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Effects of Using Artificial Intelligence on the Accounting Profession: Evidence from Istanbul Certified Public Accountants*

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ABSTRACT

This study aims to analyze the accountants' awareness and perception of using artificial intelligence in accounting practices and determine whether the characteristics of accountants significantly affect their awareness and perception of using artificial intelligence in accounting practices. This research is both descriptive and analytical. The descriptive part of the research covered the accountants' awareness of using artificial intelligence in accounting and their perceptions of using it. The analytical part is about the correlation between accountants' characteristics, such as gender, age, education, area of expertise, and work experience, and their awareness and perceptions of using artificial intelligence. A questionnaire is prepared in Turkish and shared with Certified Public Accountants in İstanbul through the İstanbul Chamber of Certified Public Accountants. Based on the 155 responses received, it was noted that accountants are highly aware of using Artificial Intelligence in accounting practices, and their perception is supportive. The t-test and ANOVA results showed that accountants' personal characteristics do not significantly impact their awareness and perception of using artificial intelligence in accounting practices.

Keywords: *Artificial Intelligence, Certified Public Accountant, Accounting Profession.*

Jel Classification*: M40*

Yapay Zekâ Kullanımının Muhasebe Mesleğine Etkileri: İstanbul Serbest Muhasebeci Mali Müşavirler Odası Üyeleri Üzerine Bir Araştırma

ÖZET

Bu çalışmanın amacı, muhasebe meslek mensuplarının muhasebe uygulamalarında yapay zekâ kullanımına yönelik farkındalık ve algılarını analiz etmek ve meslek mensuplarının kişisel özelliklerinin muhasebe uygulamalarında yapay zekâ kullanımına yönelik farkındalık ve algıları üzerinde anlamlı bir etkiye sahip olup olmadığını belirlemektir. Bu araştırma hem betimsel hem de analitiktir. Araştırmanın betimsel kısmı, meslek mensuplarının muhasebe uygulamalarında yapay zekâ kullanımına ilişkin farkındalıklarını ve algılarını içermektedir. Analitik kısımda ise, muhasebecilerin cinsiyet, yaş, eğitim, uzmanlık alanı ve iş deneyimi gibi özellikleri ile yapay zekâ kullanımı konusundaki farkındalıkları ve algıları arasındaki korelasyon incelenmiştir. Türkçe olarak hazırlanmış olan anket İstanbul Serbest Muhasebeci Mali Müşavirler Odası aracılığıyla meslek mensuplarıyla paylaşılmıştır. Alınan 155 yanıt kapsamında, meslek mensuplarının muhasebe uygulamalarında yapay zekâ kullanımı konusunda farkındalıklarının yüksek olduğu ve algılarının destekleyici yönde olduğu anlaşılmıştır. T-test ve ANOVA sonuçlarına göre, meslek mensuplarının kişisel özelliklerinin, muhasebede yapay zeka uygulamalarına ilişkin farkındalık ve algıları üzerinde anlamlı bir etkisi olmadığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: *Yapay Zeka, Muhasebe Meslek Mensupları, Muhasebe Mesleği*

JEL Sınıflandırması: *M40*

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1. INTRODUCTION

A method for teaching a computer, a robot, or a product to think, learn, and make decisions like those made by people is known as artificial intelligence (AI). AI has received a lot of press in recent years owing to its several goals, including knowledge representation, planning, natural language processing, learning, reasoning, realization, and the ability to move and manipulate objects. In other words, considering the rapid advancement of AI technology, AI has a practical impact on every part of the globe, ranging from basic labor substitution to gradually altering people's daily life. Tasks previously deemed challenging, such as those needing cognitive capacity, can now be automated through AI technologies (McKinsey, 2017: 1).

Even though AI is not new, many rumors and doubts about its potential impact have recently occurred. Parlof (2016) defined AI as a broad phrase that refers to any technique used to allow computers to mimic human intelligence. More specifically, it refers to a system's ability to do tasks that would otherwise rely on human intelligence. Cognitive technology, in other words thinking technology, is a branch of AI that describes individual technologies that perform certain tasks to aid planning, reasoning from incomplete or ambiguous data, and learning, all of which are examples of human intelligence. Due to the fast growth of AI technologies, which is having an impact on practically every corner of the world and changing everything from basic labor replacement to progressively altering people's daily lives, AI and automation will inevitably transform nearly all jobs to some level (Frank et al., 2019: 6513).

The information and communications technology-based innovations of the twenty-first century have transformed many industries' ways of doing business (Chukwuani et al., 2020: 444). Due to the rising demand and use of AI, substantial improvements have been made, particularly in accounting, resulting in the transition from paper-based accounting entries to automated computer entries. Owing to cost savings and operational efficiency, operations of financial institutions have swiftly altered with the introduction of AI, and it is projected soon to take over the basic responsibilities of financial institutions as well (Dilek et al., 2015: 34).

Even while adoption varies by nation, the accounting profession, and organization, the circumstance that accountants embrace AI is the most compelling proof that the technology is applicable to and effective for accounting. According to the research held by the University of Oxford in 2015, as computers take over data analytics and number crunching, there is a 95% risk that accountants will lose their employment (Chukwudi et al., 2018: 2); however, it was also noted that as technology develops, some professions may disappear, while others will be created. This suggests that the demanding, time-consuming, and challenging components of accounting will be lessened by AI, increasing its efficiency.

