Kaunas University of Technology

School of Economics and Business

Use of Robotic Process Automation in the Audit of Financial Statements

Master's Final Degree Project

Neda Jankauskaitė

Project author

Prof. Lina Dagilienė

Supervisor

Kaunas, 2023

Kaunas University of Technology

School of Economics and Business

Use of Robotic Process Automation in the Audit of Financial Statements

Master's Final Degree Project

Accounting and Auditing (6211LX037)

Neda Jankauskaitė

Project author

Prof. Lina Dagilienė

Supervisor

Prof. Rūta Gokienė

Reviewer

Kaunas, 2023

Kaunas University of Technology

School of Economics and Business

Neda Jankauskaitė

Use of Robotic Process Automation in the Audit of Financial Statements

Declaration of Academic Integrity

I confirm the following:

1. I have prepared the final degree project independently and honestly without any violations of the copyrights or other rights of others, following the provisions of the Law on Copyrights and Related Rights of the Republic of Lithuania, the Regulations on the Management and Transfer of Intellectual Property of Kaunas University of Technology (hereinafter – University) and the ethical requirements stipulated by the Code of Academic Ethics of the University;

2. All the data and research results provided in the final degree project are correct and obtained legally; none of the parts of this project are plagiarised from any printed or electronic sources; all the quotations and references provided in the text of the final degree project are indicated in the list of references;

3. I have not paid anyone any monetary funds for the final degree project or the parts thereof unless required by the law;

4. I understand that in the case of any discovery of the fact of dishonesty or violation of any rights of others, the academic penalties will be imposed on me under the procedure applied at the University; I will be expelled from the University and my final degree project can be submitted to the Office of the Ombudsperson for Academic Ethics and Procedures in the examination of a possible violation of academic ethics.

Neda Jankauskaitė *Confirmed electronically*

Neda Jankauskaitė. Use of Robotic Process Automation in the Audit of Financial Statements. Master's Final Degree Project / supervisor Prof. Lina Dagilienė; School of Economics and Business, Kaunas University of Technology.

Study field and area (study field group): Accounting, Business and Public Management.

Keywords: Financial statements' audit, Digital technology, Robotic process automation, Artificial intelligence.

Kaunas, 2023. 69 pages.

Summary

Nowadays, digital technology is widely used in most areas of life. The field of audit is no exception, where various digital technologies are increasingly being used – artificial intelligence (AI), big data analytics, robotic process automation (RPA), cloud technologies, machine learning, etc. Their benefits and how they change the performance and procedures of the audit process are increasingly being talked about. The theoretical literature presents the positive advantages of using digital technologies, for example, the increased efficiency of audit performance, when simple and elementary calculations are performed automatically. In this way, the auditor can devote his attention and time to those areas that require specific audit knowledge and experience. In addition, digital technologies can help identify fraud risks or even make certain decisions instead of the auditor. However, not all authors agree that digital technology has only a positive side. There is a lot of uncertainty when digital technology is used in financial statements' audit. It is shown as unclear, ambiguous, or even raising concerns about the safety of using them. There are studies which talk about the lack of regulation and outdated audit standards. This difference in opinions about the use of digital technologies in the audit of financial statements shows the problematic nature of the topic that prompts examination. This study presents the use of robotic process automation in the audit of financial statements.

Research object: Financial statements' audit using RPA.

Aim of research: To identify what impact RPA makes on the data collection and analysis stage of the audit of financial statements.

The first part of the work presents the relevance and the problem of using digital technologies in the audit of financial statements. Based on the research conducted by different authors and the results obtained, it was found that there is no consensus on the impact of digital technologies, including RPA. Therefore, there is a gap between implementing and dismissing RPA in financial statements audit.

The strategy of the research is a simulation case study. In the first case, audit procedures are carried out in a traditional way, and in the second case, using the RPA system – Helix Genreal Ledger Analyzer. Standard and widely used audit procedures were chosen for the study, which are performed both at the audit planning stage and at the stage of performing procedures and analyses. Finally, the capabilities of RPA to perform more complex analytics that would not be possible without RPA are evaluated. The results of the study confirmed the assumption that digital technologies increase the efficiency of audit performance, as the necessary reports for analysis are generated automatically without the need for the auditor to perform additional calculations. The second assumption is also confirmed that RPA helps to perform more complex analyzes that are not possible without RPA.

Neda Jankauskaitė. Robotinio procesų automatizavimo panaudojimas finansinių ataskaitų audite. Magistro baigiamasis projektas / vadovė prof. Lina Dagilienė; Kauno technologijos universitetas, Ekonomikos ir verslo fakultetas.

Studijų kryptis ir sritis (studijų krypčių grupė): Apskaita, Verslas ir viešoji vadyba.

Reikšminiai žodžiai: finansinių ataskaitų auditas, didžiosios technologijos, robotinis procesų automatizavimas, dirbtinis intelektas.

Kaunas, 2023. 69 p.

Santrauka

Šiais laikais skaitmeninės technologijos yra plačiai naudojamos daugumoje gyvenimo sričių. Ne išimtis yra ir audito sritis, kurioje vis dažniau pradedamos naudoti įvairios skaitmeninės technologijos – dirbtinis intelektas, didžijų duomenų analitika, robotinis procesų autimatizavimas, debesų technologijos, mašininis mokymasis ir kt. Vis garsiau yra kalbama apie jų naudą ir tai kaip jos keičia audito proceso atlikimą bei procedūras. Teorinėje literatūroje pateikiami teigiami skaitmeninių technologijų naudojimo privalumai, pavyzdžiui, išaugęs audito atlikimo efektyvumas, kai paprasti ir elemtarūs skaičiavimai yra atliekami automatiškai. Taip auditorius gali savo dėmesį ir laiką skirti toms sritims, kurios reikalauja specifinių audito žinių bei patirties. Be to, skaitmeninės technologijos gali padėti atpažinti sukčiavimo rizikas ar netgi priimti tam tikrus sprendimus vietoj auditoriaus. Tačiau ne visi autoriai sutinka, kad skaitmeninės technologijos turi tik teigiamą pusę. Literatūroje galima rasti daug nuogastavimų dėl skaitmeninių technologijų naudojimo audito procedūrose. Jos yra parodomos kaip neaiškios, dviprasmiškos ar netgi keliančios susirūpinimą dėl saugumo jas naudoti. Daug kalbama apie reguliavimo, naudojant skaitmenines technoligijas, trūkumą bei neatnaujintus audito standartus. Šis skirtumas tarp nuomonių apie skaitmeninių technologijų naudojimą finansinių ataskaitų audite parodo temos problematiškumą, kurį skatina išnagrinėti. Šiame darbe yra pateikiamas robotinio procesų automatizavimo panaudojimas finansinių ataskaitų audite.

Tyrimo objektas: Finansinių ataskaitų auditas naudojant RPA.

Tyrimo tikslas: Nustatyti, kokią įtaką RPA daro finansinių ataskaitų audito duomenų rinkimo ir analizės stadijai.

Pirmoje darbo dalyje yra pateikiamas skaitmeninių technologijų panaudojimo finansinių ataskaitų audite aktualumas bei problematika. Remiantis skirtingų autorių atliktais tyrimais ir gautais rezultatais buvo nustatyta, kad nėra vieningos nuomonės, kokią įtaką skaitmeninės technologijos, įskaitant ir RPA. Todėl finansinių ataskaitų audite yra atotrūkis tarp RPA įgyvendinimo ir nenaudojimo.

Tyrimo strategija yra modeliuota atvejo analizė. Pirmuoju atveju yra atliekamos audito procedūros tradiciniu būdu, o antruoju naudojant RPA sistemą – „Helix Genreal Ledger Analyzer". Tyrimui atlikti buvo pasirinktos standartinės ir plačiai naudojamos audito procedūros, kurios yra daromos tiek audito planavimo etape, tiek procedūrų ir analikų atlikimo etape. Galiausiai, vertinamos RPA galimybės atlikti sudėtingesnes analitikas, kurios be RPA nebūtų įmanomos. Gauti tyrimo rezultatai patvirtino iškeltą hipotezę, kad skaitmeninės technologijos didina audito atlikimo efektyvumą kadangi reikalingos ataskaitos analizėms yra suformuojamos automatiškai be būtinybės auditoriui

papildomai atlikti skaičiavimus. Taip pat yra patvirtinama ir antra hipotezė, kad RPA padeda atlikti sudėtingesnes analizes, kurios nėra įmanomos be RPA.

Table of contents

List of figures

List of tables

List of abbreviations

Abbreviations:

ADMS – Automated decision-making systems;

AI – Artificial intelligence;

DL – Deep learning;

DLT – Distributed ledger technology;

EBA – Ethics-based audit;

IT – Information technology;

ML – Machine learning;

NLP – Natural language processing;

RPA – Robotic process automation.

Introduction

Relevance of the topic. Every year there is a noticeable growth in digital technology, which is already integrated into the finance area and audit procedures. According to Almaleeh (2021) financial statements' audit is an important government mechanism, which helps to assure that there are no conflicts between company's management and shareholders. Also, it confirms that true and correct accounting information is written in financial statements. Emerging technologies make an impact on how the audit of financial statements is performed nowadays. Murray, Rhymer and Sirmon (2021) address the joint capacity of humans and non-humans to exercise intentionality. Even though technologies have been part of audit for quite a long time, agentic technologies, which constrain, supplement, and replace people, change how audit of financial statements is performed. It is difficult to deny the benefits of using digital technologies, but at the same time they are met with negative opinions and uncertainty. Therefore, it is important to understand how digital technologies influence performing audit procedures of financial statements. Since auditors work with client's sensitive information, adaptation of digital technologies brings new perspectives on how appropriate security can be achieved. These technologies include artificial intelligence, robotic process automation (RPA), blockchain, big data and others. Allbabidi (2021) says that digital technologies transform traditional data analysis process with new ways how databases and software can be used. This shows the relevance of the research on the impact of digital technologies when performing financial statements' audit.

Scientific problem. Usage of digital technology in financial statements' audit is changing the traditional audit procedures with new ones. This change can be viewed from both positive and negative sides. The most common advantage of using emerging technologies according to Kend and Nguyen (2020) is higher efficiency in audit procedures. Robotic automation systems are able to perform manual and not interesting tasks, allowing auditors to bring attention to more judgement-demanding work. Therefore, it is important to investigate RPA in audit. Optimization and reduced time of data collection is a significant benefit (Manita, Elommalb, Baudierc, and Hikkerovad, 2020), however, Kend and Nguyen (2020) argue that auditors must learn how RPA technologies can be used, and this leads to higher time consumption, at least in the beginning of learning how it works. Also, Kokina and Davenport (2017) see a high risk on lack of objectivity of machines which can make conclusions. Ethical questions have been raised by Manita et al. (2020) for digital technologies usage in audit. Authors argue that together with emerging technologies, audit standards and independence rules must be updated to avoid possible negative consequences. Asif, Searcy, Castka (2022) add to this idea that there is a need in the future to understand how different digital technologies work together and accordingly specific control mechanisms should be in place. After noticing such conflicting opinions of the authors regarding the use of automation technologies, there is a need to investigate the impact of their integration into the audit of financial statements. However, the predominant studies are conceptual, normative thinking-based, but empirical research is also needed to substantiate the value of digital technologies for audit companies. The scientific literature lacks studies about the specific application of RPA in professional decision making and financial audit procedures under case studies.

Research question: What impact does RPA have on audit of the financial statements?

Aim of research: To identify what impact RPA makes on the data collection and analysis stage of the audit of financial statements.

Research object: Financial statements' audit using RPA.

The Objectives:

1. To argue the role of digital technologies in financial statements audit.
2. To analyze the theoretical aspects of the impact of digital technologies on the audit of financial statements.
3. By using RPA (Helix General Ledger Analyzer), prepare a simulation case study on the research of financial statements' audit procedures.

The methods used in the research: Most importantly, literature review was made for theoretical background of the problem. Method used for research is a simulation case study where comparison is made between adopting and rejecting digital technologies in audit process.

1. Problem analysis of digital technologies in the audit of financial statements

Introduction to the problem of digital technologies in financial statements audit will be provided in this problem analysis.

Definitions of key terms

Financial statements' audit is a government mechanism whose purpose is to confirm the absence of conflict between company's management and shareholders, and to assure that correct accounting information is in financial statements (Almaleeh, 2021).

Digital technology is a broad term, which includes artificial intelligence, big data, blockchain, RPA and other. Digital technologies are transforming the process of traditional data analysis with new databases and software (Allbabidi, 2021).

Robotic process automation is a complex programmed software which uses business data for the ability to autonomously perform processes combinations, different activities and tasks. Such preconfigured software is able to repeat and automate human work or tasks and can be called robots (Moffitt, Rozario and Vasarhelyi, 2018).

Big data is a large and complex set of information, which volume has increased exponentially in the last years. The data might not only be numbers or text but also pictures, videos, audio and other material. Thus, data analytics uses new processing models in order to make a tangible structure and convert the data into valuable knowledge (Tiberius and Hirth, 2019).

Artificial intelligence can be described as capacity of machines or computers that are able to understand and simulate intelligent behavior of others (Munoko, Brown-Liburd, Vasarhelyi, 2020).

Blockchain technology is one of the technology megatrends. It is a difficult system with encrypted data, which is mostly used for crypto currencies (Springer Sargent, 2021).

In the theoretical parts there will be written in more detail about the application of digital technologies, including RPA, in auditing, since the advantages and disadvantages are connected.

1.1. Regulatory environment for digitalization in audit

Audit if financial statements is a highly regulated process. Auditing standards, which are developed by responsible institutions, are very important for audit procedures. Also, audit regulation is widely discussed in the theoretical literature, where insights of the authors are presented. International audit standards (ISA) are reviewed all the time by the International Auditing and Assurance Standards Board (IAASB). It is an independent board founded in 1978, which sets international audit standards to ensure the quality of audits performed and to strengthen public confidence about it (IAASB, 2022).

Verification of information takes the most time during the audit. IAASB has issued ISA 520 which is about analytical procedures. The term "analytical procedures" is related to analysis of financial data and finding relationships between financial and not finance-related information. The auditor has two main objectives:

1) Receiving trustworthy and relevant audit evidence when performing substantive analytical procedures.

2) Making and performing such analytical procedures which could help the auditor to form audit opinion about the financial statements. Also, to understand if designed analytical procedures are consistent with the audit company view about the client's business (IAASB, 2010).

ISA 520 says that analytical procedures can be a comparison of financial statements with prior period information, budgets and forecasts, similar sector data. Generally, substantive analytical procedures are used for high volume transactions which can be predicted in future periods. Expectations must be raised for the data to understand if no individual or aggregated misstatements materially affect financial statements. Moreover, an important step during analytical procedures is assurance that data is tested reliably. Auditor has to skeptically evaluate if data is received from independent sources, if it can be compared with industry data, as well as how relevant the information is and what controls have been used for preparation of the data.

It is an important task to verify received information from the client during the audit in order to draw a conclusion on financial statements. However, it is not enough to merely review it – all the conducted work must be documented in the right manner. For guidance on how it should be done, the auditor has to rely on ISA 230. This international audit standard defines the auditor's responsibilities in preparation of audit documentation when issuing an opinion on financial statements. The specific requirements are described in detail. The standard also gives the definition of "audit documentation" – records of performed audit procedures, received evidence, and formed conclusions. It can also be named as "working papers" (IAASB, 2010).

When writing about the nature and timing of concluded procedures, the auditor shall document the characteristics of the data and items, or matters reviewed. Usually, the audit team is formed with more than one person, therefore, the name of the responsible person for a specific task has to be clearly identified, as well as the date of performed work. Lastly, all documentation must be reviewed, so the name of the reviewer and the date of review is mandatory (IAASB, 2010).

Another inseparable subject from the standards above is ISA 500 – audit evidence (Fig 1).

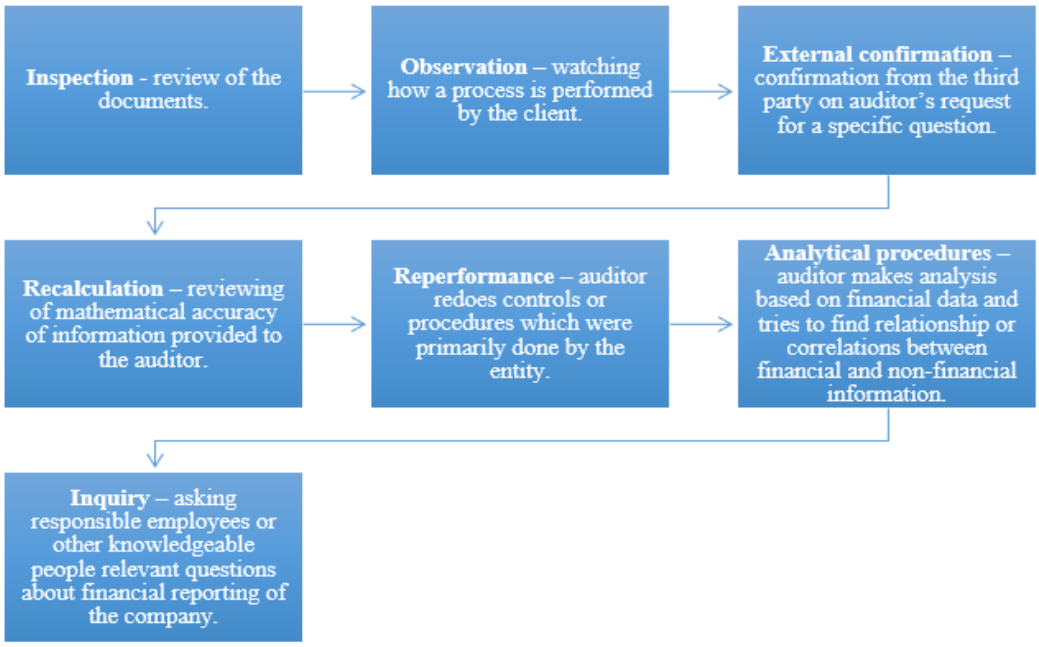


Fig 1. Audit evidence examples (prepared by the project author based on IAASB, 2010)

It makes a direct impact on receiving qualitative evidence and finalizing audit conclusion of financial reporting. ISA 200 (2010) complements audit evidence standard as it explains that reasonable assurance can only be obtained when auditor gets sufficient, reliable, appropriate audit evidence and in that way audit risks can be reduced to an acceptable level.

Audit evidence and regulatory environment is not only defined in audit standards. This is also explored through literature analysis. According to Adaskevic and Raziunaite (2019) there are three main characteristics of audit evidence – reliability, relevance, and sufficiency. If the audit evidence meets these three characteristics, it creates positive conditions to effectively perform work during planning, scoping and verification of information stages of audit.

Appelbaum, Kogan and Vasarhelyi (2017) explore how new analytics methods in audit and audit standards should evolve to improve auditors' competencies. The important part is where authors pay attention to guidance regarding data analytics in audit tasks. Nowadays, international audit standards indicate that full population must be tested only in certain situations, but with digital technologies auditors have the opportunity to test 100% of population without substantial effort. These two approaches do not correlate with each other and raise future problems. Therefore, more research must be done on new analytic methods: their usage in different circumstances, their effect, ability to be documented and formalized, as well as their classification and quantitative evaluation.

Barr-Pulliam, Brown-Liburd and Munoko (2022) also investigated audit standards and their relationship with digital technology in financial statement's audit. Literature review showed that there is a significant increase of interest on the topic which is a positive sign. However, auditors often note the lack of audit standards related to digital technologies. Hence, audit companies have concerns about implementing new technologies in audit procedures because no or little regulation is present as of today. Additionally, there is a threat that auditors will do more tasks than they actually should because they are doing procedures with AI or blockchain but still have to do traditional work to be consistent with regulations.

1.2. Overview of the impact of digital technologies on auditing

Throughout the years, the way how audit is performed has changed. There are many factors for that, but one of them may be the digital technologies. However, there is no clear opinion how digital technologies impact the audit procedures. Discussion questions arise, as additional procedures appear in the audit process, and at the same time, opportunities for analysis and visualization increase. Literature on the topic can be divided into three parts: 1) positive opportunities; 2) both positive and negative opportunities or no opportunities at all; 3) negative opportunities. Also, an important part of audit is sampling and emerging technology's impact on it.

Positive opportunities of digital technologies in auditing

Allbabidi (2021) analyzed if technological, organizational and environmental (TOE) factors have an impact on emerging technology usage in financial statement's audit. The results were positive: TOE make a significant influence on the audit procedures and improve the performance of auditors. Nonetheless, this study has limitations as research was conducted in Jordan and no comparison with developing and developed countries has been made (Allbabidi, 2021).

Asif, Searcy and Castka (2022) analyses how digital technologies can improve supplier audit and its efficiency and authenticity. Authors made comprehensive literature review on the topic. Their analysis shows that there are major benefits of emerging technologies on the audit:

- Costs effectiveness
- Informative disclosures for shareholders, investors, regulators, customers and other entities
- Data safety
- Appropriate management and governance models

However, it is noteworthy that positive results are expected only in the long term. Authors also acknowledge the fact that in the future there is a need to understand how separate digital technologies (AI, big data, blockchain, RPA) work together and what governance mechanisms should be developed (Asif, Searcy, Castka, 2022).

Mixed opportunities of digital technologies in auditing

Tiberius and Hirth (2019) made a two-stage Delphi study on the impact of digitalization for the next 5 to 10 years. Conclusion was drawn that no major changes will be made during the given time. Respondents also did not identify any major threats for audit professionals. Although this expectation that audit does not change, or experience stagnation is quite dangerous. For instance, digital technologies and especially big data analytics could improve accounting data and financial statements. AI could perform the same tasks as a human and if blockchain verifies all transactions, overall audit profession could appear redundant (Tiberius and Hirth, 2019).

Additionally, another Delphi study was made by Almaleeh (2021), where different answers from Tiberius and Hirth (2019) Delphi study in Germany were received. Those respondents foreseen major changes in audit procedures. It is expected that continuous audit will replace traditional audit performed at the end of financial year. Digitalization will enable auditors to make more difficult procedures where professional judgement is needed. Furthermore, research has showed that it will not be enough to have knowledge in accounting and audit, IT knowledge will also be required in order to perform tasks with automated technologies. The findings of the study disagree with Tiberius and Hirth opinion that audit profession can disappear. But it should be noted that digital technologies can change and there is a probability that advanced technologies will decrease the number of tasks made by humans in audit procedures. Limitations of the research should be discussed in order to understand the professional bias that could have impacted the answers of respondents (Almaleeh, 2021). More experts from other fields (IT, university professors, etc.) could improve the accuracy of this study.

Another research of Kend and Nguyen (2020) has been conducted by interviewing auditors. This analysis differs from the ones reviewed before because it included regulators of financial market, audit standards settlers, audit professionals from Big 4 and not Big 4 companies, investors, managers, and CFOs. The results of the study showed that there is an overall positive effect of digital technologies in audit and auditors can get higher assurance on larger or even full population size. Also, emerging technologies give opportunity to see the broader picture and to make better decisions in the places where the judgement or critical thinking of the auditor is needed. Some of the negative aspects were also disclosed such as costs of the technologies and whether smaller audit companies

will be able to keep up with the industry. Regulators acknowledged that their monitoring role has to evolve, and standards must be updated in regards of changing digital technologies. Kend and Nguyen (2020) provide few topics for future research: stakeholders' of the company's knowledge of emerging technologies, how accounting study programs are changing and if these technologies really are as transformational as it is presented.

Krieger, Drews and Velte (2021) researched how emerging technologies are adopted in financial statement's audit procedures. Results were divided into two dimensions:

1) Usage of digital technologies related to management of audits – communication with client, project management, audit documentation. Interviews showed that management part is already highly advanced. However, it is needed to close the gap between auditors' capabilities and technological advances as this slows down innovations in audit. Managers must be included much more in this process of learning and teaching colleagues in order to achieve the results. Regulators should also take part in this to prepare a solid background for auditors as well as how digital technologies could be implemented and adapted.

2) Usage of digital technologies related to fieldwork – assessment of audit risks (receiving evidence as support documents for audit opinion). It has a greater impact on audit profession, however, digitalization in fieldwork is quite slow and even though potential of all digital technologies is high, its adoption is limited (Krieger, Drews, Velte, 2021).

Pizzi, Venturelli, Variale, Macario (2021) made bibliometric analysis to understand what impact digital technologies make on managerial audit. Conclusion has been drawn that emerging technologies have more positive aspects to managerial audit than negative ones. However, authors talk about challenges of the subject. Today practitioners and academics often have different views on digitalization in managerial audit. Thus, this slows down innovations in the field (Pizzi, Venturelli, Variale, Macario, 2021).

Negative opportunities of digital technologies in auditing

One of the concerns of digital technologies in audit is ethical issues. Main question is regarding artificial intelligence. Munoko et al. (2020) say that nowadays AI is used for not only tracing documents but also for detecting fraud or inherent risks, taxes recalculation and even decision making. This comes with concern that AI systems can lead to arbitrary conclusions and decisions because it is based on cognitive tasks which were made by humans with human judgment. No other software has the possibility to "learn" from the data and evolve in the future to influence new data so that no human involvement is needed. Due to all the risks, there is a need for ethical governance.

Brown, Davidovic and Hasan (2021) say that it is clear that AI can be helpful in audit in order to build trust with clients and the public, but it is still a question of how it can be done. Current proposals are too high level to be put in practice without following guidance or they focus on technical things of transparency, bias and do not take into account broader perspective. What is needed is a third-party ethical assessment of algorithms, but it is a very complicated task to develop such mechanism.

To conclude, even though digital technologies bring a lot of great things, negative aspects cannot be forgotten. Various authors talk about different problems of digitalization in audit but in this master

thesis one problem will be taken into consideration – the gap between using and dismissing digital technologies in audit.

Impact of digital technologies on sampling in auditing

An important part of the audit is testing the transactions and for that auditors commonly use sampling techniques. During the years, sampling was well established and has improved the effectiveness of audit process, however, some big data related limitations have been found. The main problem is that sampling involves only a small amount of the population, and it is extremely difficult to get an appropriate sample, which would accurately reflect the whole data. One way to eliminate such risk is to test full population using digital technologies – audit by exception. This means that transactions are tested not at the end of the financial period, but they are monitored all year long using defined rules. Those rules are usually made based on internal controls and auditor's experience. If transaction violates rules, it is shown as an exception and alerts auditor that further review must be performed (Huang, No, Vasarhelyi, Yan, 2022). In this way, it becomes not the examination of transactions but the examination of exceptions.

1.3. Specific digital technologies used in auditing

Kokina and Davenport (2017) made a literature review on how automation is impacting and changing audit. Their analysis suggests that overall audits will become automated with less time spent on technical tasks and more on links between data and business, identifying trends and patterns. Authors also provide examples of AI that is already used in audit procedures. As expected, they are mostly related to documents or invoices review and data analytics of large amount of data. Despite positive aspects of digitalization in audit, Kokina and Davenport stress a few points:

1) Lack of objectivity – machines make conclusions and reflect biases of humans who work with that technology.

2) Lack of transparency – AI and deep learning neural networks are challenging technologies and even technical experts sometimes cannot interpret the outputs. Therefore, these technologies should become more transparent to be able to use their judgements in audit procedures (Kokina, Davenport, 2017).

Digital technologies are a very wide topic which contains several different emerging technologies in it, one of which is blockchain technology. It is a difficult system with encrypted data, which is mostly used for crypto currencies (Springer Sargent, 2021). Author talks about blockchain and how this technology will help to upgrade data collection, storing, tracing, and sharing. This will make the audit process much easier and less time-consuming. The author also draws attention to the relevance of the auditors as society stresses about extinction of the profession. Springer Sargent (2021) assures that both accountants and auditors will be more relevant than ever due to changes in the systems and their knowledge on how to navigate it. Similar views of digitalization in the audit are expressed by Schmitz and Leoni (2019). They state that emerging technologies will make audits significantly effective and will help save on costs. Likewise, it is noted that there will be a reduction in risks of human mistakes. According to Abdennadher, Grassa, Abdulla and Alfalasi (2020) blockchain technology does have a positive impact on audit but audit companies will not be changed. Yet, they will be automated which will lead to more efficient and safer audits.

Kend and Nguyen (2020) also did a research on blockchain technology and audit as the Abdennadher, Grassa, Abdulla and Alfalasi (2020). However, they have much more skeptical views on the application of blockchain technologies in auditing practice. The adoption of blockchain is difficult and there is still a small part of specialists who could implement it into audit firms. This idea is also supported by Alles and Gray (2020) who did a study on blockchain and talked about how much value this technology will truly bring to the audits. They suggest that only big companies in developed countries will be able to implement this technology while others will still use traditional infrastructure and processes.

