

Project Manager Knowledge, Skill, And Competency Measurement Using Project Manager Competency Development Framework (PMCDF®) (Study Case Fronthaul Easy Macro BTS Telkomsel Project)

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Abstract — PT XYZ is a subsidiary of Telekomunikasi Indonesia, Tbk which is engaged in construction services, one of which is working on an easy macro project fronthaul according to orders from Telkomsel. The Fronthaul Easy Macro Telkomsel BTS development project is a fiber core infrastructure provision service as a solution for implementing cellular networks, especially in areas that can only be reached by micro BTS. The project is known to experience delays past the completion date specified in the contract. In the problem formulation, the author gives weight to the 3 largest human resources, namely the project managers involved in the project. Measuring project manager competency by distributing questionnaires according to the PMCDF® method, namely aspects of the project manager's personal competency. By using the AHP model as weighting and measuring with a Likert scale. The results on the PMCDF reference obtained the 3rd largest weighting unit, namely Managing an average rating of 64.3%, Leading an average rating of 69%, and Cognitive an average assessment of 79%. Proposed developments for each competency unit to increase the value of the project manager will be planned and implemented several types of learning according to the results of weak scores. This type of learning is accompanied by experts in their respective fields.

Keywords — Project Manager, Project Manager Competency Development Framework (PMCDF®), Personal Aspect, AHP, Skala Likert, and Development Proposal Plan

I. INTRODUCTION

Development of the current era with modern telecommunication and communication technology is needed by everyone. In one of the West Bandung areas, the construction of a wireless telecommunications network will be carried out, namely the BTS Tower or Base Transceiver Station. Telkomsel's Fronthaul Easy Macro BTS Tower was built, but in reality, related to licensing and land acquisition, coffee farmers asked for the project which is actually not the farmer's competence to make the tower. To expand the range of cellular services, it is necessary to add Fronthaul development as a form of fulfillment of the simultaneous

improvement in the quality of data and voice services (Susanto, Hartono, & Nainggolan, 2017). The following is a depiction of the construction of Telkomsel's BTS Easy Macro Fronthaul project.

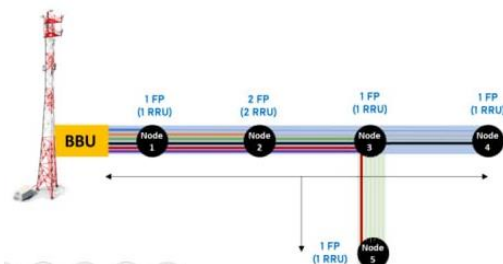


FIGURE I.1.

Telkomsel BTS Easy Macro Fronthaul Project

(Source: PM Fronthaul Easy BTS Telkomsel construction project)

In the implementation of the project, the macro content is declared to be on air if the connectivity from the BBU (Base Band Unit) radio device has been connected to the Radio Remote Unit (RRU) through a fiber optic network. The process that occurs in the description of these activities certainly involves related parties, both directly and indirectly (Emasriani & Rahmadewi, 2021). The description of the activities of the implementation of the Telkomsel BTS easy macro fronthaul construction can be seen according to the data curve below, which is as follows.

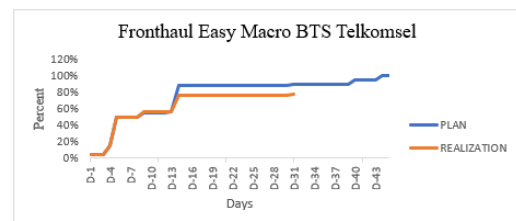


FIGURE I.2.

S curve of Telkomsel BTS Easy Macro Construction Project

(Source: PM Fronthaul Easy BTS Telkomsel construction project)

can be described in the Fronthaul Easy Macro BTS Telkomsel construction project is not according to the original plan, meaning that the construction project can be defined as experiencing delays as the planned time past the completion date specified in the contract or outside the agreed date. Figure I.2 is known to be the project late from day 14 to day 31. A project that is late on schedule is already a common problem in construction projects. The fishbone diagram is arranged as follows.

