

Evaluation of Printer Usage at BAPPEKO Surabaya

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Abstract

Technology that keeps developing, require people to work side by side with office equipment to support its activities. Printer as one of the supporting equipment used in offices also keep developing. Many new type of printer being introduced by manufacturer. Technology that keeps changing should also go along with the good planning and good utilization of equipment. BAPPEKO as one of the busiest Surabaya City Government offices also require printer as the supporting tools to support their work activity. The procurement method during this time that only considers buying as the only method seems to be not appropriate anymore, as many developed industries nowadays choose to lease rather than buy. Good printer management should also be considered carefully in order to prevent underutilized or over utilized printer. Therefore, in this research, it evaluates printer management system in existing condition, where the founding in field shows surprising fact that there is no maintenance data, no failure data, unconformity total printer, and bad utilization of printer. Thus, this research is conducted in order to have good utilization of printer, good asset management, and preventing unimportant expense.

Keywords: Asset Management, Printer Management System, Utilization.

I. INTRODUCTION

In this modern era, high technology equipment as a supporting tool is required to alleviate employees' workload and quicken the work. As the second largest city in Indonesia, Surabaya has 72 *Satuan Kerja Perangkat Daerah* (SKPDs). In *Rencana Pembangunan Jangka Menengah* (RPJM) 2010-2015, Surabaya's vision is to become a better Surabaya as Service City, smart trading, humane, dignified and environmental minded. Aligned with the vision, as a city that prioritizes high service level to its citizen, the necessity of high technology equipment in government offices to support its activities are expected to increase effectively and efficiently. Additionally, to increase the services of Surabaya City Government to the society, the existence of IT-based equipment is needed. IT based equipment in question is computer, laptop, and printer. Thus, from numerous IT based equipment exist, this research

will focus on printer. The reason behind the selection is due to the total printer procured in SKPD is not followed by good utilization.

Noting that IT based equipment is urgently required by SKPD, good procurement system which is also followed by good printer utilization is needed by Surabaya City Government. Utilization which is defined in Merriam-Webster dictionary means that to make use of something. Procurement is the activities that required in order to get the product from supplier to its final destination. Procurement activities includes purchasing function, stores, traffic and transportation, incoming inspection, and quality control and assurance, allowing companies to make supplier selection decisions based on total cost of ownership (TCO), rather than price [15]. Weele (2010) also mention that procurement activities relate to the function of purchasing input used in the firm's value chain that may include raw materials, supplies, and other consumable items as well as assets such as machinery, laboratory equipment, office equipment, and buildings.

Above all numerous type of supporting office equipment, the demand of printer as one of office's supporting is also increasing. According to the International Data Corporation (IDC) Worldwide Quarterly Hardcopy Peripherals (HCP), business-inkjet printer and all-in-one shipments maintained their momentum in the third quarter of 2015 (3Q15) with 2.2 million units shipped and 16.3 percent year over year growth as presented in table 1 [16].

Table 1. Worldwide Hardcopy Peripherals Market Share and Year-Over-Year Growth for Q3 2015 (based on unit shipments)

Vendors	3Q14 Units Shipment	3Q15 Units Shipment
HP	10,840,722	9,983,710
Canon	5,659,586	5,293,411
EPSON	4,128,439	4,075,438
Brother	1,943,206	1,881,925
Samsung	1,315,456	1,039,723
Others	3,653,255	3,525,903
Total	27,540,664	25,800,110

(Source: IDC Worldwide Quarterly Hardcopy Peripherals Tracker, 2015)

Likewise, the needs of printer keep increasing, the cost of investment to have advanced-enough printer along with

technology development is also increasing. Hence, each SKPD requests printer procurement to the Surabaya Procurement Division either for reasons such as outdated features, lagged technology, or un-optimal result. In its implementation, printer procurement request by each SKPD is done by specifying required printer specifications without mentioning certain brand. The request will then be sent to Surabaya Procurement Division to be allocated based on the funds available. Historical data from Surabaya integrated asset recording system called as *Sistem Informasi Management Barang Daerah (SIMBADA)* shows that the procurement of IT based equipment is increasing.

Printer procurement request that keep increasing year by year raises a question, is it really need printer that much in the office. As it seems irrational if the procurement of printer which is only a supporting tool in an office keep increasing. Additionally, printer, as shows in table 2 and as we all know, is a fast-moving-development and an easily obsolete equipment, due to rapid new technology. This situation makes the increasing printer procurement more unreasonable, as it will be detrimental to Surabaya City Government.

