

# Automation of Data Collection for Measuring The Quality of E-Commerce

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**Abstract**— The research aims to help managers in information gathering web log visitors based on traffic data, building automation data for determining the needs of e-Commerce extensibility, and design of information systems in the process of database interaction diagrams to show the control chart. Web monitoring is not so complex that requires a variety of tools (tools / applications / programs). Data collection in the form of traffic data and transaction data obtained automation. Data collected by the web application traffic and data traffic of e-Commerce transactions themselves. For a company whose goal is not just appear and serve customers, but is able to know the customer desires and business growth observed, this method is very suitable for monitoring quality control chart diagram shown in the form on page E-Commerce it. Automation of data collection occurred in real time on information systems, so that the extensibility of e-Commerce report can be continuously monitored. The results demonstrate the extensibility of information systems such as e-Commerce can be applied to other e-Commerce.

**Keywords**- *e-Commerce; Web traffic; Extensibility; Automation; Control chart*

## I. INTRODUCTION

e-Commerce is not just appear and serve customers, but is able to know the wishes of the customer , and observing the growth of the business, a web monitoring trigger job research. Web monitoring work in fact very complex, and can not be done manually, it takes a variety of tools ( tools / applications / programs ) helper who can perform this task automatically [9]. The research aims to help managers in information gathering web log- visitors based on traffic data, making the data automation for web monitoring needs , and making the data automation for web monitoring needs , and designing information systems extensibilitas in the form of control charts on the e commerce. Data collection in the form of ' traffic data ' and ; transaction data ' obtained by automation. 'Traffic data ' collected by ' traffic web applications ', and ' transaction data ' by e - Commerce itself. This method is suitable for monitoring quality control chart diagram shown in the form on page e-Commerce it

Google already provides features such as Google Analytic to collect traffic data as well as providing information on a web visitor behavior. This is to be copied, but the extensibility and information systems that deliver web traffic to the web page itself, would make it easier for web owners to control and make decisions for optimal web use.

Utilization of data traffic from Google Analytic, can also be developed using techniques Statistic Process Control (SPC) to analyze web traffic activity. SPC control charts as early as possible to systematically detect unexpected situation (out-of-control) on the issue of the cost of using the web. Google analytic graphs shown Analytic perceived differently by SPC control chart can be seen in Figure 1. Google Analytic Dashboard shows the trend of the number of visits, number of pages visited and the number of pages of web traffic visitation. Being the basic plot of web traffic situation display SPC notify the stability of the website. SPC charts are very helpful to accurately detect to return to normal levels (stable), so it does not affect the sales and profitability of the web site [8].

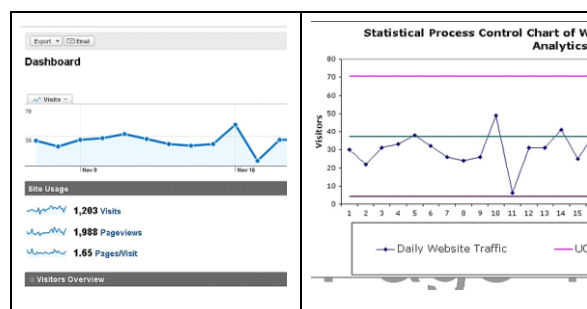


Figure 1. Google Analytic charts look different from the SPC

## II. EXTENSIBILITY E-COMMERCE

### A. e-Commerce

e-Commerce for most companies is more than just buying and selling products and services online. E-Commerce can include various processes of development, marketing, sales, delivery, service, and payment for products and services in the global market in the customer's network systems and the support of business partners cyberspace [5].

The essence of programming online stores is how the handling of the transactions made by customers in a website, term popularity of shopping carts or shopping cart [4].

e-Commerce web development from the basic model can be done as needed, for example the desire for subscriber authentication password, the counter data or other web traffic. Completeness of features identified by the architecture of e-Commerce. The architecture of e-Commerce includes several aspects such as the following [5].

