Investment feasibility tracking: the importance of measuring and tracking the success level of the project during commercialization phase

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Abstract. Measuring project success level is a challenging activity. This area of works has attracted many researchers to look deeper into the method of measurement, success factor identification, risk management, and many others relevant topics. However, the project management scope is limited until the project handover stage. After a project handover, the control of a project management changes from Project Management Team to the project owner/commercialization team. From an investor's point of view, the success of a project delivery needs to be followed by the success of commercialization phase. This paper aims to present an approach on how we track and measure the progress and success level of a project investment in the commercialization phase. This is an interesting topic which probably often being forgotten in many practical case. Our proposed concept modify Freeman and Beale concept by estimating the variance between the Planned Net Present Value / Annual Worth (as it is in the Feasibility Study Document) and the Actual Net Present Value / Annual Worth (until the point time of evaluation). The gap will lead us to the next analysis and give us some important information, especially exposing whether our project investment performs better than the planning or underperformed. Some corrective actions can be suggested based on the provided information. Practical cases to exercise the concept is also provided and discussed; one case in a property sector in the middle of commercialization phase, and another case in a Power Plant investment approaching the end of commercialization phase.

1. Introduction
The Project Management Institute defined Project Life Cycle consist of project start – organizing and preparing - carrying out the work - and closing the project [1]. However, after project closing, in many construction/manufacturing project, it will be continued with commercialization phase. Munss and Bjeirmi tried to extend the scope of project after the closing/handover [2]. They tried to highlight which is the project scope actually not only in the short term until the project deliverable is ready for use. From the investor point of view, it just the beginning. A good Project Management team who responsible with the development or construction project need to be followed by a good commercialization team to
achieve different kind of objectives. It’s also important part of project and need to be considered (even it’s not become the part of Project Management scope).

Jugdev and Muller stated that the definition of project success nowadays has changed from the PMI definition about Project Life Cycle to the entire Project and product life cycle / commercialization stage [3]. Both part have the same importance for investor / owner point of view. We are often heard this statement: “The operation was succeed but the patient died”. In other hand, sometimes a project even it was categorized as failure project, it succeeded during the commercialization (Sydney Opera House, took 15 years to build and 14 times overbudget).

Now, we focus on commercialization stage. How we can tracking and monitoring the project success level during the commercialization stage? In construction stage, it’s normally evaluated with Earned Value Analysis (EVA), Earned Schedule, or Earned Duration Management (EDM) [4]. For success probability in the construction planning considering Quality – Cost – Time we known the concept of Project Reliability [5]. For commercialization stage, Freeman and Beale suggested the Net Present Value from Discounted Cash Flow of Feasibility Study compared with the actual as the basis mechanism to track and monitor project success during commercialization stage [6].

Even from theoretical/research point of view it’s already defined, the project success measurement during commercialization stage seems to be forgotten especially in Indonesian case. In many public infrastructure case, from public road until the toll road, it was completed with a comprehensive feasibility study (FS) document as the basis of judgement go or not go the project. In toll road case, the FS document will be the basis consideration to determine the fare. However, in practical, we never found the process of tracking and monitoring the actual progress and comparing with the planning document.

Similar case in some industry, e.g.: power plant, port, or some manufacturers.

The question about the project success during commercialization we found is raised up by the Senior Managers or CEO in case of the asset/project/product reaching near end of their life time, e.g.:
- Do we achieve the target?
- When the actual Break Even Point / Payback period is occurred?
- Can we shut down the asset next year and replace with the new one?

Although it can be easily answered since the concept is already well defined, we found there are some obstacles when we want to evaluate this issue when the asset reaching near end of their life time. The several obstacles, i.e.:
- Do we keep the Feasibility Study document (from 15 -30 years ago?)
- Do we have good record data about the actual cost, revenue, and investment spending during the commercialization years?
- Currency exchange may have an effect (in term cost, revenue, or investment). Indonesian industry experienced hit by currency exchange fluctuation during 1997 – 1998.
- Some company maybe doing revaluation with their asset during the commercialization period.
- Too late for corrective action if the commercialization performance is worst than the plan.

