

Investment Project Lifecycle Guidelines: Implementation Evaluation at PT Clean Energy Indonesia

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Abstract - Capital investment projects are intended to boost a company's portfolio and attain its' strategic objectives through strategic programs and initiatives that will later be delivered through individual projects. On the other hand, a common project lifecycle is defined as the series of phases that a project passes through from its start to its completion and provides the basic framework for managing the project. Traditionally, the project management metrics of time, cost, scope and quality have been the most dominant factors in defining the success of a project. But more recently, scholars and practitioners have determined that project success should also be measured with consideration towards the achievement of project objectives. Therefore, a company tends not to be interested as solely to have as many projects properly executed as possible, but also having the right projects selected and passing to the execution phase. As Indonesia enters the Energy Transition era, PT Clean Energy Indonesia's ("The Company") role in providing natural gas as a bridging fuel brings a strong momentum to push capital investments in order to dominate the market. This qualitative research studies the issues The Company faced in achieving its' investment projects targets, and how it can improve its Project Lifecycle Guidelines.

Keywords - Guideline Improvements, Implementation Issues, Investment Projects, Project Lifecycle, Project Performance, Root Cause

I. INTRODUCTION

Before entering the year 2020, generally the natural gas industry was returning to the ideal conditions for infrastructure development. First and foremost, according to McKinsey (2018), the global energy need was on the rise, especially in Asia, with details as follows:

- Developing countries in Asia will become the global energy center of growth in the next years,
- The growth of electricity demand will increase by four times, faster than any other energy, and
- The demand for natural gas still has growth potential, whereas oil and coal have reached peak demands.

Second, LNG (Liquefied Natural Gas) will become a game changer in the natural gas industry, with details as follows:

- LNG demand will become dominant in 2022 with 75% of growth in developing countries

- The LNG market is no longer price sensitive as 70% of the market views LNG as a need, not a commodity.

Third, there is a large potential of international market development, with details as follows:

- 76% of LNG growth will come from China, ASEAN and Asia Pacific
- Turkey is increasing its LNG regasification capacity from 70 mcm/d to 136 mcm/d in 2021
- Nigeria needs a total of 20 billion cubic meters of natural gas
- The Philippines faces total decline of their Malampaya gas field in 2024, with a total demand of 135 mmcf/d
- Cambodia has a total LNG demand for power generation of 200MW

On the other hand, domestic demand of natural gas was projected to grow 3.2% per year, driven by power plants and refinery upgrades, with details as follows:

- Natural Gas Demand based on RUEN Energy Mix will grow from 22% in 2025 to 23% in 2028
- The national natural gas demand in 2028 will reach 11,415 BBTUD
- Each Province has a different Energy Mix Policy
- 60% of natural gas demand growth will come from the Power Plant sector between 2017-2035
- Natural Gas Demand from Power Plants is growing 4.7% per year between 2017-2035
- PERTAMINA plans to enforce the existing refineries (4 RDMP and 2 GRR) starting from 2021

There is also an import potential of LNG to fulfil the domestic natural gas needs, with details as follows:

- Indonesia's natural gas supply is declining at a rate of 3.2% p.a.
- The development of new fields is not enough to balance the natural gas deficit in 2025
- The LNG and natural gas exports show a declining trend, to balance the growth of total domestic demand

As a publicly listed state-owned enterprise who holds the role of National Gas Sub holding, PT Clean Energy Indonesia ("The Company") has been driven by the above natural gas industry conditions to have an extensive natural gas and LNG infrastructure development from

2020 to 2024. In order to achieve The Company's ambitious business targets, massive investments in infrastructure are required in the upcoming years. Yet as a publicly listed company, The Company must uphold Good Corporate Governance principles, including in implementing its aggressive plans of infrastructure development. Therefore, guidelines for project lifecycle management have been an important part of The Company's document system because they will determine and shape the course of investment project implementations.