- a. Access Control and Security
- b. Profile Creation and Personalization
- c. Discovery Management
- d. Content Management
- e. Catalog Management
- f. Payment
- g. Work Flow Management
- h. Notification Activity

### B. Extensibility of e-Commerce

Quality improvement model of the web is one of the company's improved performance in building business image. Companies improve business image, the right design and attractive websites can boost business image sellers, further the company's website can be likened to 'the embodiment shop' of business sellers in cyberspace [12]. This statement may be analogous to that company's web site is an advertisement in the virtual world. Companies must fight for business image (conversion rate), due to its high conversion rate indicated that the offer on the website is not just interesting enough to warrant a response, but also encourages perespons to buy [1].

they respond and buy a company's products and services [1], or by the following formula.

$$C_r = \frac{P_b}{P_r} \quad (2.1)$$

with:

Cr = conversion rate

Pb = number of people who respond and buy

Pr = the number of people who respond to your advertisements

If the value of Cr analogous to the value of e-Commerce extensibility, Pb is the number of visitors who transact in e-Commerce and Pr is the number of visitors based on traffic data of e-Commerce, then the formula (2.1) can be rewritten into:

$$X_t = \frac{T_t}{K_t} \quad (2.2)$$

with:

Xt = extensibility of e-Commerce

Tt = the number of transactions on e-Commerce

Kt = number of visits to e-Commerce

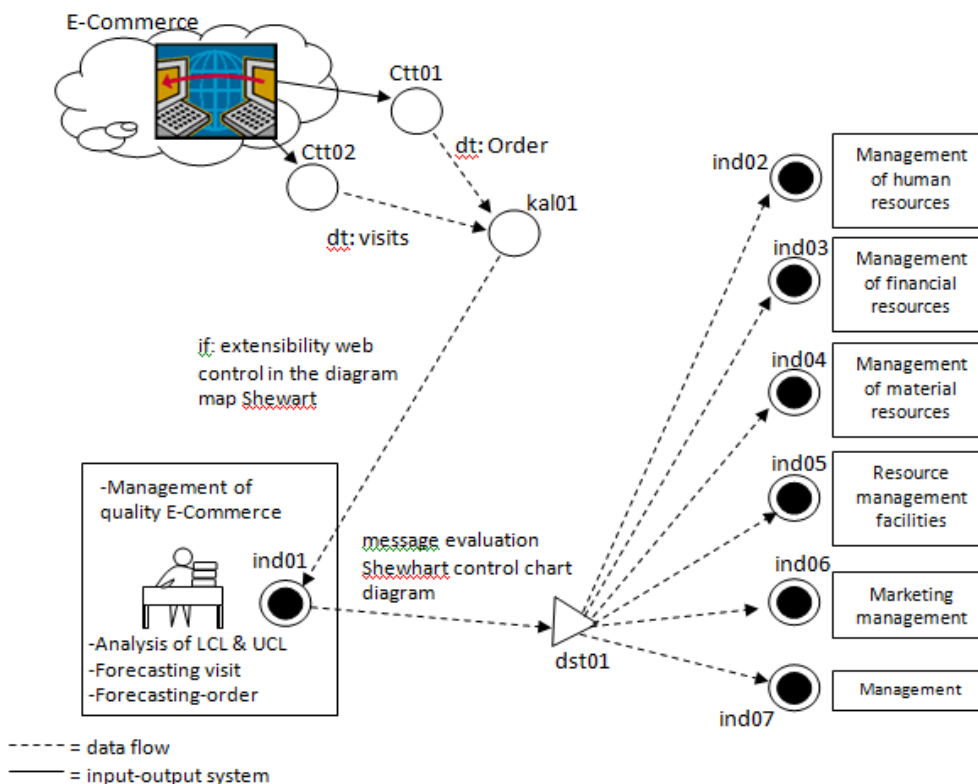


Figure 2. Framework Ekstesibilitas Information Systems e-Commerce by SPC in the Process Manualisasi