Huang and Vasarhelyib (2019) explore RPA which is used for simple and repetitive audit tasks. The pilot project was created for RPA application in confirmations procedure. Authors had consulted with other researchers and audit professionals and received their feedback. Firstly, they defined confirmation's procedure steps. When data examination was produced, complexity of the procedure was evaluated. Later, the procedure was modified to meet RPA requirements and implemented into a pilot project. Statistically auditor takes about 30 minutes to complete one confirmation. However, implicated RPA model took only 3 minutes for the task. It is estimated that such technology could save up to 600 hours when using this tool. This is not a complex example how digital technologies can make audit processes more efficient by automating tasks which do not require auditors' opinion or judgement (Huang, Vasarhelyib, 2019).

Conclusion can be drawn that there is a gap between implementing and dismissing digital technology in the audit of financial statements. No one common opinion can be concluded from various authors, as most of them see both positive and negative signs of digital technology usage in audit process. That is why it is important to make further research about it.

2. Theoretical solutions of digital technologies in the audit of financial statements

In this part theoretical solutions related to financial statements audit and the impact of digital technologies will be disclosed. Firstly, conjoined agencies between humans and technologies will be presented. Later, an overall process of financial statements' audit will be described as well as historical overview of digital technologies in audit. The usage of emerging technologies in different audit stages will be reviewed. After that data collection methods and sampling will be explained. Also, the theoretical background of positive and negative aspects of using digital technologies in the audit will be discussed. Lastly, main assumptions will be generated from the literature review.

2.1. Conjoined agencies between humans and digital technologies

Conjoined agency is the joint capacity of humans and non-humans to exercise intentionality (Murray, Rhymer and Sirmon, 2021).

Technologies have been a part of organizational routine for humans for quite some time. However, agentic technologies, which have the ability to consciously constrain, supplement, and change people in ordinary practice, shift agency away from people in protocol development and choice of action. Authors categorized four forms of conjoined agencies based on who – technology or human – can intentionally use protocol creation or action selection (Fig 2).

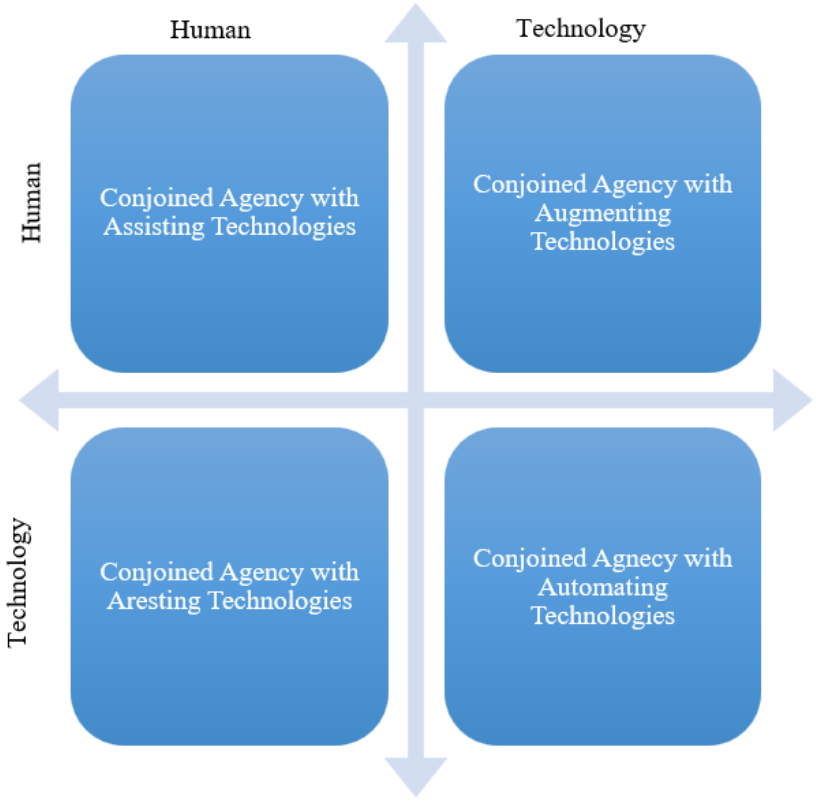


Fig 2. Forms of conjoined agencies (prepared by the project author based on Murray, Rhymer and Sirmon, 2021)

Conjoined agency with assisting technologies can exist when technologies are not able to develop protocols and select actions in a human and not human ensemble. Assisting technologies can only assist human in the decision making or react to occurred situations (Albawwat, Frijat, 2021). In the

audit, world the most commonly used assisting technology is MS Excel and MS PowerPoint – such software is only assisting for the easier and better performance of required tasks.

Another form is conjoined agency with arresting technologies – it cannot develop protocols but can select actions. Arresting technologies independently and automatically perform the tasks without human involvement. This means that it can constrain people. An example of such technology can be a blockchain based smart contracts, which have ability to execute actions if certain conditions are satisfied (Murray et al., 2021).

The third technology is augmenting – it is able to develop protocols in the human and non-human ensemble but does not have an option to select actions. Usually, augmenting technologies contain a large set of data, find patterns and connections, correlations in the data and give predictive suggestions on how problems can be solved. These technologies consciously complement people in everyday practice and can be labeled as machine learning (Murray et al., 2021). It can also be considered as analytical intelligence as it can learn from the human behavior. Therefore, human an such technology is co-decision makers (Albawwat, Frijat, 2021).

The last conjoined agency is with automating technologies. Both parts can be done by these technologies – developing protocols and selecting actions. Same as augmenting technologies, automating also contains large unstructured data. However, there is an ability to learn how to develop analysis made without any involvement from people. It can be claimed that automating technologies are self-sufficient, and this is the main difference between all of them. An example of this technology is unstructured machine learning that freely checks large amount of data, finds correlations, learns from them, formulates some rules for the guidance how to act and executes it (Murray et al., 2021).

2.2. Financial statements' audit process

Financial statement audit is and has been a relevant topic for many years. Cohen, Krishnamoorthy and Wright (2002) emphasized the audit as an important corporate governance mechanism in the beginning of 21st century. The authors believe that audits help to deter fraudulent activities. It can be considered as a monitoring device to have a true view of financial statements. Furthermore, corporate governance is crucial for long term stakeholders' value in the business. Therefore, audit is an inseparable part of the existence of the companies (Cohen, Krishnamoorthy and Wrigh, 2002).

Different authors refer to varying number of audit steps. A full audit process usually includes signing audit agreement with the client, planning audit procedures, identification of the risks and preparing required audit working papers. Most commonly the crucial part is to distinguish steps that would be independent and consistent (Xiao, Geng and Yuan, 2020). Based on these steps, full external audit process can be divided into seven stages (Adomavičiūtė et al., 2015; IAASB, 2010). Please refer to the Fig 3.

With reference to Adomavičiūtė et al. (2015) and IAASB (2010), the first part of the audit starts with the audit strategy. It is the determination of the objectives, scope, and characteristics of the audit. Before audit starts, audit managers attend meetings with the client's management to discuss methods of conducting information required for the audit, review scope, risk areas of the business. In this step, it is essential to explain to the client how the audit will be conducted, what are the expectations from them and what they can expect from the audit company. Before signing the audit agreement, all these aspects must be discussed.

Understanding the business is the second step and it includes gathering information about the client and their business processes. It may not seem like it, but it is an extremely important part of the whole audit as this highly influences audit quality and subsequent steps. This check of the company helps to improve audit strategy, identify risks and other significant matters.

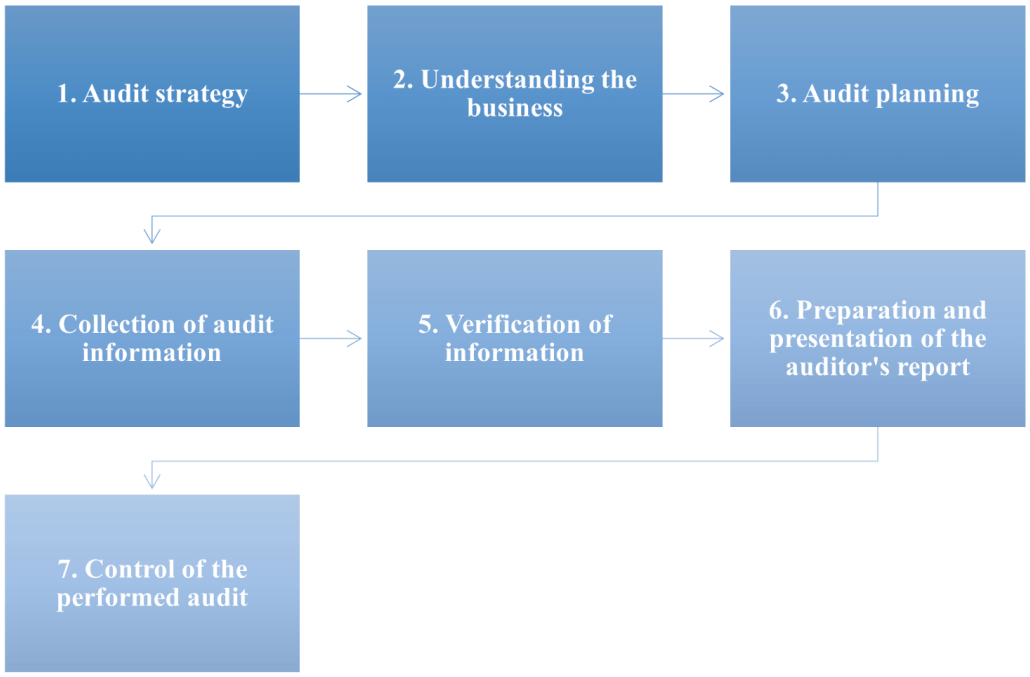


Fig 3. Audit process (prepared by the project author based on Adomavičiūtė et al., 2015 and IAASB, 2010)

Another part of the audit process is planning in which auditors have to make a general audit plan and work program. It includes a timeline which must be followed throughout the entire audit. Planning audit procedures indicate critical parts of the client's business and auditor puts extra efforts to identify potential problematic areas and how they should be addressed.

After it has been planned and all procedures for the specific client are concluded, another stage of the audit begins – collection of required information. Auditor collects necessary data which can be written, oral or digital. Written information can be financial statements, agreements, accounting documents, various registers, protocols, and minutes of shareholders meetings etc. Oral information usually is the answers to auditor's questions. Digital data can be received using information technology (IT) systems. Information can be taken from internal or external sources. However, it is well known that information received from external, independent sources gives more assurance for the audit company compared to internal client information.

The audit step which lasts the longest in the process of the audit is verification of information. It is also the most complicated stage where documents or assets are inspected. Tangible assets are checked physically to make sure that assets included in the general ledger really exist and what is their condition. One of the procedures – inventory counts. Auditor participates in annual stock (sometimes long-term assets) count and not only observes how it is done by the responsible employees, but also

recalculates selected items. Later, documents and accounting bookings are checked for correctness to ensure that there are no differences and fraudulent activities in the company.

Authors state three methods how document verification is used: formal, logical, and arithmetic. Formal verification helps to understand if there is all the required data of the document, if all the signatures of responsible employees are in place, correct reporting period, etc. Logical verification lets us understand whether operations were performed as they should be done. Lastly, the arithmetic method shows errors in simple procedures such as multiplying or dividing numbers. Auditors must always check only original documents, not copies.

The sixth part of the audit process is preparation of auditor's report. After all information is received and reviewed, the auditor can summarize all the evidence and concluded work from the previous steps. An audit opinion is issued for the financial statements prepared by the client. All significant matters, adjustments and observations are put together in the audit report.

The very last step of the whole process is control of the performed audit. Auditor examines the audit quality, ability to keep up with the plan and timeline and identifies mistakes. This stage helps to improve audit procedures for the next year (Adomavičiūtė et al., 2015).

During all these steps auditors are required to assure that there is no material misstatement (fraud or other) on the whole financial statements. It means that audit quality must always be high, and procedures performed have to be sufficient (Xiao et al., 2020).

2.3. Historical overview of digital technologies in financial statements' audit

Back in 2001, Bierstaker, Burnaby and Thibodeau emphasized how much audits are shifting from paper to computer-based audit. Authors said that it is more efficient to store all the audit data in the computer than comparing with a paper form. In the early 21st century scientists (Bierstaker et al., 2001) already predicted that digital technology will make a dramatic impact in every step of the audit process. The main positive aspects were pointed out:

1) Capability to test full population during the audit.
2) Digital technology is necessary for auditors to familiarize with the client's business procedures and activities.
3) Better data storage than paperwork.
4) Highly increased audit efficiency, effectiveness.
5) Reduced audit time for required procedures (Bierstaker et al., 2001).

All the above points are still valid in the current period. Digital technology is being integrated more and more in the audit process and especially in Big 4 Firms. Such name was given as a nickname because they are the largest accounting and audit entities in the world by revenue.

Big 4 companies have enough resources to invest in digital technology and all of them implement various IT tools into planning, execution or reporting phases. Liew, Boxal and Setiawan (2021) did research on how data analytics transform Big 4 entities' audit of financial statements (see Fig 4). In the 1980s, there was an unstructured process, all audit evidence was documented in different files in

a paper form. About 10 years later semi structured process was established as electronic systems appeared in audit procedures. The structured process was in the late 2000s with an audit support system. From mid 2010s incorporation of digital technology, automated matching was started, and auditors of Big 4 companies started using smart audit system.

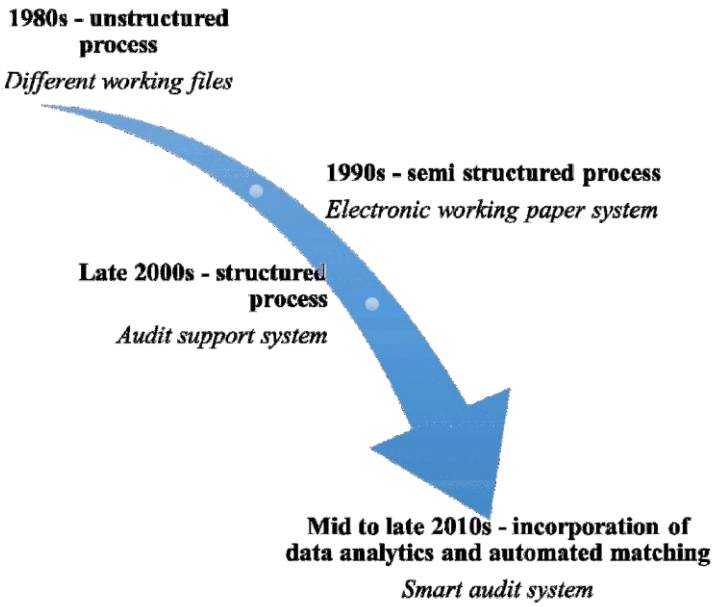


Fig 4. Big 4 companies' evolution of IT tools in audit (prepared by the project author based on Liew et al., 2021)

All Big 4 companies are replacing external analytical tools with internal smart audit systems. For instance, PwC founded "Halo", which replaced Audit Command Language (ACL), EY has "Helix", KPMG – "Clara" and Deloitte – "Illumia". The main difference between these tools is that ACL and others require at least basic coding experience, but most audit professionals do not have it. Liew et al. (2021) conducted interviews with Big Four auditors in New Zealand to understand how digital technology is affecting their audit profession. 23 semi-structured interviews were conducted with individuals who had different audit experience (from recent graduates to senior executives). This helps to understand integration and usage of digital systems between all the ranks in the company as all of them are responsible for different tasks. Results showed that the Big 4 companies are pushed to employ and increase the usage of data analytics. The main aspect of this compulsion is the ability to make deeper insights into client's business and activities. These internal analytical tools are more technologically advanced and employees who work on financial statements audit are capable to learn how to use it quite easily. Authors do not see any reluctance but vice versa – positive thoughts and attitudes are noticed (Liew et al., 2021).

Another study has been made on the usage of audit data analytics. Auditors in Norway have been interviewed and similar results were received as in Liew et al. (2021) study. Audit companies are pressured to apply audit data analytics in everyday practice, especially to the new clients (Eilifsen, Kinserdal, Messier, McKee, 2020).

Different types of digital technologies

The Association of Chartered Certified Accountants (ACCA) made a research about digital technologies and audit profession in 2019. An interesting thing was noted by the authors – only 13%

of respondents said that they have “high” or “expert” understanding of digital technologies. The cause of such a low percentage may be the fact that there are quite a lot of different digital technologies. The main ones are disclosed in the Table 1.

Table 1. Types of digital technologies (prepared by the project author based on the authors mentioned in the table)

Name of digital technology	**Description**	**Authors**
Artificial intelligence (AI)	Generally, AI is an evolving digital technology which is involved in processing of human information, for instance, pattern recognition, problem solving which requires logic. In the audit profession, AI is useful in finding anomalies in accounting bookings or financial data.	Tiberius and Hirth (2019)
Robotic process automation (RPA)	It is a complex programmed software which uses business data for the ability to autonomously perform processes combinations, different activities and tasks. Such preconfigured software is able to repeat and automate human work or tasks and can be called robots.	Moffitt, Rozario and Vasarhelyi (2018)
Data analytics	This is a tool which helps for data processing and analysis to be made in a more modern and advanced way. It allows to achieve highly effective and automated audit analysis with more overall assurance of the financial statements.	Krieger, Drews and Velte (2021)
Machine learning (ML)	ML is using statistical analyses and data to create predictions or even make decisions based on historically stored big data. For good quality predictions, correct prior periods data is needed. Otherwise, there is a high possibility that wrong conclusions will be made.	ACCA (2019)
Natural language processing (NLP)	NLP lets the computer software understand human voice and speech. It is not that widely used as most research is still more focused on vision tasks and not voice based.	Zhong, Scarinci and Cicirello (2022)
Deep learning (DL)	DL is closely related to machine learning. It is used for natural language understanding and generation. Also, it can be used for video processing.	Craja, Kim and Lessmann (2020)
Drone technology, internet of things and sensor technologies	The Big 4 accounting companies found a modern way to participate in inventory count performed by the client – using drones. This is helpful when physical scale is an issue. Drones belongs to the Internet of Things and is connected to it by internet protocol.	ACCA (2019)
Distributed ledger technology (DLT), including blockchain	It is a difficult system with encrypted data, which is mostly used for crypto currencies. These technologies are useful in audit and helps to generate special reports which are based on transactions, raw data and not sampling.	Springer Sargent (2021)

Name of digital technology	Description	Authors
Smart contracts	Smart contracts are related to DLT as it is self-executing based on written code, like Bitcoin – it exists in Blockchain technology and shares same characteristics.	ACCA (2019)
Cloud technologies	It is a place to store personal or business data. If cloud storage is used, there is no physical control of the data as it is provided to cloud service provider. Security of the data is one of the main question and difficulty.	Zhao and Chanf (2022)

Digital technologies have already been integrated in the financial statement's audit. An important note is that some of them are related and could not work without each other. For instance, smart contracts exist in blockchain technology or deep learning is related to machine learning. Even though these digital technologies are still emerging in the audit profession, they are changing how the auditors perform specific procedures and the whole audit process.

2.4. Digital technologies application in different audit stages

The impact of digital technologies can be distinctive in each audit stage. It means that digital technologies can be implemented in a lot of areas and in different ways. Analytical procedures are often used by the auditors in the planning and verification of information phases. Not to mention, with increased digitalization, even more complex analytics must be performed. In the risk assessment stage analytical procedures are mostly reasonableness tests. In the information review phase analytical procedures give overall review of the assessments made and conclusions reached. In both of the stages those procedures may be used as substantive ones to obtain required support and evidence related to certain assertions or transactions type. A lot of times analytical procedures are more effective compared to substantive test of details as test of details only tests small amount from the total population (Appelbaum, Kogan, Vasarhelyi, 2018). The typical and usually used analytical procedures are presented in the Table 2.

Table 2. Typical analytical procedures in the audit (prepared by the project author based on Appelbaum et al., 2018)

Analytical procedures	Information sources
Comparison of the current year's accounts with the balances of the same accounts from previous periods	Detailed lists of financial information/accounts
Comparison of current accounts with expected results in client budgets	Budgets and other forecasts
Review of the relationship between current year accounts and other current year balances to see if they follow predictable patterns based on the company's experience	Financial correlations between certain account in the financial year audited
Comparison of current year accounts and financial correlations and ratios with similar client industry information	Statistical data from the same industry
A review of the correlations between current year account balances and relevant non-financial information	Appropriate non-financial information

Authors made literature review and evaluated 572 papers and majority of them (80 percent) talk about efficiency of various analytical procedures as the main topic. Moreover, reviewed articles mention analytical procedures in the audit stages. Most of them are discussing such procedures in two or more stages.

1) Engagement. Most articles discuss various ratios analysis, descriptive statistics, and regression. Only few articles mention visualization, expert systems, text mining, and other structural models.

2) Planning. Majority of papers are talking about audit examination of all types, various regressions, descriptive statistics and few discussions of expert systems, probability and structural models, visualization.

3) Substantive and compliance testing. Analytical procedures are very popular in this part of the audit. Main ones are regressions, expert systems, probability models and descriptive statistics.

4) Review. Most frequently written procedures of this stage are ratios analysis, computer assisted audit techniques, correlations, expert systems.

5) Formulation of opinion and reporting. Mainly ratios analysis is mentioned, as well as expert systems, visualization, descriptive statistics.

6) Control of performed work. None of the articles talk about analytical procedures in ongoing activities (Appelbaum & others, 2018).

Moffitt and others (2018) made research about robotic process automation in the audit and how it could be implemented in substantive testing of the financial information phase. In order to move toward RPA audits, these steps must be performed (Fig 5):

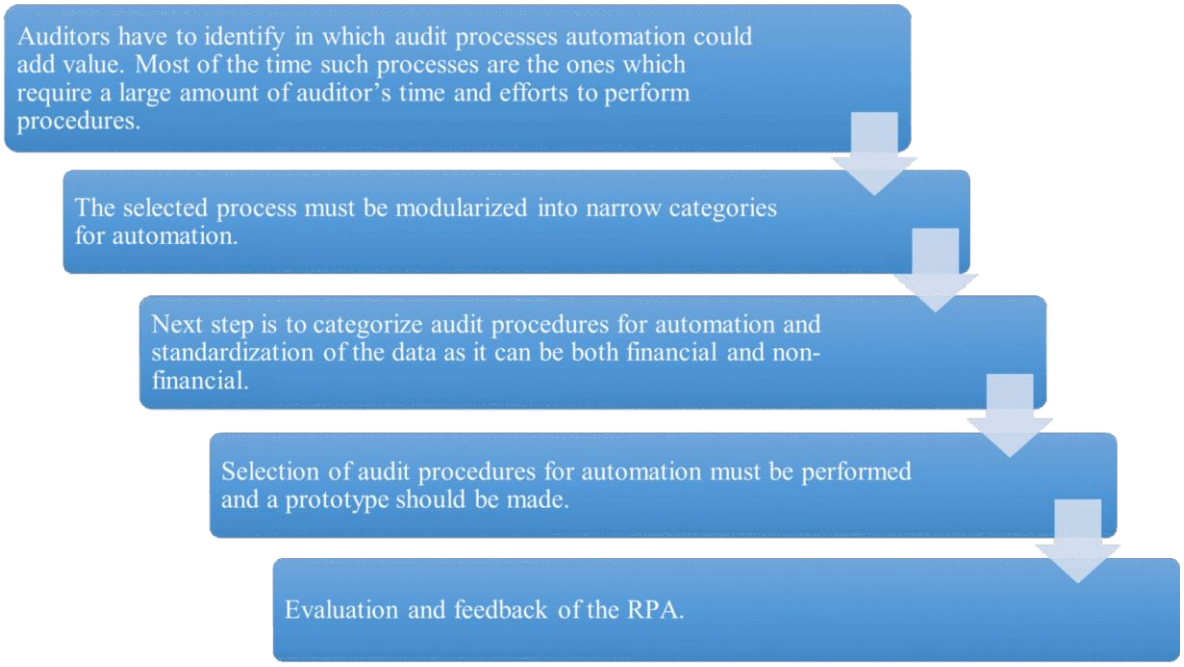


Fig 5. RPA process of making in substantive testing and financial information phase of audit (prepared by the project author based on Moffitt et al., 2018)

Revenue testing using RPA can be taken as an example. After implementation performing all the steps mentioned above, RPA can automatically log into the system, enter the query for the search of required digital documents, extract them, and even perform three-way matching. It can even generate alerts about which items do not match and should be checked by the auditor. Revenue testing using RPA gives more coverage for the audit of revenue account, helps to reduce time spent on the audit procedures and guides to focus on more significant tasks, like reviewing the contrasting items (Moffitt and others, 2018).

Kokina and Davenport (2017) made a literature review about AI in audit procedures. In a similar manner as Moffitt and others, Kokina and Davenport also found application of AI in substantive testing of the financial information phase of the audit process. The most common examples of AI usage are:

1) Review of the documents
2) Confirmations with the third parties
3) Data acquisition (extraction, comparison and validation)
4) Stock counts
5) Disclosure research
6) Risk analytics which can be predicted

Munoko et al. (2020) researched where artificial intelligence can be used in audit profession. The results show that AI is used in these audit procedures/phases:

1) Risk assessment phase.
2) Test of transactions selection – usage of AI while selecting transactions for testing from the whole population.
3) Analytics – various analytics which include AI.
4) Preparation of audit working papers.
5) Test of transactions – usage for the main testing procedure.

Also, there are financial statements audit procedures which are expected to be used in near future:

1) Internal controls monitoring.
2) Controls evaluation.
3) Client’s going concern evaluation.
4) Change of auditor's decision (Munoko, et al., 2020).

This research shows that AI is mostly used for making a selection for test of transactions. AI helps to test bigger samples or even test full data of the client. There are 4 audit procedures in which no AI has been used yet, but it was expected to be used in the next few years.

Santis and D'Onza (2020) exclude these main opportunities where digital technologies can be used in financial statements audit process:

1) Planning stage – better ability to identify risk of material misstatement.

2) Testing of internal controls – significantly higher reliance can be achieved when using digital technologies in the assessment of internal controls. ERP systems are very important in this part as it makes it possible to use process mining technology when performing walkthrough tests.

3) Detection of fraudulent activity – emerging technologies helps to effectively perform testing of transactions, general ledger entries or even compare financial and nonfinancial data (both internal and external information).

4) Analytical procedures preparation stage – usually auditors have to perform quite a lot of substantive analytical procedures and digital technologies provide an advantage as it can help to analyse various data sets (financial, not financial, internal, external, grouped, unstructured) with more efficiency (Santis and D'Onza, 2020).

Another interesting aspect of digitalization in audit is process mining. Werner, Wiese and Maas (2021) made systematic analysis of audit standards, literature and process mining, which means that in the business understanding part of the audit procedures business processes can be analyzed with automated techniques. This helps to achieve higher level of reliability on auditor's conclusions and increases strength of audit evidence as less manual work has to be performed. Also, there are challenges related to the topic because it is important to always be in line with audit standards. It should be taken into account that this technology can be used only for internal controls which were recorded in source system. If transaction was received outside source system – process mining will not work. Other challenge of the process mining is lack of specialists who can build and implement it to audit (Werner, Wiese, Maas, 2021).

From the literature review of digital technologies application in different audit stages, conclusion can be drawn that there are two phases from the whole audit process in which digital technologies are already used - planning and verification of information. The main procedures are analytical reviews (correlations between few accounts, comparison of the current and prior periods, etc.), risk analytics, documents review, testing of transactions and its selection.

2.5. Data collection methods and sampling

Sampling and population size were always part of audit procedures as it is not effective to audit all accounting or other data of the client by hand. However, emerging technologies create an opportunity to automate the testing of the entire population. Huang, No, Vasarhelyi and Yan (2022) analyze how applying machine learning could help to test the full population or "audit by exception". The auditors have to set rules on how the system must monitor violations of the rules at every transaction. Those rules should be designed based on the knowledge of experienced audit professionals and internal controls. When a certain transaction violates even one rule, the system notifies the auditor to investigate more. This leads from the test of transactions to the test of exceptions. Digital technologies can be a critical improvement in identifying incorrect transactions and the level of deviation. If the deviation level is small, it would not be given for the auditor to review as small deviations are assumed

to be less risky. This approach provides a higher level of assurance even though the auditor has to review the same number of transactions in the population. This method has its challenges:

1) High costs of implementation.

2) High level knowledge professionals are required to do the job.

3) Proper documentation as a lot of auditor judgement is needed.

4) Inconsistency with audit standards as it is required to provide reasonable assurance on financial statements, but still not full mistakes could be found (Huang and others, 2022).

Santis and D'Onza (2020) in their research found that there is a concern related to switching from sampling to testing the entire population. Sampling is a traditional way to test population and it is approved by international audit standards and widely used among audit professionals. Therefore, testing full population is a rather new approach which can create a misconception that auditors must test transactions, financial statements and even assertions this way in all cases. The main problem and the fundamental risk area is that two different conclusions can be drawn for the same audit client depending on if sampling was used or not. Thus, distinct results can be achieved from different approaches and auditors must take responsibility if sampling was used and they failed to find significant misstatements or fraud (Santis and D'Onza, 2020).

