

# Implementation of Information Systems in PT Terminal Teluk Lamong: Does Supply Chain Intervenes?

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**Abstract-**This study examines the effect of information quality and service quality on the organizational impact of implementing information systems at PT Terminal Teluk Lamong. PT Teluk Lamong terminal is the first terminal port in Indonesia that uses a semi-automated concept, so research on this information system is important to do. This study uses a test tool in the form of Smart PLS to see the results of the outer model and the inner model, which in turn will produce relationships between variables. Supply chain management significantly and positively mediates between quality system, information quality, service quality, and organizational impact. Data is collected by distributing questionnaires to all company employees. Of the total 260 employees, only 101 employees of PT Terminal Teluk Lamong participated in filling out the questionnaire given. The participants represented a total of 9 departments in the company. The results found in this research are that there is a significant relationship between the information quality and service quality variables on organizational impact. This research will be used as an evaluation material for the management of PT Terminal Teluk Lamong to update on the implementation of the company's information system.

**Keywords;** *Information quality, Service quality, Organizational impact, Supply chain management*

## 1. Background

It is impossible for a company to operate without the support of even the simplest information systems. In general, all of these tools and technologies are used to support company activities called Information Communication Technology (ICT). Modern information systems can lead to faster processes and also help improve the quality of service to customers [1]. The linkage of information systems grouped with some components for carrying out the process of data in various ways; therefore, supply chain management significantly employs a dominant role among components [2]. Implementation of an information system not only requires various terminologies for numerous activities but also requires the process of supply chain management to join terminologies. Supply chain management aims to deliver

prominent role between task and performers; therefore, the eminence of supply chain management prevail in controls of information system. The quality of the information system could induce through its usage, so the effectiveness of supply chain management inserts the dominant part for the usage [3]. Due to the competitive advantage, technology-enhanced various ways of information system implementation; therefore, supply chain management tends as a prevailing factor where organizations took benefit by using role among them [4]. The significant role of supply chain management results between various factors that tends to enumerate some influences and relationships.

W. DeLone and E. McLean in 1992 developed a model that could be used to evaluate the quality of information systems called the DeLone and McLean are Success Model (ISSM) or D&M Model. This study will discuss the success model of D&M information systems using four variables, namely system quality, information quality, service quality, and organizational impact [5]. Information quality represents the quality of output generated from information systems in the form of online or offline reports. The concept of Information quality is to measure the success of a system and express it as one of the most important constructs in facilitating user understanding.

Service quality can be defined as the level of discrepancy between the customer's normative expectations for service and their perception of service performance [6]. The concept of Service quality will be reflected through the extent to which information department staff can meet user expectations, whether satisfactory or not. Some measurement dimensions of service quality are reliability, responsiveness, assurance, and empathy. Service quality is more often associated with something that can be provided by staff or officers who provide services. For example, in a company that has an Information Technology Department, service quality can be measured based on how the department's staff

serve other department staff and whether the service assistance can help complete the work of employees [7].

The organizational impact is an enterprise-level benefit received by an organization because of the impact it has on the use of information systems. The organizational impact can be in the form of planning and supporting process relations with suppliers of production and operations, product and service improvement, and customer relationships. A study conducted discusses the influence of system quality, information quality, and service quality on organizational impact. This research was conducted at several accountant companies located in Hong Kong with the initial goal of getting a strategy to improve the quality of information technology. The results obtained that Information Quality and Service Quality has a positive effect on organizational impact.

Other research also conducted that discusses the relationship between system quality and information quality on organizational performance, which results in the conclusion that system quality has a significant impact on the efficiency and effectiveness of performance in an organization. This also applies to the good information quality of the information system that can be used to improve organizational performance [8]. Furthermore, researchers tried to develop a research model conducted by Gorla et al. to replicate research at PT Terminal Teluk Lamong with the aim of obtaining evaluation material from the application of information systems that have been used in the company concerned. This research model uses several variables proposed by DeLone and McLean [9].

