

Research on Factors Affecting the Application of Artificial Intelligence in The Audit: Evidence from Vietnamese Auditing Firms

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Abstract

Artificial intelligence is considered one of the core technologies of the Industrial Revolution 4.0. Many countries worldwide have begun to recognize the inevitable development trend and the precise impact of artificial intelligence in all aspects of social life, and Vietnam is not out of this development trend. Artificial intelligence has now been applied in many fields, such as services, manufacturing, education, healthcare, banking, accounting, and auditing. It is possible to see the benefits brought by artificial intelligence to audit activities, but there are also many difficulties in applying artificial intelligence in audits at Vietnamese auditing companies. This study focuses on the factors affecting the application of artificial intelligence at auditing firms in Vietnam as a basis for proposing solutions to promote the application of artificial intelligence to audit and improve the quality of audit services in Vietnam.

Keywords: Artificial intelligence, applying artificial intelligence, audit services, auditing company, Vietnam

Introduction

Artificial intelligence or artificial intelligence is a technology that simulates human thought and working processes for machines, especially computer systems. These processes include learning (gathering information and rules for using information), reasoning (using rules to reach approximate or definite conclusions), and self-correction. Artificial intelligence's benefits to humans can be mentioned as detecting and limiting risks, saving labor, improving creativity, and bridging languages to expand working opportunities. Although it is still in its first steps, artificial intelligence has positively affected many areas, including auditing. Applying artificial intelligence will solve many manuals and repetitive tasks, and auditors will have more time to focus on other aspects of the job, such as consulting and analyzing data or strengthening relationships and transmitting information to customers. To apply artificial intelligence most effectively, besides studying the experiences of occupied countries, it is necessary to base on the situation in Vietnam to determine the advantages and disadvantages that will be encountered in applying artificial intelligence in the accounting field, thereby offering suitable solutions.

In 2019, the Association of Chartered Certified Accountants of the United Kingdom (ACCA) published the latest research results entitled "The race to adapt to the changing

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international experience of accounting and auditing in the Industrial Revolution 4.0". The study mentions opportunities available to accounting and financial auditors, who are seen as core contributors to adopting new technologies to drive business growth (Abhayawansa et al., 2021; Andreou et al., 2021). However, according to ACCA, if accountants and auditors do not seize this opportunity, they risk losing competitiveness in the rapidly changing digital technology landscape. ACCA's research also warns that if technology opportunities are not taken advantage of, accounting and financial audit professionals will be excluded from the strategic decision-making process of businesses. They need advice on making real-time decisions and considering key technologies such as Robotic Process Automation (RPA), Cloud, Analytics, social media, Cybersecurity, and Artificial Intelligence in transforming auditing and accounting functions.

According to ACCA, artificial intelligence is a new field, and many people think they use it to follow trends and trends. However, the fact that the use of artificial intelligence brings additional valuable insights that help to form assumptions about the direction of the future. Progressive cognitive chain, using self-learning machine algorithms: For example, entering input data into the accounting books of a company leads to a chain of advanced perception of the machine based on existing data and self-analysis of trends in costs, revenues, money (Andrew & Baker, 2020; Baud et al., 2019; Brennan et al., 2019).

Artificial intelligence could enable broader analysis and improve trend identification over time as machine algorithms learn on their own and more data. More extensive data generate more input about customers, prices, and cost structures, allowing auditors to have more inputs that create future value for the company rather than relying solely on past reported performance results (Chua, 1988; Davenport & Kokina, 2017; Dignum, 2018). Therefore, artificial intelligence can do manual auditing tasks such as collecting, processing, and calculating data, but human participation is always required in stages such as analyzing and handling situations. It can be assessed that artificial intelligence, although not wholly replacing humans, is significantly changing the environment, circumstances, and efficiency of auditing activities at auditing companies.

Literature Review

Artificial intelligence is intelligence through computers created by humans. This intellect can think, think, and learn like a human being. Data processing is at a broader, more scaled, systematic, scientific, and faster level than humans. Artificial intelligence has three levels: alternative computers to perform a specific task better than humans (Narrow AI) - the study of applying artificial intelligence in accounting. Auditing is currently at this level; Artificial intelligence reaches a general state when it can perform any task using intelligence with the same accuracy as humans (General AI). Finally, artificial intelligence is compelling as it can beat humans in many specific tasks (Strong AI) (Denzin, 2018; Csernatoni, 2019; Christopoulos et al., 2016; Albu & Flyverbom, 2016; Adelofo & Rufai, 2018).