In December 2015, The Company launched a project management lifecycle guideline, which was implemented from 2016-2019, and basically consisted of 7 phases, as shown below:

Project Organization Options	Investment Strategy FEL-1	Business Planning FEL-2	Facility Planning FEL-2	Project Planning FEL-3	Project Implementation	Facility Startup	Operate Maintain Improve
	◀Front End Loading▶			◀Execution/Startup▶			Operation
Phase Objectives	Customer Needs and Requirements	Business Objectives, Capital Forecasts	Project Basis, Capital Budget	Production Design Basis, CAC, Project Authorization	Detailed Design, Construction and Readiness to Operate	Meet Customer Needs & Requirements	Continued safe operation to meet customer needs
1. Owner Role (BOO)	Growth Strategy	Gate Review	Gate Review	Gate Review	Gate Review	Gate Review	Business Value
2. Owner Role (Project Sponsor)	Understand Growth Strategy	Definition of Business Objectives	Gate Review Leadership & Steering	Gate Review Leadership & Steering	Gate Review Leadership & Steering	Gate Review Leadership & Steering	Business Value Realization Validation
3. Owner Role (PM, Integrated Project Team)	Understand Growth Strategy	Translate Business Objectives to Proj. Strategy	Project Objectives Definition, Complete FEL2	Production Design Basis, CAC, Complete FEL3	Contractor Management	Contractor Management Support Ops	Business Value Realization Validation
4. Owner Role (Operations Leadership)	Input into Growth Strategy	Input into business objectives (not Sponsor)	Participate in project reviews during FEL 2 and FEL 3. Initial Readiness to Operate (RTO) planning	Participate in project reviews, RTO Implementation	Complete RTO, Asset ownership, Startup		Business Value Realization Validation

Fig. 1. The lifecycle phases of investment projects in The Company (2016-2019)

According to [9], only 49% of the annual investment budget was consumed, which shows relatively moderate investment project performance. Also in the report, Management acknowledges a new government regulation, setting a maximum return on investment of 11%, making investments in the natural gas business even more challenging. In December 2019, to ameliorate project performances, The Company launched a new project lifecycle guideline, designed to streamline the process of Front-End Loading of projects and accelerate execution, as follows:

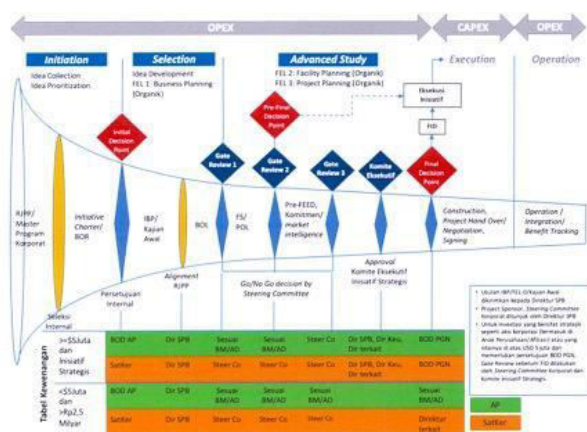


Fig. 2. The lifecycle phases of investment projects in The Company (2020)

The “*Pedoman Tata Kelola Maturitas Inisiatif Strategis*” is used as a guideline to determine the full lifecycle of a project, from its initiation all the way to the Final Investment Decision before being executed.

The guidelines have four (4) major canals:

1. The new and existing business initiative canal
2. The bulk business initiative canal
3. The inorganic business development or The Company as a Bidder canal
4. The non-business development initiative canal

These four canals will determine the phases and gate reviews a certain project has to fulfil in order to be executed. These guidelines also obey a threshold system, based on the Company Board Manual, which dictates the level of authority needed to generate the investment decision of each type of project.

These new guidelines reduced the number of stages, as they set different thresholds of decision authority, based on project value. Strict gate reviews are reserved for major projects, with capital expenditures exceeding USD 5 Million. Yet, during the year 2020, The Company Group employees still found difficulties in the maturity process (formerly known as Front End Loading) of projects, thus not accelerating execution as expected. Reference [8] shows that at the end of 2020, only 36% of initial annual investment capital budget was consumed, after going through a major mid-year budget revision, cutting nearly 62% of capital expenses.

In this qualitative research, the authors investigate the following research questions:

1. What are the root causes of project target achievement gaps at The Company during implementation of the new project lifecycle guidelines?
2. What should be improved in the project lifecycle guidelines to meet The Company's business objectives?

II. LITERATURE REVIEW

A project is a temporary endeavor undertaken to create a unique product, service, or result. They are meant to fulfil objectives by producing certain deliverables. An objective is defined as an outcome toward which work is to be directed, a strategic position to be attained, a purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed. A deliverable is defined as any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project. Deliverables may be tangible or intangible [6].

