the change characterizes the propensity of the organization to risk and innovation, and the chosen methods, in turn, the degree of creativity and innovativeness, because mathematically identical results can be achieved in different ways in terms of time, finance, marketing and, as a result, competitive advantage.

3.4 Modelling Software

According to the requirements set by the company, work on business processes was carried out using Bizagi Modeler. As is known, Bizagi Modeler is a tool for graphical description of processes which supports collaboration, simulation and model export to word processing and other formats. The software allows to control all processes in real time, and based on the data obtained at each stage, the head of the company and departments will always be able to understand at what stage the work on a particular process is. This method can significantly improve the efficiency of management. The Bizagi modeler uses BPMN 2.0 notation (Bizagi 11.2.4.2x BPM Suite User Guide -

Digital Business Platform, 2021). Business Process Management Notation (BPMN) is a business process modeling language that play the role of an intermediate link between the formalization and the implementation of a business process (About the Business Process Model And Notation Specification Version 2.0, 2021). In BPMN 2.0, all the items are represented in the form of special icons. In this system, the most comprehensive set of icons is presented, which provides the ability to visually display a variety of business process diagrams. In the Table 3.3 below, main elements associated with the busin0ess process modelling are shown.

Table 3.3. Main elements of Bizagi Modeler

Operation Name	Bizagi Notation	Description
Task		The icon indicates the elementary unit of work within the process flow
Control flow		The icon indicates order of movement from one operation to the another
Fork "AND"		The icon indicates the creation of the alternative paths, namely, one incoming control flow simultaneously turns into two or more parallel outgoing control flows
Fork "OR-OR"		The icon indicates the creation of the alternative paths, but only one of possible flows is chosen
Start Event		The icon indicates where a specific process starts (there can be only one)
End Event		The icon indicates when a specific event end (there may be several)

4 The Case of “KazTemirTrans”

While the implementation of process-based approach was a decision of “Samruk Kazyna”, the top management of KazTemirTrans has initiated the current project. The management of the company aims to reach streamlined operations, well utilized resources and end-to-end visibility of all BPs, however senior executives are dissatisfied with the work of subordinates.

Moreover, the company has faced difficulties while transition from the function-based management approach to a process-based management. These obstacles were associated with the challenges for the local managers to documenting the BPs with the subsequent optimization. So far, the company has the text form of the partially described business processes, that has not been complied by the imposed regulations, and the list of standards provided by Samruk Kazyna.

Furthermore, the interdisciplinary departments facing problems in terms of communication and cooperation with one another. The organizational structure of the company consists of a central office, subsidiaries, 2 representative offices and 10 regional branches operating in almost all regions of the Republic of Kazakhstan, as well as 4 car repair depots.

The Capstone team were agreed to describe provided business processes in a form of a diagram with the help of Bizagi modeler and also, to optimize and automate business processes for increasing organizational efficiency and overall department’s productivity. Namely:

- Flowchart Diagram of the existing business processes with Bizagi Modeler (“as is” models) with the analysis of KPIs and critical success factors.
- Updated flowchart diagrams of optimized business processes (“to be” models)
- New templates for business processes regulations.
- General recommendations for improving business processes.
- Approaches for optimization and digitalization (if possible) of business processes.

4.1 Initial data provided

The company provided a basic guideline for working with BPs that was issued by Samruk Kazyna. At the beginning of work on the project, the company made clear request for following all the requirements and standards prescribed in the guideline. It defines uniform requirements and standards for the projects, and standards for implementation of BPs for all its affiliated companies, including KazTemirTrans. Also, the company provided all (73) templates of documents for all the following phases of the project:

1. Initiation
2. Planning
3. Execution
4. Monitoring and Control
5. Closure

For the introductory stage with the working documentation, a time frame of one month was set starting from the beginning of the work on the Capstone project.

4.2 Organization of work

At the first meeting of the working group, a list of company employees was agreed with whom interviews or questionnaires should be conducted. Each head of the structural unit agreed to prepare a list of contact persons among his subordinates. After the list of employees is approved, the schedule of the meetings was agreed. It has been borne in mind that the phase of the primary collection of information should not be longer than one month (till the end of the February). The agreed schedule of meetings is then sent to the heads of structural divisions and after approval, the employees included in it already have free time for interviews or filling out questionnaires.

As is clear, it was agreed that it is not necessary to always invite all members of the working group to the meetings. It follows from these scheduled meetings to make working meetings to discuss the progress of the project phases. It was concluded that for the Capstone team it would be the best decision to independently invite those who are needed to hold such a meeting. And it is better to do this in person by phone, rather than in writing by email. An agenda was circulated a few days before the meeting, detailing the issues to be discussed. In addition to the agenda, materials were always sent for familiarization to the invited members of the working group.

5 Results

In the following sections, selected BPs for optimization is presented. Along with that, the initial state of BPs, problems identified, corresponding improvement plans and "as it should be" models are described.

5.1 Selected BP for Optimization

As it was already mentioned, the PMO that is analyzed within the framework of this paper has functionality in organizational structure of the company, manages the project and, at the same time, performs routine, repetitive work. This means that PMO uses superposition of all three management approaches (functional, project-based and process-based) in work. While managing projects, PMO relies on Project Management Book of Knowledge (PMBOK), according to which the project lifecycle is divided into 5 phases. The Table 5.1 below summarizes all (24) BP of PMO that took place at each phase of the project.

Table 5.1. Business processes at each project phases

Project Phases	**Business Processes**
Initiation	1. Project team formation 2. Development of Agenda for Change 3. Development of Project Charter 4. Development of Financial-economic Model 5. Development of Stakeholders' Map 6. Development of statement of work
Planning	1. Development of Baseline of a Project 2. Development of Resource Plan 3. Communications Management 4. Development of Procurement Plan 5. Development Risk Mitigation Plan
Execution	1. Resource Allocation Plan 2. Execution of a Project Plan 3. Quality Assurance

	4. Procurement Control
Monitoring and Control	1. Change control 2. Assessment of the Quality of Project Management 3. Error Determination and Analysis of Causes 4. Monitoring of Improvements Made
Closure	1. Analysis and Summary 2. Preparing Documents for Closure 3. Operational Testing 4. Transmission of Project Results 5. Archiving

It is necessary to recall the Pareto principle of 20%, according to which only 20% of the most important and problematic business processes should be taken for priority optimization. Thus, it is necessary to select four or five BP for optimization. PM of the Company has identified 8 most problematic and time-consuming BP that he would like the Capstone team to work on:

1. Development of Agenda for Change
2. Development of Project Baseline
3. Development of Financial-Economic Model (FEM)
4. Development of Resource Plan
5. Communications Management
6. Archiving
7. Change Control
8. Preparing Documents for Closure

However, documentation and optimization of all abovementioned BPs would require more time than the Capstone timeframe. To select which BPs in particular need an optimization, Critical Success Factors (CSF) of the PMO need to be identified. CSFs are objectives and performance results of the PMO. A the name states, they determine the success or failure of PMO. Since the PM has a systemic vision of the organization and

are competent in the processes taking place in the PM Office, he was asked to identify CSFs. The following CSFs were used in the analysis:

- CSF 1 - Clear objectives and expectation
- CSF 2 - High qualified and motivated team
- CSF 3 - Clearly defined plan
- CSF 4 - Strong committed sponsors and top management support
- CSF 5 - Effective managing capabilities
- CSF 6 - Effective communication

The second step in determining the importance of business processes is to compare them with the critical success factors. The main essence of the comparison is that each BP should answer the following question: “What are the critical success factors that this business process supports?”. Obviously, the importance of the BP is determined by the degree of its contribution to the achievement of the goals of PMO, therefore, the more CFS the considered BP supports, the more its importance.

The next step is to identify the degree of problematicity of all BPs provided for the analysis. For this purpose, an interview was conducted with the PMO (see Appendix A). Based on the interview and Table 3.2, degrees of problematicity were assigned for each BPs. To visualize the results, the comparison matrix is used (Table 5.2), the columns of which correspond to the formulated CSF, and the lines correspond to the selected BPs.

Table 5.2. Assessment of links between BP and CSF

Name of Business Processes		CSF 1	CSF 2	CSF 3	CSF 4	CSF 5	CSF 6	CSF Score	Degree of problematicity
BP 1	Development of agenda for change	+			+	+	+	4	A
BP 2	Development of baseline	+	+	+	+	+	+	6	D
BP 3	Development of financial-economic model			+	+	+		3	B
BP 4	Development of Resource plan	+		+	+	+		4	C
BP 5	Communications management	+	+	+	+	+	+	6	C
BP 6	Archiving						+	1	C
BP 7	Change Control	+	+	+		+	+	5	B

BP 8	Operational testing					+	+	2	B

Based on the links between BPs and CSFs, the final ranking matrix that prioritizes BPs in terms of importance and problimaticity can be drawn. The matrix is shown in Figure 5.1 below.

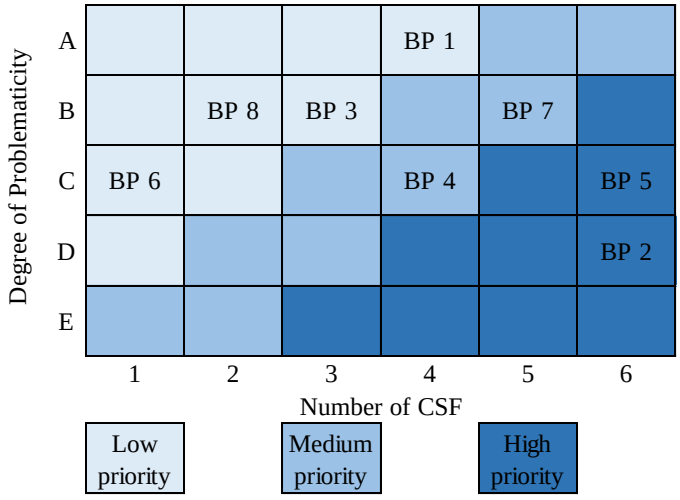


Figure 5.1. Matrix of priorities for the selection of BPs for optimization

To assess the degree of possibility of making changes, a list of the main barriers that may be encountered on the way of making changes is formulated by the top management of the company. Main barriers include:

- Group of barriers “Finance”;
- Group of barriers “Personnel”;
- Group of barriers “Legislation”.