Table 2. Printer Evolution

Name	Introduction Time
Printing Press	1 January 1439
The Movable Type Press	1 January 1550
Steam Printing Press	1 January 1814
Rotary Printing Press	1 January 1847
Xerox	22 October 1938
First High Speed Printer	17 February 1953
Daisy Wheel Printer	1 January 1969
Dot Matrix Printer	1 January 1970
EARS	1 November 1971
IBM 3800	1 January 1976
The Xerox 9700	1 January 1977
HP LaserJet	1 March 1984
HP DeskJet	1 January 1988
HP DeskJet Color	1 January 1994
Xerox ColorQube - Solid Ink	6 May 2009

(Source: Timetoast, n.d.)

In relation to governance administration needs and governance finance institutions, Surabaya Procurement Division states the policy that all office equipment of Surabaya City Governance has economic life equal to five years. Service life of an equipment or asset can be smaller, equal, or longer than the economic life that has been stated in the policy. Generally, service life is defined as the expected lifetime of a product or a period usage of an equipment/tools, on the other hand, to avoid misinterpretation with economic life, it is a period where the assets fulfilled the required function [1]. Service life span of a product itself might be longer or shorter than predicted as it is highly affected by the way of usage of the product.

Majority of printer in Surabaya Government Offices still considered as a new asset as from survey result shows that 78.14% of the printer is procured after 2009 [2]. This means that actually if based on the regulation stated before, the procurement of some SKPD would not be done in the following year, yet in its implementation, there is still procurement request. This situation makes there is an urge to conduct utilization analysis of printer as the evaluation method before SKPD proposing a procurement request. The utilization analysis will be then used as the basis to determine printer procurement activity. Aside from that, the focus of this research will be done in BAPPEKO because not only from the discussion with Procurement Division whom want to evaluate the existing condition of BAPPEKO, but also from interviews and surveys that have been done on several SKPD, BAPPEKO has the highest potential to become the research object as it provides data needed in conducting the research and has more cooperative stakeholder. Furthermore, from the analysis of BAPPEKO existing condition, it is expected to draw general model or framework that will be applicable for all SKPD.

In this research, it will analyze the existing condition in BAPPEKO as the main focus and problem that currently happened in BAPPEKO. Verification of current asset is also done in the beginning of the research to make sure the condition of the printer and to match the data between SIMBADA and existing condition. However, as the asset inputted in SIMBADA cannot be traced in the real condition due to unclear codification, the asset will be matched with the KIR (*Kartu Inventaris Ruangan*) and it will be classified into the printer taxonomy made before. Questionnaire related to the printer usage will also be spread in order to measure the utilization level of current asset. Thus, after the RCA (Root Cause Analysis) of existing problem made, it will give solution alternatives regarding the problem in BAPPEKO.

Thereby, after evaluating the existing and analyzing the data, one question arises, why SKPD need such sophisticated feature and large number of procurement if the utilization itself is low and the function demanded is actually not necessarily so high. As an additional consideration, due to printer technology that keeps developing, a good printer management system, asset transfer option, and asset leasing concept seems need to be considered.

Therefore, by conducting this study, it hopes that offices in Surabaya City Government will have a good printer utilization before proposing new procurement request. Besides, a good record of asset maintenance and failure should also be made, which can be used as evaluation method regarding printer performance in SKPD.

II. RESEARCH METHODOLOGY

A. Problem Identification and Formulation Stage

In problem identification and formulation stage, it divided into two parts which is literature review and field study. Problem identification and formulation stage aim to get the basic concept/idea of existing condition in observed SKPD.

B. Data Collection Stage

Secondary data got from Surabaya Procurement Division about total assets from BAPPEKO seems to be insufficient and uncompleted. Direct observation is needed in order to validate the existing condition in order to get a clearer vision of the assets, especially printer which becomes the main focus in this research. Direct observation will be done by conducting interviews with the experts, direct survey and will cover up the validation of the existing data and the existing condition of the assets itself in BAPPEKO.