Kend and Nguyen (2020) say that digital technologies allow auditors to automate more complex and demanding tasks. Also, it gives an opportunity to test much larger population than before. Therefore, sampling becomes less relevant in the audit process and ability to test more transactions gives higher assurance level compared to the past. However, research shows that such statements are more likely to be true within Big Four companies. The risk is that smaller auditors will not be able to implement emerging technologies as quickly as Big Four companies and this will make problems with financial statements audit market concentration and competitiveness. (Kend and Nguyen, 2020)

Manita, Elommalb, Baudierc, and Hikkerovad (2020) selected qualitative approach as they interviewed auditors from five largest audit companies in France (Big 4 and Mazars). Interviewed individuals were selected according to their rank in the audit company – only managers or above with average of 14 years of experience. Also, all included audit firms involve data analysis technologies in their audits. Authors asked all auditors the same questions:

1) AI place in the audit company (overall impact, pros and cons, firms' culture in internal system).

2) Changes in the auditor's profession due to digitalization (impact on data security, ethics, internal implementation strategy, etc.).

3) Audit company's strategy for adoption of digital technologies (what subjects and strategy should be adopted in order to become an expert in this field).

4) Digital strategy for training and recruitment

5) Impact of digital technologies on corporate governance (how AI usage in audit will impact accounting information and decision making of stakeholders).

Results of the questioning confirmed that AI will allow audit companies to rethink and optimize their entire audit process, encourage emergence of new audit offers, as well as improve audit quality, rebuild future auditor's profile, and embody new culture of innovation. All of these implications make a better management of audit company and stakeholders will have a better understanding of it (Manita et al., 2020).

The success of AI in the audit companies depends on two key items:

1) Audit companies have to invest in data security as this would help build trust among customers and data transfer. This is a very important part of the audit since if there are safety breaches, auditors cannot ensure that they are auditing correct numbers.

2) Audit companies must implement corporate policies to include the culture and ethics of innovation at all levels of audit profession to keep newest technology and constantly evolve their offers for the customers (Manita et al., 2020).

2.6. Positive and negative aspects of using digital technologies in the audit

Positive aspects

According to Manita et al. (2020), digital technologies have potential to improve audit as a governance mechanism. The findings of the research showed that digitalization makes influence on the audit profession and overall audit procedures on at least five key levels (Manita et al., 2020):

1) Improved audit relevance in today's finance environment – saving time on repetitive tasks and better focus on more valuable work for the client. Optimization and reduced time of data collection will have major impact on audit, even though this does not always correlate with cost savings (new staff will be needed). Also, authors confirm that current sampling practice will be replaced by auditing full population of documents in the future.

2) New services can be offered for their clients – services like real-time audit, data extraction and forecasting.

3) Improved quality of the financial statements' audit as all client data will be analysed and higher level of assurance achieved.

4) Renewed profile of the auditor – auditors will have to increase their professional competencies and learn data related skills.

5) New wave of innovation within audit companies – the whole culture of innovation is now being created between audit firms to be able to meet changing needs of their clients (Manita, et al., 2020).

Santis and D'Onza (2020) conducted research on big data in audit and what factors impact the use of these technologies. The results showed the high importance of the legitimacy of big data analytics in the audit profession. Legitimacy building process is highly advanced compared to companies outside audit services. The use of digital technologies by the audit client has a huge impact on the implementation of these technologies during audit processes. If the client is technologically advanced and all or most of their business is done digitally, it is much easier to use digital technologies in their audit. Nonetheless, it can be more difficult to include big data analytics or other emerging

technologies when auditing small or medium companies. It is due to simple IT systems used which cannot be matched with big data analytics. Research results showed that Big Four companies already use big data in their favour extensively and attempt to get maximum results. AI and other technologies help to include new ideas on methodological aspects of audit process, as well as how certain procedures are performed and what techniques are used (Santis and D'Onza, 2020).

Kend and Nguyen's (2020) research showed that digital technologies are already changing how audits are delivered and the impact of it is positive. One of the main aspects is the ability to achieve better assurance when auditing large populations. Also, in the audit process, some procedures can be boring and require manual work. Emerging technologies take such tasks from the auditors and let them put their attention and time into more difficult and judgement-demanding tasks. Another important conclusion was drawn that digital technologies save time and provide valuable help (Kend and Nguyen, 2020).

In addition, Kend and Nguyen's (2020) study showed an interesting statement that with changing audit tools comes changing clients' expectations about the audit process and how it should be done. Big data, AI and other analytics tools leads to more accurate results from the information received. Therefore, clients expect to get appropriate and useful feedback so that audit would not only draw conclusions if financial statements show true and correct view of the company, but also would drive to improve internal processes and overall management of the company. Additionally, some respondents in the study agreed that emerging technologies allow one to resolve issues and disagreements when a lot of judgement is used in specific areas (Kend and Nguyen, 2020).

Furthermore, Gao and Han (2021) made literature research on the reliability of accounting and audit information. Authors say that digital technologies are very powerful tools and should not be used to ensure numbers in financial statements are in line with required standards but to ensure the reliability of accounting information. AI improves the independence of the audit by getting information from independent sources. Such technologies help to raise audit procedures to the higher level of reliability of accounting information (Gao and Han, 2021).

Negative aspects and ethical issues

Emerging technologies most of the time are described as radical, fast-growing, uncertain and ambiguous. That is why there is a high risk of significant impact of uncertainties about emerging technologies. Ethics researchers try to find a way that would help to find and identify ethical risks (Munoko, et al., 2020).

Kend and Nguyen (2020) found in their research that there is not enough evidence that auditor's time would be saved on certain tasks. Especially in the starting phase, when auditors must learn how to use digital technologies in the first place.

Mokander, Morley, Taddeo and Floridi (2021) talk about ethics-based audit (EBA) as governance mechanism for automated decision-making systems. Traditional control mechanisms that were designed to oversee processes made by humans most of the time fail when being applied to automated decision-making systems (ADMS). One of the main reasons authors emphasize is the same as Munoko & others (2020) – things that were based on human decision-making now is decided by AI and this leads to ethical problems. In response to this situation, many institutions (companies,

governments, academic field) released guidelines on AI's autonomy, explicability, justice, non-malice, and usefulness.

EBA means that it is based on pre-established adherence to ethical principles. Therefore, EBA takes focus from abstract discussions to action and forms guiding principles to managerial intervention: how AI will be designed, deployed, and used. Audit process is purpose orientated and the aim of EBA is to ensure that AI works in ways that is aligned with specific ethics rules (Mokander, et al., 2021).

The Fig 6 below shows what responsibilities have all the parties during audits. The management's responsibility is to achieve company goals, which includes ethical values. Auditor has to objectively review organization's work (using professional scepticism) and advice how company adheres required principles. Another part is regulators, who monitor the compliance of the company on behalf of the government. In order to be able to review ADMS effectiveness, auditors must be able to test ADMS in various scenarios. After that, the regulator can show support for voluntary EBA by providing necessary tools for information sharing and creating required standardized financial reporting valuation and format (Mokander, et al., 2021).

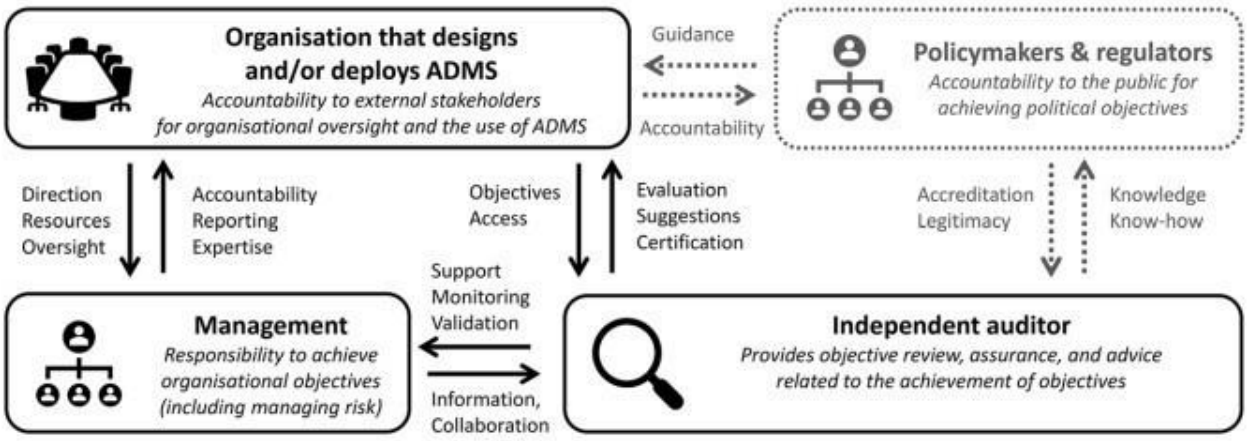


Fig 6. Roles and responsibilities throughout audits (Mokander, Morley, Taddeo and Floridi, 2021)

Mokander et al. (2021) propose seven criteria which could help to implement ethics-based audit with success. Research was made with reference to theoretical literature and explanations. Authors believe that even though best practices for EBA and emerging technologies will be developed in the future, organizations already developed variety of EBA tools and frameworks. These are the basis from which organizations can learn. If they want to have ethical AI, they have to break down their organizational policies into tasks and assign responsible individuals for that exact task. Formalizing software and allocating responsibilities helps to clarify roles and responsibilities. However, this approach is not enough. It is important to have people who believe in ethics-based audit and AI. The trustworthiness of specific AI is not only about specific technology, but it is also about value alignment. Balances and checks developed to ensure safe AI should be included into company's strategies and policies. Moreover, as it was mentioned in theoretical part, things that were based on human decision-making now are decided by AI. Thus, at this point, it is crucial to understand that it is the auditor's responsibility to ensure the right questions are being asked and properly answered. This will help to manage the risk of lack of evidence received and also assist in resolving ethical questions.

Taken together, these lessons show that ethics-based audit can make real difference in AI implementation and design. But from effectiveness side, EBA procedures must meet seven criteria and these procedures should be:

1) Holistic – AI should be treated as a component of a hole system, not as individual technology.

2) Traceable – all tasks should be documented and assigned to responsible person who would supervise it.

3) Accountable – unethical behaviour should be traceable and linked to sanctions.

4) Strategic – ethics should be related to organization's strategies and policies.

5) Dialectic – ethics-based audit should be viewed as collaborative and constructive process.

6) Continuous – it should be managed as a long-term process which has to be monitored, reviewed and communicated.

7) Driving re-design – information and feedback should be provided in order to be able constantly re-design AI (Mokander, et al., 2021).

It is not expected that organizations would implement all of these seven criteria at the same time, but Mokander et al. (2021) emphasize that this process does not have to be perfect. It is important to understand the advantages of this criteria and make adjustments in the long run. This will help to develop strong institutional trust and understanding that continuous ethical reflection must always be the core aspect.

Manita et al. (2020) researched digitalization of auditors, how it improves audit procedures and what impact it makes on corporate governance. Audit is evolving and today it not only has to assure that financial statements show true and fair view of the company, but also have to take into consideration reliability of AI, cyber security, social and environmentally responsibilities. In order to do that audit companies are digitizing, creating better internal processes, using big data and trying to find a way how these digital tools are going to bring value for their clients. By using AI auditors can focus on current data (not only historical), which helps evaluate client's opportunistic forecasts and going concern issues. This improves audit relevance and corporate governance. Although Manita et al. considers interpretation of the results as one of the main problems of digitalization and it leads to ethical questions.

Manita et al. (2020) says that attention must be taken to legislative and normative issues. As technologies are evolving, current legislation on security, privacy and audit standards should be updated as emerging technologies are moving quickly. Rules of ethics must be taken into consideration, how audit companies can exercise audit profession in all independence respecting professional ethics at this digital environment (Manita, et al., 2020).

Munoko et al. (2020) state that there are three approaches to ethics in AI systems. First one is to ignore ethics when dealing with new digital technologies with a belief that some concerns could slow down innovations. Second approach is an assumption that benefits will be higher than cons of AI. The last approach assumes that it is possible to forecast what ethical consequences will be in the particular field of audit. There are two frameworks in the third approach:

1) Ethics of Emerging Information and Communication Technologies (ETICA) by European Consortium. Analyzing ethical features of AI.

2) Anticipatory Technology Ethics (ATE) (it is built on ETICA framework). Analyzing ethical features and physical configuration of AI, which produces desired goals (Munoko, et al., 2020).

Munoko et al. (2020) combined ETICA and ATE approaches in their research. Even though those methods have overlapping steps, both was used and forecast ethical implications of the use of emerging technologies. Authors provide analysis using past studies and their inferences which were based on reported use of AI by auditors. The analysis was made from various stakeholder's views. Results of the research are presented in Table 3.

Table 3. Rights, possible risks and responsibilities by different stakeholders in the audit process (Munoko, et al., 2020).

	Rights	**Possible risks with AI**	**Responsibilities**
Auditor	Access to the technologies, autonomy, trainings, supervision, proper work environment, fair salary.	Isolation, losing the job, deskilling.	Compliance with ethical principles, codes of conduct, corporate policies and standards
Audit company	Unrestricted access of the client's information, development of AI which increases effectiveness, employee's compliance with standards and policies, guidance from regulators.	Expectation and responsibility gaps, failure of achieving goals with AI, stakeholders do not accept AI.	Compliance with ethical principles, codes of conduct, corporate policies and standards; monitoring of AI use impact, providing proper work environment for auditors (employees); transparency on using of AI (pros and cons); validation of AI.
Client	Compliance with ethical principles by audit firm, efficient audit procedures.	Audit company's used AI is not effective and does not meet the goal; expectation gap.	Providing all necessary information and documents for the auditors; proper qualifications of the management and employees; compliance with ethical principles, standards, codes; remuneration of auditors for work performed.
Client investor	Timely and valid information which helps to make decisions.	Expectation gap.	Reporting of violations for responsible authorities.
Profession	All the members have to be compliant to standards and codes.	Gap in responsibility, not all members have the same access to AI (may be from lack of knowledge), not professional behavior.	Guidelines and trainings on AI, informing stakeholders on AI impact.
Regulators	Access of all required information, transparency of regulators.	Gap in responsibility, too little transparency in AI to be able to make adequate review.	Guidelines on AI, monitoring of AI, informing stakeholders on AI impact.
Society	Timely and valid information, compliance to ethical principles.	Gap in responsibility, job loss.	Staying informed, reporting of violations for responsible authorities.

To sum up, Munoko et al. (2020) find that ethical impact of AI will affect three main levels: individual auditors, audit companies and profession itself. AI potentially will fundamentally encourage change on audit profession. Also, the tension between auditors, audit companies, society, investors, and

regulators is becoming a larger problem as it grows the conflict of the rights, expectations and responsibility gaps. Due to all this, ethical conflicts will not be an exception and the need of practical guidance will increase even more. It should be a continuous process of addressing ethical issues with proper feedback form to all related stakeholders. If ethics will be ignored, AI development in auditing might be slowed down.

2.7. Assumptions of digital technologies' integration in the audit of financial statements

Theoretical research was made about digital technologies, their application in audit process, positive and negative aspects of it. From literature review main assumptions/ issues of digital technologies integration have been raised (Fig 7).

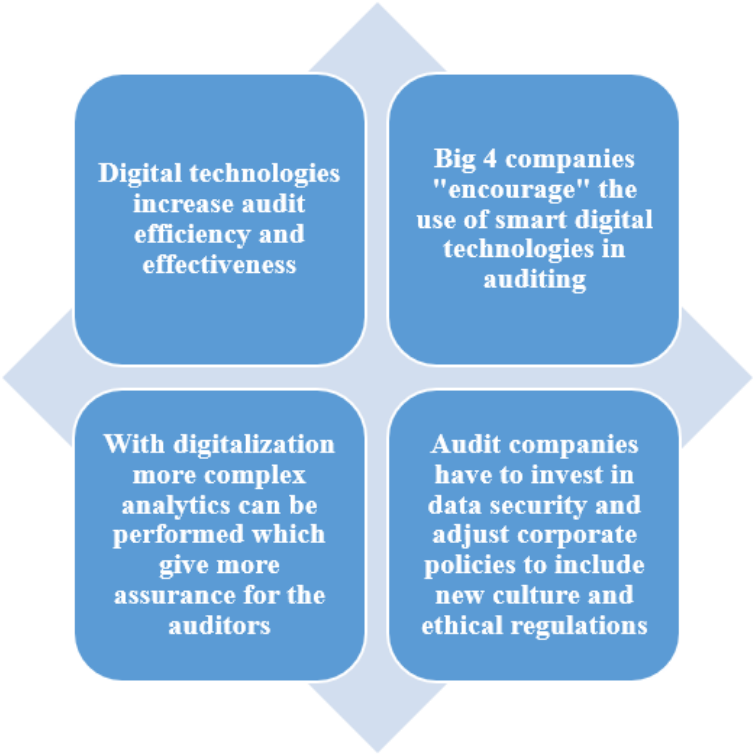


Fig 7. Assumptions of digital technologies' integration in the audit of financial statements

1) **Digital technologies increase audit efficiency and effectiveness.**

   Many researchers agree with this statement due to one of the main purposes of digital technologies being efficiency. Effectiveness of digital technologies can be achieved in a lot of procedures performed by the auditors. It can save time while performing boring and simple tasks and it allows auditors to shift their focus to complex and significant issues or procedures of the client. So, a more correct and accurate conclusion can be drawn on financial statements of the client.

2) **Big 4 companies "encourage" the use of smart digital technologies in auditing.**

   During the years Big 4 companies were the ones, which made the largest difference in developing digital technologies in financial statement's audit. These entities are capable of investing large amounts of money into digitalization. Moreover, they are obliged by the clients

to provide the best service possible. Therefore, Big 4 companies must evolve and increase usage of smart technologies in audit process to be able to keep up with the clients. Additionally, internally used analytical tools are very smart and technologically advanced, so no special knowledge is usually needed to learn how to use them. This facilitates implementation of emerging technologies in daily procedures performed.

3) **With digitalization more complex analytics can be performed which give more assurance for the auditors.**

   This helps to achieve higher level of reliability on auditor's work done and conclusions made. Usually, more advance analytical procedures give deeper knowledge about the client in several audit process phases. In the planning phase it can help to identify the risk of material misstatement and assertions. In verification of information phase advanced analytics allows to make more insightful conclusions and even help find fraudulent activity.

4) **Audit companies have to invest in data security and adjust corporate policies to include new culture and ethical regulations.**

   The last assumption is related with data safety and new regulations importance. A lot of times digital technologies are presented with a fear that there can be issues how the data is received and whether usage of such technologies is in line with policies and audit standards. Also, ethical questions have been raised due to artificial intelligence and its ability to learn and make decisions independently. There can be conflict of the rights and expectations, as well as responsibility gaps.

3. Research methodology

In this chapter, research methodology will be provided. In order to find the answer to the research question, it is important to analyze what would represent current events and give effective results. For the topic about digital technology's usage on financial statements audit a simulation case study strategy has been selected. This will help to understand the relationships between important variables and to draw conclusions.

3.1. Argumentation of research method – simulated case study

The research method is simulation case study when RPA system is used and not used in the audit procedures. Case study represents the research strategy, which focus is to understand the dynamics of one environment or setting (Eisenhardt, 1989). It can include one or several cases and various analysis. Case study research is very suitable for the analysis of new and not fully explored cases when theoretical knowledge cannot fully support it. Eisenhardt and Graebner (2007) investigated case studies and why they are necessary. Theoretical background is inseparable from any research, however, in some cases research question can be better answered not with theory building but with theory testing. Research of case study covers the gap between research question and existing theory (Eisenhardt and Graebner, 2007). Case study research can be found in various fields, including audit. Churchill (1966) conducted research with case study on audit and management role in the audit process, which proves that such studies have been used for a long time in audit field.

The case study made in this research will be simulated as no real data will be used due to confidentiality purposes. The data received for the study includes not only financial statements or accounting records, but also employees' names and other sensitive information, which cannot be analyzed publicly. Therefore, simulated data will be presented.

The main tool used for the research of simulation case study will be one of Big 4 companies' system – EY Helix General Ledger analyzer (GLA). It is an RPA internal system used in the audit process as the main tool, which helps to perform required audit procedures.

Helix GL Analyzer is a global analytics platform where client's data is stored – all client's accounting bookings for the audit period (may be for interim period or the financial year). Helix GLA can be used for almost the whole audit process:

1) Understanding the business stage
2) Planning and risk assessment phase
3) Collection of required data
4) Verification of received information and analytical procedures (EY Global, 2022)

EY states that there are 5 main benefits of using Helix GLA, refer to the Fig 8. The benefits are similar or the same from theoretical literature review: deeper knowledge of the client, higher level of assurance, higher quality of analytics, feedback for the client and efficiency of procedures performed.

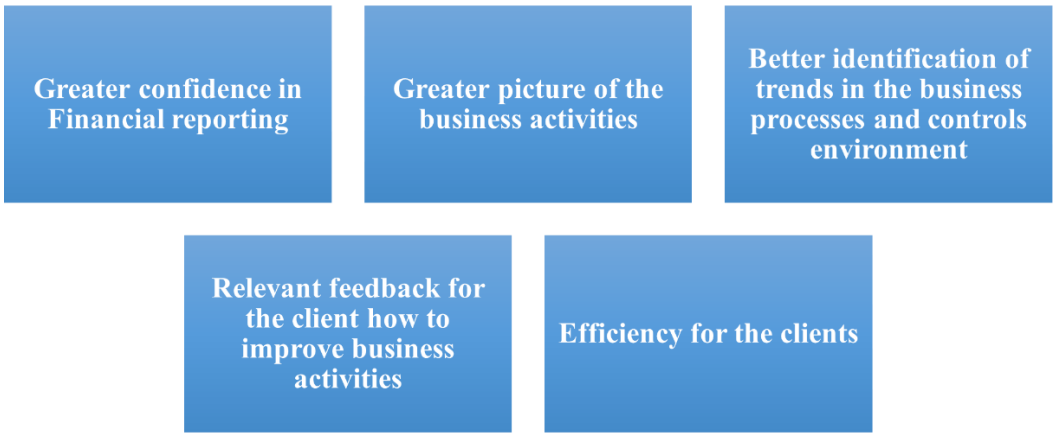


Fig 8. Benefits of using EY Helix GLA (prepared by the project author based on EY Global, 2022)

EY Helix GLA can be used for all audit clients regardless of company's size, age, sector, etc. Usually, the decision on whether to use Helix GLA is based on the planned hours and complexity of the project. Although, it is encouraged to use this RPA system for most audits due to its advantages.

For the simulation case study two companies will be analyzed:

1) For the first one traditional way of the audit procedures without RPA (Helix GLA) will be used. The dataset in this case is general ledger for two financial periods. Also, monthly income statement data is used. The company selected for this case is a medium-sized company producing furniture.

2) For the second one Helix GLA will be used to perform audit procedures. The Helix GLA cube used in the research is prepared by EY for trainings purposes. Having said that, no real client data is analyzed. Period of the case study is two financial periods. Dataset includes journal entries, trial balances, master files. The company selected for this case is large furniture manufacturer.

Data period will be 2 years – auditing period for current financial statements and prior period. This will give opportunity to make analysis, trends and compare current year's situation with prior year.

Two cases have been selected for the purpose of showing two different ways an audit can be performed nowadays. It can be said that simulated cases are incomparable because they test different things. First one is used to perform traditional audit and the second one is to demonstrate complex audit procedures.

3.2. Procedures performed and methods used for comparison of the RPA usage in audit

To be able to make conclusions for assumptions raised, several widely used audit procedures will be compared. This will help to understand if RPA system usage impacts financial statements audit and if it does – what outcomes it lets to.

Procedures that will be done with and without Helix GLA for the case study:

1) Data collection for the audit (for traditional audit and Helix GLA cube)
2) Audit procedures performed during planning phase of audit (Significant accounts identification for the audit planning phase in a traditional way and with RPA)
3) Income statement analytics, including gross margin analysis

Procedures that will be done only with Helix GLA:

4) Three-way correlation (Sales > Trade Receivables > Cash)
5) Journal entries testing (day of week analysis, day lag analysis, date analysis by month, account class analysis, round numbers analysis and specific phrases search in the accounting bookings)
6) Preparer Process Map and change in Preparers

Audit process is the same for all companies, therefore, for the first entity audit procedures will be performed when not using Helix GLA. This means that the only analysis tool will be MS Excel software and general ledger.

In the research several methods will be used:

Graphical analysis

Graphs, figures and tables, which represents the analysis performed during the research or given examples. Some tables will represent the traditional audit procedures. Another part of figures and graphs will be generated automatically by RPA system.

Process visualization

In order to have a better understanding about the processes described in the research, they will be visualized with graphs prepared by the project author. This helps to have a clearer view what outcomes can be received from some procedures performed or how many steps must be done so that analysis could be started.

Structural analysis

Structural analysis is important when several periods of information is being analyzed. As in this research two periods of trial balances will be reviewed – prior and current periods. Also, monthly income statement and gross margin analysis will be made in a structural way with comparison between two years as well as 12 months periods.

Other ways of collecting information

For certain procedures, the client may be interviewed to provide additional information. However, due to the simulation nature of this study, it was not possible to obtain such information.

Data collection for the simulation case study

Data for the simulation case study has been received in two ways. The information required for the first case is based on manufacturing company's data, however, numbers were changed to avoid independence breaches. Data for the second case was received from Ernst & Young Baltic UAB, which provided Helix GLA cube with trainings project "British Virgin Islands". Some consultations have been made with the auditor managers to select the procedures, which could be considered as complex analytics.

Reliability of the study

Even though dataset used in the research is simulated and not received from a real company, it does not change the fact that whole research analysis is reliable. The purpose of the study is to show the differences between traditional audit procedures and RPA usage in the audit of financial statements. It means that all generated reports or tables provided look identical to how it would look with real client data. The audit procedures selected for the research are the ones widespread in almost every audit of financial statements and have been carried out for years around the world. Therefore, information provided in the simulation case study is based on true audit process described in the theoretical part of the project.

4. Research of the RPA use in the audit of financial statements

After literature review 4 assumptions have been made (see the section 2.7). Three of them will be analyzed in more detail. For the research, a simulation case will be used, i.e., the data used for analysis will be fictitious, not a real company's data in order not to violate any data security requirements.

Presentation of research results will organize around two main scenarios, which will be examined in the simulated cases: 1) the analysis of the impact of digital technology on financial statement's audit efficiency and effectiveness; 2) the analysis of more complex analytics performed due to incorporation of digital technologies in the audit process (Fig 9).

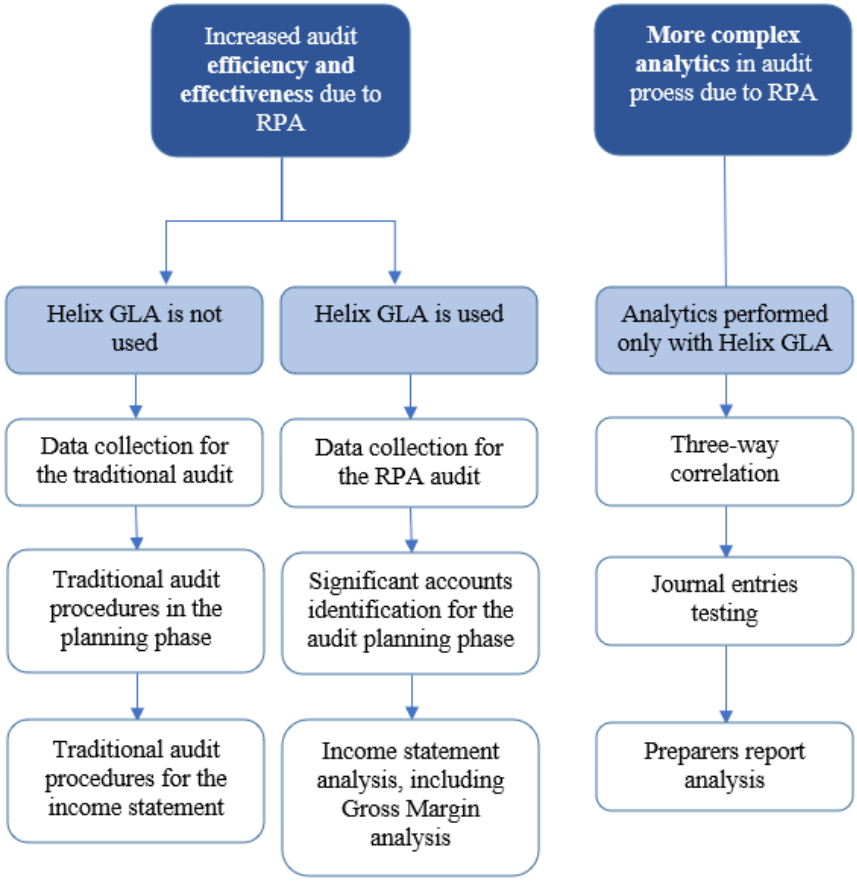


Fig 9. Research scenarios of the RPA use for the financial statements' audit in simulated cases (prepared by the project author)

The first scenario, regarding audit efficiency, will be performed in two ways: a simulation study for the traditional audit and simulation case for the RPA audit. Three procedures will be analyzed in both ways: 1) how the data is collected for the audit; 2) audit procedures in the planning phase; 3) income statement analysis. This will help to understand the differences of the same procedures when RPA is used and not used.