The group of barriers “Finance” includes barriers that cause unnecessary financial costs for changes in BP. This includes costs that the company will incur in the current period, as well as possible investments in new technologies and funds.

The group of barriers “Personnel” includes employees’ resistance to changes. Overcoming these forces will also require financial resources. In the general case, when they are eliminated, irreversible negative consequences for the organization can arise: the departure of valuable employees, a decrease in the moral and psychological climate and, as a result, a decrease in labor productivity.

The group of barriers “Legislation” includes barriers that hinder the implementation of changes that arise from the side of legislation. This may also include methodologies given by the mother company – Samruk Kazyna.

The Table 5.3 below represents the BP ranking in terms of possibilities to make changes, where the highest score (e.g. 5) corresponds to the most possible one. The scores of possibility of making changes in BP were assigned in cooperation with PM.

Table 5.3. BP ranking in terms of possibility for changes

Business Processes		Barriers "Finance"	Barriers "Personnel"	Barriers "Legislation"	Total score	Normalized score
BP 1	Development of agenda for change	5	2	1	8	3
BP 2	Development of baseline	5	5	3	13	5
BP 3	Development of financial-economic model	5	3	1	9	3
BP 4	Development of Resource plan	5	5	3	13	5
BP 5	Communications management	2	4	5	11	4
BP 6	Archiving	4	1	2	7	3
BP 7	Change Control	4	5	4	13	5
BP 8	Operational testing	5	2	2	9	3

As a result of Table 5.3 and Figure 5.1, following BP have been selected for optimization: BP 2 – Development of Project Baseline (high priority, high possibility for changes), BP 5 – Communications Management (high priority, moderately high possibility for changes), BP 4 – Development of Resource Plan (moderate priority, high possibility for changes), BP 7 – Change Control (moderate priority, high possibility for changes).

5.2 Optimization of selected business processes

In the following sections selected business processes will be discussed in terms of “as is” models, related problems, improvement plans and “to be” model. For convenience, all flowcharts (e.g. BP models) are zoomed in Appendix B. Related problems were identified through logical analysis of “as is” models and received information from conducted interviews with business process owners. The interview scripts are presented in the Appendix A. Then, based on highlighted problems corresponding methods for optimization were selected. Taking into account the proposed changes, “to be” model of the BP along with KPI will be demonstrated.

5.2.1 Development of Project Baseline

Project Baseline is developed at the planning stage of the project and represents calendar schedule of works to be done. It is created relying on Work Breakdown Structure (WBS), list of project deliverables and working documentations. Once the Project Baseline is approved, it should not be subjected to changes, since it serves as a reference for an Actual execution plan. However, when critical amendments take place in the project, the revision of Project Baseline would be required.

"As is" model

The "as is" model of "Development of Project Baseline" was prepared based on the Samruk Kazyna Guideline and data provided by the PM during the questionnaire. In the process of Project Baseline development three parties are involved: Project Manager, PM Office and Financial Manager (Figure 5.2). For the development of Project Baseline the organization applies MS Project software application.

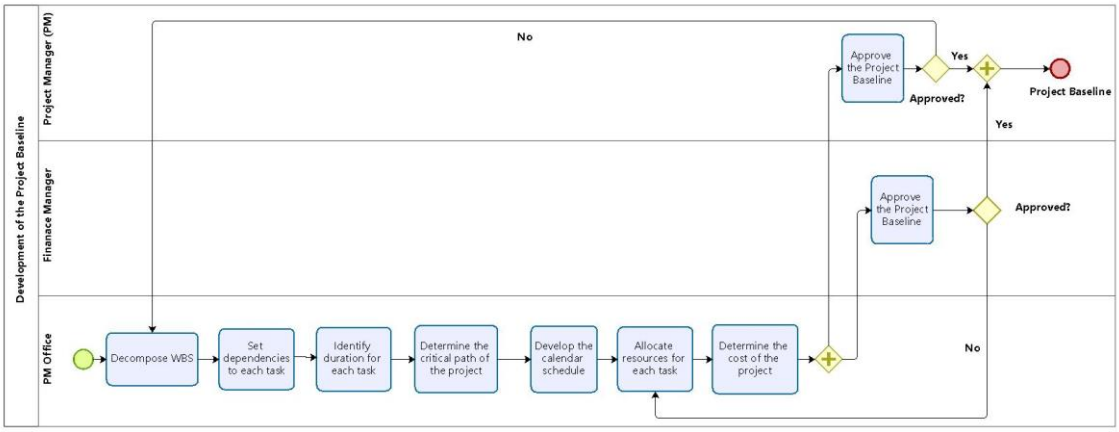


Figure 5.2. Development of Project Baseline - "as is" model

Problems:

- During the project realization phase, the Project Baseline is subjected to revision several times
- There is a significant discrepancy between Project Baseline and Actual execution plan
- Long cycle time of the process

- Some tasks are duplicated by different employees

Improvement plan

To provide productive workflow and to eliminate abovementioned problems BPRD method should be applied. As the first step of redesign of BP, generalized activities should be deployed into specific tasks. To reduce the cycle time of the process, tasks are paralleled where it is possible. While developing the Project Baseline, the PMO should work in cooperation with the Project Team to ensure that all critical tasks are included in WBS, duration and resources are allocated reasonably, so that the number of revisions will be reduced. Moreover, to develop a complete baseline efficiently, executer should understand what the key elements and what input data are needed. These initial data can be derived from the Project Charter, that is developed and approved at the Initiation phase. It defines the main parameters of the project: organizational structure, description of upcoming works, work breakdown structure, time and budget constraints. Therefore, based upon the information outlined in Project Charter, the PMO can prepare a comprehensive baseline.

"To be" model

Analyzing the Baseline content, removing unnecessary activities, rearranging the sequence, the following activities were depicted that is illustrated in "to be" model in Figure 5.3 below. Referring to the "to be" model, one can easily understand where to start and how to reach accurately developed Project Baseline. This workflow can also assure the small discrepancy between Project Baseline and Actual execution plan, the completion of the project within the set time and budget constraints. These parameters can be considered as KPIs for the future evaluation of optimization outputs.

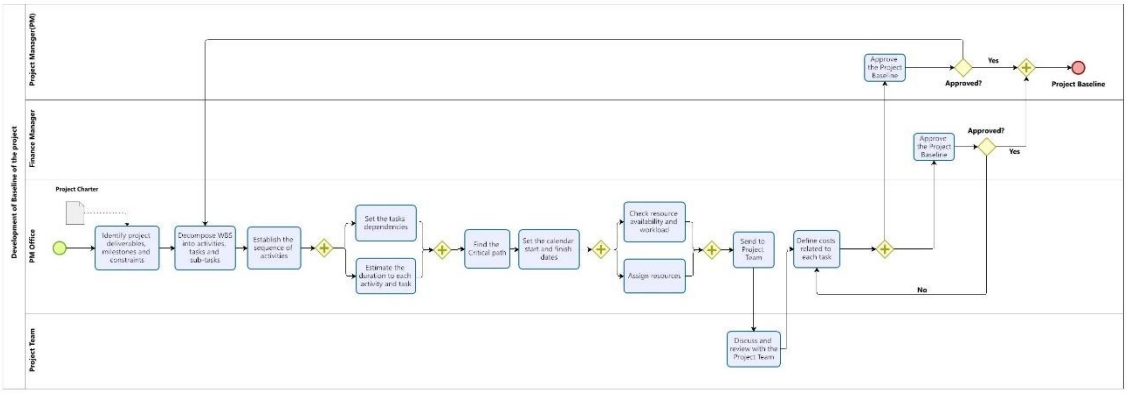


Figure 5.3. Development of Project Baseline - "to be" model

5.2.2 Communications Management

Communication Management ensures timely collection, generation, distribution and storage of the necessary project information. Communication plan contains a list of communication activities of the project with an indication of the participants, as well as “channels” (e.g. official letter, e-mail, meetings) and the frequency of interaction and information reasons for communication. It allows participants to productively interact and fulfil their tasks.

“As is” model

The “as is” Communications Management process is illustrated in the Figure 5.4. The process is started with the list of events. Here, the term “events” includes kick-off meetings, reports etc. Often, the person delivering the message has a profound impact on the target audience. Therefore, it is important to correctly identify the event participants, methods and format of message transmission. For example, presentations for small or large groups, training sessions, seminars, e-mail, instant messengers, web page, blog. Different media have different levels of influence. The finalized communication plan is obtained after assigning responsible persons who will carry out communication. The implementation of the developed communication plan of the project is a providing event participants with a single information field for the project exactly to the extent that it is necessary for their role. Moreover, an important step is to control the execution of the plan. Any unplanned event is expected to be identified at this stage.

