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## FORENSIC ACCOUNTING IN FINANCIAL FRAUD CONTROL IN DIGITAL ENVIRONMENT: A RESEARCH ON INDEPENDENT AUDITORS


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### ABSTRACT

The technology, which takes on different structures and features with each passing day, has left enterprises to interact more with digital environment. While processing the business data in digital environment results in positive outcomes, such as saving on time and costs for businesses, it has also caused a new fraud technique to come into question, which is a negative effect. This technique is called financial fraud. It has led a new profession to come into prominence in financial fraud control performed in digital environment, where 3M theory and competence element play a significant role in the realization of financial fraud. Developments in technology have caused sophisticated cases within businesses to increase and strategic decisions to become more significant, and as a remedy for these causes, allowed forensic audit reports and forensic accounting to become prominent. In this study, it has been tried to investigate whether core-competencies and characteristics are effective in financial fraud audits in digital environment. For this purpose, a survey has been applied to auditors of audit companies that have the authority to issue transparency reports at KGK, and as a result of the survey, it was concluded that the core-competencies and characteristics of the auditors evaluated as forensic accountants were close to forensic accountants abroad but there were no forensic accounting software against financial frauds performed digitally and the transactions were made on audit software during financial fraud audits. On the other hand, it was observed, in the research data, that the accounting profession was in development in Turkey, there was not enough infrastructure provided, and forensic

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accounting was also effective in internal audit and quality financial reporting.

### **STRUCTURED ABSTRACT**

In order to prevent or minimize sophisticated cases occurred in businesses by the effect of digitization, business owners or managers should take certain measurements. The importance of forensic accounting profession considered as one of these measurements is increasing day-by-day. In Turkey, the importance of forensic accounting profession is almost not present in terms of preventing frauds in digital environment, which is considered as a negative effect alongside the positive effects brought by the globalization, due to the fact that it has recently started to accelerate and the necessary infrastructure has not yet been completely established. In the world, it is supported by research results that the importance of forensic accounting profession is increasing day by day, that required regulations are made for this and that the profession is at the stage of development or even maturation. Because the density of complex transaction is at the highest stage in Turkey today and for the control of fraudsters who can use this as leverage, we tried to take opinions of independent auditors who are considered among those with characteristics of a forensic accountant who is able to think like a criminal and able to think line an ordinary investigator, depending on the situation; and the results are as follows in short;

Most of the participants were PAs, and CPAs and lawyers follow respectively,

According to the survey results, it has been observed that most of the participants were male, the age range is mostly between 36-50 years, 86.3 of them were married, the rate of the ones with bachelor's degree is high, the expertise status in their own fields are mostly more than 15 years, their expertise in the field of forensic auditing/accounting is mostly not expert, this is followed by the ones being expert in forensic accounting for between 0-5 years, and finally, the part where forensic accounting field of occupation was seen most undertakes forensic accounting service and it was followed by the option of not involving in forensic accounting.

It has been seen that, for the relationship between forensic accounting departments and certification that may be required for forensic accounting, the independent auditing certificate had no effect on forensic analysis and financial fraud prevention in digital environment, that it only had effect on economic damage calculation, legal transactions and valuation, that forensic accounting certificate, which is İSMMMO academy certificate, is effective in computerized forensic analysis and fraud departments but not sufficient, and from research data, it has been obtained that internal auditing certificate is partially effective in fraud and valuation.

In addition, it has been shown that financial fraud partially had a relationship between demographic background of participants, and that their forensic accounting field expertise was more effective than their own field expertise. Additionally, in research results, it was also seen

that independent auditing certificate in financial fraud control was not as effective as İSMMMO academy forensic accounting certificate and PA certificate.

According to the participants, as a result of the research, it was seen that there was a positive relationship between internal control and forensic accounting field expertise, and that the relationship between quality financial reporting and forensic accounting field expertise was partially significant.

Participants' status of possessing a forensic accounting certificate has been tried to examined, and it is seen that only 16 of the participants had a forensic accounting certificate and that the forensic accounting expertise experience with this certificate is only in the beginning phase in Turkey.

It is observed that forensic accounting was also effective on internal control and quality financial reporting in addition to financial fraud control, as a result of the questions directed at participants by Likert questionnaire method.

In accordance with the research subject, opinions of the participants on basic and characteristic features of a forensic accountant and their core competencies/skills have been tried to treated and that the result partially differs from the research conducted at California State University, and it is possible that the reason for this difference is because the research was conducted on independent auditors but not on accountants, lawyers and academicians like they did abroad. However, as a result of the research, it was seen that independent auditors do their research not by using a fraud control tool but on audit software, and that most of the independent auditors saw forensic accounting as a case support and made their assessments on books and documents instead of using a software.

In this study, in summary, it was seen that forensic accounting was not seen only as a financial fraud control but it was also important for internal audit and quality financial reporting, that forensic accounting core-competencies and characteristics were partially different and the reason for this difference was that the research was conducted on independent auditors, however, that independent auditors did not use any forensic accounting analysis software in financial fraud audit performed in digital environment. It was also stated by independent auditors that the profession of forensic accounting has not yet been established completely in Turkey and that forensic accounting meant legal-case supports. In conclusion, according to research results, it was determined that forensic accounting profession has not yet accelerated in Turkey, the development of forensic accounting profession was not at a significant size and there were not any fraud control software for financial frauds in digital environment, and that the needs were satisfied by traditional methods. In today's world where technology has reached a different dimension, sophisticated cases in today's businesses cannot be revealed by traditional methods and the need for fraud control software against possible negative cases in information environment should be fulfilled in order to eliminate this complexity.