Data collection phase is done to gather and know the existing condition. Data gathered in this research will be about experts' interview regarding to the asset observed, historical data and validation data of asset in BAPPEKO. Historical data of the asset acquired by accessing SIMBADA system that shows the data from 1995 until 2015. As the information from the secondary data is unreliable, direct observation is carried out in order to validate and compare data from secondary data with the existing condition in the field based on the questionnaire made. Another form used in data collection is printer utilization form. This form consists of section, printer type and brand, and total daily printing. In the process of data collection, writer interviewed one by one the user/worker in BAPPEKO office to obtain the data about the printing frequency in a day starting from Monday until Friday. Aside from it, writer also conduct a deep interview related on specific printer being used in their printing activity in order to get representative calculation of printer utilization.

C. Data Processing Stage

In this phase, data got from interview done before will be processed further. The problem exist in BAPPEKO will be discussed and find the root cause behind the problem exist. After the root cause has been defined using fish bone diagram, it will suggest alternative regarding the problem exist. Base on the fact in the field, it is then suggested a new printer management system. The management system will follow the PDCA cycle.

D. Conclusion Stage

In this phase, it will conclude the problem exist in existing condition related to the printer management and evaluation of the existing condition regarding the usage of the printer itself in BAPPEKO office. Therefore, the important points in the research will be pointed out and concluded to answer the objectives of the research. Matters that have not been answered in this research will be suggested for further research to enrich and enhance the usefulness of this research.

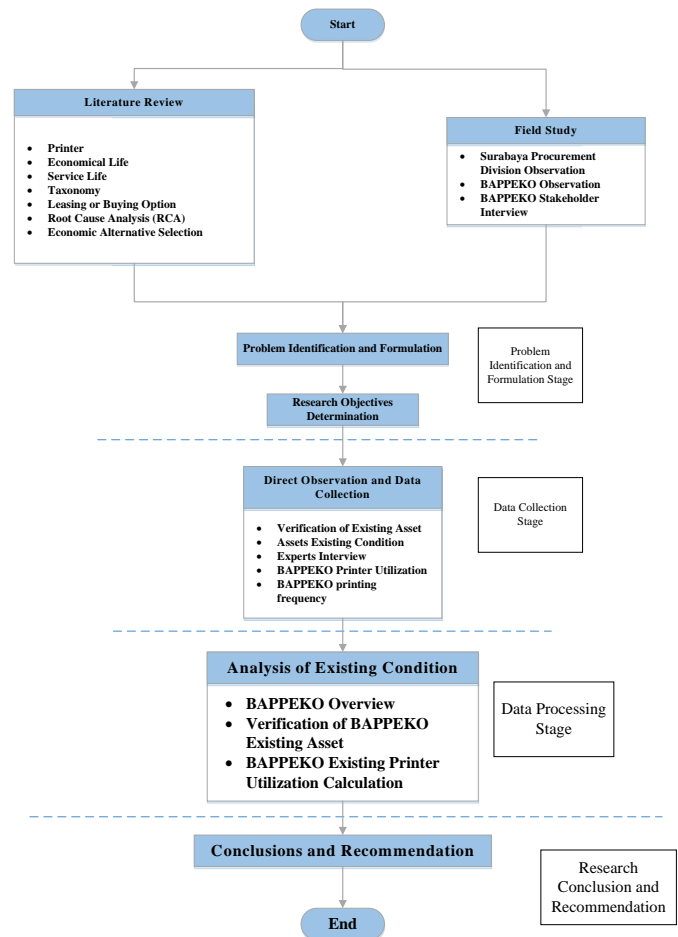


Figure 1. Flowchart of Research Methodology

III. ANALYSIS OF EXISTING CONDITION

A. BAPPEKO Overview

BAPPEKO which stand for *Badan Perencanaan Pembangunan Kota Surabaya* is one of Surabaya City Government offices that help Surabaya in composing and executing regional policy regarding development planning. BAPPEKO has vision to have participatory planning, innovative and qualified to become a better Surabaya, where the mission is improving the quality of implementation and control system for regional development planning.

As coordinator of development planning, BAPPEKO arranges stages of activities that involving various stakeholders, in order to use and allocate resources exist to help improving social welfare. BAPPEKO itself has function such as:

1. Planning technical policy formulation
2. Coordinating the development planning
3. Coaching and execution of tasks in the field of development planning
4. Administrative management
5. Execution of other tasks given by Head of Region in accordance with the duties and functions

In executing the duties and functions given, BAPPEKO carries out part of government affairs in the field of public works, housing, spatial planning, development planning,

regional autonomy, general government, region financial administration, regional instrument, staffing and coding.