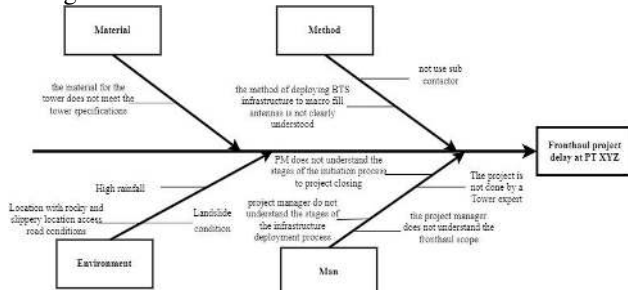


FIGURE I.3
Diagram Fishbone

In the fishbone diagram in the background, it can be seen that the problem of the Fronthaul construction project is the delay of the Fronthaul project. In a more in-depth analysis, these issues the author performs the 3rd largest weighting on the fishbone diagram using the basis of weights for decision making with stakeholders involved in the fronthaul project by considering risk analysis, it can be determined based on the potential impact of the criteria on risk. Efforts to identify the root of the most dominant problems in the Fronthaul Easy Macro BTS Telkomsel development project are more focused. In this context, the three biggest problem weights were chosen, namely those related to human resources. This section pays special attention to human resource issues.

In the man aspect (human resources) there are three weights of 20%, namely 3 root problems out of the 10 root problems that have been described. Focusing on the elaboration of alternative solutions above, the author's choice focuses on human resources, focusing on the role of project managers who are not yet fully competent in understanding the knowledge and skills required in managing projects.

A project manager is expected to be qualified to lead, manage, and communicate project direction to the team. However, the history of projects managed by these project managers often suffers from delays. Therefore, the author takes the problem related to human resources that focuses on project managers by measuring personal aspects using PMCDF. Some formulations of problems in this study are as follows:

1. How is the measurement of the level of personal competency as a project manager in the knowledge and skills contained in the Telkomsel BTS Fronthaul macro construction project at the development stage based on the PMCDF® method?
2. How is the proposal to increase the competency of a Project Manager from the aspect of knowledge and skills contained in the Telkomsel BTS Easy Macro Fronthaul construction project?

Based on the formulation of the problem, the objectives of this study are as follows:

1. To identify the measurement of personal competency level as a project manager in the knowledge and skills

contained in the Telkomsel BTS Fronthaul macro construction project at the development stage based on the PMCDF® method.

2. To identify proposals for improving the personal competency of a Project Manager from the point of view of knowledge and skills contained in the Telkomsel BTS Easy Macro Fronthaul construction project.

II. THEORITICAL REVIEW

Literature review is related to the theory implemented in data processing, which is as follows:

A. Project Manager

Based on the author who has been studied in the project management course, project managers are required to have enhanced soft and hard skills to achieve complex and autonomous projects (Ribeiro, Amaral, & Barros, 2021). According to the book *A Guide to the Project Management Body of Knowledge PMBOK® GUIDE Seventh Edition* and *The Standard for Project Management (Project Management Institute, 2021)*, the project manager is a key in the project to establish and maintain good team relationships from security, mutual respect and non-judgment in order to create an atmosphere for the project that is carried out harmoniously and has open communication.

B. Project Management Competency Development Framework (PMCDF®)

Project Management Competency Development Framework (PMCDF®) is a method that describes an assessment framework for the development of personal competencies aspects and performance of a worker in which there is defining, assessing, and developing competencies, especially in project managers. (PMBOK) Sixth Edition (Project Management Institute, 2017), that the Project Management Competency Development Framework (PMCDF®) method applies the framework mentioned in the talent triangle focusing on three sets of skills in project building skills, there are 3 main Technical Project Management, Leadership, and Strategic and Business Management.

C. Project Manager Personal Competence

Project manager personal competency is how a project manager's knowledge of behavior, attitudes, cultural influences, and characteristics focus on the core of his personality in contributing to the project. Personal competencies are grouped in six units, as follows Communicating, Leading, Managing, Cognitive Ability, Effectiveness, and Professionalism (PMI, Project Manager Competency Development Framework - Third Edition, 2017).