**Keywords:** Forensic accounting, forensic audit report, financial fraud, 3M theory, digital environment, competency factor

## **DİJİTAL ORTAMDAKİ FİNANSAL HİLE KONTROLÜNDE ADLİ MUHASEBE: BAĞIMSIZ DENETÇİLER ÜZERİNDE BİR ARAŞTIRMA**

### **ÖZ**

Her geçen gün farklı yapı ve özelliğe bürünen teknoloji, işletmeleri dijital ortamla daha fazla etkileşim içinde bırakmıştır. İşletme verilerinin dijital ortam üzerinden yapılması, işletmelere zaman, maliyet tasarrufu gibi olumlu etkiler sağlarken olumsuz etki olarak ta yeni bir hile tekniğinin oluşmasına neden olmuştur. Bu teknik finansal hile olarak adlandırılmaktadır. Finansal hilenin gerçekleşmesinde 3M teorisinin ve yetkinlik faktörünün önemli rol oynadığı ve dijital ortamda gerçekleştirilen finansal hile kontrolünde yeni bir mesleğin ön plana çıkmasına neden olmuştur. Teknolojideki gelişmeler, işletmelerdeki sofistike durumlarının artmasına ve stratejik kararların daha anlamlı hale gelmesine neden olmuş ve bu nedenlerin çözümü için adli denetim raporlarının ve adli muhasebenin önem kazanmasına olanak sağlamıştır. Yapılan bu çalışmada adli muhasebecilerin öz beceri ve karakteristik özelliklerinin dijital ortamdaki finansal hile kontrolünde etkili olup olmadığı araştırılmaya çalışılmıştır. Bu amaçla KGK'da şeffaflık raporu yayınlama yetkisi bulunan denetim şirketlerinin denetçileri üzerine anket uygulanmış, uygulanan anket sonucunda dijital ortamdaki hile kontrolünde, adli muhasebeci olarak değerlendirilen denetçilerdeki öz beceri ve karakteristik özelliklerin yurtdışındaki adli muhasebecilere yakın olduğu ancak dijital ortamda gerçekleştirilen finansal hileler için adli muhasebe yazılımı bulunmadığı, finansal hile kontrolünde denetim yazılımları üzerinden işlemlerin gerçekleştirildiği sonucuna varılmıştır. Ayrıca adli muhasebe mesleğinin Türkiye'de gelişme aşamasında olduğu, yeterli alt yapının sağlanmadığı ve adli muhasebenin iç kontrol, kaliteli finansal raporlamada da etkili olduğu araştırma verilerinde gözlemlenmiştir.

**Anahtar Kelimeler:** Adli muhasebe, adli denetim raporu, finansal hile, 3M teorisi, dijital ortam, yetkinlik unsuru

### **Introduction**

Developments in information systems and technology have also affected the enterprises and led the trade to growth and development, and even change in production, marketing and sales methods. Traditional methods of the accounting records, which constitute the important part of this change, have been replaced by digital methods. Accounting records tried to be performed with digital methods have brought some sophisticated cases along with conveniences for businesses and added a new financial fraud method that may occur in businesses. It has led a new field to become prominent in the audits of financial fraud cases created under the effect of sophisticated situations that occur in financial field with multinational enterprises starting to operate all over the World. There are a lot of dual listed companies using accounting and financial standards in the World (Aksoy and Dayi, 2017: 33-34). Despite the fact that there are postgraduate and doctoral theses on forensic accounting/forensic

audit in Turkey, there have not been found any studies where information systems and core-competencies and characteristics of forensic accountants are tackled and evaluated together. With this study, we tried to meet the deficit in the literature, regarding the effect of forensic accounting on preventing and determining financial fraud in digital environment and the financial fraud, which bears the heaviest effect of frauds in Turkey, with a survey applied to the auditors of Independent audit companies who are authorized to issue transparency reports by Public Oversight, Accounting and Auditing Standards Authority. The method of the research consists of a literature review based on the studies on researches conducted in national and international field on forensic accounting/auditing and a survey study on the forensic accounting expertise status of the auditors of audit companies who are authorized by Public Oversight, Accounting and Auditing Standards Authority, core-competencies and characteristics of forensic accountants and their perspective on financial fraud, internal audit and quality financial reporting.

### **1. Conceptual Framework: 3M Theory in Financial Fraud, Forensic Accounting and Forensic Audit**

A fraud is to confiscate or unfairly use the assets of an individual or organization (Pehlivanlı, 2011: 3). Inaccuracies in financial statements of businesses may be caused by a fraud or an error. The most important factor that separates the fraud or irregularities from the mistake is whether it has been intentional or not. While accounting errors in businesses are usually made on records, accounting frauds are deliberately made on documents. Therefore, the definition of financial fraud is to deliberately forge the transactions, records and documents of businesses on a specific purpose. The way that frauds seen in businesses are done occur in two types. (Toroslu, 2012: 237-238); While the purpose in financial report frauds is to lead users to make wrong choices when taking decisions, the purpose in using the assets is to use business assets for personal purposes and not to reflect these actions to the financial statements of businesses. Even though there are different definitions of fraud in the literature, in order for the fraud to take place, it need requires some elements within. Some of these elements are (Bozkurt, 2009: 60):

- That the fraud is an activity carried out secretly by the fraudster,
- That the fraudster is benefiting from the fraud,
- That there is definitely a wrongful intention,
- That the one exposed to fraud is deceived in a way,
- That the victim or businesses suffer from damages in fraud cases.

In order for fraud cases to come into question in businesses, there must be certain cases existing. Donald R. Cressey's study "Trust Violators" and W. Steve Albrecht's researches were on the existence of fraud elements, and as a result of their researches, they defined fraud elements as opportunity, pressure and justification and added the term "Fraud Triangle" in the literature; on the other hand, Josep T. Wells is who is the founder of ACFE and does researches on fraud subject (Tarhan Mengi, 2012: 116). In recent years, additionally, with a different approach, the reasons for adding the competency to the fraud triangle have been stated and the importance of competency that turns it into a Fraud Diamond has been emphasized. The most critical purpose of financial statement frauds that will or are planned to be done in businesses is to introduce the financial performances and structures of businesses incorrectly and to create a difference in the well-being of the circles who are connected to the business (Demir ve Bahadır, 2007: 104). According to whether the financial statement frauds are complying with accounting principles and standards, it is possible to classify them as Activities Complying with Accounting Principles and Standards and as Financial Fraud and 3M Theory. In consequence of some financial frauds seen in businesses performed in compliance with accounting principles and standards, it is defined as the fraud performed in order to change the

perception of financial knowledge users on the performance and financial structure of the business. Otherwise, financial frauds can be caused the financial failures for companies (Civan and Dayi, 2014: 2-3). Activities performed by business managers and in violation of accounting principles and standards are defined as financial frauds. Financial fraud is performed not only through financial data of the business but also through non-financial ones (Serçemeli,2018)(Kısacık,2018)(Dayi, 2019b).

