UDK 657.6:004.4
DOI: 10.7251/FIN2003061D

PREGLEDNI RAD

Predrag Dragičević*
Anja Rajak**

Interna revizija u IT okruženju

Internal Audit in the IT Environment

Rezime

U ovom radu dat je pregled literature koji razmatra potencijale i izazove obavljanja interne revizije u vrijeme dominacije informacionih tehnologija i ekonomije koja karakteriše digitalna transformacija i veoma velika količina podataka. Rad istražuje primjenu računarski potpomognutih tehnika revizije, te prednosti njihovog korišćenja nasuprot preprekama u njihovoj implementaciji. Unapređenje efikasnosti i efektivnosti obavljanja postupaka, te povećanje pouzdanosti obrade podataka je sa jedne strane, a potrebna stručnost i eventualne tehničke poteškoće sa druge strane. Kako donijeti odluku?

Ključne riječi: *interna revizija, informacione tehnologije (IT), revizijske tehnike primjenom računara (CAATs).*

Abstract

The paper provides the literature review on the topic of opportunities and challenges of performing an internal audit in the context of information technologies and overall digital transformation of the economy nowadays, with very big sets of data. The research depicts computer-assisted audit techniques, naming advantages and challenges of their implementation. On one hand, both efficiency and effectiveness improvement joined with enhanced data processing reliability. On the other hand, the required expertise and potential technical issues. Which way to go?

Keywords: *internal audit, information technologies (IT), computer-assisted audit techniques (CAATs).*

* Državna revizorska institucija Srbije, e-mail: predrag.dragicevic@dri.rs
** Univerzitet u Istočnom Sarajevu, Fakultet poslovne ekonomije Bijeljina, e-mail: anja.rajak@fpe.unssa.rs.ba

UVOD

Interna revizija je od svog nastanka do danas prešla dug put. Kako Krsmanović i Polić (2008) ističu, među različitim motivima ekspanzije interne revizije sreću se oni koji proističu iz zakonske prirode ili statuta kompanija, ali u tržišno orijentisanim privredama su svakako dominantni želja za konkurentnošću na tržištu i smanjenje izdataka potrebnih za angažovanje eksternih revizora.

Potrebno je razumjeti da se među najznačajnijim izazovima koji se pred revizora stavljaju u savremenom poslovanju nalazi izvještavanje u realnom vremenu uz potrebu da revizor mnogo češće daje svoje mišljenje nego što je to bio slučaj u tradicionalnom poslovanju (Munteanu, 2014). Nadalje, evidentno je da su informacione tehnologije promijenile proces obavljanja revizije, ali je primjetna i jasna distinkcija u stepenu primjene revizorskih softvera u malim i srednjim revizorskim firmama, sa jedne strane, te velikim firmama, kao što je „Velika četvorka", sa druge strane. S tim u vezi je iznenađujuće malo istraživanja posvećeno potrebi integracije informacionih tehnologija u postupak revizije od strane revizorskih firmi svih veličina (Thottoli, Thomas, Ahmed, 2019).

Svakako da je transformacija od tradicionalnog ka savremenom načinu poslovanja stavila i internu reviziju pred izazove i uzrokovala njeno prilagođavanje, prvenstveno sa aspekta prisutnosti informacionih tehnologija, kako u poslovanju svih kompanija, pa samim tim i u obavljanju interne revizije. Štaviše, sama potreba za internom revizijom postala je jača uz intenzivnije korišćenje informacionih tehnologija, koje su često pogodno tlo za kreiranje različitih kriminalnih radnji ili grešaka.

Istraživačka pitanja

Izvođenje interne revizije nije moglo da ostane imuno na digitalnu transformaciju koja se dešava u globalnom okruženju. S obzirom na povećan protok informacija i rast odgovornosti prema vlasnicima kapitala, složeniji su i zadaci interne revizije i efekti koji se od izvještaja internih revizora očekuju. Nesporni su potencijali koje informaciona tehnologija ima za unapređenje rada interne revizije, a samim tim i funkcionisanje poslovnih organizacija. Međutim, stepen primjene alata i tehnika uz pomoć kompjutera od strane revizora i revizorskih firmi je diskutabilan. Zbog toga su u fokusu ovog rada sljedeća istraživačka pitanja:

1. Kako su savremene informacione tehnologije uticale na obavljanje interne revizije?
2. Da li su računarski potpomognute tehnike revizije (CAATs) savremeni načini sprovođenja revizorskog postupka, te koje su njihove prednosti i izazovi primjene?
3. Da li je u savremenom poslovnom okruženju moguće obavljati kvalitetnu internu reviziju korišćenjem tradicionalnih metoda revizije?

Značaj istraživanja

Aktuelnost ove teme proizlazi iz značaja interne revizije za uspješnost poslovanja kompanije, te bespovratne migracije poslovanja u svim segmentima na zavisnost od informacionih tehnologija. Svakako da to sa sobom nosi brojne izazove i potrebu praćenja savremenih istraživanja u oblasti prilagođavanja interne revizije IT okruženju. Da bi interni revizori odlučili da li će se i u kom obimu osloniti na dostupne revizorske softverske pakete, moraju najprije da posjeduju detaljne informacije o prednostima i nedostacima koje ovakve promjene sa sobom nose. Ovo istraživanje se koristi sekundarnim podacima, ali dodaje trenutno dostupnoj literaturi još jedan uvid u prepreke i prednosti korišćenja CAATs.

1. PREGLED LITERATURE

1.1. Razumijevanje interne revizije

Za početak, interna revizija se, prema definiciji Instituta internih revizora (1999), označava kao „aktivnost nezavisnog i objektivnog uvjeravanja i savjetodavna aktivnost, dizajnirana tako da poveća vrijednost i unaprijedi poslovanje organizacije. Ona pomaže organizaciji da ostvari svoje namjere tako što na sistematičan i uređen način pristupa procjeni i unapređenju efektivnosti procesa upravljanja rizicima, kontrolnih procesa i procesa upravljanja organizacijom". Za razliku od ranijih definicija istog pojma, Nagy i Cenker (2002) su kod navedene definicije uočili pomjeranje fokusa od davanja uvjerenja ka stvaranju dodane vrijednosti i potenciranju postojanja standarda na kojima se zasniva obavljanje interne revizije.

