

# The Effects of System Quality, Information Quality and Service Quality on User Satisfaction and the Implication to the Website Benefit

Case Study at Universitas Pembangunan Nasional “Veteran” Jakarta, Indonesia and  
Universiti Selangor, Malaysia

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**Abstract**— Website has been around for quite sometime since the existence of Internet technology. Website becomes possible because of Information and Communication Technology (ICT), especially the Internet technology. ICT has a dramatic impact on almost every facet of our lives including on higher educational operations. DeLone and McLean Information Systems Success Model can be adopted as one of the measurement instruments of the higher education’s success. This study is attempting to modify and implement the updated DeLone and McLean Information Systems Success Models at two universities; University of National Development “Veteran” Jakarta, Indonesia (Universitas Pembangunan Nasional “Veteran” Jakarta = UPNVJ) and University of Selangor (Universiti Selangor = UNISEL), Malaysia. The objective of this research is to determine the effects of systems quality, information quality and service quality on user satisfaction and the implication to the website benefit. Method employed in this study was a path analysis. The samples of this research were 298 students of UPNVJ and 192 students of UNISEL that were selected randomly.

The results, in both universities, indicated that information quality has the strongest effect on user satisfaction followed by service quality, whereas systems quality has the weakest effect on user satisfaction and website benefit. At UPNVJ, 63.7% of user satisfaction can be explained by system quality, information quality and service quality, and 42.2% of website benefit can be explained by system quality, information quality, service quality and user satisfaction. Meanwhile at UNISEL, 69.1% of user satisfaction can be explained by system quality, information quality and service quality, and 67.8% of website benefit can be explained by system quality, information quality, service quality and user satisfaction.

Based on these results, it can be concluded that even though using the exact same research instruments, it’s produced different outcome. In this case, there are similarities and differences in term of hypotheses testing. One of the reasons was that every respondent has different priority in accessing the information provided by the institutions.

**Keywords:** *DeLone and McLean Information Systems Success Model; ICT, Path Analysis; Website*

## I. INTRODUCTION

In the information age as today, it’s hard to find universities without having websites. Website has been around quite sometime since the existence of Internet technology. Most universities’ websites are designed to help potential students and or current students who are in need of information about the university’s programs, academic, etc. But, in researcher’s preliminary investigation at the Faculty of Computer Science, University of National Development “Veteran” Jakarta (Universitas Pembangunan Nasional “Veteran” Jakarta = UPNVJ) to the new students of 2013/2014 found out that it was not the case. Most of them were not knowing or getting information they needed in the UPNVJ’s website. This preliminary finding leads the researcher to dig more deeply into information systems provided by the website in any universities, especially at UNPVJ and Universiti Selangor (UNISEL), since these two universities have a Memorandum of Understanding (MOU) and one of its contents is on research collaboration. The researcher intends to compare about the user satisfaction in accessing information and the benefit of website provided by both universities to the current students.

One of the reasons is because website was made to help the users in finding information necessary for them. Information provided by the university’s website should be informative and up to date, so that it will full fill the users need. In reality there are some out dated information still published in front page instead of put it as an archive.

In addition to that, by having informative and up to date information, it will attract more users wherever and whenever they are to access it for whatever purpose the users want. This will be heading to the users satisfaction so that the website has beneficial to the users. But in reality, not all users who access UPNVJ’s website obtain the necessary information. Based on the preliminary investigation conducted by the author to the new students of 2013/2014 was only less than 10% who access UPNVJ’s website getting necessary information before registering for admission.

Furthermore, in nowadays, organizational spending on information and communication technology (ICT) has continued to increase. One of the reasons is because ICTs play an importance role in every aspects of life. In all type of organizations, from professional services to educational institutions, competitive advantage is garnered through possession of information. However, the role of information systems in providing business a competitive edge has recently been the subject of much debate. It has been argued that not the IS solution but their utilization is what provides the competitive advantages [1]. Information systems (IS) success can be measured and the measurement of IS success or effectiveness is critical to our understanding of the value and efficacy of IS management actions and IS investments [2].

The Research model provided by DeLone and McLean Information Success Model is implemented partly in this study. The original model has six interrelated dimensions of success: System Quality, Information Quality, Use, User Satisfaction, Individual Impacts, and Organizational Impacts [2] [3]. In the updated model [4], dimensions of Service Quality and Intention to Use were added and the original dimensions of Individual and Organizational Impact were combined into one new dimension, Net Benefit, so, its became: System Quality, Information Quality, Service Quality, Intention to Use/ Use, User Satisfaction and Net Benefit [3]. In this study, not all dimensions or variables are adopted, but a modified one is implied to evaluate the use of websites, as a net benefit, provided by UPNVJ and UNISEL. So that, the variables analyzed are System Quality, Information Quality, Service Quality, User Satisfaction and Website Benefit. It is important to compare the data obtained in both universities and then analyse it. The results of these analyses will be compared to know the similarities and/or the differences between of them.

## II. LITERATURE REVIEW

### A. Website

According to ref. [5] website is: 1. in common but technically inaccurate usage, a Web page, 2. in technically correct usage, one or more computers that are associated with a fully qualified domain name and make content available on the Web. The web operates on client/server model and user run web client browser software such as Microsoft's Internet Explorer on the user's computer [6]. Furthermore, ref. [6] stated that the term home page is often used to refer to the first or top page in a collection of pages that make up a Web site. The opening, the first or top page which is usually called home page, contains hyperlinks to other pages on the same or other site(s).