The consequences of using AI in accounting practices are frequently reviewed topics, although previous studies in this field have shed light on these impacts and the potential changes they may bring about. Accounting departments, companies, regulatory authorities, and other accounting stakeholders will all be impacted by AI and automation. Nevertheless, because of the potential shift in demand for their talents, accounting professionals will be the ones who would be significantly affected by these developments. Examining their view and understanding whether these experts consider AI an opportunity or a threat is crucial. Their

opinions could impact how widely AI is used in accounting practices. The research, addressing the following questions, focused on Istanbul (Türkiye) Certified Public Accountants:

1. What is the accounting professionals' awareness level of using AI in accounting practices?
2. How do accounting professionals perceive using AI in accounting practices?
3. Is there a significant effect of personal characteristics like gender, age, education, experience, and area of expertise on;
   - the awareness of accountants on using AI in accounting practices?
   - the perceptions of accountants on using AI in accounting practices?

By demonstrating how AI is being perceived in the accountancy profession, this study can raise awareness among accounting professionals about the use of AI and the value of being ready for upcoming changes in the industry. Because it will shed light on accountants' perceptions of the application of AI in accounting, which is a crucial element in the profession's effective endorsement of AI, this study will be especially beneficial to accountants, professional accounting bodies, accounting regulators, accounting firms, and accounting academicians.

The quantitative methodology was preferred for this study. The questionnaire prepared in Google form was shared with CPAs in Istanbul by ISMMMO (Istanbul Chamber of Certified Public Accountants) at their internal platforms. 155 responses were received, and T-test and one-way between-group ANOVA were used to analyze these responses.

2. AI AND ITS USE IN ACCOUNTING PRACTICES

John McCarthy introduced the term "artificial intelligence" to describe a research area in computer science that aims to build a machine with intelligence that can carry out various tasks (Yadav et al., 2017: 30). Additionally, it is a research area that focuses on the technical know-how for creating intelligent software and computers, as well as the study of programming computers to carry out activities more effectively and precisely than people. AI gives devices the ability to perform activities only the human brain expects. This also includes the capacity to learn, understand the context, make decisions, and think creatively (Chukwudi et al., 2018: 3). AI is used in various fields, including sophisticated processing tasks, massive data management, analyzing and solving complex algorithms, and much more. The ability of programmed technology to carry out tasks that the human brain would ordinarily carry out is another approach to define AI. The ability to gather information, make sound decisions, think creatively, and comprehend interpersonal interaction are some examples of these.

Various scenarios are being discussed regarding AI's effect on jobs, considering its positive and negative implications. Some studies suggest job displacements; some argue that AI will not be a threat to humans, while others assert that there will be an increase in unemployment due to the improved use of AI.

Makridakis (2017) classified AI scenarios discussing the possible future effect of AI into 4: the optimists, the pessimists, the pragmatists, and the doubters. According to the optimists, AI will give the chance to humans to work at the jobs they prefer as robots will do the actual work. The pessimists, on the other hand, believe that when all the actual work is

done by computers, humans will be at a second-rate status. Even government officials might be elected by computers. According to pragmatists, as AI improves, humans also extend their own skills and will be a step ahead of AI. The doubters do not believe that AI will be a threat to humans. All of them, however, accept that AI will influence our lives.

In accounting, there are many repetitive transactions throughout the year. Starting from the initial use of accounting software, it is aimed to convert manual, repetitive transactions to automatic transactions held within the software. Timeliness is one of the enhancing qualitative characteristics of useful financial information. Older information is less useful to decision-makers (IFRS framework, 2020:2/33). Accordingly, business entities try to finalize their accounting records and share their financial statements with their stakeholders as soon as possible. Considering the high volume of transactions and complicated financial reporting standards, accountants definitely need the support of accounting software, i.e., machines. Therefore, even when small entities use basic accounting software, large corporations generally use complicated Enterprise Resource Planning Systems where they can both follow accounting transactions and plan their business activities.

Besides accounting and financial reporting, technological developments also have a significant effect on the audit profession. From an auditor's point of view, under a risk-based audit approach, automated controls are always considered more appropriate than manual controls (Şavlı, 2019: 201). Auditors both count on machines while evaluating control risk in an entity, and they also try to use certain audit software in performing audit procedures.

Therefore, large audit firms established AI departments that both work on using AI in external audit activities and implementing AI for their clients' own use. Newly developed financial robots by the Big Four accounting firms can independently recognize data, enter payments, and produce financial reports. These financial robots would be anticipated to replace entry-level accounting clerks, enabling business managers without accounting expertise to make defensible judgments based on basic accounting data (Bullock, 2017:1). The development of several machine learning technologies by the Big Four accounting firms, which are utilized for data analysis, risk assessment, information extraction from documents, and fully automated audits, has been established. The Big Four corporations are still growing their portfolio of machine learning initiatives to take advantage of the benefits. (Ucoglu, 2020: 5). However, the usage of AI is not limited to large firms (Lee & Tajudeen, 2020: 230). Even small and medium practices benefit from AI applications even if it is limited to certain bookkeeping tasks.

On the other hand, work steps in accounting and auditing are a combination of structured and unstructured tasks, and unstructured tasks require social and creative intelligence. Therefore, there are certain, for example, audit tasks that are unstructured and rely on insufficient and confusing data, making them inappropriate for AI applications (Abdolmohammadi, 1991: 536).

With the automation of the accounting process, and the significant replacement of procedural basic accounting work by accounting information systems, the role of accounting personnel will change from doing basic, procedural, and repetitive accounting work to more valuable managerial work (Li and Zheng, 2018: 814). Considering the extended use of

accounting software enhanced with AI, accountants should develop their advisory skills and aim to transform from bookkeepers to financial advisors.

