



# Evaluating the Implementation of Marine and Fisheries Technopark in Tegal, Indonesia Using Project Cycle Management

Ady Sabana<sup>1\*</sup>, Helgi Kristinarson Gestsson<sup>2</sup>

<sup>1</sup>Centre of Marine and Fisheries Training and Extension Program, Ministry of Marine Affairs and Fisheries of Indonesia. <sup>2</sup>Faculty of Business Administration, University of Akureyri, Iceland. \*Email: [sabana.2016@outlook.com](mailto:sabana.2016@outlook.com)

## ABSTRACT

In 2015 the government of Indonesia planned the construction of 100 technology parks, spread over the whole of the country, of which 24 Marine and Fisheries Technology Parks (MFTP) were to be built in the period from 2015 to 2019. To establish a sustainable operation of the Tegal MFTP within four years the study evaluates the implementation of the MFTP in Tegal, Central Java Province, Indonesia, using a Project Cycle Management (PCM). The Tegal MFTP has been in operations since 2015. Comparing performance to targets over the first two years has called for improvements. In 2015 four incubator activities were started up at the MFTP. Unfortunately, all but one incubator was discontinued 2016. Based on PCM analysis suggestions to improve the operational sustainability of the MFTP are presented. The suggestions cover various aspects for improvement regarding the operations for the Tegal MFTP as well as for the new MFTPs, both for those starting operations now and those still in the planning. These aspects are a financial support approach, a MFTP administrative approach, an innovative technology approach, and an incubator services approach seeking to improve the satisfaction of the participants/tenants.

**Keywords:** Marine and Fisheries Techno Park, Project Cycle Management, Business Incubator

**JEL Classifications:** O22, O21

## 1. INTRODUCTION

Marine fisheries are of considerable importance to the Republic of Indonesia in terms of both quantity and value. Located mainly in Southeast Asia with some territories in Oceania, between the Indian and Pacific Ocean, and it has a very high marine biodiversity. Although the marine environment is rich, the development in this sector has also experienced considerable challenges.

Empirical data show a correlation between scientific and technological capability with the progress of a country's economy. Although Indonesia's economic performance is relatively good, the contribution of technology to economic growth is still modest. Indonesia faces two significant constraints: (1) The limited investment in the downstream industries for processing raw or semi-finished materials into finished products, and (2) the immature state of national technology to support growth of the downstream industries (Ristek, 2011).

Faced with these problems in order to realize the vision to become a developed and prosperous country by 2025, the government launched the Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MPAEIED) to accelerate economic transformation. The approach focuses on concrete and measurable priorities. One of the strategies in the implementation of MPAEIED is human resource capacity development and science and technology through the development of technology parks or "techno parks" in marine activities (Coordinating Ministry for Economic Affairs, 2011).

One of the main purposes of the development of techno parks is to address the problems faced by the fishing industry in Indonesia. Marine and fisheries SMEs' problems are commonly related to size, isolation, market opportunities, standards/quality, supply and value chains, logistics and technology innovation. As marine and fisheries SMEs vary widely in size, capabilities, environment (urban or rural based) and organizational structures, coherent region-wide approaches to address their problems have been difficult to craft.

In 2015 the government of Indonesia launched the construction of 100 technology parks spread over the whole of country, and of which, 24 of Marine and Fisheries Technology Parks (MFTP) were to be built in the period from 2015 - 2019 under the Ministry of Marine Affairs and Fisheries (MMAF) of Indonesia. This program will involve universities, R&D institutions, the business and industry sector, fisheries training centres, supporting institutions and society aiming for them to work in synergy with each other. The MFTP is expected to be a forum to facilitate the application of science and technology into innovations that improve the competitiveness of marine and fisheries businesses and industries.

By 2016, only four of the 24 MFTPs, located in Tegal, Banyuwangi, Ambon, and Bitung had been established. Several problems have risen regarding the establishment and operation of the MFTPs and therefore, it is important to evaluate the experience so far. The MFTP in Tegal was selected for the study. Suggestions for improvement was based on project cycle management (PCM) analysis. The research questions of the study were:

- (1) What problems have arisen during the implementation of a MFTP in Tegal, Central Java Province, Indonesia?
- (2) How can the implementation of MFTP in Indonesia, especially in Tegal, Central Java Province, Indonesia, be improved based on a PCM analysis?

The goal of the study was to find ways to improve the implementation process of the MFTPs in Indonesia to establish a sustainable operation of the techno parks under the local government.

The result of the study is expected to contribute to the development of MFTP in Tegal as well as be used as an input for formulating programs in developing an efficient and effective MFTP. This study has limitations. Even though interviews were conducted with managers of MFTPs in Indonesia and secondary data of MFTPs collected and analysed, most of the reasoning used for the PCM analysis has been constructed on the perception of the author of this paper. This is especially true for the stakeholder analysis and the problem- and objective analysis, where it would have been right to use the input from the group of managers. The same thing applies for the determination of the indicators in the LF matrix used in the PCM analysis, as normally a group of managers would establish such indicator.

## 2. LITERATURE REVIEW

Economic growth is defined as an increase in income per capita; this is one of the factors that is required to improve well-being. Economic growth is necessity for the sustainability of economic development and improved welfare (Tambunan, 2011).

The importance of technology for economic growth has been recognized for a long time (Arsyad, 1999). It has generally been viewed as shown in the Solow model (Solow, 2007). In short, the level of technology will increase the level of productivity which in turn will improve economic growth. The increase of innovation in technology can occur through research and development. Innovation is not just about high-technology products, but more

about innovation that addresses specific challenges to the local context. Different types of technology innovations play different roles at various stages (OECD, 2012).

### 2.1. Technology Parks and Clusters

There are many terms employed to describe technological parks, such as technopolis, science park, science city, cyber park, hi-tech (industrial) park, innovation centre, R&D park, university research park, research and technology park, science and technology park, technology park, technology incubator, techno park, techno pole and technology business incubator (EESC, 2011). The broad concept of high-tech clusters may encompass the above terms, but differences between the various parks become apparent when their focus and contextual background are analysed (UNIDO, 2014).

Clusters are a geographic concentration of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition (Porter, 1998). Furthermore, clusters can be defined by the co-location of producers, services providers, educational and research institutions, financial institutions and other private and government institutions related through linkages of different types (European Commission, 2013). There is a huge diversity among clusters. They differ in terms of their stage of development along the cluster life cycle, some are networks of SMEs, some are organised around key anchor firms and yet others have developed around universities. The importance of clusters and networks for innovation and competitiveness is increasingly recognized by policy-makers (de Propis, 2002). According to Mytelka and Farinelli (2000), techno-parks is a form of "constructed" clusters that play an important role in promoting the cooperation between two different environments, academic and business.

Technology park developers have always aimed at supporting productive capacities to boost trade and, through increased prosperity, improve the quality of life. The first parks date back to 1705 in Gibraltar and the 1840s in Hong Kong. The early 1920s saw the emergence of a variety of special areas, such as customs zones, free trade zones, free ports, free zones, industrial estates, industrial parks, science parks, technology parks, export processing zones and special economic zones, all offering services to support trade and industry. From the 1950s onwards, science, research and technology parks emerged in many industrialized countries charged with bolstering innovation by linking researchers and industry (UNIDO, 2014).