In addition to that, ref. [5] stated that an Internet domain name that contains all the higher level components, including the highest level (i.e., com, org, or edu) that allows the domain to be accessed from any location on the Internet; for example, <http://www.nps.edu/> is a fully qualified domain name. This example is called a web address containing several subjects or company related webpages and data files accessible through a browser. Each website has its own unique web address which can be reached through an Internet connection.

Web-based information displays many benefits of multimedia technology. Web information system, or web-based information system, is an information system that uses Internet web technologies to deliver information and services, to users or other information systems/applications. A web information system usually consists of one or more web applications, specific functionality-oriented components, together with information components and other non-web components.

So, Website is a web-based information system that posted a great deal of data and information in many different forms that will beneficial to anyone who need them. It can be accessed at anytime and anywhere in the world whenever the users please to do. This can be done because the advancement of the information and communication technology (ICT), more specifically the Internet technology. Web-based information systems displays many advantages of information technology and using today's fast broadband connections, it is possible to accessed sophisticated content to a computer anywhere in the world at any time.

### B. DeLone and McLean's Information Systems Success Model

The initial DeLone and McLean's Information Systems Success Model, hereafter referred to as the D & M IS Model, is a theory which was trying to determine the information success by identifying six critical variables that is system quality, information quality, use, user satisfaction, individual impact and organizational impact [7]. Furthermore, it was said that information systems research is to make a contribution to the world of practice, a well-defined outcome measure (measures) is essential. Also, the evaluation of I/S practice, policies and procedures requires an I/S success measure against which various strategies can be tested (p 61).

In the updated D & M IS Model [5], they modified the six dimensions became: system quality, information quality and service quality as independent variables, usage and user satisfaction as inter mediate variables and net benefits as dependent variable. In this model, net benefits variable as the most important one. So that the solutions provided by information systems (IS) have been a central theme in IS success research. Solutions and their organizational context have also been the focus of extensive study within the educational as well as in the managerial fields.

#### 1 Systems Quality

System Quality is manifested in the system's overall performance [8]. Ref. [7] explains system quality as the desired characteristics of the information system itself which produces the information. System quality was measured in term of ease-of-use, functionality, reliability, flexibility, data quality, portability, integration, and importance [5]. According to ref. [3] system quality as the desirable of an information system has several components such as ease of use, system flexibility, system reliability, and ease of learning.

#### 2 Information Quality

Information quality refers to the wanted characteristics of the information that the IS produce [7]. Ref. [3] describes information quality as the desirable characteristics of the system outputs; that is, management reports and Webpages.

Information quality refers to the quality of the information that the system is able to store, deliver, or produce, and is one of the commonest dimensions along which information systems are evaluated. Information quality was measured in terms of accuracy, timeliness, completeness, relevance, and consistency [5]. The quality of the information will determine user satisfaction. According to ref. [9] information technology has become a tool with which to produce accurate, reliable, and timely information through the development of information systems. It is in line with the opinion of ref. [3] that in measuring information quality consisting of relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability. Information quality is often seen as a key dimension of user satisfaction.

### 3 Service Quality

Service Quality can be explained as the overall support delivered by service provider, applies regardless of whether this support is delivered by the IS department, a new organizational unit, or outsourced to an Internet service provider [5]. According to ref. [3] there are four of the main components of service quality, i.e. responsiveness, assurance, reliability, and empathy.

### 4 User Satisfaction

User satisfaction refers to the users' level of satisfaction with the reports, web sites, and support services [3]. Ref. [7] stated that user satisfaction is the most widely used measure of IS success and one of the reasons is that the appeal of satisfaction as a success measure is that most of the other measures are so poor; they are conceptually weak or empirically difficult to obtain. User satisfaction can be described as the summary of a person's attitudes or feelings towards several factors affecting that specific situation. In this study, User Satisfaction is considered as students' opinions on using the website and its environments.

### 5 Net Benefit

Net benefits refer to the extent to which IS are contributing to the success of individuals, groups, organizations, industries, and nations [3]. For example: improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development. Net benefits are the most important success measures as they capture the balance of positive and negative impacts of our customers, suppliers, employees, organizations, markets, industries, economies, and even our societies [5]. Furthermore, even though net benefit was the most important variable but it cannot be analyzed and understood without system quality, information quality, and service quality measurements.

## III. RESEARCH MODEL AND HYPOTHESES

The information success model presented in ref [2] explains the impact of three independent variables on the two intermediate variables and one dependent variable. This research model (Figure 1) builds on the construct of systems quality, information quality and service quality and their effect on user satisfaction and the implication to the website benefit.

Based on the above explanation, the research model for this study can be illustrated as follow.

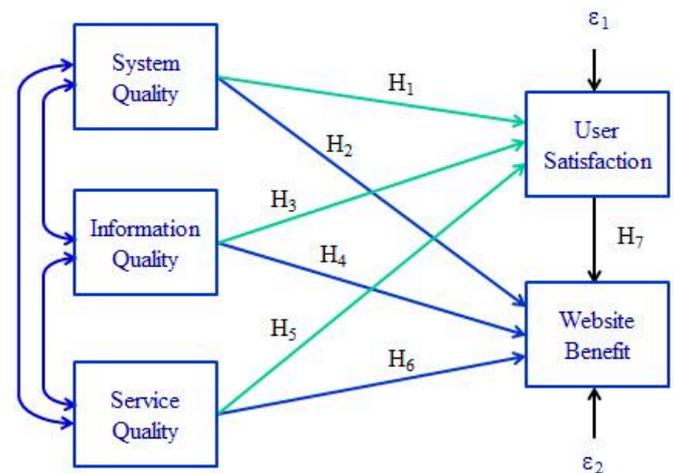


Figure 1. Research Model

### Hypotheses

Based on the above research model, in this study the hypotheses are:

- H<sub>1</sub>: Systems Quality has a significant direct effect on User Satisfaction.
- H<sub>2</sub>: Systems Quality has a significant direct effect on Website Benefit.
- H<sub>3</sub>: Information Quality has a significant direct effect on User Satisfaction.
- H<sub>4</sub>: Information Quality has a significant direct effect on Website Benefit.
- H<sub>5</sub>: Service Quality has a significant direct effect on User Satisfaction.
- H<sub>6</sub>: Service Quality has a significant direct effect on Website Benefit.
- H<sub>7</sub>: User Satisfaction has a significant direct effect on Website Benefit.

