TELKOMNIKA, Vol.17, No.2, April 2019, pp.609~614
ISSN: 1693-6930, accredited First Grade by Kemenristekdikti, Decree No: 21/E/KPT/2018
DOI: 10.12928/TELKOMNIKA.v17i2.7247

Information technology investment analysis of hospitality using information economics approach

Eva Novianti[1], Ahmad Nurul Fajar*[2]
[1]Information System Department, Faculty of Engineering, Darma Persada University,
Radin Inten II Street, Jakarta, telp: +62-021-8649057 (ext: 2018), Indonesia
[2]Information Systems Management Department, BINUS Graduate Program-Master of Information Systems Management, Bina Nusantara University, Jakarta, Indonesia
*Corresponding author, e-mail: eva_novianti@ft.unsada.ac.id[1], afajar@binus.edu[2]

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 five 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 the information economics (IE) approach 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 five star hotel in Jakarta is feasible to make IT investment with ROI score more than 1 and scorecard value 28 which shows that IT investment in 5-star hotel is quite beneficial for hotel business process.

Keywords*: five star hotel, hospitality, information economics, information technology investment*

1. Introduction

Nowadays hospitality thinks that technology can improve business effectiveness and efficiency. Hospitality in Indonesia, especially Jakarta was competing to provide the best service in terms of information and technology. Moreover, implementation of IT is one of strategies to improve hotel performance [1]. The need for technology is increasingly needed as the level of hotel guest satisfaction starting from check-in process until check-out [2]. Based on previous research, IT implementation at the hotel has been started since 1980s until 1990an, many hotels that invest millions of dollars for information technology about 4.4 million dollars [3]. This will continue and the number of investments will increase as the development of information technology in hospitality has an impact on improving service quality, reducing costs, increasing productivity, gaining competitive advantage, and improving bottom line profitability [4-6]. Gaining competitive advantage [7] such as, IT security investments may stop the competitors to absorb market power. From other studies that point to problems appearing in hospitality to find out if the IT they invested is effective, [8] asserts that many hospitality companies have no procedures to see how effectively their spending on information technology is. Based on other research, it is found how to look at the characteristics of IT investment decision making in the field of hotel with empirical research [9] by means of financial evaluation, and second research is investment evaluation on system that has been applied will influence investment feasibility [10] financially and non-financially using Information Economics approach.

Various sources of data that show about IT investment in the hotel, then the problem is the existence of large amount of investment for IT development without understanding IT effectiveness for the hotel [11], the managerial party who difficult to give data about the values and intangible/tangible benefits. To find out how IT decisions are worth doing, and the benefits and IT used by 5-star hotels in Jakarta, one with the Economic information (IE) method. IT investment is an investment in equipment, applications, services and basic technology [12, 13]. According to [14], an IT investment consists of the total life cycle cost of an entire project or project chunk that involves IT, including the post-project operating cost of the system that was implemented. The investment ceases to exist when it is replaced or eliminated for any reason.

Received September 9, 2017; Revised October 21, 2018; Accepted November 23, 2018

Evaluating expense or impact of large IT investment may vary from study to study [15]. In order to evaluate IT investment, Information Economics (IE) is a set of calculating tools to measure the benefits and costs of an information technology project. IE is the development of CBA (Cost Benefit Analysis) so that, IE methods focus on the analysis of benefits and costs associated with the value of business performance. Information Economics that evaluate the feasibility based on non-financial will show the quantitative perspective [16] and improve business outcomes. As described in Figure 1, in the development of IE connects business performance and information technology. The benefits of IT/IS that organizations use can be viewed by combining Simple ROI analysis and analysis of technology and business domain.