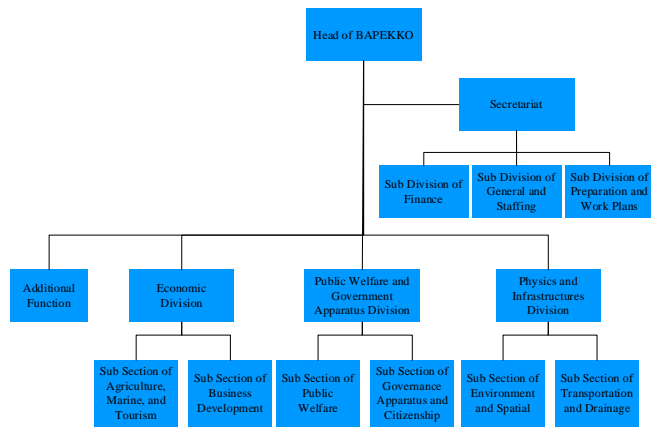


Figure 2. BAPPEKO Organization Chart

In doing such complex tasks, BAPPEKO, as shown in figure 2, divides the staff into 4 different sections, which are, economic division, secretariat division, public welfare and government apparatus division, and physics and infrastructures division. Additionally, each division is supplied with office supporting equipment including printer. Historical data shows that BAPPEKO procurement on asset keep increasing year by year especially in 2008 which increased drastically. Each printer in BAPPEKO office is arranged to be used by 2 people. Printer procured in BAPPEKO office is ranged from EPSON, HP, Fuji Xerox, and Canon brand. The procurement is done by proposing procurement request to Surabaya Procurement Division which only include the specification of printer need without specifying the brand. Printer procurement request that has entered Surabaya Procurement Division will be proceed and given to BAPPEKO.

B. BAPPEKO Existing Condition

In the existing condition of BAPPEKO office, the total number of printer is not followed by the utilization of the printer. From the interview and observation done on the related stakeholder in the BAPPEKO office, it is known that the printer is only used frequently, where the utilization reaches its highest point only in the end of period (monthly, quarterly, or yearly). Thus, in the daily operation, the utility of printer is very low, as it is only being used for several document printing, and if it is summed up, it only has total average usage of 2 hours per day.

1. Verification of Existing Printer Asset

In the existing condition, the asset procured, in this case printer, has been inputted to SIMBADA software, where it stored all asset being procured through Surabaya Procurement Division. When in fact, in its implementation, the procurement is not only done through Surabaya Procurement Division, but some of it also procured using its own funding. This condition lead to invalid asset verification where the asset in the existing condition might be more or less than the total asset inputted to the software. Therefore, an asset verification form that has been elaborated with taxonomy is made in order to make sure and check the existence of printer in BAPPEKO office. By

comparing the total printer from SIMBADA and existing condition, it is known that there is deviation as much as 12 printers. The deviation exists due to not update SIMBADA software once the asset returned to or eliminated by Surabaya Procurement Division. In addition, the asset that is not physically exist is still included in SIMBADA software, which makes the data more unreliable

2. Unclear Codification

In existing asset controlling system, the procured asset is inputted into SIMBADA software in which the data inputted consist of location, register number, equipment code, equipment name, brand, type, total asset, unit, value, procured year, acquired year, and information. Thus, as a matter of fact, current system cannot fully track the asset including the condition. The codification of equipment is also not specific, where one type of product can have different codification. This situation makes the asset's condition harder to be tracked and checked. Thus, a unique code of each asset is needed in order to make the data collection of asset regarding its condition easier. In addition, the codification has to be specific so that it can ease the maintenance procedure if there is any failure happened.

3. Low Utilization of Printer

Based on the observation facts exposed before, it is known that the total printer procured is not followed by its utility. In the existing condition, if the printer is broken or the print result is not good, user/employee tends to print document by using other printer through Internet Protocol (IP) of another user/employee. The employee prefers entrusting document printing to service the printer as it saves more time. Thus, in the daily operational, the printer is not necessarily procured that much.

From the data of existing printer utilization based on the calculation of printing speed and assumption of daily working time is 480 minutes or equal to 8 hours. The table provides the utilization of each printer brand exist in BAPPEKO office, both daily, monthly, and 3-month utilization. The number of daily printing is got from the questionnaire and validated again by interviewing each worker in BAPPEKO office that is using printer in their work. The total number of printing has already considered the document that other user entrusted into it by using IP/LAN network/Wi-Fi technology.