As the tasks will change, accountants need new skills that were not necessary a few years ago. As stated by the IT Faculty of ICAEW (2017), big data analytical skills, machine learning expertise, skills in leadership, communication, and critical thinking are among the attributes required. The accounting profession is changing and will continue to change due to AI. Hence it is necessary for accountants to enhance their skills (Shaffer et al. 2020: 43). For example, auditors must acquire training in cognitive technologies, which can sharpen and broaden their expertise and considerably improve data processing and analysis; financial and tax accountants should learn how to use optical character recognition, which can significantly reduce the time needed to manually collect data from paper documents by 75%. Accountants' decision-making, forecasting, and analytical capabilities should be strengthened (Claim Li and Zheng, 2018: 183).

Since AI is already having an impact on and will continue to have an impact on the accounting function, it is imperative for accounting academia to change the way they think and enhance the required skills and competencies that are related to smart technologies and their improved commercial uses. There is still more work to be done to revise accounting curricula and better prepare graduates for successful careers (Stancheva-Todorova, 2018: 138). Researchers have highlighted the necessity of colleges acting as a bridge between aspiring accountants and the industry by offering accounting students that are knowledgeable necessary to build IT skills, even if such knowledge is solely theoretical (Rîndașu, 2017: 588).

3. LITERATURE REVIEW

Chukwudi et al. (2018) presented the effects of AI on accounting tasks through survey-based descriptive research. This study found that using AI improved the efficiency of accounting practice in Southeast Nigeria.

In her study paper, Stancheva-Todorova (2018) emphasized that modern, intelligent technology and its useful commercial applications should be covered in accounting education. Todorova claims that because AI is already having an impact on and will continue to have an impact on the function of the accountant, it is imperative for accounting educators to change the way they think and enhance the required skills and competencies that are related to smart technologies and their improved commercial uses. Besides, they must also consider how the new technologies will affect financial reporting standards and the transparency of the data produced, and the risks connected with AI applications thereon.

Greenman (2017), based on his study about the impact of AI on the accounting profession, concluded that the phenomena of new technologies affecting the labor force does not exempt the accounting profession, but accounting firms have not gone out of business as a result of using tax filing software; rather, it changed the volume of tax returns that an accountant could file. Using technology in accounting just shifted the emphasis from manual entry using paper and pencil to automated entry using computers and software, not reducing the revenue of accountants. AI in the accounting industry will not replace accountants; rather, it will shift the emphasis.

Tiberius and Hirth (2019), through a Delphi study with a panel of German auditors, auditing professors, regulators, and IT experts of audit software, noted that the respondents did not anticipate significant changes to the auditing practice during the course of the following 5 to 10 years. The results show that experts do not anticipate a significant influence of technological advancement on their industry.

Duong and Fledsberg (2019) made an explanatory study based on 13 accounting firms in Norway and concluded that there is a limited understanding of digitalization by accounting firms and they are at an early stage of digitalization. There is a need for better technical skills, and for this educational system should change to prepare students for digital business life.

Based on their research on local audit firms in Jordan, Albawwat and Al Frijat (2021) concluded that auditors' perception of using AI is related to its ease. Their perception is positive for the assisted AI systems which handle the repetitive tasks on behalf of the auditor and augmented AI systems which help the auditor to conclude on certain issues by doing certain analysis. However, they underestimate the capabilities of autonomous AI systems and perceive as complicated to use and therefore not useful.

Based on a survey made in Romania by Banta et al. (2022), accountants do not see AI as a threat to their employment as long as they continue to increase their knowledge and abilities to use AI.

The primary focus of Adiloglu and Gungor's (2019) study on the effect of digitization on the audit profession was an assessment of independent audit firms in Türkiye. The exploratory program is designed to gain a deeper understanding of how digitization affects the tools and practices utilized by the audit profession. Nearly all audit firms have been found to provide independent audit and tax audit services. Only the Big Four Accounting Firms make the necessary infrastructure and human resource investments. Only the Big Four Accounting Firms offer their employees training in digital technologies. Consequently, due to digitalization, information technology has become more significant. However, the audit companies have not yet invested in these areas as needed.

Gacar (2019) conducted a study on AI and the effects of AI on the accounting profession in Türkiye. The accounting industry is going through a digital change, with the use of e-invoices, interactive tax offices, e-declarations, etc. Gacar concluded that AI technology definitely has an impact on the accounting profession, but this impact is currently very limited in Turkish accounting practices.

A study was carried out in Nigeria by Ologe (2020) to assess the awareness and perception of accounting professionals and whether the personal characteristics of accountants have an effect on their awareness and perception in Nigeria. The findings show that Nigerian accounting professionals are very knowledgeable about the application of AI in accounting, though most of their understanding is theoretical. They think AI will be helpful in accounting practices and improve effectiveness. They also expressed high support for and a desire to work with AI. The study also found that Nigerian accounting professionals are less worried about losing their jobs to AI.

The possible effects of using AI in the accounting profession are discussed, and there are positive and negative views thereon. The effects of using AI on the accounting profession are very much related to the knowledge and willingness of accountants to work with AI. Therefore, it is worth understanding the awareness and perception of accountants for future planning. This study will contribute to the literature by analyzing the awareness and perception of public accountants in Turkey, specifically in İstanbul.

4. RESEARCH METHODOLOGY AND FINDINGS

4.1. Research Methodology

This study's objective is to analyze the accountants' awareness and perception of using AI in accounting practices and determine whether the characteristics of accountants have a significant effect on their awareness and their perception of using AI in accounting practices.