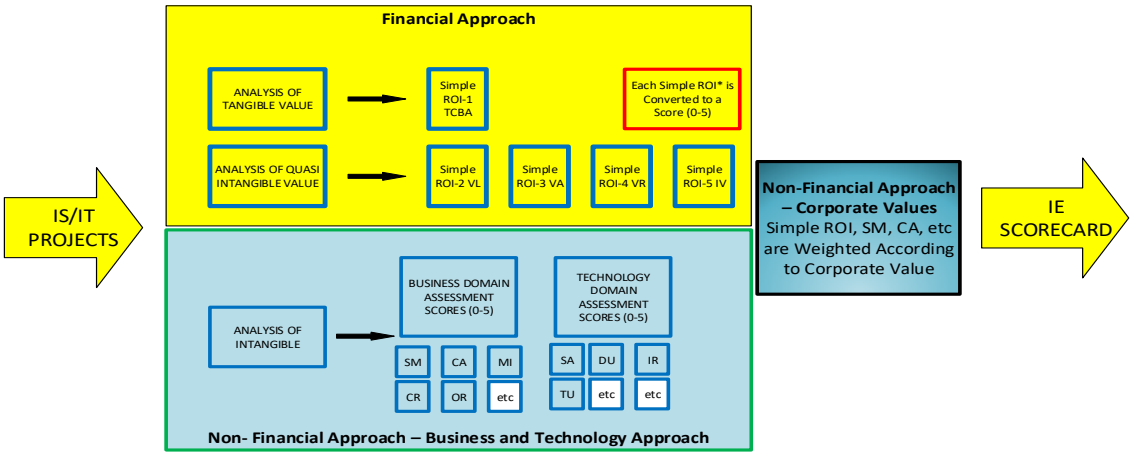

Figure 1. Information economic approach [17]

2. Research Method

This study using Information Economic approach in order to do feasibility assessment that combine technology domain and business domain. Moreover, there are few phases using IE approach consists of 1) Data Collection Phase; this stage is formulating of of IT/IS conditions and the needed of IT/IS at the hotel industry, specifically in Jakarta. Secondary data was collected from journal, text book and Indonesian Hotel Association [18, 19] as well as annual final report [20-22] from samples of 5-star hotels. It aims to obtain data that could be used in weighting corporate values phase. The data collected includes the financial data of 5-star hotels and IT projects undertaken, as well as the costs for the technology used today. This stage is also done spread the questionnaire online for intangible value analysis of business domain and technology domain. 2) Analysis using Information Economics Phase. After the data was collected, the data woule be processed for analysis on the financial aspects of tangible value analysis and quasi tangible value. Tangible value analysis is done with traditional cost-benefit analysis resulting ROI1 and first economic impact. While the analysis of Value Linking (VL), Value Acceleration (VA), Value Restructuring (VR) aims to measure the benefits of quasi tangible value.

The feasibility of IT investment can be known ROI score generated on the economic impact sheet. According to [23], to calculate simple ROI, there are three worksheets, such as: development cost sheet using ratio, ongoing work sheet, and economic impact sheet. The final value of the ROI and the scores of corporate analysis is incorporated into the IE Scorecard showing the value and benefits of IT investments in 5-star hotels in Jakarta. At the same time, we doing non-financial analysis with analysis on Domain Business and Domain Technology obtained from questionnaire results. After getting ROI1, we doing the quantification of VL, VA with intangible benefits factors in the business domain and technology are added up with ROI1. 3) Conclusions; from the results of the analysis conducted, it will be concluded on the economic impact sheet to determine the feasibility of IT investment based on ROI score and IE Scorecard. Balance scorecard will evaluate corporate performance [24] from corporate value perspective. Those phases are outlined below on Figure 2. The Scores on the IE Scorecard will show the value and benefits of investment for IT. It will help the company to take further IT investment

decisions. According to [25], software complexity could be reduced. Relate to [26], business process model could be derived from goal model.

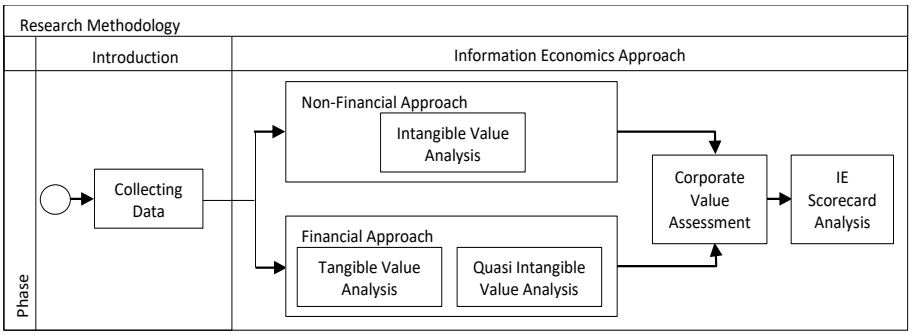

Figure 2. Research methodology

3. Results and Analysis

3.1. Collecting Data Result

The results of questionnaire are short profile about the sample. Based on the results of literature studies, it shown the architecture and information technology projects in 5-star hotels are consists of five area, such as: (1) Application Services Monitoring,this application is used to perform records, services monitoring hotel,employee work schedules in payroll process for hotel employees. In the three samples of 5-star hotels, there are using finger print or card, which will be calculated for overtime, or schedule replacement. In general, overtime occurs during high season such as long school holidays, or holidays. 5-star hotels that have overseas mothers generally follow the parent hotels using well-known apps/systems such as with FCS Computer System, Oracle, with servers in their host city hotel. (2) Intranet and Wireless connection.