The second scenario of the research will be related to complex analytics due to RPA. Four analytical procedures will be performed with RPA system (two- and three-way correlations, journal entries testing and preparers report analysis). No traditional way of such procedures will be analyzed as usually they are not performed if RPA is not used. The auditor can inquire the client about the

preparers of the financial information, how journal entries are performed, etc. But no analysis can be made from it. Therefore, for the second assumption, a simulation case with RPA will be made.

One of the assumptions will not be included in this research. The conclusion that assumption no. 2 on Big 4 companies' "encouragement" to use smart digital technologies in auditing is made with reference to theoretical review of the issue. The majority of analyzed authors (Liew et al. (2021) and Eilifsen et al. 2020) claim that changing audit procedures due to digitalization require a lot of financial resources. Such financial and personnel burden is often not available for small or medium audit firms as they do not have enough qualified employees and free cash flows to invest in development and creation of digital technology. Therefore, Big 4 companies have a very important role in the area of digital audit, because they have all the necessary resources and can afford to invest in such technologies, develop them and thus change how the audit is performed.

4.1. Impact of RPA use on audit efficiency

In this section three audit procedures will be analyzed from two perspectives – when Helix GLA is used and not used. The selected procedures are typical and widely used in the audit process. The first procedure is data collection from the client without which the audit work cannot begin, as the auditor reviews client data. The second procedure is performed during the planning stage of audit. Usually, overall analytical review (OAR) is done. During this analysis the auditor determines which accounts are significant for the audit and what assertions should be added to them. The third procedure is income statement analysis. The typical tasks when reviewing income statements are to perform OAR on the financial year end numbers and gross margin analysis.

4.1.1. Client data collection for the audit

Traditional audit procedures

In order to perform any audit procedures, auditors must receive the required data from the client. When Helix GLA is not used for the audit, only general ledger (GL) is required in order to start audit procedures. Usually, trial balance is requested two times:

1) for interim audit procedures – general ledger for the agreed time period (can be January – September, January – October, etc.);

2) for final audit procedures – general ledger for full year period (January – December).

The accountant of the audited client sends general ledger to the auditors in the MS Excel format via email or Client portal. Trial balance consists of GL entries, their debit, credit amounts and final balance of requested period (Appendix 1).

RPA audit procedures

When Helix GLA is used, client must send a lot more information, not only general ledger. In order to use Helix GLA, auditors must receive information from the client and when process data to be able to prepare the Helix GLA cube.

The same as without Helix GLA, auditors plan to utilize the data in two audit phases – interim and final – and therefore the client will be asked to extract the data at different points of time. To expedite

the extraction process, client has to provide the name of company's team member who can assist auditors in determining the best approach for data extraction (usually, IT department employee).

Once the data is extracted, it will be delivered to audit the company using one of the secure transfer mechanisms (Client portal or secure file transfer program on the internet). The client is always informed that auditors respect data privacy and security and have policies and controls in place to govern the integrity and security of the data. For all this data extraction and cube preparation process audit company has a Data capture specialist, who helps the audit team to receive information on time.

Data security is very important subject for all audit companies as client's data is most valuable thing in the audit process. Therefore, EY has established another digital technology through which the data can be received – EY Canvas and EY Canvas Client Portal. EY Canvas is the first totally online platform with private cloud. It lets to reduce administration hours during the audit and helps to coordinate all information in one place. EY Canvas Client Portal is integrated into EY Canvas and lets direct communication with the client (EY Global, 2023). All information requests, including general ledger or data for Helix GLA cube, are send to the client and can be monitored if the client sends information upon agreed deadline. However, EY Canvas Client Portal has a size limit of 75 MB. Most commonly, information required for Helix GLA cube is larger than that, so another program is suggested to the client for this purpose – MediaShuttle (size limit is up to 10 GB).

As mentioned above, if the Helix GLA is used in the audit, client has to submit much more information for the auditors. In the Table 4 data extraction scope is provided. Audit company needs all general ledger entries made in the financial year and the year before. This allows a comparison between the data and makes more effective analysis when analysing changes throughout the years. Additionally, master files have to be sent, which later can be used for various analysis.

Table 4. Data extraction scope

Nature of data	**Description and extraction ranges**	
	When Helix GLA is used	**When Helix GLA is not used**
Journal entries	General ledger journal entries for the audit period as well as for the previous period.	No information is requested from the client.
Trial balances	Trial Balances for the beginning and ending of each of different accounting periods being extracted. That is from DD/MM/YYYY to DD/MM/YYYY	Trial Balances for the ending of each of different accounting periods being extracted.
Master files	Master and reference tables which are common to the different areas of analysis	No information is requested from the client.

To sum up, there are four main items that has to be delivered by the client: opening balances, all general ledger journal entries, closing balances and additional master files see (Fig 10).

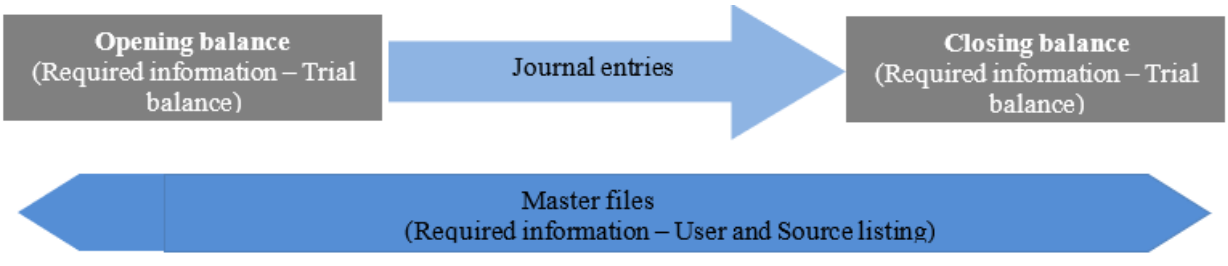


Fig 10. Client Data extraction for Helix GLA

Also, there are requirements for the data. It should be provided in the following file format:

- Microsoft Excel (.xls or .xlsx) (preferred)
- Delimited Text (.txt .csv)

Preferred delimiters: "|", Tab (→) and „~". The delimiter chosen should not appear in any of journal entry field. Client must ensure that all files include appropriately named headers and are clearly named. Dates have to be provided in a prevalent format with no timestamp in it.

Table 4 shows that required data from the client is trial balance (for both opening and closing period), accounting journal entries and master files, which are user and source listings. All these required data must be sent to the auditors in appropriately formatted tables. The requirements are analyzed below.

In the Table 5 all required information for the trial balance, source listing and user listing format is presented.

Table 5. Technical requirements for information for trial balance, source listing and user listing

	Data Point	**Format**	**Definition**	**Required or Optional**
Trial balance format	GL account code	string	Trial balance account identifier. Cross references to the journal entries data.	Required
	GL account name		Account name.	Required
	Functional opening balance	decimal	Balance as at the start date of the trial balance period. This is the amount which is recorded for financial recording purposes, generally for statutory account reporting for the legal entity.	Required
	Functional closing balance		Balance as at the end date of the trial balance period. This is the amount which is recorded for financial recording purposes, generally for statutory account reporting for the legal entity.	Required
	Segment code	string	Optional segmentation identifier.	Optional
	Business unit code		Business unit identifier. Cross references to the business unit master table.	Optional
	Functional currency code		The currency code that the legal entity uses to prepare its financial statements.	Optional
Source listing format	Source code		Source identifier (usually code number, for example document type or similar).	Required
	Source description		Name of the source.	Required
User listing format	User ID		User identifier in the system.	Required
	User full name		Full name and of the user.	Required
	User department		Department the user is assigned to.	Optional
	Title		Title of the user within the entity.	Optional

1) Trial Balance

When preparing the trail balance, the following should be checked:

- trial balance GL accounts balances to zero at each date;
- statement of profit or loss GL accounts shall not be closed (should not have balances of zero);
- trial balance should include all accounts with activity in the period (also accounts with journal entries in the period, even if GL account balance is zero at the beginning or the end of the period). This also includes all clearing accounts with journal entries in the period between trial balances.

2) Journal Entries

The details of journal entries from the trial balance and sub-ledgers for the financial year outlined in the Appendix 2.

3) Source listing

Source checks the subledger or system from which a trial balance journal posting occurs. Source also separates different types of postings from a subledger or system: for instance, in the trade receivables subledger this may include sales invoice, cash payments, credit or manual entries. Source listing should reference to the source data points (Source code) included in the journal entries data (see section Journal Entries). Refer above for the source listing requirements (Table 5).

4) User listing

Register of the various users authorized to make the bookings of journal entries, physical and internal system users (automatic system transactions could be present, for example, for monthly depreciation bookings). Refer above for the user listing requirements (Table 5).

To sum up, there there is a significant number of requirements for the data received from the client in order to be able to prepare Helix GLA cube. The client must understand and follow the instructions as this is the only way how the information can be safely delivered to the auditors.

After all the information is delivered to the audit company, audit team member has to do one more procedure before Helix GLA cube is prepared by a Data capture specialist. Auditor has to prepare mapping for the trial balance received from the client. It indicates that all the accounts, for instance account 121000 Land, has to be mapped:

- Account Type – Assets
- Account Sub Type – Long term asset
- Account Class – Investment property
- Account Sub Class – Land

This procedure has to be done on all GL accounts. When all the information is transferred to Data capture specialist, he or she can prepare Helix GLA cube, which audit team members can import in the MS Excel to use it. There is a home page (Fig 11), which contains four types of procedures that can be performed using Helix GLA. The first column is “Financial statement profiling” from which balance sheet, income statement can be extracted. Significant accounts identification is used during audit planning phase and will be analyzed in more detail. Financial statement tie-out report is used at the end of the audit, when company has already provided full financial statements that need to be

traced and agreed with audited information. The second column is “Validation” and is used to understand if Helix GLA was prepared correctly and has no differences between generated reports and client’s provided information. The third column is “Process analysis”, which helps to improve the knowledge of the client’s processes, preparers and their segregation of duties. Lastly, “Account and journal entry analysis” is very helpful in understanding client’s accounting booking patters, the relationships between different accounts.

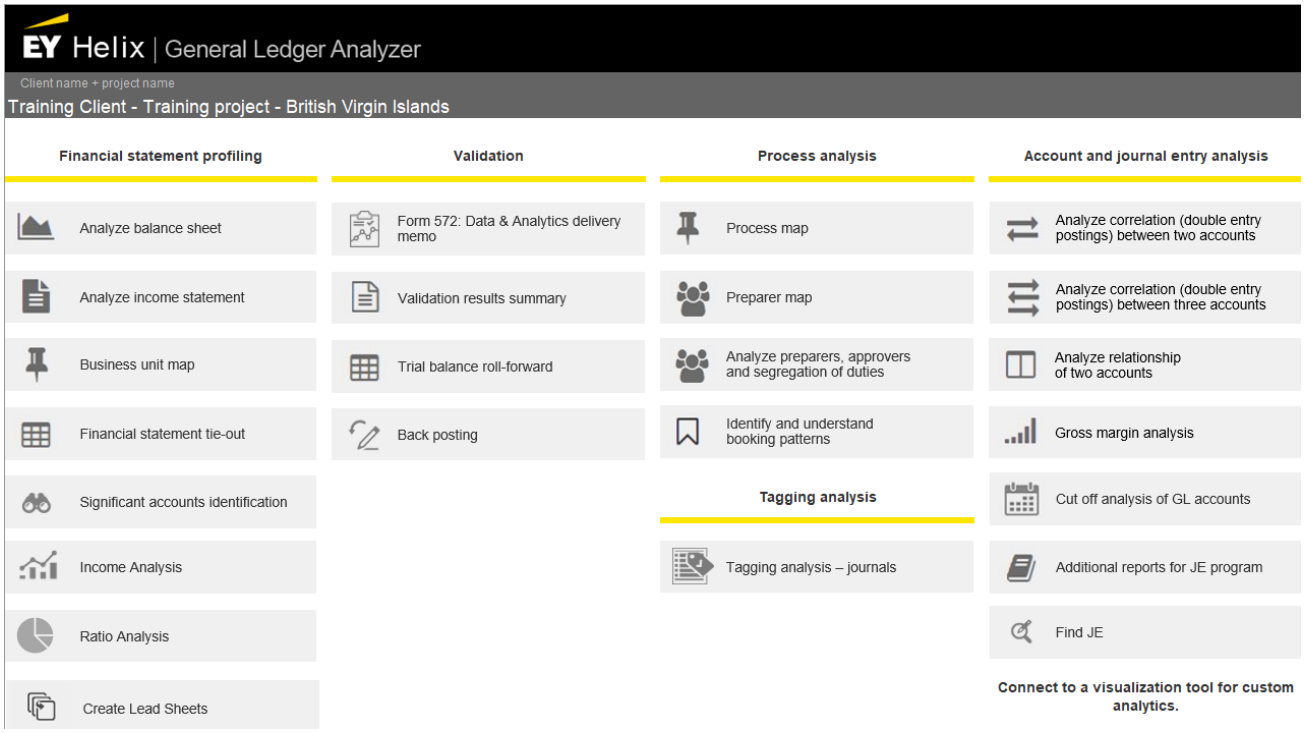


Fig 11. Helix GLA home page

In the Appendix 1 trial balance when Helix GLA is not used was provided. It can be seen that information is displayed in a very simple way and it is hard to see an overall view of the company’s performance and results. In the Fig 12 balance sheet generated with Helix GLA is provided. Due to mapping procedure, Helix GLA has the ability to show a more informative view:

- Ending balance for the current auditing period;
- Ending balance for prior period;
- Change between current and prior period (in terms of currency and percentage);
- Net income in order to have a full picture of the company’s results;
- View similar to financial statements with total lines of assets, equity and liabilities.

Such balance sheet presentation with Helix GLA saves time for the auditors as less technical work has to be performed in order to see the changes between years and total lines. Although, if such overall view is not enough for the analysis, auditor can extend the line to see what accounts belongs to it. As well as monthly analysis of the accounts can automatically be formed.

Without Helix GLA

Account	Account name	Beg. Balance	Closing Balance
111010	Licenses	13 400	13 400
111015	Software equipment	349 045	349 045
121000	Land	1 500 000	1 500 000
121010	Buildings	13 768 640	13 768 640
200111	Stocks of basic materials	2 006 687	3 007 970
202001	Semi-finished products	1 537 657	2 649 548
203000	Manufactured products	7 656 309	4 688 624
270000	Cash	14 870	23 730
300000	Capital	-6 794 833	-6 794 833
330000	Reserves	-679 483	-679 483
340000	Retained earnings (loss) in the previous period	-4 513 266	-4 513 266
350000	Grants and subsidies	0	0
401011	Long-term debts to credit institutions	-30 876 598	-30 630 438
430060	Current year portion of lease IFRS16	-909 864	0
450000	Short-term trade payables to suppliers	-15 973 048	-16 172 597
472000	Salaries payable	-479 864	-371 234

With Helix GLA

	EUR			
	Current Period Ending Balance 2014-12-31	Prior Period Ending Balance 2013-12-31	Current and Prior Period Period End Change Amt	Change %
Current assets	150 710 333	212 869 651	(62 159 318)	-29%
Cash and cash equivalents	35 182 375	80 477 704	(45 295 329)	-56%
Inventory	31 904 689	32 490 540	(585 851)	-2%
Prepayments and accrued income	105 588	195 276	(89 688)	-46%
Receivables	83 517 682	99 706 131	(16 188 450)	-16%
Non Current assets	185 387 014	158 122 213	27 264 801	17%
Financial assets	75 795 300	75 795 300	-	0%
Intangible assets	56 676 015	37 605 113	19 070 902	51%
Tangible assets	52 915 699	44 721 800	8 193 899	18%
Total Assets	**336 097 348**	**370 991 865**	**(34 894 517)**	**-9%**
			-	
Current liabilities	(126 009 310)	(129 773 571)	3 764 261	-3%
Accruals and deferred income	(48 229)	(22 872)	(25 358)	111%
Payables	(125 961 081)	(129 750 699)	3 789 619	-3%
Non current liabilities	(11 228 364)	(10 042 941)	(1 185 423)	12%
Provision for future employee costs	(2 755 836)	(2 878 583)	122 747	-4%
Provisions for risks and charges	(8 472 528)	(7 164 358)	(1 308 170)	18%
Total Liabilities	**(137 237 674)**	**(139 816 512)**	**2 578 838**	**-2%**
			-	
Equity	(155 175 353)	(189 285 133)	34 109 780	-18%
Legal reserve	(4 160 000)	(4 160 000)	-	0%
Profit & loss reserve	(130 058 462)	(164 168 242)	34 109 780	-21%
Revaluation reserve	(156 891)	(156 891)	-	0%
Share capital	(20 800 000)	(20 800 000)	-	0%
Total Equity	**(155 175 353)**	**(189 285 133)**	**34 109 780**	**-18%**
			-	
Net income	**(43 684 321)**	**(41 890 220)**	**(1 794 101)**	**4%**
			-	
Total Liabilities, Equity and Net income	**(336 097 348)**	**(370 991 865)**	**34 894 517**	**-9%**

Fig 12. Balance sheet generated without Helix GLA and with Helix GLA

After the analysis of data collection for the audit procedures, steps are different for traditional audit and RPA audit (Fig 13). In the first case, it is enough for the auditor to receive the Trial balance from the client and the audit work can be started. In the second case, there are significantly more steps that must be completed before the work can begin. In addition, the client has a number of requirements regarding the format in which the requested information must be provided.

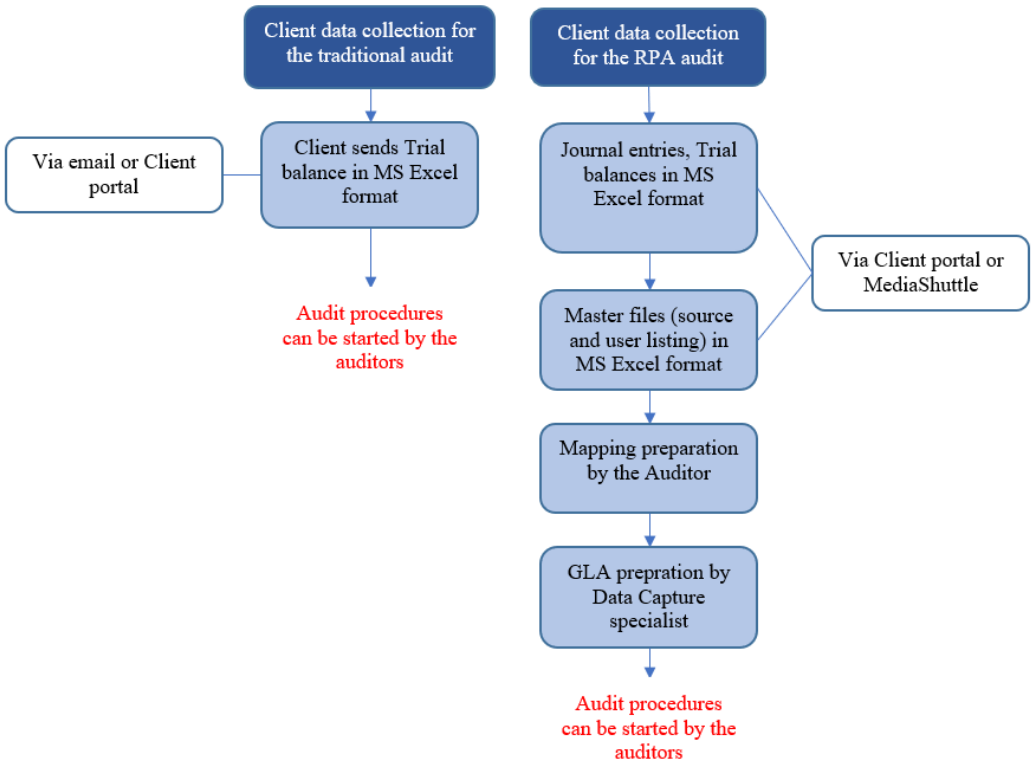


Fig 13. Data collection summary for the traditional and RPA audit (prepared by the project author)

It is easier and less time-consuming for the client to send the trial balance as no IT department incorporation is needed. However, from the auditor's side, usage of Helix GLA gives new perspective on how standard reports can be upgraded. This means that auditor can save time resources and shift attention to more significant tasks than technical work. Data transfer is an important part of data collection, and other platforms can be used for that – EY Canvas Client portal or MediaShuttle. When the auditor receives the necessary information (Trial balance or Helix GLA), interim audit procedures can be started.

4.1.2. Traditional audit procedures in the planning phase

Traditional audit procedures

For most clients' interim audit procedures are performed as this helps to reduce the workload from the final audit and help to identify risk areas of the company in an early stage of the whole audit process. This means that overall analytical procedures have to be prepared and all accounts must be reviewed to determine if they are significant (S), limited risk (LR) or insignificant (IS). To do that, auditor has to calculate the change between years, check if the change and account is above selected Tolerable Error (TE). These steps are calculated manually using MS Excel formulas. Also, assertions must be added to significant accounts (existence (E), valuation (V), etc.). The typical presentation of such procedure is provided in the Table 6.

Table 6. Overall analytics in the planning phase of audit

Account	Account name	Beg. Balance	Closing Balance	Change	Change above TE?	Account above TE?	Account S/LR/IS	Assertion
111010	Licenses	13 400	13 400	-	-	-	IS	
121000	Land	1 500 000	1 500 000	-	-	Yes	S	E
121010	Buildings	13 768 640	13 768 640	-	-	Yes		
200111	Stocks of basic materials	2 006 687	3 007 970	1 001 283	Yes	Yes	S	E, V
202001	Semi-finished products	1 537 657	2 649 548	1 111 891	Yes	Yes		
270000	Cash	14 870	23 730	8 860	-	-	S	E
300000	Capital	-6 794 833	-6 794 833	-	-	Yes	LR	
330000	Reserves	-679 483	-679 483	-	-	-		
401011	Long-term debts to credit institutions	-30 876 598	-30 630 438	246 160	-	Yes	S	P&D

Color legend:

Grey – information provided by the client

Yellow – information prepared by the auditor

Green – significant account

Blue – limited risk account

White – insignificant account

The grey columns are provided by the client (extracted from the Trial balance). The yellow ones are prepared by the auditor. Usually, significant accounts are marked green, limited risk – blue and insignificant accounts are left white. Such formatting helps to draw attention to significant accounts, which are most important and have the highest risk of material misstatements. Additionally, few more columns can be added. For instance, the comments section, explaining the changes between years, or process column, which explains what type of processes will be reviewed for significant accounts.

Overall analytical procedures are rather simple to perform. However, it takes time to do all the calculations because significant accounts and assertions are usually checked not on a single account level but on the account group level, such as property, land and equipment, inventories, cash, equity, sales, cost of sales (COS), financial income and expenses. It means that sum lines have to be added in the Trial balance and correct accounts must be included manually.

RPA audit procedures

The same planning procedures must be done regardless of whether RPA is used for the audit or not. However, the process of these procedures is quite different.

Auditors review the Significant account identification analysis generated by Helix GLA (Fig 14). This means that balance sheet and income statement already have sum lines similar to financial statements. Helix GLA has one helpful feature – the auditor can write TE amount and accounts above it will automatically be marked. It means that marked lines should potentially be assigned as a significant or limited risk account. When a significant or limited risk account is selected, line is painted green or blue by Helix GLA. Also, the auditor can see manual Journal Entries (JE) volume to the accounts in the table. These numbers later can be drilled down to debits and credits in order to get a better understanding what bookings have been made manually and what was the purpose of that. Therefore, the auditor gets a deeper knowledge of the account without any client intervention.

				Enter Tolerable Error:				
				500 000				
				EUR				
Account Type	Account Sub-type	Account Class Account Sub -Class GL account	Significant Account?	Current year balance 2014-12-31	Prior Year balance 2013-12-31	Total Debits	Total Credits	Manual JE volume
Assets	Current assets	Cash and cash equivalents	S	35 182 375	80 477 704	6 078 605 533	(6 123 900 862)	(45 295 329)
Assets	Current assets	Inventory	S	31 904 689	32 490 540	426 224 652	(426 810 503)	(585 851)
Assets	Current assets	Prepayments and accrued income	IS	105 588	195 276	327 459	(417 147)	(89 688)
Assets	Current assets	Receivables	S	83 517 682	99 706 131	1 532 663 892	(1 548 852 342)	(413 579 563)
Assets	Non Current assets	Financial assets	S	75 795 300	75 795 300			
Assets	Non Current assets	Intangible assets	S	56 676 015	37 605 113	49 873 379	(30 802 477)	19 070 902
Assets	Non Current assets	Tangible assets	S	52 915 699	44 721 800	34 759 200	(26 565 301)	8 193 899
Liabilities	Current liabilities	Accruals and deferred income	IS	(48 229)	(22 872)	240 811	(266 169)	(25 358)
Liabilities	Current liabilities	Payables	S	(125 961 081)	(129 750 699)	1 044 836 533	(1 041 046 915)	121 681 640
Liabilities	Non current liabilities	Provision for future employee costs	NS/LR	(2 755 836)	(2 878 583)	3 263 008	(3 140 261)	122 747
Liabilities	Non current liabilities	Provisions for risks and charges	NS/LR	(8 472 528)	(7 164 358)	16 481 343	(17 789 514)	(1 308 170)
Equity	Equity	Legal reserve	NS/LR	(4 160 000)	(4 160 000)			
Equity	Equity	Profit & loss reserve	NS/LR	(130 058 462)	(164 168 242)	159 780 440	(83 780 440)	76 000 000
Equity	Equity	Revaluation reserve	NS/LR	(156 891)	(156 891)			

Fig 14. Significant account identification report generated by Helix GLA (1)

Helix GLA Significant accounts report allows to analyze not only closing balances, but also provides information about total volume of debits and credits posted through the account. As well as other indicators that the account may have a relevant event or condition associated with it, e.g., a high number of sources, preparers or manual entries (Fig 15). Such information shows to which accounts bookings are made every day. If some strange activities are noticed, the auditor must dig deeper into the account and inquire the client.

Account Type	Account Sub-type	Account Class Account Sub -Class GL account	No. of JE lines	No. of Manual JE lines	No. of Sources	No. of Preparers
Assets	Current assets	Cash and cash equivalents	36 048	28 960	16	10
Assets	Current assets	Inventory	146	146	1	2
Assets	Current assets	Prepayments and accrued income	215	215	8	7
Assets	Current assets	Receivables	110 710	58 243	61	17
Assets	Non Current assets	Financial assets	-	-	-	-
Assets	Non Current assets	Intangible assets	277	277	7	2
Assets	Non Current assets	Tangible assets	633	633	3	1
Liabilities	Current liabilities	Accruals and deferred income	107	107	4	4
Liabilities	Current liabilities	Payables	98 432	91 918	38	44
Liabilities	Non current liabilities	Provision for future employee costs	281	281	4	2

Fig 15. Significant account identification report generated by Helix GLA (2)

To sum up, for most audits the planning procedures are performed, regardless of whether RPA is included or not. The same analysis must be done – identification of significant accounts. However, traditional planning procedures require a lot more time to do manual calculations and less information can be received just from the Trial balance. RPA lets the auditor to get more information at the beginning of the audit and this lets to get deeper knowledge about the client, it's activities throughout the year. Also, all calculations are done automatically by Helix GLA, so time resources are saved.

4.1.3. Audit procedures for the income statement

Traditional audit procedures

After significant and limited risk accounts are identified during the planning audit phase, final procedures can be started at the year end. One of the most important part is to perform income statement analytics. The first steps are identical as in overall analytics performed during planning audit. Auditor takes income statement with prior and current year balances and manually calculates the changes between years (Table 7). Changes are commented in order to understand why client's sales, COS and other expenses increased or decreased.

Table 7. Income statement analytics when Helix GLA is not used

Account	Account name	Beg. Balance	Closing Balance	Change	Change above TE?	Account Above TE?
500000	Sales	-11 482 730	-13 869 532	(2 386 802)	Yes	Yes
504000	Other sales	-23 998	-43 411	(19 413)	-	-
601100	COS	8 836 493	10 393 016	1 556 523	Yes	Yes
601122	Salary of the main workers	498 730	535 800	37 070	-	-
601124	Social insurance	10 738	12 253	1 515	-	-
602600	Electric power	254 930	375 923	120 993	-	-
602602	Water	6 582	8 723	2 141	-	-
611770	Insurance	2 389	3 484	1 095	-	-

Color legend:

Grey – information provided by the client

Yellow – information prepared by the auditor

Green – significant account

Blue – limited risk account

White – insignificant account

After such an overall view on client's performance, monthly analytics are done on significant accounts. Gross margin can be performed for sales and COS accounts to review the relationship between these accounts. Firstly, the auditor has to receive income statement with monthly numbers from the client. After that auditor takes required accounts and calculates gross margin (sales minus COS) in currency and percentage (Table 8).