## **2. 3M Theory in the Financial Frauds**

In order for financial frauds to be performed, existence of certain methods is necessary. These methods are Manipulation, Misrepresentation and Misapplication, which is abbreviated as 3M (Tarhan Mengi, 2013:13). Because today's businesses perform their various transactions online by means of computer software, the profession of forensic accounting that can use the computer experience actively and effectively have taken place. This concept, which is also known as investigative accounting, includes both legal support and investigative accounting. However, the legal support prioritizes the subjects that cause economic damages (Kasum, 2009: 3). According to the definition by ACFE, the forensic accounting is to provide an active combination by combining accounting knowledge and research skills in legal support and investigative accounting (www.acfe.com: 2014). The forensic accounting profession, which have taken place inevitably all around the world, has also triggered a change in the structure of traditional accounting applications. In addition to the front face of the numbers in financial analysis records, it was also tried to take interest in and investigate the background of the numbers (Dayi, 2019a). In today's incomprehensible economic structure, this application have become inevitable (Bozkurt, 2000: 56). In the fight against this chaos, it is safe to categorize forensic accountants as 3 different fields of activity and eliminate the chaos, which are stated as Legal Support, Expert's Testimony and Investigation of Fraud, Abuse and Corruption (Elitaş, 2012: 158; Okoye and Akamobi, 2009:43). The investigation of fraud, abuse and corruption is a field of activity which investigates frauds performed in the direction of requests made by business management or owners, or existence possibilities of accounting manipulation. This field of activity aims to reveal, investigate and prevent the frauds and corruptions performed and to be performed (Akyel, 2009: 131). In the literature, it is called as fraud examination or investigative accounting.

## **3. Characteristics and Advanced Skills of a Forensic Accountant**

Attributes that need to be possessed by the ones who perform forensic accounting profession, along with the attributes of an accountant or auditor, are understood from the definitions of forensic accounting as the forensic accounting is not only a profession but a combination of a couple of professions or disciplines, and a forensic accountant should be treated as a versatile person. Characteristics: Curious, Persistent, Inner-intuitive thinking, Risk bearer, Self-confident, Adaptable, Ability to work under pressure, Behaving ethically, Team player, Ability to see another side of numbers, Ability to perform written and oral communication, Ability to assess, Understanding towards their duty, Creative. Advanced Skills: Investigation skill, Determining complicated matters, Ability to see the big picture, Research intuition and skills, Simplifying the knowledge, Ability to track assets, Electronic exploration, Fraud detection, Ensuring internal audit activity, Having technical expertise and skills, Testifying at courts, Knowledge on legal practices, Ability to solve cases, Ability to think like a criminal, Ability to understand the status of the case, Being a critical and strategic thinker.

## **4. Fraud and Forensic Accounting in Digital Environment**

In recent years, digitization methods have been shown as the main reason for the change in information and communication techniques. Among the reasons for the development of these methods, the fact that the businesses have removed international borders for their economic and commercial activities and switched from traditional forms of business transactions to digital enterprise forms is shown. As a result of the transformations into digital business form, the concepts and practices of e-commerce, e-business and digital accounting have been inevitable. With the development of Internet

technology, costs for businesses to generate knowledge and deliver them to users have considerably decreased (Sevim, 2009:1).

In order to prevent manipulations and frauds on national and international levels, businesses should take into consideration some elements. Some of these reasons that forces businesses to this obligation are (Karausta, 2013:17);

- Developments in digital environment,
- Money laundering,
- the need for trust in order to invest in national and international markets,
- Accounting scandals

and such elements oblige businesses to take measures in order to fight against activities that are performed whether they are in compliance with the principles and standards of accounting or not. The measures to be taken by businesses are considered as task separation or internal control system, internal audit, external audit and others.

As well as forensic accounting is used as a tool for preventing financial frauds performed by business managements, it also guides businesses in creating an active and reliable organization and transparency and establishing an active internal control structure.

In order for businesses to be able to adapt to new business models in recent years, they need to keep pace with the innovations in computer and communication technology. Innovations in recent years have developed a necessity for digital techniques in order for more data to be collected, stored, processes and turned into information in businesses. As a result of these techniques, developed in businesses, not being applied effectively, there has been an increase in accounting manipulations in businesses. In order to determine and prevent the frauds performed in digital environment by white collars working at businesses, which can be seen in the data, and manipulations performed in compliance with accounting principles and standards, the integrated model in the process of forensic accounting investigation has been developed (Grubor et al., 2013: 3). The fact that frauds in businesses are performed by using keyboard much more when compared to frauds by pen or weapon, along with the development of technology, can be evaluated as negative effects of innovations in technology. Each passing day, the importance of forensic accounting is increasing, which is known as a field that attracts attention due to both its core-competency and characteristics in preventing or detecting these negative effects. Considering the features that separates forensic accounting profession from audit or fraud investigation, which are thought to be among financial fraud determination techniques, it is easily distinguished from other professions as it covers more ground by its nature and performs more detailed investigation.

The most effective and collective information for activating fraud and forensic accounting in digital environment is summarized by Narveson (2007). According to this, the first stage of the five-stage tactical assessment is to make an assessment *in terms of prevention and deterrence*. Within this scope, information management science technology and IT risk evaluation, understanding the process involving manual and computerized system, the area of use of IT systems in general in fraud and other crimes and how IT security is dodged or violated are critical. What to do for this first group is listed as follows: To create a business case scenario for fraud prevention control, to manage the risk evaluation given with a certain method, to perform application control and neutralization for exploring the human risk factors with the limits provided by given information and instructor, to use this sort of assessments as a model for certain fraud risks and approach of other cases, to determine the manipulation of the IT system for fraud and other crimes, and to develop fraud prevention programs in order to deter and prevent frauds.