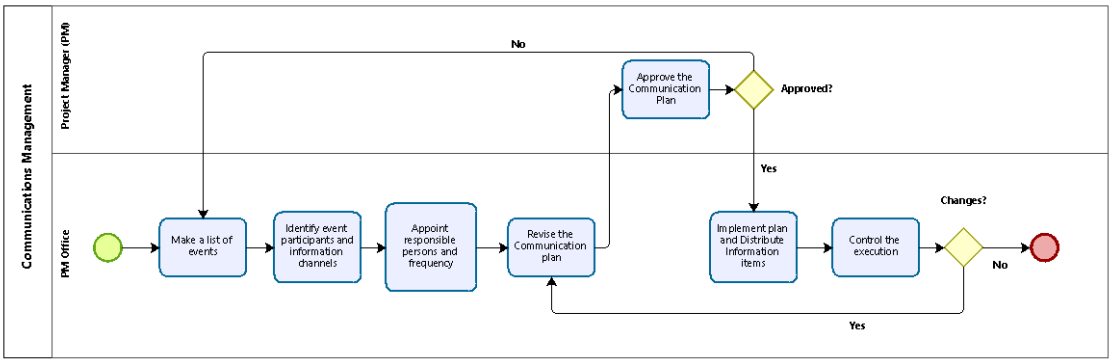


Figure 5.4. Communications Management - "as is" model

Problems:

- The communication plan is messy and hard to “read”
- Event participants are missed

- Extra participants are assigned to the event
- High number of unplanned events

Improvement plan

The highlighted problems are eliminated through application of BPI method. As the name states, applied incremental improvements will ensure the overall simplification of the BP. The deployment of generic tasks to specific ones will ensure that one can understand the flow of BP. Moreover, to increase the readability of the Communication Plan, the plan template should be revised. The template is presented in Appendix C. As it can be seen from Figure C.1, existing communication plan template is overwhelmed with extra information. To simplify the template visually, all vertical lines are substituted with Data Validation Ribbon on Excel (see Figure C.2). Moreover, several fields were combined in order to unload the template. To confirm that no participants of the event are missed, and all participants are assigned correctly there is a need to provide Event Participants with the preliminary communication plan. Thus, Event Participants can provide extensive comments on the list of the events, assigned information channels, and appointed responsible people prior to the approval of the Communication Plan by Project Manager.

"To be" model

The "as it should be" BP is presented in Figure 5.5 below and illustrates the implementation of the improvement plan. As a rule, the model of BP is simplified making it easy to understand for BP owner, yet it still represents all key tasks. The updated BP confirms that all Event Participants understand and are willing and able to act in accordance with the statements in the plan. The effectiveness of the BP can be measured through following KPIs: high employee awareness and feedback and low number of unplanned events.

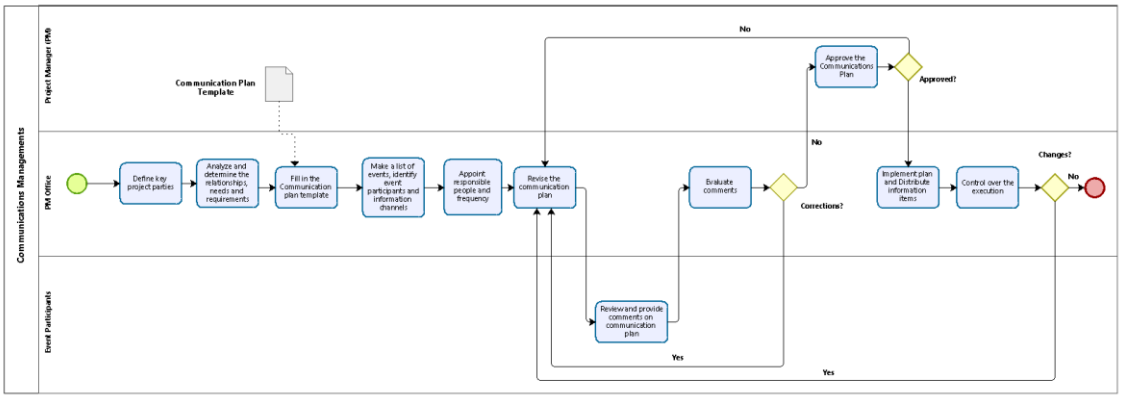


Figure 5.5. Communications Management - "to be" model

5.2.3 Development of Resource Plan

The project resource plan is a documentation that describes the list of resources required to complete the proposed project. This document is needed to make initial estimation of budget and duration of works to be executed. Also, the company uses the resource plan to monitor and ensure that the appropriate workforce is available at the appropriate time.

“As is” model

As illustrated in Figure 5.6 the Resource Plan is prepared by PMO using the template in MS Excel and then approved by PM. The sample template includes the table to list the project team members with the indication of names (in Russian and English), the job position, department name, and belongingness to a portfolio or consultancy company. Additionally, the status of each position has to be pointed out to understand whether a candidate for a particular position is selected or not, mobilized, vacant, in search or fired. When these details are filled in the Excel sheet, the next thing to show at which dates the team members are working, on business trip or on vacation. However, in order to represent this kind of information, the PMO needs to request the data from the HR department. Once all required information is added, a pivot table is generated to represent the dynamics of the employee mobilization.

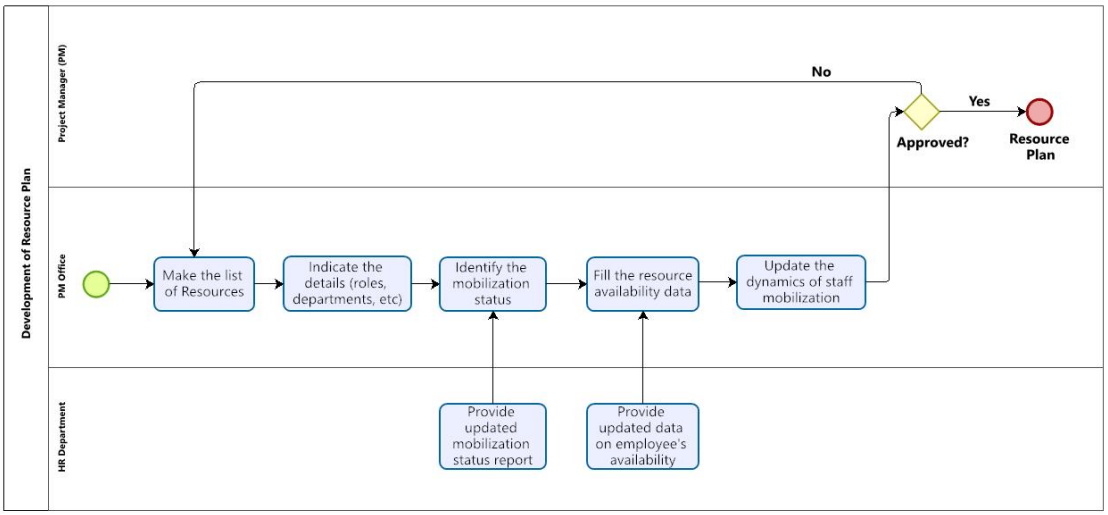


Figure 5.6. Development of Resource Plan - “as is” model

Problems:

- The template requires manual input of data
- The template does not show the appointment of employees to projects or a project task.
- The mobilization status and employee availability data (vacation or business trip days) should always be clarified from the HR department.
- Receiving data from the HR department sometimes takes a long time.
- There are some cases when the resources were over-allocated (overloaded).

Improvement plan

Having reviewed the denoted problems and flow of activities, reengineering of the current BP is proposed. The main issue with BP at its current state is that the Resource Plan is developed by PMO in accordance with the provided template that requires the input data owned by the HR department. However, during the development of Project Baseline the PMO prepares the resource schedule for each planned project, and hence knows about what projects and for what period they are assigned to. Having already the resource schedule from the Project Baseline, the PMO is obliged to prepare another document to show the dynamics of mobilization, when it can be directly done by the HR department.

“To be” model

The reengineered “to be” model of BP is demonstrated in Figure 5.7 where the HR department is now responsible for the organization of works to collect and consolidate

data related to company resources. Delegation of these activities is expected to be reasonable since the HR department is more familiarized with the employee recruiting status, details about the vacation or business trip periods.

However, the initial data should be provided by the PMO as the summary Resource schedule for the portfolio of projects. This schedule can be derived from the MS Project, if the company starts applying it extensively and manages resources by creating the portfolio of projects in MS Project. Timely provision of data about the resources required to the project and updating the mobilization plan help to accurately analyze the resources in terms of their current workload and availability during the planning stage, avoid the over-allocation and failures to meet the deadlines. Moreover, when the updated resource schedule comprising all projects is provided, the HR department can be informed about what human resources will be in demand in the future, and plan their recruitment works. At the same time, the PMO will be able to analyze the resources availability and rearrange the resource allocation during the project execution upon the receival of the Resource plan with the actualized mobilization status. This way the continuation of the project's execution without delays can be guaranteed.

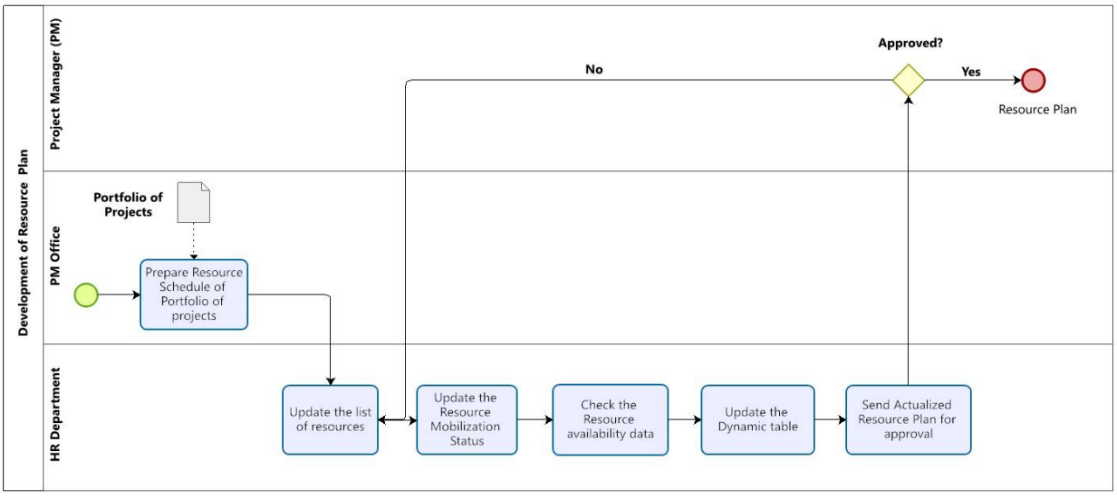


Figure 5.7. Development of Resource plan - "to be" model

5.2.4 Change Control

Change control is the formal process that guarantees that the changes in the project is implemented in a controlled and coordinated way. The changes are inevitable for any project, hence it is an important task for any organization to control these changes.

