How Audit Firm Size Moderate Effect of TOE Context toward Auditor Adoption of Technology

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Abstract: Our research aim was determine the financial auditor acceptance regarding supporting software assistance facing industry 4.0 to assist them in client financial statement audit. This research instrument refers to Technology Organization Environment (TOE) approach, and audit firm size. This research is a quantitative research that uses primary data in the form of questionnaires distributed to research objects, which is auditors who work in public accountant offices. This study examines hypotheses between variables using path analysis, structural equation modelling partial least square (SEM PLS), while the independent variables in this study are technology context, organization context and environment context while firm size become moderating variable and the dependent variable are auditor adoption of technology. The results of this study are to knowing the adoption of auditors in information technology in their work processes. It is expected that it will provide an overview financial auditor expectations on applicable information and software, so that it can improve the quality of work to be more effective and efficient, especially in terms of time and energy. The results of this study are expected to provide an overview of the adoption of technology by financial auditors in professional audit firm.

Keywords: technology, organization, environment, auditor, adoption

1. Introduction

Nowadays we have entered the era of the 4.0 industrial revolution where human power has been replaced by machines, such as in Japan there are fast food restaurants that already have waiters, namely robots. This era of the industrial revolution 4.0 affects all fields including accounting itself. So that all areas affected by automatic and computerization both positive and negative.

This 4.0 fast automatic evolution affects overall fields including accounting itself. So that all areas affected by the era of the industrial revolution 4.0 are both positive and negative. The phenomena impacted audit field. This impact is such that auditors do not need to go to the client company to request data which can now be emailed by the client company or are not required to manually calculate the client company's financial statements.

According to study in (Appelbaum et al., 2017), is stated digitalization already change financial auditor by improving the time efficiency and precise work. Software in example, IDEA, e-audit, audit command language, i-Auditor help auditor enhance skill in detecting material error on data and financial statement. Digitalization helps detecting automatically anomaly thus error that manually hard to detect using human accuracy. Audit is transformed from a manual audit process to use information technology.

According to previous study in (Manita et al., 2020), is stated this digital technology has an impact on the five main levels of audit companies, especially the role of auditing as assurance provider. First, digitization increase quality and speed of audits. Second, it allows accountant office expand offerings other competitive product. Third, precise and accurate outcome gradually increase, especially when deal with large sum of transaction. Fourth, facilitated by digitization of reform concept audit profiles emerging, and fifth enabling a culture of innovation in auditing firms. Thus, corporate control enhance, at the same time discretionary powers of managers will be limited. Our study sort importance of an automatic strategy as insight for regulatory body in prepare future additional be made to auditing standards. This should allow business schools, accounting study program tailor made technology based curriculum to catch up with the needs of the auditing company.
Based on the preliminary research that has been done by (Kim et al., 2009) states that it is likely, if any, this transformation stands as a clear example of what IT audit transformation can achieve for all organizations. Stakeholders are seen as true customers, and the IT audit role is focused on providing a wide range of valuable services to meet the needs of audit committees and companies. The results of this transformation indicate potential rewards that can be pursued and obtained by any IT audit team committed to digital transformation.

2. Literature Review

2.1. TOE Approach

The theory used in this research is the technology organization environment (TOE) theory introduced by (Tornatzky & Fletscher, 1990). This theory states that innovation depends on organizational conditions, industrial environment, and technological developments. Basically, the technology organization environment (TOE) model combines the schema of technological characteristics, organizational factors, and macro environmental elements (Yeh et al., 2015). TOE identifies three contexts that affect the adoption and implementation of corporate innovation, namely: the technology context, illustrating that adoption depends on technology both from outside and from within the company such as compatibility (both technical and organizational), complexity, trial ability (trials / experiments), and observation (visibility / imagination); organizational context, describes the scope of corporation activity, managerial support, organization ethic, a lot of difficulty on scope of organization structure as stated by main thus core of the problem; The environmental context relates to facilities and factors inhibiting company operations such as pressure from competitors, customers, socio-cultural issues, government encouragement, and technology infrastructure such as consulting services through ICT (Awa et al., 2015).

2.2. Effect of Technology Context on Auditor Adoption of Technology

In adopting technology organization has several considerations including cost, ease of use, and tutorials for use. Cost effectiveness in using technology is very important to measure because it is an indicator of the benefits resulting from technology performance (Ebimobowei et al., 2013). All investments are not only focused on costs alone but also on the risks that are likely to arise due to technology implementation. In implementing technology, there will be new challenges for organizations that will also have an impact on the implementation of technology that is vulnerable to not satisfying its users.