This research is both descriptive and analytical. The descriptive part of the research covered the accountants' awareness of using AI in accounting and their perceptions of using it. The analytical part is about the correlation between accountants' characteristics and their awareness and perceptions of using AI. Accountants' characteristics considered in this research are gender, age, education, area of expertise and work experience.

A questionnaire is prepared in Turkish based on previous studies[1] and shared with CPAs in İstanbul through ISMMMO at their internal platform. Out of 45,773 CPA members of ISMMMO, 155 responses were received.

The dependent variable was the perception of accountants on using AI in accounting practices. It was measured by 15 questions on a 5-point Likert scale which are strongly agree, agree, neutral, disagree and strongly disagree. Independent variables were the personal characteristics of accountants as gender, age, education, area of expertise and work experience.

JASP software was used for statistical data analysis. An Independent t-test was then used to examine gender effect on accountants' awareness as there are only two groups. The significance of the effect of other characteristics, including age, years of experience, education and area of expertise, on the accountants' awareness and perception of using AI was analyzed using a one-way analysis of variance (ANOVA).

4.2. Research Findings

4.2.1. Characteristics of Participants

Table 1 shows the characteristics of the participants. 51.6% of participants were male, and 48.4% were female. It was clearly illustrated that those who were above 40 years old were dominant within the group (67.1%), and in parallel with this, 72.9% of participants had more than 15 years of experience. Considering the legal requirement for having a bachelor's degree, it is unsurprising that all participants had at least a bachelor's degree. However, it is valuable to note that the percentage of participants who had master's degrees or Ph.D. degrees reached

[1] A similar questionnaire is used with the study held in Nigeria by Sharon Oluwaseunlafunmi Ologe, with permission taken. Ethics board approval is also taken from Yeditepe University Ethics Board.

48.4%. With respect to their area of specialization, out of the 155 participants, the total working as financial and tax accountants reached more than half. While internal and external auditors constitute a small portion (5.8%), those who provide advisory services were 19.4%.

Table 1. Participants Characteristics

		N	**%**
Gender	Female	80	51.6
	Male	75	48.4
	Total	**155**	**100.0**
Age	20-30	15	9.7
	31-40	36	23.2
	41-50	75	48.4
	51-60	23	14.8
	61 ≤	6	3.9
	Total	**155**	**100.0**
Education	Ph.D.	8	5.2
	Master's	67	43.2
	Bachelor's	80	51.6
	Total	**155**	**100.0**
Area of	Financial Accounting	51	32.9
	Internal Auditing	3	1.9
	External Auditing	6	3.9
	Management	9	5.8
	Tax Accounting	33	21.3
	Advisory / Consulting	30	19.4
	Other	23	14.8
	Total	**155**	**100.0**
Work	< 5 Years	7	4.5
	5 – 10 Years	20	12.9
	10 – 15 Years	15	9.7
	15 – 20 Years	38	24.5
	> 20 Years	75	48.4
	Total	**155**	**100.0**

4.2.2. Awareness of Participants on Using AI in Accounting Practices

According to the data collected, 79.4% of participants were aware of the discussions surrounding the use of AI, while 20.6% of them were not aware of it. As summarized in Table 2, personal reading is the number one source for AI awareness, which is followed by social media and publications of the professional body (ISMMMO/TÜRMOB). Only 9% of the participants noted that AI is used in their workplace. Although a significant number of participants became aware of AI from other sources, they did not mention what it was.

Table 2. Accountants' Awareness of Using AI in Accounting Practice

	Number of responses	% in total
Awareness of the discussions on the use of AI		
Yes	123	79.4
No	32	20.6
Source of information		
Social media	54	38.4
Personal readings	78	50.3
Publications of the Professional Organization (ISMMMO / TÜRMOB)	48	30.9
Currently used in work	14	9.0
Other	45	29.0

4.2.3. Perceptions of Accountants on Using AI and Its Impact

As summarized in Table 3, 77.4% of the participants do not believe that AI reduces the motivation of accountants, and 80.6% of the participants agree that AI has useful applications in accounting. 60% of the participants noted that AI capabilities are superior to the capabilities of accountants, and 84.5% agree that AI will contribute to improving how they carry out their work. Likewise, there was a significant agreement of 88.4% that AI will contribute to reducing the time that accountants spend on repetitive tasks, and 84.5% agree that AI will allow accountants to concentrate more on strategic roles in their work.

Table 3. Accountants' Perceptions of Using AI in Accounting Practice

	Strongly Agree n(%)	Agree n(%)	Neutral n(%)	Disagree n(%)	Strongly Disagree n(%)
AI in accounting reduces the motivation of accountants	6 (3.9)	17 (11)	12 (7.7)	82 (52.9)	38 (24.5)
AI has useful applications in accounting	58 (37.4)	67 (43.2)	20 (12.9)	4 (2.6)	6 (3.9)
AI capabilities are superior to the capabilities of human accountants	35 (22.6)	58 (37.4)	20 (12.9)	38 (24.5)	4 (2.6)
AI will improve the way accountants carry out their work	49 (31.6)	82 (52.9)	16 (10.3)	7 (4.5)	1 (0.6)
AI will reduce the time accountants spend on repetitive tasks	71 (45.8)	66 (42.6)	12 (7.7)	2 (1.3)	4 (2.6)
AI will allow accountants to focus on more strategic roles	71 (45.8)	60 (38.7)	14 (9)	6 (3.9)	4 (2.6)
The use of AI in accounting will lead to the emergence of new roles in the accounting profession	57 (36.8)	80 (51.6)	14 (9)	2 (1.3)	2 (1.3)
Accountants need to develop new skills to adapt to new AI trends	65 (41.9)	75 (48.4)	10 (6.5)	2 (1.3)	3 (1.9)
Accounting curriculums in universities should include appropriate IT skills	88 (56.8)	52(33.5)	7 (4.5)	3 (1.9)	5 (3.2)

