IDENTIFYING EA PRINCIPLES USING SWOT ANALYSIS
(CASE STUDY OF E-COMMERCE PT. XYZ)

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Abstract

In current business practice, an integration between business and IT is important. Enterprise Architecture (EA) is one of the study that synergize IT and business. The principle is used as the main base to designing appropriate EA. Before describing these principles, it is necessary to understand the real state of a company. It aims to make the situation as one as benchmarks to describe the state of the target. Once the state of the target is designed, it makes the processes of designing EA for a company easier. This paper uses the SWOT analysis method to recognize their core competencies in order to determine the direction of an organization by analysing and positioning the organization's resource and environment on four regions: Strengths, Weaknesses, Opportunities, and Threats. After assessing a SWOT analysis, a mapping that determines in which quadrant is the position of the company. Each of the quadrant positions describes different strategies. Based on the obtained strategy, the target principles according to the position of a company based on the SWOT analysis is defined. Thus, the EA design for a company can be started with a precise principle foundation.

Keywords : *enterprise architecture, ea principles, swot analysis, e-commerce, ea strategies*

Abstrak

Dalam praktek bisnis saat ini, integrasi antara bisnis dan TI sangat penting. Enterprise Architecture (EA) merupakan salah satu studi yang mensinergikan antara TI dan bisnis. Prinsip akan digunakan sebagai landasan utama dalam merancang EA yang tepat. Sebelum mendeskripsikan prinsip tersebut, perlu dipahami terlebih dahulu keadaan sebenarnya dari suatu perusahaan. Hal ini bertujuan untuk menjadikan keadaan tersebut sebagai salah satu tolok ukur dalam mendeskripsikan rancangan target. Setelah tergambar keadaan perancangan target yang diinginkan, maka ini akan mempermudah proses perancangan EA. Dalam artikel ini akan digunakan metode analisis SWOT untuk mengenali kompetensi inti dari suatu perusahaan dalam menentukan arah perusahaan dengan menganalisa dan menempatkan sumber daya serta lingkungan yang dimiliki oleh perusahaan dalam empat wilayah yaitu kekuatan, kelemahan, peluang, dan ancaman. Setelah dilakukan penilaian bobot, maka didapatkan suatu pemetaan yang menentukan dimana posisi kuadran perusahaan tersebut. Pada masing-masing posisi kuadran akan dideskripsikan strategi yang berbeda antara satu dengan yang lainnya. Dari strategi yang diperoleh maka akan dideskripsikan prinsip-prinsip target yang sesuai dengan posisi perusahaan berdasarkan analisis SWOT tersebut, perancangan EA untuk suatu perusahaan dapat dimulai dengan suatu landasan prinsip yang tepat.

Kata Kunci: *arsitektur enterprise, prinsip ea, analisis swot, e-commerce, strategi ea*

1. Introduction

Nowadays, in current business practice, an integrated approach to business and IT is indispensable. Enterprise Architecture (EA) captures the essentials of the business, IT and its evolution. The idea is that the essentials are much more stable than the specific solutions that are found for the problems currently at hand. Architecture helps in guarding the essentials of the business, while still allowing for maximal flexibility and adaptivity. Without good architecture, it is difficult to achieve business success [1]. It means EA can help to design strategies of business and IT to supports the company to reach business goals.

Enterprise architecture is a logical organization of a business and its supporting data, applications, and IT infrastructure, with clearly defined goals and objectives for the future success of the business. A typical architecture consists of dia-

grams or models that show how aspects of your business relate. For example an organizational chart is a model of how business units relate to each other. To develop a useful enterprise architecture (EA), it is important to firstfully understand the questions you want to answer with your architecture. Then based on these questions, you can develop an approach and identify the models that you need. Finally, you can do both quantitative and qualitative analysis on your architecture to either see where the business can be improved or identify necessary changes or enhancements to the architecture. This article offers a summary of an enterprise architecture program and its processes [2].

Designing EA consists of several phases, i.e. preliminary phase, architecture vision, business architecture, information system architecture (data architecture and application architecture) technology architecture, opportunities and solutions, migration planning, implementation governance and change management architecture [3]. In this paper it is restricted only on preliminary phase. In this phase the principles catalog that capture principles of the business and architecture principles that describe what a good solution or architecture should look like is described. Principles are used to evaluate and agree an outcome for architecture decision point. EA principles can be described from mission, vision, goals and objectives from the company, but principles are also used as a tool to assist in architectural governance of change initiatives.