D. Likert Scale

In a study, it usually uses a Likert scale to be shown to respondents in measuring research attitudes, opinions, or perceptions of a person towards social phenomena using a scaled range. This technique respondents assess using questioners by having 6-points in it such as from the Agree to Disagree scale (Hardani, S.Pd.,M.Si, et al., 2020). Here are

the steps to calculate category interpretation in Likert scale technique according to (Sugiyono, 2013):

1. Calculates the largest cumulative and the smallest cumulative by the number of respondents on the questionnaire.
2. Calculates the largest and smallest percentages.
3. The number of assessment percentage intervals.

E. Analytical Hierarchy Priority (AHP)

Understanding Analytical Hierarchy Priority (AHP) is an assessment method on a scale with the ability to compare using priority weights or ratio scales (Kulakowski, 2020). The benefits in this method can make it easier in this research to make complex decisions. To produce decisions in a complex and priority manner, it is necessary to make decisions in an organized manner by taking the following steps (Saaty, 2008):

1. The first stage determines the problem and determines the purpose of the decision, described in a complex way according to the common goal.
2. The stage of making the problem structure becomes a hierarchy and is viewed from a broad, medium, or narrow angle.
3. The data collection stage is relative to the criteria. Data collection using a simple matrix.
4. Eigenvector & geometric mean calculation stage with the aim of testing the consistency of the results obtained. If the result of consistency ratio (CR) has a result of less than 0.1 ($CR \leq 0.1$) then it can be declared consistent. If the results are inconsistent, then repeat the first step again.

III. METHOD

A. Problem Solving Systematics

The systematic problem-solving stages include the initial stage, data processing stage, analysis stage, and final stage. The systematic problem-solving process will be described in the following flowchart model.

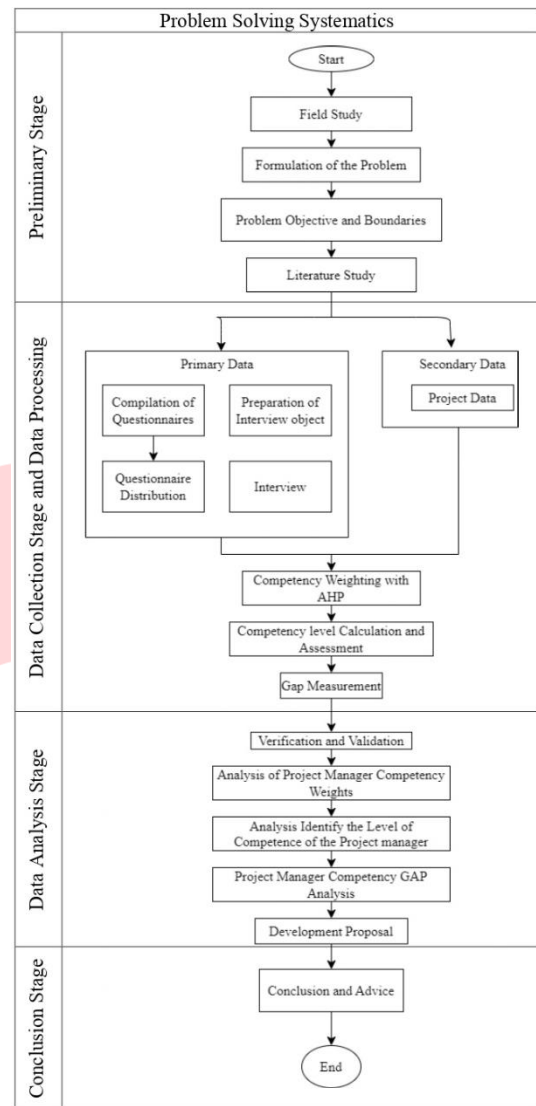


FIGURE III. 4
Problem Solving Systematics

B. Limitations and Assumptions

This study has limitations and assumptions from the view of a problem, as follows:

1. This study only measures the assessment of personal competence aspects of project managers who handle Telkomsel's Fronthaul Easy Macro BTS construction project.
2. This research the author conducted at PT XYZ
3. This study the author took measurements using the PMCDF method using surveys, analyzed using AHP by measuring assessment weighting.
4. This study only evaluates project managers who handle Telkomsel's BTS Easy Macro Fronthaul construction project.