Accounting curriculums in universities should focus more on strategic areas of accounting, not just technical accounting knowledge	84 (54.2)	56 (36.1)	6 (3.9)	5 (3.2)	4 (2.6)
AI will replace human accountants in the foreseeable future	8 (5.2)	28 (18.1)	21 (13.5)	82 (52.9)	16 (10.3)
I am worried that AI could replace me in my job	2 (1.3)	10 (6.5)	14 (9)	102 (65.8)	27 (17.4)
I support the development of AI in accounting	53 (34.2)	79 (51)	15 (9.7)	6 (3.9)	2 (1.3)
I am excited about the changes that AI will bring to the accounting profession	47 (30.3)	75 (48.4)	18 (11.6)	12 (7.7)	3 (1.9)
I am adequately prepared to work alongside AI	37 (23.9)	70 (45.2)	27 (17.4)	17 (11)	4 (2.6)

While 88.4% agree that the application of AI in accounting will result in the creation of new roles in the accounting profession, those, on the other hand, agree that accountants might be required to start developing new skills to help them adapt to new AI reached 90.3%. In parallel with this result, 90.3% believe that accounting curriculums in universities should include appropriate courses that will enhance IT skills. With the same percentage, they also agree that university curriculums must focus on strategic areas of accounting, not only on technical accounting knowledge. Technology literacy and the use of information technologies were considered the most important skills for accountants after the ability to interpret financial information (Table 4).

63.2% disagree that AI will take over the job of human accountants in the foreseeable future, whereas those who agree reached 23.3%. Similarly, but with a higher percentage, 83.2% noted that they are not worried that AI might take over their job.

85.2% of the participants noted that they support the development of AI in accounting. Furthermore, 78.7% are excited about the changes that AI will bring to the accounting profession. 69.1% are confident enough to note that they are highly prepared to work with AI.

Table 4. Using AI in Accounting Practice

Which of the following potential applications of AI would be the most useful to accountants?		
	N	**%**
Fraud detection	99	63.9
Forecasting Revenue, Cash flows, etc.	89	57.4
Analysis of large volumes of Structured and unstructured data	119	76.8
Automation of repetitive tasks	118	76.1
Identifying and extracting relevant information from documents	104	67.1
Other	25	16.1
Which of the following skills do you consider most important for accountants today?		
	N	**%**
Technological literacy	110	71.0
The use of information technologies	124	80.0

Business Advisory Skills	116	74.8
Communication skills	87	56.1
Relationship Building	74	47.7
Interpretation of Financial Information	129	83.2
Other	16	10.3

The two highest potential applications of AI are the analysis of large volumes of structured and unstructured data and the automation of repetitive tasks. However, as summarized in Table 4, identifying and extracting relevant information from documents and fraud detection were also considered significant application areas for AI.

4.2.4. Effect of Personal Characteristics on the Awareness of Using AI

Based on the independent t-test results, t (77.5) = 0.403, p = 0.688, α = 0.05, gender effect on the awareness of accountants on using AI in accounting practices was not statistically significant. However, as presented in Table 5, women showed more awareness of using AI in accounting than males.

As presented in Table 5, the age group of 41 – 50 years (M = 37.5, SD = 27.6) is more aware of the application and use of AI compared to other groups. However, considering that p = 0.525 where α = 0.05, there is no significant effect of age on accountants' perceptions of the employment of AI.

Participants were grouped into three Ph.D., Master's degrees, and Bachelor's degrees. It was observed that among all groups, participants with a bachelor's degree are more aware of the importance of using AI in accounting compared to other groups. However, the ANOVA test result of p = 0.274 reflected that there is no statistically significant difference, and accordingly, the level of education does not affect their perceptions of using AI in accounting practices.

Participants were grouped into 7 in terms of their area of expertise, as shown in Table 5. Accountants who work in the financial accounting/reporting area were more open to using AI in accounting practices compared to other groups. However, based on the p calculated as 0.169, while α = 0.05, results show that there is no significant effect of the area of expertise on accountants' awareness of using AI.

Accountants were grouped into five according to their work experience: less than 5 years, 5 – 10 years, 10 – 15 years, 15 – 20 years, and more than 20 years. Based on ANOVA results, p is calculated as 0.949, below α (0.05). Therefore, work experience does not significantly affect accountants' awareness of using AI in accounting practices. However, it is worth noting that accountants with more than 20 years of experience are more aware of the uses and applications of AI in accounting compared to other groups.