PT Terminal Teluk Lamong is a terminal that applies the Green Smart Port concept, namely by promoting the concept of environmental preservation in its operational activities. In addition, PT Terminal Teluk Lamong also only receives dry bulk in the form of animal feed and staple food, so the company is easier to manage incoming goods so as not to pollute the environment. It is different from other ports that only process wet bulk commodities such as oil and the like.

This research will be aimed at PT Terminal Teluk Lamong employees who use information systems at the company concerned with the aim of seeing to what extent the company information system at PT Terminal Teluk Lamong has been implemented in an internal environment as it should. Among them to test and analyze the effect of Information quality and service quality on the organizational impact of the use of Information Systems at PT. Teluk Lamong Terminal. The results of this study will then be used to provide suggestions for company management to be used as a basis for making improvements to information systems in the future [10, 11].

## 2. Hypotheses development

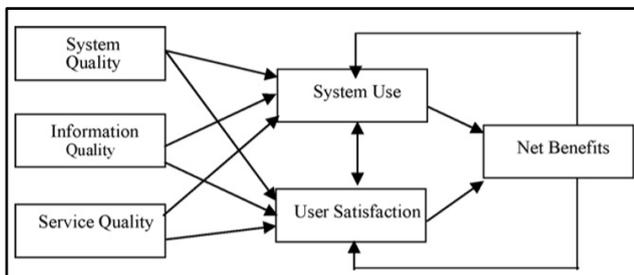
The role of the information system has shifted from initially only an information system, now has a strategic role in increasing the competitiveness of companies [12]. Some well-known information systems that are able to present data and influence decision making to get quality networking quality are Decision Supporting Systems (DSS), Management Support Systems (MRS), and Executive Information Systems (EIS) [13].

Previous studies that discuss the failure of information systems in large companies. One of them is the Hewlett-Packard (HP) company which suffered a loss of 160 million dollars due to the failure of the implementation of information systems, and there is also Nike, a shoe company that has worldwide previously lost 100 million dollars in sales and experienced a 20% decline in share prices due to information system failure [14]. Therefore, an evaluation of each information system is carried out to understand system performance, improve the system by using the basis of previous research to identify more effective techniques or methods, and investigate failures and learn from mistakes [15]. Studies also examined the success of the use of the Malaysian government's e-government information system. While the relevant research evaluates information systems at PT. Teluk Lamong Terminal. In addition, there are differences in the presence of moderation variables in the form of system development, system usability, user satisfaction, organizational structure, and organizational environment. The difference found in the current research lies in the object of research. Mazlan conducted research on information systems in the public sector in Malaysia, while this study evaluated the use of information systems implemented at PT. Teluk Lamong Terminal. In addition, the difference also lies in the variables used. Mazlan added the variables of user satisfaction, user involvement, and self-readiness as moderation variables. The difference lies in the object of research, Laurent examines the EMR system implemented in hospitals, while the authors conduct research on PT. Teluk Lamong Terminal. In addition, previous researchers only focused on the implementation of the system applied in the hospital, while the authors conducted an evaluation and provided suggestions for improvement on the implementation of the information system used.

The difference seen in multiple studies is from the perspective of the object of research. Yusof et al. conducted a study to evaluate the Fundus health information system in one of the primary care in the UK. While the researchers evaluated the information system applied at PT. Teluk Lamong Terminal. Other differences also exist in the independent variable, Yusof uses the independent variable in the form of net benefits while this study uses the independent variable in the form of organizational impact.

Technology Information triad variable on organizational impact. And also added a hypothetical system quality model to information quality. While researchers only use three hypotheses that include information technology triad on organizational impact. Another difference lies in the object of research. Gorla et al. [15], conducted research in several accounting firms in Hong Kong. At the same time, this research conducted research at the terminal port. The difference between the two studies lies in the determination of the independent variable. Yaser uses organizational performance variables, while this study uses independent variables in the form of organizational impact.