The conversion rate is derived from an ad that, the conversion rate is defined as the percentage of prospective customers (for an offer) or visitor (disebuah web site) where

t = period of hours or periods of the day

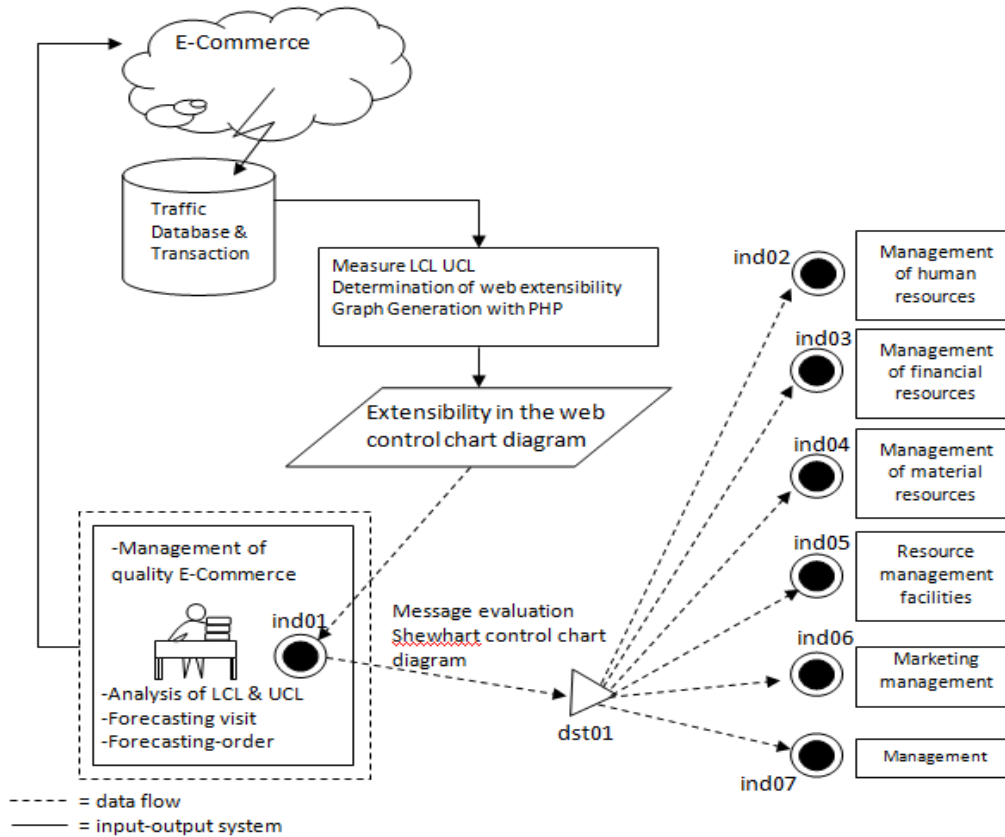


Figure 3. Framework Ekstesibilitas Information Systems e-Commerce by SPC in Process Automation

### C. The Web Application Traffic

Data collected by the web application traffic. This application form logger program (log.php) applied to the target web. The logger program did visits to the storage of information in the data base information such as IP address, the address information to enter the target web diacuh, date and time of visits, browser information, and the name of the file that you visit. Example definition of a database web application traffic as the following [7].

ID	: ID unique, incremental number
IP	: IP addresses are assigned to identify visitors
Referer	: Address referred to by visitors to enter the target web
DateFlag	: Date of visitors visits
Timestamp	: Time visitor visits
User_Agent	: Visitors used browsers, including operating system platform
FileName	: Visited file name

Technology applications utilizing PHP scripts, because it allows the logger to be used on any page [7].

### D. Information System Framework

Extensibility of information systems aimed at e-Commerce web quality control management. Framework of this system can be described as in Figure 2. Flow data recording system began in order as catatan01 (ctt01) and data traffic as catatan02 (ctt02) of e-Commerce. At data01 processing (kal01) performed grouping, calculating the average, variance of data, determination of Upper Control Limit (UCL), and Lower Control Limit (LCL) as Shewhart control chart limits in size ekstensibilitas. Next on dokumen01 (ind01) represents the presentation of information in the web extensibility diagram Shewhart control chart. And finally issued a recommendation in the form of message distribution as distribution01 (dst01) which can be known by other resources (ind02 until ind07), see Figure 4. Section managers to evaluate the quality of web information Shewhart control chart diagram. Evaluation results provide the basis for developing strategies and analysis service improvements through e-Commerce as well as the repair or improvement of the quality of e-Commerce. It is also useful for the owner of the web in an effort to improve the extensibility value or quality of e-Commerce and distribution operations management can arrange for any part of the existing resources.