Table 5. Effect of Personal Characteristics on the Awareness of Using AI

	N	Mean	SD
Gender			
Male	75	37.5	30.4
Female	80	40.0	33.9
Age			
20-30	14	7.0	5.7
31-40	37	18.5	16.3
41-50	75	37.5	27.6
51-60	23	11.5	12.0
61 ≤	6	3.0	4.24
Education			
Ph.D.	8	4.0	5.7
Master's	67	33.5	28.9
Bachelor's	77	40.0	29.7
Area of Expertise			
Financial Accounting/ Reporting	51	25.5	16.26
Internal Auditing	3	1.5	0.71
External Auditing	6	3.0	2.83
Management Accounting	9	4.5	6.36
Tax Accounting	33	16.5	16.26
Advisory/Consulting	30	15.0	16.97
other	23	11.5	6.36
Work Experience			
less than 5 years	7	3.5	2.12
5 - 10 years	20	10.0	8.49
10 - 15 years	15	7.5	4.95
15 - 20 years	38	19.0	18.38
More than 20 years	75	37.5	31.82

4.2.5. Effect of Personal Characteristics on the Perception of Using AI

The mean values shown in Table 6, males (M = 15, SD = 14.93) and females (M.= 16, SD = 15.6), illustrate very similar perceptions of using AI in accounting practices. An independent t-test was also conducted to investigate the significance of gender effect on the perceptions of accountants $t(77.5) = 0.293$, $p = 0.39$, and compared to $\alpha = 0.05$. In accordance with these results, gender does not have a significant effect on accountants' perceptions.

Table 6. Effect of Personal Characteristics on the Perception of Using AI

	N	Mean	SD
Gender			
Male	75	15	14.93
Female	80	16	15.60
Age			
20-30	14	3.0	3.00
31-40	37	7.2	7.19
41-50	75	15.0	16.54
51-60	23	4.6	3.65
61 <	6	1.2	1.64

Education			
Ph.D.	8	1.6	3.05
Master's	67	14.0	14.09
Bachelor's	77	15.4	13.76
Area of Expertise			
Financial Accounting/ Reporting	51	10.4	9.76
Internal Auditing	3	0.6	0.89
External Auditing	6	1.2	2.17
Management Accounting	9	2.0	1.87
Tax Accounting	33	6.8	6.02
Advisory/Consulting	30	6.0	6.08
other	23	4.4	4.28
Experience			
less than 5 years	7	1.4	1.52
5 – 10 years	20	3.8	4.32
10 – 15 years	15	3.0	3.08
15 – 20 years	38	7.4	7.16
More than 20 years	75	15.0	13.95

In parallel with the above results, the highest number of participants who are not worried that AI might replace them in their job (Figure 1) and who support the development of AI in accounting practices (Figure 2) were aged between 41-50 years.

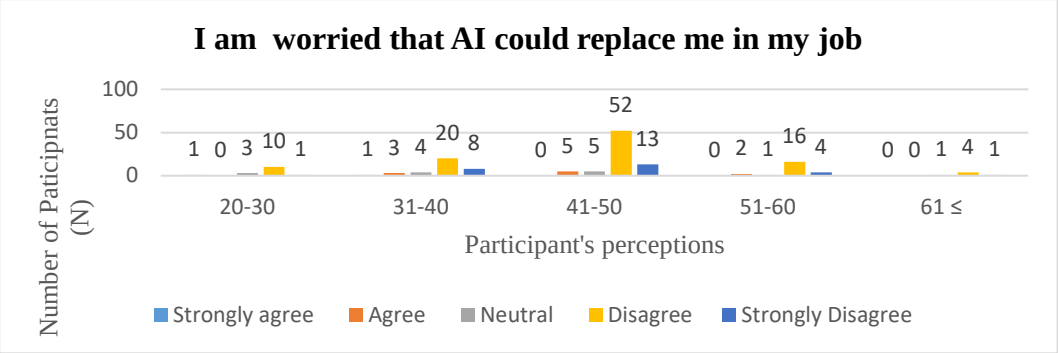

Figure 1. Age Effect on the Perception of Implication of Using AI

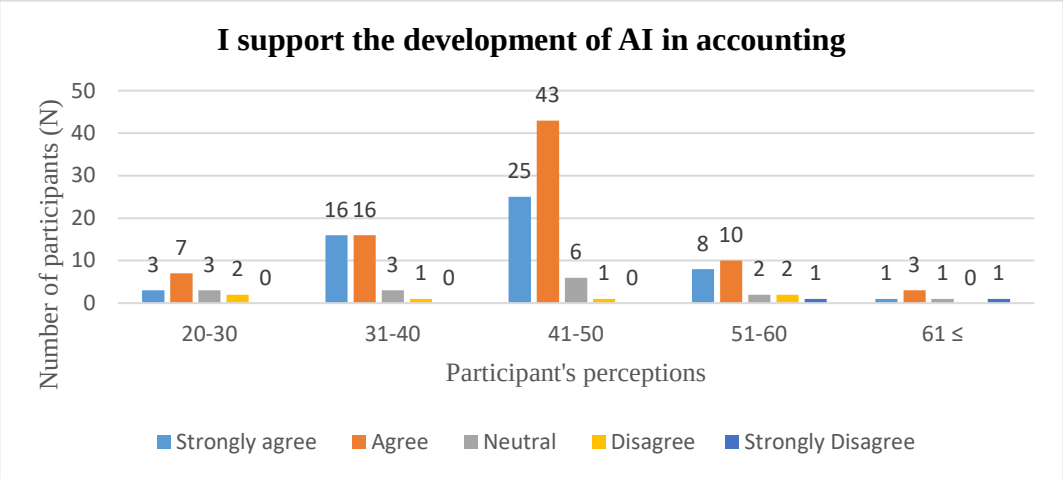

Figure 2. Age Effect on the Support of Using AI

Accountants with a bachelor's degree have similar perceptions to accountants with a master's degree. Furthermore, under the ANOVA test, p was calculated as 0.16, where α is 0.05. Accordingly, there is no significant effect of the level of education on accountants' perceptions of using AI in accounting practice.

