

# Performance Evaluation of Information Technology Investment at PT. ATPF

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## *Abstrak*

*Tujuan dari penulisan ini adalah untuk mengetahui nilai ekonomis investasi TI yang dilakukan, tingkat pengembalian investasi TI, dan dampaknya terhadap kinerja perusahaan. Metodologi yang digunakan adalah penelitian kepustakaan, dengan cara mengumpulkan data dan informasi melalui membaca dan mempelajari buku-buku yang berhubungan dengan pembahasan masalah dalam penulisan tulisan ini, melakukan survei dengan menggunakan teknik observasi dan wawancara. Selain itu, penulis juga menggunakan metode analisis Information Economics. Information Economics bertujuan untuk melakukan analisis investasi atas pengimplementasian sistem online trading perdagangan berjangka pada perusahaan. Hasil dari penelitian ini adalah tingkat pengembalian dari investasi yang telah dilakukan serta penilaian kinerja investasi TI berdasarkan analisa terhadap Business Domain dan Technology Domain. Kesimpulan dari penelitian ini adalah investasi TI yang dilakukan oleh perusahaan menghasilkan return bagi perusahaan dan berkinerja baik.*

*Kata Kunci: kinerja, investasi TI, Information Economics*

## *Abstract*

*The purpose of writing this essay is to determine the economic value of IT investments are made, the return on IT investments, and their impact on corporate performance. The methodology used was bibliography research, by collecting data and information through reading and studying books that relate to the discussion of the problem in writing this essay, a survey by using observation and interviews. In addition, the authors also use the Information Economics method of analysis. Information Economics aims to conduct investment analysis on the implementation of online trading systems futures trading in the company. The results of this study is the rate of return from investments that have performed as well as evaluating the performance of IT investments based on analysis of the Business Domain and the Technology Domain. The conclusion of this research is the IT investment made by companies to produce returns for the company and performing well.*

*Keywords: performance, investment in IT, Information Economics*

## **1. Introduction**

In this age of globalization, Information Technology (IT) is growing. The success, progress, and the level of productivity of a conscious business relies heavily on the support and the ability of IT systems, so there is no doubt that IT has become a very important component to the success of a business and organization.

The need for IT and the increased competition in the business world, making almost all companies make IT investment. By making IT investments, the expected speed, information processing capabilities, and connectivity of computer and internet technology to fundamentally improve the efficiency of business processes, as well as improve communication and cooperation among the people responsible for operations and management.

PT. ATPF is one of the futures trading company in Indonesia, where IT investments are very instrumental in improving the company's business processes. Therefore, the implementation of IT becomes important points that need to be noticed by the management seen from the large investment that

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will be issued, so the company must have a planned management, both in terms of operational and economic or financial. Management is intended to measure whether the business entity within the company is able to adapt to the technology that has been implemented, whether the profit obtained is in conformity with the investment that has been done, and if the software has been implemented to meet the requirements of the company.

This study will describe the analysis of each product that has been developed and implemented to support business processes. Financial or economic suitability will be analyzed with the Information Economics method to quantify the costs and benefits gained by implementing each of the IT Assets.

The result of this evaluation is expected to help PT. ATPF to determine the return on IT investments and their impact on corporate performance.

**2. Research Method**

Research method used to evaluate of information technology investment performance at PT. ATPF is information economic. Information Economics is a collection of computational tools to quantify costs and benefits (cost and benefit) of an information technology project [3]. Information Economics is used as a method of calculation to obtain the economic value of a procurement project of Information Technology. This method was developed by Marilyn M. Parker and his team-mates in 1985 while working at the International Business Machines (IBM), and the development of method-Cost-Benefit Analysis (CBA). Information Economics to assess the relationship between IT investments with corporate performance, which valued the company's performance based on the value obtained and the cost of investment.

The underlying background is needed Information Economics:

1. The benefits generated by the Information System were different so that the values obtained were also different.
2. In general, corporate resources that can be used to build the information system is very limited in number.
3. Companies need to make a decision to allocate its resources in the most effective manner with consideration of the results obtained over the allocation of costs incurred.
4. Tools (tools) to perform a traditional cost-benefit analysis is not adequate to calculate all the values of existing IT investments.