Sa tim se slaže Tušek (2017), koji navodi da je interna revizija usmjerena na poboljšanje korporativnog upravljanja i može se posmatrati i kao njegov nadzorni mehanizam, zatim upravljanja rizicima i sistema internih kontrola, a u današnjem poslovnom ambijentu ima sve veći značaj zbog svog potencijala da stvori novu vrijednost za cjelokupno poslovanje. Poslovne organizacije koriste internu reviziju kao pomoć pri ostvarenju svoje misije i ciljeva i upravljanja rizikom (Krsmanović, Rajak, 2016; Andrić, Krsmanović, Jakšić, 2012).

Prema Krsmanoviću i Poliću (2008), interna revizija obuhvata finansijsku, operativnu i upravljačku reviziju.

Tušek i Sever (2007) ističu razliku između revizije finansijskih izvještaja i interne revizije preko predmeta njihovog ispitivanja i lica koja ih obavljaju, te naglašavaju ulogu interne revizije za unapređenje poslovanja organizacije. Ovu ulogu interna revizija ostvaruje kroz detaljno ispitivanje i ocjene načina rada, te obezbjeđenje preporuka za unapređenje poslovanja.

1.2. Uticaj digitalne ekonomije na reviziju

Kao što Krsmanović i Rajak (2016) napominju, intenzivna primjena novih tehnologija u poslovanju klijenata revizije je pred revizore stavila nove izazove, kako sa aspekta neophodnog stalnog obrazovanja u oblasti korišćenja informacionih tehnologija (Mijić, 2019), tako i sa bezbjednosnog aspekta. Sa druge strane, vidljive su uštede u vremenu i novcu (Krsmanović, Rajak, 2016), te unapređenje kvaliteta i pouzdanosti revizorskih izvještaja (Mijić, 2019; Banker, Chang, Kao, 2002).

U domenu potrebne kontinuirane edukacije za revizore vrijedi pomenuti da, kako bi interni revizori savladali informacione tehnologije u onoj mjeri koja je njima potrebna za efikasan rad, na raspolaganju su im brojne obuke i kursevi. Te obuke pružaju fakulteti i razna stručna udruženja. Pored toga, neke kompanije pružaju kompjuterski softver za reviziju i obuku za interne revizore. Uz to, brojni stručni radovi i udžbenici su obradili ovu tematiku, kako ističe Leko (2008).

1.3. Potreba baziranja savremene interne revizije na informacionim tehnologijama

Najprije je potrebno da se istakne da bi obavljanje revizije danas bez korišćenja informacionih tehnologija bilo vrlo neobično zbog toga što su računari dio skoro svih poslovnih procesa, odnosno, kako primjećuje Sayana (2003), s obzirom na to da su svi podaci koji su predmet revizije u elektronskom obliku, bilo bi nemoguće izvesti reviziju bez pomoći računara.

Upravo ta sveprisutna upotreba informacionih tehnologija iscrtava smjer rada interne revizije na oblast informacionih tehnologija i sistema. Zbog toga je jedna od suštinskih aktivnosti prilikom obavljanja interne revizije, ali i osiguravanja njene efikasnosti i efektivnosti, upravo ispitivanje i procjena informacione infrastrukture, sigurnosti podataka i bezbjednosti procesa.

INTRODUCTION

Internal audit has come a long way since its inception. As Krsmanović and Polić (2008) point out, among the various motives for the expansion of internal audit are those arising from the legal form or statute of companies, but in market-oriented economies, the desire for market competitiveness and reduction of costs required to hire external auditors are certainly dominant.

It needs to be understood that among the most significant challenges facing the auditor in modern business is real-time reporting along with the need for the auditor to give opinion much more frequent than was the case in traditional business (Munteanu, 2014). Furthermore, it is evident that information technologies have changed the audit process, but there is a clear distinction in the degree of application of audit software in small and medium-sized audit firms, on the one hand, and large firms, such as the Big Four, on the other. With this in regard, surprisingly little research has been devoted to the need for integrating of information technology into the audit process by audit firms of all sizes (Thottoli, Thomas, & Ahmed, 2019).

Certainly, the transformation from the traditional toward the modern way of doing business puts internal audit in front of challenges and it caused its adjustment, primarily from the aspect of the presence of information technologies, both in the business of all companies and thus in performing internal audit. Moreover, the need for the internal audit itself has become stronger with the more intensive use of information technology, which is often a suitable ground for the creation of various criminal acts or errors.

Research questions

Performing of internal audit could not remain immune to the digital transformation which is taking place in the global environment. Given the increased flow of information and the increase of responsibilities towards capital owners, the tasks of internal audit and the effects expected from internal auditors' reports are more complex. The potentials that information technology has for improving the work of internal audit, and thus the functioning of business organisations, are indisputable. However, the degree of application of computer-assisted tools and techniques by auditors and audit firms is debatable. Therefore, the focus of this paper is on the following research questions:

1. How have modern information technologies influenced the performance of internal audit?
2. Are computer-assisted audit techniques (CAATs) modern ways of performing the audit procedure, and what are their advantages and challenges of application?
3. Is it possible to perform quality internal audit, in a modern business environment, by using traditional audit methods?

Significance of the research

The significance of this topic derives from the importance of internal audit for the success of the company's business, and the irreversible migration of business in all it's segments toward its dependence on information technology. Certainly, this brings with it numerous challenges and the need to follow modern research in the field of adapting internal audit to the IT environment. For internal auditors to decide whether and to what extent they will rely on available software programs for audit performance, they must first have detailed information about the advantages and disadvantages that such change brings. This research uses secondary data but adds to the currently available literature another insight into the barriers and benefits of using CAATs.

1. LITERATURE REVIEW

1.1. Understanding internal audit

To start with, internal audit, as defined by the Institute of Internal Auditors (1999), is defined as "an activity of independent and objective assurance and advisory activity, designed to increase the value and improve the management of the organisation. It helps the organisation to achieve its intentions by systematically and in an orderly manner assessing and improving the effectiveness of risk management processes, control processes and organisational management processes." Unlike earlier definitions of the same term, Nagy and Cenker (2002) observed a shift in focus from giving assurance to creating added value and emphasizing the existence of standards on which the performance of internal audit is based.