"As is" model

The “as is” model of the Change Control is presented in Figure 5.8. The change request is made by the Initiator. It contains a description of the change request, purpose, reasons, type of change request, as well as the possible impact on the implementation of the project (increase in the budget, shift of deadlines etc.). Requests should be clear and concise, with no more than one change. Further, the applicant sends this change request to the PMO. The responsible PMO employee within one working day checks the correctness and completeness of the request. The classification of a change request provides a full analysis of the impact of the proposed change. For this purpose, all the information necessary to assess the consequences of this change is collected and agreed. The type of changes in a project include, but not limited to, changes in deadline, labor costs, scope of work and design solution (organizational structure, description of roles, risks etc.). The decision makers of the change request are then identified. The decision is made considering the assessment of the impact of the proposed changes.

During the approval of a change request, the results of an assessment of the consequences of this changes are considered and a decision is made whether to approve or reject the change. If a positive decision is made, then the executors are approved. All decision on change requests is documented by PMO. After deciding on the need to make changes, changes are made to all project documents depending on the type of request (project baseline, Resource plan, risk management plan, budget, etc.). If the changes will take a longer time, the update tasks must be included in the detailed work plans. Control over the correct and complete execution of work is carried out in order to verify that the changes made correspond to the declared changes in the change request. Closing a request is done after all changes are completed and quality control of changes is made.

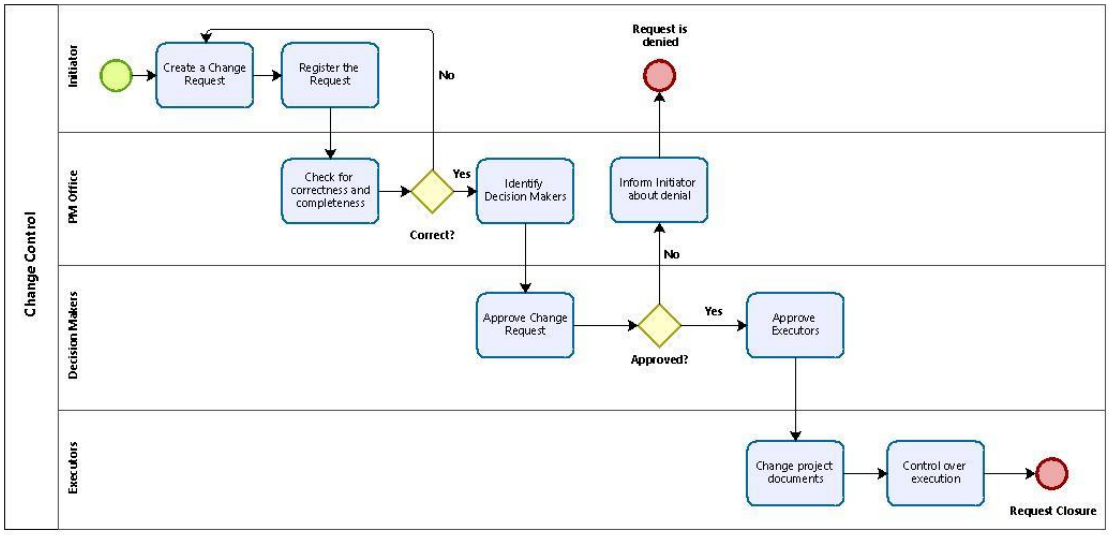


Figure 5.8. Change Control Process - "as is" model

Problems:

- Unstructured Change Request
- PMO almost always redirects back the Change Request to the Initiator due to the incompleteness of the document
- Long cycle time of the process
- No template for change request
- Approved changes are often forgotten to be reflected in other documentations of the project
- High bureaucracy
- Irregular control over execution of approved change

Improvement plan

The distinguished problems can be resolved by applying the BPI method that implies the simplification of the BP, reduction of cycle time and the elimination of bureaucracy. The first step of optimization is the creation of the Change Request template, that will considerably reduce the time cycle. The proposed template is demonstrated in Appendix D and it contains the sections such as Initiator's name, department, contacts, date, urgency of the change and changes described. It also must specify in which documents the proposed changes are reflected. Moreover, to reduce the level of bureaucracy and to simplify the BP, all activities followed by the approval of the change should be performed by PMO. The main reason is that all project documentation is under control of PMO. Additionally, to prevent project failures because of bad communication,

it is essential to set strict regulations for control over execution of changes. It is proposed to control the execution process at least once a week through electronic control system of the Company.

“To be” model

The process “as it should be” after implementation of indicated improvements is illustrated in the Figure 5.9. After optimization it can be expected that the BP simplifies, the level of bureaucracy and cycle time reduce. The efficiency of the implemented optimizations can be assessed against following KPIs: improvement in the average time taken to request approval, number of successful changes implemented.

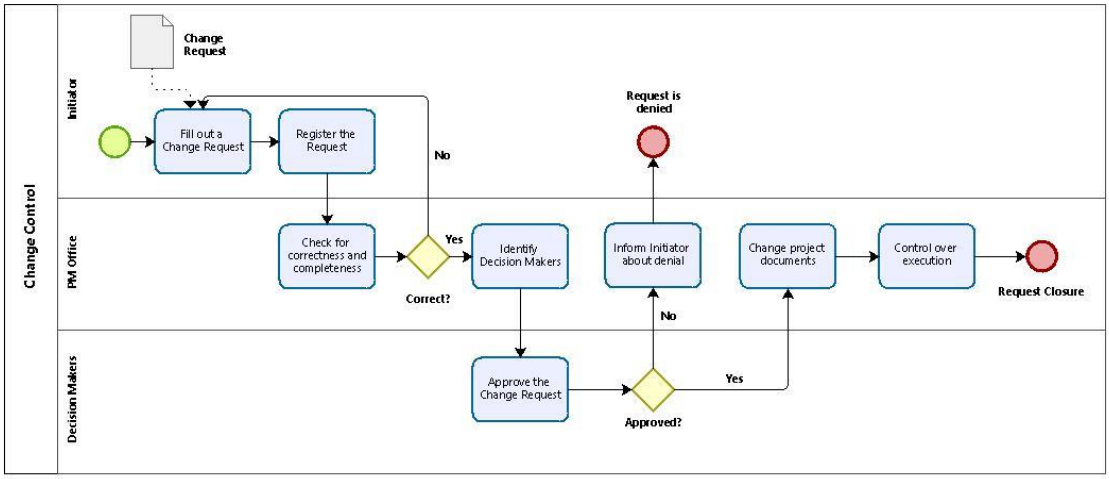


Figure 5.9. Change Control - “to be” model

6 Recommendations

Having analyzed each business process and provided the set of actions for their improvement, the ways to optimize the performance as a whole organization should also be evaluated.

Firstly, it is necessary to create a structural unit that will directly deal with the documentation of business processes and their regulation. Thus, all employees will work in accordance with regulations, where there is a clear understanding of what business processes exist and what is the accurate flow of work to be performed.

Documentation of BP and its official publication is one of the main requirements in ISO standards.

Documenting is a means of consolidating the decisions made by a company to perform the necessary actions for identifying and describing processes, as well as with the results achieved. The purpose of documenting processes is to create a regulatory framework in the organization for the construction, operation and continual improvement of both a quality management system and an organization's management system. Once the organization establishes the documented BPs, it can facilitate the following tasks:

- set requirements for the implementation of processes and activities in the quality management system,
- ensure a correct understanding of the requirements for processes and activities,
- ensure reproducibility of processes and activities,
- ensure the traceability of the execution of processes, as well as the assessment of the results achieved,
- to prevent and resolve controversial issues arising during the execution of processes and activities under conditions of uncertainty,
- to consolidate the best traditions and accumulate experience for the implementation of processes and certain types of activities.

Within the framework of this paper, the business processes of only one department were analyzed. Therefore, it is highly recommended to continue this work for the remaining departments and divisions.

Moreover, the package of corporate templates including 73 files were examined. From the first glance it seems that there are several unnecessary templates and some are duplicating the same information. Therefore, the specialized working group has to reconsider each template and assess its primary goal, to what extent it is needed, the informativeness, convenience and applicability (frequency). Based on such an evaluation, the templates can be sorted, removed, combined, redesigned and afterwards provided to the team.

It is known that the company uses the MS Project software tool, but the level of its level of application is very limited. However, the MS Project has numerous capabilities and benefits to facilitate the ways of managing the projects, planning and controlling the project activities of organization. As an extended application, the company can integrate Corporate Project Management System based on the MS Project Online and MS Project Pro. This system develops a portfolio of company projects and creates a corporate pool of company resources, which in turn allows to do:

- See the entire portfolio of projects in real time and monitor its implementation
- Control the work of employees and monitor the implementation of tasks
- Take under control the deadlines and costs of the portfolio of projects
- Obtain the required information on any project of interest from one place
- Detect problems and risks in the implementation of a portfolio of projects, as well as prevent their occurrence
- With the application of MS Project Online many PMO activities and preparation of project related documentation can be automated

Finally, the Capstone team recommends following the ISO Standards to perform a Continuous improvement of BPs. It is an important aspect of BP optimization since the market is unceasingly growing, the technological solutions are always enhanced, and the ways of organizing the BP are changed. The continuous improvement can enable to perform the processes quickly with the minimal expenditures, at the same time keeping the product quality and customer service.

7 Conclusion

This capstone project is aimed to model and describe the existing business processes of the project management office in JSC “KazTemirTrans” with bringing in ideas for their optimization with further automation. This company that integrated the process-based approach in organization’s management, struggled with the challenges such as inconsistencies of activities between departments, disorganized work because of the unpreparedness of staff for unexpected transition. Considering the case of KazTemirTrans, the method and technologies of optimizing the business processes, modelling, and describing them were studied.