In daily life, e-commerce has many names, including the Internet Commerce, E-com, e-commerce or Immerce that basically all of these names have same meaning. These terms mean electronically buying or selling. E-commerce can also be interpreted as advertising, sales, support and service using a webstore (shop on the website) 24 hours a day for all customers. E-commerce describes the process of purchase, sale, transfer or exchange of goods or information via computer network including the Internet [4].

SWOT analysis systematically identifies various factors to formulate the corporate strategy. This analysis is based on the logic that maximizes strengths and opportunities but minimizes the weakness and threats. The process of decision is always made associated with development strategy of the mission, goals, strategies, and policies company. Therefore, planning strategies must analyze the factor of corporate strategy (strengths, weaknesses, opportunities, and threats) in current conditions. SWOT analysis compares the chance of external factor (opportunity and threats) with internal factor (strength and weakness) [5].

SWOT Matrix is a tool to prepare the company strategic factor. This matrix describes how opportunities and threats that face the company can be tailored to strengths and weaknesses from the company to achieve the expected goals [5]. The matrix is illustrated in TABLE 1 [6].

TABLE 1
SWOT MATRIX

	Strenghts (S)	Weaknesses (W)
Opportunities (O)	SO Strategy Create strategies which use the power (strength) to exploit the opportunities	WO Strategy Create strategies which minimizes weakness for exploit the opportunities
Threats (T)	ST Strategy Create strategies which use the power (strength) to overcome the threat	WT Strategy Create strategies which minimizes wekaness for avoid threat

2. Methodology

SWOT Analysis of E-commerce Websites of Dangdang.com

According to the previous research about website of Dandang.com, the development of e-commerce has brought out a variety of new e-commerce models [7]. There are three main traditional e-commerce models i.e.:
1) B2B (Business to Business) model (represented by Alibaba.com).
2) C2C (Customer to Customer) model (represented by Taobao.com).
3) B2C (Business to Customer) model (represented by Dangdang.com).

Started from selling books via online, Dandang.com aims to become the largest shopping online store. It has grown rapidly and expanded into selling general merchandise of dozens of categories, including audios and videos, household goods, cosmetics, clothes, digital products, etc. Dandang.com sends over 200.000 packages every day, and has set up 21 warehouses in 11 cities, over 370,000 square meters, to provide delivery services around China. It can deliver goods in the same day since ordered in 21 cities and by the next day in 158 cities. The result of SWOT Analysis by Dandang.com is as follows:
a) Opportunities: along with the advances is tech-nology booming and E-business is becoming a trend, the penetration rate of Internet is rising, this is facing lots of opportunities for the Dandang.com. The other opportunities are encouragement to develope e-commerce and set up laws and regulations for Internet safety by the country.
b) Threats: Chinas's e-commerce is still at growing stage, and many of the policies and regulations are not perfect or standardized.
c) Strengths: Dandang.com as a local online store has a better understanding of Chinese

market. Obtained some venture capitals, building up financial strengths. Dandang.com has established a number of warehouse centers cooperated with various local logistic companies, and provided Cash on Delivery in more than 800 cities across the coun-try.

d) Weaknesses: mutual understand-ding with consumers of categories that Dandang.com is expanding at (i.e. clothing, cosmetics, electrical appliances, etc.), is much more difficult to describe and to reach.

Enterprise Architecture: Enablers of Business Strategy and IS/IT Alignment in Government

From previous research about strategic alignment [8], government agencies in Australia, as in elsewhere, face a dynamic business environment with increasing expectations of operational efficiency. This operating environment means that government agencies may use a range of mechanisms to align their business strategy and IS/IT. Alignment allows an organization to apply information resources to the most important business delivery task and operational activities.

The case study presented in this paper is part of doctoral study that investigated the use of enterprise architecture in four Australian government agencies (the ABS, the Centerlink social services agency, the Department of Deffence, and the Queensland Department of Main Roads). The four organizations were drawn from the Commonwealth Architecture Forum and the Queensland Government Forum for Enterprise Architecture

Collaboration, which are special interest groups that aim to reach up the enterprise architecture goals and to initiate the goal up to the federal and the states government levels.