Table 8. Gross margin analysis when Helix GLA is not used

Account	January	February	March	…	October	November	December	Closing Balance
500000 Sales	-986 383	-808 463	-1 398 264		-1 294 632	-1 184 630	-1 777 588	-13 869 532
601100 COS	783 628	653 861	1 073 519		840 317	812 731	1 283 729	10 393 016
Gross margin	-202 755	-154 602	-324 745		-454 315	-371 899	-493 859	-3 476 516
Gross margin, %	21%	19%	23%		35%	31%	28%	25%
Expectation	22%	22%	22%		30%	30%	30%	
Variation	-1%	-3%	1%		5%	1%	-2%	

Color legend:

Grey – information provided by the client

Yellow – information prepared by the auditor

Another important part is to raise a proper expectations for a gross margin or other accounts. As it helps to understand if that expectation is sufficiently precise to identify a misstatement that, individually or when aggregated with other misstatements, may cause the material and significant misstatement in the financial statements. After the expectation is established, auditor calculates difference from the factual gross margin and evaluates if he or she is comfortable with it. If variation is too high, it must be reviewed, and the client has to provide an explanation for it.

Similarly, all significant accounts have to be checked with monthly analytics. Expectations must be raised and deviations from factual amounts are calculated manually. Client involvement is inevitable because all significant aspects have to be commented and support documents or journal entries, if needed, received. It can be concluded that income statement analytics take a lot of auditor's time as well as client's.

RPA audit procedures

RPA usage in income statement analytics can be very helpful and less time consuming compared to the traditional way. No manual calculations have to be performed as all necessary reports are generated by Helix GLA. An income statement with changes between years and accounts percentages from total sales or expenses is presented in the Fig 16. Auditor only need to check which accounts are above selected threshold and the changes between years can be commented.

	EUR					
	Current Period Ending Balance 2014-12-31	Prior Period Ending Balance 2013-12-31	Current and Prior Period			
			Period End Change Amt	Change %	% of Revenue (Current)	% of Revenue (Prior)
Extraordinary income	-	(469 763)	469 763	-100%	0%	0%
Other extraordinary income	-	(469 763)	469 763	-100%	0%	0%
Financial income	(2 229 393)	(3 282 469)	1 053 076	-32%	0%	-1%
Foreign exchange gains	(15)	(48)	33	-69%	0%	0%
Other financial income	(2 229 378)	(3 282 420)	1 053 043	-32%	0%	-1%
Sales	(470 395 214)	(469 607 743)	(787 471)	0%	-100%	-99%
Other revenues and income	(8 411 252)	(10 454 087)	2 042 835	-20%	-2%	-2%
Sales of goods and services	(461 983 962)	(459 153 656)	(2 830 305)	1%	-98%	-97%
Total Revenue	**(472 624 606)**	**(473 359 975)**	**735 369**	**0%**	**-100%**	**-100%**
Cost of sales	406 718 626	410 478 794	(3 760 168)	-1%	86%	87%
Changes in inventories of finished products, sen	236 895	(4 146 559)	4 383 454	-106%	0%	-1%
Other operating expenses	4 243 740	3 909 645	334 095	9%	1%	1%
Personnel costs	32 581 994	33 146 586	(564 592)	-2%	7%	7%
Provisions for risks	5 799 592	4 645 909	1 153 684	25%	1%	1%
Financial charges	1 340 252	1 345 860	(5 608)	0%	0%	0%
Foreign exchange losses	42	258	(217)	-84%	0%	0%
Interest and other financial charges	1 340 211	1 345 602	(5 391)	0%	0%	0%
Taxes	20 881 407	19 645 102	1 236 306	6%	4%	4%
Current taxes	21 486 902	19 062 558	2 424 344	13%	5%	4%
Deferred tax assets and liabilities	(605 495)	582 544	(1 188 038)	-204%	0%	0%
Total Expenses	**428 940 286**	**431 469 755**	**(2 529 470)**	**-1%**	**91%**	**91%**
Net Income	**(43 684 321)**	**(41 890 220)**	**(1 794 101)**	**4%**	**-9%**	**-9%**

Fig 16. Profit (loss) statement generated by Helix GLA

Monthly analytics must be performed to significant accounts in order to get assurance if there are no material misstatements. Gross margin analysis is usually done for this task. However, differently from the traditional audit, monthly income statement is automatically generated by RPA as the client provided all journal entries and required information before the start of the audit. Therefore, auditor can check gross margin report without a need to do any calculations.

Report generated by Helix GLA contains gross margin in percentage and currency for two years – current and prior period (Fig 17). Additionally, total sales and COS amounts for the same two years are presented.

EUR							
Gross Margin Summary							
	201401	201402	201403	...	201410	201411	201412	Total
Gross Margin % Current	54%	47%	34%		-1%	13%	-191%	12%
Gross Margin Current	27 604 782	20 873 369	13 466 301		(456 307)	4 553 665	(44 941 615)	55 265 336
Gross Margin % Prior	57%	45%	30%		14%	-2%	-204%	11%
Gross Margin Prior	28 872 021	20 039 852	10 659 817		6 176 385	(543 371)	(50 648 704)	48 674 863
Sales Total Current	(50 776 838)	(44 613 810)	(39 756 699)		(42 615 981)	(34 962 815)	(23 533 847)	(461 983 962)
COS Total Current	23 172 055	23 740 441	26 290 398		43 072 288	30 409 150	68 475 462	406 718 626
Sales Total Prior	(50 405 035)	(44 342 088)	(36 012 737)		(42 840 008)	(35 549 914)	(24 829 691)	(459 153 656)
COS Total Prior	21 533 014	24 302 236	25 352 921		36 663 623	36 093 285	75 478 396	410 478 794

Fig 17. Gross margin analysis when Helix GLA is used

Same as in traditional audit procedures, auditor must raise expectations on GM. The difference between actual amounts and expected can be immaterial – no significant impact on financial statements as a whole. However, if the difference is material, it must be checked. This is where RPA system helps the auditor to perform more effective audit. As all journal entries made throughout the

year is in the Helix GLA, auditor can drill down any amount of the account. It means that if there is a certain amount that increases or decreases monthly gross margin amount, it can be drilled down to the basic debit and credit. Additionally, auditor can see full account type, class, number, the description, currency and even the date when journal entry was booked (Fig 18). This means that RPA lets raise better questions to the client without the need to receive journal entries. Both the auditor and the client save time resources from the manual tasks and the audit procedures can be done with less effort.

Account Type	AccountSub Type	Account Class	Account SubClass	GL Account Number	GL Account Name	Amount	Debit Amount	Credit Amount	Amount Currency	Effective Date	Entered Date
Assets	Current assets	Receivables	Trade receivables	0020000000	Receivables _ domestic customer	15 926	15 926	-	EUR	2014-07-01	2014-07-01
Assets	Current assets	Receivables	Tax credits	0020001101	VAT sales	(2 872)	-	(2 872)	EUR	2014-07-01	2014-07-01
Revenue	Sales	Sales of goods and services	Sales of goods and services	0120000000	Domestic sales finished products	(17 601)	-	(17 601)	EUR	2014-07-01	2014-07-01
Revenue	Sales	Sales of goods and services	Sales of goods and services	0120010000	Trade discounts	4 547	4 547	-	EUR	2014-07-01	2014-07-01

Fig 18. Drill down of a booking

Another useful feature is that Helix GLA generates a graph of gross margin comparison (Fig 19). It saves the preparer's time as it is automatically made by RPA. Moreover, such presentation of gross margin is very convenient for the reviewer of the working paper (audit manager or audit partner) as the main information can be seen clearly in one place. There is no need to search the table with numbers and analyze it. As managers and partners review time is very limited, such capabilities of Helix GLA to automatically create graphs are quite simple, but very useful in terms of time saving.

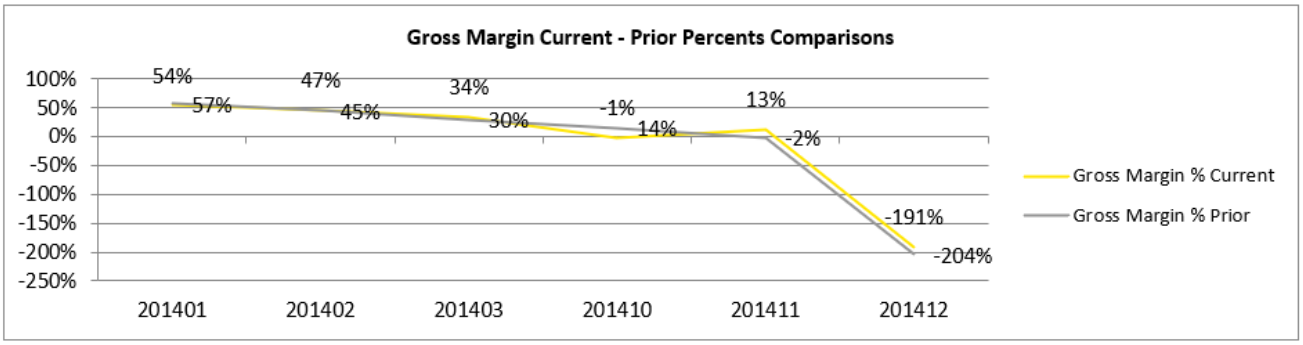


Fig 19. Gross margin presentation with Helix GLA

To sum up, RPA increases audit efficiency as all required reports and graphs are generated automatically. Also, it saves time as auditor can drill down accounting bookings, which means that better questions can be referred to the client, without a need to ask the journal entries.

Income statement analytics include not only gross margin analysis. It is a rather complicated working paper, which requires knowledge and resources to perform appropriate work. Having said that, auditors prepare additional procedure to have a full view how client's income is realized as cash. For this, a three-way correlation is performed. Furthermore, auditor makes journal entries testing on income and COS (or other significant accounts if needed), as well as preparers report analysis. All these procedures can be made with RPA when Helix GLA is used. Therefore, in the next chapter these more complex analytics will be made in order to understand what is the added value for the audit.

4.2. Analysis of more complex analytics with RPA in audit process

The procedures described in the 4.1 chapter can be performed without any smart technologies as digital technology helps to do the tasks more efficiently. In this chapter the analysis of more complex analytics for income statement will be made, which cannot be performed without RPA – three-way correlation, journal entries testing and preparers report analysis.

4.2.1. Three-way correlation

The journal entry postings between three accounts analysis have provided a significant improvement in ability to audit a client's business cycle particularly around how revenue is realized as cash. This analysis allows to understand complete populations of entries by raising questions about an entity's processes. This approach authorizes the risk assessment of material misstatements. It may serve as the primary substantive evidence over relevant assertions and leads to less reliance being placed on sampling in audit strategy.

Three-way correlation analysis is focused on the flow of journal entries between the primary and secondary accounts and then the journal entries posting between the secondary and tertiary accounts. This analysis can be more complex when a single journal entry posts to the primary, secondary and tertiary accounts.

For example, when reperforming journal entries between revenue (primary account), trade receivables (secondary account) and cash (tertiary account) a single journal entry posting to all three accounts would be observed if there is an invoice settled by cash which includes a payment discount recorded as a debit to revenue.

In the Helix GLA the postings between all three accounts, highlights these types of journals in the journal entry posting between three accounts. By separately identifying these entries, their impact can be assessed and, if significant to the overall flow of activity, provide the ability to determine an appropriate audit response.

The three-way correlation is made using Helix GLA. The execution of correlation process:

1) Auditor selects the accounts for which three-way correlation will be performed
2) Auditor raises the expectations for the correlation
3) Helix GLA generates three-way correlation reports for chosen accounts
4) Auditor analyses if correlation meets the expectations
5) If there are material differences between correlation and raised expectations, auditor analyses it
6) Activities not posting to accounts are analyzed, if material
7) If differences are reasonable and no unusual postings have been found, auditor makes the conclusion that there are no material deviations.

Below will be analyzed how three-way correlation is performed for the simulation case study client, which standard Value Added Tax (VAT) is 20% (see Appendix 3).

Full three-way correlation can be separated into two parts:

1) Sales (primary) activity posting to trade receivables (secondary) activity (Fig 20).

2) Trade receivables (secondary) activity posting to cash (tertiary) activity (Fig 21).

Correlation difference is 15,40% instead of expected 20%. The usual procedure how to challenge the expectation is to get sales list and filter what amount of total sales that have been made locally and in foreign countries. Sales to foreign countries have 0% VAT rate, which distorts the correlation difference. Therefore, auditor calculates the new expectation based on the VAT rate applied and concludes if it's correct.

Composition of Sales activity (Primary)	Audit period 2014-12-31 EUR		Composition of Trade AR activity (Secondary)	Audit period 2014-12-31 EUR
Opening balance (n/a) for income statement	-	Correlation	Opening balance (n/a) for income statement	86 437 944
B - activity posting to Trade AR >>	(473 919 501)	difference	B - activity posting to Sales >>	546 908 124
A - activity not posting to Trade AR >>	3 524 288	-15,40%	D - activity posting to Cash >>	(512 437 482)
			E - activity not posting to Sales or >> Cash	(61 974 363)
			C - reversal of duplicates>>	11 938 600
Closing balance	(470 395 214)		Closing balance	70 872 822
Unallocated difference	-		Unallocated difference	-

Color legend:

Yellow – B activity (sales and trade receivables postings)

Grey – D activity (cash and trade receivables postings)

Fig 20. Three-way correlation (Sales >> Trade receivables)

Another important part is to check how many of total sales go through trade receivables. Sales activity posting to trade receivables (B part in the Fig 20) is 473 919 501 EUR. However, it can be seen that trade receivables posting to sales amount is significantly higher – 546 908 124 EUR. Auditor must analyze in more detail 72 988 622 EUR difference to understand if bookings are made in a correct manner. Helix GLA generates full reports with the accounts that are posting in the correlation. The differences are mostly due to accounts which was not selected by the auditor when making the correlation (see Appendix 4). The explanation of the difference with amounts is presented in the Table 9.

Table 9. Part B differences from three-way correlation

Explanation	Amount, EUR
Sales activity posting to trade receivables	(473 919 501)
Correlation difference - Sales and trade receivables	72 988 622
VAT	(85 646 425)
Sales bookings directly to cash	8 810 174
Sale bookings through accounts payable	3 341 452
Sales recognized net (decreasing cost)	506 613
Total	(72 988 186)
Unexplained difference – immaterial	436
Trade AR posting to Sales:	546 908 124

It can be seen that majority of the difference come from sales VAT (see Appendix 5), which was not selected for the correlation. Also, there are sales bookings that go directly to cash or through accounts payable, as well as decreasing costs. Total amount of the explained differences is 72 988 186 EUR and unexplained difference is only 436 EUR – immaterial. Therefore, conclusion can be drawn that sales bookings to trade receivables are correct, without material differences.

The second part of the correlation is trade receivables activity posting to cash activity. Correlation difference is 16,63% (Fig 21) and the primarily expectation is that difference will be 0% – all trade receivables will go to cash. However, the auditor has to understand how the processes are done in client's business. For this case, auditor expects about 16% of trade receivables credit activity not posting to sales or cash due to set offs with trade payables performed during the year, which is usual practice for the Client.

Composition of Trade AR activity (Secondary)	Audit period 2014-12-31 EUR		Composition of Cash activity (Tertiary)	Audit period 2014-12-31 EUR
Opening balance (n/a) for income statement	86 437 944		Opening balance (n/a) for income statement	80 477 704
B - activity posting to Sales >>	546 908 124	Correlation		
D - activity posting to Cash >>	(512 437 482)	difference	D - activity posting to Trade AR >>	427 224 138
E - activity not posting to Sales or Cash >>	(61 974 363)	16,63%	F - activity not posting to Trade AR >>	(472 519 467)
C - reversal of duplicates>>	11 938 600			
Closing balance	70 872 822		Closing balance	35 182 375
Unallocated difference	-		Unallocated difference	-

Color legend:

Yellow – B activity (sales and trade receivables postings)

Grey – D activity (cash and trade receivables postings)

Fig 21. Three-way correlation (Trade receivables >> Cash)

Still there is the difference between D activity posting to cash (512 437 482 EUR) and activity posting to trade receivables (427 224 138 EUR), which must be explained. The most common is net offs with trade payables and in this case total amount of such net offs is 85 350 409 EUR (Table 10). Also, VAT bookings were not selected for the correlation as it should (see Appendix 6).

Table 10. Part D differences from three-way correlation

Explanation	Amount, EUR
Trade AR activity Posting to cash	(512 437 482)
Correlation difference - Trade AR and Cash	(85 213 344)
Net-off with trade payables	85 350 409
VAT bookings	(138 264)
Total	85 212 145
Unexplained difference – immaterial	(1 199)
Receivables activity posting to Cash	427 224 138

Two main parts have been analyzed from the three-way correlation: sales (primary) activity posting to trade receivables (secondary) activity and trade receivables (secondary) activity posting to cash (tertiary) activity. However, there are 11 938 600 EUR reversal of duplicates (C part in Fig 21). This

tab includes entries that impact all three account groups (e.g., an entry is recorded to clear an invoice, partially through a cash receipt and partially through an adjustment to revenue). Since these entries are also included within categories B and D, they must be reversed out of the trade receivables roll forward in order to reconcile to the ending trial balance. Auditor may obtain an understanding of these entries but generally do not need to investigate further because they are already tested in categories B and D.

The last part of the correlation is to clear up activities not posting to sales, trade receivables or cash. Firstly, E part (trade receivables activity not posting to sales or cash) will be reviewed. These entries either represent:

- Trade receivables that were raised through the revenue process but were not settled in cash (e.g., the entity initially issued an invoice and recorded revenue but subsequently settled the receivable through means other than a cash receipt or reversal of the initial revenue entry (such as a write-off of the debt)). Since these entries resulted in the recognition of revenue, but that revenue is not supported by cash, auditor should perform additional testing to substantiate the revenue.

- Trade receivables that were raised through some process other than revenue (e.g., the entity issued an invoice upon the sale of property, plant, or equipment). As no revenue was initially recorded, these entries likely do not relate to revenue and may have no implication on auditor's conclusion regarding the occurrence and measurement of revenue. However, it must be considered whether the trade receivable is classified appropriately and how the transactions affect auditor's conclusions on other significant accounts.

Total amount of not posting to sales or cash in the analyzing case correlation is 61 974 363 EUR. 62 468 058 EUR are related to trade payables (see Table 11 and Appendix 7), 153 678 EUR are VAT accounts not selected under trade receivables, 2 124 545 EUR is other financial income (interest). An unusual booking has been noticed with depreciation expenses. Such entries must be drilled down in order to understand if no adjustments need to be booked by the client. Also, write-offs made through expenses were also not included in the correlation as no income has been recognized.

Table 11. Part E activity not posting to sales or cash from three-way correlation

Explanation	**Amount, EUR**
Trade receivables activity not posting to Sales or cash	(61 974 363)
Trade receivables activity posting to trade payables (set-offs)	62 468 058
VAT	(153 678)
Other financial income	(2 124 545)
COST (depreciation expenses)	6 200 000
Write-offs via expenses	(4 415 472)
Unexplained difference – none	-

Secondly, auditor has to review A part from the correlation – sales activity not posting to trade receivables. The majority of the sales not posting are related to discounts (trade payables and property, plant and equipment). Provisions for risks and charges are 3 720 000 EUR and sales activity lowering costs is 1 223 308 EUR (see Table 12 and Appendix 8).

Table 12. Part A sales activity not posting to trade receivables

Explanation	EUR
Sales activity not posting to trade receivables	3 524 288
Sales activity posting solely to trade payables (in case of discounts usually)	148 368
Sales activity posting to property, plant and equipment	(6 204 014)
Provisions for risks and charges	3 720 000
Sales activity lowering cost (recognized net)	(1 223 308)
Total	(3 558 954)
Unexplained difference – immaterial	(34 666)

After a three-way correlation was analyzed, it can be concluded that it requires a deeper analysis from the auditor to understand if all sales, trade receivables and cash correlates in line with expectations. All unusual bookings have to be reasoned with explanations, drilled down entries or support documents from the client if needed. Other than that, a three-way correlation gives the auditor highest assurance on sales balances and turnovers. When RPA is not used in the audit procedures, income statement analysis is rather simple and mostly based on the client‘s comments. RPA makes posting between three accounts easier to understand and evaluate.

4.2.2. Journal entries testing

Three-way correlation lets the auditor understand the flow between three accounts. However, there is a need to understand overall journal entries and their bookings. If the RPA system is not used for the audit procedures, auditor can inquire the client about it, though no deeper analysis can be performed. Helix GLA can generate journal entries reports in order to audit them from different perspectives. Such reports can help identify fraudulent or illegal activity by the client, as well as give more assurance on bookings in significant accounts. There are six main reports for journal entries testing (Table 13). Expectations must be raised for some of the procedures as every client’s business model is different.

Table 13. Journal entries testing reports summary

Name	Procedures
Round numbers report	Auditor reviews numbers‘ patterns ending in 000, 111 and 999 (or can be selected any other based on audit team judgement).
Specific phrases report	Review is performed for words: "litigation", "fee", "legal", "professional", "as per Petras", "request", "based on", names of top management (chief accountant, directors) and board members (or any other words).
Source of Details (SoD) by account class	Auditor reviews journal entries made to unrelated, unusual or seldom used account (report presents number of transactions for each account): - less than 5 bookings per year per account (or any other number) - review accounts that contradicts business/sector rationale - look for significant changes between years in number of preparers, number of journal entries, turnovers.
Day of the week report	Audit team reviews day of the week report for unusual patterns based on expectations raised.
Day lag report	Auditor reviews day lag report for unusual patterns based on expectations raised.
Date analysis by month	Auditor reviews date analysis by month report for unusual patterns based on expectations raised.

The first one is round numbers report. The importance of it is described in ISA 240 (2009) that improper bookings and adjustments have one thing in common – usage of round numbers. Such reports can be done for both current and prior periods and it is an important part as a lot of times clients adjust precisely previous years. RPA gives the possibility to select what numbers auditor will review and shows how many entries include selected number (Appendix 9). All journal entries found by Helix GLA should be drilled down by the audit team and examined in further detail, to get assurance if there are no material misstatements. Without RPA, auditor can only inquire the client and ask to send similar report, if possible. However, the assurance level received will be significantly lower than extracting such report with Helix GLA.

Similarly to round number report, RPA can generate specific phrases report, which can be selected by the audit team and adjusted to different clients (management names, etc.). For the simulation case study generated report did not find any selected phrases (Appendix 10). In such case, auditor can select more phrases which could possibly indicate fraud or any other misstatements.

SoD By Account Class worksheet summarizes the number of preparers, number of journal entries and financial statement impact by account class (Appendix 11). This report gives a lot of information for the auditor about the current and prior periods:

- Number of preparers processing journal entries to the account class
- Number of journal entries processed into the account class
- Dividing the JE count by the number of preparers to calculate the average number of entries per preparer
- The value of the activities (debit and credit) for the account class

Such information shows what accounts were the main ones in the client's business cycle, if there was a high employee's turnover between years who can make accounting bookings. SoD by account class can help the auditor to understand if there were significant changes between years about which the client did not inform. Also, it can indicate client's bookings mistakes if some unusual activity is noted.

Another important journal entries testing part is day of the week analysis. The day of week worksheet summarizes the account activities for the accounts selected by the day of the week the transactions relate to (i.e., by entry date). The usual expectation for most clients is that accounting bookings will be made during the work week – Monday to Friday. In a very rare cases, e. g. if it is a manufacturing company and the production is non-stop, accounting entries can be made on weekends. However, these are mostly exceptions that must be analyzed. In the simulation case study journal entries have been made on the weekends and the amounts of the bookings are material (Appendix 12). For this situation, auditor must drill down the entries to have the knowledge what was booked. As well auditor should inquire the client because it might be a control deficiency, which could have a significant impact on the financial statements. The same report can be generated not only for the auditing year but also for the prior period in order to compare the bookings.

Day of the week report can be supplemented with day lag report. The day lag worksheet classifies all the transactions for the accounts selected by the day lag, which is the number of days between the effective date and the entry date of a transaction. For example, when a transaction took place on 15 January and the journal to record the transaction was entered on the accounting system on 17 January,

then the transaction has a day lag of 2 days, this lag would be shown as (2). If the day lag is zero, then the transaction was recorded on the date it took place. If the transaction is recorded before the effective date, then the activity will be listed at a positive day lag of 2. The table also show the debit, credit and net value of the transactions, and the number of journal and journal lines with the specified day lag days (see full report in Appendix 13). From the auditor's perspective, the most important part is to analyze amounts that are (30) and more days above as in most cases it is necessary to make the bookings at the same month (in 30 days interval). Day lag above 30 days can expose cut off issues between months, especially at the end of the year. It can show not allowed corrections, etc. However, if the client closes the monthly general ledger a few days after the end of the calendar month, it should be considered. Without RPA day lag analysis is possible, yet not so sufficient. Usually, simple cut off analysis consists of reconciling few invoices with detailed list provided by the client. But the problem is that very small part of total population is reviewed. This issue can be fixed with RPA usage in the audit procedures.

The last analysis performed for the journal entries testing is date analysis by month, which summarizes the account activities for the accounts selected each day of the period (year). The values displayed are the net value of the transactions impacting the selected accounts by effective date. The usual practice for this analysis is to raise the expectation that most entries will be made at the beginning and the end of the month. Likewise, the auditor does not expect to see any individual large amounts, outliers during any day. In the simulation case study report can be seen that such expectations are met as most significant amounts are booked at the firsts or lasts days of the month (Appendix 14). If some unusual booking pattern is noted, auditor should dig deeper and drill down the entries. The client can also be inquired, if necessary.

To sum up, RPA system allows to perform more journal entries testing from different perspectives. It helps to find fraudulent or improper activities and client's bookings mistakes. Without RPA such analysis would be not possible or only possible on some level. There is still a need of the client's involvement, however, generated reports help to understand booking patterns and have proper proof and arguments in front of the client.

4.2.3. Preparers report analysis

There are few reports that can be generated with Helix GLA, which lets the auditor to evaluate preparers of financial information. Preparers are employees of the audit client, who have access to company's accounting data and can perform bookings in the system. Most of the time, preparers are accountants of the company. Two main preparers analyses are done, see Table 14. The purpose of such an analysis is to understand whether the keeping of accounting records is performed only by persons who are able to do so according to their duties.

Table 14. Preparers analysis reports summary

Name	**Procedures**
SoD change in preparers	Auditor obtains list of different preparers and reviews for any inconsistencies.
Preparer process map	Auditor receives the list of employees that are able to make entries and a table showing their unique codes. Audit team verifies for any unauthorized bookings. Also, identifies postings from unusual preparers (made by individuals who do not typically make journal entries (e.g., the Controller or CFO).

The SoD change in preparers worksheet identifies new, common, or inactive preparers by comparing prepares from the prior period with the current period. The number of journal entries processed by each person and the change in volume of journal entries processed period-on-period are also shown (Appendix 15).

The report allows the auditor to easily identify new preparers of accounting journal entries. If the entries made of new preparer are material, the client should be inquired in order to understand what responsibilities new employee has in the company. This helps to identify override of controls, if any.

Preparer process map expands the knowledge about the preparers of journal entries. The expectation of this report is that entries will only be made by authorized personnel. Auditor can see names of the employees, and in which accounts they have made the entries (Appendix 16). For instance, if an accountant is the only one responsible for inventories account, it is not expected any other entries to be made by the same person. If posting by unusual preparers are noted, the client should be informed and inquired as logical explanation should be presented to the auditor. All significant entries must be commented to make sure that all material journal entries are reasonable.

In conclusion, journal entries and preparers testing are a highly important part of audit as fraudulent activity can be found after the analysis. Also, client's controls are tested in regard to appropriate preparers of accounting information. No such reports could be made without the RPA system. As client's inquiries are not sufficient for journal entries testing by itself, Helix GLA is irreplaceable in today's audit procedures. Overall, higher level of assurance is achieved when RPA system is included in the audit. Which means that the overall quality of audit performance is improved.