Based on the provided package of documentations, the team studied the company’s existing management system, the activities broken down into business processes, and the solutions to integrate the process-based approach and encountered difficulties. For an effective optimization and modelling of BP, among all existing business processes the ones that require the changes were selected. The business processes were evaluated taking into account their level of importance, problematicity, ability to make changes and cyclical nature. As a result, four high and medium priority BP were selected for further optimization, which are Development of Baseline, Communications Management, Development of Resource Plan and Change control. Before proposing the recommendation on BP optimization, the BPs were described in the current mode through developing the “as is” models. Based on the identified challenges and problems related to each BP, and then applying the BPI, BPRD and BPR optimization tools, the business processes were represented in their “to be” models. The proposed “to be” models of BP is the first step to optimize the activities of the company and increase the performance of work done. As it is stated in ISO standards, implementation of the process-based approach is not a one-time procedure, it requires constant improvement. Therefore, the business process should be constantly analyzed and improved for timely identification and resolution of potential problems. The constant improvement of business processes will contribute to the practical implementation of the process-based approach but will also facilitate avoiding problems associated with the distribution of resources.

Moreover, the team recommends to pay attention to the documentation and regulation of business processes to establish an united vision of the business processes and understanding how to manage them. This can be realized through creation of

structural division that will be responsible not only for documentation of BPs, but also for monitoring of the execution of BPs in an organized way. Moreover, the company should recheck the standardized templates and provide to employees in a more structured way. Furthermore, the company can automate the procedures to develop the project baseline and resource management by using the extended version of MS Project and Bizagi tools.

8 Reference list

Ahmady G. A., Mehrpour, M., Nikooravesh, A. (2016). Organizational structure. Procedia - Social and Behavioral Sciences, 230, 455–462. https://doi.org/10.1016/j.sbspro.2016.09.057

Asq.org. 2021. PDCA Cycle - What is the Plan-Do-Check-Act Cycle? | ASQ. [online] Available at: <https://asq.org/quality-resources/pdca-cycle> [Accessed 20 April 2021].

Bandara, W., Indulska, M., Chong, S., & Sadiq, S. (2007, October). Major issues in Business Process Management: An expert perspective. BPTrends. (pp. 1–8).

Björn, A 1999, *Business Process Improvement Toolbox*, 2nd edn., ASQ Quality Press, Milwaukee, Wisconsin.

Elzinga, D. J., Horak, T., Chung-Yee Lee, & Bruner, C. (1995). Business process management: survey and methodology. IEEE Transactions on Engineering Management, 42(2), 119–128. https://doi.org/10.1109/17.387274

Engwall, L., Kipping, M., Usdiken, B. (2016). Defining Management: Business Schools, Consultants, Media (1st ed.). Routledge: Taylor and Francis Group, 1–24. ISBN-13: 978-0415727884

General Director, 2018. Quality Management by ISO 9001: when and how to apply. Professional Magazine of the Head "General Director", [online] 30 July. Available at: https://www.gd.ru/articles/9881-menedjment-kachestva-iso-9001

Help.bizagi.com. 2021. Bizagi 11.2.4.2x BPM Suite User Guide - Digital Business Platform. [online] Available at: <https://help.bizagi.com/bpm-suite/en/index.html?bpmn_shapes.htm> [Accessed 22 April 2021].

Hobday, M. 2000. The project-based organisation: An ideal form for managing complex products and systems? Research Policy, 29, pp. 871-893.

Iso.org. 2008. ISO 9000 Introduction and Support Package: Guidance on the Concept and Use of the Process Approach for management systems. [online] Available at: <https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/04_concept_and_use_of_the_process_approach_for_management_systems.pdf> [Accessed 10 March 2021].

Jacobides., M. G. (2007). The inherent limits of organizational structure and the unfulfilled role of hierarchy: Lessons from a near-war. Organization Science, 18, 3, 455-477

Kffanek.kz. 2021. АО «Қазтеміртранс». [online] Available at: <http://kffanek.kz/ao-k-aztemirtrans> [Accessed 3 April 2021].

Kizikov I.V., and Savchenko Ya.V., 2012. METHOD OF CHOICE OF BUSINESS PROCESSES FOR OPTIMIZATION IN THE INTEGRATED HOLDING COMPANIES. Journal of Modern Problems of Science and Education, №6.

Kohlbacher, M. (2010), "The effects of process orientation: a literature review", Business Process Management Journal, Vol. 16 No. 1, pp. 135-52.

Konenko, V., 2020. METHODOLOGY OF ORGANIZATION AND DESIGN OF BUSINESS PROCESSES. Efektyvna ekonomika, (11).

Liu, C., Li, Q. and Zhao, X. (2009), "Challenges and opportunities in collaborative business process management: overview of recent advances and introduction to the special issue", Information Systems Frontiers, Vol. 11 No. 3, pp. 201-9.

Lobanova, A., Dolganova, O. and Vinogradova, E., 2016. The modelling of business processes:. Academic Bachelor Textbook and Workshop. Moscow: Urait, pp.14-28.

McCormack, K., & Johnson, W. (2001). *Business process orientation: Gaining the E-business competitive advantage.* Delray Beach: St Lucie Press.

Nkomo, A. and Marnewick, C., 2021. Improving the success rate of business process re-engineering projects: A business process re-engineering framework. SA Journal of Information Management, 23(1).

Omg.org. 2021. About the Business Process Model And Notation Specification Version 2.0. [online] Available at: <https://www.omg.org/spec/BPMN/2.0/> [Accessed 22 April 2021].

Paim, R.C.S., Caulliraux, H. and Cardoso, R. (2008), "Process management tasks: a conceptual and practical views", Business Process Management Journal, Vol. 14 No. 5, pp. 694-723.

Project Management Institute. (2004). A guide to the project management body of knowledge (PMBOK® guide) (3rd ed.). Newtown Square, PA: Project Management Institute.

Quality management systems - Requirements (ISO 9001:2015). European Committee For Standardization. Reference number EN ISO 9001:2015E.

Seethamraju, R. and Marjanovic, O. (2009), "Role of process knowledge in business process improvement methodology: a case study", Business Process Management Journal, Vol. 15 No. 6, pp. 920-36.

Sinai-group.ru. 2011. Optimization of business processes according to ISO standard. [online] Available at: <http://www.sinai-group.ru/stati/optimizaciya-biznes-processov-po-standartu-iso> [Accessed 15 March 2021].

Syed N.A., 2020. Business Process Redesign. Journal of Business Strategy, 12(6), pp.48-51.

Timane, R., 2012. Business Process Reengineering (BPR) to Business Model Reengineering (BMR). SSRN Electronic Journal.

Torremans, H., Vanhaverbeke, W. (1999). Organizational structure in process-based organizations. Knowledge and Process Management, 6(1), 41–52. https://doi.org/10.1002/(SICI)1099-1441(199903)6:1<41::AID-KPM47>3.0.CO;2-4

Yoo, K., Suh, E. and Kim, K., 2007. Knowledge flow-based business process redesign: applying a knowledge map to redesign a business process. Journal of Knowledge Management, 11(3), pp.104-125.

Zaini, Z. and Saad, A., 2019. Business Process Reengineering as the Current Best Methodology for Improving the Business Process. Journal Of ICT In Education, 6, pp.66-85.

Zairi, M. and Sinclair, D. (1995), "Business process re-engineering and process management: A survey of current practice and future trends in integrated management", Business Process Re-engineering & Management Journal, Vol. 1 No. 1, pp. 8-30.

Appendix A

Interview Script with PMO

Which process, in your opinion, needs to be optimized?

- *As for me, the development process of baseline needs an optimization, advanced methodologies can be implemented. Why I'm thinking that this business process is problematic? Well… there is always a difference between the Project Baseline and real life. And by real life I mean actual execution plan. Because of it Project Baseline is always being revised and changed…*

  And as senior executives have mentioned we do have some problems with communication and cooperation between departments. So, the process of communication management should also be optimized. I don't know… maybe new channels for communication can be introduced. One of the main problems is that usually the needed person is missed or even worse needless person is invited to the event. Because of that there is still high number of unplanned events, in trying to revise the whole communication plan is very time consuming.

  Moreover, as all project management offices we do hate any changes in the project, but as we all know they are inevitable so maybe at least we can control the changes. So the process of controlling the changes should also be optimized. One of the main problems here is that the change request almost always redirected back to the initiator of this change because the document itself is raw. And because of that the process of implement the changes in the project is very long, that eventually leads that urgent changes are very problematic too implement in the project. And there are too many people within this process that leads that the changes approved are often forgotten to be reflected in other documents of the project. Yeah, that's all the main business processes it popped up in my mind first.

  Since any project starts with the development of agenda for change which is actually serves as a basis for initiation of all projects. Unfortunately, not all projects are being approved by the senior executives and maybe you can also check this process whether we are doing right or wrong. Because sometimes it happens that we have already developed the agenda for change and have spent too much time in all sources of our office but eventually it is rejected by the management. We want to know maybe the process solve is wrong maybe we're doing something wrong that eventually leads to the rejection of the project.

  In my viewpoint, you could also look through the process of the development of financial economic model, I don't think that you could change much there, but at least you can look through it. Because you know, you are new people and the fresh site on our routine work would be very helpful for us. By the way talking about development processes, you can also look through the development of resource planning. I'll provide all the necessary documents templates and examples so that you can brainstorm on it.

  Oh, it seems that I have gave you too many business processes from project planning phase let me give you some from project closure phase too. Even though

I don't think that there are much problems on project closure but still you can look through the archiving process and operational testing.

Please list the main Critical Success Factors of the project management office.

- *If my team does have clear objectives set and expectations of the project, they can perform on a very high level. Moreover I think for my office to succeed, I do need highly qualified and very motivated team with effective manage capabilities. It's essential to highlight that clearly defined plan and communication within our Department as well as with other departments is also important in our work. Needless to say that strong committed sponsors and support of senior executives is also one of the success factors off my office.*

Evaluate each of the following business processes in terms of "the clearness" of the designed plan (1-5).

- *Development of agenda for change (1)*
- *Development of baseline (4)*
- *Development of financial-economic model (FEM) (1)*
- *Development of Resource plan (3)*
- *Development of communication management plan (3)*
- *Archiving (1)*
- *Change control (4)*
- *Preparing documents for closure (4)*

Which of the following business processes can be optimized in terms of the changes in financial plan of BP?