If in the past, audit work was carried out largely publicly, relying heavily on the prudence and professionalism of auditors with papers working according to specific standards. In recent decades, before the strong development of scientific and technical achievements, Modern technology and artificial intelligence has gradually been introduced into the auditing field (Cortese & Andrew, 2020; Cui & Jiao, 2019; Daugherty et al., 2019; Coslor, 2016). From the basic recording and calculation on Excel software until recently, the auditing industry witnessed a new innovation revolution when many specialized auditing software were born,

record keeping, sample calculation, and error prediction became faster and more accurate than ever.

To improve the knowledge and function of artificial intelligence and decision trees to analyze semantics in sentences, extracting meaningful information and saving it in the database (Cooper et al., 2019; Boza & Evgeniou, 2021). Today, artificial intelligence applications have given the audit industry a new form as audit software applies integrated artificial intelligence to create contextual information and symbols to emphasize the importance of textual data rather than representing numbers. Artificial intelligence can also automatically enter data and adjust parameters... by applying data entry technologies by optical character recognition (OCR) technology by converting images, PDFs, and handwriting into soft document documents (Cullen & Brennan, 2017; Cooley, 2020; Dalla Via et al., 2019). In addition, artificial intelligence also applies machine learning technology. This technology helps artificial intelligence to learn quickly from which to interpret the data they receive.

This technology makes it possible for audit work to automate the data entry of the audited entity, which will be digitized, encrypted and then assigned to each working document according to the record index that the companies the audit firm agreed with the process. In this process, the artificial intelligence system will learn which records must be written into which work papers, and over time, that work will be fully automated. Besides, decentralized systems that store information in information blocks (blockchain) can significantly reduce the likelihood of errors and resist data modification, high security is gradually becoming popular in the audit industry (Chaidali & Jones, 2017; Bebbington et al., 2019; Al-Htaybat & Von Alberti-Alhtaybat, 2017). Specifically:

At Deloitte

Like other Big Four audit firms, Deloitte is increasingly focusing on artificial intelligence. A recent report by Deloitte said that the cave has adopted artificial intelligence technology in the following categories:

1. Products: Artificial intelligence technology is embedded in products or services to provide all customers.
2. Process: Artificial intelligence technology is integrated with working processes and daily activities towards automation to increase productivity and work efficiency. Automation can take two forms: reducing direct manpower or enhancing employees' ability to perform tasks better/faster.
3. Insight: Artificial intelligence is used to make informed and strategic decisions to advise auditors when assessing contract risk in accepting new clients or continuing to provide audit services with existing clients.

The Deloitte USA report (2014) said that the cave has automated reviewing and extracting of all relevant contract information while reducing meticulous, human-intensive work. The company claims that artificial intelligence technology has helped reduce the time it takes to review legal contract documents, invoices, financial statements, and audited unit board meeting minutes by up to 50% or more.

At Ernst & Young

Ernst & Young also recently applied artificial intelligence to lease contract analysis. The company claims that using artificial intelligence has made capturing relevant information from contracts easier, such as lease start dates, amounts payable, and renewal or termination options. EY is working on automating the audit process, as the company argues that this

reduces the administrative time spent reviewing audit documents and gives auditors more time to engage in the judgment and analysis part of the process (Agostino & Sidorova, 2017; Agrawal et al., 2019). These applications appear to be in beta, as screening audit documents can be highly time-consuming. Another area where EY has adopted artificial intelligence technology is automating routine tasks, such as audits, using its proprietary Robotic Process Automation (RPA) system. EY claims that this technology helps the company perform more accurate, efficient client audits (Boiral et al., 2019).

EY Australia has adopted this digital audit technology, claiming that 50% of their bank audit confirmations are filed using an artificial intelligence-enabled system. This artificial intelligence support system can accept and validate audit requests and process and provide auditors with relevant documents for final analysis and judgment (Bedford et al., 2019).