System that occurs in Figure 2 is developed from manualisasi process using the data processing software to the automation that is placed on the target web. Figure 3 shows the automation recording traffic data, transaction data recording, processing and presentation of information in the web extensibility diagram Shewhart control chart. The assumption that the author of this can be done in e-Commerce as the target web and this system can take place in real time.

### III. DATABASE DESIGN FOR EXTENSIBILITY

Database model developed from the data base model relationships between database tables in the Online Store before. The database model can be considered basic, making it easier to develop, change or addition to the table as necessary e-Commerce. On the application server platform with MySQL built a database of e-Commerce with additional tables Traffic.

Especially for the preparation of maps charting control Extensibility, added with some database tables such as tables Traffic, Periode\_temp tables, tables and table Periode\_hari Periode\_jam. The assumption that the author of these tables will be generic to other e-Commerce, these tables are built without any relation to a table that already exists on the target web.

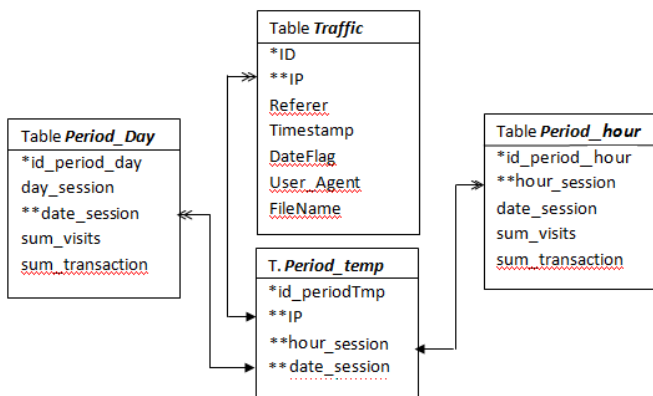


Figure 4. Relation Between Tables for Automation Data

### IV. AUTOMATION OF DATA COLLECTION

Extensibilitas Information system is built from the main database tables Period\_Day, or Period\_hour. Presence Periode\_temp table is only used as a filter tool for visitors who are no different to no longer fit into Period\_Day table, or tables Periode\_hour. Period\_Day table is used as a means of collecting data on the number of visitors and the number of transactions per day, well that Period\_hour tables used as a means of collecting data on the number of visitors and the number of transactions per hour. Relationships between tables for the data automation information needs extensibilitas illustrated in Figure 4.

Furthermore, some sort of program to log.php script triggers added, so that changes in the number of visitors are automatically entered into the Period\_Day table, or tables Periode\_hour. The successful implementation of this

program demonstrated that Period\_Day tables, and tables Period\_hour automatically filled by the access of members or guests. In other words, In other words, when a member or guest to the web, then there is the identification of a visit accompanied by recording changes in the number of visitors.