This framework explains success in managing an organization's information technology deployment that depends on balance and five factors including (1) the external environment; (2) organizational strategy; (3) individuals and their roles; (4) technology; and (5) management process. This multidimensional relationship between information system success measures has been extensively tested in a number of studies.



**Figure 1.** Information system success models

There are six dimensions of information system success models that can be seen in Figure 2.2 above, which include; system quality information quality, service quality, system use; user satisfaction; and net benefits [16]. The research conducted at PT Teluk Lamong only adopted organizational impact variables to be formulated into the research model. When the information system in the company has good quality, then the system can be used effectively and can produce higher benefits. But the opposite.

In this study, researchers chose to focus on the direct influence that information technology has in the form of information quality, and service quality on organizational impact. Information quality is always measured as part of user satisfaction, and the construct depends on the instrument of end-user satisfaction. Information quality into two dimensions, namely based on information content and information format [17].

Service Quality refers to the quality of support received by system users from the Information Systems department and Information Technology support personnel. Service Quality as the level of difference between a customer's normative expectations for service and their perceptions

about service performance. Service Quality into five dimensions consisting of tangible forms, reliability, responsiveness, assurance, and empathy [18, 19].

Service Quality has a great reputation for helping information system success models because that dimension supports what users of information systems must receive from the information technology department and support personnel. In a study conducted by Beatson, Coote [20], the construct of Service Quality was measured by four indicators: reliability, responsiveness, assurance, and empathy.

**H1:** Quality system significantly influences the organizational impact.

The Organizational Impact variable is adapted by the information system success model, which contains two constructs, namely, individual impact and organizational impact [21]. The organizational impact is equal to the advantages and strategic value of a company. Meanwhile, according to (), explains that organizational impact is the same as market value; organizational effectiveness & efficiency; and capacity utilization [22, 23]. Organizational impact is the same as efforts to improve operational efficiency and create a competitive advantage.

Information quality is not good; in this case, when the information is unknown, the source is not accurate, and irrelevant will have a detrimental impact on the management control of the company, causing difficulties in decision making; causing cost overruns, and decreased productivity [24]. High information content (accurate, complete, and relevant) will lead to better product cost control and an increase in organizational efficiency in the form of increased profit margins and increased decision-making efficiency. Conversely, poor information quality will have an impact on the impact of operational, tactical, and strategic level organizations. So this research proposes the following hypothesis:

**H2:** Information Quality positively influences Organizational Impact

Some studies have also found the fact that service quality has a relationship with organizational performance. Although some previous periods, there have been incidents of failure to implement Total Quality Management (TQM). Most of the results of the study concluded that management quality, in this case, is service quality significantly contributes to the success of the company [25]. Based on the statements above, this research proposes the following hypothesis:

**H3:** Service quality has a positive effect on Organizational Impact.

Supply chain management referred by studies with eminent implementation between a varieties of aspects; therefore, between information system implementation role of supply chain management arise with significance in literature dominating simplified organizational structure

[26]. In the implementation of an information system, various factors prevail that renders system supporting decisions, so the effectiveness of the supply chain enumerates a better decision-making process. Companies suffer after implementing the system of information due to non-coherence among the tasks assigned to the operational ground; therefore, supply chain management help by inducing a role in the coherence of simplified organizational structural tasks [27]. The chaining process not only renders the way of performing various operational works, but the eminent implementation of supply chain management prominently induces all parts that could help in evaluating operational performance [28]. Some dominant implementations usually adhere robustly with the use of supply chain management in various ways.

**H4:** Supply chain management significantly and positively mediates among quality systems and organizational impact.

Supply chain management widely enumerated in literature due to its role among various factors used in a study to enumerate the impacts or influences over information quality. The positive element of supply chain management refers to the building of relationships among all components that studies tend to evaluate [29]. The link of information system implementation widely states the quality system as a dominant measure that influences the organizational impact. Wide literature was stating the importance of implementing the measure of a quality system, the prevalence of supply chain management dominance reasonable coordination for the measures of implementation [30]. Various roles in the organizations enumerated by vast literature where the importance of supply chain management founded intact with roles. The term supply chain management works multi-dimensionally for the organizations by employing various measure that supports in attaining various objectives [31].