EY has also presented a proof-of-concept artificial intelligence, which uses computer cameras to allow aerial drones to monitor inventory during the inventory process. For example, this drone can count the number of vehicles in a manufacturing plant being audited and transmit this data directly into EY Canvas – the global audit digital platform. Besides, drones allow more data to be collected during the audit process. It also will enable auditors to focus on areas of risk instead of manually inventorying inventory. This drone adoption seems to be at the research stage and does not appear to be a service widely offered by EY to its customer base (Bleicher, 2017; Bol et al., 2016; Ananny & Crawford, 2018).

At PwC

PwC has also announced the start of the adoption of artificial intelligence. Using synthetic intelligence approaches such as machine learning, PwC claims that GL. AI learns and becomes more viable with every audit. It has been trained in audit data from Canada, Germany, Sweden, and the U.K. PwC also announced that it has made significant investments in Natural Language Processing (NLP), a technology that supports artificial intelligence. NLP makes sense of complex lease agreements, revenue contracts, and board meeting minutes to form meaningful insights for clients (Chen et al., 2012; Baker & Andrew, 2019).

Using 'digital twin' technology and 'future power,' PwC has claimed it has helped significant automakers envision and navigate more than 200,000 go-to-market scenarios to refine their strategies and launch a new multi-billion-dollar business in ride-sharing and autonomous vehicles/electric vehicles (Alarcon et al., 2018; Arthur & Owen, 2019).

At KPMG

KPMG has built its own portfolio of artificial intelligence tools called KPMG Ignite. The KPMG Ignite offering is designed to enhance business decisions and processes on a digital platform. Critical features of KPMG Ignite include artificial intelligence tools, elements that integrate artificial intelligence to make these tools compatible with existing IT infrastructure, and application instructions. He is audited and tested, prototype development and innovation on emerging artificial intelligence applications. KPMG also uses artificial intelligence to analyze and extract information from leases or investments (Alles, 2015; Anderson, 2007; Andrew & Baker, 2019; Appelbaum et al., 2020). Some of the business processes that KPMG claims to have adopted artificial intelligence support technology can be mentioned as follows:

Call Center Analytics Engine- Utilizes NLP to design a model to predict future events and even convert customer calls into unstructured text, which is then streamlined to identify keywords and customer sentiments and predict future trends.

Artificial Intelligence Anomaly Event Prediction Tool – Uses artificial intelligence techniques to develop a model to predict future business events.

Compliance assessment tool – Use artificial intelligence to read the entire document – contracts, leases, and investment agreements – and provide relevant information.

Leading auditing firms worldwide are investing in artificial intelligence technology for audit services. Artificial intelligence is being integrated into the audit firm's core services operation, and companies are adopting more and more intellectual techniques of artificial intelligence at the time of the audit (Ahn & Wickramasinghe, 2021). Thus, applying artificial intelligence techniques to audit is a trend that Big Four auditing firms are pursuing.

Besides, the leading auditing firms consider artificial intelligence a vital factor to give them an advantage over other auditing firms (Arnaboldi et al., 2017a). The application of artificial intelligence promises to bring many benefits to auditing firms, reducing open jobs. Hundreds of pages of documents over long hours and reports, many of the data collected during the audit process are heterogeneous and susceptible to human error. This artificial intelligence-enabled technology trained in unstructured data is increasingly capable of recognizing mistakes and streamlining parts of the process (Arnaboldi et al., 2017b).

Research Methodology

The research questions in this study focused on factors affecting the application of artificial intelligence in audits at auditing firms, so the sample focused only on auditing firms in Vietnam. Based on the number of independent variables included in the analysis of 19 variables and 1 dependent variable, a standard study sample size $n = 5 \times 20 = 100$ was appropriate in running FA and regression analyses. The respondents are partners, audit directors, or auditors, and those likely to be directly involved in the audit work at audit firms. Surveys are sent directly to survey subjects or sent by email, as well as telephone interviews. Once collected, the team filters the data and then analyzes the data according to the goals and hypotheses the study offers. The study uses SPSS.20 software for analysis, statistics, data processing, and linear regression.

Research sample characteristics:

The sample obtained 111 valid responses: 3 votes came from Big4 auditing companies, 49 from medium-sized auditing firms, and 59 from small audit firms.

Table 1: *Research sample statistics*

No.	Kind	Amount	%
1	Big4 Auditing Company	3	2.7
2	Medium audit firm	49	44.1
3	Small audit firm	59	53.2
	Sum	111	100.0

Table 1 shows the Cronbach Alpha results of 19 variables of the survey are presented in table 2.