IV. RESULT AND DISCUSSION

The results of AHP processing and survey assessments to determine the priority ranking of interests include personal aspects in the PMCDF reference, namely Communicating, Leading, Managing, Cognitive Ability, Effectiveness and Professionalism can be seen in table IV.1

TABLE IV.1
Priority Rating and the results of the Project Manager competency assessment

Personal Competence Aspects	Unit weight	Project Manager Value		
		Code Competency Element	Percentage element	PM Competency Level
Managing	28,3%	(M 1)	74%	5
		(M 2)	43%	5
		(M 3)	76%	5
Leading	22,6%	(L 1)	40%	2
		(L 2)	76%	5
		(L 3)	79%	5
		(L 4)	82%	5
		(L 5)	71%	4
Cognitive Ability	14,1%	(CA 1)	60%	4
		(CA 2)	55%	3
		(CA 3)	42%	2
		(CA 4)	80%	5
Professionalism	13,9%	(P 1)	73,61%	5
		(P 2)	69,17%	4
		(P 3)	72,50%	5
		(P 4)	75,00%	5
Communication	13,7%	(C 1)	50%	3
		(C 2)	65%	4
		(C 3)	56%	3
		(C 4)	57%	3
Effectiveness	7,5%	(E 1)	44,44%	2
		(E 2)	47,92%	3
		(E 3)	73,3%	5
		(E 4)	76,04%	5

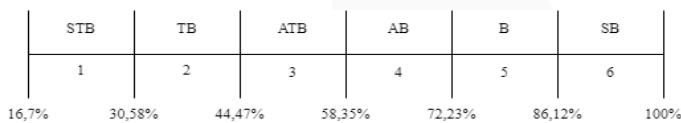


FIGURE IV.5
Continuum Line

The table is presented with a continuum line which can be seen in Figure IV.5 and the category descriptions in Table IV.3 are as follows.

TABLE IV.3
Description of Score Category Interpretation Results

Final Grades	Percentage Value	Value Categories	Code
1	16,70% - 30,58%	Very Not Good	STB
2	30,59% - 44,47%	Bad	TB
3	44,48% - 58,35%	It's a bit bad	ATB
4	58,36% - 72,23%	quite good	AB
5	72,24% - 86,12%	Good	B
6	86,13% - 100%	Excellent	SB

A. Communicating

In Communication, it can be analyzed from the C1 element related to skills (Listening, understanding, and responding to stakeholders actively) getting a score of 50% with the category Somewhat Not Good, the C3 element related to ability (Guaranteeing information quality) has a score of 56%, and the C4 element related to ability (Adjusting communication to the Audience) has a score of 57%, all three are categorized as Somewhat Not Good. While the C2 element related to capability (Maintaining communication lines) has a score of 65%, with the category Somewhat Good. From the evaluation of this research, it indicates that the project manager who handles the Telkomsel BTS Easy

Macro Fronthaul construction project is still lacking in terms of Communicating Capabilities. Also presented is the GAP communicating graph can be seen in figure IV.6.

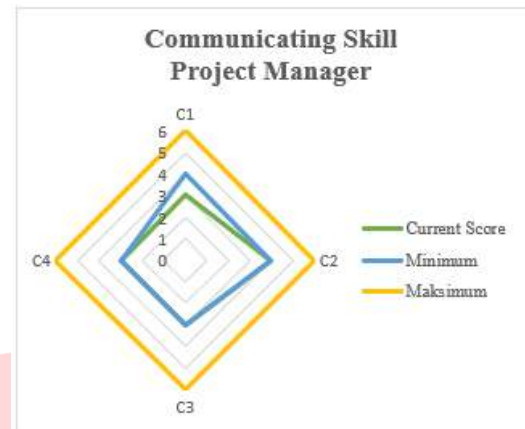


FIGURE IV.6.
GAP Communicating

Communication competence gets the fifth rank weighting, with a percentage of 13.7%. However, from the percentage of the four elements in Communication Competence, there is one value that is less than the minimum value that has been set in reference to the personal aspect of PMCDF, namely element C1. While the three elements, namely elements C2, C3, and C4 get a minimum score with reference values from PMCDF. To improve the elements of C1, C2, C3, and C4 PM must be able to increase activeness and train the style of speaking to stakeholders when delivering projects or discussing. It is better to gradually improve communication lines. Communication is carried out not only in Telegram groups but can be through meetings every week with meetings held consistently. To maintain more effective and quality communication, the PM is able to avoid communication misses such as when meetings are made MoM (Minutes of Meeting) so that the PM and stakeholders can follow up on the actions to be taken.