## IV. RESEARCH METHOD

Research method employed in this study was survey research with causative approach [10]. Path analysis or Structural Equation Modeling (SEM) without latent variables [11] is employed in this study to analyze the relationship among variables, specifically to measure the direct and indirect effect from exogenous variables to endogenous variables. Data collected from the respondents will be analyzed using AMOS (Analysis of Moment Structures) [12]. Maximum Likelihood estimation method is implemented using AMOS and the chosen outputs are minimization history, standardized estimates, squared multiple correlations and indirect, direct & total effects [13]. This research was done without any special treatment to the data obtained by the researcher.

The survey was conducted at UPNVJ, Indonesia from July to September 2014 and at UNISEL, Malaysia from September to December, 2014. The two universities were chosen since they have signed Memorandum of Understanding (MoU) and one of the objectives is in the area of research and publication. Two hundred and ninety eight (298) students from UPNVJ were selected randomly as respondents from Faculty of Computer Science and Faculty of Economic and one hundred and ninety two students (192) were also selected randomly from Faculty of Business of UNISEL, Malaysia. Those respondents are representative enough to represent the population of the students from two universities. The main reason is that by using AMOS as an analytical tool, is that by having at least 150 respondents then is good to go [13]. Maximum likelihood estimation techniques require samples range from 150 - 400 [14].

The survey questions in the form of questionnaire, as the research instrument, using five-point Likert scales were used with the anchors “1 = strongly disagree” and “5 = strongly agree.” Before distributed to the respondents, the instrument was tested using Pearson Product Moment formula to test its validation and using Alpha Cronbach to test its reliability. Using  $\alpha = 0.05$  all items of the questionnaire were proven valid and reliable.

## V. FINDING AND DATA ANALYSIS

The results are based on the questionnaire answered by students of the UPNVJ and UNISEL. Descriptive statistics, such as mean, median, mode, standard deviation, range, minimum and maximum for the data collected from UPNVJ depicted in Table 5.1 and for the data collected from UNISEL depicted in Table 5.10. Correlation for the independent variables, output resulted by AMOS version 21, illustrated in Table 5.2 for UPNVJ and in Table 5.11 for UNISEL. Beta coefficient can be seen in Figure 2 and Table 5.3 for UPNVJ and Figure 3 and Table 5.12 for UNISEL.

### A. UPNVJ

#### 1 Descriptive Statistics.

Data obtained based on questionnaires answered by the students of the UPNVJ. Descriptive statistics were analyzed using Microsoft Excel 2010, among others; include the mean, median, mode, standard deviation, range, minimum and maximum values for all the variables, shown in Table 5.1. Correlations between independent variables produced by AMOS version 21 is shown in Table 5.2. Correlation between System Quality (X1) and Information Quality (X2) is equal to 0.625, between Information Quality (X2) and Service Quality (X3) is equal to 0.584, and between System Quality (X1) and Service Quality (X3) is equal to 0.495. Whereas beta coefficient can be seen in Figure 2 and Table 5.3.

Table 5.1. Descriptive Statistics

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>
Mean	33.31	41.88	16.15	34.06	29.74
Std Error	.351	.354	.181	.323	.321
Median	33.00	42.00	16.00	35.00	30.00
Mode	30	48	15	30	27
Std Deviation	6.060	6.111	3.118	5.571	5.539
Variance	36.720	37.339	9.725	31.037	30.685
Kurtosis	1.181	-.298	-.241	-.560	-.415
Skewness	10.449	.436	-.128	1.056	.585
Range	65	37	18	36	36
Minimum	14	23	7	14	9
Maximum	79	60	25	50	45
Sum	9927	12480	4813	10149	8862
Count	298	298	298	298	298

Table 5.2. Correlations: (Group number 1 - Default model)

	Estimate
X2 <--> X1	.625
X2 <--> X3	.584
X3 <--> X1	.495

Table 5.3. Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
X4 <--- X2	.463
X4 <--- X1	.079
X4 <--- X3	.373
X5 <--- X3	.222
X5 <--- X4	.315
X5 <--- X1	.013
X5 <--- X2	.186

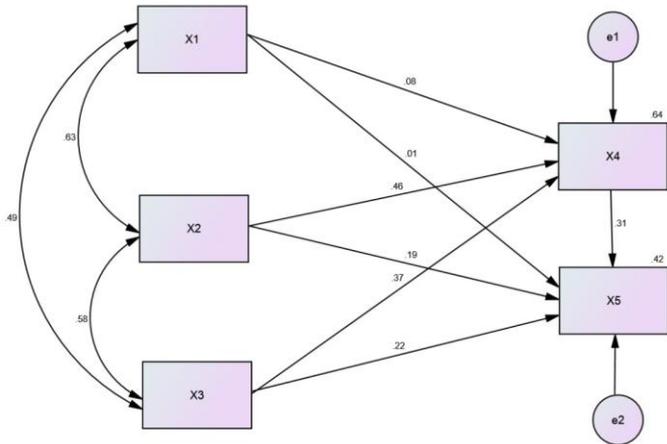


Figure 2. Standardized Estimates  
Source: AMOS output

Notes:

- X1 = Systems Quality
- X2 = Information Quality
- X3 = Service Quality
- X4 = User Satisfaction
- X5 = Web Benefit

## 2 Hypothesis testing

Hypothesis testing is conducted using the t-value with the level of significance of 0.05. The t-value in AMOS is denoted as Critical Ratio (CR) which will be compared to the value of  $t_{table}$  which is 1.96. So, as the basis of calculation is if the value of  $CR \geq 1.96$  or value the probability ( $P \leq 0.05$ ) then  $H_0$  is rejected, meaning that the research hypothesis  $H_1$  is accepted (has significant effect). As the basis for the calculation is the result of the calculation using AMOS program shown on the Table 5.4 *Regression Weights* below.

Table 5.4 *Regression Weights: (Group number 1 - Default model)*

	Estimate	S.E.	C.R.	P	Label
X4 <--- X2	.423	.045	9.457	***	par_1
X4 <--- X1	.073	.042	1.724	.085	par_7
X4 <--- X3	.666	.079	8.478	***	par_8
X5 <--- X3	.394	.110	3.582	***	par_2
X5 <--- X4	.313	.073	4.297	***	par_6
X5 <--- X1	.012	.053	.223	.824	par_9
X5 <--- X2	.169	.064	2.638	.008	par_10

### Testing Hypothesis 1.

- $H_0$  : System Quality (X1) has no significant effect on User Satisfaction (X4)
- $H_1$  : System Quality (X1) has significant effect on User Satisfaction (X4).

Decision : Because the value of  $CR = 1.724$  is less than 1.96 and t-value = 0.085 is greater than 0.05 then  $H_0$  is accepted, meaning that the System Quality (X1) has no significant effect on User Satisfaction (X4). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.079.

### Testing Hypothesis 2

- $H_0$  : System Quality (X1) has no significant effect on Website Benefit (X5).
- $H_1$  : System Quality (X1) has significant effect on Website Benefit (X5).

Decision : Because the value of  $CR = 0.223$  is less than 1.96 and the t-value = 0.824 greater than 0.05 then  $H_0$  is accepted, meaning that the System Quality (X1) has no effect on the Website Benefit (X5). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.013.

### Testing Hypothesis 3

- $H_0$  : Information Quality (X2) has no significant effect on User Satisfaction (X4).
- $H_1$  : Information Quality (X2) has significant effect on User Satisfaction (X4).

Decision : Because the value of  $CR = 9.457$  is greater than 1.96 and t-value = 0.00 is less than 0.05 then  $H_0$  is rejected, meaning that the Information Quality (X2) has significant effect on User Satisfaction (X4). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.463.

### Testing Hypothesis 4

- $H_0$  : Information Quality (X2) has no significant effect on Website Benefit (X5).
- $H_1$  : Information Quality (X2) has significant effect on Website Benefit (X5).

Decision : Because the value of  $CR = 2.638$  is greater than 1.96 and t-value = 0.008 is less than 0.05 then  $H_0$  is rejected, meaning that the Information Quality (X2) has significant effect on Website Benefit (X5). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.186.

### Testing Hypothesis 5

- $H_0$  : Service Quality (X3) has no significant effect on User Satisfaction (X4).
- $H_1$  : Service Quality (X3) has significant effect on User Satisfaction (X4).

Decision : Because the value of  $CR = 8.478$  is greater than 1.96 and t-value = 0.00 is less than 0.05 then  $H_0$  is rejected, meaning that the User Satisfaction (X4) has significant effect on User Satisfaction (X3). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.373.

### Testing Hypothesis 6

H<sub>0</sub> : Service Quality (X3) has no significant effect on Website Benefit (X5).

H<sub>1</sub> : Service Quality (X3) has significant effect on Website Benefit (X5).

Decision : Because the value of CR = 3.582 is greater than 1.96 and t-value = 0.000 is less than 0.05 then H<sub>0</sub> is rejected, meaning that the Service Quality (X3) has significant effect on Website Benefit (X5). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.222.

Testing Hypothesis 7

H<sub>0</sub> : User Satisfaction (X4) has no significant effect on Website Benefit (X5).

H<sub>1</sub> : User Satisfaction (X4) has significant effect on Website Benefit (X5).

Decision : Because the value of CR = 4.297 is greater than 1.96 and t-value = 0.000 is less than 0.05 then H<sub>0</sub> is rejected, meaning that the User Satisfaction (X4) has significant effect on Website Benefit (X5). Based on Table 5.3, Standardized Regression Weights, the magnitude of the effect is 0.315.

The final results of hypothesis testing can be summarized as depicted in Table 5.5.

Table 5.5. Recapitulation of hypothesis testing.

No	Hypothesis	Decision H <sub>0</sub>	Conclusion
1	System Quality has significant effect on User Satisfaction	H <sub>0</sub> is accepted	no significant effect
2	System Quality has significant effect on Website Benefit.	H <sub>0</sub> is accepted	no significant effect
3	Information Quality has significant effect on User Satisfaction.	H <sub>0</sub> is rejected	significant effect
4	Information Quality has significant effect on Website Benefit.	H <sub>0</sub> is rejected	significant effect
5	Service Quality has significant effect on User Satisfaction	H <sub>0</sub> is rejected	significant effect
6	Service Quality has significant effect on Website Benefit.	H <sub>0</sub> is rejected	significant effect
7	User Satisfaction has significant effect on Website Benefit	H <sub>0</sub> is rejected	significant effect

3 Direct Effects, Indirect Effects and Total Effects.

Path analysis is actually intended to find out how big the effect of one variable against another either directly or indirectly as well as the total effect. Interpretation of the results of this analysis is to investigate and determine how to improve the usefulness of Website Benefit. The results of direct effect, indirect effect and total effect produced by AMOS version 21 as in Table 5.6, Table 5.7 and Table 5.8.