Table 2: Cronbach Alpha results

Item-Total Statistics	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Management is aware of the importance of artificial intelligence	59.23	70.236	0.617	0.873
Management understands the decision-making steps related to artificial intelligence	59.81	66.537	0.723	0.868
Management is interested in audit procedures that can apply artificial intelligence	59.42	67.737	0.782	0.867
The Board of Directors is oriented to build an audit program with the application of artificial intelligence	59.41	69.534	0.648	0.871
Auditors understand the audit process with the application of artificial intelligence	60.18	71.095	0.620	0.873
Auditors have applied artificial intelligence in audit procedures	60.12	73.032	0.452	0.878
Auditors took training classes in artificial intelligence	60.13	72.748	0.462	0.878
Auditors involved in the development of the audit program	59.92	73.257	0.425	0.879
The auditing company has funding for professional training and professional development activities	59.91	67.974	0.675	0.870
Auditing firms often organize training classes and training for auditors	60.14	71.791	0.392	0.881
The audit firm facilitates the auditor to improve his qualifications	59.90	71.563	0.538	0.875
The audit service market has many audit firms involved in providing services	59.29	73.880	0.378	0.880
The audit services market has many large-scale audit firms	59.41	75.172	0.307	0.882
Barriers to entry into the audit services market are virtually nonexistent	60.08	72.275	0.441	0.879
The barrier to exit from the audit services market is quite large	60.08	73.766	0.386	0.880
Services provided by the audit firm are easily replaced	59.69	73.433	0.346	0.882
There are many research papers on artificial intelligence, and easy to access	59.76	71.495	0.519	0.876

Many workshops are sharing about the application of artificial intelligence in the audit	60.16	71.646	0.394	0.881
There are many legal documents of the State on the application of artificial intelligence	60.12	73.541	0.380	0.880

Cronbach's Alpha is 0.882

Table 2 shows that the variables' item-total correlation coefficients are more significant than the acceptable standard of 0.3. The Cronbach Alpha coefficient of the scale = 0.882, and the Alpha If the item deleted are less than 0.882 (< 0.882), indicating that the scale is highly reliable and accepted to measure the impact of the application of artificial intelligence in the audit in Vietnam. It can be said that the design scale in the study is statistically significant and reaches the required confidence factor.

The results of the EFA discovery factor analysis of independent variables are as follows:

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.807
Bartlett's Test of Sphericity	Approx. Chi-Square	1.062E3
	Df	171
	Sig.	0.000

Table 3 shows that the results of the Bartlett test showed that hypothesis H0 (variables without overall correlation) was rejected (Sig. = 0.000), and the KMO index reached a high value of 0.807. This proves that the data used for factor analysis is wholly appropriate, and the factor analysis method is acknowledged in this study.

According to the eigenvalue criterion greater than 1, 5 factors are derived in the rotated factor matrix. The quoted variance is equal to 68.315%. The quoted variance value tells us that the 5 components identified explain 68.315% of the variability of the data. The variables all have a factor load more significant than 0.3, so the variables are all important in the 5 extracted components. Thus, the scale is accepted, and the observed variables correlate with the overall scope of the survey sample.

The interpretation of factors is based on recognizing variables with a significant factor loading factor in the same group of factors. The result of the factor matrix after rotation gives us the distribution of 19 observed variables into the following 5 specific factors:

- ✓ The first factor, "Awareness and understanding of artificial intelligence of the auditing company's management," has a significant coefficient in 4 variables, the largest coefficient is 0.867, and the smallest coefficient is 0.649.
- ✓ The second factor, "The level of competition of the audit services market," has a large coefficient in 5 variables, the most significant coefficient is 0.851, and the smallest coefficient is 0.554.
- ✓ The third factor, "Qualifications of auditors," has a significant coefficient in 4 variables, the largest coefficient is 0.858, and the smallest coefficient is 0.544.

- ✓ The fourth factor, "The State's theoretical and regulatory system on artificial intelligence," has a large coefficient in 3 variables, the most significant coefficient is 0.832, and the smallest coefficient is 0.711.
- ✓ The fifth factor, "Cost of the audit firm committed to developing the audit program," has a large coefficient in 3 variables, the most significant coefficient is 0.854, and the smallest coefficient is 0.574.