Accountants who have an experience of more than 20 years had the highest mean value of 15 and a standard deviation of 13.95, which indicates that they have a better understanding of AI and its implications compared to other groups. However, according to the results of the ANOVA test, p is 0.062, which is higher than α (= 0.05). Therefore, there is no significant effect of years of experience on accountants' perceptions of using AI.

In parallel with the above results, it was noted that the majority of participants who are not worried that AI might replace them in their job (Figure 3) and who support the development of AI in accounting (Figure 4) have more than 20 years of work experience.

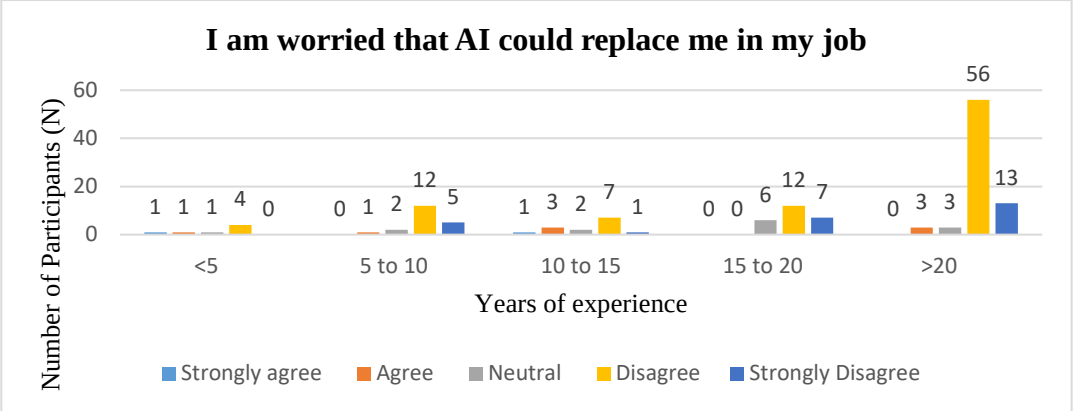

Figure 3. Work Experience Effect on the Perception of Implication of Using AI

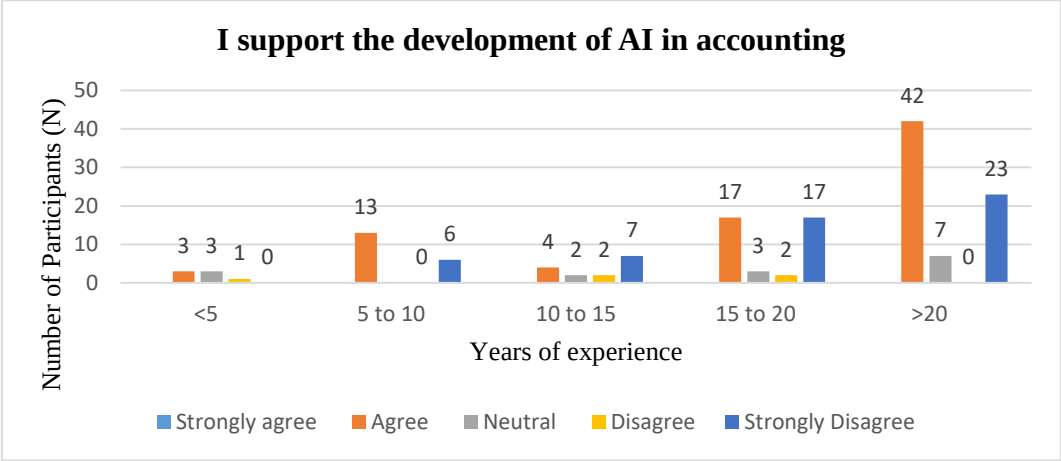

Figure 4. Work Experience Effect on the Support of using AI

Based on the results summarized in Table 6, it is clearly shown that accountants who work within the financial accounting/reporting department had more favorable perceptions compared to other groups. However, as the ANOVA test results show a lower p (= 0.11) compared to α (= 0.05), it is concluded that the area of expertise does not have a significant effect on accountants' perceptions of the using of AI in accounting practices.

As illustrated in Figure 5, the top two groups of participants who are not worried that AI might replace them in their job work in financial accounting/reporting and tax accounting. Similar results (Figure 6) are observed in support of the development of AI in accounting.