- *Development of agenda for change can be accompanied by certain expenses changes.*
- *Redevelopment of the baseline will provide financial alterations, however, can be redesigned if a new, enhanced model will be presented.*
- *Development of the financial-economic model (FEM) can be adjusted to the new proposed model with the endorsement of the mother company's regulations.*
- *Development of Resource plan is not so flexible in finance as all the resources have already been allocated among the labour required.*
- *Development of communication plan can be adjusted in the financial part if there are some new techniques that will enhance the communication within the working team.*
- *Archiving cannot be significantly altered in terms of financial part, as there is no great need to be changed*
- *Change control can be somehow be moderated in the subsidies, however, in comparison with others is not so flexible*
- *Preparing documents for closure also has no significant possibility to alternate its budget because of the regulation of the company.*

In your opinion, which business process changes will be characterized by a significant restructuring of responsibilities and tasks for the project team?

- *Development of agenda for change will not be restructured significantly as this process does not require significant alterations in the team involved.*
- *Development of baseline can require a certain degree of restructuring depending on the implementation of the adjustment in the baseline scenario.*
- *Development of the financial-economic model (FEM) will not be changed significantly in terms of restructuration as all the required parties involved are already established in advance.*
- *Development of the Resource plan can somehow change the structure and responsibilities if the process is approved by all the parties involved.*
- *The development of communication plan changes can be accompanied by significant changes in project team selection.*
- *Archiving will not be accompanied by the change in team and the responsibilities, as the process is defined by the regulations of the mother company.*
- *Change control can be characterized by certain alterations in the responsibilities as this BP is flexible to this factor.*
- *Preparing documents for closure will not be characterized by significant restructuring within the team involved, as all the roles were clearly defined before hence.*

According to the regulations established by the mother company, which of the business processes is more flexible to the adjusted changes? Rank from 1-5.

- *Development of agenda for change (2)*
- *Development of baseline (2)*
- *Development of financial-economic model (3)*
- *Development of Resource plan (3)*
- *Development of communication management plan (4)*
- *Archiving (2)*
- *Change control (5)*
- *Preparing documents for closure (2)*

Appendix B

Zoomed flowcharts of business processes

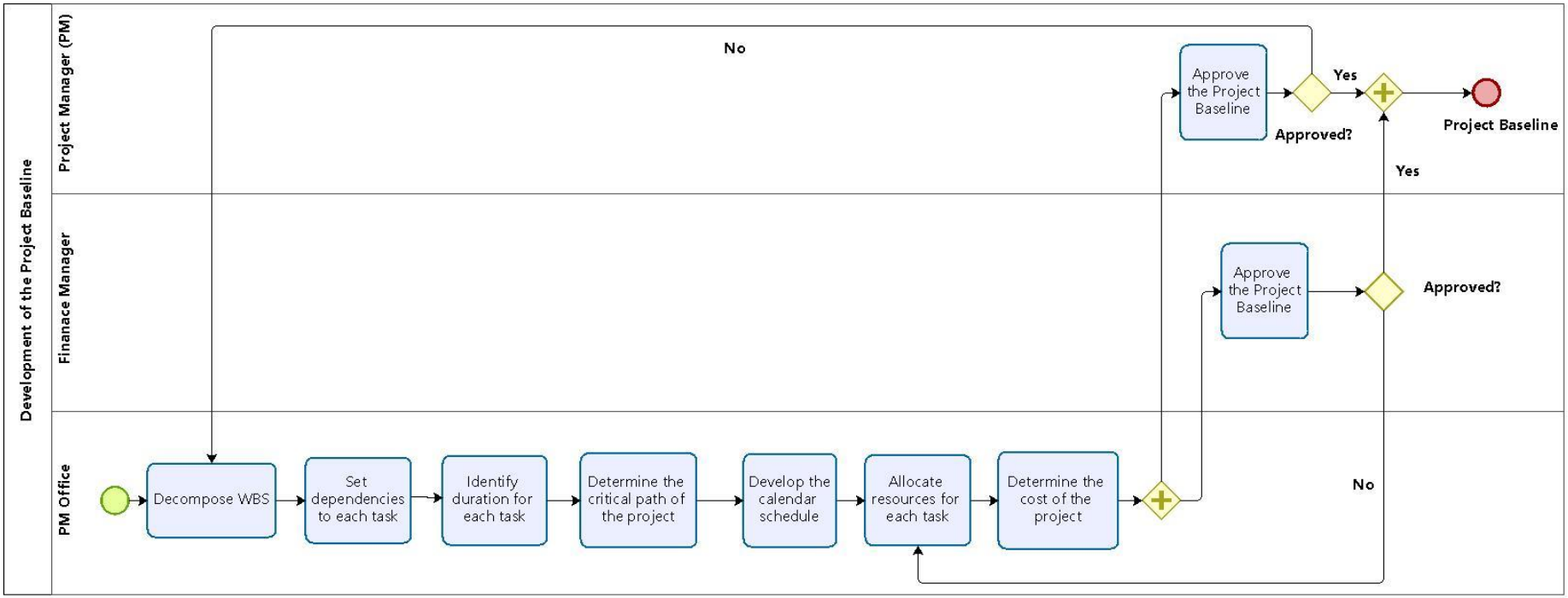


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.1. Development of the Project Baseline - "as is" model (zoomed)*

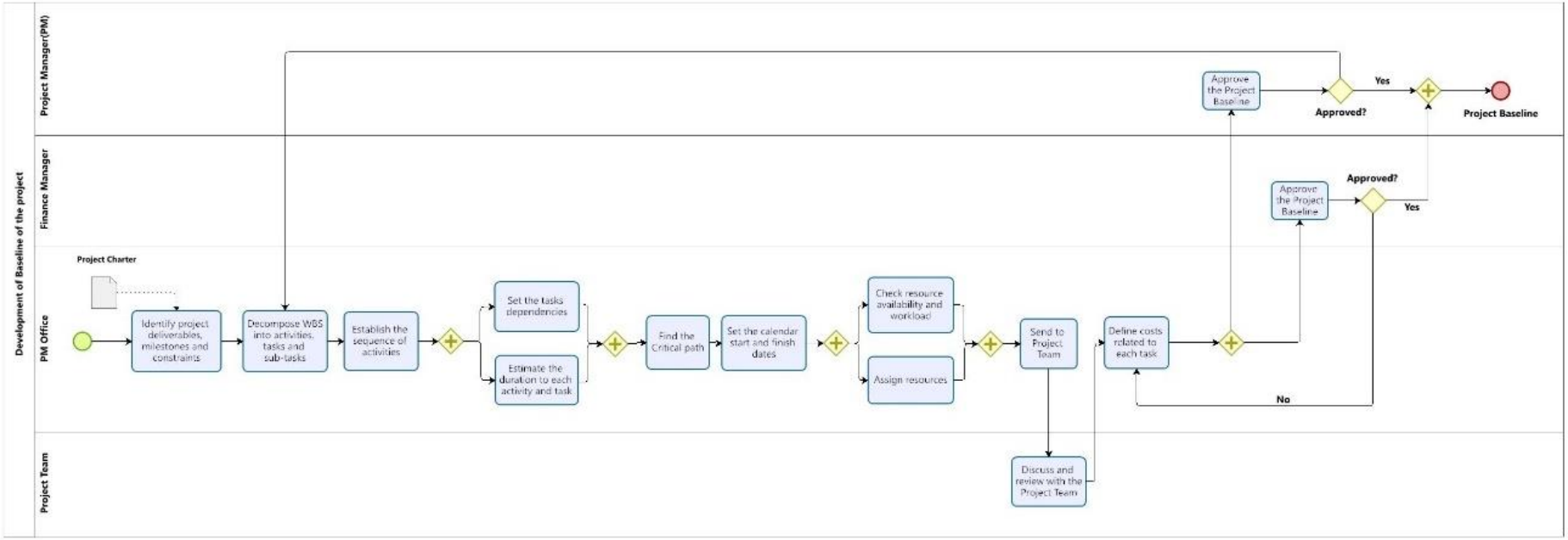


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.2. Development of the Project Baseline - "to be" model (zoomed)*

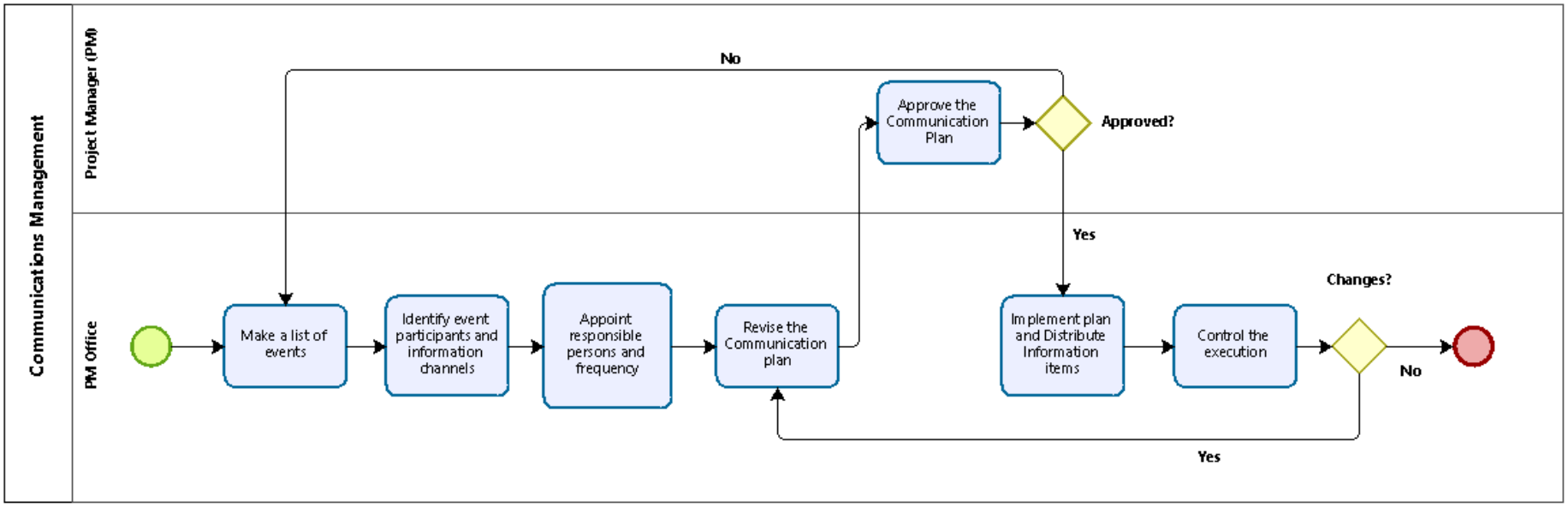


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.3. Communications Management - "as is" model (zoomed)*

