Benefit of Using Cloud Services in IT Infrastructure in the Capability, Strategy and Cost Efficiency Aspects: detikNetwork Case Study

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Abstract. IT infrastructure becomes essential for online media business. Nowadays online media companies shall able to handle the huge traffic volume. It is caused by the growth of the internet and the ubiquity of the medium for accessing online information. On the other hand, cloud service has a promising capability to provide more uptime and handling large traffic. At present cloud services can be grouped into 3 models: IAAS, PAAS, and SAAS. Moreover, cloud services also can be configured as needed. Therefore, detikNetwork utilizes IAAS to improve its IT infrastructure capability. Based on the IT outsourcing definition, cloud service can be one of the IT outsourcing implementations. Previous studies prove that IT outsourcing has a positive influence on the company. The benefits of IT outsourcing can be measured into 3 aspects: capability, strategy, and cost-efficiency. The purpose of this study is to explore the benefit on detikNetwork after cloud adoption by using IT outsourcing benefit perspective. The qualitative method by conducting interviews with experts from detikNetwork was used to complete this study. This study found that detikNetwork adopts cloud service with a selective and general approach and also discovers cloud service adoption does not bring all the benefits of IT outsourcing. DetikNetwork does not experience following IT outsourcing benefits: become more innovative and able to develop a new product, cost-efficiency on the expert acquisition, and cost-efficiency to follow technology trends.

1. Introduction
Availability is very important for online media business. The growth of internet coverage and ubiquity of medium for accessing online information can cause the rapid traffic increase. Handling large volume of traffic becomes the primary competence for companies that run online media business. The drop or downtime of services can impact the company's competitiveness. Therefore IT infrastructure play significant in this business. On the other hand, cloudification of IT infrastructure is very common. Cloud services can provide more advanced IT infrastructure and on-demand configuration. Furthermore, many cloud service providers guarantee their services are able to provide more availability.

DetikNetwork is a company under PT Trans Digital Media that provides 24/7 news delivery services and for this organization to compete in this digital age, detikNetwork requires an IT infrastructure that can provide stable and fast services. Choosing a cloud service is one of detikNetwork's efforts to improve the capabilities of their IT infrastructure, with the hope of delivering news services consisting of several web portals, such as: (1) detikCom, (2) CNN Indonesia, (3) CNBC Indonesia, (4) Haibunda, (5) FemaleDaily, (6) Beautynesia, and (7) InsertLive can work stable and fast.

Some previous studies state that the use of IT outsourcing can have a positive impact on the company [1,2,3]. In line with the definition of IT outsourcing, which is using third party services to provide resources and to do other company activities [4, 5], that makes the use of cloud can also be categorized...
as a form of IT outsourcing. This research will identify what benefits are obtained by detikNetwork by using cloud services. This research will also explore whether the use of cloud services on detikNetwork correlates with the benefits obtained from IT outsourcing.

This research contributes about relationship the use of IAAS with strategy, cost and quality owned by the company. This research consists of 5 sections. The first section is about the background of this study. The second section will review the theoretical reason that are used. The third section will outline the methodology used in this study. The fourth section will present the analysis and implications of the study. The fifth section will present conclusions and suggestions.

A company makes it reasonable to hire the services of other companies to manage IT infrastructure or to carry out IT activities [6]. This kind of relationship is called as IT outsourcing. Forms of IT outsourcing can be divided into two: general outsourcing and strategic outsourcing. General outsourcing is outsourcing that has a small impact on the company's strategy, while strategic outsourcing is outsourcing that has a large impact on the company's strategy [7]. The application of IT outsourcing can be done selectively or largely [6, 8]. Companies selectively outsource IT when only a few IT services or functions are carried out by partners. Companies will outsource IT on a large scale when almost all the company's IT functions are managed by partners.

The benefits of implementing IT outsourcing consist of several aspects, namely: capability, strategy, and cost efficiency. In terms of capabilities, companies can obtain new abilities or improve existing facilities by utilizing the services provided by partners [9]. The company also has the flexibility in choosing services and partners that match their needs of the company, this also increases the agility of resources in meeting the changing needs [10, 11].