Tušek (2017) agrees with this, stating that internal audit is aimed at improving corporate governance and can be seen as its supervisory mechanism, risk management and internal control systems, and in today's business environment is increasingly important because of its potential to create new value for the entire business. Business organisations use the internal audit as an aid in achieving their mission and goals and risk management (Krsmanović and Rajak, 2016; Andrić, Krsmanović and Jakšić, 2012).

According to Krsmanović and Polić (2008), the internal audit includes financial, operational and management audit.

Tušek and Sever (2007) stress out the difference between the audit of financial statements and internal audit through the subject of their examination and the persons who perform them, and emphasize the role of internal audit for improving the organisation's management. Internal audit achieves this role by detailed examination, performance evaluation, and recommendations for business management improvement.

1.2. The impact of the digital economy on auditing

As Krsmanović and Rajak (2016) note, the intensive application of new technologies in the business management of clients of audit has posed new challenges to auditors, both from the aspect of necessary continuous education in the field of information technology (Mijić, 2019) and from the security aspect. On the other hand, savings in time and money are clear (Krsmanović and Rajak, 2016), and an improvement in the quality and reliability of audit reports (Mijić, 2019; Banker, Chang and Kao, 2002).

In the domain of necessary continuous training for auditors, it is worth mentioning that for internal auditors to master information technologies to the extent they need to work effectively, they have several pieces of training and courses at their disposal. The training is provided by academia and various professional associations. Also, some companies provide computer software for auditing and training for internal auditors. Likewise, numerous professional papers and textbooks have addressed this topic, as Leko (2008) notes.

1.3. The need to base modern internal audit on the information technology

Firstly, it is crucial to mention that contemporary audit performance would be very unusual without the use of information technology because computers are part of almost all business processes. As Sayana (2003) depicts, given the fact that all data audited in an electronic form, it would be impossible to perform an audit without the help of a computer.

Therefore, this ubiquitous use of information technology sets the direction of internal audit work in the field of information technology and systems. Hence, one of the essential activities when performing

Nadalje, globalizacija je stavila određene izazove i pred revizorske i računovodstvene firme, u smislu neophodnosti da ponude nove usluge svojim klijentima, koje su globalno orijentisane i zahtijevaju nova znanja i vještine, kako bi se obezbijedilo efikasno upravljanje i uz povećanu količinu informacija i izmijenjeno poslovno okruženje. Međutim, važno je napomenuti i stav Andrića i dr. (2012) da, i pored promijenjenog okruženja poslovanja u smislu opšte prisutnosti tehnologije prilikom obrađivanja računovodstvenih podataka, nije došlo do promjene primarnog cilja i djelokruga revizije.

U suštini, informacione tehnologije djeluju na internu reviziju tako što IT proučava i ocjenjuje računovodstvene kontrole, a prije svega djeluju putem revizijskih tehnika primjenom računara – CAATs (engl. Computer-Assisted Audit Techniques ili Computer-Assisted Audit Tools and Techniques), koje unapređuju efikasnost i efektivnost revizijskih postupaka (Soltani, 2007). Kako Leko (2008) zapaža, interni revizor treba da u svakom trenutku uzima u obzir i manuelne i IT komponente sistema, jer mu samo njihovo jedinstveno djelovanje pruža mogućnost da procijeni sistem kao jedinicu i da stvori testove manuelne i IT kontrole, kako bi ostvario ciljeve.

Naravno, zbog enormnog rasta količine podataka koji se pojavljuju u preduzećima, revizija u novim uslovima poslovanja analizira veoma veliku količinu podataka. U vezi s tim, revizija današnjice susreće se sa novim pojmom – Big data analytics.

Big data analytics predstavlja primjenu naprednih analitičkih tehnika na veoma velike količine podataka, te zajedno čine jedan od najzanimljivijih trendova današnjice u poslovnoj inteligenciji (Russom, 2011), koji svakako ima potencijal da utiče i na postupak revizije i donese promjenu fokusa sa ispitivanja uzorka na ispitivanje populacije. Motivi kompanija koje koriste napredne analitičke tehnike su različiti, ali Russom (2011) naglašava potrebu poslovnih analitičara da otkriju nove činjenice o poslovanju preduzeća koje do tada nisu bile nikome poznate. Rezultati ankete koju je sproveo TDWI 2009. godine pokazali su da je 38% ispitanih kompanija koristilo naprednu analitiku, a 85% je imalo jasan plan da se korišćenju ovih tehnika okrene u naredne tri godine.

Nadalje, mnoge informacije koje su internim revizorima neophodne za rad postoje samo u elektronskoj formi. Da bi revizor koristio takve informacije, pa i one koje su dostupne u papirnoj formi, on mora da vlada određenim revizorskim alatima koji su rezultat novih tehnologija.

Ipak, ne oslanjaju se svi revizori u istoj mjeri na te tehnologije. Dok pojedini revizori žele da ih usvoje i primijene čim im postanu dostupne, drugi se trude da se minimalno oslanjaju na njih. Zbog toga Coderre (2008) navodi četiri različita nivoa primjene tehnologije u obavljanju revizije:

1. Početni nivo primjene tehnologije odnosi se na one revizore koji nisu ni započeli sa korišćenjem tehnika i alata na računaru, tako da se proces revizije koju oni vrše nije izmijenio. To znači da se fajlovi analiziraju manuelno, a ne postoje ni tendencije da se u budućnosti uvode nove tehnologije u radni proces. Tehnologija se upotrebljava samo ukoliko ne postoji način da se određeni zadatak obavi na drugačiji način.
2. Srednji nivo primjene tehnologije odnosi se na veoma ograničenu upotrebu informacionih tehnologija u procesu interne revizije. To znači da se tehnologije primenjuju sporadično i, najčešće, samo od strane jedne osobe ili manjeg broja osoba koje čine revizorski tim. U ovom stadijumu, došlo je samo do promjene alata koji se koriste za obavljanje aktivnosti koju su esencijalni za dobijanje finalnog izvještaja. Iako bi iz ovog stadijuma interna revizija trebalo da svoj dalji rad zasniva na još većoj upotrebi informacionih tehnologija u svom radu, u slučaju nedostatka vizije o daljoj njihovoj upotrebi moguće je da bi i najmanja prepreka koja se javi prilikom upotrebe informacionih tehnologija mogla da dovede do stagnacije na ovom stadijumu.
3. Integralni nivo primjene tehnologije jeste stadijum u kome se informacione tehnologije snažno integrišu u funkciju interne revizije, kao neizostavni dio njenog daljeg razvoja. U ovom stadijumu, tehnologije se sofisticiranije upotrebljavaju, postoji vizija za upotrebu informacionih tehnologija i CAATs, a vrši se i automatizacija procesa koji su ranije vršeni manuelno. Takođe, izdvajaju se novčana sredstva za stalno unapređenje i razvoj novih revizorskih tehnika i alata. Primjeri upotrebe tehnologija u revizijskom procesu koje navodi Coderre (2008) jesu sljedeći:
   - „izvlačenje i analiziranje podataka klijenta kao podrška specifičnim ciljevima revizije;
   - automatizacija administrativnih funkcija revizijske organizacije, kao što su planiranje vremena, izvještavanje, obračuni, planiranje revizije, analiza rizika i upravljanje projektima;
   - osnivanje elektronske biblioteke materijala vezanih za reviziju (politike, procedure, zakoni);
   - automatizacija radnih papira i unakrsno istraživanje izvornih dokumenata, uz mogućnost razvoja interne mreže sa linkovima hiperteksta;
   - razvijanje baza podataka sumiranjem podataka klijenata iz prethodnog perioda u vezi s ključnim informacionim sistemima koji se koriste za analize trendova, planiranje revizije ili sistem ranog upozorenja“ (Coderre, 2008: 52–53).
4. Napredni nivo primjene tehnologije podrazumijeva kontinuirano unapređenje tehnologije, u smislu razvoja automatskih sistema. U ovom stadijumu, postoji maksimalna iskorišćenost informacionih tehnologija da bi revizija mogla da ostvari maksimalne benefite od njihove upotrebe.

Na kraju, Coderre (2008) podsjeća na to da primjena tehnologija u reviziji ne znači da je obavezno da u okviru preduzeća postoji velika organizacija interne revizije, niti da ulaganja u tehnologiju moraju da budu skupa i stalna. Minimalno ulaganje u revizorsku tehnologiju može donijeti izuzetne koristi u radu internog revizora, na primjer, veća primjena analitičkog pregleda može da doprinese boljoj prevenciji i otkrivanju kriminalnih radnji (Pacini, Brody, 2005).

2. REZULTATI ISTRAŽIVANJA I DISKUSIJA

CAATs (engl. Computer-Assisted Audit Techniques), odnosno kompjuterski podržane tehnike revizije obuhvataju niz računarskih alata i procedura koje koriste revizori u različitim fazama revizije finansijskih izveštaja i interni revizori u širokom spektru operativnih i posebnih revizija (Debreceny i dr., 2005). CAATs predstavljaju esencijalne alate u revizorskoj profesiji (Rosli, Yeow, Siew, 2012), sa stanovišta prikupljanja dokaza i revizije informacinih sistema (Soltani, 2007).

2.1. Prednosti korišćenja CAATs

Najprije je neophodno spomenuti potrebu obrade povećanog broja transakcija u preduzećima, čime se bave kompjuterizovani računovodstveni sistemi, kao što je ERP (engl. Enterprise Resource Planning), što dovodi do povećane potrebe za korišćenjem CAATs, u poređenju sa „manuelnim“ revizorskim metodama (Munteanu, 2014).

Jedan opšti smjer razvoja CAATs u organizacijama ne postoji. Naime, svaka organizacija ima jedinstveno radno okruženje, specifična znanja zaposlenih, te zahtjeve organizacije (Coderre, 2008).

an internal audit is the examination and assessment of information infrastructure, data security and process security, but also ensuring its efficiency and effectiveness.

Furthermore, globalisation has brought certain challenges to audit and accounting firms, in terms of the need to offer new services to their clients, which are globally oriented and require new knowledge and skills, to ensure efficient management and with an increased amount of information and changed business environment. However, it is important to mention that Andrić et al. (2012) advocate that despite the changing business environment in terms of the general presence of technology in the processing of accounting data, there has been no change in the primary objective and scope of the audit.

Essentially, information technology influences internal audit due to IT's role in research and evaluation of the accounting controls, but foremost through the computer-assisted audit techniques - CAATs (Computer-Assisted Audit Techniques or Computer-Assisted Audit Tools and Techniques), which improve efficiency and the effectiveness of audit procedures (Soltani, 2007). As Leko (2008) argues, the internal auditor should always take into account both manual and IT components of the system because only their unique action allows the auditor to assess the system as a whole and create manual and IT control tests to achieve objectives.

Undoubtedly, due to the enormous growth of data in companies, the audit analyzes a very large amount of data in the new business environment. In this regard, today's audit encounters a new concept - Big data analytics.

Big data analytics is the application of advanced analytical techniques to very large sets of data, and together they form one of the most interesting trends in today's business intelligence (Russom, 2011), which certainly has the potential to influence the audit process and brings a shift of focus from testing based on a sample, to the entire population. The motives of companies that use advanced analytical techniques are different, but Russom (2011) emphasizes the need for business analysts to discover new facts about the companies' performance that were undiscovered before. The results of a survey conducted by TDWI in 2009 showed that 38% of the surveyed companies used advanced analytics, and 85% had a clear plan to start to use these techniques in the following three years.

Moreover, various information that internal auditors need exist only in electronic form. For an auditor to use such information, even those in paper form, she/he must be skilful regarding certain audit tools that arose as a result of the new technologies.

However, not all auditors rely on these technologies to the same extent. While some auditors want to adopt and implement them as soon as they become available, others try to rely on them as less as possible. Therefore, Coderre (2008) points out four different stages of technology application in auditing:

1. The initial level of technology application refers to those auditors who have not even started using computer-assisted techniques and tools, so the audit process they perform has not changed. This means that files are analyzed manually, and there is no tendency to introduce new technologies into the workflow in the future. Technology is used only if there is no other option to perform a particular task.
2. The medium level of technology application refers to the very limited use of information technology in the internal audit process. This means that technologies are applied sporadically and, most often, only by one person or a few people from the audit team. At this stage, there has only been a change in the tools used to perform the activities that are essential to obtaining the final report. Although from this stage onward, internal audit should focus its work on even greater use of information technologies, in case of lack of vision on its further use, it is possible that even the slightest obstacle occurred due to information technologies appliance could lead to stagnation at this stage.
3. The integral level of technology application is the stage in which information technologies are strongly integrated into the function of internal audit, as an indispensable part of its further development. At this stage, technologies are used more sophisticatedly, there is a vision for the use of information technologies and CAATs, and the automation of processes that were previously performed manually is conducted. Also, funds are allocated for continuous improvement and development of new audit techniques and tools. Examples of the use of technology in the audit process cited by Coderre (2008) are the following:
   - „extracting and analyzing client data in support of specific audit objectives;
   - automatisation of the administrative functions of the audit organisation, such as time management, reporting, accounting, audit planning, risk analysis and project management;
   - establishment of an electronic library of materials related to auditing (policies, procedures, laws);
   - automatisation of working papers and cross-examination of source documents, with the possibility of developing an internal network with hypertext links;
   - developing databases by summarizing client data from the previous period regarding key information systems used for trend analysis, audit planning or early warning system "(Coderre, 2008, pp. 52-53).
4. Advanced level of technology application implies a continuous improvement of technology, in terms of the development of automatic systems. At this stage, there is a maximum utilisation of information technology so that the audit can achieve the maximum benefits from its use.

Finally, Coderre (2008) emphasizes that the application of technology in auditing does not mean a large internal audit organisation within the company is necessary, nor that investments in technologies must be expensive and constant. Minimal investments in audit technologies can bring tremendous benefits to the work of an internal auditor, for example, greater application of analytical review can contribute to better prevention and detection of criminal acts (Pacini and Brody, 2005).

2. RESEARCH RESULTS AND DISCUSSION

CAATs (Computer-Assisted Audit Techniques), in other words, computer-aided audit techniques, include several computer tools and procedures used by auditors in various phases of auditing financial statements and internal auditors in a wide range of operational and special audits (Debreceny et al, 2005). CAATs are essential tools in the auditing profession (Rosli, Yeow, & Siew, 2012), from the perspective of evidence gathering and information systems auditing (Soltani, 2007).

2.1. Advantages of using CAATs

First of all, it is necessary to mention the need to process an increased number of transactions in companies, which computerized accounting systems are dealing with, such as ERP (Enterprise

S obzirom na direktnu vezu između primjene revizorskih softvera i povećanja efikasnosti revizorskih firmi, koju su u svojoj studiji prikazali Thottoli i dr. (2019), daje se snažna preporuka revizorskim firmama da u budućnosti pozicioniraju svoje poslovanje u ovom pravcu. U istom pravcu idu i zaključci koje nudi Mijić (2019), da su značajna unapređenja koja proizlaze iz upotrebe revizorskih softvera vidljiva u izvođenju kontrolnih i suštinskih testova, budući da revizori mogu da prikupe veći obim dokaza i obezbijede veću pouzdanost. Naravno, još jedna od osnovnih prednosti u korišćenju revizorskih softvera krije se u korišćenju tzv. read only kopije dokumenata, koji su zaštićeni od izmjene podataka (Munteanu, 2014).

Pored navedenog, značajno je spomenuti i sljedeće prednosti korišćenja kompjuterski podržanih tehnika revizije:

1. „testiranje računarskih softvera klijenta, jer revizor može provjeriti da li radi ispravno ili ne, pošto je obim transakcija koji je predmet revizije izuzetno visok. Jedini efikasan način za testiranje programa klijenta je korišćenje tehnika pomoću računara;
2. testiranje velikih količina podataka za kratko vrijeme i sa visokom tačnošću, tako da revizor ima više povjerenja u sopstveno mišljenje;
3. testiranje izvora podataka, jer revizor može testirati računovodstveni program i njegove evidencije direktno prema njihovom porijeklu, umjesto da testira papirne dokumente koji treba da budu tačne kopije;
4. reviziju troškova (isplativost) jer se, kada se implementira softver za reviziju, može koristiti godišnje za dobijanje revizijskih dokaza, pod uslovom da klijent ne mijenja svoj računarski softver;
5. pravljenje poređenja između dobijenih rezultata koristeći CAATs i rezultate tradicionalnih testova. Ako se dobiju slični rezultati, opšte samopouzdanje revizora će porasti“ (Munteanu, 2014: 214).

Na kraju, praksa izvođenja revizije unapređuje se kada se prilagođeni revizorski softver primjenjuje uz odgovarajuće računovodstvene i revizorske standarde (Thottoli i dr., 2019).

2.2. Izazovi korišćenja CAATs

Specijalizovani revizorski softveri dostupni su već godinama, a neki od njih su čak besplatni. Ipak, veoma mali broj revizora ih koristi, i to uglavnom revizori informacionih sistema (i to ne u punom obimu, već za specijalizovana testiranja ili u specifičnim okolnostima). Generalno posmatrano, veoma je mali broj revizora koji su spremni da ulože sredstva u alate i tehnike zasnovane na računaru, a još manji je broj onih koji su spremni da ulože u informacione tehnologije (Coderre, 2008).

Postavlja se pitanje zbog čega revizori nisu spremni da koriste tehnologiju koja im omogućava da pregledaju hiljade transakcija u kratkom vremenskom roku, ili da vrše statističko uzorkovanje koje ne bi mogli da sprovedu koristeći tradicionalne tehnike revizije?

Kao moguća objašnjenja Coderre (2008) navodi da mnogi revizori smatraju da su revizorski softveri i druga potrebna oprema skupi, a njihova efikasnost upitna. Ovakvo mišljenje određenog broja revizora bilo bi ispravno prije deset ili petnaest godina, kada specijalizovani softveri zaista jesu bili skupi, a rezultati revizije su bili isključivo u papirnom obliku i time teški za analizu i prezentaciju. Takođe, programi su bili napisani tako da većina revizora nije bila dovoljno kompjuterski „pismena“ za njihovo korišćenje. Međutim, danas je situacija znatno drugačija, te zablude od prije deceniju ili dvije nemaju mjesta u današnjem okruženju. Danas su specijalizovani softveri neuporedivo jeftiniji i lakši za upotrebu. Vjerovatno najveća promjena jeste činjenica da su današnji softveri znatno fleksibilniji, što znači da mogu da se koriste za analizu podataka iz svih aplikacija, na različitim platformama.

