3. RESEARCH METHODOLOGY

3.1. Theoretical Model

This study aims to find out the impact of Data Quality, Information Quality, and System Quality within Digital Accounting Systems (DAS) on decision-making Quality, discerning whether this influence is positive, negative, or neutral. Additionally, an exploratory analysis examines the role of Analytical decision-making Quality as a moderating variable, assessing whether it exerts a positive, negative, or neutral effect on overall Decision-making Quality. Research model that will be used is shown in figure 3.1 and below is the description of variables used in the research model.

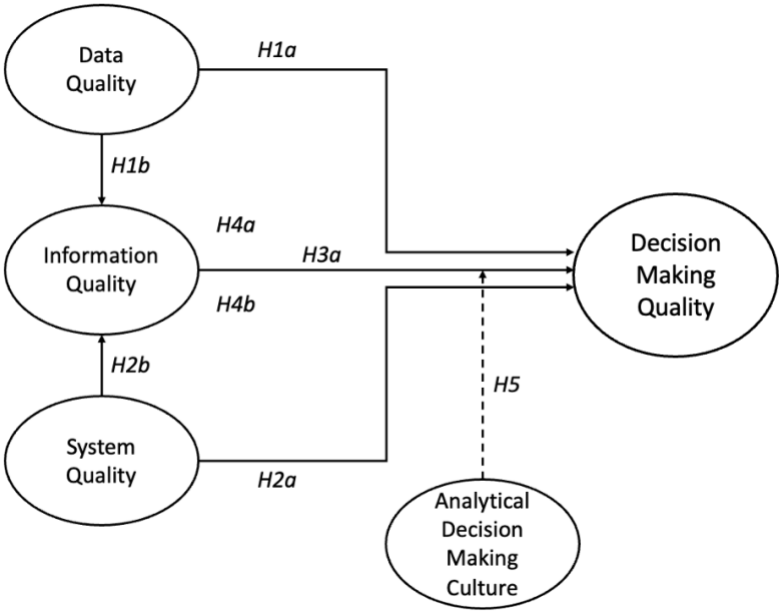

Figure 3.1 Research Model

Table 3.1

Description of variables used in the research model

Code	Variable	Unit of Measure
DMQ	Decision-making Quality	5 points Likert Scale
SQ	System Quality	5 points Likert Scale
DQ	Data Quality	5 points Likert Scale
IQ	Information Quality	5 points Likert Scale

ADMC	Analytical decision-making Culture	5 points Likert Scale

3.2. Variable Operationalization

The variables include the dependent variables (Information Quality and decision-making Quality) and independent variables (System Quality, Data Quality, Analytical decision-making Culture)

3.2.1. Information Quality (IQ)

In this research, this variable (IQ) will be measured by questionnaire from a previous study which is from Al-Okaily et al. (Al-Okaily et al., 2022) that are also taken from Lin et al. (Liu et al., 2020) and Gable et al. (Gable et al., 2008) This approach will includes questions from 4 sets of measurements, which are: (1) the information provided by the DAS is always timely, (2) the information provided by the DAS is useful, (3) the information provided by the DAS is easy to understand, (3) importance of information related to decision-making. The survey targets decision makers i.e., managers, owners, internal auditor in Indonesian manufacturing companies, and a likert scale will be used to point out the statements from the respondent. Surveys will be targeted to decision makers and just like previously, a likert scale will be used to point out the statements from the respondent from Strongly Disagree (1) to Strongly agree (5).

3.2.2. decision-making Quality (DMQ)

DMQ will also be reflected by the answers from the questionnaires filled by the respondents. Measurements were taken from Al-Okaily et al. (Al-Okaily et al., 2022) that are also taken from Alalwan et al. (Alalwan et al., 2014) and Quiddad et al. (Quiddad et al., 2020). There are 4 indicators of them: (1) According to the information from DAS, the decisions made by the respondent are typically correct, with minor errors. (2) According to the information from DAS, the decisions made by the respondent are usually accurate, with no errors. (3) According to the information from DAS, the decisions made by the respondent are typically precise, as the DAS consistently yields the same outcome when faced with the same problem. (4) According to the information from DAS, the decisions made by the respondent are generally dependable. Surveys will be targeted to decision makers and just like previously, a likert scale will be used to point out the statements from the respondent from Strongly Disagree (1) to Strongly agree (5).