The appropriateness of using audit software to assist auditors’ duties will influence the adoption of big data analytics in organizations. The higher the fit of the audit software task with the audit function, the higher the acceptance of the application of software to help the audit function (Rosli et al., 2012). Based on above information, researcher come to a decision in made first hypothesis:

H1: Technology context significantly affecting auditor adoption in technology

2.3. Effect of Organization Context on Auditor Adoption of Technology

The increasing demand for increased effectiveness and efficiency in organizations encourages individuals do job faster. Realize idea of work faster, technology assistant is necessary. The adoption of technology within the organization is also affected by several variables and possibilities inside an organization. This is one of the factor moved auditor to change and adapt techno-software in organization (Siew et al., 2020). Larger companies certainly have more resources, both financial and human resource, which proper usage of software in the organization. According to, company readiness can be seen from the financial condition of the organization and its technical resources.

Financial and technical resources can be used by organizations to support organizational readiness by using technology based equipment and being able to create a working atmosphere that supports the use of technology. Commitment from top management which is audit partner in public accounting firm plays an important role in technology adoption in organization (Siew et al., 2020), (Li et al., 2018). That was refer to business leader has authority to decide whether the organization will adopt technology and also top management will also play a role in motivating employees to try to adopt technology. Based on above information, researcher come to a decision in made second hypothesis:

H2: Organization context significantly affecting auditor adoption in technology

2.4. Effect of Environment Context on Auditor Adoption of Technology

Variable affecting intention or use of software are not only influenced by technology or internal factors but also involve factors from outside the organization such as clients, professional bodies, and competitors. The larger the size of the client organization, the wider and more complex the audit scope will be. The complexity of
the scope can lead to an audit risk where the auditor fails to detect fraud or errors by the company. In this situation division of auditor hired by corporation of company must be able to follow the regulations and policies made by International Auditing Standard (ISA) as a professional accounting body for audit. The audit function must also be performed in accordance with the fieldwork audit standard. Therefore, if ISA encourages the use of technology, it will be one of the driving factors for the adoption of big data analytics in the internal audit function. Based on the above explanation, researcher come to a decision in made third hypothesis:

H3: Environment context significantly affecting auditor adoption in technology

2.5. Audit Firm Size Moderate Effect of Technology Context on Auditor Adoption of Technology

In audit profession there is interesting fact that has not found in another industry or field of business. It is the presence of big four audit firm, big four often associated as has better performance than non-big four audit firm (Harris & Williams, 2020). According to our previous study in (Rosli, Yeow, & Siew, 2013), stated that audit firm size able to moderate the effect of variables in TOE to auditor intention in adopting technology. Based on that finding, we formulate our hypothesis as follow:

H4a: Audit firm size moderate effect of technology context on auditor adoption of technology
H4b: Audit firm size moderate effect of organization context on auditor adoption of technology
H4c: Audit firm size moderate effect of environment context on auditor adoption of technology

The following is a picture of our research framework, presented in figure 1

![Research Framework](image)

Figure 1. Research Framework

3. Material and Method of Research

3.1. Quantitative Analysis Design

Our study was conducted by collecting primary data through distributing questionnaires conducted with quantitative methods with the TOE framework approach. (Sekaran & Bougie, 2016) defines primary data as data obtained directly by researchers through media recorded by other parties. Respondents who were involved in filling out the questionnaire for the study included the company's internal auditors who are currently running the remote audit process. Researchers use an approach. (Roscoe, 1975) which states that the appropriate number of respondents from the sample is over 30 or between 30-50 respondents. Therefore, the researcher determined the number of samples to be obtained more that numbers, finally researchers collected 102 samples from auditors.

3.2. Data Collection, Sampling and Analysis

Sampling was carried out by distributing questionnaires where the data collection technique was carried out by giving a number of questions and also written statements to be answered by respondents. The questionnaire was distributed through social media using Google Form. In the questionnaire, the researcher provided a written statement which was measured using a Likert scale. According to (Sekaran & Bougie, 2016), the Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people regarding social phenomena.
The method of data analysis is known as path analysis, which compiles hypotheses on the relationship between the tested variables and tests the casual model using a system of linear equations (Ghozali & Hengky, 2015). The analysis was performed using partial least square structural equation modeling (SEM PLS). Researchers tested statistical hypotheses using the Smart PLS 3 software.