The techno park concept has contributed to the development of local industries through regional innovation policies. Techno parks have played an important role in the growth of start-ups, venture firms, and SMEs' since Techno parks rely on the SMEs' competency in terms of their long-term competitiveness. Moreover, to foster SMEs and increase their value and competitiveness, techno parks deploy various business supporting programs and endeavours. Enhancing the competitiveness of SMEs has been recognized as a driving force of local economic as well as industrial growth. Thus, many of such business supporting programs were designed to equip local SMEs to gain global competitiveness (Kyung et al., 2014).

According to UNIDO (2014), techno parks foster innovation where creativity generates ideas, which in turn lead to innovation and new technologies and ways of doing things. They generate public-sector investment where economic growth improves citizens' quality of life. Innovation is about bringing value to the market and that value enhances quality of life. Techno parks play a key role in driving innovation at every level in every country. Innovation is high-tech, but it can also be medium tech, low-tech, and even no-tech. Techno parks also link researchers with industry as techno parks can map local industry needs and work with small business communities to give them access to research results. They also offer support in bringing research to the market. It means that techno-parks can look for research results that have commercial potential; they conduct market research and due diligence, intellectual property research, and assessments on patents and licenses. The techno park concept thus builds on concentric circles with research institutions and companies at the core and areas for production situated on the outer rings. The density of specialized institutions guarantees close cooperation necessary for networking between the tenants (Figure 1).

As the tenant companies develop and grow, the park will continue to invest in infrastructure and services, to reflect the changing demands of the companies, for instance, in providing amenities that improve the quality of the working environment (UNIDO, 2014).

**2.2. PCM**

PCM is a term used to describe the management activities and decision-making procedures used during the life time of a project, including key tasks, roles and responsibilities, key documents, and decision options (European Commission, 2004). It is a methodology for the preparation, implementation and evaluation of projects that incorporates the principles of the Logical Framework Approach (LFA). The project cycle provides a structure to ensure that stakeholders are consulted and that relevant information is

available, so that informed decisions can be made at key stages in the life of a project (European Commission, 2002). The generic project cycle has six phases as shown as Figure 2.

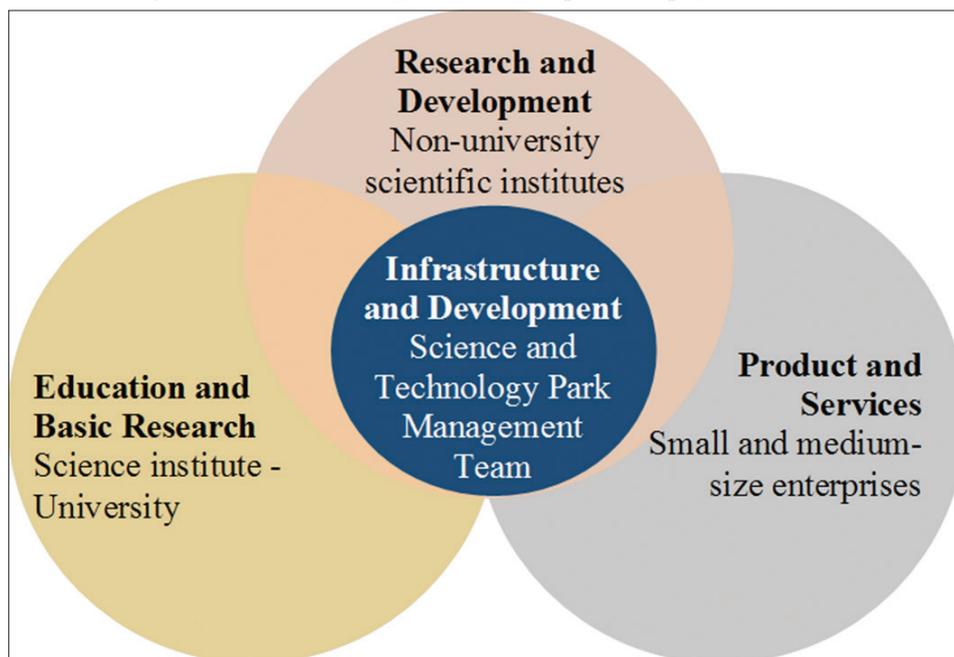
For a project to be accepted by the European Commission all phases of the PCM methodology are to be addressed and approved. Among the core PCM tools are quality assessment criteria, institutional capacity assessment and the Logical Framework Approach (European Commission, 2004)

LFA is an analytical and management tool which is used, in one form or another, by most multi-lateral and bi-lateral aid agencies, international NGOs and many governments (European Commission, 2004). According to Team Technologies, Middleburg, Virginia (2005), LFA is a tool that has the power to communicate the essential element of a complex project clearly and succinctly throughout the project cycle. It is used to develop the overall design of a project, to improve project implementation monitoring, and to strengthen periodic project evaluation. Essentially the log frame is a "cause and effect" model of project interventions to create desired impacts for the beneficiaries. A properly planned project addressing the real problems of the beneficiaries' can't be achieved without an analysis of the existing situation. There are four types of analysis based on LFA; stakeholder analysis, problem analysis, analysis of objectives and analysis of strategies (European Commission, 2002).

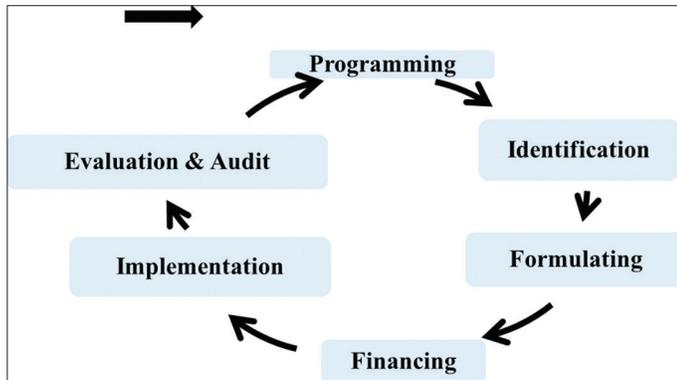
**3. METHODS**

The study used descriptive research by means of a case study. A descriptive study tries to find an exact description of all the activities, objects, processes, and communities (Basuki, 2010). Descriptive research relates to the collection of facts and valid data to provide a representation of the object under study. Here the data collection and the LFA used are described.

**Figure 1:** Institutional linkages of the techno park concept (UNIDO, 2014)



**Figure 2:** Six phases of project cycle management (European Commission, 2004)



### 3.1. Data Collection

The study was conducted in Iceland between December 2016 and January 2017. Data and information were collected through diverse methods as follows:

#### 3.1.1. Interviews

Semi-structured interviews were undertaken to collect qualitative information about the implementation of Tegal MFTP from informants/stakeholders. The interviews are conducted with an open framework which allowed for focused, conversational, two-way communication (FAO, 1990). Through interviews, the researcher sought a depth of information regarding the development of the Tegal MFTP project from a person in charge of the implementation project of MFTP in Tegal, and the person in charge in Tegal MFTP incubator activities.