3.2.3. Data Quality (DQ)

DQ will be taken from questionnaire answers filled by the respondents with a measurement taken from Al Al-Okaily et al. (Al-Okaily et al., 2022) that are also taken from Torres

and Sidorova (Torres & Sidorova, 2019). It will be measured from 4 indicators which are: (1) The data accessible to the DAS is precise. (2) The data accessible to the DAS is extensive. (3) The data available for the DAS is accurate. (4) The data available for the DAS is consistent. Surveys will be targeted to decision makers and just like previously, a likert scale will be used to point out the statements from the respondent from Strongly Disagree (1) to Strongly agree (5).

3.2.4. System Quality (SQ)

SQ will also be reflected from the answer from the questionnaire taken from Gable et Al. (Gable et al2008) and 4 measurements are taken to be the indicators which are: (1) Data from the information systems often needs correction, (2) Data from the information systems is current enough, (3) The information systems are always operational as needed, (4) The information systems respond quickly enough. Surveys will be targeted to decision makers and just like previously, a likert scale will be used to point out the statements from the respondent from Strongly Disagree (1) to Strongly agree (5).

3.2.5. Analytical Decision-Making Culture (ADMC)

ADMC is a moderating variable that is closely related with decision-making quality. The indicators for this variable are: (1) The decision-making process is clearly defined and familiar to stakeholders. (2) The manufacturing policy is to integrate available information into any decision-making process. (3) The respondent takes into account the information provided by the DAS, irrespective of the nature of the decision to be made. Surveys will be targeted to decision makers and just like previously, a likert scale will be used to point out the statements from the respondent from Strongly Disagree (1) to Strongly agree (5).

3.3. Type and Source of Data

This research will employ quantitative data, which refers to information that can be quantified and expressed numerically. This kind of data is known for being measurable and factual. It refers to the analysis of data by describing or summarizing the collected data (Rini et al., 2023).

The source of data will use primary data which is directly collecting the information through questionnaires, interviews, experiments, etc. In this research, the author will use primary data to collect the data specifically using the questionnaire method that will be distributed to decision makers that use Digital Accounting Systems from Manufacturing Companies in Jakarta and Surabaya, Indonesia.

3.4. Instrument For Gathering Data: Questionnaires

This research will use questionnaires as the instrument to collect the data. The questionnaire method is a widely employed research approach that involves the use of a designed set of questions to gather information from individuals or groups. In order to implement this method effectively, the author designs the questionnaire based on previous studies and ensures that the questions are organized logically. The data that are collected through the questionnaires will be used as the primary data. The questionnaire was divided into seven sections where the first part is about the respondent's personal data including gender, age, education, job title, experiences in the position, and experience in accounting system use. The second part will be assessing the data quality followed up with the third part assessing the information quality, fourth part is assessing the system quality, fifth part assessing the analytical decision-making culture and the sixth part is assessing the decision-making quality. For section 2 up until 6, respondents will be asked to answer using the 5 points likert scale (from 1= strongly disagree to 5= strongly agree).

The questionnaire will be distributed randomly to the decision makers i.e., manager, owner, internal auditor, accountant that ever use a digital accounting system in a Manufacturing Company in Jakarta and Surabaya using Google Form as the media. The data that are collected will be used to show the correlation between the dependent and independent variables.

3.5. Population and Sample

3.5.1. Population

A population refers to the entire group of individuals possessing specific characteristics, whereas a sample is a smaller subset selected from that population (Thacker, 2020). This research's population will consist of Indonesian Decision Makers from manufacturing industries particularly in Jakarta and Surabaya. In order to get a reliable analysis, the sample will be taken from multiple manufacturing companies with a minimum of 2 individuals per company, this will give an accurate result for the data analysis. The target of the respondent will be people who ever made a decision-making within the organization, for example manager, owner, supervisor, analyst, auditor, accountant, etc. The following characteristics are going to be shared by the manufacturing companies' decision maker who will be included in the population:

1. Decision makers who ever use Digital Accounting system (i.e., managers, owners)
2. Ever make decision based on Digital Accounting system
3. Work in Manufacturing industries in Jakarta and Surabaya, Indonesia
4. Available and willingly to participate

Decision makers were chosen because they are the one who is bound to deal with output from the Digital Accounting System and able to make the decision therefore, they know about how it impacts their decision-making quality.