PMI [6] defines business value as the net quantifiable benefit derived from a certain business endeavor. The benefit may either be tangible, intangible, or both. In business analysis, business value is considered as the return, in the form of time, money, goods, intangibles or other elements in return for something exchanged. In projects, business value refers to the benefit that the result of a specific project provides to its stakeholders. The benefit from projects could be tangible, intangible, or both.

Effective and efficient project management should be considered a strategic competency within organizations. It enables organizations to:

- Tie project results to business goals,
- Compete more effectively in their markets,
- Sustain the organization, and
- Respond to the impact of business environment changes on projects by appropriately adjusting project management plans [6]

A project life cycle is the series of phases that a project passes through from its start to its completion. It provides the basic framework for managing the project. This basic framework applies regardless of the specific project work involved. The phases may be sequential, iterative, or overlapping [6].

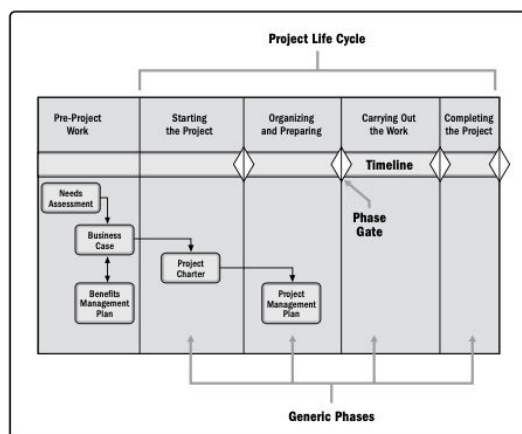


Fig. 3. Project Lifecycle and interrelationship with project documents (PMI, 2017)

A project phase is defined by PMI [6] as a series of logically related activities within a project culminated by the completion of one or more deliverables. The phases in a life cycle, PMI continues, can be described by various attributes. Attributes may be measurable and unique to a specific phase. A phase gate, as shown by the diamond-shaped objects on Figure 3, is held at the end of each phase. The project's performance and progress are compared to initially submitted and agreed upon project and business documents including but not limited to:

- The project business case,

- The project charter,
- The project management plan, and
- The benefit management plan

A decision (e.g., go/no-go decision) is made as a result of this comparison to:

- Continue to the next phase,
- Continue to the next phase with modifications,
- End the project,
- Remain in the phase, or
- Repeat the phase or elements of it [6]

One of the challenges found in many endeavors of project management is determining whether a project is successful. Traditionally, the metrics of time, cost, scope, and quality have been the most dominant factors in defining the success of a project. More recently, practitioners and scholars have determined that project success should also be measured in conscious consideration of achievement of the project objectives [6].

Project stakeholders may have different ideas as to the successful completion of a project and which factors are the most essential. It is highly critical to clearly document the project objectives beforehand and to select objectives that are measurable [6].

PMI [6] states that, besides the above measures, project success may also consist of additional project-specific criteria that are linked to the strategy of an organization and to the delivery of business results or objectives. These project objectives may include, but are not limited to:

- Fulfilling the project benefits management plan,
- Meeting the agreed-upon financial measures stated in the business case. These financial measures may include, but are not limited to:
 - IRR (Internal rate of return),
 - NPV (Net present value),
 - ROI (Return on investment),
 - PBP (Payback period), and
 - BCR (Benefit-cost ratio).
- Meeting non-financial objectives as stated in the project business case,
- Executing the movement of an organization from its current state to a desired future state,
- Fulfilling terms and conditions of a contract,
- Meeting the organizational strategy, goals, and objectives,
- Achieving the satisfaction of one or more stakeholders,
- Acceptable customer/end-user adoption,
- Integration of specific deliverables into the organization's existing operating environment,
- Achieving a certain agreed-upon quality of delivery,
- Meeting compliance to governance criteria; and

- Achieving other agreed-upon measures or criteria of success (e.g., successful process throughput).

According to Buttrick [2], as a project proceeds over time, the amount of money invested in it increases. A wise proportion of the budget should be spent on reducing the risks associated with the project. The project manager's objective is to ensure that risks are driven down as the project moves from being an idea to becoming a reality. Figure 4 clearly demonstrates this condition.