Fig.1 shows the ABS enterprise architecture method. The decision to present the ABS case is based on the finding that it is a well managed organization that has successfully developed 60% of its analytical business software, retained the services of a loyal workforce, and has survived the rigorous of government IT outsourcing initiatives and independent government reviews. The ABS is respected by other federal agencies as the best-practice organization [8].

3. Purpose of Solution

Based on the previous researches, the purpose of solutions are as follow:

1) Discussing and identifying the internal and external environment of e-commerce website. By implementing SWOT analysis, this paper points out opportunities, threats, strengths, and weaknesses of e-commerce website.

2) Presenting the argument that an organization's enterprise architecture can enable the alignment of business strategy and information systems and technology (IS/IT).

4. Case Study of E-Commerce PT. XYZ

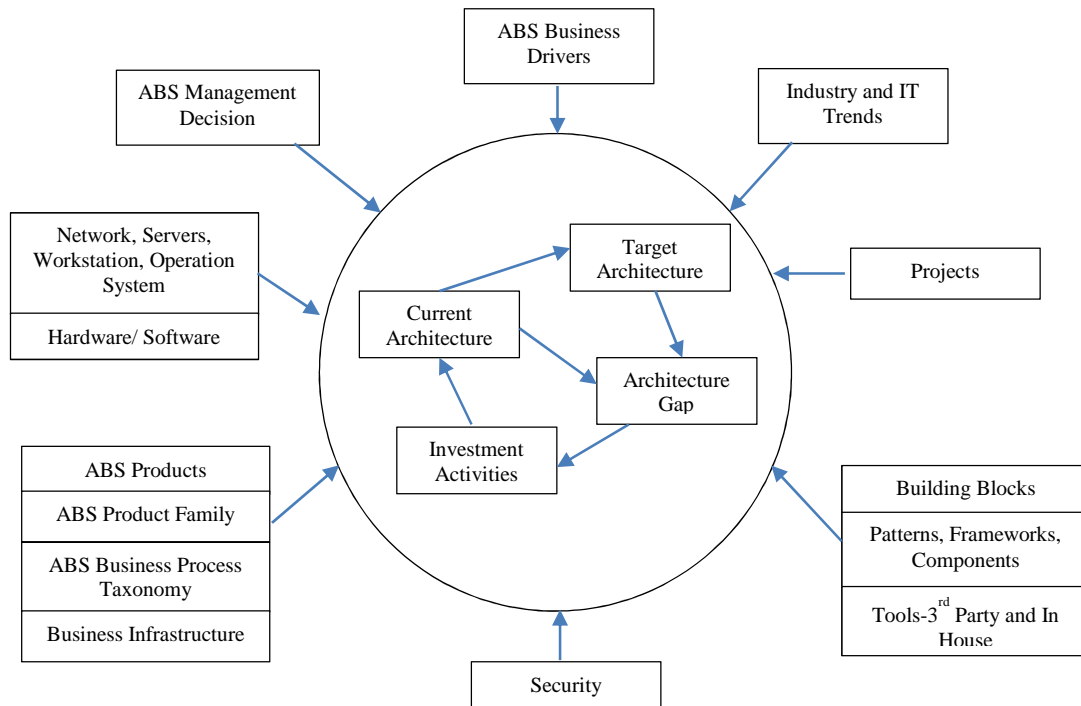PT. XYZ is a company that opening new business opportunities in e-commerce. At the first

Fig 1. ABS enterprise architecture method

time the e-commerce built by PT. XYZ is only intended as supporting business, but because of the evolution of information technology the PT. XYZ wants to make e-commerce as one of the main business. As a new actor in e-commerce, there are still many insufficiencies that must be corrected to improve the success of the business.