After conducting a factor analysis, the original theoretical model did not change. Cronbach Alpha confidence factor elements are required and will be used in the next test.

With hypotheses rearranged according to the research model built on EFA:

Hypothesis H₁: The higher the audit firm's awareness and understanding of artificial intelligence, the higher the ability to apply artificial intelligence in the audit

Hypothesis H₂: The more fierce the competition level of the audit services market, the higher the ability to apply artificial intelligence in the audit

Hypothesis H₃: The more professional the auditor's qualifications, the higher the likelihood of applying artificial intelligence in the audit

Hypothesis H₄: The more complete the system of reasoning and regulations of the State on artificial intelligence, the higher the ability to apply artificial intelligence in the audit

Hypothesis H₅: The more the audit firm commits to investing in developing an audit program, the higher the ability to apply artificial intelligence in the audit

Regression analysis

The theoretical model after factor analysis has all 6 factors as stated, of which the application of *artificial intelligence in auditing companies in Vietnam* is a dependent factor. The remaining 5 factors are independent and are assumed to be factors affecting the application of artificial intelligence in audits at auditing firms in Vietnam. The study continues to conduct regression analysis to determine the weighting of each factor affecting the *application of artificial intelligence in audits at auditing firms in Vietnam*. Regression analysis was performed with SPSS software version 20.0 (Hair et al., 2021).

To determine the degree of influence of each factor X_i on Y , the study analyzed using the Binary logistics regression method. Regression analysis is performed using the method of simultaneous inclusion (Method: enter).

The regression analysis is based on the binary logistic regression method because the dependent variable in binary form (Binary) only receives code 0 or 1. There are three problems that, in this case, it is not possible to use the usual least squared method (OLS):

- ✓ Heteroskedastic variance occurs (the variance of the dependent variable is very different from the variance of the independent variable).
- ✓ In this case, there is no normal distribution.
- ✓ The predicted probability may be greater than 1 or less than 0, which is a serious problem for subsequent analyses.

Generalized binary logistic regression model:

$$Y = \text{Log}(p/1-p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Note

Y: is a dependent variable: applying artificial intelligence in audits in auditing firms in Vietnam

β_0 : is the blocking factor;

$\beta_1 \rightarrow \beta_5$: is the angular coefficient

X₁: is an independent variable: Awareness and understanding of artificial intelligence of the audit firm's management

X₂: is an independent variable: The level of competition of the audit services market

X₃: is the independent variable: The qualification of the auditor

X₄: is an independent variable: The State's theoretical and regulatory basis system on artificial intelligence

X₅: is independent variable: The cost the audit firm commits to developing the audit program

Regression results

Table 4: Omnibus Tests of Model Coefficient

		Chi-square	Df	Sig.
Step 1	Step	80.353	5	0.000
	Block	80.353	5	0.000
	Model	80.353	5	0.000

Table 4 gives the results of the overall conformity test of the model with the hypothesis H₀: $\beta_0 = \beta_1 = \dots = \beta_4 = 0$ and the hypothesis H₁: At least one coefficient other than 0.

The result of this table is Sig. = .000 < 0.05, so we reject hypothesis H₀ and accept hypothesis H₁. Thus, there is a link between the application of artificial intelligence in audits at auditing firms in Vietnam and at least one of the variables: Awareness and understanding of artificial intelligence of the audit firm's management; The level of competition in the audit services market; Qualifications of auditors; The State's theoretical basis system and regulations on artificial intelligence; Cost the audit firm committed to developing the audit program.

Table 5: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	18,046 ^a	0.515	0.876

Table 5 measures the overall suitability of the model based on the -2 Log likelihood indicator, showing the model's suitability test results. The value -2 Log likelihood = 18,046 is not high, indicating that the model is a good fit.

Table 6: Variables in the equation

	B	St.d Coef.	SE.	Wald	Df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
Step 1^a									
FAC1	4.881	0.345	1.889	6.676	1	0.010	131.773	3.250	5.343E3
FAC2	2.834	0.183	1.174	5.826	1	0.016	17.018	1.704	169.983
FAC3	4.478	0.521	1.570	8.134	1	0.004	88.043	4.058	1.910E3
FAC4	-1.335	-0.100	0.732	3.321	1	0.068	0.263	0.063	1.106
FAC5	3.501	0.252	1.501	5.442	1	0.020	33.157	1.750	628.178
C.	-8.161		2.847	8.218	1	0.004	0.000		

Table 6 shows:

FAC1: is a representative element of the awareness and understanding of artificial intelligence of the audit firm's management.