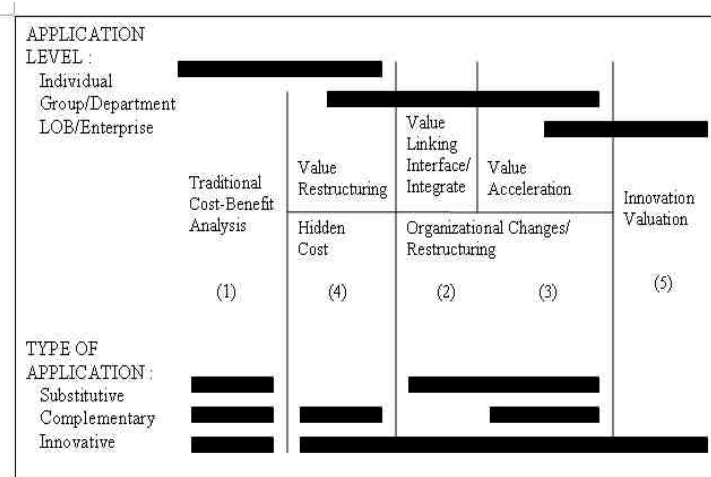


Figure 1. Mapping application types, application levels, and analysis techniques and causes

IT invested in PT. ATPF is used to assist companies in dealing with any transaction relating to company's business process, which are future turnover. Software that is used on PT. ATPF included in type of complementary IT applications because it is used to increase the productivity and effectiveness of employees in any activity there. All costs associated with the development and implementation borne by the company's management, including the cost of purchasing hardware and software installation on all the division that serves to facilitate the business process itself. According to figure 1, mapping application types at PT. ATPF will be focused on Traditional Cost Benefit Analysis, Value Restructuring and Value Acceleration.

Table 1. IT Investment benefit PT. ATPF

Kinds of Benefit	Benefit	Value	Technic (IE Method)
Tangible Benefit	Reduce operating costs, which consist of : - Reduction in telephone costs - Cost reduction recorded conversation - Reducing costs of stationery	Return on Investment (ROI)	Traditional Cost Benefit Analysis
Quasi Tangible Benefit	- Streamline the management of transactions Increase employee productivity	Return on Investment (ROI)	Value Acceleration, Value Restructuring
Intangible Benefit	- Supporting the company's business strategy - Creating new business strategy	Strategic Match  Competitive Advantage	Analisis Business Domain
	- Creating the availability of information to support the Critical Success Factors - Providing technology to compete	Management Information  Competitive Response	
	- Allowing the creation of investment to other IT projects	Strategic IS Architecture	Analysis Technology Domain

### 3. Problem Identification

Based on interviews and survey results, it can be identified some of the problems experienced in running the system, among others, as follows. ]

1. Budget IT investments that are not planned in advance.

Generally, companies have the budget to invest in IT. But so far, PT. ATPF do not have the funds before starting the planning of IT investments. The company purchases IT infrastructure without considering the company's financial condition at the time. In fact, the cost of IT investments tend to be large, so the company should have a good financial plan before starting an investment.

The proposed solution:

- Analyze a variety of IT investment alternatives that are available to determine the types of IT investments that best suits the condition of the company. Then, the company can analyze the company's financial condition to determine the budgets of alternative IT investments are selected. Analysis can be performed using calculation Traditional Cost Benefit Analysis (TCBA) to obtain details of the cost of IT investments that must be removed, as well as any benefits to be gained from the implementation of the system to enable companies to know the range of total costs in conducting an IT investment that can help companies in determining the budget ..

1. The Company does not know the return on IT investment. In general, every company implementing IT to get the return on IT investment is high. But in reality, PT. ATPF do not know the rate of return from IT investments are made. So companies do not know whether the return on IT investment is actually equal to the expected rate of return on investment.

The proposed solution:

Perform calculations using the methods of Traditional Cost Benefit Analysis (TCBA), Value and Value Acceleration Restructuring to obtain details of costs and benefits directly from the

implementation of the system, calculate the acceleration of economic benefits from existing transactions and calculate the economic benefits of increased productivity of departments or functions there, which in turn will generate the actual value of the Return On Investment (ROI).

2. The Company does not know the impact of IT investments that have been made to the company's performance. Company IT investments to support the company's business processes. However, during implementation of the company do not yet know the extent to which IT investments will have an impact on company performance. Whether these investments will improve the performance of the company, or it will make a company's performance deteriorated.

The proposed solution:

To evaluate the performance of IT investments in companies to compare the cost, with benefits that impact on corporate performance in terms of financial, Business, and Technology.