3.5.2. Sample

As previously mentioned, the sample is a smaller subset selected from a population (Thacker, 2020). From this study, the sample will be taken from manufacturing companies as Manufacturing companies have become the backbone to Indonesia's economy (Rezqianita & Ardi, 2020, 123). Furthermore, according to Statista Indonesia's manufacturing sector holds a prominent position as the largest contributor to the country's GDP. The sample will be taken focusing on manufacturing companies located in Jakarta and Surabaya as first Jakarta is the national capital of Indonesia and has become the national economy and a significant industrial hub. Secondly, Surabaya is the second largest city in Indonesia where it also became a significant industrial hub with various manufacturing sectors contributing to the country's economy. The Decision makers that will be taken here are manager, supervisor, internal auditor, chief accountant, and also accountant will be the targeted sample in this study.

Since the population of manufacturing companies in Indonesia cannot be exactly found, the calculation of the sample will use the Lemeshow's formula as the population (n) is unknown. For this research purpose, the author will follow a commonly used confidence level of 95% with a margin of error of 5%. The calculation technique is as below:

$$n = \frac{pq}{(\frac{E}{1.96})^2}$$

$$n = \frac{0.5\ (1 - 0.5)}{(\frac{0.1}{1.96})^2}$$

$$n = \frac{0.25}{0.0026}$$

$$n = 96.06 = 97$$

(3.1)

Explanation:

n = sample size

p = maximum estimate

q = 1-p

E = error tolerance (10%/0.1)

From the calculation above, using Lemeshow's technique the number of samples that will be used to be collected is 97 samples. The sample will be taken from multiple manufacturing companies located in Jakarta and Surabaya, with a minimum of 2 individuals per company to gain reliable and accurate representation of the data collected.

3.6. Unit Analysis

The unit of analysis is an essential component in every approach since it sets the aim of the investigation, forming a perspective on what we can and cannot learn in any empirical study (Damşa & Jornet, 2020). This study will gather the information from questionnaires from decision makers in manufacturing companies in Jakarta and Surabaya Indonesia. When 2 respondents are from the same manufacturing company, as mentioned above it will be counted as 1 company unit. This means that the unit analysis for this study will be based on each of the company units.

3.7. Data Analysis Technique

This study intends to employ the Smart PLS software for the analysis of the data. The investigation will utilize Partial Least Squares Structural Equation Modeling (PLS-SEM), a widely adopted method in multivariate data analysis within the realms of business and social sciences. PLS-SEM is particularly employed to scrutinize models featuring latent variables (Memon et al., 2021).

Before proceeding with the analysis, the author will distribute the questionnaire to the respondents using google form. After that, the author will select the questionnaire that is suitable with the criteria and use it to analyze the result. The data will be put in Microsoft Excel, and progress it using SmartPLS, Finally the author will analyze it and take conclusion from it.

3.7.1. Partial Least Square-Structural Equation Modeling (PLS-SEM) Analysis

The first step in examining the reliability and precision of the measurement model in PLS-SEM begins with analyzing the measurement model. Through visualization and model validation, SEM (Structural Equation Modeling) is commonly used to explain several statistical correlations at the same time. This method is typically used to describe complicated models. SEM seeks to comprehend the link between latent constructs as shown by various metrics. While PLS differs from typical multivariate approaches in that it addresses just individual objectives, it also tests other models to discover the best appropriate link between variables.