Discussion

Comparing the conducted simulation case study with the results of previous studies obtained by other authors, certain similarities and differences can be seen. The majority of researchers, who have studied the impact of digital technologies, performed literature review or interviews. It means that those studies are based on the opinion of scientists, auditors and professional individuals related to financial statements' audit. The main difference between such studies and the research performed on RPA usage in audit is that a specific technology has been tested to understand if assumptions from literature review are justified in this concrete simulation case. Despite this fact, similar conclusions can be drawn. RPA have a positive influence on audit procedures. Santis and D'Onza (2020), Munoko et al. (2020), Kokina and Davenport (2017) excluded that one of the opportunities where emerging technology can be used in the audit is risk assessment planning phase and analytics performance. Simulation case study with Helix GLA confirmed these assumptions with a specific example how RPA can save auditors' time and improve the efficiency of this widely used standard audit procedures as all reports are generated automatically without a need to perform manual calculations. Hence, auditor can spend more time to identify risks of material misstatement and causes of the changes in financial statements between years. Liew et al. (2021), Appelbaum et al. (2018) talked about the ability to make deeper insights and more complex analytics with the help of technology. Helix GLA can generate correlations between three accounts, prepare journal entries and preparers testing analytics, specific accounting bookings can be drilled downed, which would not be possible in traditional audit. Such procedures help to find the links and trends between client's business and data. Munoko et al. (2020) claimed that digital technologies can detect fraudulent activities, which is confirmed in journal entries testing part of the simulation case study because without RPA those

procedures could not be done and the only way for the auditor would be to inquire the client. The main criteria (automatically generated reports, no manual calculations, advanced and more complex analytics) fulfils the assumptions raised.

Conclusions

1. It can be concluded that digital technologies are important in the field of financial statements' audit. So far, there is no consensus whether the impact is only positive or only negative, but the fact that there is an impact cannot be denied. Most of the analyzed authors admit that digital technologies have both positive and negative sides at the same time. Digital technologies are changing the concept of auditing and promoting their use in the field. AI, RPA, big data or blockchain create new perspectives on how the audit process can be made more efficient and help to perform new analytics or procedures that would not be possible in the traditional audit process. The integration of digital technologies in the audit helps to save time in performing simple and repetitive procedures and allows the auditor to pay more attention to the solution of important issues and to analyze trends and patterns. In addition, it is observed that digital technologies can not only help in document verification or other simple areas, but also in the detection of fraud risks, which is an important advantage compared to traditional audit procedures. However, it cannot be ignored the possible negative effects of digital technologies, especially the issue of ethics. AI and some other emerging technologies are able to perform not only elementary tasks, but also to learn from itself and make certain decisions instead of the auditor. Such arbitrary decision making can have serious consequences; thus, it is a must to update auditing standards to address these important issues.

2. From the literature analysis, four main assumptions about digital technologies in the audit of financial statements were highlighted. The first one is related to efficiency and effectiveness of the audit when emerging technologies are included in the audit procedures. The audit is performed more qualitatively when the auditor can concentrate on the client's business complex areas, where material discrepancies or fraud risks are most likely. The second assumption is about Big 4 companies and their influence on digital technologies development in audit process. Those 4 largest audit companies in the world have enough financial capabilities to invest in such technologies as they have to meet client's expectations on audit quality. The third assumption is related to more complex analytics, which give higher assurance levels for the audit companies. Advanced analytical procedures help to gain deeper knowledge about the client's business model and accounting information. The last assumption made from literature review is talking about investments in data security and the need of new culture and ethical regulations. Client's data information must always be a priority for the auditors, therefore there is a need with new technologies to update policies and audit standards.

3. Simulation case study has been made as a response to raised assumptions. However, the second assumption about Big 4 influence on digital technology development was not included in the simulation and the conclusion was drawn from the theoretical point of view. From the literature analysis, it can be stated that Big 4 companies have all the necessary resources for the implementation of digital technologies in the audit. Other assumptions were positively supported by the research. Simulation case study was performed from two perspectives, where audit with RPA system Helix GLA was compared to traditional audit procedures. As Helix GLA generates all required reports automatically and allows the auditor to focus directly to analysis part, it can be concluded that RPA helps to improve audit efficiency. Also, Helix GLA is able to make three-way correlation, preparers and journal entries testing reports, which are classified as more

complex analytics. So, the third assumption is confirmed by the research. The last assumption about data security was also reviewed during the study, when talking about data collection for Helix GLA cube. All required data is preferably received via EY Canvas Client Portal or MediaShuttle platform, which are safe to use. Also, audit company has a dedicated employees just for data collection and Helix GLA cube producing, therefore, it shows that RPA usage increases data security.

Recommendations

1. The RPA usage in the audit of financial statements was explored from one of Big 4 company's (EY) perspective. As all Big 4 companies have similar digital systems, it would be recommended to review them and prepare a comparison. This could give important insights while examining their similarities and differences.

2. The theoretical literature suggests that the use of digital technologies is most prevalent among Big 4 companies. However, it may be that smaller audit firms are implementing RPA or other technologies in their audit procedures. It is recommended to examine in more detail what digital technologies non-Big 4 companies use, or to confirm the opinion from the literature that emerging technologies, including RPA, are not widespread in smaller audit companies.

3. Helix GLA can be used for various clients – large, medium or small sized companies – and regardless of their business type and sector. However, the research was performed with the data of medium and large furniture manufacturing companies. Therefore, it would be recommended to analyze if it is useful to use Helix GLA for small, non-complex clients, as it takes resources from both auditor's and client's sides to prepare Helix GLA cube.

List of references

1. Abdennadher, S., Grassa, R., Abdulla, H. and Alfalasi, A. (2020). The effects of blockchain technology on the accounting and assurance profession in the UAE: an exploratory study. Journal of Financial Reporting and Accounting Vol. 20 No. 1, 2022 pp. 53-71. DOI: 10.1108/JFRA-05-2020-0151
2. Adaškevič, U. and Raziūnienė, D. (2019). Finansinio audito įrodymai. Buhalterinės apskaitos teorija ir praktika (Online), 2020 (20), p.7. DOI: 10.15388/batp.2019.15
3. Adomavičiūtė, Danutė, Daujotaitė, Dalia, Giriūnas, Lukas, Jakštonytė, Gintarė, Miškinis, Algirdas, & Vinauskienė, Dalia. (2015). Finansų kontrolė ir auditas: teorija ir praktika: vadovėlis. Mykolo Romerio universitetas.
4. Albawwat, I. and Frijata, Y. A. (2021). An analysis of auditors' perceptions towards artificial intelligence and its contribution to audit quality. Accounting 7 (2021) 755–762. DOI: 10.5267/j.ac.2021.2.009
5. Allbabidi, M. H. A. (2021). Hype or Hope: Digital Technologies in Auditing Process. Asian Journal of Business and Accounting 14(1). DOI: https://doi.org/10.22452/ajba.vol14no1.3
6. Alles, M. and Gray, G. L., (2020). "The first mile problem": Deriving an endogenous demand for auditing in blockchain-based business processes. International Journal of Accounting Information Systems 38 (2020) 100465. https://doi.org/10.1016/j.accinf.2020.100465
7. Almaleeh, N. (2021). The Impact of Digital Transformation on Audit Quality: Exploratory Findings from a Delphi Study. Science Journal for Commercial Research Volume 3 (2021). https://www.researchgate.net/publication/354751210
8. Appelbaum, D. A, Kogan, A. and Vasarhelyi, M. A. (2018). Analytical procedures in external auditing: A comprehensive literature survey and framework for external audit analytics. Journal of Accounting Literature 40 (2018) 83–101. https://doi.org/10.1016/j.acclit.2018.01.001
9. Appelbaum, D., Kogan, A. and Vasarhelyi, M. A., (2017). Big Data and Analytics in the Modern Audit Engagement: Research Needs. Auditing A Journal of Practice & Theory 36(4). DOI: 10.2308/ajpt-51684
10. Asif, M., Searcy, C. and Castka, P. (2022). Exploring the role of industry 4.0 in enhancing supplier audit authenticity, efficacy, and cost effectiveness. Journal of Cleaner Production Volume 331, 10 January 2022, 129939. DOI: https://doi.org/10.1016/j.jclepro.2021.129939
11. Barr‐Pulliam, D., Brown‐Liburd, H. and Munoko, I. (2022). The effects of person‐specific, task, and environmental factors on digital transformation and innovation in auditing: A review of the literature. J Int Financ Manage Account. 2022;33:337–374. DOI: 10.1111/jifm.12148
12. Bierstaker, J. L., Burnaby, P. and Thibodeau, J. (2001). The impact of information technology on the audit process: an assessment of the state of the art and implications for the future. Managerial Auditing Journal 16/3 [2001] 159-164. DOI: https://doi.org/10.1108/02686900110385489
13. Brown, S., Davidovic, J., Hasan, A. (2021). The algorithm audit: Scoring the algorithms that score us. Big Data & Society January–June: 1–8. DOI: 10.1177/2053951720983865
14. Churchill, N. C. (1966). Audit Recommendations and Management Auditing: A Case Study and Some Remarks. Journal of Accounting Research, 4, 128–151. https://doi.org/10.2307/2490175

15. Cohen, J., Krishnamoorthy, G. and Wright, A. M. (2002). Corporate Governance and the Audit Process. Contemporary Accounting ResearchVol. 19 No. 4 (Winter 2002) pp. 573 – 94. https://onlinelibrary.wiley.com/doi/epdf/10.1506/983M-EPXG-4Y0R-J9YK
16. Craja, P., Kim, A. and Lessmann, S. (2020). Deep learning for detecting financial statement fraud. Decision Support Systems 139 (2020) 113421. https://doi.org/10.1016/j.dss.2020.113421
17. Eilifsen, A., Kinserdal, F., Messier, Jr. W.F., McKee, T. E. (2020). An Exploratory Study into the Use of Audit Data Analytics on Audit Engagements. Accounting Horizons 34(4). DOI:10.2308/HORIZONS-19-121
18. Eisenhardt, K. M. (1989). Building theories from case study research. Academy of Management Review, 14, 532–550. https://doi.org/10.2307/ 258557
19. Eisenhardt, K. M. and Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. Academy of Management Journal, 50, 25–32. https://doi.org/10.5465/amj.2007.24160888
20. Gao, Y. and Han, L. (2021). Implications of Artificial Intelligence on the Objectives of Auditing Financial Statements and Ways to Achieve Them. Microprocessors and Microsystems 19 January 2021, 104036. DOI: https://doi.org/10.1016/j.micpro.2021.104036
21. Huang, F. and Vasarhelyib, M. A., (2019). Applying robotic process automation (RPA) in auditing: A framework. International Journal of Accounting Information Systems Volume 35, December 2019, 100433. DOI: https://doi.org/10.1016/j.accinf.2019.100433
22. Huang, F., No, W. G., Vasarhelyi, M. A. and Yan, Z., (2022). Audit Data Analytics, Machine Learning, and Full Population Testing. The Journal of Finance and Data Science Available online 20 May 2022. DOI: https://doi.org/10.1016/j.jfds.2022.05.002
23. Kend, M. and Nguyen, L. A., (2020). Big Data Analytics and Other Emerging Technologies: TheImpact on the Australian Audit and Assurance Profession. Australian Accounting Review(2020), No. 95 Vol. 30, 269–282. DOI: 10.1111/auar.12305
24. Kokina, J. and Davenport, T. H., (2017). The Emergence of Artificial Intelligence: How Automation is Changing Auditing. Journal of Emerging Technologies in Accounting 14(1). DOI: 10.2308/jeta-51730
25. Krieger, F., Drews, P. and Velte, P. (2021). Explaining the (non-) adoption of advanced data analytics in auditing: A process theory. International Journal of Accounting Information Systems Volume 41, June 2021, 100511. DOI: https://doi.org/10.1016/j.accinf.2021.100511
26. Liew, A., Boxal, P. and Setiawan, D. (2021). The transformation to data analytics in Big-Four financial audit: what, why and how? Pacific Accounting Review Vol. 34 No. 4, 2022 pp. 569-584. DOI 10.1108/PAR-06-2021-0105
27. Manita, R., Elommal, N., Baudier, P., Hikkerova, L. (2020). The digital transformation of external audit and its impact on corporate governance. Technological Forecasting & Social Change Volume 150, January 2020, 119751. DOI: https://doi.org/10.1016/j.techfore.2019.119751
28. Moffitt, K. C., Rozario, A. M. and Vasarhelyi, M. A. (2018). Robotic Process Automation for Auditing. Journal of Emerging Technologies in Accounting (2018) 15 (1): 1–10. DOI: 10.2308/jeta-10589
29. Mokander, J., Morley, J., Taddeo, M., Floridi, L. (2021). Ethics-Based Auditing of Automated Decision-Making Systems: Nature, Scope, and Limitations. Science and Engineering Ethics (2021) 27:44. DOI: https://doi.org/10.1007/s11948-021-00319-4

30. Munoko, I., Brown-Liburd, H. L., Vasarhelyi, M. (2020). The Ethical Implications of Using Artifcial Intelligence in Auditing. Journal of Business Ethics (2020) 167:209–234. DOI: https://doi.org/10.1007/s10551-019-04407-1
31. Murray, A., Rhymer, J. and Sirmon, D. G. (2021). Humans and technology: forms of conjoined agency in organizations. Academy of Management Review 2021, Vol. 46, No. 3, 552–571. https://doi.org/10.5465/amr.2019.0186
32. Pizzi, S., Venturelli, A., Variale, M. and Macario, G. P., (2021). Assessing the impacts of digital transformation on internal auditing: A bibliometric analysis. Technology in Society Volume 67, November 2021, 101738. DOI: https://doi.org/10.1016/j.techsoc.2021.101738
33. Santis, F. and D'Onza, G. (2020). Big data and data analytics in auditing: in search of legitimacy. Meditari Accountancy Research Vol. 29 No. 5, 2021. DOI: 10.1108/MEDAR-03-2020-0838
34. Schmitz, J. and Leoni, G. (2019). Accounting and Auditing at the Time of Blockchain Technology:A Research Agenda. Australian Accounting ReviewNo. 89 Vol. 29 Issue 2 2019. doi: 10.1111/auar.12286
35. Springer Sargent, C., (2021): Replacing Financial Audits with Blockchain: The Verification Issue. Journal of Computer Information Systems. DOI: 10.1080/08874417.2021.1992805
36. Tiberius, V. and Hirth, S. (2019). Impacts of digitization on auditing: A Delphi study for Germany. Journal of International Accounting, Auditing and Taxation 37 (2019) 100288. DOI: https://doi.org/10.1016/j.intaccaudtax.2019.100288
37. Werner, M., Wiese, M. and Maas, A., (2021). Embedding process mining into financial statement audits. International Journal of Accounting Information Systems Volume 41, June 2021, 100514. DOI: https://doi.org/10.1016/j.accinf.2021.10051
38. Xiao, T., Geng, C. and Yuan, C. (2020). How audit effort affects audit quality: An audit process and audit output perspective. China Journal of Accounting Research Volume 13, Issue 1, March 2020, Pages 109-127. DOI: https://doi.org/10.1016/j.cjar.2020.02.002
39. Zhao, Y. and Chang, J. (2022). Certificateless public auditing scheme with designated verifier and privacy-preserving property in cloud storage. Computer Networks Volume 216, 24 October 2022, 109270. https://doi.org/10.1016/j.comnet.2022.109270
40. Zhong, S., Scarinci, A. and Cicirello, A. (2022). Natural Language Processing for systems engineering: Automatic generation of Systems Modelling Language diagrams. Knowledge-Based Systems Volume 259, 10 January 2023, 110071. https://doi.org/10.1016/j.knosys.2022.110071

List of information sources

1. EY Global. (2022). *EY Helix*. Access through internet: https://www.ey.com/en_gl/audit/technology/helix
2. EY Global. (2023). *EY Canvas.* Access through internet: https://www.ey.com/en_lt/audit/technology/canvas
3. International Auditing and Assurance Standards Board. (2009). *International standard on auditing 240*. Access through internet: https://www.ifac.org/_flysystem/azure-private/publications/files/A013%202012%20IAASB%20Handbook%20ISA%20240.pdf
4. International Auditing and Assurance Standards Board. (2010). *International standard on auditing 500*. Access through internet: https://www.ifac.org/system/files/downloads/a022-2010-iaasb-handbook-isa-500.pdf
5. International Auditing and Assurance Standards Board. (2010). *International standard on auditing 520*. Access through internet: https://www.ifac.org/system/files/downloads/a026-2010-iaasb-handbook-isa-520.pdf
6. International Auditing and Assurance Standards Board. (2010). *International standard on auditing 230*. Access through internet: https://www.ifac.org/system/files/downloads/a011-2010-iaasb-handbook-isa-230.pdf
7. International Auditing and Assurance Standards Board. (2022). *About IAASB*. Access through internet:https://translate.google.com/?sl=lt&tl=en&text=prieiga%20per%20internet%C4%85&op=translate
8. The Association of Chartered Certified Accountants. (2019). Audit and technology. https://www.accaglobal.com/gb/en.html

Appendices

Appendix 1. Example of a general ledger when Helix GLA is not used

Account	Account name	Beg. Balance	Debit	Credit	Closing Balance
111015	Software equipment	349 045	0	0	349 045
121000	Land	1 500 000	0	0	1 500 000
200111	Inventories	2 006 687	15 874 928	14 873 645	3 007 970
203000	Manufactured products	7 656 309	10 780 338	13 748 023	4 688 624
270000	Cash	14 870	5 638 738	5 629 878	23 730
300000	Capital	-6 794 833	0	0	-6 794 833
330000	Reserves	-679 483	0	0	-679 483
401011	Long-term debts to credit institutions	-30 876 598	300 987	54 827	-30 630 438
430060	Current year portion of lease IFRS16	-909 864	909 864	0	0
450000	Short-term trade payables to suppliers	-15 973 048	6 549 834	6 749 383	-16 172 597
500000	Sales	0	5 843	13 875 375	-13 869 532
601100	COS	0	10 458 734	65 718	10 393 016
601122	Salary	0	765 983	230 183	535 800
601124	Social insurance	0	14 738	2 485	12 253

Appendix 2. Requirements for the journal entries

Data Point	Format	Max Length	Decimals	Definition	Required or Optional
JE number	string	100		Identifier for each journal transaction - can be alphanumeric. JE number or the combination of JE number and JE line number (if applicable) is a unique identifier.	Required
JE line description	string	250		Any descriptive text associated with the journal line when entered.	Required
GL account code	string	100		GL account identifier. Cross references to the trial balance file.	Required
Functional amount	decimal		2	Journal amount, as recorded in the functional currency of the business unit. This is the amount, which is recorded for financial recording purposes, generally for statutory account reporting for the legal entity.	Required
Fiscal period	string	25		Identifier for the fiscal period (month in format from 1-12) the journal was posted to. For example, 1 (as January), 2 (as February).	Required
Effective date	date			The effective date of the journal entry i.e., when it has financial impact.	Required
Entry date	date			The date that the journal entry was entered into the system by the Preparer.	Required
Preparer ID	string	25		Identifier for the user who input the transaction. Cross references to the user listing master data table.	Required
Source code	string	25		Source identifier. Cross references to the source listing master data table.	Required
JE line number	string	100		Line within the journal. The combination of JE number and JE line number is a unique identifier.	Optional
Business unit code	string	25		Business unit identifier. Cross references to the business unit master table.	Optional
Functional currency code	string	25		The currency code that the legal entity uses to prepare its financial statements.	Optional
Reporting amount	decimal		2	Journal amount, as recorded in the reporting currency of the business unit. This is the amount which is recorded for financial reporting for components of groups, where the parent company reports in a different currency than some of the components.	Optional
Reporting currency code	string	25		The currency code which is used for reporting upward for consolidated reporting.	Optional
Fiscal year	string	25		Identifier for the fiscal year the journal was posted to.	Optional
Approver ID	string	25		Identifier for the user who approved the transaction. Cross references to the user listing master data table.	Optional
User defined fields (up to 3 fields)	string	100		Optional user defined field(s) to use to summarize and filter transactions and balances.	Optional

Appendix 3. Three-way correlation

Double entry posting of analysis across 3 accounts

Composition of Sales activity (Primary)	Audit period 2014-12-31 EUR		Composition of Trade AR activity (Secondary)	Audit period 2014-12-31 EUR		Composition of Cash activity (Tertiary)	Audit period 2014-12-31 EUR
Opening balance (n/a) for income statement	-	Correlation	Opening balance (n/a) for income statement	86 437 944		Opening balance (n/a) for income statement	80 477 704
B - activity posting to Trade AR >>	(473 919 501)	difference	B - activity posting to Sales >>	546 908 124	Correlation		
A - activity not posting to Trade AR >>	3 524 288	-15,40%	D - activity posting to Cash >>	(512 437 482)	difference	D - activity posting to Trade AR >>	427 224 138
			E - activity not posting to Sales or >> Cash	(61 974 363)	16,63%	F - activity not posting to Trade AR >>	(472 519 467)
			C - reversal of duplicates>>	11 938 600			
Closing balance	(470 395 214)		Closing balance	70 872 822		Closing balance	35 182 375
Unallocated difference	-		Unallocated difference	-		Unallocated difference	-

Appendix 4. Account selection for three-way correlation

Account Number and Name	Current Period Opening Balance	Net Activity	Current Period Closing Balance
Sales GL Account Selections			
Revenue			
Extraordinary income			
Other extraordinary income			
Other extraordinary income			
0120700200 - Other extraordinary income 1	-	-	-
Sales			
Other revenues and income			
Other revenues and income			
0120001010 - Recovery of expenses canteen	-	(16 774)	(16 774)
0120001020 - Bankruptcy recovery	-		-
0120001030 - Various income	-	(1 418 056)	(1 418 056)
0120001040 - Recharge of staff costs	-	(154 830)	(154 830)
0120001051 - Reimbursement costs phone calls	-	(10 365)	(10 365)
0120001052 - Recovery of insurance premiums	-	(4 270)	(4 270)
0120001053 - Discounts and allowances active	-	(1 109)	(1 109)
0120003000 - Disposal of assets	-	(1 168)	(1 168)
0120005000 - Royalties	-	(254 487)	(254 487)
0120006000 - Recovery / claims / deficiencies	-	(284 874)	(284 874)
0120007000 - Pallet charges	-	(945 098)	(945 098)
0120307500 - Pallets returns	-	719 992	719 992
0120700100 - Period income	-	(388 027)	(388 027)
0120700300 - Utilization of provision for future risks and charges	-	(3 500 000)	(3 500 000)
0120700400 - Prior year income customers	-	(240 178)	(240 178)
0120700500 - Prior year listing	-	(597 190)	(597 190)
0120700600 - Prior year promo	-	(1 314 818)	(1 314 818)
Sales of goods and services			
Sales of goods and services			
0120000000 - Domestic sales finished products	-	(668 826 572)	(668 826 572)
0120000010 - Sales to shop	-	(842 229)	(842 229)
0120000020 - Domestic sales commodities	-	(845 425)	(845 425)
0120000030 - Domestic sales packaging material	-	(33)	(33)
0120000040 - Selling scrap and obsolete materials	-	(54 527)	(54 527)

0120000050 - Sales of materials 2nd and 3rd choice	-	(165 922)	(165 922)
0120000100 - Sales fomestic finished products	-	(2 750 716)	(2 750 716)
0120000200 - Sales foreign finished products	-	(10 772 800)	(10 772 800)
0120000300 - Foreign sales subsidiaries finished products	-	(30 371 644)	(30 371 644)
0120000330 - Foreign sales subsidiaries materials	-		-
0120000400 - Foreign sales related finished products	-	(56 070 172)	(56 070 172)
0120000420 - Foreign sales subsidiaries commodities	-	(2 968)	(2 968)
0120000430 - Foreign sales subsidiaries materials	-	(4 807)	(4 807)
0120004000 - Sales for giveaways	-	(160 387)	(160 387)
0120008000 - Sale of assets	-	-	-
0120010000 - Trade discounts	-	278 159 865	278 159 865
0120010010 - Discounts Domestic cash	-	1 760 952	1 760 952
0120010020 - Credit note allowances	-	1 735 427	1 735 427
0120010030 - Credit notes annual allowances	-	20 712 218	20 712 218
0120010040 - Credit notes volume	-	3 460 966	3 460 966
0120300050 - Notes credit discounts compensatory	-	560 648	560 648
0120300060 - Use of provision made	-	(220 000)	(220 000)
0120300070 - Credit notes rebates	-	100 497	100 497
0120300080 - Discounts from customers	-	263 828	263 828
0120300200 - Foreign trade discounts	-	2 349 838	2 349 838
Sales GL Account Total	-	(470 395 214)	(470 395 214)

Account Number and Name	Current Period Opening Balance	Net Activity	Current Period Closing Balance
Trade AR GL Account Selections			
Assets			
Current assets			
Receivables			
Intercompany receivables			
0020000006 - Receivables _ foreign subsidiaries	7 098 861	745 897	7 844 758
0020000053 - Receivables _ foreign subsidiaries invoices to be issued	644 988	(644 988)	-
Other receivables			
0020000008 - Receivables from employees	-	-	-
0020000060 - Advances for fixed assets to be received	-	340 000	340 000

0020100426 - Credit environmental levy	896 938	283 688	1 180 626
0020100430 - Loans to Shop	-	133 490	133 490
0020100435 - Refunds	2 875	125	3 000
0020300001 - Deposits	1 640	3 154	4 794
0060000010 - Payables _ employees expenses	20 562	(1 273)	19 289
Trade receivables			
0020000000 - Receivables _ domestic customer	57 451 732	(13 572 974)	43 878 759
0020000002 - Receivables _ customers other sales	525 066	(131 041)	394 025
0020000003 - Receivables _ related domestic	2 492 425	(56 054)	2 436 372
0020000004 - Receivables _ foreign customers 1	1 179 161	(312 336)	866 825
0020000005 - Receivables _ foreign customers 2	588 612	(294 522)	294 089
0020000007 - Receivables _ related foreign	8 589 838	(878 530)	7 711 309
0020000010 - Receivables _ factored	5 354 781	(971 677)	4 383 104
0020000011 - Receivables _ factored2	1 961 381	(745 383)	1 215 998
0020000020 - Receivables _ in receivership	1 809 977	795 104	2 605 081
0020000021 - Receivables _ in receivership	2 904	(726)	2 178
0020000031 - Factored invoices receivable 1	7 244 220	(162 753)	7 081 467
0020000035 - Receivables _ factored technical account	(5 354 781)	971 677	(4 383 104)
0020000036 - Receivables _ factored2 technical account	(1 961 381)	745 383	(1 215 998)
0020000040 - Transit accounts unpaid bills	-		-
0020000041 - Transit accounts receivable	-	-	-
0020000050 - Customer invoices to be issued	114 226	(56 872)	57 354
0020000051 - Credit notes to be issued	-	(4 628)	(4 628)
0020000052 - Receivables _ related domestic bills to be issued	398 487	(398 487)	-
0020000054 - Receivables _ related foreign invoices to be issued	246 741	(246 741)	-
0020000100 - Allowance for doubtful accounts	(1 159 682)	(359 274)	(1 518 956)
0020000101 - Allowance for doubtful accounts reserve	(3 673 008)		(3 673 008)
0020510032 - Factored invoices receivable 2	1 961 381	(745 383)	1 215 998
Trade AR GL Account Total	86 437 944	(15 565 122)	70 872 822

Account Number and Name	Current Period Opening Balance	Net Activity	Current Period Closing Balance
Cash GL Account Selections			

Assets			
Current assets			
Cash and cash equivalents			
Bank			
0020500100 - Wages bank account	(2 599)	(477)	(3 076)
0020500201 - Bank A _ 1	-	-	-
0020500202 - Bank A _ 2	-	-	-
0020500203 - Bank A _ 3	-	-	-
0020500204 - Bank A _ 4	-	-	-
0020500205 - Bank A _ 5	(297)	30	(267)
0020500206 - Bank A _ 6	-	-	-
0020500207 - Bank A _ 7	-	-	-
0020500208 - Bank A _ 8	6 084 408	(122 734)	5 961 674
0020500209 - Bank A _ 9	-	-	-
0020500301 - Bank B _ 1	-	-	-
0020500302 - Bank B _ 2	-	-	-
0020500303 - Bank B _ 3	-	-	-
0020500310 - Cash in transit for trade receivables	-	-	-
0020520401 - Bank C _ 1	93 685	(93 685)	-
0020520402 - Bank C _ 2	-		-
0020520403 - Bank C _ 3	-	-	-
0020520404 - Bank C _ 4	-		-
0020520405 - Bank C _ 5	(341)	154	(187)
0020520410 - In transit foreign business trade receivables	-	-	-
Cash pooling			
0020300700 - Intercompany cash pooling _ bank 1	13 648 008	1 367 503	15 015 511
0020300701 - Intercompany cash pooling _ bank 2	60 651 945	(46 449 668)	14 202 277
0020300702 - Intercompany cash pooling _ bank 3	65 696 908	743 572	66 440 480
0020300703 - Intercompany cash pooling _ bank 4	(65 696 952)	(745 948)	(66 442 900)
0020300710 - Other cash pooling	(478)	(152)	(629)
Petty cash			
0020510001 - Petty cash 1	1 150	6 397	7 547
0020510003 - Petty cash 3	2 267	(773)	1 494
0020510004 - Petty cash 4	-	-	-
0020510005 - Petty cash 5	-	451	451
Cash GL Account Total	80 477 704	(45 295 329)	35 182 375