The huge demand for the Internet makes many hotels present the speed and bandwidth that can satisfy the guests. (3) Online Reservation. The 5-star hotels in Jakarta work with online reservation providers in Indonesia such as traveloka.com, agoda.com and globally with airbnb.com. With online reservation integrated with housekeeping department for processing rooms. (4) E-Concierge Service Management. Service to entertain hotel guests and modern travelers is currently working with smartphones in the form of E-Concierge Mobile with technology called Mobile Guest Softphone (MGS). This app uses a new solution from ALE (Alcatel-Lucent Enterprise) that maximizes the experience for the guests and improves the operational performance of the hotel. The MGS allows guests to make free wireless connection calls, allow guests to call reception/room service, process faster check-in and check-out, and use other facilities just by hand. (5) IT Security, the problem that arises when using IT in a company/organization is its security. For companies/organizations and even hotels are also very vulnerable to information that can harm the hotel in case of cyber attack.

3.2. Analysis Tangible Value Result

In order to perform the tangible value analysis, it takes balance sheet and income statement obtained from the three samples. The result of calculation of tangible value showed on economic impact sheet of three samples in Table 1. According to Table 1, ROI score 1 of economic impact sheet Grand Hyatt Hotel, means that the IT investment is feasible. Highest score for simple ROI means that IT implementation give profitability to the hotel.

According to Table 2, Mandarin Oriental Hotel ROI score is 1. This score means that the IT investment is feasible. Above 100% for Simple ROI means that IT implementation give profitability to the hotel and able to invest more in the future. According to Table 3, ROI score for Ayana Midplaza Hotel is 2. means that the IT investment is feasible. Above 400% for simple ROI means that IT implementation is good to financial performance and suggested to invest more in the future. In conclusion based on economic impact sheet from three samples, IT investment in 5-star hotel is feasible.

Table 1. Economic Impact Sheet of Grand Hyatt Hotel

A	Net Investment Required ($M)						186
B	Yearly Cash Flow						
		year 1	year 2	year 3	year 4	year 5	Total
	Net Economic Benefits						
	Operating Cost Reduction = Pre-tax income	289	310	329	312	398	
	(-) on-going expense	110	115	135	129	125	
	net cash flow	179	195	194	183	273	1024
C	Simple ROI						110.11
D	ROI score		Score	Simple ROI			
			0	zero or less			
			1	1% s.d 299 %			
			2	300% s.d 499%			
			3	500% s.d 699%			
			4	700% s.d 899%			
			5	over			

Table 2. Economic Impact Sheet of Mandarin Oriental Hotel

A	Net Investment Required ($M)						65.6
B	Yearly Cash Flow						
		year 1	year 2	year 3	year 4	year 5	Total
	Net Economic Benefits	0	0	0	0	0	
	Operating Cost Reduction = Pre-tax income	65	98.5	120	107.8	69.8	
	(-) on-going expense	1.2	1.6	2.2	1.5	2.7	
	net cash flow	63.8	96.9	117.8	106.3	68.3	453.1
C	Simple ROI						138.140
D	ROI score		Score	Simple ROI			
			0	zero or less			
			1	1% s.d 299 %			
			2	300% s.d 499%			
			3	500% s.d 699%			
			4	700% s.d 899%			
			5	over			

Table 3. Economic Impact Sheet of Ayana Midplaza Hotel

A	Net Investment Required ($M)						111
B	Yearly Cash Flow						
		year 1	year 2	year 3	year 4	year 5	Total
	Net Economic Benefits	0	0	0	0	0	
	Operating Cost Re						
	duction = Pre-tax income	550	620	651	680	707	
	(-) on-going expense	150	180	162	157	175	
	net cash flow	400	440	489	523	532	2384
C	Simple ROI						429.55
D	ROI Score		Score	Simple ROI			
			0	zero or less			
			1	1% s.d 299 %			
			2	300% s.d 499%			
			3	500% s.d 699%			
			4	700% s.d 899%			
			5	over			

3.3. Analysis Quasi-Intangible Value Result

Value Linking approach implemented in 5-star hotel, implementation online reservation and e-Concierge management, hotel guests can quickly make room reservations and guest data collection will be better. For e-Concierge the process of entering guests to the room will also be easier. Value Acceleration. The use of applications based on three samples of 5-star hotels in Jakarta can make the process and performance faster. Value Restructuring. Implementation IT investment in IT project of 5-star hotel, the occurrence of restructuring on job function.