#### 3.1.2. Study documents

Documents in the form of text, images, reports, or formal information from the institution or persons were collected in accordance with the suggestions of Sugiyono (2012). In this study documents such as formal memorandum; government published reports, manuals, regulations, guideline, minutes of meetings, as well as information from Indonesian government's official websites were used.

#### 3.1.3. Online search

Using the Internet to collect data is convenient and can greatly extend sample representativeness (Benfield and Szlemko, 2006). In the study, the internet was used to access data and information related to the study.

The data was then used for the PCM analysis purposes.

### 3.2. Logical Framework Approach

As a part of the formulating phase of the PCM the data was analysed using the LFA. In the analysis stage of the formulation phase, four analyses were conducted (European Commission, 2002):

1. Stakeholder analysis. A technique to identify and assess the importance of key people, groups of people or institutions that may significantly influence the success of an activity or project.
2. Problem analysis. It identifies the negative aspects of an existing situation and establishes the "cause and effect"

relationships between the problems that exist and a problematic outcome.

3. Analysis of objectives is a methodological approach employed to describe the situation in the future once the problems that now have been remedied, with the participation of representative parties.
4. Analysis of strategies involves selecting the strategies which will be used to achieve the desired objectives. Analysis of strategies involves deciding what objectives will be included in the project, and what objectives will remain or not, and what the project purpose and overall objective will be.

For the planning phase, only the development of the logical framework matrix (LFM) was done. This sums up the feasibility of the implementation of the project and provides suggestions for improvement of the process as is seen in Figure 3. Here the LFM uses the goal of this paper as the overall activity, the Tegal MFTP project as the purpose and then the results needed for the success of the project ending in activities for improving the project.

Ideally, the whole process of the LFA should be conducted as shown in Figure 3. However, due to limitations of time for the study and the unavailability of stakeholder involvement to help determine different perspectives, the analysis of this study stops after the analysis of the LFM stage before the scheduling and the reports part.

## 4. RESULTS

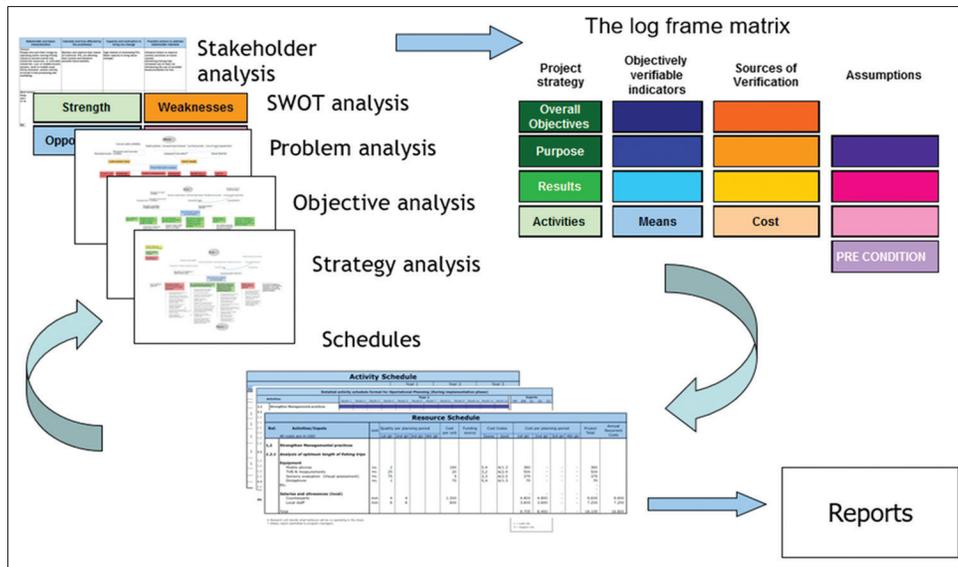
This analysis is the PCM based logical framework analysis for the case used for the study. From that analysis of identification, stakeholder analysis, swot analysis, problem analysis, objective analysis and strategic analysis a logical framework matrix is designed. The matrix ties together the overall objectives of finding ways to improve the implementation process of the MFTPs for establishing a sustainable operation of the techno parks by local governments.

### 4.1. Identification

Based on the reports of Tegal MFTP activities in 2015 and 2016, problems have arisen during the implementation. Out of the four incubators that were established in the first year, only one, a sea salt incubator was still active in the second year of the project. Techno parks have different roles such as innovation, public-sector investment, linking researchers with industry, and support in bringing research to market (UNIDO, 2014). This is in accordance with the master plan for Tegal MFTP and in line with the general role of the techno parks to try to connect diverse stakeholders in Tegal MFTP, academia to R&D institutions, entrepreneurs to industry, government and society/community (Table 1). In the case of the Tegal Techno Park the ties between diverse stakeholders are far from clear.

According to the master plan for Tegal MFTP, a comparison of performance indicators for the Technology Park in accordance to the maturity level is shown in Table 2.

**Figure 3:** Logical Framework Approach process of analysing and planning (Gestsson, 2016)



**Table 1: The role of institution involved in Tegal MFTP (Tegal Training Center, 2015)**

Institution	Regulator	Facilitator	Advocacy	R&D	User	Access investment
Central Government	x	x				
Regional Government	x	x				
Academic			x	x		
Business world/Industry					x	
Community/Society					x	
Regional investment agency						x

**Table 2: Performance indicator for technology park per maturity level (Tegal Training Center, 2015)**

Performance indicator Techno park	Maturity level model			
	Level I	Level II	Level III	Level IV
Collaboration between R&D with industries			x	x
Participation for training, education and certification	x	x	x	x
Utilization of equipment by industry	x	x	x	x
Pilot scale production/prototype industry		x	x	x
Intellectual property right (IPR)				x
Tenant/candidate for incubation		x	x	x
Start-up graduation				x
The labour force absorbed by the new SMEs				x
Annual turnover of SMEs which is built in the Techno park				x
Contribution to regional development				x

Based on the performance indicators identification, the Tegal MFTP can be categorized in a maturity between levels 1 and 2. The Tegal MFTP has already conducted some training, offered education and certification but still lacks willingness of industry to utilize the parks facilities. It has developed pilot scale productions but not had a sustainable tenant company incubation, since the operation of the business incubator has been discontinued.

**4.2. Stakeholder- and SWOT Analysis**

Any individuals, groups of people, institutions or firms that may have a significant interest in the success or failure of a project (either as implementers, facilitators, beneficiaries, or adversaries) are defined as 'stakeholders'. A basic premise that stakeholders have different concerns, capacities, and interests, and that these need to be explicitly understood and recognized in the process of

problem identification, objective setting, and selection of strategy (European Commission, 2004).

The success of the implementation of a techno park depends on the involvement of various actors or stakeholders. Based on the identification process, the implementation of Tegal MFTP has faced many problems that need to be addressed and remedied by stakeholders. Therefore, it was necessary to analyse the groups of stakeholders, the ones who are most involved, establish what their interests are, what impact they have and find out how to solve the problems arising in accordance with the role of the diverse groups.