Appendix 5. Three-way correlation Sales and Trade receivables

		201401	201402	201403	201404	201405	201406	201407	201408	201409	201410	201411	201412	Total
EUR	Cash and cash equivalents	19 491	275 213	54 415	84 113	1 238 853	4 275 655	47 570	-	699 520	1 281 242	181 636	652 467	8 810 174
	0020500204 - Bank A _ 4	-	176	-	-	-	-	-	-	16 398	-	-	-	16 574
	0020500310 - Cash in transit for trade receivables	19 491	275 037	54 415	83 304	1 238 853	4 275 655	47 570	-	683 122	1 281 242	181 636	652 467	8 792 791
	0020520410 - In transit foreign business trade receivables	-	-	-	810	-	-	-	-	-	-	-	-	810
	Receivables	50 650 633	43 997 715	38 124 023	34 150 152	38 908 397	38 048 331	30 852 261	30 305 571	46 533 697	41 531 223	34 965 867	33 193 829	461 261 698
	0020000000 - Receivables _ domestic customer	51 642 131	43 632 963	35 561 217	32 008 311	38 749 292	38 045 738	25 803 885	31 660 391	44 764 577	39 798 401	33 020 746	23 417 718	438 105 369
	0020000002 - Receivables _ customers other sales	465 448	841 125	159 369	209 455	501 257	508 872	116 700	128 408	368 297	247 991	354 959	6 409 391	10 311 271
	0020000003 - Receivables _ related domestic	337 353	310 494	216 390	209 688	138 555	912 431	400 163	156 344	433 583	323 798	329 906	1 094 596	4 863 302
	0020000004 - Receivables _ foreign customers 1	311 421	515 075	525 604	314 250	416 126	262 086	268 321	34 531	421 270	394 689	221 630	296 138	3 981 142
	0020000005 - Receivables _ foreign customers 2	45 251	169 386	103 589	484 491	284 127	505 804	249 123	-	619 927	468 804	50 903	270 852	3 252 258
	0020000006 - Receivables _ foreign subsidiaries	2 713 098	2 604 716	2 608 540	2 218 811	1 810 747	1 909 345	3 066 671	1 692 229	2 425 031	3 133 958	3 252 230	3 215 153	30 650 526
	0020000007 - Receivables _ related foreign	4 500 490	3 928 175	5 771 235	5 337 848	4 514 279	4 795 325	7 420 710	2 422 276	5 820 614	5 118 044	3 858 115	3 246 989	56 734 101
	0020000008 - Receivables from employees	-	34	-	-	600	-	-	-	5 779	600	-	-	7 014
	0020000041 - Transit accounts receivable	-	-	-	-	-	-	-	-	126	-	-	-	126
	0020000050 - Customer invoices to be issued	-	(74)	-	-	(108 826)	-	-	-	-	-	-	5 400	(103 500)
	0020000051 - Credit notes to be issued	-	-	-	-	-	-	-	-	-	-	-	(4 628)	(4 628)
	0020000053 - Receivables _ foreign subsidiaries invoices to be issued	-	-	-	-	-	(644 988)	-	-	-	-	-	-	(644 988)
	0020000054 - Receivables _ related foreign invoices to be issued	-	-	-	-	-	(243 870)	-	-	-	-	-	-	(243 870)
	0020001101 - VAT sales	(9 364 560)	(8 004 179)	(6 821 921)	(6 632 702)	(7 397 760)	(8 002 412)	(6 473 313)	(5 788 608)	(8 325 508)	(7 955 062)	(6 122 621)	(4 757 780)	(85 646 425)
	Assets TOTAL	50 670 124	44 272 928	38 178 438	34 234 265	40 147 250	42 323 986	30 899 831	30 305 571	47 233 216	42 812 466	35 147 503	33 846 295	470 071 873

EUR	Payables	156 668	375 770	1 631 298	39 832	516 031	445 000	37 805	(10 246)	84 650	-	26 840	37 805	3 341 452
	0060000000 - Payables _ Domestic suppliers	-	-	-	-	-	-	37 805	-	-	-	-	37 805	75 609
	0060000001 - Payables _ customer promotions	14 151	375 770	1 631 298	5 105	516 031	445 000	-	(10 246)	76 441	-	26 840	-	3 080 390
	0060000004 - Payables _ foreign suppliers 1	-	-	-	34 727	-	-	-	-	8 209	-	-	-	42 936
	0060000005 - Payables _ foreign suppliers 2	142 517	-	-	-	-	-	-	-	-	-	-	-	142 517
	Liabilities TOTAL	156 668	375 770	1 631 298	39 832	516 031	445 000	37 805	(10 246)	84 650	-	26 840	37 805	3 341 452

EUR	Cost of services	(14 150)	(17 080)	(12 918)	(4 972)	(67 364)	934 520	(15 000)	(1 983)	(3 820)	(8 744)	(98 138)	(183 738)	506 613
	0120001050 - Revenues from fees charged	(14 150)	(17 080)	(12 918)	(4 972)	(67 364)	(9 210)	(15 000)	(1 983)	(3 820)	(8 744)	(98 138)	(183 738)	(437 118)
	0120002000 - Recoveries of expenses	-	-	-	-	-	943 730	-	-	-	-	-	-	943 730
	Expenses TOTAL	(14 150)	(17 080)	(12 918)	(4 972)	(67 364)	934 520	(15 000)	(1 983)	(3 820)	(8 744)	(98 138)	(183 738)	506 613

Appendix 6. Three-way correlation Trade receivables and Cash

		201401	201402	201403	201404	201405	201406	201407	201408	201409	201410	201411	201412	Total
EUR	Cash and cash equivalents	35 917 088	29 532 983	44 085 996	39 236 956	34 969 508	40 970 851	44 491 942	26 272 148	46 267 994	38 545 955	34 802 989	12 129 728	427 224 138
	0020300710 - Other cash pooling	7 840 656	7 247 362	13 350 748	8 577 952	9 693 343	9 465 571	13 760 976	9 117 958	10 477 487	12 236 916	10 827 244	11 928 412	124 524 624
	0020500202 - Bank A _ 2	(60 803)	(384 994)	(25 082)	(142 151)	(1 192 761)	(175 135)	(1 475 660)	(168 372)	(559 723)	(111 603)	(955 013)	(43 446)	(5 294 744)
	0020500204 - Bank A _ 4	304 161	1 496 652	823 183	424 074	367 057	220 670	1 140 783	201 681	642 143	483 420	(390 402)	(29 018 607)	(23 305 184)
	0020500207 - Bank A _ 7	-	-	-	-	-	-	-	-	(80)	-	-	-	(80)
	0020500303 - Bank B _ 3	(917 456)	(1 086 478)	(2 260 158)	(999 053)	(515 344)	(715 607)	(1 152 419)	(300 463)	(405 305)	(990 373)	(372 050)	(449 124)	(10 163 829)
	0020500310 - Cash in transit for trade receivables	18 780 746	16 109 117	23 737 443	22 562 811	18 096 772	24 162 170	25 299 492	9 354 477	24 678 585	19 842 246	18 778 749	21 203 889	242 606 495
	0020510001 - Petty cash 1	(1 812)	(2 117)	(2 112)	(548)	(6 017)	(3 058)	(2 698)	(1 234)	(229)	(724)	(3 180)	(1 233)	(24 963)
	0020510003 - Petty cash 3	-	-	-	-	-	-	(866)	-	-	-	-	-	(866)
	0020510005 - Petty cash 5	26 055	37 170	51 880	66 023	78 598	92 473	72 695	-	131 367	91 726	101 172	97 844	847 002
	0020520410 - In transit foreign business trade receivables	9 945 541	6 116 271	8 410 094	8 747 849	8 447 861	7 923 767	6 849 641	8 068 101	11 303 750	6 994 347	6 816 469	8 411 994	98 035 684
	Receivables	(43 391 025)	(36 439 380)	(50 156 367)	(45 745 337)	(40 574 468)	(44 683 891)	(49 737 878)	(30 076 560)	(49 375 428)	(42 980 244)	(40 312 699)	(39 102 469)	(512 575 746)
	0020000000 - Receivables _ domestic customer	(24 023 276)	(20 236 321)	(25 265 069)	(27 005 255)	(21 230 126)	(26 978 259)	(27 071 326)	(12 590 215)	(26 032 271)	(23 099 916)	(22 941 462)	(24 429 807)	(280 903 303)
	0020000002 - Receivables _ customers other sales	(421 319)	(590 244)	(106 806)	(98 288)	(155 545)	(37 734)	(365 588)	(62 236)	(115 325)	(93 104)	(55 463)	(118 309)	(2 219 959)
	0020000003 - Receivables _ related domestic	(749 642)	(377 303)	(1 207 377)	(963 739)	(309 415)	(182 601)	(771 759)	(138 555)	(1 159 961)	(924 170)	(153 735)	(742 082)	(7 680 339)
	0020000004 - Receivables _ foreign customers 1	(415 722)	(475 516)	(477 634)	(466 822)	(303 395)	(270 403)	(439 562)	(213 367)	(291 274)	(339 180)	(428 123)	(232 612)	(4 353 611)
	0020000005 - Receivables _ foreign customers 2	(346 753)	(135 439)	(535 324)	(165 985)	(113 597)	(543 043)	(286 301)	(506 845)	(225 611)	(322 918)	(164 114)	(276 942)	(3 622 871)
	0020000006 - Receivables _ foreign subsidiaries	(3 451 013)	(3 103 711)	(3 198 441)	(2 861 822)	(1 939 977)	(2 138 583)	(2 843 744)	(1 408 872)	(3 762 510)	(2 279 979)	(2 046 973)	(2 627 666)	(31 663 291)
	0020000007 - Receivables _ related foreign	(5 628 392)	(3 257 016)	(4 270 319)	(4 686 342)	(6 068 308)	(4 885 676)	(3 982 972)	(6 008 306)	(7 107 301)	(3 379 769)	(4 181 552)	(5 372 002)	(58 827 955)
	0020000008 - Receivables from employees	-	(2 552)	(1 046)	(845)	-	-	-	-	(4 183)	(1 349)	(401)	-	(10 376)
	0020000020 - Receivables _ in receivership	-	(20 274)	-	-	-	(2 367)	(63 854)	-	-	(5 201)	-	-	(91 696)
	0020000031 - Factored invoices receivable 1	(5 268 050)	(4 999 185)	(9 874 676)	(6 899 830)	(7 019 133)	(6 297 337)	(9 225 583)	(6 732 433)	(7 290 382)	(8 069 203)	(6 815 039)	(8 978 213)	(87 469 063)
	0020000060 - Advances for fixed assets to be received	-	-	-	-	-	-	-	-	-	-	600 000	6 746 000	7 346 000
	0020001101 - VAT sales	(4 528)	(6 013)	(8 673)	(10 927)	(12 773)	(13 624)	(12 326)	-	(21 714)	(14 467)	(16 612)	(16 608)	(138 264)
	0020100430 - Loans to Shop	(21 528)	(31 157)	(43 206)	(55 096)	(65 825)	(78 849)	(60 369)	-	(109 653)	(77 259)	(84 560)	(81 236)	(708 738)
	0020100435 - Refunds	(232)	(4 948)	-	-	-	(335)	(3 436)	(2 488)	(3 312)	-	-	-	(14 751)
	0020510032 - Factored invoices receivable 2	(3 062 382)	(3 203 119)	(5 170 262)	(2 531 379)	(3 362 391)	(3 257 950)	(4 614 622)	(2 414 477)	(3 253 509)	(4 376 563)	(4 027 845)	(2 974 226)	(42 248 726)
	0060000010 - Payables _ employees expenses	1 812	3 418	2 466	993	6 017	2 870	3 564	1 234	1 577	2 834	3 180	1 233	31 198
	Assets TOTAL	(7 473 937)	(6 906 397)	(6 070 371)	(6 508 381)	(5 604 960)	(3 713 040)	(5 245 936)	(3 804 412)	(3 107 435)	(4 434 289)	(5 509 709)	(26 972 741)	(85 351 608)

EUR	Payables	7 473 881	6 906 331	6 070 273	6 508 350	5 604 747	3 712 842	5 245 846	3 804 409	3 107 387	4 434 209	5 509 596	26 972 537	85 350 409
	0060000000 - Payables _ Domestic suppliers	68 203	211 537	30 840	47 859	296 915	-	-	-	2 266	2 305	6 713	4 655	671 293
	0060000001 - Payables _ customer promotions	6 517 909	6 504 681	5 476 205	6 389 030	5 257 509	3 709 202	5 245 846	3 729 131	2 316 754	4 403 406	5 498 699	3 737 856	58 786 227
	0060000003 - Payables _ related companies domestic	767 993	7 034	561 036	4 156	2 227	-	-	1 598	655 453	-	-	12 998	2 012 496
	0060000004 - Payables _ foreign suppliers 1	119 776	143 772	-	57 305	48 097	-	-	73 680	126 913	18 499	-	8 572 676	9 160 717
	0060000005 - Payables _ foreign suppliers 2	-	34 365	3 762	10 000	-	-	-	-	6 000	10 000	-	14 640 000	14 704 127
	0060000051 - Payables _ foreign related companies	-	4 942	(1 570)	-	-	3 640	-	-	-	-	4 184	4 352	15 548
	Liabilities TOTAL	7 473 881	6 906 331	6 070 273	6 508 350	5 604 747	3 712 842	5 245 846	3 804 409	3 107 387	4 434 209	5 509 596	26 972 537	85 350 409

Appendix 7. Other trade receivables not posting to sales or cash

		201401	201402	201403	201404	201405	201406	201407	201408	201409	201410	201411	201412	Total
EUR	Receivables	(9 674 881)	(1 743 193)	(1 117 825)	(8 701 827)	(1 654 774)	(2 265 166)	(6 854 672)	(3 975 760)	(537 576)	(8 128 514)	(751 466)	(16 722 387)	(62 128 041)
	0020000000 - Receivables _ domestic customer	(23 485 133)	(13 630 674)	(13 001 570)	(15 693 645)	(14 910 899)	(13 491 646)	(19 982 791)	(13 405 281)	(12 017 145)	(22 752 602)	(10 885 871)	(9 396 076)	(182 653 332)
	0020000002 - Receivables _ customers other sales	(247 080)	(61 169)	(65 854)	(100 537)	(82 148)	(202 772)	(81 080)	(14 654)	(549 222)	(236 859)	(281 632)	(6 299 346)	(8 222 352)
	0020000003 - Receivables _ related domestic	(95 381)	26 460	683 728	1 952	171 236	735 606	217 860	(271 260)	582 625	30 047	74 014	604 097	2 760 983
	0020000004 - Receivables _ foreign customers 1	-	-	-	-	-	-	-	-	-	-	-	-	-
	0020000005 - Receivables _ foreign customers 2	26 870	-	-	(40 000)	28 159	18 600	(2 818)	-	26 800	18 480	-	-	76 091
	0020000006 - Receivables _ foreign subsidiaries	900	197 412	143 096	-	159 716	775 435	16 620	55 096	88 000	104 620	221 846	(4 080)	1 758 661
	0020000007 - Receivables _ related foreign	12 877	76 180	58 062	9 789	196 367	295 991	146 798	15 454	37 100	194 067	51 550	121 091	1 215 325
	0020000008 - Receivables from employees	-	3 560	673	-	(600)	-	-	-	154	(600)	-	-	3 187
	0020000010 - Receivables _ factored	4 066 444	2 927 817	(2 514 187)	(1 282 004)	2 560 029	(1 783 872)	377 789	755 025	(415 835)	2 275 171	(2 659 182)	(5 278 873)	(971 677)
	0020000011 - Receivables _ factored2	2 001 841	(177 250)	(1 592 502)	(840 400)	1 003 929	375 867	(54 665)	(728 820)	959 358	(83 297)	(793 840)	(815 605)	(745 383)
	0020000020 - Receivables _ in receivership	203 748	-	-	-	-	2 289	325 153	-	-	355 610	-	-	886 799
	0020000021 - Receivables _ in receivership	-	-	(726)	-	-	-	-	-	-	-	-	-	(726)
	0020000031 - Factored invoices receivable 1	8 748 868	8 600 639	7 453 351	5 356 866	8 745 328	6 912 981	7 948 458	7 586 828	7 281 204	9 826 671	5 861 645	2 983 471	87 306 311
	0020000035 - Receivables _ factored technical account	(4 066 444)	(2 927 817)	2 514 187	1 282 004	(2 122 324)	1 346 166	(377 789)	(483 929)	144 740	(2 275 171)	2 973 413	4 964 642	971 677
	0020000036 - Receivables _ factored2 technical account	(2 001 841)	177 250	1 592 502	840 400	(1 003 929)	(375 867)	54 665	728 820	(959 358)	83 297	793 840	815 605	745 383
	0020000041 - Transit accounts receivable	-	-	-	-	-	-	-	-	(126)	-	16 212	(16 212)	(126)
	0020000050 - Customer invoices to be issued	-	(2 918)	(552)	-	-	-	-	-	-	-	-	50 098	46 628
	0020000052 - Receivables _ related domestic bills to be issued	-	-	-	-	-	(398 487)	-	-	-	-	-	-	(398 487)
	0020000054 - Receivables _ related foreign invoices to be issued	-	-	-	-	-	(2 871)	-	-	-	-	-	-	(2 871)
	0020000060 - Advances for fixed assets to be received	-	-	-	-	-	-	-	-	-	-	-	(7 006 000)	(7 006 000)
	0020000100 - Allowance for doubtful accounts	-	-	-	-	-	-	-	-	-	-	-	(359 274)	(359 274)
	0020001101 - VAT sales	(8 709)	(121 518)	(64 750)	(8 060)	(131 262)	843	(50 710)	(4 485)	(71 824)	(119 269)	(91 344)	(4 737 552)	(5 408 639)
	0020001102 - VAT purchases 1	21 051	110 652	61 398	18 849	74 728	(34 274)	16 162	6 375	84 993	83 512	116 254	4 695 262	5 254 962
	0020001103 - VAT purchases 2	-	-	(34 210)	-	(143 044)	-	(108 834)	(34 210)	-	(108 834)	(39 933)	(113 608)	(582 674)
	0020001104 - VAT purchases 3	-	-	34 210	-	143 044	-	108 834	34 210	-	108 834	39 933	113 608	582 674
	0020100426 - Credit environmental levy	-	-	-	-	(896 938)	-	-	-	-	-	-	1 180 626	283 688
	0020100430 - Loans to Shop	82 142	33 078	39 980	62 741	51 284	71 326	33 280	9 903	144 887	72 372	168 438	72 797	842 229
	0020100435 - Refunds	3 163	1 745	272	-	471	-	617	3 923	3 373	1 432	(120)	-	14 876
	0020300001 - Deposits	-	-	-	-	-	-	1 577	-	-	1 577	-	-	3 154
	0020510032 - Factored invoices receivable 2	5 064 223	3 025 869	3 577 760	1 690 980	4 505 659	3 494 478	4 559 957	1 773 823	4 124 702	4 293 266	3 690 216	1 702 410	41 503 343
	0060000010 - Payables _ employees expenses	(2 418)	(2 509)	(2 693)	(762)	(3 581)	(4 961)	(3 754)	(2 577)	(2 002)	(839)	(6 906)	531	(32 471)
	Assets TOTAL	(9 674 881)	(1 743 193)	(1 117 825)	(8 701 827)	(1 654 774)	(2 265 166)	(6 854 672)	(3 975 760)	(537 576)	(8 128 514)	(751 466)	(16 722 387)	(62 128 041)

EUR	Payables	9 680 858	2 060 798	1 957 065	8 676 584	2 211 608	3 700 750	7 165 705	4 005 228	1 238 831	8 628 046	1 058 981	12 083 604	62 468 058
	0060000000 - Payables _ Domestic suppliers	147 997	19 019	15 689	23 948	915 355	117 199	33 993	-	414 127	143 300	61 941	6 222 391	8 114 960
	0060000001 - Payables _ customer promotions	6 746 423	1 988 159	1 970 433	8 645 796	1 222 172	3 519 600	7 149 194	3 773 534	843 507	8 277 129	1 019 804	5 024 421	50 180 170
	0060000002 - Payables _ amounts owed to professionals	-	-	-	-	-	-	-	-	-	-	-	806 000	806 000
	0060000003 - Payables _ related companies domestic	95 967	62 136	-	(1 952)	100 024	83 321	9 326	271 260	-	236 272	3 206	55 336	914 896
	0060000004 - Payables _ foreign suppliers 1	-	-	-	-	-	-	-	-	-	-	-	-	-
	0060000005 - Payables _ foreign suppliers 2	-	-	-	40 000	-	8 580	2 818	-	-	-	-	-	51 398
	0060000101 - Purchase credit notes to be received	-	-	-	-	-	-	-	-	-	-	-	4 269	4 269
	0060000112 - Invoices to receive promotional last year	2 721 851	16 000	-	-	-	-	-	-	-	-	-	-	2 737 851
	0060000700 - In transit hotel	17 571	14 548	21 601	25 092	18 917	24 314	15 020	23 531	11 211	23 886	28 741	23 539	247 972
	0060400200 - Employee salaries to be paid	(46 617)	(39 064)	(50 658)	(56 300)	(44 859)	(52 265)	(44 646)	(63 097)	(30 014)	(52 541)	(54 710)	(52 353)	(587 124)
	0060400221 - Employee deductions for various	(2 334)	-	-	-	-	-	-	-	-	-	-	-	(2 334)
	Liabilities TOTAL	9 680 858	2 060 798	1 957 065	8 676 584	2 211 608	3 700 750	7 165 705	4 005 228	1 238 831	8 628 046	1 058 981	12 083 604	62 468 058

EUR	Other financial income	-	-	(634 196)	-	-	(571 397)	-	-	(533 093)	(123)	(80)	(385 655)	(2 124 545)
	0120500100 - Interest income on other receivables	-	-	-	-	-	-	-	-	-	(123)	(80)	-	(203)
	0120501000 - Interest income intercompany banking	-	-	(634 196)	-	-	(571 397)	-	-	(533 093)	-	-	(385 655)	(2 124 341)
	Revenue TOTAL	-	-	(634 196)	-	-	(571 397)	-	-	(533 093)	(123)	(80)	(385 655)	(2 124 545)

EUR	Cost of services	(17 080)	(327 681)	(217 806)	15 176	(584 332)	(1 115 264)	(322 666)	(42 090)	(182 086)	(510 531)	(316 236)	(1 548 532)	(5 169 129)
	0120001050 - Revenues from fees charged	(41 377)	(2 516)	(9 452)	(9 789)	(34 583)	(31 789)	(12 941)	(3 684)	(26 800)	(30 583)	(14 949)	(17 977)	(236 440)
	0120002000 - Recoveries of expenses	-	(343 696)	(232 826)	-	(572 004)	(1 109 430)	(339 178)	(67 126)	(165 700)	(504 878)	(326 796)	(323 578)	(3 985 212)
	0140251001 - Environmental charges and levy 1	-	-	-	-	-	-	-	-	-	-	-	(34 500)	(34 500)
	0140251003 - Environmental charges and levy 3	-	-	-	-	-	-	-	-	-	-	-	(19 866)	(19 866)
	0140251004 - Environmental charges and levy 4	-	-	-	-	-	-	-	-	-	-	-	(1 126 260)	(1 126 260)
	0140460400 - Charges fixed telephone	223	51	11	159	37	42	61	120	-	14	-	59	777
	0140460500 - Water	-	-	-	-	-	-	3 796	-	-	3 920	-	-	7 716
	0140480100 - Delivery charges	69	85	35	81	39	67	140	39	-	37	81	41	713
	0140520410 - Expenditure of receipts / payments abroad	200	-	-	-	-	-	-	-	-	-	-	-	200
	0140560100 - Travel expenses	17 918	15 475	20 805	21 148	18 754	22 245	20 214	24 931	8 825	18 238	22 256	21 077	231 885
	0140560101 - Staff petrol allowance	4 360	1 822	2 674	2 551	2 841	2 232	4 189	1 954	987	1 746	2 591	2 122	30 068
	0140560103 - Expenses for conferences	38	-	-	-	-	-	-	-	-	-	-	-	38
	0140620101 - Marketing 1	1 488	1 098	807	801	584	1 369	1 053	1 237	583	974	581	401	10 978
	0140660101 - Advertising agency charges 3	-	-	-	-	-	-	-	-	-	-	-	(50 098)	(50 098)
	0140900985 - Costs to be recharged	-	-	140	224	-	-	-	440	20	-	-	48	872
	Costs for raw materials, consumables, supplies and goods	6 415	6 627	6 980	6 921	7 280	6 922	6 924	9 360	7 078	7 701	5 553	4 494	82 255
	0140204010 - Purchase of stationery	324	211	246	357	167	345	266	201	114	644	154	95	3 124
	0140204064 - Purchase fuel and lubricants	6 070	6 410	6 708	6 561	7 078	6 574	6 628	9 158	6 904	7 007	5 345	4 394	78 837
	0140800100 - Discounts and allowances expense	21	6	27	3	35	3	30	1	60	49	54	5	294
	Depreciation and amortization	-	-	-	-	-	-	-	-	-	-	-	6 200 000	6 200 000
	0140702000 - Construction in progress	-	-	-	-	-	-	-	-	-	-	-	6 200 000	6 200 000
	Doubtful receivables	-	-	-	-	-	-	-	-	-	-	-	360 000	360 000
	0140711000 - Provision for doubtful receivables	-	-	-	-	-	-	-	-	-	-	-	360 000	360 000
	Other operating expenses	4 687	3 449	5 782	3 147	20 218	244 156	4 709	3 261	6 846	3 422	3 248	8 476	311 401
	0140900501 - Contingent liabilities 1	50	-	-	-	-	-	-	-	-	-	-	-	50
	0140900504 - Contingent liabilities 4	-	-	-	-	-	240 178	-	-	-	-	-	-	240 178
	0140900600 - Entertainment expenses 2	129	60	54	88	153	38	-	135	-	-	202	405	1 263
	0140900700 - Charities, donations, gratuities	-	2 331	2 785	1 207	3 051	3 136	2 136	2 889	2 382	-	2 707	1 629	24 253
	0140900850 - Stamps, marks, rights, visas	-	-	-	-	12	-	-	-	-	-	-	-	12
	0140900952 - Losses due to defaults 2	-	-	726	-	-	-	-	-	-	-	-	(726)	-
	0140900960 - Various costs deductible	4 508	1 058	2 217	1 852	17 003	804	2 535	237	4 465	3 422	339	7 168	45 607
	0140900973 - Various expenditures	-	-	-	-	-	-	38	-	-	-	-	-	38
	Expenses TOTAL	(5 977)	(317 605)	(205 044)	25 243	(556 834)	(864 187)	(311 032)	(29 469)	(168 162)	(499 409)	(307 436)	5 024 438	1 784 528

Appendix 8. Other sales not posting to trade receivables

		201401	201402	201403	201404	201405	201406	201407	201408	201409	201410	201411	201412	Total
EUR	Cash and cash equivalents	(163)	-	-	1 614	(7 720)	0	1	0	-	-	3 672	-	(2 595)
	0020500202 - Bank A _ 2	-	-	-	-	(4 906)	0	-	-	-	-	-	-	(4 906)
	0020500203 - Bank A _ 3	-	-	-	-	-	-	1	0	-	-	-	-	1
	0020500204 - Bank A _ 4	-	-	-	-	(1 614)	-	-	-	-	-	3 672	-	2 058
	0020500207 - Bank A _ 7	-	-	-	1 614	-	-	-	-	-	-	-	-	1 614
	0020510003 - Petty cash 3	(163)	-	-	-	-	-	-	-	-	-	-	-	(163)
	0020510005 - Petty cash 5	-	-	-	-	(1 200)	-	-	-	-	-	-	-	(1 200)
	Receivables	(1 757)	(473)	(2 446)	20 015	(3 347)	3 273	2 485	(46)	(58)	17 109	(65)	2 569	37 261
	0020001101 - VAT sales	(52)	(50)	(66)	(51)	(64)	(61)	(62)	(46)	(58)	(47)	(65)	(49)	(671)
	0020001102 - VAT purchases 1	(1 704)	(423)	(2 380)	20 066	(3 283)	3 334	2 547	-	-	17 157	-	2 618	37 932
	0020001103 - VAT purchases 2	345	-	-	-	-	-	-	-	-	-	-	-	345
	0020001104 - VAT purchases 3	(345)	-	-	-	-	-	-	-	-	-	-	-	(345)
	Tangible assets	-	-	-	-	-	(3 366)	-	-	-	-	-	(6 200 648)	(6 204 014)
	0040002010 - Industrial buildings	-	-	-	-	-	-	-	-	-	-	-	(6 200 000)	(6 200 000)
	0040004000 - General plant	-	-	-	-	-	(2 706)	-	-	-	-	-	-	(2 706)
	0040004005 - Accumulated depreciation general plant	-	-	-	-	-	2 706	-	-	-	-	-	-	2 706
	0040005000 - Specific plant and machinery	-	-	-	-	-	(391 461)	-	-	-	-	-	(10 368)	(401 829)
	0040005005 - Accumulated depreciation specific plant and machinery	-	-	-	-	-	388 094	-	-	-	-	-	9 720	397 814
	0040008000 - Equipment	-	-	-	-	-	(12 777)	-	-	-	-	-	-	(12 777)
	0040008005 - Accumulated depreciation equipment	-	-	-	-	-	12 777	-	-	-	-	-	-	12 777
	0040015000 - Office machines	-	-	-	-	-	(1 165)	-	-	-	-	-	-	(1 165)
	0040015005 - Accumulated depreciation office equipment	-	-	-	-	-	1 165	-	-	-	-	-	-	1 165
	0040016070 - Various PPE	-	-	-	-	-	(626)	-	-	-	-	-	-	(626)
	0040016075 - Accumulated depreciation various PPE	-	-	-	-	-	626	-	-	-	-	-	-	626
	Assets TOTAL	(1 919)	(473)	(2 446)	21 629	(11 067)	(93)	2 486	(46)	(58)	17 109	3 607	(6 198 079)	(6 169 348)