Table 3. Printer Usage and Specification per User

No	User	Frequency (daily)	Usage	Specification Required
1.	Secretariat Division	Average 57 pages per day, per person, per division	General document printing	Color and Monochrome, single function printer
2.	Economic Division	Average 71 pages per day, per person, per division	General document printing	Color and Monochrome, single function printer
3.	Public Welfare and Government Apparatus Division	Average 30 pages per day, per person, per division	General document printing	Color and Monochrome, single function printer
4.	Physics and Infrastructures Division	Average 45 pages per day, per person, per division	General document printing and Layout (image) printing	Color and Monochrome, single function printer

Furthermore, table 3 shows the average printing frequency in a day that is specified further into printing per person and per division. The table also shows the usage of the printer itself for what it is being used per division, along with the specification of printer required, in which the data is got from interviewing user and distributing questionnaire for all staff in BAPPEKO office. From the interview with inventory person in charge, Mr. Irfan, it is also known that the needs of color and monochrome printer is proportioned into 40% for color printer and 60% for monochrome printer. The utilization of printer that is so low compared to the total number of printer makes it become source of waste. Therefore, in order to know the cause of the waste, it is using fishbone diagram to present the cause of waste which is presented in figure 3.

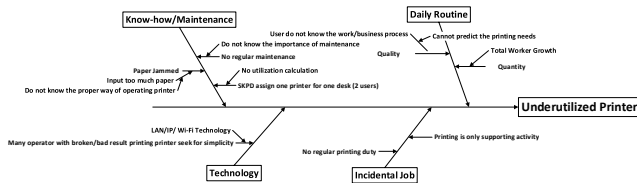


Figure 3. Fishbone of Waste Exist

The waste exist in the current condition is underutilized printer, where the printer in BAPPEKO office is not used in its full potential. After the fishbone been developed, it can be concluded that three main reasons/main causes of the waste are unknown importance of needs analysis determination, printing is only a supporting activity rather than main activity, and the idealism that thinking existing condition is the ideal condition. The recommended action regarding the waste exist is conducting thorough utilization calculation in which will lead to ideal number of printer need to be procured so that the printer utilization will not be so low and the suggestion given will not prevent the user from doing its daily printing activities.

4. No Printer Workload Data

In existing condition of BAPPEKO office, the workload of printer tends to be fluctuated. From 31 printers available in BAPPEKO office, the workload of each printer is different. In example there is printer in Public Welfare and Government Apparatus Division that has daily printing frequency of 2 pages only. As in Secretariat Division, there is printer that has daily printing frequency reaches 147 pages. Most of the printer workload is not distributed evenly, in example in secretariat section, monthly report or annual 5-year report is charged into 1 printer. The main reason is because the quality of the printer is the best of all.

The absence of printer workload data is also due to printer is not a primary need, but supporting tools. This means that the usage of each printer is not fix and cannot be determined, as it will be fluctuating. Another reason of no printer workload data is that the printer is not dedicated for one user, but it is dedicated for one desk consist of two users. Furthermore, if other user's printer is broken down, then printing job is charged to another printer

5. No Maintenance Data

In the existing condition of BAPPEKO, none of the staff or printer user realized the importance of regular maintenance. The regular maintenance can be done by the user itself by using the software provided by printer manufacturer, with purpose to lengthen the life span of the printer and to ensure the quality of

printer itself. Besides it does not occur any cost, it also requires some time that is not longer than 30 minutes. Another type of maintenance that is also not being done in the existing condition is preventive maintenance, albeit, this alternative needs quite expensive cost. The preventive maintenance can be done by contacting third party that provides printer maintenance service. BAPPEKO existing condition does not have clear record regarding to printer maintenance. Once printer is broken or error, the maintenance will be done by Mr. Irfan as the person in charge for inventory, and if the error occurred cannot be solved, it will be then brought to partner service center. In the current condition, the maintenance record of asset is combined into one record without specific type of maintenance and equipment being maintained. Unspecific record of maintenance data might be because it is troublesome to specify the maintenance done, as the fund allocated is also accumulated for all equipment maintenance. Thus, in the existing condition, if the maintenance cost of a printer nearly same as the price of the printer, the decision is to buy a new one as it turns out be the same.