The second important tactic is the evaluation of digital evidence. One of the main connections of TWG in digital environment is related to the acquisition of digital evidence. Thanks to the professional data entry, the fraudster can attempt to do many things with the digital evidence. For example, by using a seized computer, they can destroy or damage all evidences in a courtroom by a simple activation method. Within this scope, the aspects that should be considered and studied are as follows: A special requirement to be prepared in order to collect and store digital evidences for forensic investigations, such as headers in documents, digital evidence type information such as e-mail links and audit logs in investigation, online source information (public records, filing, submissions and court records), information of contacting other experts in case of findings regarding unethical or forceful entries in case of forensic accountants being exposed to assaults, information of rules regarding electronic exploration. Actions to be taken in order to achieve these; to apply rules regarding the storage and management of evidences in an investigation method, to introduce and use a digital evidence in a case scenario, to use the Internet and other sources for investigation and data collection, to define the cases where forensic experts on data security and computers, and to explain the effect of proper use of e-mail on electronic exploration.

In terms of reporting, which is the third tactical assessment, it is necessary to have a status where reports, graphic presentations and verbal sources are written and where various contact forms are included, to have the knowledge of using various software tools in order to report and explain the findings of fraud investigation. Actions to be taken within this scope; To present evidences and results in order to perform the transactions, and to make an assessment by using cyber-crimes for the data presentation and analysis by using timetables and themes verbal and graphically.

The fourth tactical assessment, which is maybe the most important one, in order to classify and correctly track cyber-crimes, is the necessity of simple knowledge on cyber-crimes and, for intellectual property rights and cyber-crimes, legal knowledge; where, within this scope, it is critical to be able to define the necessary situations for data security or forensic computer experts, and the situations that violate the law, confidential rights and other subjects regarding the crime.

The main necessities in the phase of determination and investigation, which is the last tactical assessment, can be listed as follows: To observe the contradictory statements and attempts of perpetrators in order to cover their active frauds, to affect the regular files with fraud types and to show closeness to electronic files, to seize forensic hardware, such as Roadmaster, St500, and write-protectors and deleted files, to acquire software packages according to various information for data extraction analyses. Data mining and continuous supervision and information regarding various software including sound software are suitable for case analyses. General knowledge of techniques and tools, which are used on forensic computers and for recovering files from seized computers, and how forensic accountants should work must definitely be combined with training. The answer to the question what to do within this scope is listed as follows: In company records, to define how to declare fraud types and how matters related to computers are detected by using audit tools and techniques, namely, to determine the use of BDDT; to define certain analysis techniques for fraud detection and the analysis defined to state the solution to the difference between an error and fraud; to use computer-based tools for common audit software for data acquisitions (Billing transactions, extraordinary variants, rate and trend analyses, statistical anomalies (Regression, Simulation, Data mining, Pattern recognizing software), to use vertical and horizontal analysis methods, to analyse how the analysts should connect to analysis packages with their laptops; to provide time table theme of analysis packages, to define the situations where forensic computer experts are to be employed, and to explain how the legal transactions are to be carried out and whether the evidences have been collected by a skilled inspector or not (Narveson,2007:37,40,41).

## 5. Research Findings

In Turkey, there are no researches on the control of financial frauds in digital environment and improvement of internal controls, within the scope of core-competencies and characteristics of forensic accountants. In this study, opinions of independent auditors, who are considered to be among those with characteristics of being a forensic accountant, on forensic accounting and financial frauds have been taken, and the awareness of forensic auditors for the frauds performed in digital environment have been tried to be featured.

**Table 1:** Mentioned Professions and Their Demographic Characteristics

	Frequency Distribution	Percentage		Frequency Distribution	Percentage
PA	140	73.7	Gender		
CPA	11	5.8	Male	159	83.7
Academician	19	10.0	Female	31	16.3
Criminologist	2	1.1	<b>Total</b>	<b>190</b>	<b>100.0</b>
Statistician	1	.5		Frequency Distribution	Percentage
Lawyer	7	3.7	Single	26	13.7
Psychologist	3	1.6	Married	164	86.3
Other	7	3.7	<b>Total</b>	<b>190</b>	<b>100.0</b>
<b>Total</b>	<b>190</b>	<b>100.0</b>		Frequency Distribution	Percentage
			License	90	47.4
			Master's Degree	83	43.7
			Doctorate	17	8.9
			<b>Total</b>	<b>190</b>	<b>100.0</b>

**Table 2:** Fields and Forensic Expertise Experiences of Participants in the Research

Professional Expertise	Frequency Distribution	Percentage	Forensic Expertise	Frequency Distribution	Percentage
0-5 years	22	11.6	I am not an expert	66	34.7
6-10 years	39	20.5	0-5 years	43	22.6
11-15 years	44	23.2	6-10 years	31	16.3
> 15 years	85	44.7	11-15 years	30	15.8
<b>Total</b>	<b>190</b>	<b>100.0</b>	> 15 years	20	10.5
			<b>Total</b>	<b>190</b>	<b>100.0</b>

As population, 190 people were interviewed by using survey and face-to-face techniques, who were dealing with forensic crimes and especially occupied with professions regarding forensic accounting field (see Table1). 73.7 percent of interviewees are Independent Public Accountants, 5.8 percent are Certified Public Accountants, 10 percent are Academicians, 1.1 percent are Criminologists, 0.5 percent are Statisticians and 3.7 percent are Lawyers. 83 percent of participants are male and 10.6% are female; at the same time, 86 percent are married and 13 percent are single; 47.4 percent of participants have license degrees, and considering the distribution of professional expertise, the rate of the ones with 15 years or more professional experience is 44.7 percent and the rate of the ones who

have been occupied with forensic expertise for 0-5 years is 11.6 percent; the rate of the ones claiming to be a forensic expert for 15 or more years is 10.5 (see Table 2); considering the occupation of participants in forensic accounting field, while 43 percent of them answered that they did not want the forensic accounting service, 4 percent said that they already employed forensic accountants; and the rate of the ones who see themselves as a forensic accountant and see this occupation as a profession is 21.6 percent; the rate of the ones who claimed not to have any interest in forensic accounting but to have knowledge about it is 30 percent (see Table 3).