FAC2: is a representative factor of the competitiveness variable of the audit services market

FAC3: is the representative element of the auditor's qualification variable

FAC4: is a representative element of the State's theoretical and regulatory basis system on artificial intelligence.

FAC5: is the representative factor of variable Cost audit firm committed to developing audit program.

Constant: is the constant

The results of the table show that the Sig. value of the FAC4_1 factor equal to 0.068 is more significant than 0.05, so the factor FAC4_1, the State's theoretical basis and regulations on artificial intelligence, is not statistically significant. At this time, only 4 variables with Sig. values less than 0.05 are statistically significant.

The logistic regression equation is written as follows:

$$Y = \text{Log} [p/(1-p)] = - 8,161 + 4,881x_1 + 2,834x_2 + 4,478 x_3 - 1,335 x_4 + 3,501x_5$$

Or:

$$p/(1-p) = e^{- 8,161 + 4,881X_1 + 2,834X_2 + 4,478 X_3 - 1,335 X_4 + 3,501X_5}$$

$$\text{And: odd} = e^{- 8,161 + 4,881 X_1 + 2,834 X_2 + 4,478 X_3 - 1,335 X_4 + 3,501X_5}$$

Based on the Standardized Coef, we know the impact of factors on the application of artificial intelligence in the audit. This level of influence is arranged from high to low as follows: Professional qualifications of auditors, awareness, and understanding of artificial intelligence of the audit firm's management. Cost of audit firm commitment to audit program development and The level of competition in the audit services market.

In summary, the logistic regression analysis results show that the application level of artificial intelligence in auditing companies in Vietnam is positively and quite strongly correlated with 4 factors. Factors including awareness and understanding of artificial intelligence of the audit company's management, The level of competition in the audit services market, the qualification of the auditor, and the cost of the audit firm committed to developing the audit program.

The model with 04 factors represents the research problem. In particular, "Qualifications of auditors" has the most substantial impact on applying artificial intelligence in audits at auditing companies in Vietnam. Still, other factors and other observational variables may also affect the application of artificial intelligence in the audit but have not been fully covered by this study in the current research model due to limited scope and survey time.

The regression results demonstrate that the role of factors in influencing the application of artificial intelligence in the audit is clearly delineated. Therefore, the solution to enhance the feasibility of applying artificial intelligence in the audit must be based on the results of the examination of the influencing factors but need to be adjusted over time when the position value of the above factors changes over time, space, and economic and political conditions.

Findings and Discussion

About the size of the auditing company

The research results show that, in practice, the size of the auditing company is compatible with the feasibility of applying artificial intelligence in the audit in the direction that the larger the size of the audit company, the more business capital, the number of auditors practicing, the ability to apply artificial intelligence in the interview higher success audits.

Large-scale, more complex auditing firms often have more resources to invest in technology. With the capital spent, they are willing to hire highly qualified managers who are creative in using modern tools for executive management. Therefore, the larger the audit firm, the ability to apply artificial intelligence to the audit will be higher than the smaller audit firms.

About the awareness and understanding of artificial intelligence of the audit firm's management

The study results indicate that the audit firm manager's awareness and understanding of artificial intelligence is the second most crucial factor, which strongly impacts the application level of artificial intelligence in the audit. This factor is compatible with the feasibility of applying artificial intelligence in the audit when the manager appreciates the usefulness of the tools of artificial intelligence and has an understanding of artificial intelligence. The higher the demand for the application of artificial intelligence in the audit or the higher the cost of investing in the application of artificial intelligence will increase the feasibility of applying artificial intelligence in the audit.

However, in this study, the application of artificial intelligence in the audit at auditing firms in Vietnam is shallow. Proving that audit company managers have not really paid attention to building an audit program applying artificial intelligence, not fully aware of the significant role of artificial intelligence in audit activities.

About the level of competition in the audit services market

The results of the study indicate that the level of competition in the audit services market is compatible with the feasibility of applying artificial intelligence in the audit in the direction of the level of competition in terms of scale, level of competition for services provided, The greater the number of competitors in the same market segment, the greater the feasibility of applying artificial intelligence in the audit.