Table 5.6. Standardized Direct Effects: (Group number 1 - Default model)

	X1	X3	X2	X4
X4	.079	.373	<b>.463</b>	.000
X5	.013	.222	.186	<b>.315</b>

Based on the results presented in Table 5.6, *Standardized Direct Effects* can be explained as follows:

- a. Direct effect System Quality (X1) on User Satisfaction (X4) is equal to 0.079.
- b. Direct effect Information Quality (X2) on User Satisfaction (X4) is equal to 0.463,** and
- c. Direct effect Service Quality (X3) on User Satisfaction (X4) is equal to 0.373.

It can be concluded that the Information Quality (X2) has the greatest direct effect, i.e. 0.463, when compared with the effect of the System Quality (X1) and Service Quality (X3) on User Satisfaction (X4).

- d. Direct effect System Quality (X1) on Website Benefit (X5) is equal to 0.013,
- e. Direct effect Information Quality (X2) on Website Benefit (X5) is equal to 0.168,
- f. Direct effect Service Quality (X3) on Website Benefit (X5) is equal to 0.222, and

**g. Direct effect User Satisfaction (X4) on Website Benefit (X5) is equal to 0.315.**

It can be concluded that the User Satisfaction (X4) has the greatest direct effect, i.e. 0.315 in comparison with the effect of the System Quality (X1), Information Quality (X2) and Service Quality (X3) to Website Benefit (X5).

Table 5.7. Standardized Indirect Effects: (Group number 1 - Default model)

	X1	X3	X2	X4
X4	.000	.000	.000	.000
X5	.025	.117	<b>.146</b>	.000

Based on the results presented in Table 5.7, *Standardized Indirect Effects* can be explained as follows:

- a. Indirect effect System Quality (X1) on Website Benefit (X5) is equal to 0.025.
- b. Indirect effect Information Quality (X2) on Website Benefit (X5) is equal to 0.146, and**
- c. Indirect effect Service Quality (X3) on Website Benefit (X5) is equal to 0.117.

It can be concluded that the Information Quality (X2) has the greatest indirect effect, i.e. 0.146 in comparison with the indirect effect of the System Quality (X1) and Service Quality (X3) to the Website Benefit (X5).

Table 5.8. Standardized Total Effects: (Group number 1 - Default model)

	X1	X3	X2	X4
X4	.079	.373	<b>.463</b>	.000
X5	.038	<b>.339</b>	.332	.315

Based on the results presented in Table 5.8, *Standardized Total Effects* can be explained as follows:

- a. Total effect System Quality (X1) on User Satisfaction (X4) is equal to 0.079
  - b. Total effect Information Quality (X2) on User Satisfaction (X4) is equal to 0.463, and**
  - c. Total effect Service Quality (X3) on User Satisfaction (X4) is equal to 0.373.
- It can be concluded that the Information Quality (X2) has the greatest total effect, i.e. 0.463, when compared with the total effect of the System Quality (X1), and Service Quality (X3) on User Satisfaction (X4).
- d. Total effect System Quality (X1) on Website Benefit (X5) is equal to 0.038,
  - e. Total effect Information Quality (X2) on Website Benefit (X5) is equal to 0.332,
  - f. Total effect Service Quality (X3) on Website Benefit (X5) is equal to 0.339 and**
  - g. Total effect User Satisfaction (X4) on Website Benefit (X5) is equal to 0.315.

It can be concluded that the Service Quality (X3) has the greatest total effect, i.e. 0.339 in comparison with the effect of the System Quality (X1), Information Quality (X2) and, User Satisfaction (X4) to Website Benefit (X5).

#### 4 Coefficient of determination

The magnitude of the contribution can be calculated from the output in Table 5.9 below.

Table 5.9. Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
X4	.637
X5	.422

Based on the results presented in Table 5.9 *Squared Multiple Correlations* can be explained as follows:

- a. Estimated value of Squared Multiple Correlations shows that the System Quality (X1), Information Quality (X2) and Service Quality (X3) have 63.7% in explaining User Satisfaction (X4).
- b. Estimated value of Squared Multiple Correlations shows that the System Quality (X1), Information Quality (X2), Service Quality (X3) and User Satisfaction (X4) have 42.2% in explaining Website Benefit (X5).

## 5 Conclusion

Based on data finding:

- a. User Satisfaction (X4) is effected by the System Quality (X1), Information Quality (X2) and Service Quality (X3) amounted to 63.7% and 36.3% came from other variables not examined.
- b. Website Benefit (X5) is effected by the System Quality (X1), Information Quality (X2), Service Quality (X3) and User Satisfaction (X4) amounted to 42.2% and 57.8% came from other variables not examined.
- c. System Quality (X1) has no significant effect on User Satisfaction (X4) and also System Quality (X1) has no significant effect on Website Benefit (X5).
- d. In this study, there are two hypotheses are not proved influential, namely:
  - 1) Hypothesis 1: The effect of System Quality (X1) on User Satisfaction (X4) and
  - 2) Hypothesis 2: The effect of System Quality (X1) on Website Benefit (X5).

Based on these findings it can be concluded that the system quality provided has no impact on the user satisfaction and website benefit in UPNVJ. Meanwhile information quality is the greatest effect variable on user satisfaction and toward website benefit. So that, information quality is a top priority in obtaining information.