Five important groups of stakeholders were identified for the Tegal MFTP, all with different interests and influence and capacity to bring about the necessary change. The groups are the central

government, local government, academia and R&D, the industry (including entrepreneurs) and society (Appendix 1).

Based on the stakeholder grouping a SWOT analysis for the Tegal MFTP was created (Appendix 2). It is clear, that experience in delivering training for the marine and fisheries industry, certification of competences in that field and being able to offer technical infrastructure for marine and training constitutes strengths. The major weaknesses at the same time are found to be unclear rules and regulations related to the park as well as limited facilities. Lack of appropriate innovation support in line with the Tegal marine and fisheries potential and market needs and last, but not least the lack of capability to create synergy and collaboration of the actors. The project is seen at the same time to be facing threats from the environment such as limited support from academia and R&D institutions. Support from the local government in Tegal is also lacking, international competition is increasing and fishing is reduced in accordance with the IUU fishing regulations. But the environment also provides opportunities. The market for fish is growing and at the same time the community has great expectation for the park to become successful. There is support from a community based training centre and the government sees the program as a priority, supported by the nearby local government of Brebes.

These results were then used for the following problem analysis.

#### 4.3. Problem Analysis

The problem analysis identifies the negative aspects of an existing situation and establishes Cause and effect relationships (European Commission, 2004). The following problems have been identified;

- Out of four incubators that have been established and activated, after two years only the sea salt incubator is still operational.
- The Tegal MFTP's role in activating stakeholder engagement between the park and academia, R&D institutions, industry, government, and society/community is not clear. This is seen by the lack of involvement and support from stakeholders in MFTP activities.
- Based on project performance indicators, the Tegal MFTP can only be categorized as been at maturity level between stages 1 and 2.

All these problems have impacted the 2016 implementation schedule of MFTP in Tegal as it still does not meet the target set. According to the Tegal MFTP stakeholders and with reference to the implementation reports, the causes for the problems are found to be;

- The limited and different understanding of the concept of MFTPs from the central government, local government, and other stakeholders.
- Limited financial support, as the only source of financing comes from the government national budget.
- Late access to funds due to the slow administration that in some cases leads to difficulties in providing the already planned incubator facilities.
- Slow process for the preparation of documents required for the MFTP construction.

- Lack of involvement in providing innovation and technology and facilities based on the local needs.
- Lack of stakeholder engagement to support incubation processes from the marine and fishing industry and financial institutions.

To better understand the root of the problems a problem tree analysis was carried out. Based on the effects, impacts, and possible causes of the problem of the implementation of the project not being not on time in the problem tree analysis, four major groups of problems were found to dominate the process during the implementation of the project. These are the inaccurate financial support for the project, the administrative bureaucracy process, the availability of innovation, technology, and support facilities and lastly the customer's or the participant's satisfaction.

The effects of the problem tree were firstly found to be that the inefficiency of the project that the projects secondly that the target is not on time, thirdly, that inaccurate and late budget and financing are problematic for the projects progress, fourthly that the wasting of resources that are not the ones in line with the needs of the stakeholders. Lastly, the stakeholders and participants were also unhappy with the MFOB's cooperation. This has led to lost opportunities for capacity improvement, to not offering the right technology and assistance for innovation for improving products/services, inadequate funds for developing the businesses and not helping to create networks for companies to access the necessary markets.

#### 4.4. Analysis of Objectives

Objective analysis is a methodological approach employed firstly to describe the situation in the future once problems stated in the problem analysis have been remedied, secondly to verify the hierarchy of objectives and thirdly to illustrate the means-ends relationships in a diagram (European Commission, 2004). From the problem tree chart, it can be stated that the project objective of the problem is to make sure that the implementation of the Tegal MFTP is in line with the target plan. To fulfil the objectives of the tree for the Tegal project, four different approaches are considered. The objective analysis chart for the Tegal project is shown in Figure 4.

A financial support approach is needed for improving the ministerial administration process, a MFTP administrative approach, improving the MFTP administrative process for the projects, an innovation and technology approach, providing innovation, technology, and facilities in accordance with local needs, and an incubator services approach seeking to improve the satisfaction of the participants/tenant companies.

#### 4.5. Analysis of Strategies

The different approaches from the identification of the objective analysis are the inputs for the strategy analysis.

In Table 3 the approaches are evaluated and described more fully, the needs associated to each approach are listed, time needed for improvement is shown for ease of scheduling

**Table 3: Problem solving comparison of each approach**

No.	Approach	Description	Need	Time	Benefit
1.	Financial support approach	Provide sustainable financial support for the MFTPs by improving the ministerial administration process	Shortening the time for preparing administrative documents Providing for alternative sources of financial support	Does not need a long time depending on the consistency of planning arrangement Does not need a long time depending on result of engagement with other financial institutions that can provide funding	The process of the construction of MFTPs is fast All stakeholders will be supportive because they feel they own the project
2.	MFTP administrative approach	Provides the appropriate MFTP local administration required for the schedule	Provide good understanding from the stakeholders about the MFTP concept Improve the number of competent HR when preparing documents Improve support in the administration process from local stakeholder and district government	Needs time to prepare the technical guidance, allocate time for interaction, and HR in term of administration need Needs time for HR building programs and engagement with the local government Does not need long time after local stakeholder and district government become involved to support the administration process	Stakeholders will be supportive because they feel they own the project HR is an importance factor for the sustainability of the project Stakeholders will be supportive because they feel they own the project
3.	Innovation and technology based on the needs approach	Provide innovation and technology in accordance with local needs	Provide good feasibility studies Provide extensive availability of innovation and technology Provide facilities that support innovation and technology	Needs time to prepare comprehensive studies. It can be accelerated by involving academia and R&D institutions Does not need too long a time depending on the networking to the academia, R&D institutions and companies Does not need too long a time depending on the networking to the academia, R&D institutions	Construction of MFTP in accordance with the local needs Construction of MFTP in accordance to the local needs Efficient budget, time, and effort
4.	Incubator services approach	Prospective tenants satisfied with the services	Provide competent HR resources for training, coaching and mentoring with access to marketing Provide facilities that support innovation and technology Provide alternative funding for limited budget	Does not need long time depending on the selection of the best candidates and engagement with the stakeholder Needs time for the collaboration for facilities with other institutions and the preparations of the equipment Does not need too long a time depending on the network with the financial institution and companies	The HR is the resource that ensures that the program is sustainable Efficient budget, time, and the effort of cooperation with other institutions Efficient budget, time and effort, and finding ways to make stakeholders see the benefits of the project

and lastly the benefits sought from each approach are then explained.