TABLE 2
SWOT ANALYSIS OF PT. XYZ

Strengths	Weaknesses
1. Extensive shipping network	1. Display of product unattractive
2. Easier terms become a merchant	2. Lack the promotion of product and website PT.XYZ to public
3. Name of the website reflect the company's identify	3. There is no access from merchant to web store
4. System of payment is reliable	4. System of payment doesn't varying
	5. Lack of integration between many parts application in PT.XYZ
Opportunities	**Threats**
1. Business of e-commerce is popular	1. International competitor in business of e-commerce
2. Local products (UKM) has a good quality	2. Domestic competitor in business of e-commerce Indonesia
3. People more familiar with internet	3. Merchant who have a physical store
4. A large population of Indonesia will support PT.XYZ to grow-up	4. Trading forum on the internet
5. The geographical condition of Indonesia	
6. A large number of UKM	

In this study many factors of strengths and weaknesses of PT. XYZ is described. Strengths and weaknesses obtained by conducting internal research at PT. XYZ. Contrast with opportunities and threats, both of them are obtained by looking at the external circumstances of PT. XYZ.

SWOT analysis is used to describe the real situation in PT. XYZ based on the factors that exist in the company, such as strengths, weaknesses, opportunities, and threats. TABLE 2 shows the SWOT analysis of designing EA for PT. XYZ.

Strengths

Strength is an internal factor of PT. XYZ to build e-commerce business. Strength is also a special competition that can provide a competitive advantage for PT. XYZ. The strengths of PT. XYZ are as follow:
a) Service of shipping that has a large distribution network in facilitating PT. XYZ to develope e-commerce business to reach various regions in Indonesia. Shipping is a service of PT. XYZ, which had been used and known by Indonesia's people to deliver a variety of goods to custo-mers with the help of couriers to reach the des-tination address.

b) In cooperation with PT. XYZ, the merchant will not be faced with complex requirement. This is because PT. XYZ does not have any requirement and specification that make merchant to cooperate with him self.
c) Name of web store PT. XYZ reflects the company's identity. It aims to introduce e-commerce of PT. XYZ, as well as from the web store then customer can recognize the characteristics according to the identity of the PT. XYZ.

Weaknesses

Weaknesses are a limitation or lack of PT. XYZ in resources, skills, and capabilities that can inhibit the performance of PT. XYZ. The weaknesses of PT. XYZ are as follow:
a) Display product is unattractive to make visitor feeling interested to buy the product that are sold in web store. It can be seen from customers perspective, they are surely more interested to see those products if the products are presented with attractive image, if necessary by adding animation to the image so customers can see from the front, side, and top. Different condition when the appearance of the product is only a product image without editing process, the picture taken by regular camera and has a diverse background, it can reduce the beauty of the display of each product.
b) Lack of products promotion causes customers become unfamiliar with the products sold by PT. XYZ. If PT. XYZ can display their product's promotion on the web store by making headlines promotion or another, customers surely will be interested to buy.
c) There is no access from merchant to web store, so admin must perform updated information regarding the products that are sold by the merchant. Moreover the admin of PT. XYZ updates the product information only once a week. It will be better if the merchant have access to manage information of products it sells in PT. XYZ.
d) The payment system of PT. XYZ does not vary. This is shown by the choice of payment that PT. XYZ provides i.e. bank transfer and demand deposits.
e) The type of shipping that provided by PT. XYZ does not vary. This is shown by a few shipping options that are offered by PT. XYZ to their customer.
f) Lack of integration between many parts of application causes the generated information by each application is ineffective to be used in other application. It also can impact the efficiency of resource (time, employees).

Opportunities

Opportunities are an important situation that can benefit PT. XYZ to develop business of e-commerce. Several opportunities by PT. XYZ are as follow:

a) Based on current trends, e-commerce is being favored by many communities in Indonesia. In the modern era, many people who want practical things such as in shopping. There are increasingly lots of people that do not want to waste their time to explore each corner of the market or other shopping centers. Therefore, many people are more interested with the on-line shopping so that they can save their time.

b) Not only factory-made product, local products produced by UKM (Small and Medium-sized Enterprises) from various region also has a good quality. It is shown when customers are interested to buy handicrafts from local regions, they would still buy evethough the prices are more expensive than the prices of the factory-made products.

c) The trend of e-commerce has increased along with the expanding use of Internet. Internet usage in Indonesia is growing very fast, the phenomenon will facilitate PT. XYZ to develop e-commerce and PT. XYZ is also easier to be known and demanded by the public.

d) A large population of Indonesia will affect the level of customer demand hence the opportunity of e-commerce will also increase.

e) Geographical of Indonesia became one of the opportunities for e-commerce to grow up. With the development of business technology, the customer is not restricted by space and shopping time. Suppose a customer who lives in Borneo Island. He/she can buy products that is only sold in Jakarta by using e-commerce.

f) The large number of UKM in every region in Indonesia can provide the opportunity for PT. XYZ to establish cooperation with them. So PT. XYZ will increase sell of products typical of each region in Indonesia. Indirectly, PT. XYZ will be one of the most important elements to improve the development of UKM in Indonesia.