### B. UNISEL

#### 1 Descriptive Statistics.

Data obtained based on questionnaires answered by the students of the UNISEL. Descriptive statistics were analyzed using Microsoft Excel 2010, among others; include the mean, median, mode, standard deviation, range, minimum and maximum values for all the variables, shown in Table 5.10. Correlations between independent variables produced by AMOS version 21 is shown in Table 5.11. Correlation between System Quality (SysQ) and Information Quality (InfQ) is equal to 0.613, between Information Quality (InfQ) and Service Quality (SerQ) is equal to 0.574, and between System Quality (SysQ) and Service Quality (SerQ) is equal to 0.495. Whereas beta coefficient can be seen in Figure 3 and table 5.12.

Table 5.10. Descriptive Statistics

	System Quality	Information Quality	Service Quality	User Satisfaction	Website Benefit
Mean	30.380	38.208	14.547	34.182	26.563
Std Error	0.400	0.522	0.279	0.501	0.426
Median	30	39	15	35	27
Mode	30	36	15	36	27
Std Deviation	5.549	7.240	3.869	6.939	5.906
Variance	30.792	52.417	14.972	48.150	34.886
Kurtosis	0.159	0.831	0.234	0.938	1.144
Skewness	0.059	-0.530	-0.245	-0.498	-0.498
Range	32	44	20	43	36
Minimum	15	12	5	12	9
Maximum	47	56	25	55	45
Sum	5833	7336	2793	6563	5100
Count	192	192	192	192	192

Table 5.11. Correlations: (Group number 1 - Default model)

	Estimate
SysQ <--> InfQ	.613
InfQ <--> SerQ	.574
SysQ <--> SerQ	.495

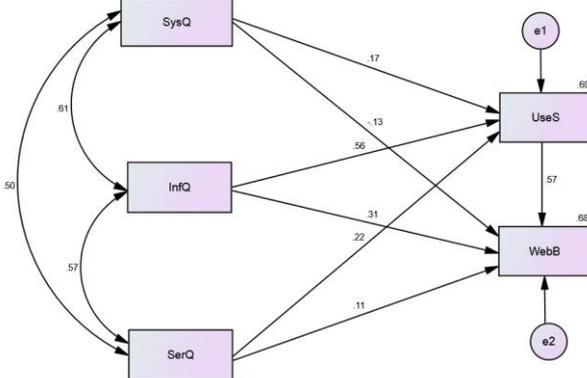


Figure 3. Standardized Estimates  
Source: AMOS output

Notes:  
SysQ = System Quality  
InfQ = Information Quality  
SerQ = Service Quality  
UseS = User Satisfaction  
WebB = Website Benefit

Table 5.12. Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
UseS <--- InfQ	.565
UseS <--- SysQ	.170
UseS <--- SerQ	.219
WebB <--- UseS	.565
WebB <--- SysQ	-.134
WebB <--- InfQ	.307
WebB <--- SerQ	.111

## 2 Hypothesis Testing.

Hypothesis testing is conducted using the t-value with the level of significance of 0.05. The t-value in AMOS is denoted as Critical Ratio (CR) which will be compared to the value of  $t_{table}$  which is 1.96. So, as the basis of calculation is if the value of  $CR \geq 1.96$  or value the probability  $(P) \leq 0.05$  then  $H_0$  is rejected, meaning that the research hypothesis  $H_1$  is accepted (has significant effect). As a basis for calculation is the output resulted by AMOS as shown in Table 5:13 below.

Table 5.13. Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
UseS <--- InfQ	.541	.053	10.204	***	par_4
UseS <--- SysQ	.212	.065	3.251	.001	par_5
UseS <--- SerQ	.392	.090	4.342	***	par_6
WebB <--- UseS	.481	.063	7.644	***	par_3
WebB <--- SysQ	-.142	.058	-2.439	.015	par_7
WebB <--- InfQ	.251	.057	4.372	***	par_8
WebB <--- SerQ	.169	.082	2.051	.040	par_9

### Testing Hypothesis 1.

$H_0$  : System Quality (SysQ) has no significant effect on User Satisfaction (UseS)

$H_1$  : System Quality (SysQ) has significant effect on User Satisfaction (UseS).

Decision : Because the value of  $CR = 3.251$  is greater than 1.96 and t-value = 0.001 is less than 0.05, then  $H_0$  is rejected, meaning that the System Quality (SysQ) has significant effect on User Satisfaction (UseS). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.170.

### Testing Hypothesis 2

$H_0$  : System Quality (SysQ) has no significant effect on Website Benefit (WebB).

H1 : System Quality (SysQ) has significant effect on Website Benefit (WebB).

Decision : Because the value of CR = -2.439 is less than 1.96 and t-value = 0.015 is less than 0.05, then H0 is accepted, meaning that the System Quality (SysQ) has no significant effect on Website Benefit (WebB). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is -0.134.

Testing Hypothesis 3

H0 : Information Quality (InfQ) has no significant effect on User Satisfaction (UseS).

H1 : Information Quality (InfQ) has significant effect on User Satisfaction (UseS).

Decision : Because the value of CR = 10.204 is greater than 1.96 and t-value = 0.00 is less than 0.05, then H0 is rejected, meaning that the Information Quality (InfQ) has significant effect on User Satisfaction (UseS). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.565.

Testing Hypothesis 4

H0 : Information Quality (InfQ) has no significant effect on Website Benefit (WebB).

H1 : Information Quality (InfQ) has significant effect on Website Benefit (WebB).