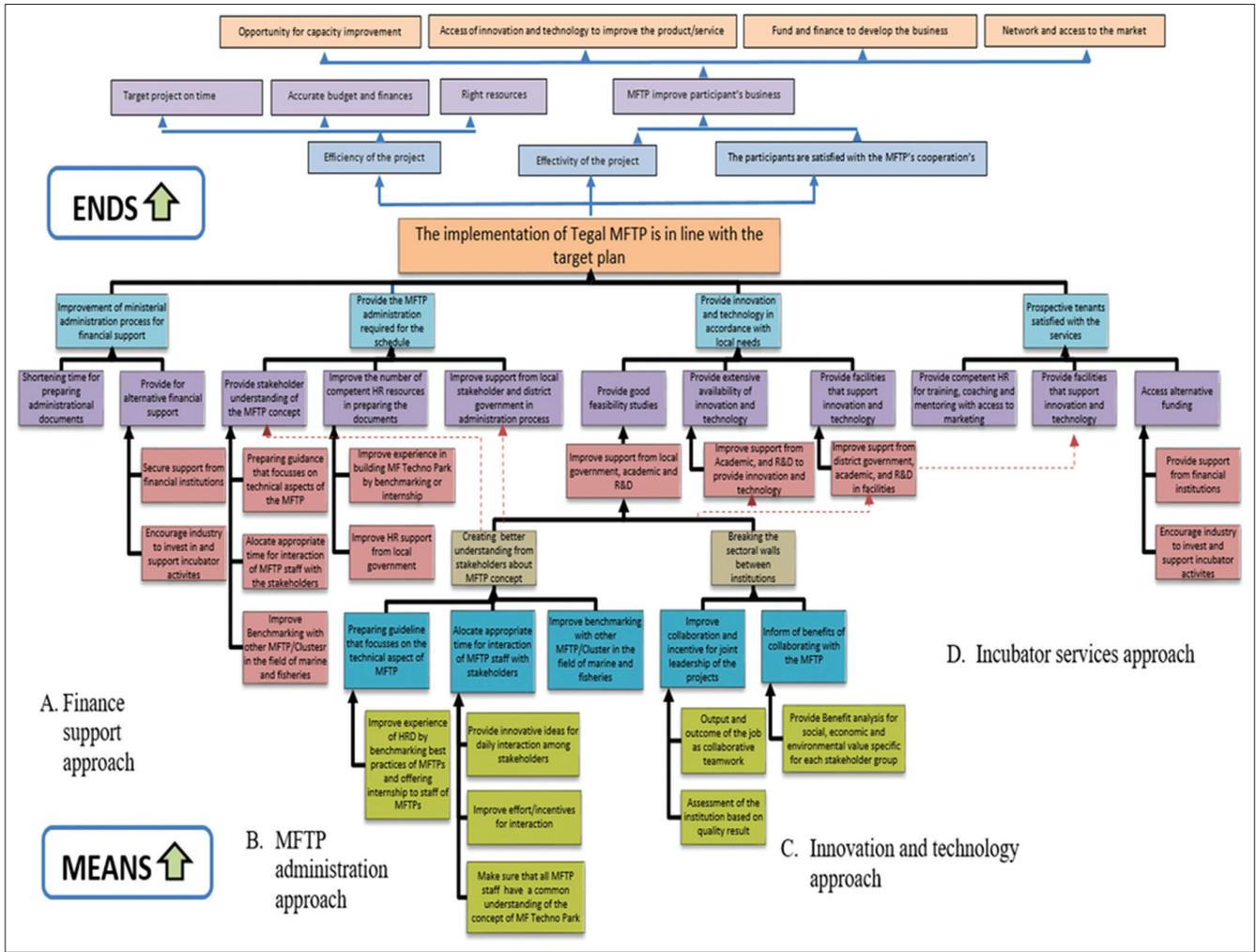
In Appendix 3, a table of the activities needed for improvement for the four approaches is shown. The activities needed for improvement were arranged in accordance with the objective

analysis. These activities are the foundation for the suggestions for improvement of the Tegal MFTP project.

**4.6. Logical Framework Matrix**

During the process of stakeholder-, problem analysis and the identification of potential project objectives, views on the potential

Figure 4: Objective analysis chart for the Tegal Marine and Fisheries Technology Parks project



merits or difficulties associated with addressing problems in different ways has been discussed. These issues and options then need to be more fully scrutinised to help determine the likely scope of the project before more detailed design work is undertaken (European Commission, 2004).

The logical framework matrix for Tegal MFTP is shown here as Table 4. It shows the project description of the overall objective of improving the competitiveness of marine and fisheries businesses/SMEs and related industries in Tegal, the purpose being that the local sustainability of the Tegal MFTP business incubators is in line with the target plan and the deliverables listed. Indicators/targets for success are shown in the table as well as how performance will be verified through distinct sources. Risk and assumptions that are the precondition for success are also specified.

The list of activities part of the logical framework matrix is not shown in Table 4 but is accessible separately as Appendix 3.

### 5. DISCUSSION

The goal of the Tegal MFTP is to improve business processes and the value added of marine and fisheries products. Furthermore, it is supposed to facilitate new start-up companies with services at

the business incubators, including assistance and guidance with their strategy by helping them to develop new markets or grow in existing markets. For the long-term the program aims to improve the local economy and increase contributions to local revenues in Tegal and major cities around it.

It is expected that by 2019 the Tegal MFTP will be sustainable and can be transferred to the local government for carrying on their operations. Yet the project has neither been meeting the success targets nor the time set objectives in accordance to the original masterplan. This problem must be remedied.

From the analysis of the PCM the major problems were found to be the limited and different understanding of the concept of MFTPs by the central government, local government, and other stakeholders. Limited financial support, late release of funds due to the slow ministerial administration process create difficulties in providing the already planned incubator facilities. The preparation of documents required for the MFTP construction is also very problematic as well as the lack of involvement in providing innovation and technology and facilities that are based on local needs. Importantly the lack of stakeholder engagement for support of the incubation process from the marine and fishing industry and financial institutions must be improved.

**Table 4: Logical framework matrix for the Tegal MFTP**

Project description	Indicators	Source of verification	Assumptions
Overall objective			
Improving the competitiveness of marine and fisheries businesses/ SMEs and related industries in Tegal	A yearly relative growth in industry×s local GDP of 0.5% A yearly growth in production value of 1.5%	Yearly monitoring survey by monitoring division under the ministry (MMAF)	
Purpose			
The local sustainability of the Tegal MFTP business incubators in line with the target plan	By 2019 all incubator businesses are running sustainability and have been taken over by local government	Yearly monitoring survey by monitoring division under the ministry (MMAF)	Support by the national policy to build marine and fisheries techno park 2015-2019
Result/Outputs/Deliverables			
Improvement for ministerial administration process for financial support	The process of the ministerial financial support is on schedule for the MFTP construction. Delay for funds not longer than 1 month	6 months periodically monitoring survey by monitoring division under the ministry (MMAF)	No cutting of finances from higher institutions during implementation of the project
Improvement for the internal administrative process of the MFTP for support for technical infrastructure and facilities	Administration process in line with the schedule of the MFTP construction. Delay in construction and implementation not longer than 1 month MFTP has agreements with financial institutions for financial support by 2017. 20% of total funding by 2019 MFTP has agreement with at least 1 company related to business incubator for investment and/or financial support by 2017	6 months periodically monitoring survey by monitoring division under the Ministry (MMAF) 6 months periodically monitoring survey by monitoring division under the ministry (MMAF)	All stakeholders encouraged to collaborate to support the administration process Support by government mechanism role in stakeholder collaboration project
Provide innovation and technology based on the needs of industries	100% of the tenants have access to innovation and technology (Incubator activity) provided in the MFTP by 2018	6 months periodically monitoring survey	Availability of research and innovation by R&D and academia for local need of industries
Satisfaction of tenants with MFTP services	1 <sup>st</sup> batch tenants from 2017 have a 50% wider networks and better access to their market by 2018, and 70% by 2019  25% of the 1st batch tenants in 2017 have found financial support and have grown their business level by 2018, and 35% by 2019	6 months periodically monitoring survey  6 months monitoring agencies survey	Availability of competent HR resources for training, coaching and mentoring with access to marketing, and facilities Availability of funding/ grant from government, corporate banking, or social institution