Based on the recommendation to use tools and techniques in the Communication process according to PMCDF 6rd reference is to use Focus Group discussions with stakeholders and PM by making a checklist in the form of activities to guide the course of the project. This activity can minimize the low communication of PM to stakeholders and vice versa. The recommendation for the project manager development stage to improve communication skills is to carry out the development stage or professional communication training accompanied by experts in their fields.

B. Leading

Leading Competencies in L1 elements (Creating a team environment that promotes high performance) received a percentage score of 40%, with a current score of 2 and categorized as Not Good. Furthermore, for the L2 element related to ability (Building and maintaining effective relationships) there was a percentage of 76%, with a current score of 5 indicating the Good category. The L3 element related to (Motivating and guiding project team members) also showed a percentage of 79%, with a current score of 5 which belongs to the Good category. The L4 element with capability (Taking accountability to deliver projects)

recorded a percentage of 82% and had a current score of 5, which was included in the Good category. Meanwhile, the L5 element with ability (Using influencing skills when needed) recorded a percentage of 71% and had a current score of 4, which was included in the Somewhat Good category. Also presented is the GAP communicating graph can be seen in figure IV.7.



FIGURE. IV.7
GAP Leading

Leading competencies get the second rank weighting, with a percentage of 22.6%. However, from the percentage of five elements in the Leading Competency, there is one value that is less than the minimum value that has been set in the reference to the personal aspect of PMCDF, namely the L1 element. While the four elements, namely elements L2, L3, L4, and L5 get a score exceeding the minimum value set by PMCDF. To improve the L1 element to achieve maximum value, PM is able to create a team environment that can support the success of the project. In carrying out the project PM is able to build and maintain effective relationships with fellow teams, building trust. Although the L2, L3, L4, and L5 elements have exceeded the minimum score that has been set, it still has to be improved by developing personal skills of the leading aspects of the project manager.

In reference to PMCDF® that the results of the PM assessment of Leading competence in element (L1) have been proven by the provision of motivation, rewards and reports on projects, but there is still a need for development in it to improve the professional aspect of his personal aspect. In the code elements (L2), (L3), (L4), and (L5) that PM has been able to build and maintain active relationships with stakeholders, motivate such as rewarding as performance rewards, also in delivering projects as evidenced by the risk register in which there is a content of possible risks, and PM is able to use skills to be involved in projects such as being able to influence techniques appropriately to stakeholders by making S Curves to more easily read projects and controlling project costs. However, the five elements still need an improvement stage as well as development to be maximal in being responsible for the completion of the project.

C. Managing

Based on the description in table IV.32 for the M1 element related to (Building and Retaining a Project Team) shows a percentage of 74%, with a current score of 5 and categorized as Good. Furthermore, for the M2 element related to (Planning and Managing Project success in an Organized Way) a percentage of 43% was seen, with a current score of 2 indicating the Not Good category. Meanwhile, the M3

element related to skills (Resolving Conflicts Involving Project Teams or Stakeholders) recorded a percentage of 76% and had a current score of 5, which was included in the Good category. Also presented is the GAP communicating graph can be seen in figure IV.8.



FIGURE. IV.8
GAP Managing

Managing competence gets the first rank weighting, which is with a percentage of 28.3%. Managing skills in M1 and M3 elements get values that exceed the minimum value determined by PMCDF. There is one value that is less than the minimum value that has been set in reference to the personal aspect of PMCDF, namely the M2 element. In the skill of planning and managing the success of project projects, project managers still need the development stage by conducting project management training with a direct simulation approach. Project managers must understand the stages of the project process, namely from the initiation, planning, executing, monitoring and controlling stages to project closure. Although the M1 and M3 elements have exceeded the minimum score, they still have to be improved by developing so that the value is maximized.