3.7.2. Descriptive Statistics Test

The discipline of statistics known as descriptive statistics dealing with gathering, presenting, and categorizing a dataset in order to offer a clear overview of its major aspects. Descriptive statistical tests are used to analyze and describe the main aspects of a dataset,

providing insights into its central tendency, variability, and distribution. Descriptive statistics focus on summarizing and presenting data in a meaningful way. This study will use descriptive statistical analysis which are:

a. Mean

Mean is a measure of central tendency in a dataset. It is also known as the arithmetic mean of average. Mean is calculated by summing all of the values in a dataset and dividing them with the total by the number of values. The formula used to calculate the mean is:

$$\frac{1}{n}\sum_{i=1}^{n} x1 \qquad (3.2)$$

Explanation:

x = mean

n = sample size

x1 = value of x1 to xn

b. Score Classification

For score classification, it will be divided into 4 score classification, namely by using this calculation formula:

$$\frac{Highest\ score - Lowest\ score}{Score\ Classification}$$

$$= \frac{5-1}{4} = 1 \qquad (3.3)$$

Explanation:

5 = Highest answer in Likert scale

1 = Lowest answer in Likert scale

4 = Score classification

Table 3.2

The mean category of respondent's answers descriptively

Interval	**Category**
1.00 - 2.00	Very Low
> 2.00 - 3.00	Low

> 3.00 - 4.00	High
> 4.00 - 5.00	Very High

c. Standard Deviation

The standard deviation is a statistical metric that indicates the degree of variation or dispersion of results from the mean. It assesses dataset consistency and variability. It is determined by taking the square root of the variance and expressing it in the same units as the data. A larger standard deviation implies more variability, whereas a smaller standard deviation shows closer values to the mean:

$$s = \sqrt{\frac{1}{n-1}\sum_{i-1}^{n}(Xi - X)^2} \quad (3.4)$$

Explanation:

s = standard deviation sample

n = sample size

X = mean

Xi = value of x1 to xn

3.7.3. Outer Model Evaluation

The validity and reliability of each existing variable will be examined in this outer model (Abdillah & Hartono, 2015). The outer loading or also called as the measurement model is showing the correlation between the indicators and the variable where the value must be more than 0.5 (Hair et al., 2019). The validity test in this study tries to assess the accuracy of an instrument in measuring data and the goal is to determine whether the questionnaire is valid. The reliability test in this study is to determine the consistency of the variable indicators, and it is performed on the questionnaire for each variable to be tested. There are two things that will be tested for validity in this study which are convergent validity and discriminant validity;

3.7.3.1. Validity Test

A. Convergent Validity

Convergent validity refers to how well the variable scales connects to existing variables and measures of the same notion. It is an important concept in research as it can impact the research findings. The assumptions and upfront interpretation of the outcome are required to determine convergent validity. If the correlation with the instruments assessing the same construct is more than 0.50, the result is typically deemed satisfactory and acceptable. If it is

declared as 0.5, it will be deemed insufficient or invalid and the indicator must be deleted. This test will be using the Average Extracted Variance (AVE) value as the metric to test each indicator with their construct variable (Carlson & Herdmand, 2012).

B. Discriminant Validity

Discriminant validity is about how much a test is different from other tests that measure different things. Evidence indicates that measures of constructs that should not be highly connected are not significantly associated with one another. It looks at whether ideas or measurements that shouldn't be connected are actually not related. A good discriminant validity study shows that a test for one idea is not strongly connected to tests for other, different ideas (Kenny, 2016). Discriminant validity test can use cross loading from PLS algorithm to measure the validity where each correlation value from the indicators and the variable shows a higher value than the other variable (Abdillah & Hartono, 2015).

3.7.3.2. Reliability Testing`

A reliability test will be conducted in this study in the following way. Reliability testing is part of research methodology, this tests it to evaluate the consistency, accuracy and precision of the results. Reliability testing in PLS, can be carried out by using two methods which are Cronbach's alpha and Composite reliability. Cronbach's alpha and composite reliability are methods to see if survey questions work well together. They give a number (between 0 and 1) that shows how reliably the questions measure the intended thing. Cronbach's alpha is common to ensure a test is accurate. Composite reliability, similar but more detailed, it checks on how well questions connect to an underlying idea, giving a score for reliability. Higher scores mean the questions are doing a good job measuring what they're supposed to. This examination is conducted to assess the real indicator value against a benchmark of > 0.7, and a value of 0.6 is deemed acceptable (Sholihin & Ratmono, 2013).