Fig. 4. Management of Project Risk over Time (Buttrick, 2009)

As we can see from the figure, the investigative stages are crucial, and one should hold back any development work until his/her investigations have proved that the risks are acceptable.

Referring to Williams et. al [11], the importance of the front end is being increasingly recognized by all types of project researchers: practitioners, policy makers, and scholars. It is thus not a surprise that there is increasing interest and high demand for the necessary tools to manage the front end and for clear structures that allow the determination of both accountability and responsibility for the progression and performance of the front end. The tools that are attracting most attention mainly deal with issues associated with the uncertainty and ambiguity that the front end is bound to involve. The seeking of clarity and focus is the major driver, and whether it is through deployment of computational techniques, social science methodologies, or human experience and tacit knowledge, the quest is always to help those who are involved in the front end to reveal, articulate, and structure the data, information, knowledge, and wisdom that are potentially already available to be captured and used. The range and scale of the challenge for recognizing the hidden elements of the front end and how they are to be managed and progressed, are a true reflection of the diversity in scale and nature of the universe of projects.

It takes a great deal of innocence to assume that there is a one-size-fits-all solution, which is especially true when - and is almost always the case - objectives and goals for projects vary among those instigating the project.

It is clear from the above literature that several activities or events occur during the front end. The front end is where the following happens:

1. The initial idea emerges.
2. Complexity and underlying problems and need(s) ought to be analyzed.
3. The first estimates of costs and benefits are made, which are important to evaluate the project, further refined as a project concept is identified.
4. The stakeholders' preferences and incentives become visible.
5. With very little information, the front end is characterized by scant information available about the prospective (yet ill-defined) project.
6. Uncertainty is at its highest.
7. The opportunity space is/should be explored systematically.
8. The conceptual alternatives are carved out, the choice of which are key to successful projects
9. Stakeholders are recognized.
10. The situated project within the context of the organization's portfolio.
11. The foundation is laid, and the main decisions are made.

When talking about selection of projects and go/no-go decisions, we need to talk about how projects start. It is paramount to acknowledge that every project commences with a proposal, but not all proposals are automatically transformed to a project. Project selection becomes one of the most dominant success factors of any project or program, especially in projects that face the issues of limited time/human resources and funds. [11]

It is of the general consensus that a decision process that follows a sound logical reasoning and chronological order should finally result in the selection of the "best project". Unfortunately, Williams and Samset (2010) discovers that this selection process is "complex, less structured, and affected by chance." Furthermore, it is often influenced by biased or insufficient analysis, not to mention political priorities. [11]

A variety of methods for selecting projects have been offered, of which each method has different features and characteristics and is only effective when it is customized for different organizations. Liesiö, Mild, and Salo (2007) studied the practical uses of project selection methods where they recommend that clear and simple methods taking into consideration multiple criteria be used, because those methods tend to result in decisions with higher probabilities of being accepted by decision makers. Another study conducted by Dutra, Ribeiro, and de Carvalho (2014) results in 35 different criteria used in methods for project selection, which are classified into

four groups: strategic benefits, business benefits, technical difficulty, and financial costs. [11]

There is a wide range of academic publications highlighting organizations' tendencies to incorporate different methods to meet the unique necessities that assure success in project selection. The approach taken to project selection is most certainly not universal and depends upon the sector taken into consideration.

Some conclusions of project selection guidelines in various industries are:

- Large oil companies commonly dictate the use a three-stage, front-end process for the initiation of its projects, comprising of "appraise," "select," and "define" stages. [11]
- For budgeting in the public sector, experts also propose the use of three phases (conceptual phase, design phase, and final approval phase) for selecting projects [11].

Although cost-benefit analysis usually is accepted as a useful technique in the project selection process, a more recent study by Samset and Volden (2016) reaches a slightly different conclusion, where there was a lack of confidence from Norwegian decision makers in the analysis, even though significant resources had been allocated to conduct detailed analysis up front. The authors gave several explanations for such low faith, for example, the weaknesses in the methodology, strategic use of the analyses to stimulate a preferred outcome, and the difficulty in quantifying some investment costs and benefits [2].

III. METHODOLOGY

Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure. Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation [3].