**Table 3:**Field of Occupation of Participants regarding Forensic Accounting

	<b>Frequency Distribution</b>	<b>Percentage</b>
I undertake the forensic accountancy service	83	43.7
I am an employer of a forensic accountant	9	4.7
I consider myself as a Forensic accountant	41	21.6
I'm not involved in forensic accounting	57	30.0
<b>Total</b>	<b>190</b>	<b>100.0</b>

According to the research results, considering the relationship between *Forensic Accounting Departments* and *Forensic Experience*, there has not been found any significant relationship between economic damage calculation, computerized forensic analysis, case supports, expertise supports, investigation of fraud, abuse and corruption and assessment and forensic experience but only the relationship status of *financial table manipulation analyses* has been found significant (Chi-square value 11,55 P=0,021)

When the relationship between forensic accounting departments and certification that are important for forensic accounting departments are examined, the survey results have been evaluated in terms of the ones with PA, CPA, internal auditing, independent auditing and ISMMO 3M forensic expertise certification, and summarized in the Table 4.

The relationship between financial fraud control and education level of forensic accountants has been examined in Table 5. Looking at the relationship with educational level, there has not been found any relationship regarding the availability of forensic accounting for hiding funds and one of the business assets. On the other hand, there has been found a significant relationship between the availability of forensic accounting for embezzlement of assets and determination of the recovery of transactions and educational level of accountants, in terms of, especially, involving the fraud risk and risk assessment processes being enough as a tool in determination of suspicious or fraudulent transactions, which affects as a detection tool. As a matter of fact, the strongest results have been seen in the determination of suspicious and fraudulent transactions and risk assessment processes, and especially, in the determination fraud risks.

**Table 4:** The Relationship Between Forensic Accounting Departments and the Certification That Are Important for Forensic Accounting

Relationship	PA	CPA	Internal auditor	Independent Auditor	İSMMO Forensic Expertise Certificate
Economic damage calculation			Available	Available	
Computerized forensic analysis					Available
Case supports				Available	
Expertise supports				Available	
Fraud, abuse, corruption investigation		Available	Available		Available
Analysis of manipulation in financial statements	Available	Available	Available		
Valuation			Available	Available	
Other (specify)					

**Table 5:** The Relationship between Financial Fraud Control and Educational Level of Forensic Accountants

Financial Fraud	PA	Independent Auditor	İSMMO Forensic Expertise Certificate
Forensic accounting can be used to determine the whereabouts of funds and business assets.	Significant	-	-
Forensic accounting can be used in embezzlement of assets	Significant	-	Significant
and determination of transaction recoveries.			
Forensic accounting is effective as a fraud detection tool.	-	-	-
Forensic accounting is enough as a tool for determination of suspicious or fraudulent transactions.	-	-	Significant
Forensic accounting includes risk assessment processes and especially fraud risks.	-	-	-

When the relationship among the certification required for financial fraud control and forensic accounting is examined in Table 6, Forensic accounting can be used to determine the whereabouts of funds and business assets. There has not been found any significant results in terms of Independent auditing and Forensic expertise certificate while found in terms of Public Accounting. Although there is a significant relationship finding regarding Public Accounting and Forensic expertise certificate in the opinion that forensic accounting can be used to determine the recovery of transactions of asset embezzlement, there has not been found any significant relationships in terms of Independent auditing. Forensic accounting is enough as a tool for determination of suspicious or fraudulent transactions. There has been a significant result regarding forensic expertise certificate but there has not been any significant results found regarding other two. On the other hand, considering the concepts that forensic accounting is an efficient fraud determination tool and that Forensic accounting also contains risk assessment processes and fraud risk, there have not been found any relationship among the possession

of certificates of Public Accounting, Independent auditing and Forensic expertise within these two concepts.

**Table 6:** Relationship between Internal Controls and Forensic Accounting Expertise Experience

<b>Internal control</b>	<b>Forensic Expertise relationship with Significant</b>	<b>Chi-Square Value</b>	<b>P-Probability Value</b>
Forensic accounting is effective on the design of internal control.	<b>Significant</b>	<b>32.830</b>	<b>0.008</b>
Forensic accounting is effective on the supervision and assessment of internal control system.	<b>Significant</b>	<b>37.614</b>	<b>0.002</b>

Considering the relationship between internal auditor and forensic accounting expertise experience, it has been found significant that accounting was effective on the design of internal control system and that the supervision and assessment of internal control system were also effective (see Table 7).

**Table 7:** Relationship between Quality Financial Reporting and Forensic Accounting Expertise Experience

<b>Quality Financial Reporting</b>	<b>Forensic Relationship with Expertise Significant</b>	<b>Chi-Square Value</b>	<b>P-Probability Value</b>
Forensic accounting increases the quality of financial reporting.	<b>Significant</b>	<b>30.906</b>	<b>0.014</b>
Forensic accounting increases the trust of shareholders of corporate companies.	-	-	-
Accountants/auditors provide better quality financial reporting with forensic accounting skills.	<b>Significant</b>	<b>29.457</b>	<b>0.021</b>
Forensic investigations directly decrease the opportunities of fraud in financial reporting.	-	-	-

While the elements regarding that its relationship with quality financial reporting increases the quality of financial reporting and that accountants and auditors with forensic accounting skills provide better quality financial reporting are significant, there has not been any significance regarding that the increase in the trust of shareholders of corporate companies directly decrease the fraud opportunities in financial reporting.