We named the project success measurement in commercialization stage as Investment Feasibility Tracking. We want to complement the method based on Freeman and Beale idea from investor point of view. We also want to add another alternative graphical method, the Annual Worth (AW) method, as basis of evaluation. The graph will consist of 3 annual worth components of feasibility analysis. i.e.: Annualized Revenue, Annualized Cost, and Annualized Investment.

2. Investment Feasibility Tracking Concept

Freeman and Beale define the project success during commercialization (they named it as success of a venture) can, therefore, be measured objectively via a DCF technique called Net Present Value (NPV) [5]. It can be used to show past and prognose of future performance during commercialization stage. The budgeted/planned NPV as FS Document is compared with the actual NPV. The concept of NPV is discussed in many Engineering Economics Handbook [7]. We try to complement Freeman and Beale concept with following concern.

I. Period of Evaluation
Our first concern, do we need to track the deviation every year or we wait until the project reaching near end of their lifetime? It’s similar with the question when the right time to evaluate a long term planning in strategic management [8]. The answer is everytime when one from two conditions occurred, e.g.: the assumption is changed or the deviation (actual vs planning) is significat different.

About the time of evaluation, in our opinion, the 1st revision can be revisited in the end of hand over stage (from construction to commercialization). Some deviation during construction project and assumption updated may need during the period. Next revision is conducted as needed, depend on 2 requisite above.

2. **Basis document of evaluation**

For basis of evaluation, in our opinion, it’s not necessary to be always compared with FS Document. For the first time revision, the FS Document (the number zero document) will be revised by the 1st revision document. Anytime we revaluate the actual and future planning again, the last document will replace the previous one. Comparison each update with FS Document may not be relevant since 15-30 years time horizon is a long time, with a high potential of deviation.

3. **Graphical Method of Annual Worth as an alternative**

Graphical Method of Annual Worth is an alternative to show Investment Feasibility Tracking. The concept of Annual Worth actually equivalent with the Present Worth with different time point of view (Annuity vs present) [7]. The illustration concept is showed in Figure 2.

**Figure 1.** Investment Feasibility Tracking, revision 0, 1, and 2.

For instance, figure 1 indicates the illustration of our concern. In the beginning (year 0 = 2014), as FS Document the project owner expected NPV (in specific discount rate) USD 529.5 million by the end 2030 with 2 years construction period. The Break Even Point is expected in 2023. However, after the end of construction period (2016), the construction cost overrun. Market is lower than expected in 2014 and growth rate of business 1% lower. The 1st revision revised the Project NPV into USD 308.2 million and BEP 3 years longer (2026). After 4 years commercialization running, the actual net cash flow actually higher than expected, but slowing in the last 2 years due to many new competitor completing their construction process. Management need to revise future growth assumption. The 2nd revision revised the project NPV into USD 172.4 million and BEP 1 year longer (2027).
We divide the series into 3 parts, Annualized Investment Cost, Annualized Revenue, and Annualized O & M Cost (minus depreciation). Each year data of annualized is indicating the value of annual worth from the beginning of the project (after project handover, t = 0, 1997) until t = the period year of evaluation. For instance, in 2005, annualized revenue was IDR 599.59 Million; it’s indicating the annual worth of revenue since 1997 to 2005. By the end of 2016, Annualized Revenue (from 1997 – 2016, IDR 139.1 million) is lower than annualized total cost (from 1997 – 2016, IDR 185.3 millions). It means the project not reached the Break Even Point yet. The graphical method of Annual Worth provides slightly different approach comparing to the Net Present Value Method. It shown 3 parameters simultaneously (annualized investment, operation & maintenance cost, and revenue), giving more comprehensive analysis, i.e.:

- Does our EBITDA margin have enough amount of money to cover investment capital cost of recovery?
- We can track the gap between Annualized Revenue and Annualized Total Cost in every year of commercialization.
- Does our growth of revenue can deal with the growth of Operation & Maintenance Cost?

3. Practical Assessment
In this section, we would like to discuss the practical assessment the concept of Investment Feasibility Tracking in 2 project commercialization evaluation in Indonesia. Some discussion and finding are provided.