Sa druge strane, Janvrin, Lowe i Bierstaker (2008) ističu da, bez obzira na izgradnju popularne atmosfere prelaska na poslovanje zasnovano na informacionih tehnologijama, samostalni revizori se i dalje relativno malo oslanjaju na tehnike i alate potpomognute kompjuterom, odnosno sporije od očekivanog.

Takođe, male i srednje firme se češće odlučuju na korišćenje MsExcel programa jer njihovo osoblje nije prošlo dovoljno treninga ili nema dovoljno praktičnog iskustva u korišćenju revizorskih softvera (Thottoli i dr., 2019).

Međutim, u prošlosti su softveri bili takvi da revizor nije mogao da ih koristi bez pomoći programera, a, sa druge strane, programeri nisu bili iskusni na polju revizije tako da ni oni nisu mogli samostalno da razvijaju i unapređuju revizorske softvere. Takav proces je zahtijevao znatno više vremena, te su mnoga preduzeća odustala od uvođenja CAATs. Ipak, oni koji danas odlučuju o uvođenju kompjuterski pomognutih tehnika i alata u postupak revizije treba da budu svjesni da današnji revizorski softveri nemaju takve vrste ograničenja, već se veoma lako koriste, mogućnosti za skladištenje podataka su ogromne, a revizori sve operacije u postupku revizije mogu da obave na sopstvenom računaru putem stabilnih mreža velikog protoka (Coderre, 2008).

Zatim, rezultati istraživanja koje su sproveli Janvrin i dr. (2008) koristeći UTAT model koji su razvili Venkatesh, Morris, Davis i Davis (2003) pokazuju da bi, između ostalog, sljedeći faktori mogli da utiču na odluke revizora da koriste CAATs:

1. lično uvjerenje da će korišćenje CAATs obezbijediti bolje performanse;
2. mreža podrške za primjenu CAATs; i
3. razvijanje potrebnih treninga iz oblasti primjene CAATs.

Nažalost, kao što Coderre (2008) navodi, i danas mnogi menadžeri na rukovodećim položajima vjeruju da su isključivo revizori informacionih sistema sposobni da koriste revizorske softvere. Međutim, činjenica je da revizori danas znatno jačaju svoje ekspertize, te im je u postupku revizije potrebna minimalna pomoć IT profesionalaca, i to samo u izuzetnim slučajevima ili kada se tehnologija koju revizori koriste znatno promijeni.

Za kraj, u ovom kontekstu treba pomenuti vjerovanje mnogih menadžera kako su podaci koje revizori obrađuju u postupku revizije kompromitovani korišćenjem CAATs, što, naravno, nije tačno. Današnji softveri omogućavaju revizorima da vrše postupke revizije bez kopiranja fajlova; sasvim je dovoljno da se najobičnijim laptop računarom prikače na centralni računar preduzeća (Coderre, 2008).

ZAKLJUČAK

Na osnovu pregleda literature i sučeljavanja stavova, ovo istraživanje identifikuje izmijenjeno okruženje u kojem se interna revizija našla. Zanimljivo, i ona, kao i ostali segmeni poslovanja i života, mora da nauči da živi sa stalnim promjenama i čak ide korak ispred njih, ukoliko želi da svojim korisnicima ponudi dodatu vrijednost.

Prije svega, potrebno je razumjeti aktuelno informatičko okruženje organizacije (hardver, softver, politike, nivo znanja i znanja revizora u oblasti informacionih tehnologija). Takođe, potrebno je razmotriti kakvi su stavovi zaposlenih i, naročito, menadžmenta organizacije kada su u pitanju informacione tehnologije, kako bi se stekao uvid u

Resource Planning). Thus, there is an increased need to use CAATs, compared to "manual" audit methods (Munteanu, 2014).

There is no general direction for the development of CAATs in organisations. It arrives from the fact that each organisation has a unique work environment, specific knowledge of employees, and the requirements of the organisation (Coderre, 2008).

Given the direct link between the application of audit software and increasing efficiency of the audit firms, which was presented in the study conducted by Thottoli et al. (2019), a strong recommendation has been given to audit firms to position their business in this direction in the future. Along the same lines are the conclusions offered by Mijić (2019) - significant improvements arising from the use of audit software, are visible in the performance of control and substantive tests, since auditors can gather a larger amount of evidence and provide greater reliability. Surely, another key advantage of audit software lies in the usage of so-called read-only copies of data-protected documents (Munteanu, 2014).

In addition, it is important to mention the following advantages of using computer-assisted audit techniques:

1. "testing the client's computer software, because the auditor can check whether it is working properly or not since the volume of transactions that are the subject of the audit is extremely high. The only effective way to test a client's program is to use computer-assisted techniques;
2. testing large sets of data in a short time and with a high level of accuracy, so that the auditor is more confident;
3. testing data sources, because the auditor can test the program for accounting and its records directly according to their origin, instead of testing paper documents that should be exact copies;
4. audit of costs (cost-effectiveness) because, when the audit software is implemented, it can be used annually to obtain audit evidence, provided that the client does not change the software;
5. making a comparison between the results obtained using CAATs and the results of traditional tests. If results are similar, the general self-confidence of the auditor will be increased "(Munteanu, 2014, p. 214);

Finally, the practice of performing an audit is improved when customized audit software is applied under appropriate accounting and auditing standards (Thottoli et al, 2019).

2.2. Challenges of using CAATs

Specialized audit software has been available for years, and some of them are even free of cost. However, very few auditors use them, mainly information system auditors (not in full but for specialized testing or in specific circumstances). In general, very few auditors are willing to invest in computer-based tools and techniques, and even fewer are willing to invest in information technology (Coderre, 2008).

The question arises, why are auditors unwilling to use technology that allows them to review thousands of transactions in a short period, or to perform statistical sampling that they would not be able to perform using traditional audit techniques?

As a possible explanation, Coderre (2008) states that many auditors consider audit software and other necessary equipment to be expensive and their effectiveness questionable. This opinion of a certain number of auditors would have been correct ten or fifteen years ago, when specialized software was really expensive, and the audit results were exclusively in paper form and thus difficult to analyze and present. Also, the programs were written in such a way that most auditors were not computer-literate enough to use them. However, today this is significantly different, and those misconceptions from a decade or twenty years ago have no place in today's environment. Nowadays, specialized software is incomparably cheaper and easier to use. Probably the biggest change is the fact that today's software is much more flexible, which means that it can be used to analyze data from all applications, on different platforms.