**Table 8:** Opinions of Participants on Five Most Important Basic and Characteristic Features Required for Forensic Accounting

Basic/Characteristic Features	Participant Number	Percentage
Able to see background of numbers	134	70.5
Skeptical	105	55.3
Focused on details	98	51.6
Behaving ethically	94	49.5
Analytic thinker	85	44.7
Investigative	73	38.4
Intuition	64	33.7
Self-confident	53	27.9
Team player	31	16.3
Able to work under pressure	31	16.3
Able to create new ideas and virtual paths	28	14.7
Curious	19	10.0
Skillful	17	8.9
Insistent	16	8.4
Can answer questions	13	6.8
Adaptable	11	5.8
Tolerant about the work	10	5.3
Able to evaluate	4	23.2
Able to relax others	4	2.1
Other (specify):	0	0

Considering the opinions of participants on basic characteristics required for Forensic accounting, it is observed that the features of being able to see background of numbers, skeptical, focused on details, behaving ethically and an analytic thinker, in terms of basic characteristics, rated higher in percentage (see Table8).

**Table 9:** Opinions of Participants on Five Most Important Core-Competencies/Skills for Forensic Accountants to Possess

Self-competencies/Skills	Participant Number	Percentage
Auditing Skill	127	66.8
To be able to think like a criminal	113	59.5
Able to see the big picture	112	58.9
Able to identify key subjects	103	54.2
Instinct for investigation	80	42.1
Investigation ability	80	42.1
Testimony	57	30.0
Interpretation of exploration and analysis results (Legal practice)	56	29.5
Being an effective verbal communicator	42	22.1
Asset tracking	40	21.1
Fraud detection	33	17.4
Able to solve unstructured problems	32	16.8
Being an effective written communicator	24	12.6
Able to organize unstructured cases (Effectiveness of internal control)	24	12.6
Electronic exploration skills	6	3.2
Other (specify): Having human relations	1	0.005

Considering the opinions of participants on Core-Competencies and Skills required for Forensic accounting, it has been seen that the rate of features of Auditing skills, being able to think like criminal, being able to see the big picture, determination of key subjects, instinct and skills for investigation, testimony, interpretation knowledge, verbal communication and detection of assets and frauds were higher (see Table 9).

**Table 10:** Opinions of Participants on the Departments of Forensic Accounting

<b>Expertise Departments</b>	<b>Participant Number</b>	<b>Percentage</b>
Expertise supports	162	85.3
Case supports	119	62.6
Research, abuse and corruption investigation	112	58.9
Economic damage calculation	94	49.5
Analyses of financial table manipulation	84	44.2
Valuation	82	43.2
Computerized forensic analysis	61	32.1
Other (specify)	0	0

Considering the opinions of participants in Forensic accounting departments, it has been seen that expertise supports, case supports and investigation of abuse and corruption were the most important accounting departments (see Table 10)(see Table 11).

**Table 11:** Techniques Used in Fraud Control in Digital Environment

<b>Techniques Used in Fraud Control in Digital Environment</b>	<b>Participant Number</b>	<b>Percentage</b>
Benford Law	19	10.0
Computer Aided Audit Techniques	85	44.7
Data Mining	19	10.0
Markov Chain Monte Carlo Simulation	22	11.5
Linear Programming	22	11.5
Computerized forensic analysis	0	0
I don't use any technique	70	36.8
Other : (specify):	12	6.3

## CONCLUSION

In order to prevent or minimize sophisticated cases occurred in businesses by the effect of digitization, business owners or managers should take certain measurements. The importance of forensic accounting profession considered as one of these measurements is increasing day-by-day. In Turkey, the importance of forensic accounting profession is almost not present in terms of preventing frauds in digital environment, which is considered as a negative effect alongside the positive effects brought by the globalization, due to the fact that it has recently started to accelerate and the necessary infrastructure has not yet been completely established. In the world, it is supported by research results

that the importance of forensic accounting profession is increasing day by day, that required regulations are made for this and that the profession is at the stage of development or even maturation. Because the density of complex transaction is at the highest stage in Turkey today and for the control of fraudsters who can use this as leverage, we tried to take opinions of independent auditors who are considered among those with characteristics of a forensic accountant who is able to think like a criminal and able to think like an ordinary investigator, depending on the situation; and the results are as follows in short;

- Most of the participants were PAs, and CPAs and lawyers follow respectively,
- According to the survey results, it has been observed that most of the participants were male, the age range is mostly between 36-50 years, 86.3 of them were married, the rate of the ones with bachelor's degree is high, the expertise status in their own fields are mostly more than 15 years, their expertise in the field of forensic auditing/accounting is mostly not expert, this is followed by the ones being expert in forensic accounting for between 0-5 years, and finally, the part where forensic accounting field of occupation was seen most undertakes forensic accounting service and it was followed by the option of not involving in forensic accounting.
- It has been seen that, for the relationship between forensic accounting departments and certification that may be required for forensic accounting, the independent auditing certificate had no effect on forensic analysis and financial fraud prevention in digital environment, that it only had an effect on economic damage calculation, legal transactions and valuation, that forensic accounting certificate, which is İSMMMMO academy certificate, is effective in computerized forensic analysis and fraud departments but not sufficient, and from research data, it has been obtained that internal auditing certificate is partially effective in fraud and valuation.
- In addition, it has been shown that financial fraud partially had a relationship between demographic background of participants and that their forensic accounting field expertise was more effective than their own field expertise. Additionally, in research results, it was also seen that independent auditing certificate in financial fraud control was not as effective as İSMMMMO academy forensic accounting certificate and PA certificate.
- According to the participants, as a result of the research, it was seen that there was a positive relationship between internal control and forensic accounting field expertise and that the relationship between quality financial reporting and forensic accounting field expertise was partially significant.
- Participants' status of possessing a forensic accounting certificate has been tried to examined, and it is seen that only 16 of the participants had a forensic accounting certificate and that the forensic accounting expertise experience with this certificate is only in the beginning phase in Turkey.
- It is observed that forensic accounting was also effective on internal control and quality financial reporting in addition to financial fraud control, as a result of the questions directed at participants by Likert questionnaire method.
- In accordance with the research subject, opinions of the participants on basic and characteristic features of a forensic accountant and their core competencies/skills have been tried to treated and that the result partially differs from the research conducted at California State University, and it is possible that the reason for this difference is because the research was conducted on independent auditors but not on accountants, lawyers and academicians like they did abroad. However, as a result of the research, it was seen that independent auditors do their research not by using a fraud control tool but on audit software and that most of the independent auditors saw forensic accounting as a case support and made their assessments on books and documents instead of using a software.