After selecting qualitative as the design of this research, the researchers performed the following steps to complete the research: define data collection procedures, define data recording procedures, performing the data collection, analyze and interpret the data, and finally confirm the validity of the data accuracy.

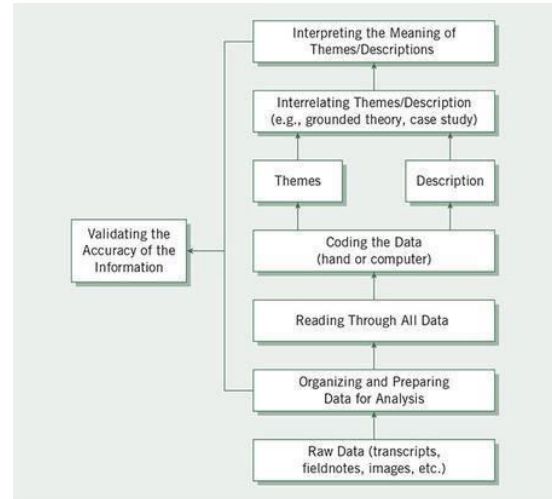


Fig. 5. Data handling flow

According to Creswell (2017), qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures [3]. In this research, the authors employ a procedure shown in Figure 6, through which interviews are given to respondents who have sufficient experience in investment project lifecycle implementation and the research findings are further validated through literature review related to project lifecycles. Transcripts are also checked, to make sure they do not contain obvious mistakes during the manual transcription process.

In qualitative approach, the researcher seeks to establish the meaning of a phenomenon from the views of participants. The views are collected by giving open-ended questions, which will then be interpreted by mind-mapping and pattern recognition through categorization of findings [3].

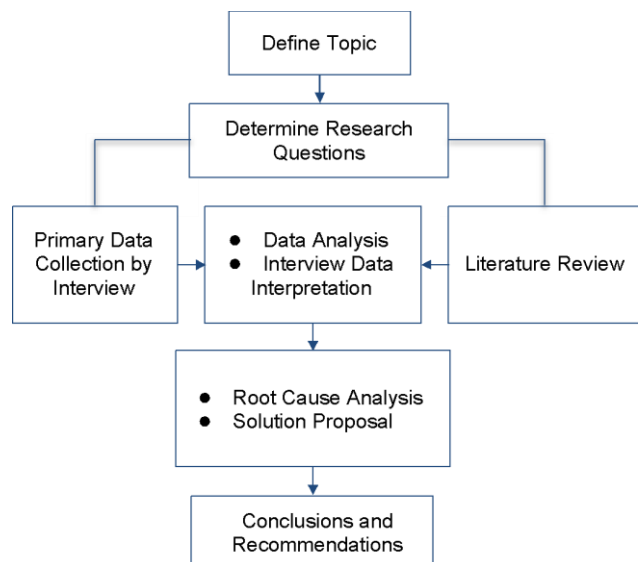


Fig. 6. Research process flow

The research was limited to the performance of investment projects in The Company Group (including consolidated subsidiaries) during the financial year of 2020. Respondents of the qualitative research was limited to members of Central Project Investment Management team, members of Steering Committee and Representatives of Project Sponsors.

IV. FINDINGS AND DISCUSSION

Respondent selection was done through comprehensive study by considering the knowledge, competency, experience and role within the research scope. Respondents were selected from three (3) clusters: Budget Holders/Project Sponsors (Cluster 2), Project Investment Management Division members (Cluster 3) and Steering Committee members (Cluster 1).

All three (3) clusters were composed of a balanced mix of Middle and Top Management. While Cluster 1 comprised of an Analyst, an Engineer (each with 10-15 years' experience) and a more senior Vice President (15-20 years' experience), Clusters 2 and 3 were represented, respectively, by a supervisor (10-15 years' experience), a manager and a Vice President (each with 15-20 years' experience), all three (3) of which coming from three different subsidiary companies, and by two Senior Analysts (each with 10-15 years' experience and a Vice President (15-20 years' experience). All respondents came from an Engineering and/or Business education background. All interviews were conducted through online meeting platforms, recorded, and transcribed verbatim.