On the other hand, Janvrin, Lowe, and Bierstaker (2008) stress out that despite building a popular atmosphere of transition to IT-based business, independent auditors still rely relatively slightly on computer-assisted techniques and tools, or slower than expected.

Besides, small and medium-sized firms decide to use the MS Excel more often, because their staff has not undergone sufficient training or does not have decent practical experience in using audit software (Thottoli et al, 2019).

After all, in the past, the auditor could not use the software were without the help of software developer, but at the same time, developers did not have expertise in auditing, so they could not independently develop and improve audit software. Such a process required significantly more time, and many companies abandoned introducing CAATs. However, those who decide today to introduce computer-aided techniques and tools in the audit process should be aware that today's audit software does not have such limitations, rather is very easy to use, data storage capabilities are extensive, and auditors are also able to perform the audit on their computer via stable high-flow networks (Coderre, 2008).

Nonetheless, the results of research conducted by Janvrin et al. (2008) using the UTAT model developed by Venkatesh, Morris, Davis, and Davis (2003) show that, among others, the following factors could influence auditors' decisions to use CAATs:

1. a personal belief that the use of CAATs will provide better performance;
2. support network for the application of CAATs; and
3. developing the necessary training in the domain of application of CAATs.

Unfortunately, according to Coderre (2008), even today many high-level managers believe that only information system auditors are capable of using audit software. However, auditors nowadays have undoubtedly strengthened their expertise, so in the audit process, they need minimal help from IT professionals. Thus only in exceptional cases or when the technology used by auditors changes significantly.

Finally, in this context, the belief of many managers that the data processed by auditors in the audit process are compromised by the use of CAATs should be mentioned, which of course is not true. Today's software allows auditors to perform audit procedures without copying files; it is quite enough to connect to the central computer of the company with just a laptop (Coderre, 2008).

CONCLUSION

Based on a review of the literature and a confrontation of views, this research identifies a changed environment in which internal audit operates. Interestingly, audit, like every other segment of business or life, must learn to live with constant changes and even go one step further, if it wants to offer added value to the customers.

postojanje podrške za uvođenje CAATs, ili eventualno u nedostatak iste (Coderre, 2008).

Kao odgovor na prvo istraživačko pitanje, kroz ovaj rad je ustanovljeno da su informacione tehnologije povele internu reviziju na put transformacije i potrebe oslanjanja na tehnike i alate potpomognute kompjuterom. Međutim, razlika postoji u stepenu korišćenja ovih alata kod malih i srednjih, te velikih revizorskih firmi. Jednostavno, male i srednje firme ne vide istu isplativost kao velike firme prilikom primjene revizorskih softvera (Thottoli i dr., 2019).

Nadalje, kao odgovor na drugo istraživačko pitanje, istraživanje je pokazalo da CAATs omogućava kraće i pouzdanije sprovođenje revizorskog postupka, a što je važnije, ta ušteda u vremenu i novcu ne ide nauštrb kvaliteta. Svakako, potrebna obuka se ne smije zanemariti, ali njena raspoloživost i uslovi su danas vrlo povoljni.

Treba odrediti zahtjeve u pogledu obuke kadrova u postupku revizije – kojim kadrovima je potrebna obuka, u kom obimu i u kom vremenu, da li će se odvijati u okviru organizacije ili će biti organizovana eksterna obuka, i slično (Coderre, 2008).

Na kraju, kao odgovor na treće istraživačko pitanje, rad je doveo do zaključka da, sa jedne strane, postoje interni revizori koji su prigrlili benefite informacionih tehnologija, a sa druge strane ima i onih koji preferiraju tradicionalne metode. Međutim, usljed stalnog pritiska tržišta za povećanjem efikasnosti rada i rastom očekivanja i zahtjeva korisnika, realno je očekivati da će i oni koji nisu simpatizeri automatizovanih načina rada biti prinuđeni da uvide sve njegove potencijale.

IZVORI

1. Andrić, M., Krsmanović, B., Jakšić, D. (2012). *Revizija – teorija i praksa*. Ekonomski fakultet, Subotica.
2. Banker, R. D., Chang, H., Kao, Y. (2002). Impact of information technology on public accounting firm productivity. *Journal of Information Systems*, 16 (2), 209–222.
3. Coderre, D. (2008). *Internal Audit: Efficiency Through Automation*. The Institute of Internal Auditors, Wiley.
4. Debreceny, R., Lee, S. L., Neo, W., Shuling Toh, J. (2005). Employing Generalized Audit Software in the Financial Services Sector: Challenges and Opportunities. *Managerial Auditing Journal*, 20(6), 605–618.
5. Janvrin, D., Lowe, D. J., Bierstaker, J. (2008). *Auditor Acceptance of Computer-Assisted Audit Techniques*. Preuzeto 2. 9. 2020. sa https://www.researchgate.net/profile/Diane_Janvrin/publication/253742129_Auditor_Acceptance_of_Computer-Assisted_Audit_Techniques/links/551aa6d60cf2fdce84367160.pdf.
6. Krsmanović, B., Rajak, A. (2016). Uticaj nove ekonomije na reviziju. U: *Perspektive računovodstva i revizije pred ulazak u EU* (str. 135–145). Bečići: Institut sertifikovanih računovođa Crne Gore.
7. Krsmanović, B., Polić, S. (2008). *Informacione tehnologije u računovodstvu i reviziji*. Banja Luka: Finrar.
8. Leko, D. (2008). Uticaj informacione tehnologije na internu reviziju u bankama. *Industrija*, (2), 1–31.
9. Mijić, K. (2019). Specifičnosti procesa revizije finansijskih izvještaja u okruženju informacionih tehnologija. *Financing*, 10(2).
10. Munteanu, C. C. (2014). Arguments on Using Computer-Assisted Audit Techniques (CAAT) and Business Intelligence to Improve the Work of the Financial Auditor, Pitesti, *Management Strategies Journal*, 26(4), 212–220.
11. Nagy, A. L, Cenker, W. J. (2002). An assessment of the newly defined internal audit function. *Managerial Auditing Journal*, 17(3), 130–137.
12. Pacini, C., Brody, R. (2005). A proactive approach to combating fraud: seven preemptive measures can help internal auditors deliver a first-round knockout to fraudulent activity. *Internal Auditor*, 62(2), 56–61.
13. Rosli, K., Yeow, H. P. P., Siew, E. (2012). *Computer-Assisted Auditing Tools Acceptance Using I-Toe: A New Paradigm*. PACIS 2012 Proceedings. Paper 195.
14. Russom, P. (2011). *Big Data Analytics*. TDWI Best Practices Report.
15. Sayana, S. A. (2003). Using CAATs to Support IS Audit. *Information Systems Control Journal*, (1).
16. Soltani, B. (2007). *Revizija – međunarodni pristup*. Zagreb: MATE.
17. Thottoli, M. M., Thomas K. V., Ahmed, E. R. (2019). Adoption of Audit Software by Audit Firms: A Qualitative Study. *Journal of Information and Computational Science*, 9(9), 768–776.
18. Tušek, B. (2017). *Interna revizija – organizacijski i metodološki aspekti*. TEB Poslovno savjetovanje, , Zagreb
19. Tušek, B., Sever, S. (2007). Uloga interne revizije u povećanju kvalitete poslovanja poduzeća u Republici Hrvatskoj – empirijsko istraživanje. U: *Zbornik Ekonomskog fakulteta u Zagrebu* (str. 273–294). Ekonomski fakultet, Zagreb