Based on PCM model four strategies (approaches) were identified that can be used to improve the progress of the Tegal MFTP. The ministry must undertake improvement to their budget disbursement process which has been less than optimal. This has interfered with the implementation. Late disbursement of funds has caused problems, including for the incubation activities and budgeted lease payments have been delayed as well. Government cuts the budget have also affected the success of the Tegal MFTP project. Alternative solution is the manager must be creative to find another funding source to support the activities of MFTP, in accordance with the rules.

Problems also occur that are linked to the administration of the Tegal MFTP. Time consuming administrative procedures and document preparation for scheduled rent of land and facilities, administration of training activities and for the licensing procedures of Environmental Impact Assessment (EIA). In

order to make sure that the implementation of the project runs smoothly, necessary and timely administrative support will be needed. Administrative process involving many stakeholders for cooperation and understanding must be improved, for example in the process of preparing incubation infrastructure. Strong support from stakeholders can expedite the administrative process. Availability of competent human resources also affects the efficiency of the administrative services. Increasing the HR competencies can be done by engaging managers and staff and to schedule and take part in visitations, to visit other MFTPs/ clusters for benchmarking or to seek short internship and learning experiences from them.

The MFTP is expected to be a forum where the flow of science and technology is turned into innovations that can provide increased competitiveness of marine and fisheries businesses and industries. Innovation and technology should be developed in

accordance with local needs and the level of SMEs businesses of the area. Some of the problems of the incubation tenants in 2015 and 2016 have been technology related. This can be resolved with collaboration between agencies or with other stakeholders that can offer a more appropriate technology. This collaboration can also address problems that are associated with the lack of expertise and infrastructure facilities. The collaboration can help to optimize the budgets and improve the success of the MFTP in meeting its targets.

The recipient of the MFTP incubator service in the end is the community. Tenants of the Tegal MFTP who want to develop their business in the field of marine and fisheries, should be able to increase the level of their business and gain increased profit to become more prosperous. Failure of the incubator process could result in the termination of the necessary services for the tenants so that they will not be able to develop or continue with their business. Problems can also arise from less than optimal training facilities, unavailability of competent facilitators, unsuitable innovation, technology or facilities. There is also the problem of limited information, unfulfilled expectations of access to markets and financial support not being met. This can be overcome by improving cooperation with relevant stakeholders. This could be helped by having access to more competent HR specialists that can cooperate with both R&D and academia and provide extension officers from the local government's centre of extension. Also having access to support of innovation technology that is available by R&D and academia and support facilities from other stakeholders is important. To improve market access and investment funding networking with industry and finance institutions is advantageous, helping future tenants, both individuals and companies to become more successful in their businesses.

## 6. CONCLUSIONS AND RECOMMENDATIONS

Technology park developers have always supported productive capacities in order to increase trade and, through increased prosperity, improve the quality of life. This has led to the development of local industries. Technology parks play an important role in the growth of start-ups, venture firms, and SMEs. Moreover, for fostering SMEs to increase their value and to heighten their competitiveness, techno parks offer various business supporting programs and endeavours.

Indonesian marine and fisheries techno parks have been established to respond to such challenges. Their purpose is to contribute to the development of local industries in the field of marine and fisheries. Four MFTPs have been started. One of them is the Tegal MFTP. Even if positive achievement has been made with the project there is room for further improvement. According to the PCM based analysis some suggestion for improvement can be made.

The goal of the study was to find ways to improve the implementation process of the MFTPs in Indonesia as to establish a sustainable operation of the techno parks so that they can sustainably be run by local government.

The Tegal MFTP has been focussing on the development of a sea salt incubator business started in 2016 in collaboration with local authority of Brebes Regency.

The sea salt production incubator was moved but should have opened again in 2017. Collaboration between R&D institutions, academia and local stakeholders is needed for the successful reopening of the incubator. It is suggested that in 2017 a detailed sustainable benefit and cost analysis should be made for that project, considering all stakeholders in the sea salt business in the hope of attracting more companies or entrepreneurs and other stakeholders willing to join the MFTP.

The ministry, as the main sources of funding for the project, should have a consistent policy for the development of the Tegal MFTP project. The financial support from the ministry should be paid out timely in accordance with the budget schedule for the project to be able to run efficiently and effectively. Monitoring and evaluation should be implemented regularly.

It is recommended to the Tegal MFTP that cooperation should initiated with both financial institutions and companies through their social responsibility programs so that independent funding can be made available for the tenants' businesses.

The local government is to be totally responsible for the operations for the Tegal MFTP project at the end of 2019. The MFTP must plan for being taken over by them at that time. It is crucial to start initiating the mechanism for transfer as early as soon as possible.

According to the governments planning, 24 new marine and fisheries techno parks will be constructed around Indonesia. Based on this study the following suggestions are made to improve the process of establishment of the new MFTP;

During the planning phase of new MFTPs an analysis of new opportunities should be carried out in cooperation stakeholders. It is suggested that a LFA framework is used. Such an analysis should give a detailed and comprehensive information about all relevant aspect of new marine and fisheries businesses, both direct and indirect business in the areas or regions it is operating in, and preparing future scenarios for the possibility of the need for expansion.

When a new MFTP is planned it should designed as a part of a network with the other techno parks or clusters in the field of marine and fisheries. Cooperation within the network can be in the form of visiting, internship or training activity. The new MFTP should develop collaboration with other stakeholders that can assist in giving support for applications for grants, HR, offering necessary access to technology facilities and marketing assistance.

The local government is an actor that must be involved in the project from the start as it will take over the operations after the first four years. It is therefore crucial to craft a strategy for the mechanism needed for such a transition.

## 7. ACKNOWLEDGEMENT

We would like to express gratitude to Dr. Tumi Tomasson who is the Director of the United Nations University-Fisheries Training Program (UNU-FTP) and his deputy, Mr. Thor Asgeirsson for their initial support and guidance while developing this work. We would also like to thank the board of the UNU-FTP and to the Director of the Marine and Fisheries Research Institute, management and staff for their support to this work.