**H5:** Supply chain management significantly and positively mediates among information quality and organizational impact.

While enhancing the object of organizational impact stated in the literature, supply chain management performs all activities between the organizations through various modes [32]. The dominance of roles is pertinent to be mentioned that are performed individually or jointly through the multidimensional role of supply chain management. The overall management process in an organization includes the process of supply chain management, whether in a chain of distributing information or chain of attaining company goals [33]. Information quality and service quality are important elements of an information system that inserts a dominant role in organizational impact. At the same time, supply chain management induces a significant role among the system of quality and organizational impact [34].

**H6:** Supply chain management significant mediates among service quality and organizational impact..

### 3. Methodology

This study aims to obtain an evaluation of the use of information systems applied at PT Terminal Teluk Lamong. The study uses Information Quality, and Service Quality as Independent variables, and Organizational Impact as Dependent variables. This study will look at how the influence of each variable on organizational impact in PT Terminal Teluk Lamong. The quality system variable consists of several indicators, including ease of use, accessibility, flexibility, usefulness, and reliability. The information quality variable consists of several indicators, including content, availability, accuracy, timeliness, conciseness, and convenience. In comparison, service quality consists of several indicators, including reliability, responsiveness, communications, empathy, attitude, and competence. All indicators are used to measure the independent variables used so that it will produce organizational impact at PT Terminal Teluk Lamong.

Quality Information refers to the quality of output produced by the information system. In this study, information quality is defined as the characteristics or weights of information output derived from the application of information systems at PT Terminal Teluk Lamong, with the aim of providing data and relevant information according to user needs.

Service quality is defined as the weight or characteristics of the services provided by the information technology department staff at PT Terminal Teluk Lamong, as expected by the user.

Organizational Impact is defined as the influence felt by the organization in terms of cost-effectiveness and improvement in organizational performance. Organizational impact represents several indicators, including productivity, agility, product/service timeliness, revenue growth, and cost reduction. The research conducted at PT Terminal Teluk Lamong focuses on companies in the service sector so that the indicators of the variables used will be adjusted to the research needs.

Research conducted at PT Terminal Teluk Lamong uses quantitative data types, namely primary data and secondary data. The population in this study are all employees at PT Terminal Teluk Lamong, amounting to 260 people. The rules in determining how many samples are needed for PLS tools, which are ten times the number of arrows which point to the dependent variable in the research model. It is known that the research model conducted at PT Terminal Teluk Lamong consists of two arrows that point to the dependent variable, so the minimum number of samples needed in this study is 20 respondents. Researchers distributed

questionnaires to all employees at PT Terminal Teluk Lamong with 260 employees, but only 101 questionnaires were filled out and returned from all respondents.

The technique used in this study is simple random sampling, which means that the researcher does not determine how many sample members are drawn from the population. The current research uses a partial regression analysis method (Partial Least Square) with the aim of testing some of the variables proposed in the hypothesis. PLS has the advantage of being able to overcome complex models with multiple independent and dependent variables that have many indicators, and can also be used to overcome variables with nominal, ordinal, and continuous types.

Process PLS has two stages of analysis, namely, testing the suitability of the model through the test of the construct validity and reliability of each indicator by using a measurement model (outer model), and using convergent Validity, discriminant validity, and composite reliability values to see the loading factor value generated by using the structural model (inner model). The limit on the accepted loading factor value is 0.6. As for reliability using composite reliability values and Cronbach's Alpha > 0.7.

The variables such as information quality (IQ) has seven items, quality system (QS) has five items, and system quality (SQ) has four items. In addition, mediating variable such as supply chain management (SCM) has four items while organizational impact (OI) also has four items. These variables along with links are shown in Figure 1.