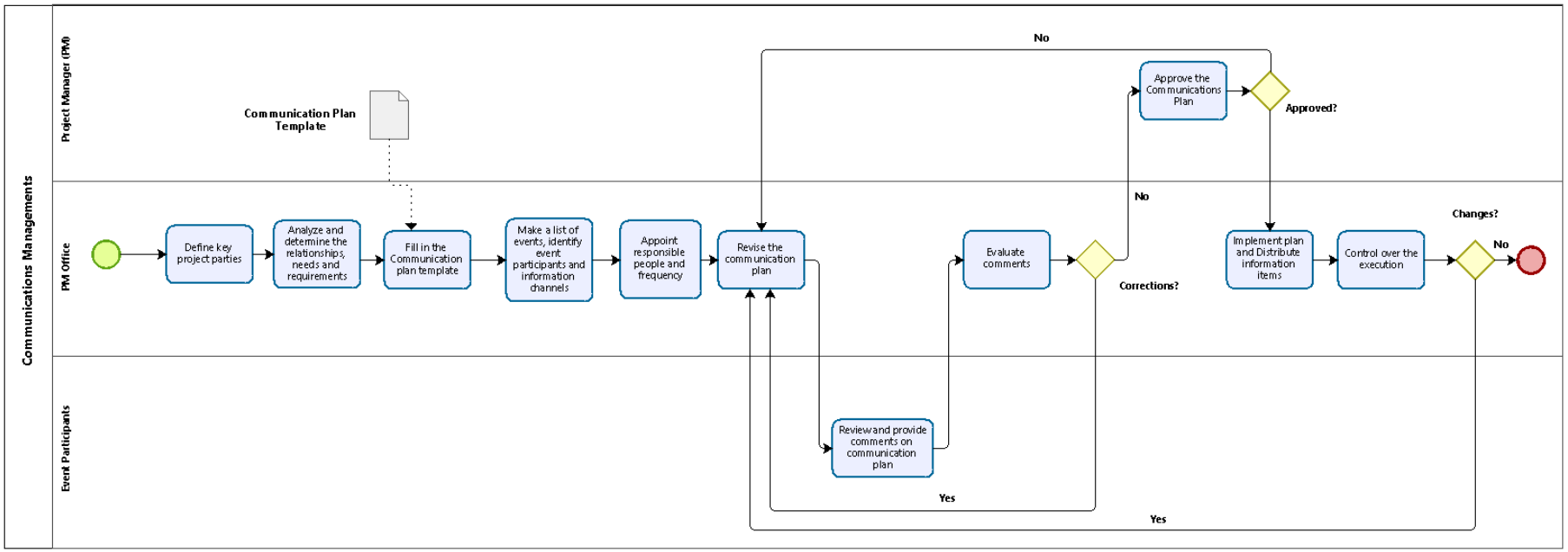


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.4. Communications Management - "to be" model (zoomed)*

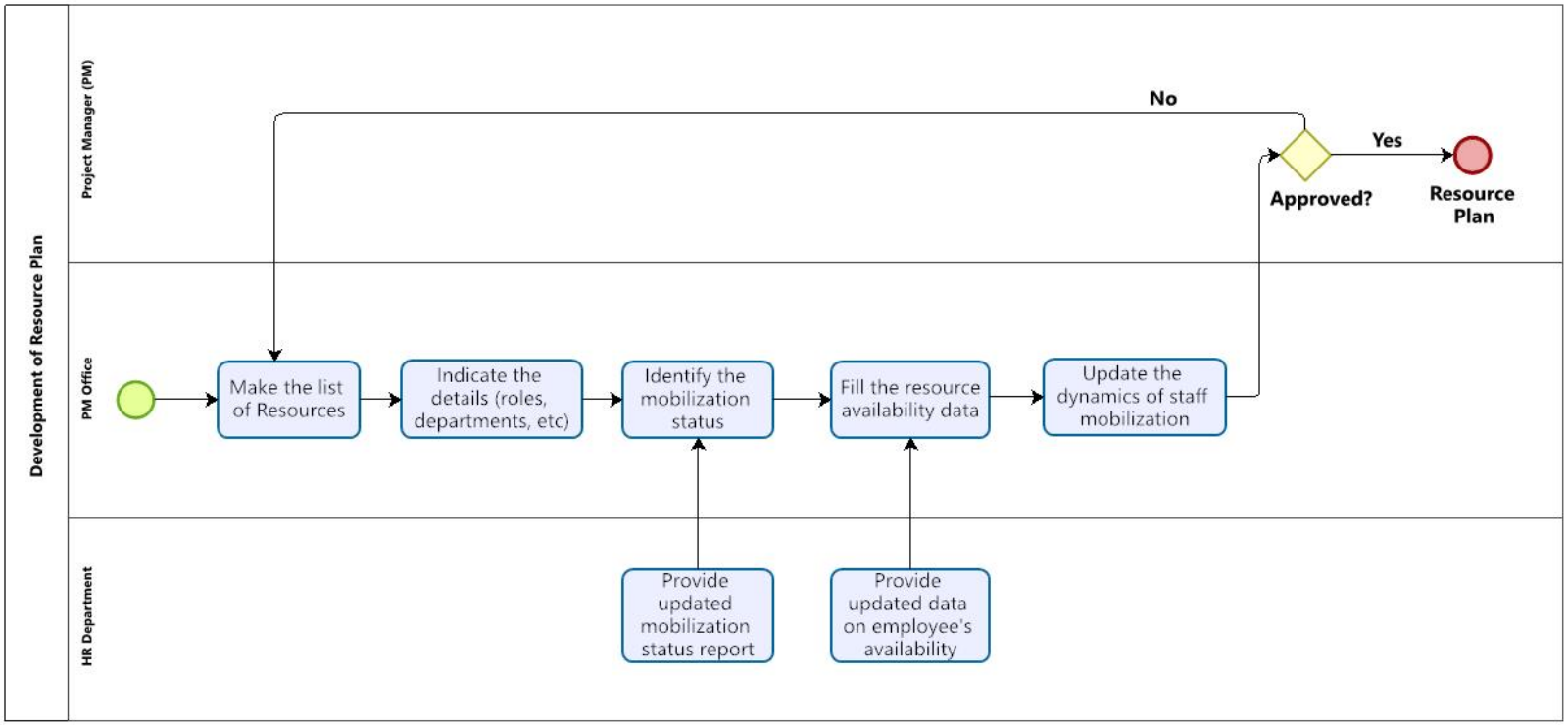


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.5. Development of Resource Plan - "as is" model (zoomed)*

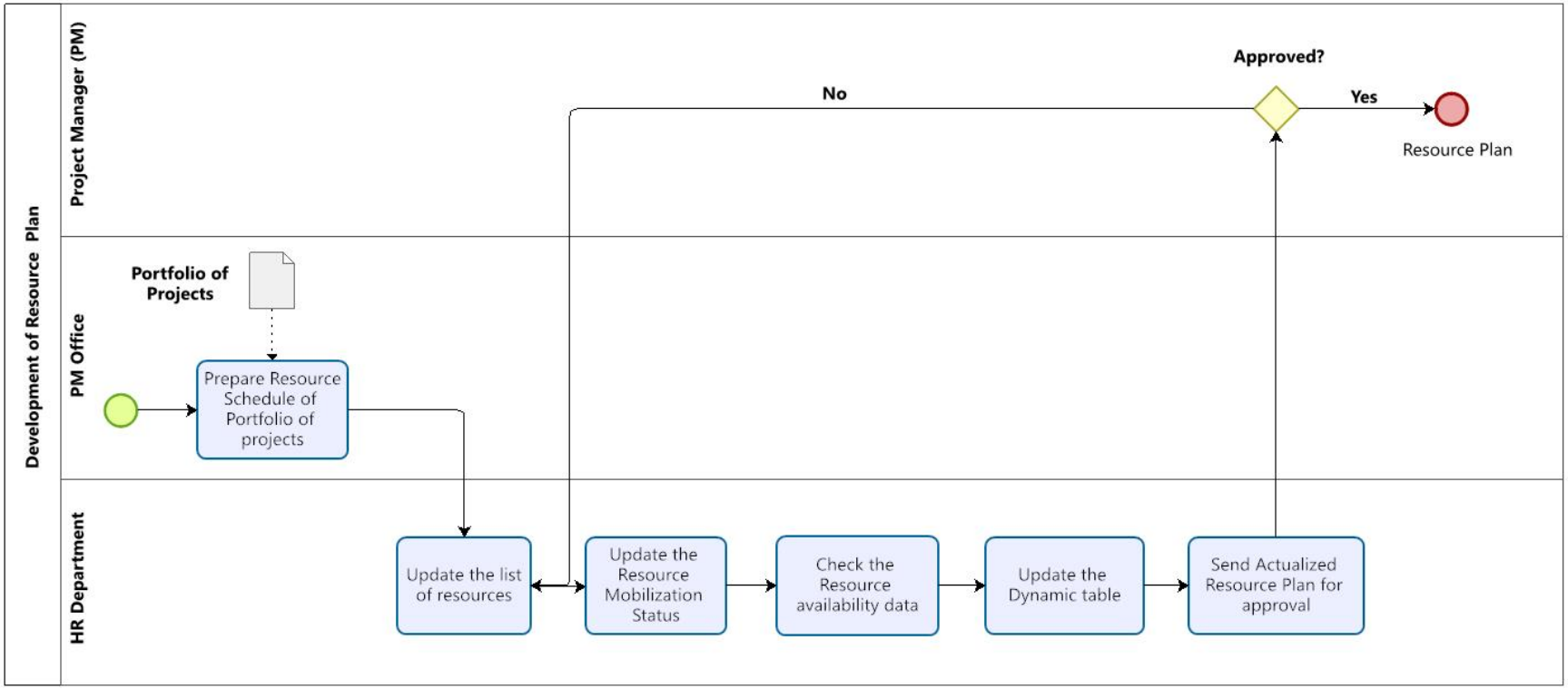


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.6. Development of Resource Plan - "to be" model (zoomed)*