With regards to the Research Objectives and Research Questions, a concise interview protocol was conceived beforehand as a guide in conducting interviews for this research, comprised of eight (8) questions. All questions had their own purpose and relation to the research questions. The first question was related to the respondents' position and role in this organization during the year of 2020. By knowing the respondent's background, it can measure the quality of information and data to be analyzed in this research. The second question tried to capture the respondents' knowledge about The Company Group's Project Lifecycle Guidelines that were used in the year 2020. By knowing the respondent's knowledge, it can measure their interest to the research topic.

While the two first questions warmed the respondents up, the third, fourth and fifth questions entered the main conversation topic. The third question was about how the respondents view their organization and The Company

Group's investment project performance during the year 2020. The authors believe by knowing the respondent's view on the performance, it can evaluate the perception of project success rate in The Company during the year 2020.

The fourth question tried to capture the key issues of project performance in the respondents' organization and The Company Group during the year 2020. By knowing the key factors, the root cause of project performance issues could be found and linked to the lifecycle guidelines. Last in this session, to pinpoint and prioritize the root cause of project performance due to the guideline's imperfections, the authors explore major challenges by asking what the challenges in implementation of the project management lifecycle guidelines in the year 2020 had been.

The sixth to eighth questions focused on the improvements. As a sixth question, the authors demanded the respondents to explain the efforts each of the organizations had done to mitigate the risks that arose from the above challenges, to measure the effectiveness of organization's in handling the issues. Seventh of all, to define a future better guideline to be put in place and implemented, the authors gave the opportunity to give suggestions on the improvement of the guidelines. Finally, the authors dug on the respondent's confidence level of project performance success when the improved guidelines are consistently implemented, hoping that it can estimate the effectiveness of the guidelines' suggested improvements and additional risk mitigations needed.

Interviews were conducted between March and April 2021, focusing on the research scope and limitations (The year 2020 was the focus of the research). Based on the interview results, two major constructs were used to analyze the frequent keywords: Investment Project Issues and Required Improvements. The keyword frequencies of each construct are plotted on Figures 7 and 8.

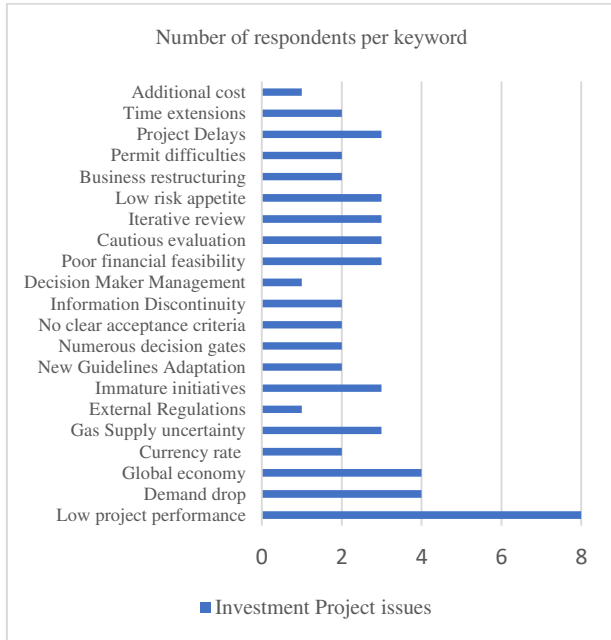


Fig. 7. Frequent Keywords during interview: "Investment Project Issues" Construct

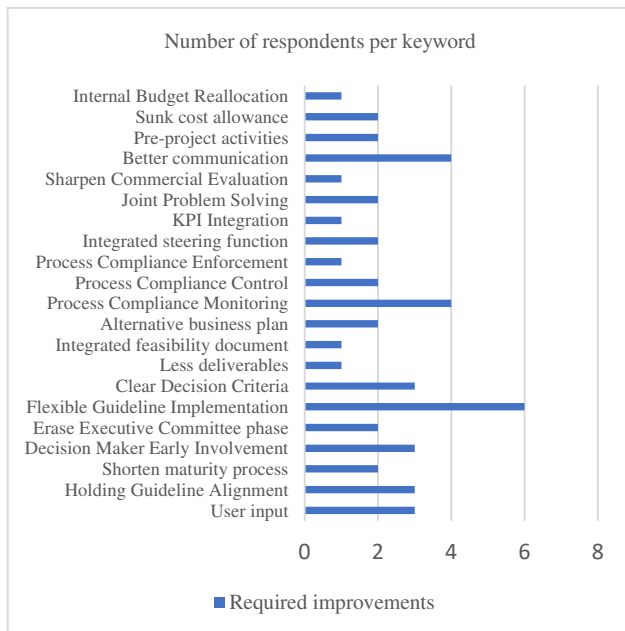


Fig. 8. Frequent Keywords during interview: "Investment Project Issues" Construct