**4. Evaluation Result**

**4.1. Traditional Cost-Benefit Analysis**

Economic Impact "worksheet (sheet of economic impact), including the calculation and analysis of cost and benefit (costs and benefits) that are used to obtain a simple ROI calculation results and scores of information technology projects. The calculation of these costs include the cost of system development (development cost) and cost of maintenance or operation of the system (maintenance or on-Go-in expenses).

The cost of system development includes five categories, namely:

1. The cost of developing a program
2. The cost of purchasing hardware
3. The cost of purchasing software
4. Training Costs
5. Other costs.

While operating costs are divided into six categories, namely:

1. Software maintenance costs
2. The cost of data storage
3. Cost komunikasi
4. The cost of purchasing new hardware or software
5. Supply
6. Other costs.

A. Net Investment Required (From Development Costs Worksheet)																				
B. Yearly Cash Flows : Based on five 12-month periods following implementation of the proposed system. Cash flow can be negative																				
	YEARS					TOTAL														
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5															
Net economic Benefit	0	0	0	0	0															
Pengurangan biaya	Xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx															
= Pre-tas Income	Xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx															
(-) Ongoing expense from worksheet	Xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx															
= Net Cash Flow	Xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx %														
<p>C. Simple ROI, calculated as B / # YRS / A</p> <p>D. Scoring, Economic Impact</p> <table border="1"> <thead> <tr> <th>Score</th> <th>Simple Return On Investment</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Zero or less</td> </tr> <tr> <td>1</td> <td>1% - 299%</td> </tr> <tr> <td>2</td> <td>300% - 499%</td> </tr> <tr> <td>3</td> <td>500% - 699%</td> </tr> <tr> <td>4</td> <td>700% - 899%</td> </tr> <tr> <td>5</td> <td>over</td> </tr> </tbody> </table>							Score	Simple Return On Investment	0	Zero or less	1	1% - 299%	2	300% - 499%	3	500% - 699%	4	700% - 899%	5	over
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5	over																			

Figure 2. Economic impact worksheet

According to financial report related with IT investment data and measurement of tangible benefit using Information Economic standard from 2007 - 2010, result of measurement from Return on Investment for Quantification of economic impact of direct benefit are 13,30 % or score 0.

#### 4.2. Value Acceleration

Value Linking is a financial evaluation of the benefits that an effect of the application of information technology in the combined company, for example the creation of communication between departments more efficient. Value acceleration is a financial evaluation of any acceleration of the time whose influence is increasing productivity which can be a faster job completion. Result of Return on Investment measurement for PT. ATPF are 164,25% or score 1.

#### 4.3. Value Restructuring

Value restructuring is the value associated with the restructuring of the functions of divisional task. Measurement assessment of the increase in value resulting from changes in productivity of the organization, from activities whose value is lower switching into higher-value activities. Result for quantification of economic impact of value restructuring are 165,84% or score 1.

#### 4.4. Factors in the Business Domain

The benefit of course can not be directly visible on the ROI calculation, because some of these benefits are unique to the business domain and some are unique to the technology domain. In the business domain, there are still other factors beyond simple ROI calculation that need to be evaluated for this weighting to be better and score the project look more realistic.

The factors in the domain business are:

1. Strategic factors Match, focused on the degree of support or alignment of direct and indirect relationships between the built with the company's strategic objectives.
2. Competitive Advantage Factor, pay attention to evaluation of public policy firm that has been undertaken in relation to improving the company's capability to compete.
3. Factor Management Information, which was weighted, is the level of information management support to the main activities of the company (Management Information Support of Core Activitied / MISCA).
4. Competitive Response Factor measures the level of failure in running the system that resulted in the failure of the company competitive. This can happen because a competitor had already providing services, products or exchange data.
5. Project or Risk Factors Organization, focusing on the level where the organization is able to implement changes required by the SIM project. Evaluation considering the user or organization Business Domain, and not a technical organization. The components of organizational capacity include support change management, maturity use of computers in organizations, and assessment of the reality of the task in completing the project through the business processes and functions.

Scores business domains that have been obtained will then be incorporated into the Economic Scorecard for Business Domain.