Threats

Contrary to the opportunities, threats are external factors that describe a situation that is not favorable for PT. XYZ. The threats of PT. XYZ are as follow:

a) Many international and domestic competitor of the e-commerce business can be threats to PT. XYZ. Moreover, many e-commerce are established more than PT. XYZ now. This should motivate PT. XYZ to continue to develop them selves in the e-commerce business.

b) Sellers who have physical store are also threats to the PT. XYZ. This is because there is still assumption that buying products online is less satisfying. Even some might feel disappointed with the purchased product because it does not suit the displayed image. Therefore PT. XYZ must ensure the quality of every product they sell.

c) The existence of trading forums on the Internet can divert the customer interest. This is because trading forum also contains sale and purchasing transactions and also membership of buying and selling. This kind of forums are dominated by people who know each other or domiciled in the same region. Thus the sale and purchase transaction carries out more saver and easier because it can meet directly (Cash on Delivery) between the buyer and the seller.

Weight Calculation of SWOT Analysis

Weight calculation of SWOT is used to determine the position of PT. XYZ at current time. The calculation is done by dividing the weight of each SWOT factors as in the TABLE 3, 4, 5 and 6. Capturing the value based on the priorities of each of the factor in each section. The weights are obtained based on the calculation of filling weights that obtained from the stakeholder concern. Scores are obtained by multiplying values and weights.

TABLE 3.
STRENGTHS ANALYSIS OF PT. XYZ

Strengths			
Key Internal Factors	Value	Weight	Weigth Score
Extensive shipping network	4	29	116
Easier terms become a merchant	2	23	46
Name of the website reflects the company's identity	3	23	69
System of payment is reliable	4	25	100
Total		100	331

To complete the SWOT quantitative calculation, a questionnaire that contains the internal and the external key factors is provided. The questionnaire is filled by 15 people who come from different backgrounds, including employees of PT. XYZ, e-commerce customers, and e-commerce merchants.

Each factor will be mapped into quadrant as shown in the Fig.2. Hence PT. XYZ is mapped in quadrant II or called W-O (Weaknesses-Opportunities). Each quadrant has its unique strategies.

The strategies of PT XYZ based on each quadrant are shown in TABLE 7.

TABLE 4.
WEAKNESSES ANALYSIS OF PT. XYZ

Weaknesses			
Key Internal Factor	Value	Weight	Weigth Score
Display of products is unattractive	4	20	80
Lack the promotion of products and website PT. XYZ to public	4	17	68
No acces from merchant to webstore	2	18	36
System of payment doesn't varying	4	23	92
Type of shipping doesn't varying	3	12	36
Lack of integration between many parts application in PT. XYZ	3	10	30
Total		100	342

One thing that is emphasized in the questionnaire is that participants have to fill in questionnaire weights based on their opinion. The higher their approval of the internal and the external key factors, the higher the scores assigned to the weight is. The scores are: 1 = disagree, 2 = moderately, 3 = agree, 4 = strongly agree.

TABLE 5.
OPPORTUNITIES ANALYSIS OF PT. XYZ

Opportunities			
Key External Factor	Value	Weight	Weigth Score
Business of e-commerce is popular	4	18	72
Local products (UKM) has a good quality	4	20	80
People more familiar with internet	4	18	72
A large population of Indonesia will support PT. XYZ to grow-up	2	13	26
The Geographical condition of Indonesia	2	13	26
A large number of UKM in Indonesia	3	18	54
Total		100	330

The weight that the 15 participants fill in the questionnaire will be the sum of each key factors, for example in TABLE 3 is a table that contains the internal key factors of PT. XYZ's strength. The extensive shipping network factor obtains the total weight of 51 from 15 questionnaire participants as well as the easier terms become a merchant factor i.e. 47. The name of the website reflects the company's identity (it is scored 47), The reliability of payment system is scored 48. The sum of the weights from all questionnaire participants of each key factors on TABLE 3, 4, 5 and 6 is rounded

into 100 so that each key factor will be transformed into percentage.