During the interviews, it was recorded that there are 21 points of discussions or key quotes that were obtained to answer the research question about the root cause of the investment project performance, under the super-category Investment Project Issues. Totally, it recorded 62 mentioned quotes, with the major contributor being from respondent R9 who represented the Project Investment Management cluster and mentioned 13 quotes or 21% of total mentioned quotes.

The second research question is about improvement of Project Lifecycle Guidelines; therefore, the authors also mapped and analyzed a second super-category, which is the Required Actions construct which talks about the priority actions needed to improve the guidelines and thus improve the investment project performance in The Company Group.

During the interviews, it was recorded that there are 22 points of discussion or key quotes that were obtained to answer the research question about Guideline Improvements. Totally, it recorded 75 mentioned quotes, with the major contributor being from respondent R9 who represented the Project Investment Management cluster and mentioned 15 quotes or 20% of total mentioned quotes.

Based on the dominant factors, major findings and emerging constructs, a root cause analysis is made referring to [1] resulting in the Root Cause Analysis diagram on Figure 9.

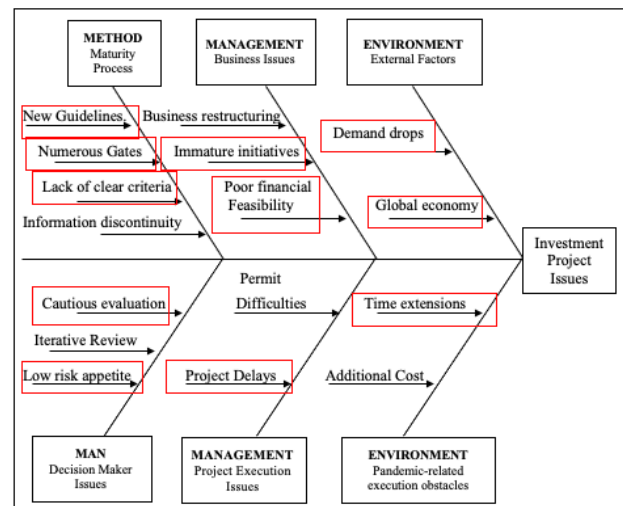


Fig. 9. Root Cause Analysis diagram of Investment Project Issues at The Company

Although the keyword "Iterative reviews" was a major construct, it was excluded from the root cause analysis, for reasons tied to the literature study. As part of the pre-project phases in a project lifecycle, it is common and theoretically acceptable for reviews to be iterative or felt to be iterative by Project Owners. We thus cannot classify iterative reviews as a root cause of poor project performance. Other root causes that have caused certain initiatives to have iterative reviews are immature initiatives and low risk appetite of management

Another major construct that was excluded from being a root cause is “Decision maker management”. Although it is an important issue and a heavy task to be done, and surely a dominant factor to be tackled, is not a root cause of poor project performance.

Deriving from the respondents’ answers and the root cause analysis, aligned with the literature studies, several solutions are proposed, as shown in Table 1.