Finally, we would like to thank the Marine and Fisheries Training Centre, Tegal Training Centre, Ministry of Marine Affairs and Fisheries in Indonesia, for the time given to work on this paper.

## REFERENCES

- Arsyad, L. (1999), Economic for the Development. 4<sup>th</sup> ed. Yogyakarta: YKPN High School of Economic Science.
- Basuki, S. (2010), Research Methods. Jakarta: Penaku.
- Benfield, J.A., Szlemko, W.J. (2006), Internet-based data collection: Promises and realities. *Journal of Research Practice*, 2(2), 1-15.
- Coordinating Ministry for Economic Affairs. (2011), Masterplan Percepatan dan Perluasan Pembangunan Ekonomi Indonesia 2011-2025 Republik Indonesia. Jakarta: Coordinating Ministry for Economic Affairs, Republic of Indonesia.
- de Propis, L. (2002), Types of innovation and inter-firm co-operation. *Entrepreneurship and Regional Development*, 14, 337-353.
- EESC. (2011), Opinion of the European economic and social committee on European technology, industrial and science parks in the crisis management, preparation of the after-crisis and post-lisbon strategy period. *Official Journal of the European Union*, ???, ???.
- European Commission. (2002), Project Cycle Management Handbook. Germany: PARTICIP GmbH.
- European Commission. (2004), Aid Delivery Methods, Project Cycle Management Guidelines. Vol. 1. Brussels: Europe Aid Cooperation Office.
- European Commission. (2013), Innovation Clusters in Europe: A Statistical Analysis and Overview of Current Policy Support, DG Enterprises and Industry.
- FAO. (1990), The Community's Toolbox: The Idea, Methods and Tools for Participatory Assessment, Monitoring and Evaluation in Community Forestry. Bangkok: FAO Regional Wood Energy Development Programme.
- Gestsson, H.K. (2016), Project Cycle Management. A lecture for United Nations University Fisheries Training Program (UNUFTP) in University of Akureyri. Iceland, Akureyri: UNU FTP.
- Kyung, J.S., Yang, S.J., Hwang, J.H. (2014), A case study of business support model deriving for SMEs: Chungnam Techno park. *World Technopolis Association*, 3, 165-175.
- Mytelka, L., Farinelli, F. (2000), Local Clusters, Innovation Systems and Sustained Competitiveness, Discussion Paper Series. The Netherland: The United Nations University, INTECH.
- OECD. (2012), Innovation for development. A Discussion of the Issues and an Overview of Work of the OECD Directorate for Science, Technology, and Industry, Organisation for Economic Co-operation and Development (OECD).
- Porter, M.E. (1998), Clusters and the New Economics of Competition. Boston: Harvard Business Review. p98609.
- Ristek. (2011), Innovation for Public Welfare. Jakarta: Ministry of Research and Technology.
- Solow, R. (2007), The last 50 year in growth theory and the next 10. *Oxford Review of Economic Policy*, 23(1), 3-14.
- Sugiyono. (2012), Understanding the Kualitatif Research. Bandung: ALFABETA.
- Tambunan, T.T. (2011), Industrialization in the Developing Country, Study Case in Indonesia. Jakarta: Ghalia Indonesia.
- Team Technologies. (2005), The Logframe Handbook: A Logical Framework Approach to Project Cycle Management. Washington, DC, Middleburg, Virginia: World Bank.
- Tegal Training Center. (2015), A Master Plan for the Development of Tegal Marine and Fisheries Techno Park. Tegal: Tegal Training Center.
- UNIDO. (2014), Fostering Inclusive and Sustainable Local Industrial Development in Europe and Central Asia, Second Regional Conference on the New Generation of Industrial Parks. Ljubljana, Slovenia: Ministry of Economic Development and Technology and the Ministry of Foreign Affairs of Slovenia.0

## APPENDIX

### APPENDIX TABLES

#### Appendix 1: The table of stakeholder analysis for Tegal Marine and Fisheries Techno Park

Stakeholder and basic characteristics	Interest and how affected by the problems	Capacity and motivation to bring about change	Possible actions to address stakeholder interests
Central government Consisting of several institutions/agencies across sectors for the development policies MFTP as a national program	The success of the MFTP program will increase the output target of the institution. The failure MFTP program will cause the performance of institutions to decrease	MFTP is expected to support the creation of new jobs, develop new company, increase economic growth, and increase prosperity in the marine and fisheries sector nationally	Preparing regulations and resources (man, money, methods) to support the development of MFTP

(Contd...)

**Appendix 1: (Continued)**

Stakeholder and basic characteristics	Interest and how affected by the problems	Capacity and motivation to bring about change	Possible actions to address stakeholder interests
Local government Consisting of several institutions/agencies in the scope of the marine and fisheries sector in the district/regency/city	MFTP success in the region will create jobs. The failure MFTP does not reflect negatively on the local government since it is considered as a program of the central government	MFTP is expected to support the creation of new jobs, business development, economic growth in the fisheries sector, as well as the improvement of social welfare in the marine and fisheries sector in the region	Preparing regulations and resources (finance, infrastructure, facility) to support the development of regional MFTP.
Academic/R&D Consists of several educational institutions and government agencies in the field of research and development of fisheries and marine resources	MFTP success will give added value output targets of the institution. The results not only for academic research purposes but also for industry. The failure MFTP program does reflect negatively on Academic/R&D institution since it is considered as a central government program	MFTP is a place for educational institutions and research institutes to apply innovation and technology appropriate to the needs of the marine and fisheries sector	Giving account to innovation and appropriate technology and resources as well as man, methods, facility to support the development of MFTP.
Industry Consisting of employers, groups of employers or companies engaged in the fisheries and marine sector, and some of them belonging to the community-based training centres	MFTP success will boost the company's profits. Failure of MFTP does not cause the company to suffer losses	MFTP a forum for them to develop a network and business in the marine and fisheries sector. To increase value/profit companies as well as improved brand/company image.	Invest in MFTP, open access to information on business opportunities in marine and fisheries sector. Increasing the quality and quantity of products/services produced
Society Consisting of society in general, training alumnae, or a group of marine and fisheries businesses who are interested to developing businesses in the marine and fisheries sector	MFTP success by involving society will increase the level of business and leisure, the ease of access to the market, innovation and technology, and financing. The lack of success of this program will led to reduced access to the markets, innovation, and appropriate technologies, as well as reduced financing	Business development, increase economic benefits, which resulted in the improvement of the welfare of the family.	Encourage motivation, willingness, and enthusiasm to work and develop business in the field of marine and fisheries

**Appendix 2: SWOT analysis for Tegal Marine and Fisheries Techno Park**

Internal	Strength	Weakness
	Experience in delivering technical training in marine and fisheries Certification of competence in the field of marine and fisheries Facility and technical infrastructure for marine and fisheries training	Unclear rules and regulation The infrastructure still partly the training centre Limited space for incubator activity Lack of innovation that is appropriate for the local capacity and market need Lack of capability to synergize and collaborate with the Tegal government, education and R&D Institutions
External	Opportunity High demands for fisheries production in the market High expectation by the community for the success of the techno park Support from community based training centre Maritime sector is a government priority program Support from Brebes government to the development of marine and fisheries techno park	Threats Limited support from academic/university Limited support from research institutions (R&D) for the providing access to applied innovations and technology Lack of support from the Tegal government Competition from other countries Reduced availability of the raw materials because of the IUU fishSIng regulation