TABLE 6.
THREATS ANALYSIS OF PT. XYZ

Threats			
Key External Factor	Value	Weight	Weigth Score
International competitors in business of e-commerce	1	15	15
Domestic competitor in business of e-commerce Indonesia	4	35	140
Merchant who have a physical store	2	20	40
Trading forum on the internet.	4	30	120
Total		100	315

Having obtained the weight of the 15 participants of the questionnaire, the value based on mutual agreement by seeing the state during the study is charged. The score is as same as the score given in questionnaires, i.e. 1-4.

TABLE .7
STRATEGIES OF E-COMMERCE PT. XYZ

	Strenghts (S)	Weaknesses (W)
Opportunities (O)	1. International expansion of e-commerce 2. Empowerment post office branches in every region to support e-commerceof PT. XYZ 3. Development of a merchant electoral system 4. Development of a reliable payment system 5. Realtime shipping management 6. Cooperate with many merchant	1. Increased competence and ability of human resourcefor learning information technology 2. Implementation of shipping services accordance with customer needs 3. Increased promotional activities 4. Development a flexible and user friendly webstore 5. Increased variations in payment system 6. Integration of application between departments 7. Giving permission access for merchant 8. Implementation of product quality control from merchant 9. Giving the result of market sentiment analysis to the merchant
Threats (T)	1. Cooperating with the various parties in financial services 2. Giving some promotion (discounts and free shipping service) 3. Provide a variety product and newest	1. Rejuvenation strategy of business 2. Rejuvenation webstore PT. XYZ 3. Improved quality of service PT. XYZ 4. Increased usage of information technology

From calculating the weight based on the TABLE 3, 4, 5 and 6, the result obtains the Strength (331), Weakness (342), Opportunity

(330), and Threat (315). Before mapping into SWOT quadrant there will be a reduction i.e.:
- Weaknesses–Strengths=342-331=11 (Weaknesses), and
- Opportunities-Threats=330–315=15 (Opportunities).

By identifying the factor in four fields, PT XYZ can recognize its core competencies for decision making, planning, and building strategies [9]. Based on the Fig.2, PT. XYZ can determine the enterprise architecture strategies as well as the SWOT analysis. Based on the calculation done in this research, the right strategy for PT. XYZ is WO (Weaknesses–Opportunities).
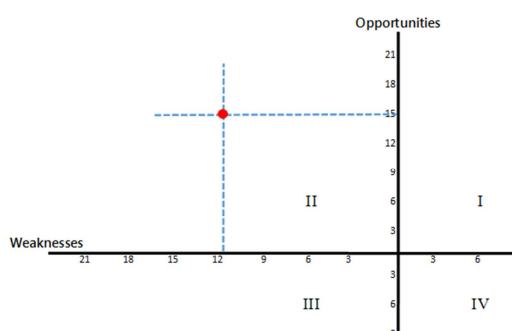

Fig 2. Position of Exixting E-Commerce

5. Conclusion

According to the image of quadrant mapping (Fig.2) it can be concluded that PT. XYZ is in position W-O (Weaknesses-Opportinities). Based on this quadrant, the appropriate step to be done by PT. XYZ is to change the existing strategies into the newer and more precise one to develop e-commerce of PT. XYZ. Those strategies are as fol-low:
1. Increase competence and ability of Human Resource for learning information technology.
2. Implement shipping services according to the customer needs.
3. Increase promotional activities.
4. Develop a flexible and user friendly web store.
5. Increase variations in payment system.
6. Integrate the application between departments.
7. Provide permission access for merchant
8. Implement the product quality control from merchant.
9. Provide the result of market sentiment analysis to the merchant.

The significant contribution in this paper is achieving an appropriate EA principles design for PT. XYZ according to every architecture, including principles in business architecture, data, application, and technology architecture by obtaining the appropriate strategy according to the position of the company.

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