Evaluator	Business Domain					
(Factor→)	ROI*	SM*	CA*	MI*	CR*	OR*
Business Domain	1	5	3	5	4	1

\*Where:  
 Pengukuran ROI  
 ROI = skor tingkat pengembalian investasi

Pengukuran Business Domain  
 SM = Strategic match  
 CA = Competitive advantage  
 MI = Management information support of core activities  
 CR = Competitive response  
 OR = Project or organizational risk

Figure 3. Economic Scorecard for Business Domain

**4.5. Factors in the Technology Domain**

There are several factors that affect the domain technology investments in information technology, namely:

- Factors Strategic IS Architecture to evaluate the alignment of a project with the rest of the information system strategy is reflected in the IS blueprint
- Definitional Uncertainty factors, analyze the level of complexity of an area, it is likely that there are changes and specifications of a job.
- Technical factors Uncertainty assess the level of dependence on the ability of risk taking over the field of knowledge, dependence on certain hardware, dependence on the ability of software and software application development capabilities.
- InfrastructureRisk IS factor, is used to determine how much risk the company will be faced with a new system. This assessment focused on short-term risks that may be faced by the organization. This risk is emphasized at the level of organization necessary changes, including initial cost, integration, management training, needs reorganization, and threats to the existing equilibrium.

Scores technology domains that have been obtained will then be incorporated into a new scorecard that combines business domain with a score score technology domain.

Evaluator (Factor→)	Business Domain						Technology Domain			
	ROI*	SM*	CA*	MI*	CR*	OR*	SA*	DU*	TU*	IR*
	+	+	+	+	+	-	+	-	-	-
Business Domain	1	5	3	5	4	1				
Technology Domain							3	3	0	3

\*Where:  
 Pengukuran ROI  
 ROI = skor tingkat pengembalian investasi

Pengukuran Business Domain  
 SM = Strategic match  
 CA = Competitive advantage  
 MI = Management information support of core activities  
 CR = Competitive response  
 OR = Project or organizational risk

Pengukuran Technology Domain  
 SA = Strategic IS architecture  
 DU = Definitional Uncertainty  
 TU = Technical uncertainty  
 IR = IS infrastructure risk

Figure 4. Economic Scorecard for Business and Technology Domain

**4.6. Information Economics Scorecard**

After the score obtained by a simple ROI calculation, five factors score weighting domain business domain technology and the fourth factor is also obtained, the next step is to enter the score into the Information Economics scorecard. This score is then multiplied by the relative value of corporate to gain weight score. After that, each weighted score is summed to obtain a total score of the project.

Evaluator (Factor→)	Business Domain						Technology Domain				Weighted Score
	ROI*	SM*	CA*	MI*	CR*	OR*	SA*	DU*	TU*	IR*	
	+3	+5	+2	+4	+3	-1	+3	-1	-3	-2	
Business Domain	1	5	3	5	4	1					
Technology Domain							3	3	0	3	
Weighted Value	+3	+25	+6	+20	+12	-1	+9	-3	0	-6	+65

\*Where:  
 Pengukuran ROI  
 ROI = skor tingkat pengembalian investasi

Pengukuran Domain Bisnis  
 SM = Strategic match  
 CA = Competitive advantage  
 MI = Management information support of core activities  
 CR = Competitive response  
 OR = Project or organizational risk

Pengukuran Domain Teknologi  
 SA = Strategic IS architecture  
 DU = Definitional Uncertainty  
 TU = Technical uncertainty  
 IR = IS infrastructure risk

Figure 5. The Information Economics Scorecard

#### 4.7. Corporate Value

Table 4.1. Predicate Investment TI PT. ATPF

Score	Predicate
74 – 100	Very good
<b>47 – 73</b>	<b>Good</b>
20 – 46	Enough
(-8) – 19	Less
(-35) – (-9)	Very Less

Based on information obtained from management and IT managers, on the weighting of the business domain and technology domain that is delivered at the table above, it is known that PT. ATPF has the support of a strong business and technology.

Strong business support reflected in the high value obtained. Of the investments made, the company obtained a value of Return on Investment (ROI) is quite high. IT used to support Line of Business (LOB) companies as a means to make sales online futures and means of communication between branch also has a high level of compliance with business strategy. However, the systems used by the company are used also by other similar companies so that the competitive value of the company becomes too high. Invested very useful system help companies manage information related to strategic planning, management and operation control. Important information can be obtained will help top management in making the right decision. Although not supported by the system, transactions can still be handled manually, but the handling will not be as fast and as effective if supported by the system. Investment had the support of the management system, planning and good management, contingency plans are well formulated, processes and procedures in place, defining the product properly and in accordance with market demand, but does not require training for both employees and customers.