Based on the recommendation of using tools and techniques in the managing process in the context of building and maintaining teams as well as in resolving conflicts according to the PMCDF 6rd reference is to use RAM (Resource Assignment Matrix). RAM is able to determine the high level of responsibility for team or project stakeholders into the WBS (Work Breakdown Structure).

D. Cognitive Ability

The description in table IV.33 For CA code element 1 related to competence (Taking a Holistic View of the Project) shows a percentage of 60%, with a current score of 4 and categorized as Somewhat Good. Furthermore, for CA 2 code elements related to competence (Effective Problem Solving and Problem Solving) a percentage of 55% was seen, with a current score of 3 indicating the Somewhat Not Good category. Furthermore, the CA 3 code element (Using the Right Project Management Tools and Techniques) shows a percentage of 42%, with a current score of 2 which is included in the Not Good category. Meanwhile, the CA 4 (Looking for Opportunities to Improve Project Results) code element recorded a percentage of 80% and had a current score of 5, which was included in the Good category. Also presented is the GAP communicating graph can be seen in figure IV.9.

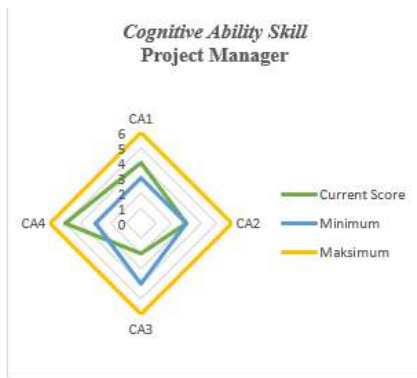


FIGURE. IV.9
GAP Managing

Cognitive Ability competence gets the second rank weighting, with a percentage of 14.1%. However, of the percentage of four elements in the Cognitive Ability competency, there is one value that is less than the minimum value that has been set in reference to the personal aspect of PMCDF, namely the CA3 element. While the CA 2 element gets a minimum value equal to the minimum value in the reference PMCDF value. And the elements CA 1 and CA 4 in value already exceed the values set by PMCDF. However, to maximize this value, there needs to be a stage of development and training.

Based on the recommendation to use tools and techniques in Cognitive Ability competencies according to PMCDF references is to develop teams using Training. Training by means of mentoring and mentoring on a scheduled basis. And in the competence of Cognitive Ability in the elements of effective problem solving, risk identification can be carried out with the concept of statement finalization. Statement finalization is a risk identification lifecycle where this statement is more detailed in the complete risk statement.

E. Effectiveness

Based on the description in table IV.34 For code element E 1 related to skills in (Solving Project Problems) obtained a percentage of 44.44% with a current score of 3 and categorized as Not Good. Furthermore, for element E 2 related to skills in (Maintaining Project Stakeholder Engagement, Motivation, and Support) a percentage of 47.92% was seen, with a current score of 3 indicating the Somewhat Not Good category. Element E 3 relating to deep skills (Changes in Speed Required to Meet Project Needs) showed a percentage of 73.3%, with a current score of 5 which belongs to the Good category. Meanwhile, Element E 4 related to inner skills (Using Assertiveness When Needed) recorded a percentage of 76.04% and had a current score of 5, which was included in the Good category. Also presented is the GAP communicating graph can be seen in figure IV.10.

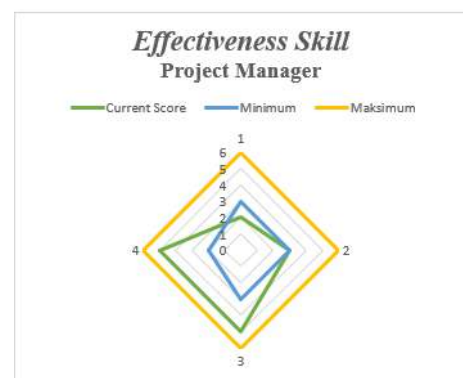


FIGURE. IV.10
GAP Effectiveness

Effectiveness competence gets the sixth rank weighting, which is the last with a percentage of 7.5%. However, of the percentage of four elements in the Effectiveness competency, there is one value that is less than the minimum value that has been set in reference to the personal aspect of PMCDF, namely element E1. While element E2 gets a minimum score set by PMCDF. And element E3 and E4 get a score exceeding the specified value. In element E1 and element E2 project managers in solving project problems need development and training on project management. In order for the fulfillment of a project to be done quickly, it requires understanding the project scope from the initiation stage to the closing stage to run the project effectively.