Currently, Vietnam's integration into the international economy is deepening, signing and implementing new-generation free trade agreements (FTAs) with the world's leading significant partners, completing the implementation of economic commitments within the

framework of the World Trade Organization (WTO), and joining the ASEAN Economic Community. Therefore, the domestic market's competition level will be even more fierce. To stand firm in the market requires the management of auditing firms to be more methodical. Auditing firms need management tools and artificial intelligence tools that are indispensable in managing audit activities. This is why applying artificial intelligence in auditing firms' audits is directly proportional to market competition.

Based on the qualifications of auditors.

According to the research results, this is the most critical factor impacting the application of artificial intelligence in auditing the Vietnam auditing company. Auditors with high expertise in artificial intelligence, who understand the process of building artificial intelligence systems, know how to implement that process through the reports prepared, through participating in advising the board of directors of the auditing company will be a strong influence on the application of artificial intelligence in the audit.

Vietnamese auditors work according to habit. However, the level of auditors in auditing firms in Vietnam is not uniform, and has not been regularly fostered and trained to be qualified to undertake audit work in applying artificial intelligence. According to professional judgment, many operations arise to the extent they are handled there. And sometimes, the consequences have already occurred without time to cause damage to the audit firm and the information people.

About the cost of the auditing company committed to investing in the development of the audit program

Based on the research results, this factor is directly proportional to the application of artificial intelligence in the audit. When the auditing company accepts to deduct a part of finance as a source of funding to serve the development and training of employees for the application of artificial intelligence in the audit, and the more abundant this funding is, the more it will promote the improvement of employees' qualifications as well as access to advanced technology for the application of intelligence. The more feasible artificial intelligence is in the audit, the more viable it is to apply artificial intelligence in the audit.

However, setting aside a funding source for applying artificial intelligence in the audit is no minor difficulty for auditing companies. Because of limited financial resources, focusing most of the resources on business activities, auditing firms often "forget" to spend money on training and training their employees or investing in technology to apply artificial intelligence in the audit. This has had a significant impact on reducing the ability to use artificial intelligence in audits.

In short, to apply artificial intelligence in auditing companies, audit firms must first have a team of auditors with solid expertise in artificial intelligence and understand the process of building an audit system based on artificial intelligence. From there, auditors will be effective assistants for audit firm managers in policy advice related to business strategy. Next, the management of the auditing company must be aware and knowledgeable about the importance of artificial intelligence in auditing. To do that, administrators and auditors must be active learners, cultivating knowledge to improve their qualifications and understanding of artificial intelligence.

Besides, the scale and cost factor is equally important to help the application of artificial intelligence in higher management audits. When the audit firm is large-scale, the manager understands the importance of applying artificial intelligence in the audit and their decision-

making. They are willing to spend a sum of money on human resource development to build an audit program system with the application of artificial intelligence. In addition, the competitive pressure of the audit services market will also motivate the audit firm to find highly effective solutions. And applying artificial intelligence in the audit will be an effective tool to help company managers improve the audit quality and achieve the company's business goals.

Conclusion

Industry 4.0, in general, and artificial intelligence, in particular, are and will profoundly affect the auditing industry in Vietnam. Artificial intelligence is an effective support tool in the field of auditing. Auditors must be the ones who really master the technology, identify core values, and enhance their role to help audit firms improve audit quality, save costs, increase profits and improve their competitive position. However, deploying artificial intelligence cannot be done overnight but has to go through a long process. Auditing companies need to be explicitly planned and appropriate. Besides, auditing firms are afraid to apply artificial intelligence because it will create the risk of unemployment in the audit industry; The auditor's professional level and ability to meet artificial intelligence technology are still not high, making it challenging to deploy artificial intelligence. There are still many challenges due to many reasons, such as the implementation cost applied to the audit. It is pretty high, while the efficiency brought by intelligent intelligence artificial intelligence applications involved in the audit has not been determined. While there are still ethical and legal issues associated with AI in auditing and accounting, in any case, AI is becoming part of various business, auditing, and accounting processes, with companies investing more and more capital in their growth. Although in the future, new problems and new threats may arise, surely, AI will still bring many opportunities and practical solutions.

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