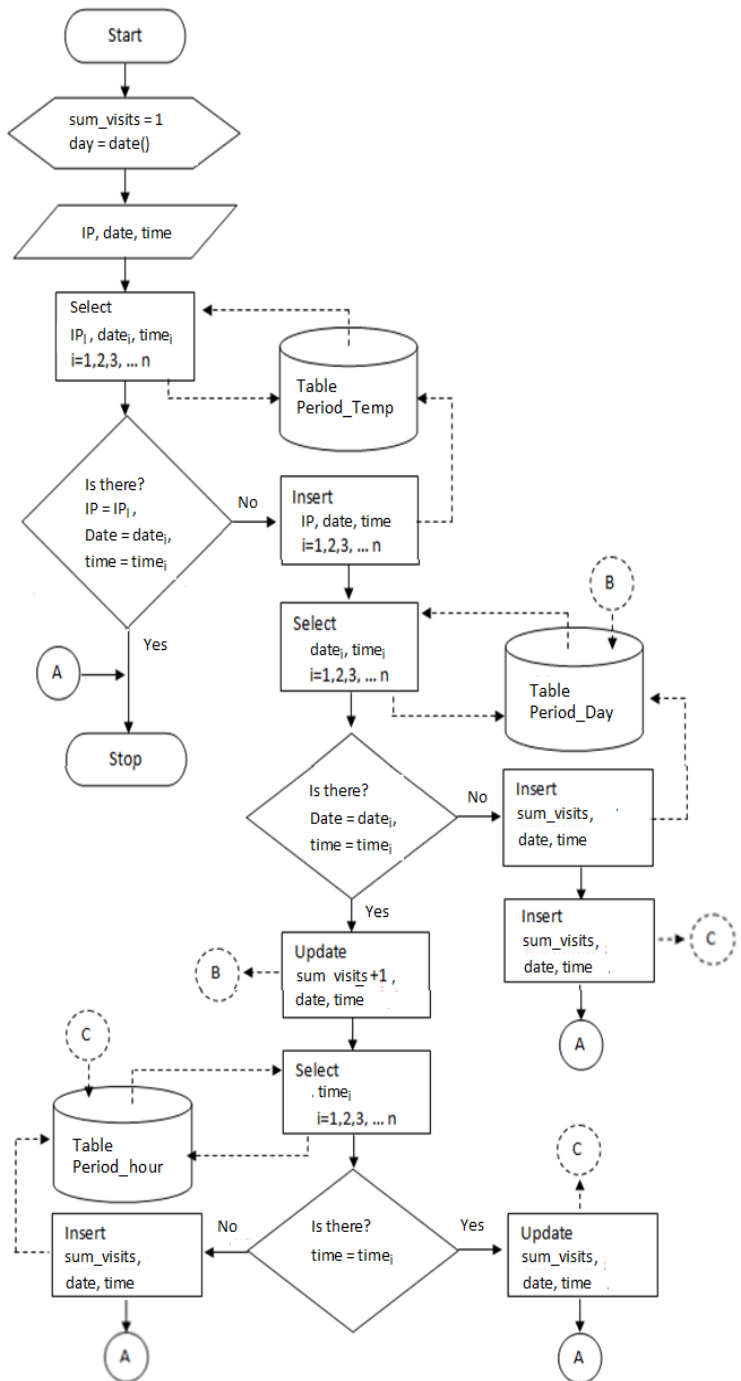


Figure 5. Program Flowchart for process automation Recording Data Number of Visits



If the visitor is a visitor identification is different and Period is not yet available in the data base , recording automatically place data on the number of new visitors into the table . Another case if the visitor is a visitor identification differ in that period ( Period available in the data base ) , it automatically changes the value of data with the number of visitors increased by one , occurs in the table. Flowchart of this process can be seen in Figure 5 .

The completeness of the data occurs in Periode\_Day table, or on tables of Periode\_hour in the recording process, involving the presence or absence of transactions on each visit. On planning, data changes occur when the number of transactions declared successful payment verification by Administrator. Examples of the results of data collection can be seen in Figure 6