EUR	Payables	8 835	418 016	15 157	(48 110)	126 273	1 276 044	(12 167)	1 584	17 098	(65 706)	2 064	(1 590 720)	148 368
	0020100420 - Employee vouchers	1 364	1 299	1 709	1 331	1 669	1 579	1 607	1 205	1 496	1 229	1 688	1 268	17 444
	0020100438 - Treasury Fund	3	-	-	-	-	-	-	-	-	-	-	-	3
	0060000000 - Payables _ Domestic suppliers	167	(5 834)	6 462	9 804	5 523	2 939	0	(0)	2 211	-	8	12 935	34 215
	0060000001 - Payables _ customer promotions	9 484	2 561	6 751	(120 862)	18 203	(19 442)	(14 126)	4	4	(95 141)	0	(26 968)	(239 531)
	0060000004 - Payables _ foreign suppliers 1	-	-	-	-	-	400	-	-	-	-	-	-	400
	0060000051 - Payables _ foreign related companies	1 570	-	-	-	-	-	-	-	-	-	-	-	1 570
	0060000100 - Payables _ Invoices to be received	2	593	-	62 416	112 174	1 290 216	-	-	13 092	27 823	-	-	1 506 316
	0060000101 - Purchase credit notes to be received	1	(3 356)	-	-	-	-	-	-	-	-	-	-	(3 355)
	0060000102 - Credit notes to be received promotional	(4 130)	(56 957)	(114)	(1 150)	(11 646)	2	-	-	-	-	-	-	(73 996)
	0060000110 - Invoices to be received _ promotions	-	-	-	-	-	-	-	-	-	-	-	(3 404 701)	(3 404 701)
	0060000112 - Invoices to receive promotional last year	-	90 142	-	-	-	-	-	-	-	-	-	1 265 978	1 356 120
	0060000113 - Invoices to be received last year	-	-	-	-	-	-	-	-	-	-	-	560 390	560 390
	0060000600 - Other payables to third_party	-	348 000	-	-	-	-	-	-	-	-	-	-	348 000
	0060400200 - Employee salaries to be paid	375	350	350	350	350	350	350	375	295	375	375	378	4 273
	0060501012 - Other social security contributions 2	0	-	-	1	-	-	1	-	0	-	-	-	3
	0060501013 - Other social security contributions 3	-	41 217	-	-	-	-	-	-	-	-	-	-	41 217
	0060501014 - Other social security contributions 4	-	-	-	-	-	-	-	-	-	8	(8)	-	-
	Provisions for risks and charges	-	-	-	3 640	-	-	-	-	-	-	197 385	3 518 975	3 720 000
	0080010000 - Other charges 1	-	-	-	3 640	-	-	-	-	-	-	197 385	3 298 975	3 500 000
	0080010011 - Other charges 4	-	-	-	-	-	-	-	-	-	-	-	220 000	220 000
	Liabilities TOTAL	8 835	418 016	15 157	(44 470)	126 273	1 276 044	(12 167)	1 584	17 098	(65 706)	199 449	1 928 255	3 868 368

	Cost of services	17 008	17 208	3 263	2 256	3 749	(1 104 487)	2 817	292	259	1 172	2 066	3 256	(1 051 142)
	0120001050 - Revenues from fees charged	-	-	(343)	-	-	-	-	-	-	-	(367)	3 000	2 290
	0120002000 - Recoveries of expenses	-	-	-	-	-	-	-	-	-	-	0	-	0
	0140040002 - Promotional expenses 2	3 375	-	-	-	-	-	-	-	-	-	1 200	-	4 575
	0140040006 - Promotional expenses 6	-	15 412	-	-	-	(1 104 910)	-	-	-	-	-	-	(1 089 498)
	0140040012 - Consumer promotions 2	-	-	-	419	-	-	-	-	-	-	-	-	419
	0140620101 - Marketing 1	13 633	1 796	3 605	1 838	2 549	423	2 817	292	259	1 172	1 233	254	29 871
	0140630103 - Promotion 3	-	-	-	-	1 200	-	-	-	-	-	-	-	1 200
	0140900985 - Costs to be recharged	-	-	-	-	-	-	-	0	-	-	-	2	2
	Costs for raw materials, consumables, supplies and goods	-	-	-	-	-	-	1 805	0	-	2 043	-	-	3 848
	0140204061 - Acquisition of consumables	-	-	-	-	-	-	1 805	-	-	2 043	-	-	3 848
	0140800100 - Discounts and allowances expense	-	-	-	-	-	-	-	0	-	-	-	-	0
	Costs for use of third party assets	-	-	-	-	-	(1 452)	-	-	-	-	-	-	(1 452)
EUR	0140530100 - Car rental	-	-	-	-	-	(1 452)	-	-	-	-	-	-	(1 452)
	Other operating expenses	3 417	2 699	6 471	6 580	10 406	5 737	6 117	764	20 035	5 089	4 951	27 133	99 399
	0140900600 - Entertainment expenses 2	471	313	4 488	5 212	7 882	2 008	4 459	198	19 053	2 832	3 007	13 852	63 776
	0140900700 - Charities, donations, gratuities	480	480	1 555	480	480	480	480	480	462	462	462	-	6 298
	0140900900 - Ordinary loss on disposal of assets	-	-	-	-	-	2 506	-	-	-	-	-	648	3 154
	0140900960 - Various costs deductible	2 466	1 804	427	682	1 838	742	1 178	86	520	1 796	1 482	12 633	25 654
	0140900980 - Donations to employees	-	103	-	206	206	-	-	-	-	-	-	-	516
	Personnel costs	2 333	(276 294)	-	-	-	-	-	-	-	-	-	-	(273 961)
	0140300012 - Employee bonuses	-	39 604	-	-	-	-	-	-	-	-	-	-	39 604
	0140300013 - Employee other bonuses	2 085	-	-	-	-	-	-	-	-	-	-	-	2 085
	0140300020 - Salaries for internships	-	(330 632)	-	-	-	-	-	-	-	-	-	-	(330 632)
	0140310012 - Social security contributions of employee bonuses	-	11 800	-	-	-	-	-	-	-	-	-	-	11 800
	0140310013 - Social security contributions of other bonuses	248	-	-	-	-	-	-	-	-	-	-	-	248
	0140330001 - Provision for severance pay 1	-	2 934	-	-	-	-	-	-	-	-	-	-	2 934
	Expenses TOTAL	22 758	(256 387)	9 733	8 836	14 155	(1 100 203)	10 738	1 056	20 294	8 305	7 017	30 389	(1 223 308)

Appendix 9. Round numbers report

Round numbers (T:1000)(S:NA)	JE count	JE line count
111	237	420
0	2576	3796
999	128	164

Appendix 10. Specific phrases report

Identified phrases (T:5000)(S:headerline)	EUR	
	JE count	JE line count
cash	0	0
fraud	0	0
email	0	0
percent	0	0
per	0	0

Appendix 11. SoD By Account Class

		EUR											
Account Type (Sub Type)	Account Class	CY Preparers	PY Preparers	CY JE Count	PY JE Count	CY Entries/ Preparer	PY Entries/ Preparer	CY Amount	CY Debit	CY Credit	PY Amount	PY Debit	PY Credit
Assets (Current assets)	Cash and cash equivalents	10	9	23 199	20 734	2 319	2 303	(45 295 329)	6 078 605 533	(6 123 900 862)	40 473 302	5 244 064 199	(5 203 590 897)
Assets (Non Current assets)	Intangible assets	2	2	145	157	72	78	19 070 902	49 873 379	(30 802 477)	(4 535 648)	2 998 645	(7 534 293)
Assets (Current assets)	Inventory	2	2	26	31	13	15	(585 851)	426 224 652	(426 810 503)	5 034 469	414 367 582	(409 333 113)
Assets (Current assets)	Prepayments and accrued income	7	7	108	113	15	16	(89 688)	327 459	(417 147)	(18 139)	437 608	(455 747)
Assets (Current assets)	Receivables	17	17	55 109	56 615	3 241	3 330	(16 188 450)	1 532 663 892	(1 548 852 342)	2 184 135	1 422 418 291	(1 420 234 156)
Assets (Non Current assets)	Tangible assets	1	2	255	210	255	105	8 193 899	34 759 200	(26 565 301)	(482 436)	9 617 440	(10 099 877)
Liabilities (Current liabilities)	Accruals and deferred income	4	2	41	49	10	24	(25 358)	240 811	(266 169)	(22 872)	219 133	(242 005)
Liabilities (Current liabilities)	Payables	44	39	47 037	58 964	1 069	1 511	3 789 619	1 044 836 533	(1 041 046 915)	(4 167 175)	946 743 548	(950 910 722)
Liabilities (Non current liabilities)	Provision for future employee costs	2	1	214	242	107	242	122 747	3 263 008	(3 140 261)	358 601	3 713 889	(3 355 288)
Liabilities (Non current liabilities)	Provisions for risks and charges	2	2	78	66	39	33	(1 308 170)	16 481 343	(17 789 514)	3 065 982	23 049 008	(19 983 026)
Equity (Equity)	Profit & loss reserve	2	1	3	2	1	2	76 000 000	159 780 440	(83 780 440)	-	78 876 657	(78 876 657)
Revenue (Financial income)	Foreign exchange gains	1	1	1	2	1	2	(15)	-	(15)	(48)	-	(48)
Revenue (Extraordinary income)	Other extraordinary income	1	2	2	2	2	1	-	19 288	(19 288)	(469 763)	-	(469 763)
Revenue (Financial income)	Other financial income	6	3	28	17	4	5	(2 229 378)	124 523	(2 353 901)	(3 282 420)	28 590	(3 311 010)
Revenue (Sales)	Other revenues and income	13	13	608	614	46	47	(8 411 252)	1 360 845	(9 772 097)	(10 454 087)	1 607 029	(12 061 116)
Revenue (Sales)	Sales of goods and services	13	13	19 750	20 283	1 519	1 560	(461 983 962)	347 938 224	(809 922 186)	(459 153 656)	286 981 778	(746 135 435)
Expenses (Cost of sales)	Changes in inventories of finished products, semi_f	2	2	24	25	12	12	236 895	250 508 401	(250 271 505)	(4 146 559)	228 832 313	(232 978 872)
Expenses (Cost of sales)	Changes in inventories of raw materials, supplies,	2	3	26	31	13	10	348 956	176 302 103	(175 953 147)	(887 910)	180 500 945	(181 388 856)
Expenses (Cost of sales)	Cost of services	33	30	20 045	31 392	607	1 046	210 927 957	235 784 259	(24 856 302)	219 955 816	234 266 336	(14 310 520)
Expenses (Cost of sales)	Costs for raw materials, consumables, supplies and	38	35	15 743	16 122	414	460	137 503 302	141 904 682	(4 401 380)	140 112 257	153 213 385	(13 101 128)
Expenses (Cost of sales)	Costs for use of third party assets	6	5	695	997	115	199	5 349 049	5 518 938	(169 889)	4 367 413	4 658 641	(291 228)
Expenses (Taxes)	Current taxes	1	2	1	7	1	3	21 486 902	21 486 902	-	19 062 558	23 105 833	(4 043 275)
Expenses (Taxes)	Deferred tax assets and liabilities	1	2	1	5	1	2	(605 495)	-	(605 495)	582 544	4 033 177	(3 450 633)
Expenses (Cost of sales)	Depreciation and amortization	4	5	443	338	110	67	9 367 140	41 611 451	(32 244 311)	8 935 637	12 955 792	(4 020 155)
Expenses (Cost of sales)	Doubtful receivables	1	1	1	1	1	1	360 000	360 000	-	440 000	440 000	-
Expenses (Financial charges)	Foreign exchange losses	1	2	1	5	1	2	42	42	-	258	258	-
Expenses (Financial charges)	Interest and other financial charges	5	3	32	20	6	6	1 340 211	1 341 556	(1 345)	1 345 602	1 346 954	(1 353)
Expenses (Cost of sales)	Other operating expenses	9	11	1 157	1 183	128	107	4 243 740	4 593 338	(349 598)	3 909 645	5 896 802	(1 987 157)
Expenses (Cost of sales)	Personnel costs	5	3	824	831	164	277	32 581 994	45 149 502	(12 567 508)	33 146 586	44 531 861	(11 385 275)
Expenses (Cost of sales)	Provisions for risks	2	2	9	5	4	2	5 799 592	8 632 495	(2 832 902)	4 645 909	4 645 909	-

Appendix 12. Day of the week report

EUR				
Date Week Analysis Current Year				
	Day Of Work	Debit Amount	Credit Amount	Net Amount
EUR	Sunday	71 567 126	(73 937 111)	(2 369 985)
	Monday	296 689 341	(303 969 173)	(7 279 832)
	Tuesday	206 370 808	(224 290 745)	(17 919 937)
	Wednesday	181 264 655	(185 710 953)	(4 446 299)
	Thursday	204 990 361	(199 997 249)	4 993 113
	Friday	258 130 129	(292 346 838)	(34 216 709)
	Saturday	40 651 817	(43 088 756)	(2 436 940)
	TOTAL	1 259 664 237	(1 323 340 825)	(63 676 588)

Appendix 13. Day lag analysis

EUR						
Day Lag Analysis Current Year						
	DaysLag	NetAmount	DebitAmount	CreditAmount	JournalCount	LineCount
EUR	(43)	-	2 543	(2 543)	1	2
	(42)	56	1 651	(1 595)	2	3
	(40)	40	40	-	2	2
	(39)	203	18 208	(18 005)	4	4
	(38)	-	648	(648)	2	4
	(37)	3 029	6 458	(3 429)	6	6
	(36)	163	203	(40)	7	7
	(35)	6 207	47 517	(41 310)	19	19
	(34)	60	60	-	5	5
	(33)	252 061	252 061	-	8	8
	(32)	36 197 891	36 201 738	(3 848)	14	21
	(31)	78 347	82 329	(3 983)	8	8
	(30)	(291)	3 626	(3 918)	3	3
	(29)	(24 462)	28 146	(52 607)	17	17
	(28)	400	434	(35)	8	8
	(27)	230	230	-	5	5
	(26)	26 472	26 612	(140)	7	8
	(25)	24 257	28 762	(4 505)	8	8
	(24)	(219 752)	1 705	(221 457)	9	16
	(23)	(1 040)	8 728	(9 768)	10	11
	(22)	(9 806)	95 869	(105 675)	18	20
	(21)	(6 356)	22 159	(28 515)	20	21
	(20)	2 990	194 889	(191 899)	23	40
	(19)	1 073 858	4 440 696	(3 366 838)	19	36
	(18)	60 255	99 143	(38 889)	19	27
	(17)	35 898	49 033	(13 135)	17	21
	(16)	(31 844 403)	3 563 068	(35 407 471)	28	36
	(15)	748 085	3 288 908	(2 540 822)	52	56
	(14)	76 648	279 648	(203 000)	51	59
	(13)	(3 566 554)	803 408	(4 369 962)	90	110
	(12)	4 888 625	5 593 805	(705 180)	189	260
	(11)	295 261	355 734	(60 473)	55	69
	(10)	3 398 459	5 590 991	(2 192 532)	206	249
	(9)	29 544 406	30 064 852	(520 445)	173	275
	(8)	(16 159)	7 842 495	(7 858 654)	466	742
	(7)	(372 665 283)	15 650 230	(388 315 513)	430	670
	(6)	399 518 040	403 729 423	(4 211 383)	982	1 402
	(5)	11 811 152	13 728 242	(1 917 090)	850	1 292
	(4)	4 289 856	15 265 845	(10 975 989)	1 156	1 641
	(3)	17 021 710	21 033 342	(4 011 632)	1 874	2 710
	(2)	4 265 009	5 909 633	(1 644 623)	733	983
	(1)	4 457 031	29 087 765	(24 630 734)	6 440	7 648
	-	(167 119 234)	644 686 997	(811 806 231)	43 822	84 825
	1	(192 781)	-	(192 781)	5	5
	2	(3 769 629)	11 576 362	(15 345 992)	156	174
	4	(224 480)	-	(224 480)	11	11
	5	-	0	(0)	2	2
	6	(92 406)	-	(92 406)	8	8
	7	(1 811)	-	(1 811)	1	1
	8	(349 725)	0	(349 726)	21	21
	9	(1 308 130)	-	(1 308 130)	4	4
	10	(111 215)	-	(111 215)	12	12
	12	(800)	-	(800)	1	1
	13	(49 000)	0	(49 000)	4	4
	14	(179 969)	-	(179 969)	13	13
	TOTAL	(63 676 588)	1 259 664 237	(1 323 340 825)	58 096	103 613

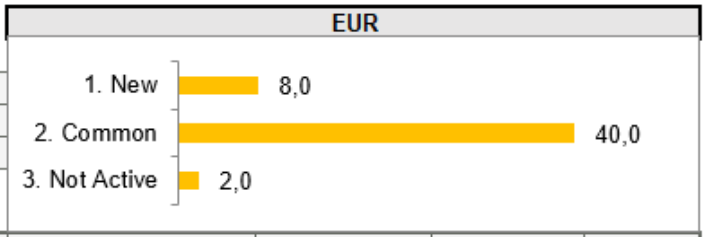
Appendix 14. Date analysis by month

Date Month Analysis Current Year														
	Day Value	201401	201402	201403	201404	201405	201406	201407	201408	201409	201410	201411	201412	Total
EUR	1	-	34 201 440	33 871 975	34 109 099	36 070 623	36 305 452	36 404 096	36 432 450	34 100 407	33 856 790	34 102 006	35 351 233	384 805 572
	2	32 586 312	-	-	(136 584)	(1 837 206)	17	(368 386)	(90 737)	(1 118 698)	(1 094 907)	-	(27 816)	27 911 995
	3	(2 615 886)	(2 810 604)	(1 759 788)	699 957	(9 975)	(1 406 605)	(844 735)	-	(407 170)	(1 097 942)	(1 461 551)	2 056 387	(9 657 913)
	4	(11 843)	(832 807)	(1 987 453)	(593 717)	(443)	(1 438 132)	(227 830)	(1 004 001)	(1 182 897)	(99 825)	(438 358)	544 525	(7 272 781)
	5	-	(825 598)	(993 582)	12 523	(737 327)	(640 184)	(14 502)	33 883	(555 733)	-	1 245 685	44 876	(2 429 958)
	6	0	(1 248 988)	(1 470 922)	-	(57 467)	(1 157 313)	6 235	346 429	(10 231)	1 206 864	1 423 381	-	(962 011)
	7	(2 107 867)	(631 604)	(1 692 596)	(978 352)	879 593	5 527	(168 174)	2 379 733	-	1 221 153	2 117 087	-	1 024 499
	8	(2 289 756)	(67 266)	(315 404)	7 980	(1 007 411)	-	6 646 072	(1 517 970)	(1 648 542)	(551 297)	11 662	(60 721)	(792 656)
	9	(1 576 763)	-	-	(690 331)	559 191	(1 258 900)	875 462	(204 574)	501 151	(709 966)	-	(1 566 906)	(4 071 636)
	10	(1 509 423)	(2 115 047)	(2 345 916)	(815 901)	(153 782)	(862 108)	713 872	-	(64 761)	782 250	(2 103 309)	223 340	(8 250 784)
	11	(34 107)	355 439	(390 027)	(590 415)	-	(814 126)	(9 113)	(1 582 246)	(660 760)	(31 719)	515 534	1 720 278	(1 521 263)
	12	-	(1 459 561)	(445 568)	(171 188)	(2 097 648)	777 853	(18 172)	(1 462 784)	(1 047 566)	-	125 438	530 314	(5 268 882)
	13	(2 208 718)	(1 154 361)	(457 127)	-	28 259	(464 046)	-	(810 390)	(35 340)	1 611 171	(469 962)	(126 157)	(4 086 671)
	14	(1 487 784)	(1 447 260)	(226 579)	156 765	545 075	(36 934)	(1 560 076)	(1 148 154)	-	1 606 077	(507 860)	-	(4 106 729)
	15	(1 252 258)	(19 213)	-	(65 895)	97 721	(241 615)	(281 400)	0	(2 350 159)	1 931 087	(97 599)	(1 536 957)	(3 816 288)
	16	(1 373 319)	-	-	1 402 411	593 445	(532 327)	1 521 353	-	(678 052)	(134 399)	-	(299 136)	499 977
	17	(1 431 719)	(2 464 384)	(1 063 294)	(100 511)	(33 343)	(1 253 964)	1 528 073	-	(750 363)	(907 420)	(1 130 770)	569 696	(7 037 998)
	18	(32 159)	(765 165)	(83 740)	1 209 329	-	(1 209 194)	712 947	(1 184 978)	(489 412)	(68 967)	(311 290)	2 799	(2 219 830)
	19	-	(1 393 895)	(774 804)	-	(410 500)	(902 911)	(16 882)	(1 066 237)	(410 371)	-	(580 011)	297 465	(5 258 147)
	20	(2 776 810)	(1 111 776)	(315 138)	-	(184 404)	(540 290)	(33 552)	(785 348)	(95 221)	(2 330 038)	(280 499)	(130 770)	(8 583 847)
	21	(1 521 529)	(1 156 150)	(706 950)	-	(723 719)	(254 054)	(1 042 862)	(1 000 906)	-	(1 025 934)	(1 006 703)	(25 415)	(8 464 223)
	22	(1 029 137)	(16 114)	-	4 102 140	(486 775)	-	(126 591)	(848 291)	(2 092 143)	428 232	(29 926)	1 237 225	1 138 621
	23	(1 487 465)	-	-	(1 673 710)	(940 497)	(1 142 484)	1 895 428	(23 523)	(681 965)	42 949	-	4 849 265	837 997
	24	(1 144 254)	(897 843)	(802 272)	(639 516)	(233 091)	(270 087)	566 267	-	240 167	1 288 068	(398 756)	(1 334 765)	(3 626 082)
	25	(104 976)	(1 040 077)	140 731	(0)	-	358 945	(496 655)	(697 955)	(1 024 977)	(851 847)	(275 928)	-	(3 992 740)
	26	-	(1 124 362)	(704 038)	(5 507)	(1 371 762)	412 894	(236 035)	118 422	(1 300 164)	-	(717 245)	-	(4 927 797)
	27	(2 600 815)	(740 517)	365 829	-	(1 147 209)	(1 235 256)	-	741 566	32	(587 023)	(621 585)	(1 697)	(5 826 675)
	28	(45 759)	(32 286 618)	90 069	(977 877)	(1 339 436)	(339 781)	(1 894 907)	(211 199)	-	(579 620)	(2 451 213)	-	(40 036 343)
	29	(269 593)	-	4 839	597 459	(1 444 911)	-	280 230	60 797	(1 752 131)	(531 378)	20 646	875 778	(2 158 265)
	30	(759 926)	-	-	(32 704 294)	(3 319 675)	(35 847 661)	676 793	251 731	(33 705 696)	(718 646)	(31 556 000)	745 145	(136 938 228)
	31	(30 584 705)	-	(31 467 109)	-	(32 155 833)	-	(34 406 952)	(32 704 593)	-	(32 344 855)	-	(4 923 452)	(198 587 500)
	TOTAL (Current)	(27 670 260)	(21 052 333)	(13 528 865)	2 153 865	(10 918 507)	(13 987 285)	10 080 004	(5 978 876)	(17 220 595)	308 858	(4 877 127)	39 014 535	(63 676 588)

EUR	Monthly Average	(1 064 241)	(877 181)	(563 703)	89 744	(389 947)	(518 048)	347 586	(229 957)	(662 331)	11 439	(180 634)	1 560 581	(2 476 689)
	Maximum Daily Amount	32 586 312	34 201 440	33 871 975	34 109 099	36 070 623	36 305 452	36 404 096	36 432 450	34 100 407	33 856 790	34 102 006	35 351 233	384 805 572
	Minimum Daily Amount	(30 584 705)	(32 286 618)	(31 467 109)	(32 704 294)	(32 155 833)	(35 847 661)	(34 406 952)	(32 704 593)	(33 705 696)	(32 344 855)	(31 556 000)	(4 923 452)	(198 587 500)

Appendix 15. SoD change in preparers report

1. New = Activity in CY and not PY
2. Common = Activity in CY and PY
3. Not Active = Activity in PY but Not CY



Preparers	User Type	CY Journal Entries	PY Journal Entries	Change
01 ABC - 01 ABC	2. Common	2 689	2 463	226
01 BCD - 01 BCD	2. Common	103	106	(3)
01 DEF - 01 DEF	2. Common	329	278	51
01 EFG - 01 EFG	2. Common	377	484	(107)
01 GHI - 01 GHI	2. Common	3 013	2 163	850
01 HIJ - 01 HIJ	2. Common	888	1 032	(144)
01 JKL - 01 JKL	2. Common	367	423	(56)
01 MNO - 01 MNO	2. Common	1 375	1 338	37
01 PQR - 01 PQR	2. Common	1 270	1 519	(249)
01 STU - 01 STU	2. Common	663	684	(21)
01 VWX - 01 VWX	2. Common	435	698	(263)
01 YZA - 01 YZA	2. Common	10	37	(27)
AdaJa01 - James Adamson	1. New	8		8
AkeTh01 - Thomas Akers	1. New	74		74
AldBu01 - Buzz Aldrin	2. Common	11 878	11 056	822
AllJo01 - Joseph Allen	1. New	2		2
AndBi01 - Bill Anders	2. Common	15	27	(12)
AndCl01 - Claudie André	2. Common	647	629	18
ArmNe01 - Neil Armstrong	2. Common	1 929	1 836	93
BarDa01 - Daniel Barry	1. New	1		1
Batch - BATCH BATCH	2. Common	25 136	27 257	(2 121)
BeaAl01 - Alan Bean	2. Common	4 646	5 107	(461)
BorFr01 - Frank Borman	2. Common	679	669	10
CagYv01 - Yvonne Cagel	1. New	48		48
ConPe01 - Pete Conrad	2. Common	4 709	4 434	275
DewFr04 - Frank De Winne	3. Not Active		4	(4)
DunBo01 - Bonnie Dunbar	1. New	3		3
EwaRe01 - Reinhold Ewald	2. Common	6 813	5 131	1 682
FriDi01 - Dirk Frimout	2. Common	37	889	(852)
FugCh01 - Christer Fuglesang	2. Common	2	1	1
GerAl01 - Alexander Gerst	1. New	124		124
HaiFr01 - Fred Haise	2. Common	789	646	143
IrwJa01 - James Irwin	2. Common	2 698	2 811	(113)
JemMa01 - Mae Jemison	1. New	32		32

Appendix 16. Preparer process map

		LovJi01 - Jim Lovell	MatKe01 - Ken Mattingly	MesEr01 - Ernst Messerschmid	MitEd01 - Edgar Mitchell	01 EFG - 01 EFG
		CY	CY	CY	CY	CY
EUR	Cash and cash equivalents	33 190 168			-	
	Inventory		(36 190 540)			
	Intangible assets					
	Prepayments and accrued income					
	Tangible assets					
	Receivables	(76 080 867)	606 221		22 019	
	Assets TOTAL	**(42 890 699)**	**(35 584 319)**		**22 019**	
EUR	Accruals and deferred income					
	Provision for future employee costs					
	Payables	42 557 986	(97 487 710)	(196 280)	-	(1 672 855)
	Provisions for risks and charges		(193 229)			
	Liabilities TOTAL	**42 557 986**	**(97 680 939)**	**(196 280)**	-	**(1 672 855)**
EUR	Profit & loss reserve		76 000 000			
	Equity TOTAL		**76 000 000**			