3.4. Analysis Intangible Value Result

The intangible value assessment taken from questionnaire before. The questionnaire itself divide to two categories, for business domain and technology domain. The results shown

by score 1-5 which will be weighted into economic impact sheet and IE Scorecard. The result of technology domain divided for Strategic IS Architecture, Infrastructure Risk, Defitional Uncertainty, dan Technical Uncertainty. For Technical Uncertainty have specific characteristic, are required skills, hardware dependency, software dependency and application dependency. Meanwhile the result of business domain divided for Strategic Match, Competitive Advantage, Managemen Information, Competitive Response, dan Organizational Risk. Table 4 showed business domain and technology domain scores from samples based on factors that influenced both domains.

Table 4. Business and Domain Technology Score

	Factors	Score		Factors	Score
	Business Domain			Technology Domain	
1	Strategic Match	1	6	Strategic IS Architecture	4.5
2	Competitive Advantage	1	7	Definition Uncertainty	-4
3	Management Information	4	8	IS Infrastructure	0.5
4	Competitive Response	4.5	9	Technical Uncertainty	-4
5	Organizational Risk	-2			

3.5. Corporate Value Result

5-star hotels in Jakarta are in the investment quadrant position because 5-star hotels have a solid business base, have the time and opportunity to invest in the future. As shown on Figure 3, the value of the 5-star hotel corporation in Jakarta is 20 and the negative value is 10. This value showed that 5-star hotels in Jakarta have the time and opportunity to invest more in the future. Therefore, it is necessary to focus on future growth and development of existing infrastructure.

3.6. Information Economics Result

The assessment related to corporate relative factors that are contributive to the hotel's operational services, which are more contributive factors will be given a positive value, while high risk will be given a negative value. As shown on Figure 4, the results of the assessment with information economics scorecard obtained value is 28 with enough category. It can be concluded that IT implementation and IT projects in 5-star hotels in Jakarta are quite useful. E-Concierge, mobile apps and online reservation are most valuable and success investment for 5-star hotel. But, in order to improve the performance of hotel IT, which in terms of security and improve hotel services, need a system improvement in accordance with the hotel program, so it can support the vision and mission of 5-star hotels in Jakarta.

		Likely Value	Comment	Resulting Weight
	Business Domain			
A	ROI	Medium		2
B	Strategic Match	Low		1
C	Competitive Advantage	Low		1
D	Management Information	Medium	Strengthen Management	4
E	Competitive Response	Highest		6
F	Project Organization Risk	Medium		-2
	Technology Domain			
A	Definitional Uncertainty	Medium		-4
B	Technical Uncertainty	Medium		-4
C	Strategic IS Architecture	High		6
D	IS Infrastructure Risk	Low		-
			Total Value	20
			Total Risk & Uncertainty	-10

Figure 3. Corporate value result calculation

Evaluator	Business Domain						Technology Domain				Total
	ROI	SM	CA	MI	CR	OR	SA	DU	TU	IR	
Weight	2	1	1	4	6	-2	6	-4	-4	0	28
Business Domain	2	0	0	2	8	-2					
Technology Domain							8	-4	-4	0	
Total	4	1	1	6	14	4	14	-8	-8	0	

Keterangan

ROI = Enhanced Simple Return in Investment Score

Business Domain Assessment

SM = Strategic Match

CA= Competitive Advantage

MI = Management Information

CR = Competitive Response

OR = Project Organization Risk

Technology Domain Assessment

SA = Strateic IS Architecture

DU = Definitional Uncertainty

TU = Technical Uncertainty

Score	Description
71-100	Very good
41-70	Good
14-40	Enough
(-21)-10	Bad
(-40)-(-20)	Very Bad

Figure 4. Result of information economic analysis

4. Conclusion

The result of financial analysis that is calculated ratio and processed in economic impact sheet obtained simple ROI and can be concluded that in terms of cost, IT investment in 5-star hotels in Jakarta can provide economic benefits for the hotel. The result of weighting the corporate value with a positive score of 20 and negative 10. This score indicates that 5 star

hotels in Jakarta are included in the investment quadrant. The investment quadrant shows that a 5-star hotel has a solid business base, has the time and opportunity to invest in the future. The 5-star hotels in Jakarta also have the time and opportunity to invest more in the future. Therefore, it is necessary to focus on future growth and development of existing infrastructure. Recent conclusions show that IT projects and IT investments made currently in 5-star hotels in Jakarta provide benefits for the continuity of hotel services, financially and non-financially. The economic value of IT investment in 5-star hotels can be seen on IE score of 28 which is in the range of 14-40 score with enough category. This value indicates that IT investment in 5-star hotel in Jakarta is considered economical enough, and quite helpful and useful in supporting hotel business process.