IV. CONCLUSION/SUMMARY

From the observed object, BAPPEKO, it can be seen that there are several problems occur, which are low printer utilization, poor printer management, and there is no PDCA system to control the management of printer procurement and evaluation. From the observation done, it is known that current printer utilization of BAPPEKO office is still very poor, as from 31 operating printers, the lowest utilization happened to be only 4% over 3-month printing data, on the other hand, the highest utilization is only 73% over 3-month printing data, which is not even reached the lower bound of good utilization criteria. The management of the printer is also poor, as there are no records related to the printer failure and maintenance data. Result from the questionnaire distributed to the printer user also shows that 65% of the user never do regular printer maintenance that is already provided by the printer manufacturer. Printer utilization of SKPD in Surabaya Government Office can be optimized by proper usage of the printer. As the fact that printing is a supporting activities and cannot be predicted when it happened, then, a good technology utilization by using IP/LAN/ Wi-Fi is recommended to prevent long queueing. A uniformity printer specification is also needed to procure printer with same printing quality and speed to prevent tendency in using certain printer only. By conducting this research, printer needs in Surabaya City Government can be known by using the printer utilization in the existing condition. By knowing historical printing data each day, week, and month, it can be known whether current condition has been ideal or not. If the printer is being underutilized, it is then recommended to combine several printers with low utilization and distribute printer with heavy printing load evenly to the low utilization printer. Additionally, 75% lowest utilization limit will also help in measuring whether SKPD need to procure printer or not.

BIBLIOGRAPHY

- [1] Asselbergs, K. & Dijk, J., 2013. Economic Life of an Asset. *A Simple Model to Calculate Economic Life Shows How the Impact of Continuous Improvement on Asset Life Can Be Readily Assessed*, pp. 1-9.
- [2] Bagian Perlengkapan Pemerintah Kota Surabaya, 2015. *Executive Summary Analisis Kebutuhan Sarana dan Prasarana di SKPD Non Kecamatan*, Surabaya: s.n.
- [3] BBC News, 2000. *Babbage printer finally runs*. [Online] Available at: <http://news.bbc.co.uk/2/hi/science/nature/710950.stm> [Accessed 26 March 2016].
- [4] Berk, J., DeMarzo, P. & Stangeland, D., 2014. *Corporate Finance, Third Canadian Edition*,. 3rd ed. Toronto: Pearson Education.
- [5] Department of Information Resources, 1998. *Lease vs. Purchase: Guidelines for Lease vs. Purchase of Information Technologies*, Austin: Department of Information Resources.
- [6] IDC Research, Inc., 2015. *IDC Worldwide Quarterly Hardcopy Peripherals Tracker*, Framingham: IDC Research, Inc..
- [7] Khan, M., 1993. *Theory & Problems in Financial Management*. 1st ed. Boston: McGraw Hill Higher Education.
- [8] Kollengode, A., 2010. *The Four Steps to Constructing a Cause and Effect Diagram*. [Online] Available at: <http://www.processexcellencenetwork.com/lean-six-sigma-business-transformation/columns/the-four-steps-to-constructing-a-cause-and-effect> [Accessed 06 July 2016].
- [9] Moore, R., 2006. *Selecting the Right Manufacturing Improvement Tools*. 1st ed. s.l.:Butterworth-Heinemann.
- [10] Murphy, G. L., 1988. Comprehending Complex Systems. *Cognitive Science*, Issue 12, pp. 529-562.
- [11] Murphy, G. L., 2002. *The Big Book of Concepts*. 1st ed. Cambridge: MIT Press.
- [12] Timetoast, n.d. *The Evolution of Printers*. [Online] Available at: <https://www.timetoast.com/timelines/113981> [Accessed 22 March 2016].
- [13] Tribun Nasional, 2012. *Surabaya Akan Jadi Model e-Government Nasional*. [Online] Available at: <http://www.tribunnews.com/nasional/2012/01/09/surabaya-akan-jadi-model-e-government-nasional?page=2> [Accessed 29 March 2016].
- [14] Walikota Surabaya, 2014. *Peraturan Walikota Surabaya Nomor 32 Tahun 2014*, Surabaya: Surabaya Government.
- [15] Weele, A. J. V., 2010. *Purchasing and Supply Chain Management: Analysis, Strategy, Planning and Practice*. 5th ed. Andover: Cengage Learning.
- [16] Wirth, K., 2015. IDC: Worldwide Printer/Copier/MFP Market Declines in Third Quarter, but Business-Inkjet Shipments up 16.3 Percent. *Wirth Consulting*, 9 December.
- [17] Wirth, K., 2016. IDC: Global Production-Printer Market up 5.2 Percent in Fourth-Quarter 2015. *Wirth Consulting*, 22 March.