Decision : Because the value of CR = 4.372 is greater than 1.96 and t-value = 0.000 is less than 0.05, then H0 is rejected, meaning that the Information Quality (InfQ) has significant effect on Website Benefit (WebB). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.307.

Testing Hypothesis 5

H0 : Service Quality (SerQ) has no significant effect on User Satisfaction (UseS).

H1 : Service Quality (SerQ) has significant effect on User Satisfaction (UseS).

Decision : Because the value of CR = 4.342 is greater than 1.96 and t-value = 0.00 is less than 0.05, then H0 is rejected, meaning that the Service Quality (SerQ) has significant effect on User Satisfaction (UseS). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.219.

Testing Hypothesis 6

H0 : Service Quality (SerQ) has no significant effect on Website Benefit (WebB).

H1 : Service Quality (SerQ) has significant effect on Website Benefit (WebB).

Decision : Because the value of CR = 2.051 greater than 1.96 and t-value = 0.040 is less than 0.05, then H0 is rejected, meaning that the Service Quality (SerQ) has significant effect on Website Benefit (WebB). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.111.

Testing Hypothesis 7

H0 : User Satisfaction (UseS) has no significant effect on Website Benefit (WebB).

H1 : User Satisfaction (UseS) has significant effect on Website Benefit (WebB).

Decision : Because the value of CR = 7.644 is greater than 1.96 and t-value = 0.00 is less than 0.05, then H0 is rejected, meaning that User Satisfaction (UseS) has significant effect on Website Benefit (WebB). Based on Table 5.12, Standardized Regression Weights, the magnitude of the effect is 0.565.

The final results of hypothesis testing can be summarized as depicted in Table 5.14.

Table 5.14. Recapitulation of hypothesis testing.

No	Hypothesis	Decision H <sub>0</sub>	Conclusion
1	System Quality has significant effect on User Satisfaction	H <sub>0</sub> is rejected	significant effect
2	System Quality has significant effect on Website Benefit.	H <sub>0</sub> is accepted	no significant effect
3	Information Quality has significant effect on User Satisfaction.	H <sub>0</sub> is rejected	significant effect
4	Information Quality has significant effect on Website Benefit.	H <sub>0</sub> is rejected	significant effect
5	Service Quality has significant effect on User Satisfaction	H <sub>0</sub> is rejected	significant effect
6	Service Quality has significant effect on Website Benefit.	H <sub>0</sub> is rejected	significant effect
7	User Satisfaction has significant effect on Website Benefit	H <sub>0</sub> is rejected	significant effect

3 Direct Effects, Indirect Effects and Total Effects.

Path analysis is actually intended to find out how big the effect of one variable against another either directly or indirectly as well as the total effect. Interpretation of the results of this analysis is to investigate and determine how to improve the usefulness of Website Benefit. The results of direct effect, indirect effect and total effect produced by AMOS version 21 as in Table 5.15, Table 5.16 and Table 5.17.

Table 5.15. Standardized Direct Effects: (Group number 1 - Default model)

	SerQ	InfQ	SysQ	UseS
UseS	.219	<b>.565</b>	.170	.000
WebB	.111	.307	-.134	<b>.565</b>

Based on the results presented in Table 5.15, *Standardized Direct Effects* can be explained as follows:

- a. Direct effect System Quality (SysQ) on User Satisfaction (UseS) is equal to 0.170,
- b. Direct effect Information Quality (InfQ) on User Satisfaction (UseS) is equal to 0.565,** and
- c. Direct effect Service Quality (SerQ) on User Satisfaction (UseS) is equal to 0.219.

It can be concluded that the Information Quality (InfQ) has the greatest direct effect, i.e. 0.565, when compared with the effect of the System Quality (SysQ), and Service Quality (SerQ) on User Satisfaction (UseS).

- d. Direct effect System Quality (SysQ) on Website Benefit (WebB) is equal to -0.134,
- e. Direct effect Information Quality (InfQ) on Website Benefit (WebB) is equal to 0.307,
- f. Direct effect Service Quality (SerQ) on Website Benefit (WebB) is equal to 0.111, dan
- g. Direct effect User Satisfaction (UseS) on Website Benefit (WebB) is equal to 0.565.**

It can be concluded that the User Satisfaction (UseS) has the greatest direct effect, i.e. 0.565, when compared with the effect of the System Quality (SysQ), Information Quality (InfQ), and Service Quality (SerQ) on Website Benefit (WebB).

Table 5.16. *Standardized Indirect Effects: (Group number 1 - Default model)*

	SerQ	InfQ	SysQ	UseS
UseS	.000	.000	.000	.000
WebB	.124	<b>.319</b>	.096	.000

Based on the results presented in Table 5.16, *Standardized Indirect Effects* can be explained as follows:

- a. Indirect effect System Quality (SysQ) on Website Benefit (WebB) is equal to 0.096
- b. Indirect effect Information Quality (InfQ) on Website Benefit (WebB) is equal to 0.319,** and
- c. Indirect effect Service Quality (SerQ) on Website Benefit (WebB) is equal to 0.124.

It can be concluded that the Information Quality (InfQ) has the greatest indirect effect, i.e. 0.319 in comparison with the indirect effect of the System Quality (SysQ) and Service Quality (SerQ) to the Website Benefit (WebB).

Table 5.17. *Standardized Total Effects: (Group number 1 - Default model)*

	SerQ	InfQ	SysQ	UseS
UseS	.219	<b>.565</b>	.170	.000
WebB	.234	.626	-.038	<b>.565</b>

Based on the results presented in Table 5.17, *Standardized Total Effects* can be explained as follows:

- a. Total effect System Quality (SysQ) on User Satisfaction (UseS) is equal to 0.170,
- b. Total effect Information Quality (InfQ) on User Satisfaction (UseS) is equal to 0.565,** and
- c. Total effect Service Quality (SerQ) on User Satisfaction (UseS) is equal to 0.219.