In this study, in summary, it was seen that forensic accounting was not seen only as a financial fraud control but it was also important for internal audit and quality financial reporting, that forensic accounting core-competencies and characteristics were partially different and the reason for this difference was that the research was conducted on independent auditors, however, that independent auditors did not use any forensic accounting analysis software in financial fraud audit performed in digital environment. It was also stated by independent auditors that the profession of forensic accounting has not yet been established completely in Turkey and that forensic accounting meant legal-case supports.

In conclusion, according to research results, it was determined that forensic accounting profession has not yet accelerated in Turkey, the development of forensic accounting profession was not at a significant size and there were not any fraud control software for financial frauds in digital environment, and that the needs were satisfied by traditional methods. In today's world where technology has reached a different dimension, sophisticated cases in today's businesses cannot be revealed by traditional methods and the need for fraud control software against possible negative cases in information environment should be fulfilled in order to eliminate this complexity.

## REFERENCES

- ACFE, (2010), "**Report to the Nation on Occupational Fraud and Abuse**", USA, ACFE.
- Aksoy, A. ve Dayı, F. (2017), Birden Fazla Borsada İşlem Gören Hisse Senetlerinin Değerlemesi: Teorik Bir İnceleme, Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 5(15), 33-43.
- Akyel, N. (2009), "Adli Muhasebecilik ve Türkiye'de Uygulanabilmesi için Altyapı Bileşenlerinin Mevcut Durumu, Değerlendirilmesi ve Öneriler", Unpublished doctoral thesis, **Sakarya Üniversitesi Sosyal Bilimler Enstitüsü**, Sakarya.
- Bozkurt, N., (2009-2011), **İşletmelerin Kara Deliği, Hile, Çalışan Hileleri**, Alfa Basın Yayın Dağıtım Ltd. Şti., First Edition, İstanbul.
- Bozkurt, N., (2010), "**Adli Muhasebenin İçeriği, Gelişimi ve Türkiye Uygulamaları**", p.1-51.
- Bozkurt, N., (2000), "Muhasebe ve Denetim Mesleğinde Yeni Bir Alan- Adli Muhasebecilik", **Yaklaşım Dergisi**, Issue:94, p.56-61.
- Civan, M. ve Dayı, F. (2014), "Altman Z Skoru ve Yapay Sinir Ağı Modeli İle Sağlık İşletmelerinde Finansal Başarısızlık Tahmini", **Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi**, 41, 1-14.
- Crumbly, D. L., Lester E., H. and G. Stevenson, S., (2011), **Forensic& Investigative Accounting**, 5th edition.
- Dayı, F. (2019a), "Net İşletme Sermayesinin Likiditeye Etkisi: BİST 30 Şirketlerinde Uygulama", **KOCATEPEİİBF Dergisi**, 21 (1), 47-58.
- Dayı, F. (2019b), "Futbol Kulüplerinde Finansal Risk Analizi", **Maliye ve Finans Yazıları Dergisi**, 33 (111), 357-386.
- Davis, C., F., Ramona and Ogilby,S. (2009), "Characteristics and Skills of the Forensic Accountant", **AICPA**, California, pp.1-31.
- Demir, V.ve Bahadır, O., (2009), "Muhasebe Manipülasyonu Yöntemler Ve Teknikler", **Mali Çözüm Dergisi**, Issue:94, pp.1-18.

- Effiok, S. O., Ojong, C. M. and Usang, O. U. E., (2012), "The Implication of Occupational Fraud and Financial Abuse On The Performance Of Companies In Nagger", **Interdisciplinary Journal Of Contemporary Research In Business**, Volume: 4, Number: 7, pp.516-533.
- Grubor, G. R., Simeunovic, N. and N., (2013), "Integrated Forensic Accounting Investigative Process Model in Digital Environment", **International Journal of Scientific and Research Publications**, Volume:3, Issue:12, December 2013, pp.1-9.
- Gülten, Selçuk and Kocaer, İ., (2011), **Adli Muhasebe Uygulamaları**, Ankara Ofset, First Edition, Ankara
- <http://bfidan.net/2012/11/06/yetkinlik-kavrami-uzerine/>, Fidan, (02.01.2015).
- <https://www.kpmg.com/TR/tr/Issues-And-Insights/ArticlesPublications/KPMGundem/Documents/KPMGundem-Sayi-17v3.pdf>, (16.04.2015).
- Karausta, T., (2013), "Mesleki Hile Adli Denetim ve Türkiye'de Adli Denetim Mesleğinin Gerekliliği Üzerine Bir Araştırma", Doktora Tezi, **Akdeniz Üniversitesi Sosyal Bilimler Enstitüsü**, Antalya, pp. 1-174.
- Kasum, A. S., (2009), "**The Relevance of Forensic Accounting to Financial Crimes in Private and Public Sectors of Third World Economies: A Study from Nigeria**", April 15, pp.1-24. ([http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1384242](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1384242))(14.12.2014).<http://www.acfe.com/search.aspx?SearchText=forensic+accountant>, (17.03.2015).
- Kısacık, H. (2018) Adli Muhasebe Ve 6754 Sayılı Bilirkişilik Kanunu Kapsamında Muhasebe Bilirkişiliği Turkish Studies International Congress On Social Sciences II (Incos 2018 Quds) Volume 13/15, Spring 2018, P. 291-303 Doi Number: <Http://Dx.Doi.Org/10.7827/Turkishstudies.13531> Issn: 1308-2140, Ankara-Turkey
- Küçük, İ., (2008), "Finansal Raporlamada Hile-Manipülasyonlar ve Önlenmesi", Doktora tezi, **Marmara Üniversitesi Sosyal Bilimler Enstitüsü**, İstanbul.
- Mckittrick, C., (2009), "Forensic accounting- it's broader than you might think and it can help your organization", **Forensic Accounting**, No:1, pp.1-3.
- Narveson, S. D., (2007), " Education and Training in Fraud and Forensic Accounting: A Guide for Educational Institutions, Stakeholder Organizations, Faculty and Students", **West Virginia University**, February, 2007, pp:1-70.
- Oberholzer, C., (2002), **Quality Management in Forensic Accounting**, The Gordon Institute of Business Science, University of Pretoria, November.
- Okoye, E.I. and Akamobi, N.L., (2009), "The Role of Forensic Accounting in Fraud Investigation and Litigation Support", **The Nigerian Academic Forum** Vol:17, No:1, pp.39-44.
- Pazarçeviren, Y., (2005) "Adli Muhasebecilik Mesleği", **ZKÜ Sosyal Bilimler Dergisi**, Volume:1, Issue:2, pp.1-19.
- Pehlivanlı, D., (2011), **Hile Denetimi Metodolojisi ve Raporlama**, Beta Basım A.Ş., First Edition, İstanbul.
- Serçemeli, M.(2018) Muhasebe Ve Denetim Mesleklerinin Dijital Dönüşümünde Yapay Zekâ, Turkish Studies Economics, Finance and Politics Volume 13/30, Fall 2018, p. 369-386 DOI: 10.7827/TurkishStudies.14373 ISSN: 1308-2140 Skopje/MACEDONIA-Ankara/TURKEY
- Sevim, A., (2009), **Dijital Muhasebe**, T.C. Anadolu Üniversitesi Yayınları, No: 1903, First Edition, Eskişehir.