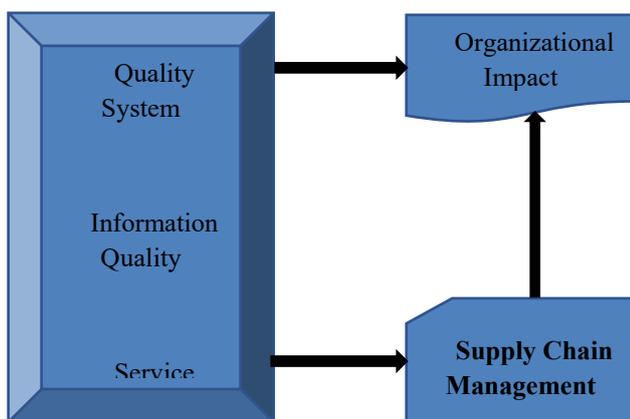


Figure 2. Theoretical framework

#### 4. Results

The findings show the items relations that is known as convergent validity. The figures show that Alpha and CR are more than 0.70 on the other hand loadings and AVE are larger than 0.50. These figures show high relationships among items and no issue with convergent validity. These are shown in Table 1.

Table 1. Convergent validity

Items	Loadings	Alpha	CR	AVE
IQ1	0.772	0.882	0.909	0.590
IQ2	0.705			
IQ3	0.580			
IQ4	0.821			
IQ5	0.826			
IQ6	0.829			
IQ7	0.812			
OI1	0.841	0.897	0.928	0.765
OI2	0.912			
OI3	0.882			
OI4	0.861			
QS1	0.835	0.856	0.897	0.635
QS2	0.780			
QS3	0.806			
QS4	0.809			
QS5	0.752			
SCM1	0.903	0.832	0.889	0.670
SCM2	0.793			
SCM3	0.705			
SCM4	0.859			
SQ1	0.761	0.802	0.870	0.626
SQ2	0.813			
SQ3	0.785			
SQ4	0.804			

The findings also show the variables relations that is known as discriminant validity. The figures show that Heterotrait Monotrait (HTMT) ratio are not higher than 0.90. These figures show no high relationships among variables and no issue with discriminant validity. These are shown in Table 2.