First of all, it is necessary to understand the current IT environment of the organisation (hardware, software, policies, level of knowledge and expertise of auditors in the field of information technology). Also, it is necessary to consider the attitudes of employees and, in particular, the management of the organisation regarding information technology, to gain insight into the existence of support for the introduction of CAATs, or maybe the lack of one (Coderre, 2008).

As a response to the first research question, the research concludes that information technology has led internal audit to the path of transformation and the need to rely on computer-assisted techniques and tools. However, there is a difference in the degree of use of these tools by small and medium, and large audit firms. Simply put, small and medium-sized firms do not see the same cost-effectiveness as large firms when applying audit software (Thottoli et al, 2019).

Furthermore, in response to the second research question, research has shown that CAATs allows a shorter and more reliable process of conducting an audit, and more importantly, time and money savings do not go against the quality of audit. Certainly, the necessity for training should not be neglected, but its availability and conditions are very encouraging nowadays.

Requirements regarding the training of personnel in the audit process should be determined - which personnel needs training, to what extent and when exactly, whether it will be organized within the organisation or externally, etc. (Coderre, 2008).

To finish with, in response to the third research question, the paper led to the conclusion that, from one side there are internal auditors who have embraced the benefits of information technology, and on the other side there are those who prefer traditional methods. However, due to the constant pressure of the market to increase work efficiency and the growth of expectations and demands of users, it is realistic to expect that those who are not sympathizers of automated modes of operation will be forced to embrace all its potentials.

REFERENCES

1. Andrić, M, Krsmanović, B, Jakšić, D. (2012). *Revizija - teorija i praksa*. Ekonomski fakultet, Subotica.
2. Banker, R.D, Chang, H, & Kao, Y. (2002). Impact of information technology on public accounting firm productivity. *Journal of Information Systems*, 16 (2), 209-222.
3. Coderre, D. (2008). *Internal Audit: Efficiency Through Automation*. The Institute of Internal Auditors, Wiley.
4. Debreceny, R, Lee, S. L, Neo, W, & Shuling Toh, J. (2005). Employing Generalized Audit Software in the Financial Services Sector: Challenges and Opportunities. *Managerial Auditing Journal*, 20(6), 605-618.
5. Janvrin, D, Lowe, D.J. & Bierstaker, J. (2008). *Auditor Acceptance of Computer-Assisted Audit Techniques*. Preuzeto 2.9.2020. sa https://www.researchgate.net/profile/Diane_Janvrin/publication/253742129_Auditor_Acceptance_of_Computer-Assisted_Audit_Techniques/links/551aa6d60cf2fdce84367160.pdf
6. Krsmanović, B. i Rajak, A. (2016). Uticaj nove ekonomije na reviziju. U: *Perspektive računovodstva i revizije pred ulazak u EU* (str. 135-145). Bečići: Institut sertifikovanih računovođa Crne Gore.
7. Krsmanović, B. i Polić, S. (2008). *Informacione tehnologije u računovodstvu i reviziji*. Banja Luka: Finrar.
8. Leko, D. (2008). Uticaj informacione tehnologije na internu reviziju u bankama. *Industrija*, (2), 1-31.
9. Mijić, K. (2019). Specifičnosti procesa revizije finansijskih izvještaja u okruženju informacionih tehnologija. *Financing*, 10(2).
10. Munteanu, C.C. (2014). Arguments on Using Computer-Assisted Audit Techniques (CAAT) and Business Intelligence to Improve the Work of the Financial Auditor, Pitesti, *Management Strategies Journal*, 26(4), 212-220.
11. Nagy, A. L, Cenker, W. J. (2002). An assessment of the newly defined internal audit function. *Managerial Auditing Journal, 17(3)*, 130–137.
12. Pacini, C, & Brody, R. (2005). A proactive approach to combating fraud: seven preemptive measures can help internal auditors deliver a first-round knockout to fraudulent activity. *Internal Auditor*, 62(2), 56-61.
13. Rosli, K, Yeow, H.P.P, & Siew, E. (2012). *Computer-Assisted Auditing Tools Acceptance Using I-Toe: A New Paradigm*. PACIS 2012 Proceedings. Paper 195.
14. Russom, P. (2011). *Big Data Analytics*. TDWI Best Practices Report.
15. Sayana, S.A. (2003). Using CAATs to Support IS Audit. *Information Systems Control Journal*, (1).
16. Soltani, B. (2007). *Revizija - međunarodni pristup*. Zagreb: MATE.
17. Thottoli, M.M, Thomas K.V, Ahmed, E.R. (2019). Adoption of Audit Software by Audit Firms: A Qualitative Study. *Journal of Information and Computational Science*, 9(9),768-776.
18. Tušek, B. (2017). *Interna revizija - organizacijski i metodološki aspekti*. TEB Poslovno savjetovanje, Zagreb.
19. Tušek, B. i Sever, S. (2007). Uloga interne revizije u povećanju kvalitete poslovanja poduzeća u Republici Hrvatskoj - empirijsko istraživanje. U: *Zbornik Ekonomskog fakulteta u Zagrebu*. (str. 273-294). Ekonomski fakultet, Zagreb.