ICT-based of investment decision and method evaluation in hospitality sector

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Abstract. This study aims to determine the feasibility of IT investment in hospitality and determine the value and tangible/ intangible benefits from IT implementation. Problem arises from high investment without knowing the real impact and future investment to IT development. The scope of this research is information technology investment in 5-star hotel in Jakarta. The data were collected by distributing questionnaires to the research samples, are Grand Hyatt Hotel, Mandarin Oriental Hotel and Ayana Midplaza Hotel Jakarta. The analysis uses Cost Benefit Analysis that combines financially and non-financial calculations to determine the feasibility of IT investment and the benefits of IT for 5-star hotels in Jakarta. From the analysis result, it can be concluded that 5-star hotel in Jakarta is feasible to make IT investment according to NPV, ROI, and Payback period calculation and IT investment in 5-star hotel is quite beneficial for hotel business process.

1. Introduction
In the recent year, inclined how crucial information technology has become in securing strategic business goals and visions [1]. The fact that Jakarta as the capital city of Indonesia will increase the visitor’s growth in Jakarta which arose the improvement to hospitality sectors. The hoteliers started to integrate their services with information technology (IT). Invest in IT will enhance service quality, reduce costs, improve productivity, gain competitive advantage, and increase bottom line profitability [2-4]. Although amount of investment is big, decision makers still have difficulty in selecting the appropriate methods to invest in IT project [5]. Calculation process to evaluate the IT investment in hospitality sector with Cost Benefit Analysis will show payback period, feasibility of future investment and tangible benefits from IT implementation.

Hence, the purpose of this study is to help IT Managers to determine the feasibility of IT investment in hospitality sector using Cost Benefit Analysis [6]. The feasibility will help IT Manager to decide investment in technology from sample of the hotels, which are Ayana Midplaza Jakarta, Mandarin Oriental Hotel and Grand Hyatt Hotel Jakarta.

1.1. IT investment methodology
The definition of IT investment methodology in this research will use to rise up management information system. The article Schniederjans et al. mentioned some of IT methodologies such as analytical hierarchy process, BSC, CSF, Delphi method, payback period, game theory, satisfaction and priority.
surveys, decision theory, and accounting rate of return [7]. However, some company still ignore non-financial and use financial methods to measure IT investment [8,9].

1.2. Financial evaluation methods
This study is majoring the financial methods. Return of investment (ROI) methodology is another technique traditionally used in capital budgeting decisions where the rate of return of an investment is compared to the opportunity cost of capital. The simple formula for ROI is profit of investment divided by the cost of investment.

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ROI = \frac{NET \ PROFIT}{COST \ OF \ INVESTMENT} \times 100
\]

1.3. Cost/benefit analysis (CBA)
Cost Benefit Analysis is a decision-making tool involves the estimation and evaluation of the net benefits associated with alternative courses of action. According to Frederick, cost component for CBA classified into four classifications; procurement cost, start-up cost, project related cost and ongoing cost [10]. Then, feasibility evaluation held by financial analysis from Net Present Value, Return On Investment, Payback Period, Internal Rate of Return, etc.

1.4. Net Present Value (NPV)
NPV is calculated as the initial cost of the investment minus the present value of future cash inflows or benefits. And the formula for NPV is summary of value benefits minus value of costs divided by present value of discount rate per periods that benefits and costs occur.

\[
NPV = \text{Initial Investment} + \frac{\text{cash flow}}{(1 + \text{discount rate})^{\text{time}}}
\]

1.5. Payback period
Payback period is a common accounting and finance tool used to select the alternative that recovers its cost in the shortest amount of time. Payback period is about time when total investment is recaptured in cumulative cash flow.

\[
PAYBACK \ PERIOD = \frac{COST \ OF \ INVESTMENT}{ANNUAL \ NET \ CASH \ FLOW}
\]

2. Method
This study using Cost Benefit Analysis method in order to evaluate the feasibility of IT investment in hospitality sector.