- Tarhan, M., B., (2012), "Hile Denetiminde Yetkinliklerin Değerlendirilmesi - Hile Karosu", **Mali Çözüm Dergisi**, Kasım-Aralık, 2012, pp.113-128.
- Tarhan, M., B., (2013), **Hileli Finansal Raporlama**, Beta Basım A.Ş., First Edition, İstanbul.
- Terzi, S., (2012), "**Hileli Finansal Raporlama: Önleme ve Tespit – İMKB İmalat Sanayiinde Bir Araştırma**", Beta Yayıncılık, First Edition, İstanbul.
- Toroslu, M. V., (2012), **Yeni Türk Ticaret Kanunu Kapsamında Finansal Tablolar Denetimi**, Seçkin Yayıncılık, First Edition, Ankara.

#### APPENDIX-A

**Table 12:** Features Separating Forensic Accounting from the Fields of Auditing and Fraud Investigation

Feature	Audit	Fraud Investigation	Forensic Accounting
<b>Perspective towards Time</b>	Examines the past.	Examines the past.	Examines the past and predicts the future.
<b>Focal Point</b>	It is done regularly.	Performed upon reaction.	Performed on cases that are preventive and ongoing.
<b>Scope of Investigation</b>	Handled in a narrow scope.	Handled in a narrow scope.	Handled in a broad scope.
<b>Main Duty</b>	Expressing opinion	Fraud status report writing	Forensic audit report writing
<b>Rules</b>	Rule based like MSUGT.	Policy based like TMS-TFRS. Within the framework of audit rules, it is valid.	Principle based.
<b>Objective of the Report</b>	Allows to track generally accepted accounting principles.	Detects frauds.	Provides fraud risk analysis and strategic service.
<b>Professional Feature</b>	Does not think like a criminal while examining.	Thinks like a criminal while examining.	Examines both like a criminal and an ordinary person.

**Appendix-B****Table 13:** Opinions of Participants on the Need for Forensic Accounting against Financial Fraud, Internal Audit and Financial Reporting (1.I strongly agree,2.I agree,3.I have no idea,4.I partially disagree,5.I disagree)

	F					%					A.O.	S.S
	1	2	3	4	5	1	2	3	4	5		
<b>Financial Fraud</b>												
Forensic accounting can be used to determine the whereabouts of funds and business assets.	48	40	25	51	26	25.3	21,1	13.2	26.8	13.7	2.83	1.42
Forensic accounting can be used in the determination of embezzlement of assets and recovery of transactions.	77	81	11	13	8	40.5	42.6	5.8	6.8	4.2	1,92	1.05
Forensic accounting is effective as a tool for fraud detection.	77	93	5	8	7	40.5	48.9	2.6	4.2	3.7	1.82	0.95
Forensic accounting is enough as a tool for determination of suspicious or fraudulent transactions.	59	92	7	26	6	31.1	48.4	3.7	13.7	3.2	2.09	1,08
Forensic accounting includes risk assessment processes and especially fraud risks.	77	86	7	13	7	40.5	45.3	3.7	6.8	3.7	1.88	1,01
<b>Internal control</b>												
Forensic accounting, internal control It is effective in designing the system.	73	91	9	11	6	38.4	47.9	4.7	5.8	3.2	1.87	0.96
Forensic accounting is effective in tracking and evaluating the internal control system.	75	86	9	16	4	39.5	45.3	4.7	8,4	2,1	1.88	0.98
<b>Financial Reporting</b>												
Forensic accounting increases the quality of financial reporting.	95	66	5	14	10	50.0	34.7	2.6	7.4	5.3	1.83	1.12
Forensic accounting increases the trust of shareholders of corporate companies.	10 6	67	5	4	8	55,8	35.3	2.6	2,1	4.2	1,64	0.95
With forensic accounting skills, accountants/auditors provide better quality financial reporting.	97	75	4	6	8	51.1	39.5	2,1	3.2	4.2	1,70	0,97
Forensic investigations directly decrease the opportunities of fraud in financial reporting.	98	71	2	11	8	51.6	37.4	1.1	5.8	4.2	1.74	1.03