1. 10th years Hotel
X Hotel was developed in 2005 and last year is the 10th year of their operation. The deviation between FS Document and 10th years operation is showed in figure 3. From year to year operation, if management not aware with Investment Feasibility Tracking issue, it will lead them to the wrong information. Every year, the net cash flow is positive. It seems to be good. However, since 3rd year of...
operation, the difference between actual and FS went wider. Unfortunately, the comparison is occurred in 10th years of operation, a little bit too late for corrective action.

Figure 3. Investment Feasibility Tracking of a Hotel in 10th year operation (1st revision)

Net Present Value deviation between FS and actual condition in 10 years operation almost reached IDR 10.4 Billion. The early warning detection actually can be detected since 3rd and 4th year operation. However, since there is no evaluation, the gap become wider and little bit too late to handle. Management didn’t realize the situation since the hotel could provide net cash flow around IDR 10-12 Billion/year with 3-4% growth/year and saving around IDR 1 Billion in the construction process. 

If the management choose to continue the current business, with current condition without any Capital Investment to rehab or renew the facilities, the gap become worst. The business actually still has negative cumulative DCF, until the end of period. By the end of 20th year, it assume the hotel will be sold IDR 100 Billion (change the cum DCF into positive). From our point of view, rather than continuing the bleeding and waiting an investor buy the asset in the end of 20th year, it’s better if there is any possibility to divest the business anytime within next 10 years. Minimum valuation required to reach positive cum DCF (NPV) is IDR 79 Billion.

2. Power Plant (at the end of the lifetime)

We can’t show any data or figure related with this practical assessment due to confidentiality agreement with the company. However we want to share the interesting behaviour we found when we deal with the problem. Let say Y Power plant was built in 1994 with an investment (for instance) USD 100 million. If we converted the value to IDR, it’s around IDR +/- 250 Billion in that day. However, Indonesia had suffered by monetery crisis in 1997 and the IDR to USD exchange rate rose until 6x. The Power Plant Valuation in the end of 2000 reach almost IDR 1200 Billion. The company renewed their asset valuation in balance sheet based on this information. After 20 years of their operation, the CEO asked a question can we shut down the plant right now?

To answer this question, we need to apply Investment Feasibility Tracking concept. Based on asset acquisition (in IDR) in 1994 and track all O & M cost, additional investment, and revenue during the operation period, we found the break even point has reached in 2006. However, if we change the currency basis from IDR to USD, we found that the Power Plant not reached the break even point yet (by the time of evaluation). It still need to be operated for more few years. Similar conclusion we found when we tried to change the 0 year basis from 1994 to 2000 (due to revaluation issue) and adjust all
revenue and cost during 1994 – 1999 to 2000 basis (a matter of discounted cash flow problem). We found the power plant not reached the break even point yet.

From the contradictory result above, we suggest the power plant company to refer the 2nd (based on USD) or 3rd result (revaluation result). Nothing wrong with the 1st result, but in investment point of view, even we already reached break even point in 1st result, however, it’s impossible we can replace the current asset with a similar one (due to different currency exchange issue, the price of new asset in USD probably not significant different, but in IDR does). The electricity tariff need to be renegotiated to meet the break even point target within next few year or if it impossible, the company need to have innovation program to reduce the operation and maintenance cost.

4. Conclusions

Based on the discussion and practical above, here some expected benefit from the Investment Feasibility Tracking implementation, i.e.:

- Early warning for management, remind the false pattern related with the project, related with 3 aspects simultaneously, investment, revenue, and cost.
- Fast risk mitigation / corrective action to response the deviation.
- Understanding the current position of Financial Performance in term of Feasibility Performance. In will give importance information what the impact of our current year performance to the overall project. It will provide comprehensive information for owner to set up future target to chase the project performance target.
- Maintain the data, keep update with current condition information, and may provide valid suggestion for future FS Document.

We also need to highlight the tracking (revision) process is conducted as requirement, but it’s better when we found the actual deviation is higher or there is some wrong assumption. Beware with currency issue in investment and operation and revaluation asset.

5. References

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