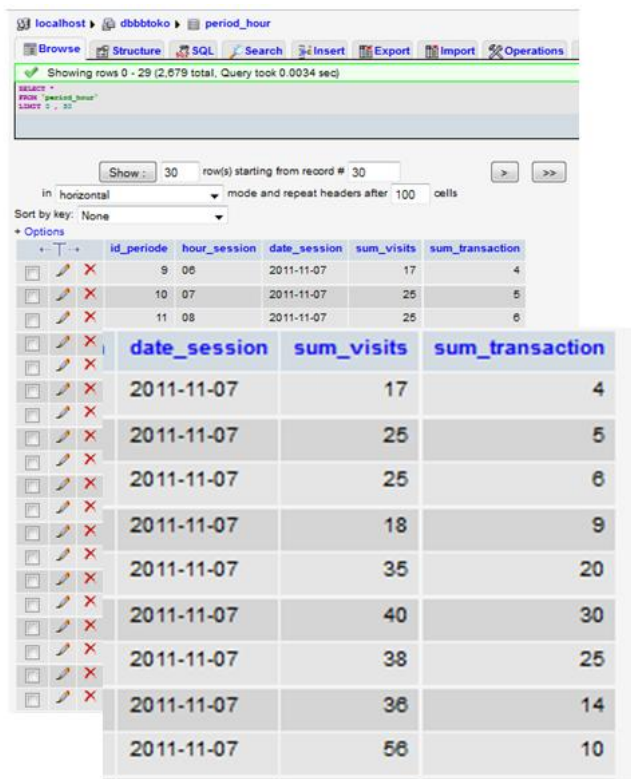


Figure 6. Examples of the results of data collection

## V. EXTENSIBILITY E-COMMERCE ANALYSIS

Extensibility in the form of information control chart diagram to display an average fluctuation extensibility e-Commerce transactions with parameters opportunities per visit. Control chart diagrams serve as a tool extensibility web control. If the value is above the value of extensibility UCL, then the chances of transactions per visit is said to be controlled. Similarly, if the value of extensibility is below LCL, then the chances of transactions per visit is said to be controlled. Uncontrollable circumstances require management action to fix it.

Consider the example of the control chart in Figure 7 for the average control, and to control the variation of each

index by 3 sigma. The second map is a map control and map control-X control-MR is jointly used for process control. The overall process of data input demand is assumed from the date of 22nd November 2011 s / d on February 9th, 2012 and the corresponding period date.

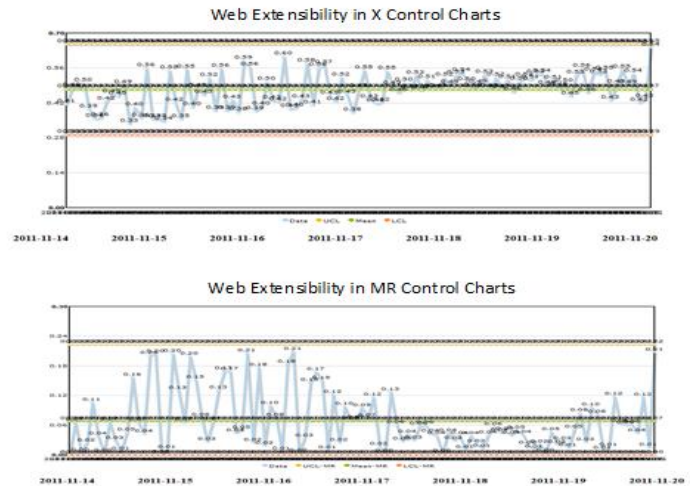


Figure 7. Web Extensibility in Controlled Conditions

Extensibility means that the controlled conditions obtained can be maintained during the period as a control chart diagram shown Figure 7 and can last for several periods ahead. Extensibility information is shown in Figure 6 with a mean of 0.473 transactions per visit. The mean value of the extensibility of e-Commerce in the category ternasuk good enough and means that from 1000 visitors as much as 473 significant transaction order. This figure can be used to increase the profitability of the management company or the consideration of the use of e-Commerce.