References

[1] Santiago MG, Jacques BG. A model that connects information technology and hotel performance. *Tourism Management*. Elsevier. 2016; 53: 30-37
[2] Yumi PK, Soyoung B, Hailin Q. Calculating tourists' customer equity and maximizing the hotel's ROI. *Tourism Management*. Elsevier. 2018; 69: 408-421.
[3] Meyers C. Closing the technology gap. *Successful Meeting*. 1999; 48(11): 14-16.
[4] Cobanoglu C, Piccoli G, Connoly D. Lodging Industry Technology Study: Developing IT Strategy. *Hospitality Technology*. 2004; 8(2): 261-290
[5] Kasavana MK, Knutson BJ, Lee H. Electronic perception technology applications in food service. *FIU Hospitality Review*. 2004; 22(2):18-27.
[6] Siguaw JA, Enz CA, Namasivayam K. Adoption of information technology in US hotels: strategically driven objectives*. Journal of Travel Research*. 2000; 39(2): 192-201.
[7] Christina YJ, Sang-Yong TL, Jee-Hae L. Information Security Breaches and IT Security Investments: Impacts on Competitors. Information & Management. 2018.
[8] Irani Z. Information system evaluation: navigating through the problem domain. *Information and Management.* 2002; 40 (1): 11-24
[9] Karadag E, Cobanoglu C, Dickinson C. The characteristic of IT investment decisions and methods used in the US lodging industry. *International Journal of Contemporary Hospitality Management*. 2009; 21(1): 52-68.
[10] Suwardy T, Ratnatunga J, Sohal AS, Speight G. IT Projects: evaluation, outcomes and impediments. *Benchmarking*. 2003; 10(4) :325-342
[11] Theo JWR, Egon WB. Methodologies for information systems investment evaluation at the proposal stage: a comparative review. Information and Software Technology. *Elsevier*. 1997; 39(1): 1-13.
[12] O'Brien JA. Introduction to Information Systems: Business and Managerial Perspectives. 12th Translation Edition. Jakarta: Salemba Empat. 2005.
[13] Schniederjans M J, Hamaker J L, Schniederjans, A M. Information Technology Investment: Decision-Making Methodology. 2nd edition. World Scientific. 2010.
[14] Fitzpatrick E. IT Portfolio Management. *IT Economics Corporation*. 2005: 28.
[15] Bayrak, Tuncay. Evaluating Large-Scale IT Investment Decisions. Technology in Society. *Elsevier*. 2018; 54: 128-138
[16] Haewon Lee et al. Impact of IT Investment on Firm Performance Based on Technology IT Architecture. *Elsevier B.V*. 2016. 652-661
[17] Parker MM. Strategic Transformation and Information Technology: Paradigms for Performing While Transforming. Prentice Hall. 1996.
[18] Group H. Indonesia Hotel and Tourism Report. Indonesia: Hotel Intelligence Indonesia; 2011.
[19] Indonesian Central Statistics Agency. Summary of *5*-Star Hotels. Retrieved from Indonesian Central Statistics Agency: www.bps.go.id. 2014.
[20] Intercontinental Hotels Group. Annual Report and Financial Statements. 2011-2016
[21] Mandarin Oriental International. Annual Report. 2011-2016
[22] Hyatt Hotels Corporation. Annual Report. Washington. 2011-2016
[23] Parker M M, Benson R J, Trainor H E. Information Economics, Linking Business Performance to Information Technology. Prentice Hall: A Pearson Education Company. 1988.
[24] Protti, Denis J. A proposal to use a balanced scorecard to evaluate Information for Health: an information strategy for the modern NHS (1998–2005). Computers in Biology and Medicine. Elsevier. 2002; 32(3): 221-236
[25] Fajar AN, Shofi IM. Reduced Software Complexity for E-Government Applications with ZEF Framework. *TELKOMNIKA Telecommunication Computing Electronics and Control*. 2017; 15(1): 415-420.
[26] Fajar AN, Shofi IM. Goal Model to Business Process Model. *International Journal of Electrical and Computer Engineering (IJECE)*. 2016; 6(6).