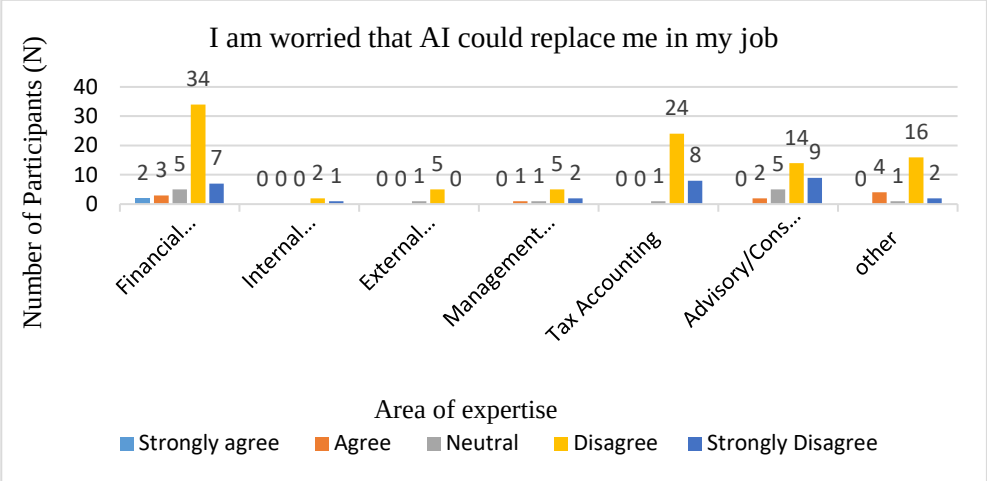

Figure 5. Area of Expertise Effect on the Perception of Using AI

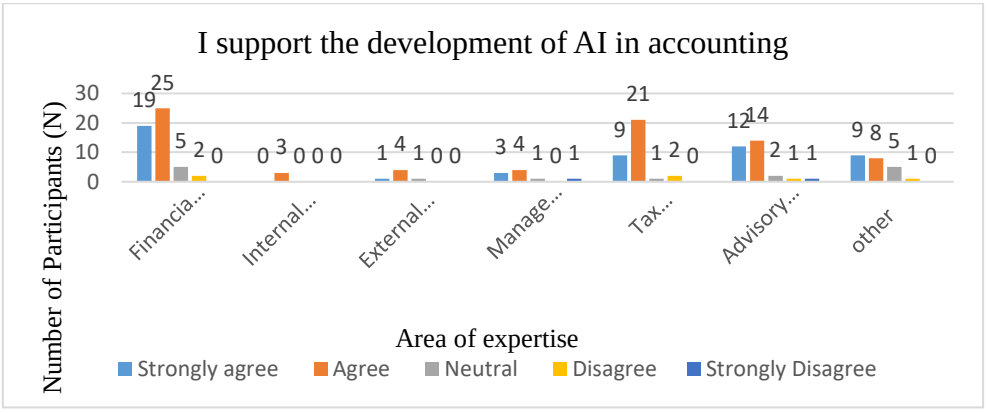

Figure 6. Area of Expertise effect on the support of using AI

5. CONCLUSION AND DISCUSSION

One of the important objectives of the study was to analyze the awareness of accountants on using AI in accounting practices. According to the results conducted, most accountants illustrated a high level of awareness (79.4%) of the use of AI. Most of the accountants became aware of AI in accounting through personal reading (50.3%), followed by

social media (34.8%). These findings comply with the results of the study conducted by Ologe (2020) in Nigeria.

Although the awareness level is quite high, only 9% of the participants stated that AI is currently used in their workplace. This, in turn, led to the fact that most accounting professionals have the required awareness and theoretical knowledge regarding AI, but they lack practical experience.

Considering that 77.4% of the participants stated that AI would not decrease the motivation of accounting professionals, this leads to the closure that most accountants have the motivation for AI to be implemented and applied in accounting practices. This result was also supported by 80.6% favorable responses for the usefulness of AI in accounting practices. Furthermore, those who believe AI will contribute to enhancing the way accountants carry out their work are 84.5% and that it will lower the time accounting professionals spend on repetitive tasks are 88.4%.

Research results also show that accountants are aware of possible new roles and that they need to develop new skills for using AI in accounting practices. This would lead to the fact that accounting professionals are open to adapting to the new working environment and learning new skills that they will benefit from in the long run. They think using information technologies, business advisory skills, and technological literacy skills are considered the most important skills for accountants nowadays. This correlates with the curriculum that has been taught in universities, as 90.3% of the participants support the implementation of appropriate IT skills courses to prepare students for the next era of technology in business life. They also agree that universities should focus on strategic accounting practices in addition to technical accounting knowledge.

Most of the accountants (83.2%) are not worried that AI could take over their job. This means that they still believe in the special capabilities of humans and support technological evolution at the same time. They also support the development of AI, and they are excited about the changes AI will bring. All these perceptions are great evidence that accountants are looking forward to the next technological level of AI in accounting practices. They believe that AI will become a very useful tool in analyzing large volumes of structured and unstructured data, automation of repetitive tasks as well as the identification and extraction of relevant information. Accordingly, they are prepared to work with AI and expect that AI will reduce the time and effort required to complete their tasks.

However, as also stated by Chuckwuani et al. (2020), accountants should develop their professional skills, managerial skills, computer skills, analytical skills, and decision-making skills in order to be able to adopt the everchanging business due to the use of AI.

Academia, policymakers, and professionals from various disciplines must respond to the innovations and challenges brought by the AI. (Luan et al., 2020: 3). Graduates must possess the necessary qualities to adapt to present and future technological developments and even to create them. (Zhang et al., 2020: 12). Education system must change (Duong and Fledsberg, 2019: 80) and accounting curriculums should be revised in order to prepare well-equipped graduates for the new business world.

Another crucial objective of the study is to examine the effect of personal characteristics on the awareness and perception of accountants on using AI in accounting practices. According to the statistical results obtained, none of the personal characteristics have a significant effect on the awareness and perception of accountants on using AI. This is also parallel with the findings of previous researches (Ologe 2020 Nigeria).

This study is expected to contribute to the literature by examining the awareness and perceptions of using AI in the accounting practices of İstanbul Certified Public Accountants. Considering that accounting and audit professions are frequently named while discussing the effect of AI on current professions, it is valuable to understand CPA's view in terms of their awareness and perception.

The questionnaire was only shared with CPAs in Istanbul, and only 155 responses have been received, which is one of the limitations of the study. On the other hand, the questionnaire used is a self-reported tool. Hence, the responses obtained might not be very accurate since some participants might misinterpret some of the questions or might not prefer to share his/her honest opinion but respond as expected from his/her position.

The study may be extended to cover CPAs in Turkey and even can be held as cross-country research. It would also be valuable to incorporate customers/employers of CPAs as well as accounting students at universities.

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