In terms of strategy, with IT outsourcing the company can focus more on its main competencies. IT outsourcing is can help to minimize routine operational activities that does not provide an added value to the company [10]. The company also does not need to make exceptional investments to keep up with technological advancements other than hiring partners [10]. To improve service quality and competitiveness, partners must keep up to date on developments in their services. By having good relationships and quality partners, companies can improve the quality of services or products, and innovate to create new products or services [10,12].

The application of IT outsourcing also provides benefits in terms of cost. Expenditures that need to be controlled are the costs needed to rent services from partners, therefore the company will be easier to manage expenses. Cost efficiency also occurs in expense of labor and technology utilization [9, 13]. When a partner provides services to the company, the partner indirectly provides professional on their product or service, therefore the company does not require specific budget to hire another expert from a separate company [10,14].

Cloud service is a form of IT outsourcing [15]. Variations of cloud services can be categorized into 3 types, Service as A Service (SAAS), Platform as A Service (PAAS), and Infrastructure as A Service (IAAS). SAAS is a cloud service in the form of an application, users do not need to manage the platforms configurations, infrastructure, and application deployment. PAAS is a cloud service that provides a platform for an application, the use of this service still requires users to configure and deploy applications. IAAS is a service that provides the infrastructure needed by the application [16, 5]. To use IAAS services, users still need to configure the infrastructure and platform for application deployment.

2. Method
This research is conducted as a case study on detikNetwork. In the initial stages, a literature study was conducted to explore theories related to IT outsourcing such as the benefits of IT outsourcing, and cloud services. Two interview sessions were conducted with detikNetwork expert. The interviewees were Agus Lestari and Suwarto. Agus Lestari is a manager who is responsible for system and network and Suwarto is a specialist in IT infrastructure. Both have 10 years experiences in managing detikNetwork’s IT infrastructure. This study also carried out document observation to complement the interviews result. The collected data was analyzed to determine the process of cloud implementation in detikNetwork, IT infrastructure, and what benefits were obtained.
Figure 1 is theoretical framework that used by this Study. Cloud implementation in detikNetwork was evaluated using IT outsourcing and cloud services theory. After that, this study examined the benefit of cloud usage in detikNetwork by using IT outsourcing benefit theory.

![Theoretical Framework Diagram](image)

**Figure 1. Theoretical Framework.**

### 3. Results and Discussion

At the beginning of the internet age, detikNetwork utilized desktop computer to deliver its content, as technology advanced, detikNetwork had used various platforms such as mobile devices, internet TV, electronic public banners, and others. To present news on the platform, detikNetwork has various applications to fulfill their daily activities and to support business needs. Based on the result of interview with Agus Lestari [17], applications owned by detikNetwork can be categorized as follows:

- **Editorial/Frontend:** this application is the frontend of the online media portals at detikNetwork. Information in the form of news for users will be displayed on this application. Optimization of this application will be immediately felt by end-users. This application consists of several types of objects including generated-html files, images, css files, mobile applications API, search engines, and others.
- **Business-related application:** this application serves to help the business department, this application consists of: (1) Advertising Platform, (2) Promotional Services, (3) User self-service platform, and others.
- **CMS/Backend:** this application is used by editorial departments to manage editorial content/front end applications. This application consists of: (1) Content Management System, (2) Meta-data management, (3) Multimedia (video image, sound) management, etc.
- **End User Application:** this application has the role of presenting an interface for users to interact with the system. This application is also used to track activities performed by users through the frontend application. This platform consists of: (1) single sign-on mechanics, (2) user generated content system, (3) loyalty program system, (4) forums, etc.
To ensure these applications continue running 24/7, detikNetwork has large enough on-premise IT infrastructure consisting of: (1) 406 Web Servers, (2) Routers, (3) firewalls.

The number of users accessing content on detikNetwork continuously increases every year, this has an impact on the use of available infrastructure resources [17]. The IT infrastructure used by detikNetwork must have powerful availability to deliver content in all circumstances. To overcome this, detikNetwork began to shift from using on-premise infrastructure to cloud services with Infrastructure as A Service. By using Infrastructure as A Service, detikNetwork only configures infrastructure and platforms for installing applications without having to think about the server physically. Cloud services that has been used by detikNetwork consist of: (1) Cloud server for frontend applications CNN, CNBC, Haibunda, Insertlive, Beautynesia, and FemaleDaily. (2) Cloud server for CNN, CNBC, Haibunda, Insertlive, Beautynesia, and FemaleDaily CMS applications [17, 18].