While the strong technology support reflected in the low risk associated with implementing the system. Invested IT alignment with strategic planning of existing information systems. The company has knowledge of the requirements and specifications in the implementation of IT. Systems that have implemented are fairly high dependence of hardware, software, application software and implementation of applications. The infrastructure required by the system only in the form of hardware, software, and network communication. The system does not need the support database as data storage media.

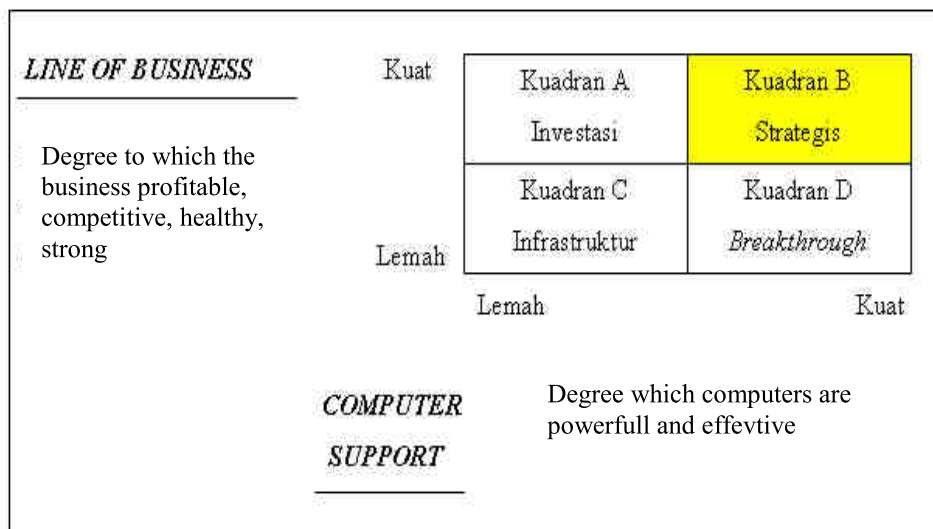


Figure 6. Corporate Value PT. ATPF

Explanation for each Quadrant means:

- Quadrant A: Investment

At the position of quadrant A, an organization has strong business strength, but has a dependency on information systems are weak. Usually this new organization to invest in their business information systems, so that still must continue to improve the strength of the business

running. With the power of existing business, they have the opportunity to increase their investment in the future, with consequences they must continue to focus on building its infrastructure.

- Quadrant B: Strategic  
In this quadrant illustrates the power of a strong business with a strong information system support as well. The organization relies heavily on information systems to run a business in which they live. Both of the systems infrastructure and backbone systems are very strong.
- Quadrant C: Infrastructure  
Organizations that are in this quadrant is described as having a weak strength of the business and followed by a weak information system support as well. Organization's level of dependence on information systems considered to be very weak.
- Quadrant D: Breakthrough or Management  
In this quadrant, the organization has a weak strength of the business but support from existing information systems is considered strong. With the support of strong information system will enable the creation of power in the existing business potential.

In general, the organization is dependent on information systems to run a business in which they live, so that PT. ATPF is located in a strategic position (quadrant B) in quadrant corporate value identified by Parker

### CONCLUSION

The conclusion that can be drawn from the evaluation of IT investment performance by using the Information Economics method is that the investment made by PT. ATPF performing "GOOD", it is based on the following considerations:

1. IT Applications at PT. ATPF used to support an online futures trading. The application can increase employee productivity and effectiveness in handling the transaction. If this application does not exist, business processes can continue running but the handling of the transaction will not be as productive and effective as if the support of this application. Therefore, applications on PT. ATPF classified as a type of complementary applications.
2. The results of analysis by using Traditional Cost Benefit Analysis calculation, the value of simple ROI is -13.30%
3. The results of analysis by using the acceleration value calculation, the new ROI values obtained that is equal to 164.25%
4. The results of analysis by using value calculation restructuring, the new ROI values obtained that is equal to 165.84%
5. Domain Analysis of Business shows that IT is implemented to support achievement of corporate strategic objectives, improve company's competitive position, it is important to create a Management Information Support of Core Activities (MISCA) in the current period, supporting the company in competing with its competitors, and have no short-term risk associated with business process redesign and organizational restructuring.
6. Domain Analysis of Technology shows that IT is implemented in line with the planning information system (blueprint) organization for the long term, the company has sufficient knowledge of the terms of implementation and the specification of the project is quite clear, has a high readiness in implementing the system, and has a project environment quite adequate.

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