3.7.4. Inner Model Evaluation

Inner model evaluation is being used to investigate inner model estimates. coefficients, as well as the model's overall fit. The process of examining the structural model, which depicts the connections between the latent variables in the research model, is known as inner model assessment in Partial Least Square Structural Equation Modeling (PLS-SEM) using the bootstrapping measurement. It is carried out following the evaluation of the outer model, which ensures that the structural model has a strong relationship (Abdillah & Hartono, 2015). There are 3 tests that will be conducted which are coefficient of determination, path coefficient of the direct and indirect effects.

3.7.4.1. Test of the Coefficient of Determination (R^2)

R squared serves as an indicator to gauge how strong independent variable influence changes in the dependent variable. A higher R squared value signifies a more effective predictive model in a study (Abdillah & Hartono, 2015). The standard to measure the strength of a relationship is first 0.75 considered as strong, 0.50 considered as moderate and 0.25 is considered as weak (Hair et al., 2017).

3.7.4.2. Path Coefficient

A coefficient test was conducted to assess the significance of relationships between constructs. Path coefficients, also referred to as path coefficients, offer valuable information by indicating the direction of the relationship between variables, whether the hypothesis has a positive or negative orientation (Hair et al., 2017).

3.7.5. Hypothesis Testing

Hypothesis testing is a statistical technique used to draw findings about a population parameter based on a sample of data. This process entails creating a null hypothesis (H0), which signifies a default assumption or a statement of no effect. Conversely, the alternative hypothesis (H1) posits a specific effect or difference. Researchers collect and analyze the data to assess whether there is enough evidence to reject the null hypothesis in favor of the alternative hypothesis. One of the ways to test hypothesis testing is using a t-test. T test compares it to a critical value from a t-distribution to determine whether the null hypothesis should be rejected (Streib & Dehmer, 2019). The statistical hypotheses that will be tested in this study are:

A. Hypothesis 1a:
    1. $H_0 : B_1 = 0$, Data quality has a significant impact on decision-making quality in Indonesian Manufacturing companies.
    2. $H_0 : B_1 \neq 0$, Data quality has no significant impact on decision-making quality in Indonesian Manufacturing companies.

B. Hypothesis 1b:
    1. $H_0 : B_2 = 0$, Data quality has a significant impact on information quality in Indonesian Manufacturing companies.
    2. $H_0 : B_2 \neq 0$, Data quality has no significant impact on information quality in Indonesian Manufacturing companies.

C. Hypothesis 2a:
    1. $H_0 : B_6 = 0$, System quality has a significant impact on decision-making quality in Indonesian Manufacturing companies.

2. $H_0 : B_6 \neq 0$, System quality has no significant impact on decision-making quality in Indonesian Manufacturing companies.

D. Hypothesis 2b:

1. $H_0 : B_7 = 0$, System quality has a significant impact on information quality in Indonesian Manufacturing companies.
2. $H_0 : B_7 \neq 0$, System quality has no significant impact on information quality in Indonesian Manufacturing companies.

E. Hypothesis 3a:

1. $H_0 : B_3 = 0$, Information quality has a significant impact on decision-making quality in Indonesian Manufacturing companies.
2. $H_0 : B_3 \neq 0$, Information quality has no significant impact on decision-making quality in Indonesian Manufacturing companies.

F. Hypothesis 4a:

1. $H_0 : B_4 = 0$, Information quality has a significant mediating relation between data quality and decision-making quality in Indonesian Manufacturing companies.
2. $H_0 : B_4 \neq 0$, Information quality has no significant mediating relation between data quality and decision-making quality in Indonesian Manufacturing companies.

G. Hypothesis 4b:

1. $H_0 : B_5 = 0$, Information quality has a significant mediating relation between system quality and decision-making quality in Indonesian Manufacturing companies.
2. $H_0 : B_5 \neq 0$, Information quality has no significant mediating relation between system quality and decision-making quality in Indonesian Manufacturing companies.

H. Hypothesis 5:

1. $H_0 : B_8 = 0$, Analytical decision-making culture has significant moderating impact on the association between information quality and decision-making quality
2. $H_0 : B_8 \neq 0$, Analytical decision-making culture has no significant moderating impact on the association between information quality and decision-making quality.

If the t-statistic exceeds 1.96, it signifies the acceptance of the null hypothesis (H0). Conversely, if the t-statistic falls below 1.96, it leads to the rejection of the null hypothesis (H0).