3.3. Operation of Variables

Variable operations are used to make abstract latent variables become more tangible and can be measured precisely using unit measurements. For this reason, we made operation of variables. The variable operations in this study are presented in table 1:

Table 1: Table Operation of Variables

| Variable of Variables | Main indicator | Source |
|------------------------|----------------|--------|
| Technology Context (X1) | 1. Technology cost benefit | (Rosli et al., 2012) |
|                        | 2. Technology compatibility |
|                        | 3. Technology complexity |
| Organization Context (X2) | 1. Top management commitment | (Siew et al., 2020) |
|                        | 2. Organization readiness |
|                        | 3. Human resources IT competency |
| Environment Context (X3) | 1. Client’s AIS complexity | (Rosli et al., 2012) |
|                        | 2. Competitive pressure |
|                        | 3. Professional accounting bodies support |
|                        | 4. Vendor services |
| Audit Firm Size (Z) | 1. Big four | (Harris & Williams, 2020) |
|                     | 2. Non-big four |
| Auditor Adoption of Technology (Y) | 1. Electronic spreadsheet | (Bierstaker et al., 2014) |
|                         | 2. Electronic working paper |
|                         | 3. Audit software |
|                         | 4. Statistical software |
|                         | 5. Data application test |

4. Research Result

4.1. Demographic Distribution of Research Object

Respondents in our study are auditors who work in public accounting firms. In the following table 2, the identities of our research respondents are presented.

Table 2: Identity of Respondents

| Gender | Firm Size | Experience |
|--------|-----------|------------|
| Male   | 65        | Big Four   | 57        |
| Female | 37        | Non-Big Four | 45      |
| Junior | 36        | 1 – 5 years | 34        |
| Senior | 42        | 6 – 10 years | 45      |
| Manager| 17        | 11 – 15 years | 13     |
Based on the data in table 2, it can be concluded that the majority of our respondents are male, have a position as a senior auditor, work in the big four public accounting firms and have work experience between 6-10 years.

4.1. Discriminant and Convergent Validity Test

The validity test was conducted to determine the ability of the research instrument to measure what should be measured. Discriminant validity refers to the degree of mismatch between attributes that should not be measured by the measuring instrument and the theoretical concepts of the variable. The construct validity was assessed qualitatively and quantitatively by testing the measuring instrument on a research subject resulting in result which has no correlation. This concept measurement application in this study used the outer model test. The outer model is often called (outer relation or measurement model) that defines how each the indicator block corresponds to its latent variable.

An indicator is said to pass the discriminant validity test if the outer loading value is greater than 0.5. According to figure 1, we can say those indicators on our research can represent variable or construct, because the outer loading value is greater than 0.5.

Convergent validity of measurement models can be seen from the correlation between the indicator score and the score the variable. An indicator is considered valid if it has an Average Variance Extracted (AVE) value above 0.5 concluded that the measurement met the criteria convergent validity. According to table 3 researcher able to say overall construct has succeed convergent validity examination, because all variable has AVE more than 0.5. We do not include validity for variable Z audit firm size because it is a dummy nominal variable.

Figure 1. Discriminant Validity
Table 3: Convergent Validity

| Variable                          | Average Variance Extracted (AVE) |
|----------------------------------|----------------------------------|
| Technology Context X1            | 0.523                            |
| Organization Context X2          | 0.585                            |
| Environment Context X3           | 0.630                            |
| Auditor Adoption of Technology Y | 0.571                            |

4.2. Reliability Test

A good measuring instrument must be able to measure correctly (valid) and consistently (reliably, reliably). There are two aspects of measuring instrument reliability: internal consistency and stability. For example: if an instrument consists of a number of question items such as a questionnaire to assess the application of technology, then the scores of the question items should be correlated with the scores of all items. Examples like this one illustrate the idea of internal consistency. Reliable measuring instruments need not only be internally consistent but also externally consistent, including the stability of the measuring instrument when used at different times, the same meter on two different occasions, on the same occasion with identical conditions.

Based on table 4, we conclude all construct already success reliability examination, because the Cronbach Alpha value and composite reliability are above 0.7.

Table 4: Cronbach’s Alpha and Composite Reliability

| Variable                          | Cronbach’s Alpha | Composite Reliability |
|----------------------------------|------------------|-----------------------|
| Technology Context X1            | 0.766            | 0.802                 |
| Organization Context X2          | 0.803            | 0.809                 |
| Environment Context X3           | 0.871            | 0.826                 |
| Auditor Adoption of Technology Y | 0.868            | 0.859                 |

4.3. Determination of Coefficient Test

The coefficient of determination is used to find how much variation in the independent variable can explain the overall variation in the independent variable. The coefficient of determination measures how much influence the independent variable as a whole has on the fluctuation of the variation in the value of the dependent variable.