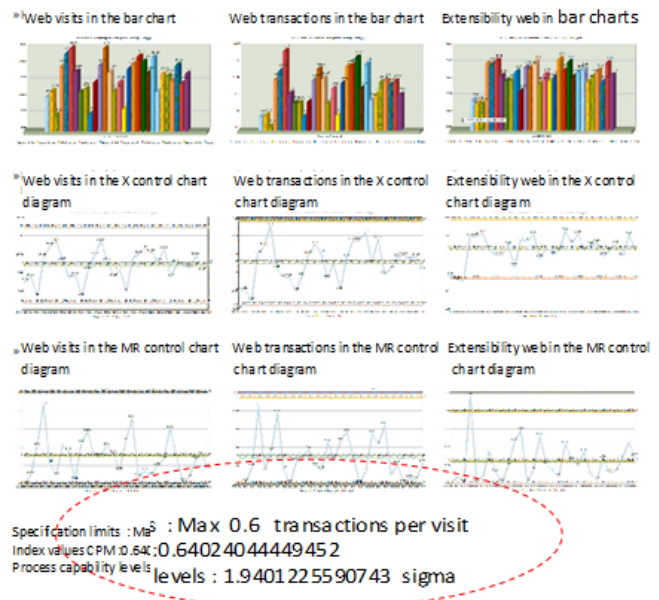


Figure 8. Information on The Capabilities of The Ongoing Process

Extensibility values obtained in the process of use, should be the main consideration that guarantee the quality or capability of the process of achieving lasting extensibility values are at stage  $\geq 3$  sigma or belief in accepting this extensibility value of  $\geq 99.74\%$ . In Figure 8, the information on the capabilities of the ongoing process indicated by the mean value of 1.940 sigma guarantee the achievement of the expected transaction (= value extensibility)  $<99.74\%$  or approximately 95% and can last for several periods ahead.

## VI. CONCLUSION

Traffic table serves as a means of data collection by the visitor logs web traffic or application log.php program. The collected data is data assigned IP addresses to identify a visitor, which addresses the data referenced by the web visitor to enter the target, the data on visitor traffic, visitor traffic time data, the data used browsers visitors, including operating system platforms, and data file names visit.

Automation of data for determining the needs of e-Commerce extensibility by log.php program. The most important data in the form of data on the number of visits and collected data on the number of transactions in the two tables and the tables Periode\_hari Periode\_jam table. Analysis of the results displayed by the control chart suggests that continuous efforts in controlling extensibility to provide benefits in an effort to retain customers as well as management can use the number of variables in improving the company's profitability extensibility or consideration of the use of e-Commerce.

This method has not been able to determine the exact defect occurs on the web by a common cause with the value obtained extensibility, subsequent research is expected to be on the exact defect search, so the repair is done right on target.

## REFERENCES

- [1] Davis, J., 2006, Magic Number for Consumer Marketing, Alat Ukur Kuantitatif & Kualitatif untuk Mengevaluasi Kesuksesan Pemasaran, PT. Elex Media Komputindo, Jakarta.
- [2] Delin, P., 2001, Generating Web Page Statistics using PHP, <http://devzone.zend.com/article/1273-Generating-Web-Page-Statistics-using-PHP> akses bulan November 2011.
- [3] Gaspersz, V., 2006, Continuous Cost Reduction Through Lean-Sigma Approach. Gramedia Pustaka Utama : Jakarta.
- [4] Hakim, L., 2009, Trik Rahasia Master PHP Terbongkar Lagi. Lokomedia, Yogyakarta.
- [5] O'Brien J., and Marakas, G., 2010. Introduction to Information Systems. McGraw Hill.
- [6] Plaza, B., 2010. Google Analytics for measuring website performance, journal homepage: [www.elsevier.com/locate/tourman](http://www.elsevier.com/locate/tourman). Faculty of Economics, University of the Basque Country, Avda. Lehendakari Agirre 83, 48015 Bilbao, Spain.
- [7] Prasetyo, D., 2005, Solusi Menjadi Web Master Melalui Manajemen Web dengan PHP, PT Elex Media Komputindo, Jakarta.
- [8] Prevette, S., 2004, How to Calculate UCL (Upper Control Limit) & LCL (Lower Control Limit) & CL?, Aiken, SC., link dari [http://shangqi.info/j/How\\_to\\_monitor\\_Website\\_Traffic\\_using\\_Statistical\\_Process\\_Control\\_Charts](http://shangqi.info/j/How_to_monitor_Website_Traffic_using_Statistical_Process_Control_Charts), akses bulan Desember 2011.
- [9] Rafiudin, R., 2004, Panduan Menjadi Seorang Webmaster, C.V Andi Offset, Yogyakarta.
- [10] Schubert, P., 2003, Extended Web Assessment Method (EWAM) - Evaluation of Electronic Commerce Viewpoint. International Journal of Electronic Commerce. Vol.7, No.2, Winter.
- [11] Suharyadi dan Purwanto, 2004, Statistika untuk Ekonomi & Keuangan Modern, Buku 2, PT. Salemba Emban Patria, Jakarta.
- [12] Sutedjo, B., dkk, 2007, Pengantar Teknologi Informasi Internet: Konsep dan Aplikasi, C.V Andi Offset, Yogyakarta.