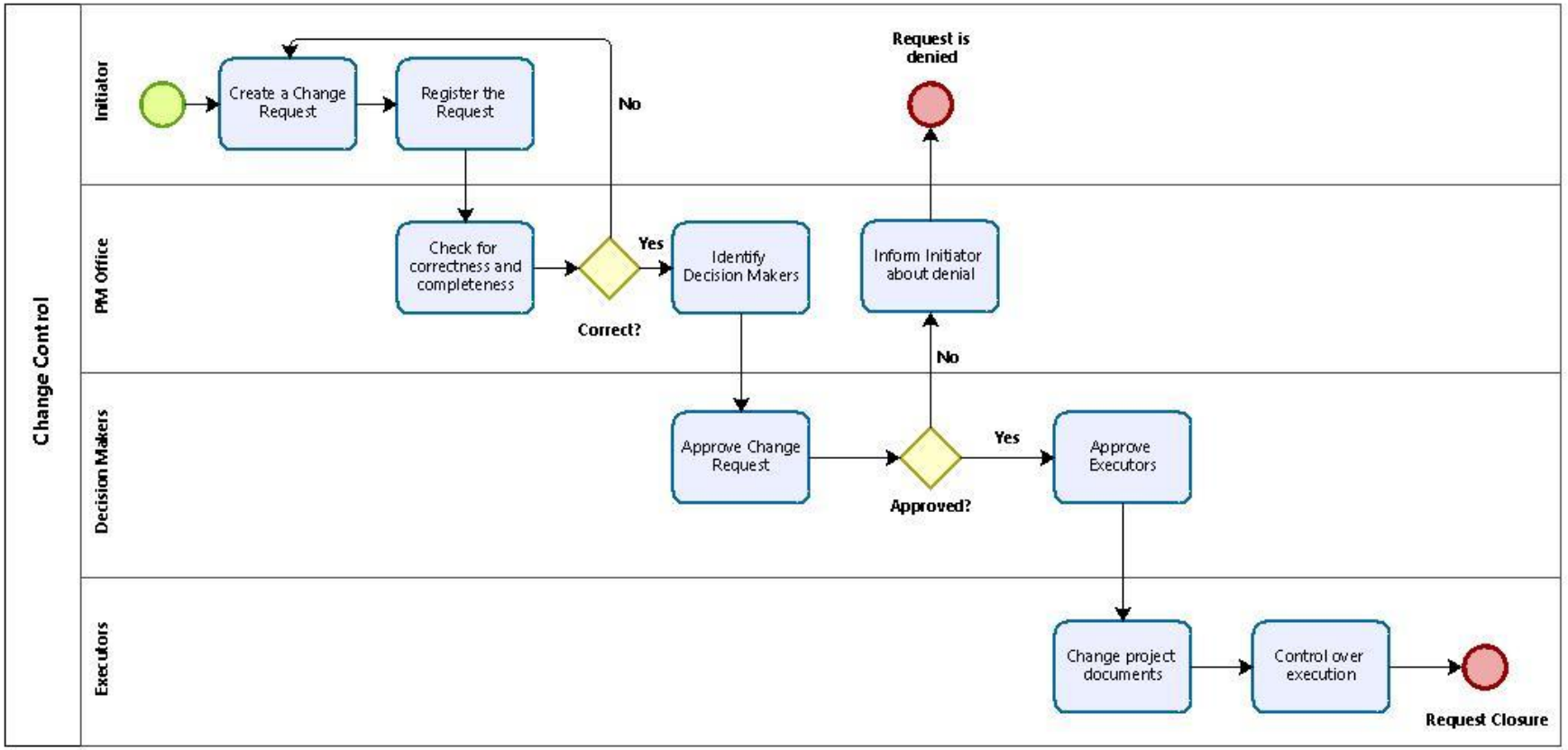


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.7. Change Control - "as is" model (zoomed)*

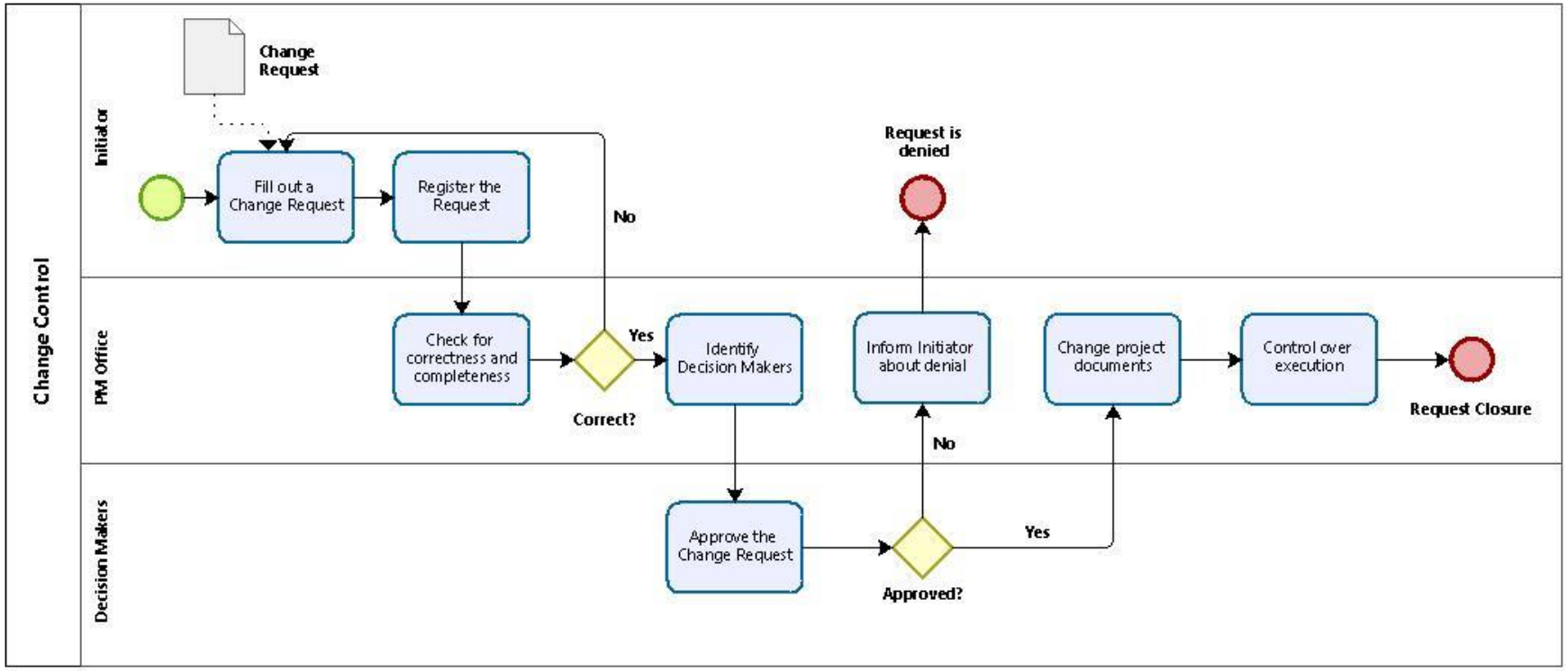


Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.8. Change Control - "to be" model (zoomed)*

Appendix C

Communication Plan Templates

Line no.	Project phase	Work on Project	Information event	Key message	Information channel										The target audience										Deadline	Responsible	Status
					Meetings, kick off meetings	Seminar	Email newsletter	Presentation	Protocol	Project Bulletin	Paper questionnaire	Enterprise corporate press	Corporate press	Portal	Steering Committee	Expert Council	Expert advice	LTT	Project management from all legal entities	Software Design Team, Contractor	Working groups of the enterprise	Key users of the enterprise	Enterprise end users	Related projects			
1	2	3	4	5	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.9. Existing Communication Plan Template*

Project phase	Information event	Information channel	The target audience	Frequency	Responsible	Status
1	2	3	4	5	6	7

Steering Committee
Expert Council
Expert advice
LTT
Project management
Software Design Tear
Working groups of th
Key users of the ente

Figure ***Ошибка! Используйте вкладку "Главная" для применения Heading 4 к тексту, который должен здесь отображаться.****.10. Simplified Communication Plan Template*

Appendix D

Change Request Form Template

Request No_____

Project Name	*Name of the project*		
Initiated by	*Name of Initiator*	Department	*Department of Initiator*
Contact number	*Contact Number*	Date:	*DD/MM/YY*
Urgency of change	☐ Normal	☐ Urgent	☐ Critical
Change Description	*Briefly write the description of changes proposed.*		
Change Reason	*Give the justification for the change.*		
Impact of Change	*Specify the impact of the change in terms of cost impact budget impact, schedule impact and impact on other projects.*		
Documents affected	*List the documents in which proposed changes are reflected.*		
Status	In review	Approved	Rejected
Approval Date	*The date of approval of rejection.*		
Decision Makers	*Decisions Makers handwritten name and sign.*		
Approved By	*Project Manager's handwritten name and sign.*		