The coefficient of determination is between zero and one. If $R = 0$ means that there is no relationship between the independent variable and the dependent variable, whereas if $R = 1$ means that the independent variable and dependent variable have a strong relationship (Ghozali, 2011).

Table 5: Coefficient Determination

| Variable                          | R Square (R²) | Adjusted R Square |
|----------------------------------|---------------|-------------------|
| Auditor Adoption of Technology Y | 0.713         | 0.702             |

Table 5 indicated R2 score regarding independent variables namely organizational commitment of 0.713 based on (Ghozali, 2011) criteria, then the model is a strong model criteria, the meaning is technology context, organization context and environment context capable to explain auditor adoption of technology as much as 71.3 percent and the rest 28.7 percent affected by other construct outside our scope of study.
4.4. Testing the Hypothesis

In this final stage, we conduct an examination regarding the hypothesis that we have previously compiled in part two, whether the four premises can be accepted or rejected.

Table 6: Hypothesis Testing

| Variable | Path coefficient | T arithmetic | p-value sig. |
|----------|------------------|--------------|--------------|
| Technology Context X1 → Auditor Adoption of Technology Y | 0.309 | 3.137 | 0.002 |
| Organization Context X2 → Auditor Adoption of Technology Y | 0.156 | 2.288 | 0.023 |
| Environment Context X3 → Auditor Adoption of Technology Y | 0.542 | 4.792 | 0.000 |
| Moderating Effect Z, X1 → Y | 0.110 | 3.326 | 0.000 |
| Moderating Effect Z, X2 → Y | 0.006 | 3.089 | 0.005 |
| Moderating Effect Z, X3 → Y | -0.180 | 1.897 | 0.058 |

Hypothesis 1, Technology context has positive impact to auditor adoption of technology. According to Table 6, referred from significance result 0.002 absolutely under 0.05 and t arithmetic of 3.137 greater to the t table which is 1.96. The magnitude of direct influence of the technology context on auditor adoption of technology is 0.309. Our outcome is in line predecessor research in (Handoko et al., 2018; Rosli et al., 2012).

Hypothesis 2, Organization context has significant effect on auditor adoption of technology. According to Table 6, referred from significance result 0.023 absolutely under 0.05 and the t value of 2.288 is greater than the t table which is 1.96. The magnitude of direct influence of the organization context on auditor adoption of technology is 0.156. Our outcome is in line predecessor research in (Handoko, 2020; Rosli et al., 2016).

Hypothesis 3, Environment context has significant effect on auditor adoption of technology. According to Table 6, referred from the significance result 0.000 absolutely under 0.05, the t arithmetic 4.792 also higher that on table which is 1.96. The magnitude of the direct influence of the environment context on auditor adoption of technology is 0.006. Our outcome is in line predecessor research in (Widuri et al., 2019), (Rosli, Yeow, & Eugene, 2013).

Hypothesis 4a, Audit firm size able to moderate effect of technology context on auditor adoption of technology. According to Table 6, referred from significance result 0.000 absolutely under 0.05 and the t value of 3.326 is greater than the t table which is 1.96. Hypothesis 4b, Audit firm size able to moderate effect of organization context on auditor adoption of technology. According to Table 6, referred from significance result 0.005 absolutely under 0.05 and t arithmetic of 3.089 is higher to the t table which is 1.96. Hypothesis 4c, Audit firm size unable to moderate effect of environment context on auditor adoption of technology. According to Table 6, referred from result 0.058 absolutely higher to 0.05 thus t arithmetic 1.897 smaller than the t table which is 1.96.

5. Conclusion and Suggestion

This research was conducted in order to provide empirical result regarding readiness of adoption of technology by financial auditor in audit firm. The grand theory of this research is the Technology Organization Environment (TOE), and this theory was empirically tested. The statistical result shows that auditors agree about technology, organization and environment context to adopt technology in audit. Thus firm size strengthen the influence of technology and organizational context to adoption of audit technology. Big four audit firm often associated with larger budget than non-big four, with their large budget they able to purchase new hardware and software to support technology adoption. Referring to the results of this study, where the technology, organization and environment context variable affects the adoption of audit technology, the partner of the Public Accounting Firm can improve the working environment situation which allow adoption audit software.
The following are suggestions that can be considered for further researchers and practitioners: subsequent research can test the actual audit technology use in the audit process, using the object of research auditors working in companies or government auditors. Further research can examine the extent to which software capabilities can help auditors to produce better audit quality. The next study examined other variables that have not been tested in this study, such as support from top management or training activities.

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