F. Professionalism

Description in table IV.35 For element P 1 related to skills (Showing Commitment to the Project) shows a percentage of 73.61% with a current score of 5 and is categorized as Good. Furthermore, for element P 2 related to skills (Operating with Integrity) there was a percentage of 69.17%, with a current score of 4 indicating the Somewhat Good category. Element P 3 related to skills (Handling Personal and Team Difficulties in a Suitable Way) showed a percentage of 72.50%, with a current score of 5 which belongs to the Good category. Meanwhile, Element P 4 related to skills (Solving Individual and Organizational Problems with Objectivity) recorded a percentage of 75.00% and had a current score of 5, which was included in the Good category. Also presented is the GAP communicating graph can be seen in figure IV.11.



FIGURE. IV.11
GAP Professionalism

Professionalism competence gets the fourth rank weighting, with a percentage of 13.9%. Professionalism

competence has a good value. Code elements P1, P3, and P4 get a score exceeding the minimum value set by PMCDF. However, from element E2 get a score of fitting values with minimum values. For this reason, project managers are still in the development stage needed to increase value to the maximum.

Based on the recommendations of tools and techniques in professional competence according to PMCDF references, a development team is carried out. By conducting training individually or in groups by improving personal soft skills by involving character.

V. CONCLUSION

There are several conclusions from this research which has been done. This final project aims to identify levels and methods develop project manager competencies based on personal PMCDF design aspects.

1. Measuring the personal competency level of project managers who handle the Telkomsel BTS Easy Macro fronthaul project through 6 units, namely Communicating with a total average score of 57%, Leading 69%, Managing 64.3%, Cognitive Ability 79%, Effectiveness 60.4%, and Professionalism 72.57%. These six elements have not met optimal values. It can be concluded from the results of measuring the value of the project manager who handles the Telkomsel Easy Macro BTS project is still at a low level.
2. Proposed to increase the competency of a Project Manager from the knowledge and skills aspects contained in the Telkomsel BTS Easy Macro Fronthaul development project in the form of development which can be described in each competency unit, namely as follows:

A. Communicating

The development stage in the Communicating unit is to conduct Training and Coaching for project managers (human resources). This training can be done online or offline. With systematic stylistic exercises, case studies are given on how to motivate yourself and your team.

B. Leading

The development stage in the Leading unit is conducting project management training with and coaching to project managers or (human resources). With the practice of leading the project in order to be able to plan, make the procedures needed in the project.

C. Managing

The development stage in the Managing unit is conducting project management training and coaching to project managers or (human resources). This Training and Coaching can be done online or offline. With practice responding to project problems and setting project policies according to company standards.

D. Cognitive Ability

The development stage in the Cognitive Ability unit is to conduct Training / Simulation or gamification of project managers or (human resources). Related to evaluating complex project problems. In understanding and applying standards, tools and techniques can learn from the Guidebook standard tools and techniques / conduct training. Also, the exercise of developing appropriate communication strategies

to involve all teams is carried out classroom training by involving all teams.

E. Effectiveness

The development stage in the Effectiveness unit is when using communication in responding to problems to be effective and concerns are carried out mentoring / coaching to train communication effectively there is a project manager or (human resources). Also exercises with a blended learning format in the form of experiential, formal and nonformal learning.

F. Professionalism

The development stage in the Professionalism unit is to conduct Peer-to-peer coaching by creating a positive environment for project managers with stakeholders. Able to learn from mistakes to improve performance by doing individual training.

The suggestions for recommendations submitted by the author are as follows, to achieve maximum value in competence, it is recommended to improve or improve competence through learning methods and development methods. This can be achieved through training, development, or participation in seminars or online training related to the development of relevant competencies.

PMCDF (Project Manager Competency Development Framework) has the potential to be a tool for assessing the personal competence of project managers within the company, with the aim of advancing and improving their personal competence and performance.

For future research, it is recommended to assess performance competencies and weigh each element of competence. This step will help identify elements that have top priority in PT XYZ.

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