Figure 1. Research methodology.
According to figure 1 above, the first phase is to identify cost. This phase is conducted by formulating IT conditions at hotels in Jakarta. The hotel’s samples are five-stars hotel in Jakarta, Ayana Midplaza Hotel Jakarta, Mandarin Oriental Hotel Jakarta and Grand Hyatt Hotel Jakarta. This phase conducted by analyze financial report of five years’ annual report. Calculation ongoing cost as first phase consist of maintenance and repair cost of IT implementation. Second phase is to identify tangible and intangible benefit from three samples, using data collection via questionnaire online to IT Hotel Managers. Secondary data was collected from journal, text books and surveyor [11] from samples. Whole data collections are evaluated into tangible and intangible benefits which come from reduction cost, reduction of errors, increased activity speed or enhancement of planning and control management. Third phase is analyzing IT investment using Cost Benefit Analysis. According to Watkins CBA assessment start with NPV analysis [12]. NPV analysis according to initial investment and interest rate each hotel. Moreover, the analysis continues with ROI that show whether the investment is accepted or not. Then, Payback Period show how long payback of investment to investor will conducted. Final phase is conclusion about feasibility of IT investment in hospitality sectors will help IT Managers to evaluate the investment from their perspective.

3. Results and discussion

3.1. Cost identification

According to the questionnaire online and interview with IT Manager hotel from sample, indicate the cost as in below.

| Hotels           | YEAR ($Million) | Total ($M) |
|------------------|-----------------|------------|
|                  | 1               | 2         | 3       | 4        | 5     | 6           |
| Ayana Midplaza   | $150,00         | $180,00   | $162,00 | $157,00  | $175,00 | $824,00     |
| Mandarin Oriental| $1,20           | $1,60     | $2,20   | $1,50    | $2,70   | $9,20       |
| Grand Hyatt      | $110,00         | $115,00   | $135,00 | $129,00  | $125,00 | $614,00     |

Total cost in table 1 are in $Million. This ongoing cost are costs must be incurred when the project has been carried out. Ongoing cost consist of maintenance and repair cost. The highest cost from samples as in Table 1 is from Ayana Midplaza with $824Million for IT implementation, maintenance, operational for five years. Meanwhile the lowest cost is Mandarin Oriental Hotel, this value may occur because Mandarin Oriental focus on services and benefits, not into technological.

3.2. Benefits identification

Benefit Identification using Cost Benefit Analysis is divided into two: tangible benefit and intangible benefit. This calculation gathered from secondary data and annual report which show the value of tangible and intangible benefit from the samples.

| Hotel         | 2011 | 2012 | 2013 | 2014 | 2015 | Total       |
|---------------|------|------|------|------|------|-------------|
| Ayana Midplaza| $84,00| $88,00| $86,00| $84,00| $86,00| $428,00     |
| Mandarin Oriental | $89,10 | $85,90 | $111,80 | $120,80 | $107,30 | $514,90     |
| Grand Hyatt   | $317,00| $313,00| $315,00| $329,00| $312,00| $1,586,00   |

Tangible benefit analysis show the highest tangible benefits is in Grand Hyatt Hotel with $1.586 Million. Table 2 show that the samples have different tangible benefits depend on the influence of their IT implementations each year for five years.

Meanwhile, intangible benefits analysis based on the intangible profit such as profit from better services, service advantages, better decision making, etc. This intangible profits are hard to transform it
into currency, hence, it transforms into other assessment such as service quality. Bad service will effect the income and decreasing the profitability.

Table 3. Intangible benefit.

| Hotel          | YEAR (MMillion) | Total |
|----------------|-----------------|-------|
|                | 2011 | 2012 | 2013 | 2014 | 2015 |       |
| Ayana Midplaza | $ 5,00 | $ 5,00 | $ 4,00 | $ 4,00 | $ 3,00 | $ 21,00 |
| Mandarin Oriental | $ 3,90 | $ 4,00 | $ 3,60 | $ 3,00 | $ 2,30 | $ 16,80 |
| Grand Hyatt    | $ 359,00 | $ 388,00 | $ 591,00 | $ 552,00 | $ 547,00 | $ 2,437,00 |

Table 3 shows that IT implementation have highest effect in Grand Hyatt Hotel with intangible benefit $2,437 Million. Meanwhile, the other two samples have lower intangible benefits. This means IT implementation may be not impact the service quality or increase the hotel’s profit. Actually, it’s depend on the vision and mission of the hotels itself.