As shown in Table 1, not all detikNetwork applications are migrated to cloud environment. At the initial cloud implementation, detikNetwork used a common form of outsourcing, this because at initial, detikNetwork only used the cloud in a small portion of the applications they had, the application did not have a large impact on the company's strategy. Over time, detikNetwork begin to shift gradually their infrastructure to cloud service, this can be seen from the management's decision not to add servers on premise and start using the cloud for applications. In cloud implementation chooses general and selective approach, this is related to detikNetwork not directly transferring all applications that are related to the cloud. Based on company's documentation, detikNetwork will maintain several applications on the existing on-premise infrastructure.

Table 1. DetikNetworks’s Applications

| Application Category   | Application Name                                                                 | Infrastructure |
|------------------------|----------------------------------------------------------------------------------|----------------|
| Editorial/ Frontend    | Portal CNN, CNBC, Haibunda, InsertLive, Beautynesia, and FemaleDaily. Portal detik.com. | IAAS [17, 18]. |
| Business-related       | detikAdsmart, detikPayment, detikShop, detikEvent, and Ads management. CMS Kunyit (CMS CNN). CMS Kencur (CMS CNBC). | On premise [17, 18]. |
| application            |                                                                                  | IAAS [17, 18]. |
| CMS/Backend            | CMS detik Publishing (CMS Haibunda, CMS InsertLive, CMS Beautynesia, and CMS FemaleDaily). CMS Jahe (CMS detik.com) | On premise [17, 18]. |
| End User Application   | CMS Socmed, Detik shortenURL, Audio, and Push notification.                      | On premise [17, 18]. |

To examine the benefit of cloud service, this study uses IT outsourcing benefit theory. Table 2 shows a summary of identified cloud service benefit in detikNetwork. Following IT outsourcing benefit theory, this study categorized found benefits into 3 aspects which are capability, strategy, and cost-efficiency.
Table 2. Implications of Cloud Adoption in detikNetwork

| Aspect                      | Benefit Indicator                              | Finding                                                                 |
|-----------------------------|-----------------------------------------------|-------------------------------------------------------------------------|
| Capability                  | Improve IT competency [9].                    | Increase availability to 99.95% [17,19].                                |
|                             | Improve company competitiveness [10].          | Able to provide online news with almost no downtime [17,19].           |
|                             | Improve IT infrastructure flexibility and agility [10, 11]. | Just in time infrastructure adjustment [17, 19].                     |
|                             | Company can focus on main business [10].       | More focus in product development and news delivery [17, 19].          |
|                             | Minimize routine activities which is not part of main business needs [10]. | No operational and maintenance activities [17, 19].                  |
| Strategy                    | Company does not need to put specific effort to learn technology trends [10]. | New infrastructure technology provided by cloud provider [17, 19].   |
|                             | Company become more innovative to deliver new services or products [10, 12]. | There is no new service or product created based on cloud services capabilities [17, 19]. |
|                             | IT cost is easier to control [9, 13].          | IT cost is simplified [17, 19].                                       |
| Cost efficiency             | Cost efficiency in expert acquisition [10, 14]. | With on-premise infrastructure detikNetwork can become more price sensitive to acquire expert services [17, 19]. |
|                             | Cost efficiency in following IT technology trends [9, 13]. | TCO of on-premise infrastructure is more economical than IAAS [17, 19]. |

On 2018 detikNetwork suffered 8 hours downtime [20]. At that time, detikNetwork infrastructure was 100% on premise [17]. Since using IAAS until this research conducted, detikNetwork did not experience any downtime in their cloud infrastructure. Thus, the capability of the company to provide 24/7 news services can be achieved. This is also reflected in service level agreement that provided by cloud service provider. They can warrant 99.95% uptime by using the latest technology they have [17, 21]. With the uptime benefit from cloud service, this study argues that 99.95% uptime has impact to detikNetwork competitiveness.