TABLE 1
Proposed Solution Matrix

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Proposed Solution Matrix

No	Solution Proposal		
	Construct	Detailed Factors	Proposed Solution
1	External Factors during planning phase	Demand Drop, Global economy	- Set up more flexible Guideline Implementation policy, giving exit clause mechanisms for sp conditions - Set up customized flows of approval for different business segments to accommodate differences of business context
2	Internal Factors during planning phase	Immature initiatives, Poor financial feasibility	- Gather User Input and conduct testing during conception of Guidelines - Set up general principles, with customized and customizable processes to cope with the different business lines - Set up Clear Decision Criteria, in the form of Procedures and Standards to complement the Guidelines to raise early awareness to Project Sponsors - Create an Integrated Steering Function to improve the process of evaluation
3	Internal Factors during planning phase related to project reviews	Cautious evaluation Low risk appetite	TABLE 1 (continued) Proposed Solution Matrix - Set up Clear Decision Criteria, in the form of Procedures and Standards to complement the Guidelines and obtain decision maker buy-in beforehand, to reduce the uncertainty of evaluation criteria during Gates - Prepare alignment with Holding Guideline in order to guarantee business harmony with Ultimate Shareholders - Shorten the maturity process by reducing the number of phases and gates - Conduct early involvement of decision makers in the approval process - Create formal and informal forums to ensure better communication between parties and project stakeholders - Process monitoring and enforcement should be done with a clear stance and consistent implementation - Office Steering Committee should be maintained in the organization as an organizer and facilitator
4	Non-pandemic related issues during execution phase	Project Delays	- Clear all loose ends and outstanding issues before going to execution phase - Process monitoring and enforcement should be done with a clear stance and consistent implementation

From the above solution matrix, it is thus proposed that the guideline needs to focus on the front end (maturity) process with the following improvements:

- Projects need a minimum level of approval and maturity before entering the annual investment budget
- Pre-project budget should be assigned to prepare the maturity of projects
- Guidelines should be flexible and customized to each business line, and gather user inputs
- Guidelines need to have a derived procedure and standard, explaining the decision criteria and testing / simulation procedures that has approval of top management to be applied during the decision process, that will simplify the review process
- Communication channels between Project Sponsor and Decision Makers must be strengthened

The proposed solutions are further divided into two categories: lifecycle guideline related, and non-lifecycle guideline related.

Summing up the findings and proposed solutions, the following discussions can be concluded:

- 2020 was an exceptional year (force majeure) and many elements of project readiness were compromised, also confirmed by a study by PMI [7].
- The Company needs to follow up the lessons learned, where maturity process should be defined as pre-budgetary, because so many variables are needed to be looked at. Budgets for project preparation should be allowed before investment decisions are made, which may be capitalized if the investment is decided to be executed.
- Stakeholder alignment and consensus needs to be made, but the guideline must allow enough flexibility and business line customizations to boost project performance due to the extra compatibility it offers to a wide range of projects.

V. CONCLUSIONS AND RECOMMENDATIONS

Answering the research questions, the authors conclude that the root causes of investment project target gaps in 2020 are: Demand drops, global economic crisis, immature initiatives, relatively low-to-moderate risk appetite, relatively low financial feasibility, cautious evaluations, project delays, lack of clear decision criteria, new guidelines adaptation, and numerous decision gates.

As a theoretical implication, the proposed solutions to the research questions are divided into two categories: lifecycle guideline related, and non-lifecycle guideline related.

The non-lifecycle guideline related solutions are:

- Setting of strict minimum level of approval and maturity before entering the annual investment budget

- Assignment of Pre-project budgets to prepare the maturity of projects
- Creation of strong communication channels between Project Sponsor and Decision Makers
- Creation of Integrated Steering Function to improve the process of evaluation
- Setting up Process monitoring and enforcement systems

Whereas the lifecycle guideline related proposed solutions are:

- Modify guidelines to be more simple, flexible and customized to each business line, and gather user inputs
- To accompany the simplified guidelines, creation of upfront derived procedures and standards, explaining the decision criteria and testing / simulation procedures that has approval of top management
- Prepare alignment with Holding Company Guidelines in order to guarantee business harmony with Ultimate Shareholders
- Shorten the maturity process by reducing the number of phases and gates (i.e., 2 Approval Gates)
- Conduct early involvement of decision makers in the approval process (i.e., at 1st Gate)

These solutions are recommended to be prepared and executed in 2021, to be fully implemented in 2022. Furthermore, as a managerial implication of the above conclusions, the authors recommend that The Company proceed in the following manner, respectively:

1. The tasks to be accomplished cannot be the responsibility of one single Working Unit, but consists of an integrated effort across the different functions within the company organization
2. The system set up and guideline modifications are to be completed before the last trimester of 2021 to be able to be tested before fully implemented in the year 2022
3. Continuous monitoring and policy improvements must be conducted in 2022
4. Before the modified guidelines are finalized, there needs to be an approval from Top Management, and this approval phase shall consist of several workshops to obtain consensus and endorsement of the decision makers who will be the ultimate stakeholders of the processes dictated by these guidelines

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