Table 4. Total benefits.

| Hotel          | Tangible benefit | Intangible Benefit | Total Benefits |
|----------------|------------------|-------------------|----------------|
| Ayana Midplaza | $ 428,00         | $ 21,00           | $ 449,00       |
| Mandarin Oriental | $ 514,90     | $ 16,80           | $ 531,70       |
| Grand Hyatt    | $ 1,586,00       | $ 2,437,00        | $4,023,00      |

The final assessment of total benefits is showed in Table 4 which the samples with highest score benefits from IT investment and implementation is Grand Hyatt Hotel with $4,0213 Million.

3.3. Cost benefit analysis

3.3.1. Net Present Value (NPV). NPV calculation functions to compare overall expenditure and revenue at a certain interest rate. NPV for the three samples is as follows:

Mandarin Oriental Hotel with interest rate 44% and initial investments $61Million, with calculation (1).

\[
\text{NPV Mandarin Oriental} = -61 + \frac{65}{(1+0.44)^1} + \frac{87}{(1+0.44)^2} + \frac{422.3}{(1+0.44)^3} + \frac{45.6}{(1+0.44)^4} + \frac{222.8}{(1+0.44)^5} \\
= -61 + 45.138 + 41.956 + 141.427 + 10,605 + 35,983 \\
= 214,109
\] (1)

NPV Mandarin Oriental Hotel for 5 years is $214,109 Million. NPV >0 means the project is accepted and feasible.

Ayana Midplaza Hotel Jakarta with interest rate 1,9% and initial investments $111Million, with calculation (2) below.

\[
\text{NPV Ayana Midplaza Hotel} = -111 + \frac{400}{(1+0.019)^1} + \frac{440}{(1+0.019)^2} + \frac{489}{(1+0.019)^3} + \frac{523}{(1+0.019)^4} + \frac{532}{(1+0.019)^5} \\
= -111 + 392,541 + 423,744 + 376,56 + 485,070 + 512,345 \\
= 2.079,26
\] (2)

NPV Ayana Midplaza Hotel Jakarta for five years is $2,079,26Million. NPV >0 means the project is accepted and feasible.

Grand Hyatt Hotel with interest rate 0,5% and initial investment $186Million with calculation (3) below.

\[
\text{NPV Grand Hyatt Hotel} = -186 + \frac{179}{(1+0.005)^1} + \frac{195}{(1+0.005)^2} + \frac{194}{(1+0.005)^3} + \frac{183}{(1+0.005)^4} + \frac{273}{(1+0.005)^5} \\
= -186 + 170,47 + 176,870 + 167,584 + 150,554 + 213,902 \\
= 693,38
\] (3)
NPV Grand Hyatt Hotel Jakarta for five years is $639,38 Million. NPV >0 means the project is accepted and feasible.

3.3.2. Payback period. Payback Period analysis occurred from the length of investment covered up the cash flow. Each samples covered the payback period more than a year for five years’ cash flow. The fastest payback according to Table 5 is from Mandarin Oriental Hotel with 1 year than the other samples.

| Hotels             | Payback Period          |
|--------------------|-------------------------|
| Ayana Midplaza     | 3 years 0,3 month       |
| Mandarin Oriental  | 1 year 0,09 month       |
| Grand Hyatt        | 4 years 0,06 month      |

3.3.3. Return of investment. Return investment method using ROI is aimed to calculate percentage of benefits from an IT project based on cost.

| HOTELS              | ROI (%) | FEASIBILITY |
|---------------------|---------|-------------|
| Ayana Midplaza      | 0,88    | accepted    |
| Mandarin Oriental   | 12,37   | accepted    |
| Grand Hyatt         | 19,72   | accepted    |

According to Table 6 ROI result, when ROI value is more than 0, then the investment is accepted. The samples show the investment is accepted with percentage is more than 0. The highest ROI percentage is Grand Hyatt Hotel with 0,1972 this means; the project has given 19,72% profit of the IT investment.

4. Conclusion
The result of financial analysis such as NPV, ROI, and benefit analysis from Cost Benefit Analysis is able to help Hotel Management specially IT Managers to decide the feasibility of IT investments and economic value of IT projects. Reconsider a project have intangible and tangible benefits, the core of CBA is in benefit analysis using previous information about IT requirements and implementation.

According to the calculation, IT project and implementation in Hotels in Jakarta can provide economic benefits for the hotel. IT Managers could use the result of financial calculation using Cost / Benefit Analysis to projecting their future investment.

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