**Appendix 3: Activities needed for Tegal MFTP improvement based on LFM**

Activities	Assumptions
Improving time for preparing administration documents	Support by government mechanism role in stakeholder collaboration project
Provide for alternative finance support	The environment for marine and fisheries business supported by government
Provide support from financial institutions	Supported by comprehensive benefit analysis for finance institution.
Encourage industry to invest and support incubator activities	Supported by comprehensive benefit analysis for finance institution.
Provide good understanding of the concept	Supported by comprehensive benefit analysis for industry.
Preparing guidance that focus on technical aspects of MFTP	Availability of funding, guidance, appropriate time for interaction, and benchmarking to other MFTPs
Allocate appropriate time for interaction of MFTP with the stakeholders	Supported by funding to improve the HR experience by benchmarking best practices of MFTPs and offering internship to staff of MFTPs
Improve benchmarking to the other MFTPs/Clusters in the field of marine and fisheries	Supported by guidance that focusses on the technical aspects of MFTP
Improve the number of competent HR in preparing the documents	Supported by funding to improve the HR of the stakeholder by benchmarking to the other MFTPs/Clusters
Improve experience in building MFTP by benchmarking or internship	Availability of funding to improve the HR of the stakeholder by benchmarking to the other MFTPs/Clusters
Improve HR support from local government	Local stakeholder and district government sign agreement to support the administration process
Improve support from local stakeholders and district government in administration process	Local stakeholders and district government sign agreement in supporting the administration process
Provide good feasibility studies	Support from the national policy to build marine and fisheries techno park 2015-2019
Improve support from local government, academic, and R&D	Local government, academic, and R&D sign agreement to support of feasibility studies
Creating better stakeholder understanding about the MFTP concept	Availability of funding, guidance, appropriate time for interaction, and benchmarking to other MFTPs
Preparing guideline that focus on the technical aspects of MFTP	Supported by funding to improve the HR experience by benchmarking best practices of MFTP×s and offering internship to staff of MFTPs
Allocate appropriate time for interaction of MFTP staff with the stakeholders	Supported by guidance that focusses on the technical aspects of MFTP
Improve benchmarking to the other MFTPs/Clusters in the field of marine and fisheries	Supported by funding to improve the HR of the stakeholder by benchmarking to the other MFTPs/Clusters
Breaking the sectoral walls between the institutions	Support benefit analysis for social, economic and environmental values specific for each stakeholder group
Improve collaboration and incentive for joint leadership of the project	Assessment of the institution based on quality of results
Inform of benefits of collaborating with the MFTP	Output and outcome of the job as collaborative teamwork
Provide extensive availability of innovation and technology	Supported by benefit analysis for social, economic and environmental value specific for each stakeholder group
Improve support from academic and R&D to provide innovation and technology	Support by government mechanism role in sharing innovation and technology
Creating better stakeholder understanding about the MFTP concept	Academic and R&D sign agreement to provide innovation and technology
Preparing guideline that focus on the technical aspects of MFTP	Availability of funding, guidance, appropriate time for interaction, and benchmarking to other MFTPs
Allocate appropriate time for interaction of MFTP staff with the stakeholders	Supported by funding to improve the HR experience by benchmarking best practices of MFTPs and offering internship to staff of MFTPs
Improve benchmarking to the other MFTPs/Clusters in the field of marine and fisheries for stakeholder	Supported by guidance that focusses on the technical aspects of MFTP
Breaking the sectoral walls between the institutions	Supported by funding to improve the HR of the stakeholders by benchmarking to other MFTPs/Clusters
Improve collaboration and incentive for joint leadership of the projects	Support benefit analysis for social, economic and environmental values specific for each stakeholder group
Inform of benefits of collaborating with the MFTP	Assessment of the institution based on quality of results
	Output and outcome of the job as collaborative teamwork
	Supported by benefit analysis for social, economic and environmental value specific for each stakeholder group

*(Contd...)*

**Appendix 3: (Continued)**

Activities	Assumptions
Provide facilities that support innovations and technology Improve support from district government, academic, and R&D in facilities Creating better stakeholder understanding about the MFTP concept Preparing guideline that focus on the technical aspects of MFTP Allocate appropriate time for interaction of MFTP staff with the stakeholder Improve benchmarking to the other MFTPs/Clusters in the field of marine and fisheries for stakeholder Breaking the sectoral walls between the institutions  Improve collaboration and incentive for joint leadership of the projects Inform of benefits of collaborating with the MFTP	Support by government mechanism role in sharing facilities District government, academic, and R&D sign agreement to provide facilities Availability of funding, guidance, appropriate time for interaction, and benchmarking to other MFTPs Supported by funding to improve the HR experience by benchmarking best practices of MFTPs and offering internship to staff of MFTPs Supported by guidance that focusses on the technical aspects of MFTP  Supported by funding to improve the HR of the stakeholder by benchmarking to the other MFTPs/Clusters Support benefit analysis for social, economic and environmental values specific for each stakeholder group Assessment of the institution based on quality of results Output and outcome of the job as collaborative teamwork Supported by benefit analysis for social, economic and environmental value specific for each stakeholder group
Provide competent HR resources for training, coaching and mentoring with access to marketing Provide facilities that support innovation and technology Improve support from district government, academic, and R&D in facilities Creating better stakeholder understanding about the MFTP concept Preparing guideline that focus on the technical aspects of MFTP Allocate appropriate time for interaction of MFTP staff with the stakeholder Improve benchmarking to the other MFTPs/Clusters in the field of marine and fisheries for stakeholder Breaking the sectoral walls between the institutions  Improve collaboration and incentive for joint leadership of the projects Inform of benefits of collaborating with the MFTP	All stakeholder related sign the agreement to provide HR for training, coaching and mentoring with access to marketing Support by government mechanism role in sharing facilities District government, academic, and R&D sign the agreement to provide facilities Availability of funding, guidance, appropriate time for interaction, and benchmarking to other MFTPs Supported by funding to improve the HR experience by benchmarking best practices of MFTP×s and offering internship to staff of MFTPs Supported by guidance that focusses on the technical aspects of MFTP  Supported by funding to improve the HR of the stakeholder by benchmarking to the other MFTPs/Clusters Support benefit analysis for social, economic and environmental values specific for each stakeholder group Assessment of the institution based on quality of results Output and outcome of the job as collaborative teamwork Supported by benefit analysis for social, economic and environmental value specific for each stakeholder group
Provide alternative funding for limited budget	The environment for marine and fisheries business supported by government
Provide support from financial institution Encourage industry to invest and support incubator activities Precondition	Supported by comprehensive benefit analysis for finance institution. Supported by comprehensive benefit analysis for finance institution. Supported by comprehensive benefit analysis for industry. Supported by the National Policy to Build Marine and Fisheries Techno Park 2015-2019