Table 2. Heterotrait Monotrait ratio

	IQ	OI	QS	SCM	SQ
IQ					
OI	0.819				
QS	0.513	0.529			
SCM	0.609	0.535	0.345		
SQ	0.848	0.641	0.470	0.651	

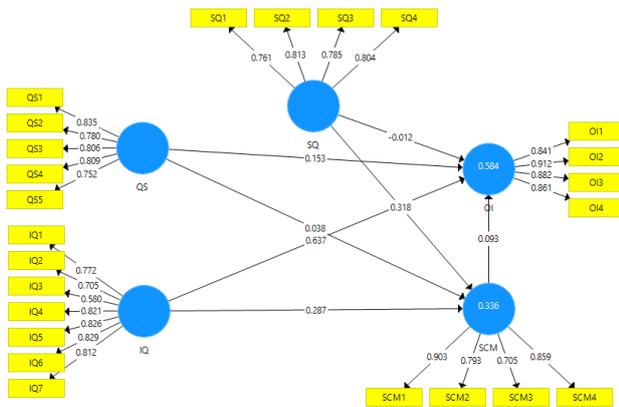


Figure 3. Measurement model assessment

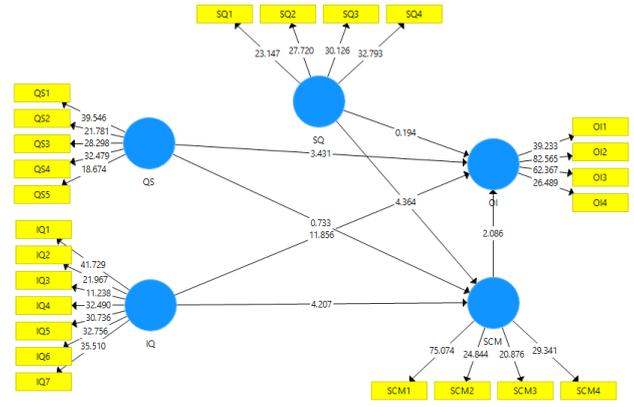


Figure 4. Structural model assessment

The path analysis show that information quality, quality and quality system have positive association with organizational impact and accept H1 and H2. However, services quality has insignificant link with organizational impact and reject H3. In addition, supply chain management has positively mediating among the links of quality system and organizational impact and accept H4. Moreover, supply chain management has positively mediating among the links of information quality and organizational impact and accept H5. Finally, supply chain management has positively mediating among the links of services quality and organizational impact and accept H6. These relationships are shown in Table 3.

Table 3. Path analysis

Relationships	Beta	S.D.	t-statistics	p-values
IQ -> OI	0.637	0.054	11.856	0.000
IQ -> SCM	0.287	0.068	4.207	0.000
QS -> OI	0.153	0.045	3.431	0.001
QS -> SCM	0.038	0.052	0.733	0.464
SCM -> OI	0.093	0.044	2.086	0.037
SQ -> OI	-0.012	0.063	0.194	0.846
SQ -> SCM	0.318	0.073	4.364	0.000
IQ -> SCM -> OI	0.127	0.014	9.071	0.021
QS -> SCM -> OI	0.104	0.005	20.800	0.000
SQ -> SCM -> OI	0.129	0.017	7.588	0.001

## 5. Discussion and conclusion

The Information quality has a significant positive effect on organizational impact with a t-statistic value of 2.069 > 1.96. Information quality with high content in the sense of being accurate, complete, and relevant will result in increased efficiency in decision making by company leaders. Effect Service Quality towards Organizational Impact. Service quality has a significant positive effect on organizational impact with a t-statistic value of 3.846 > 1.96. This is consistent with research conducted by [25] which shows that service quality significantly and positively influences organizational impact. The results of this study relate to services provided directly by the staff of the technology department. Results enumerated the significant role of supply chain management that prevails between the implementation of information systems and organizations. Supply chain management significantly enumerates the significance of quality systems that contributes to an important role in the organizational impact [32]. The prevalence of supply chain management dominantly results in the organization by inserting a mediating role among quality systems and organizational impact. The role of information quality significantly endorse eminent impact over the organizational impact; therefore, supply chain management positively mediates among the relationship between organizational impact and information quality. Service quality positively relates to the organizational impact, while supply chain management inserts mediating part among them [34]. Most PT Terminal Teluk Lamong employees who were respondents in this study answered that they felt helped by the services provided by the technology department staff. The technology department staff can evaluate the application of information systems more intensively to find out how effective this information system is for use at PT Terminal Teluk Lamong. In addition, this research can also be used to continuously update the latest information that can support the completion of tasks and work of employees to be more effective. Researchers also provide advice for companies relating to each proposed variable [35]. In terms of the information quality of the

information system, it is expected that the company always provides the latest information as material in helping users to complete their work better. Service quality, researchers expect the information technology department to continue to develop their competencies in serving all the needs of employees of the company's information system.

The studies with variant authors endorsed supply chain management a dominant variable that insert mediating role among various contributing factors of literature. Supply chain management induces a dominant part in the quality systems that are important in the implementation of information systems [34]. Although organizational impacts are variant with some authors in literature, the dominance of supply chain management inserts a vital role in the organizational impact. Many factors elaborated by authors that impact the organizations, but the significant role of supply chain management successfully put mediating role between all the components, whether influencing of asserting relationships [33]. Supply chain management contributes a prominent part in the literature widely through the role of mediation among variables.

This research is only limited to the company's internal objects, meaning that researchers only see how the application of information systems used by employees in offices, while PT Terminal Teluk Lamong as a semi-automated concept port very much implements information systems outside offices. In the future, it is expected that further researchers will also be able to conduct research with a broader object covering all parts of the company, both internal and external.

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