It can be concluded that the Information Quality (InfQ) has the greatest total effect, i.e. 0.565 when compared with the total effect of the System Quality (SysQ), and Service Quality (SerQ) on User Satisfaction (UseS).

- d. Total effect System Quality (SysQ) on Website Benefit (WebB) is equal to -0.038,
- e. Total effect Information Quality (InfQ) on Website Benefit (WebB) is equal to 0.626,**
- f. Total effect Service Quality (SerQ) on Website Benefit (WebB) is equal to 0.234 and
- g. Total effect User Satisfaction (UseS) on Website Benefit (WebB) is equal to 0.565.

It can be concluded that the Information Quality (InfQ) has the greatest direct effect, i.e. 0.626 in comparison with the effect of the System Quality (SysQ), Service Quality (SerQ) and User Satisfaction (UseS) to the Website Benefit (WebB).

#### 4 Coefficient of determination

The magnitude of the contribution can be calculated from the output in Table 10.16 below.

Table 5.18. *Squared Multiple Correlations: (Group number 1 - Default model)*

	Estimate
UseS	.691
WebB	.678

Based on the results presented in Table 5.18 *Squared Multiple Correlations*, can be explained as follows:

- a. Estimated value of Squared Multiple Correlations show that the variable System Quality (SysQ), Information Quality (InfQ) and Service Quality (SerQ) has 69.1% in explaining variables User Satisfaction (UseS).
- b. Estimated value of Squared Multiple Correlations show that the variable System Quality (SysQ), Information Quality (InfQ), Service Quality (SerQ) and User Satisfaction (UseS) has 67.8% in explaining variable Website Benefit (WebB).

#### 5 Conclusion

Based on data finding:

- a. User Satisfaction (UseS) is effected by the System Quality (SysQ), Information Quality (InfQ) and Service Quality (SerQ) amounted to 69.1% and 30.9% came from other variables not examined.

- b. Website Benefit (WebB) is effected by the System Quality (SysQ), Information Quality (InfQ Service Quality (SerQ) and User Satisfaction (UseS) amounted to 67.8% and 32.2% came from other variables not examined.
  - c. System Quality (SysQ) has no significant effect on Website Benefit (WebB).
  - d. In this study, there is only one hypothesis is not proved influential, namely: Hypothesis 2: The effect of System Quality (SysQ) to Website Benefit (WebB) and
- Based on these findings it can be concluded that the information quality as a dominant variable in effecting user satisfaction and also website benefit in UNISEL. So, the quality of information becomes a top priority in obtaining information.

## VI. DISCUSSION

The results show that there are some similarities and differences between of them in the two universities. Based on the findings obtained from UPNVJ and UNISEL can be explained as follows:

### 1 Similarities:

In UPNVJ, there are two hypotheses proven insignificant, i.e., Hypothesis 1: “System Quality has significant effect on User Satisfaction”, and Hypothesis 2: “System Quality has significant effect on Website Benefit”. Meanwhile in UNISEL there is only one hypothesis proven insignificant, i.e., Hypothesis 2: “System Quality has significant effect on Website Benefit”. So, the similarity, in term of hypotheses is that in both universities, there is one hypothesis proven insignificant, i.e. Hypothesis 2.

### 2 Differences:

#### a) User Satisfaction

In UNPVJ, User Satisfaction is influenced by Systems Quality, Information Quality and Service Quality by 63.7% and 36.3% comes from other variables not examined. The greatest total influence to the User Satisfaction is coming from Information Quality, i.e. 0.463.

Meanwhile in UNISEL, User Satisfaction is influenced by Systems Quality, Information Quality and Service Quality by 69.1% and 30.9% comes from other variables not examined. The greatest total influence to the User Satisfaction is coming from Information Quality, i.e. 0.565.

#### b) Website Benefit

In UPNVJ, Website Benefit influenced by Systems Quality, Information Quality, Service Quality and User Satisfaction by 42.2% and 57.8% comes from other variables not examined. The greatest total influence to the Website Benefit is coming from Service Quality, i.e. 0.339.

Meanwhile in UNISEL, Website Benefit influenced by Systems Quality, Information Quality, Service Quality and User Satisfaction by 67.8% and 32.2% comes from other

variables not examined. The greatest total influence to the Website Benefit is coming from Information Quality, i.e. 0.626.

## VII. CONCLUSIONS

These findings have proven that there are some similarities and differences in term of hypotheses and influence from independent variables to the dependents variables, in both universities. Meanwhile, even though using the same research instruments produce different output. There are several reasons could be stated, such as: priority, perspective, and personal background that differentiate the answers provided by the respondents. So that, having the same question will be answered differently by different respondents. Therefore, by having different answers produce different output.

Even though the findings of the research almost proven all hypotheses are significant, it is worth considering some of the limitations of the study. First, in this study the researcher only measures website benefit in connection with four other variables, but in reality it is much more than that. Second, although the sample has been considered enough but a larger sample could help to reveal smaller population effects. Third, the research model was tested with a specific case study, in this case only implemented in two universities.

These results can be considered as novelties of the study, so it can be used as a future research. Although the similar model has been tested several times, further study is needed to test whether it can be more widely applied to other circumstances. So, the proposed research model for future study is by omitting one hypothesis, i.e., Systems Quality has a significant direct effect on Website Benefit because it was proven insignificant in both universities.

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