On the other hand, expert in detikNetwork, [17] said “by using IAAS detikNetwork can have flexibility to choose the services based on the needs”, and [19] also said ” One of the advantages of using IAAS, we can quickly adjust the infrastructure capacity as needed”. It demonstrated that detikNetwork has flexibility to adjust the capability of cloud-based infrastructure. When traffic from the media that exists on detikNetwork rises dramatically, the required infrastructure resources can be added quickly and without requiring great effort. Cloud services can assist according to detikNetwork needs [17, 19].

According to previous research [9,12,13,14], cloud services should have a positive effect to company in strategy aspect. As is in the interview, [17] said “The team does not need to spend extra effort to improve IT infrastructure capabilities. By using IAAS, increasing IT infrastructure can be done by...
sending request to provider”. In addition to opinion from [17], [19] said” Some activities like hardware sizing, finding correct hardware specification for expansion, and physical architecture evaluation can be eliminated when using IAAS”. The words of [17, 19] reflects that with the application of IAAS detikNetwok can focus more on its core competencies, which is delivery the news online and just in time. This is because the implementation of IAAS will reduce the company's focus on infrastructure as a major business support. Companies can streamline IT organizations and add resources to optimize and develop applications that play an important role in presenting news services to their users. Besides, detikNetwork can also add support to the editorial department so that news availability will be much faster and more accurate.

By using cloud services, detikNetwork can minimize routine operational activities that do not provide direct benefits to the company. detikNetwork’s experts described the application of IAAS allows team to pull out of IT operational and maintenance activities, such as applying security patch on server operating system [17, 19]. These activities have been carried out by the cloud provider services.

When adopting cloud services, detikNetwork also receives infrastructure with the latest technology. This is because the IAAS provider will always update their technology. Therefore, detikNetwork does not need to make extraordinary investments to stay up to date in technology. This is very helpful because by using the latest infrastructure technology, detikNetwork can provide better services.

This study did not find any evidence that cloud services can assist detikNetwork becomes more innovative and able to create new product. The main purpose of cloud implementation in detikNetwork is to reduce downtime and complexity in operation and maintenance. Innovation and new product development in detikNetwork depend on product development team creativity. Until now, there is no newly developed product based on the cloud services capability.

Cost is an aspect that is highly considered when a company wants to implement cloud services. The company's expenses for IT infrastructure are more controlled. Based on the interviews, detikNetwork experts said “when companies want to use cloud services, the provider will help these companies to assess infrastructure needs based on the application requirements used by the client” [17, 19]. Thus, detikNetwork can set a specific budget needed according to their needs.

In terms of cost efficiency in utilizing IT technology, the use of cloud services will be slightly cost more when compared to on premise. The price of the cloud provider offer is more expensive compared to all total cost ownership in case of on-premise. The words of [17] in the interview was “With on-premise infrastructure, detikNetwork can be more price sensitive on hardware specification, operational cost, maintenance cost, and expert costs”. Furthermore [19] said” detikNetwork must pay cloud service every month, and if we compare the total cost for IAAS with on premise, IAAS is more costly”. Those statement implies that the use of cloud services at detikNetwork also does not result in reduced costs for hiring expert. The total costs incurred by detikNetwork when using cloud, if calculated as a whole, will be more expensive than using on premise infrastructure.

Furthermore, this study did not discover any proof that shows cloud implementation will benefit for cost-efficiency in following technology trends. In terms of detikNetwork, cloud implementation is only IAAS, which is only improve their infrastructure capability. Based on the interview, as online news provider detikNetwork still can operate well by using their conventional technology in on-premise infrastructure.

In addition to what is described above, detikNetwork also has challenges when it needs to implement cloud. detikNetwork must also take account the interconnection services when it wants to implement cloud services. This is because interconnection services are not included in the services provided by cloud service providers that are used by detikNetwork.

4. Conclusion
The results of this study showed that the benefits gained from using cloud is also correlated with some benefits gained from IT outsourcing. This study was limited to the benefits of using cloud services based on 3 aspects, specifically: (1) strategy, (2) capability, and (3) cost efficiency with selective and general cloud service implementation. These three aspects were tested by conducting interviews with detikNetwork employees and direct observation, also this study only covers the use of cloud services in
the form of IAAS. Future research can be conducted based on the benefits of using cloud services as seen from aspects which are not mentioned above, and other forms of cloud services other than IAAS.

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