# Managing risks of automatic accounting

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**Abstrakt**
Cieľom článku je poukázať na niektoré kľúčové operačné riziká a neoperačné riziká automatizácie účtovníctva, ktoré je potrebné zvážiť pri uplatňovaní procesov automatického účtovníctva. Automatizácia účtovníctva je aktuálnym trendom vykonávania účtovníctva. Účtovné právne predpisy a štandardy sa špecificky nezaoberajú témou automaticky vykonávaného účtovníctva. Kvôli absencii reálnych dát sa tento článok zameriava na teoretickú aplikáciu ISO 31000 – Riadenie rizík pre vykonávanie automatického účtovníctva. Z uvedených informácii vyplýva, že je možné uplatňovať automatické účtovníctvo v praxi, ale kým sa právne predpisy neaktualizujú tak, aby pokrývali riziká, zodpovednosti a overovanie automaticky vykonávaného účtovníctva, stále existuje značné právne riziko nevykonania účtovníctva zákonným spôsobom. Je potrebný hlbší výskum pre stanovenie presných pravidiel automatizácie účtovníctva.

**Kľúčové slová**
Účtovníctvo, riadenie rizík, automatizácia

**Abstract**
Purpose of this article is to point out some key operational risks and non-operational risks of accounting automation which must be considered when applying processes of automatic accountancy. Accounting automation is a further trend of performing accountancy. Accounting legal rules and standards do not specifically cover the topic of automatically performed accountancy. Due to lack of real data, this paper focus on application of ISO 31000 – Risk management on performance of automatic accounting process. Disclosures show that it is possible to apply automatic accounting in practice, but until legal rules will be updated to cover risks, responsibilities and verification, there are still significant legal risk of not performing accountancy by a legal way. Further research is needed to set up exact rules applicable for automatically performed accountancy.

**Key words**
Accounting, risk management, automation

**JEL classification**
M41; M48; O14

## 1 Introduction

Automation and robotic of accounting are part of the natural society evolution. It is no secret that occupancy of an accountant is one of the most endangered, with the predictions stating it will disappear in a near future due to replacement by an automatic robotic solution. When studying automation of accounting, there must be clearly distinguished difference between terms accountant and bookkeeper, as both terms are widely used in similar/same

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meaning. While bookkeeper is responsible mostly for recording (taping, importing, writing) of accounting information mostly presented by relevant documents, accountant is a person responsible for proper accounting of information regarding to deliver fairly presentation of financial statements (THE COMMISSION OF THE EUROPEAN COMMUNITIES, 2008). While international accounting standards are getting widely implemented across the globe, despite their complexity, automatic accounting, both bookkeeping and accounting, may be replaced by automatic (robotic) solutions. Automation of accounting rise questions regarding to its risks and risk mitigation of performing autonomous operations. Despite of evolution of accounting standards and wide spreading of international accounting standards (Dvořáková, 2017), human accountants are present for centuries. Therefore, risks of the accounting occupation and accounting processes are well described and risk of performing accounting by humans are mitigated. In the other hand when speaking of automatic accounting there shall be implemented risk management, for example, ISO 31000 – Risk management (the International Organization for Standardization, 2018).

Automation and robotic are getting implemented not only in accounting field, but in almost any industry area. Because automatic solutions shall be capable to make decisions, there is lack of legal requirements and standards for such solutions. Responsibility is still carried by a responsible person, while it is getting evident that automatic solutions may perform less error rate, shall be capable to provide greater assurance of accounting results, and can perform much faster than humans. However, the role of human accountant is probably not going to end. Human accountant shall transform from process performers to process setters and process evaluators. There always be a need to evaluate processes, to set up processes and to repair processes and data in case of an emergency or a system or process failure.

The aim of this paper is not to disclose full research on this topic, it rather points out some issues related to this ongoing trend. Further R&D is needed not only in the field itself, but also in legislative environment and rules. It is better when legislation outran the trend and sets up the path.

## 2 Current status

Accountancy in general is a strictly regulated environment where not only accounting acts, standards and rules must be met, but also many other regulations and reporting derive information from accounting (Tumpach, 2008). Automation of accounting has to meet all those required legislative requirements. Accounting acts, standards and rules do not set up the trend of automation. They follow the trend by making its adjustments/changes regarding to ongoing trends. Example can be seen in Slovakia, where it is allowed to use of digitalization of accounting documents just since 01.01.2022, based on amended Accounting act (Národná rada Slovenskej republiky, 2002) despite of it is allowed in other countries for years. Even thou, the current act brings many uncertainties especially due to strong link between accountancy and taxation in Slovakia. Current accounting act also allows to solve some digitalization burdens such as need of signatures on accounting documents. The main issue of Slovakian accounting rules is strong link to taxation rules (Národná rada Slovenskej republiky, 2003), what makes space for accounting distortion and possible tax motivated accounting. (Vlčko & Meluchová, 2021). It has also strong effect on digitalization and automation as tax rules must be considered when performing accounting. Such problems shall be solved by converging accounting acts with taxation act requirements. As easiest the rules are as easiest the digitalization and automation may be. Accounting and taxation rules shall retreat formal requirements and focus rather on the matter of a transaction. This course can be observed in IFRS, as IFRS are standards rather than strict rules.

When we look at other countries, we can observe some positive and some negative examples out of which implementation in Slovakia may take an advantage. For example, in in

Netherlands, digitalization of accounting documents is implemented for years now; also, B2G recording is so implemented, that tax authority is able to pre-fill tax return based on information it already has. Another example is Finland, where structured financial statements are submitted, and tax authority automatically generates tax return. These examples show that automatic information exchange can be beneficial for business and for government as it simplifies processes and release human resources and decrease errors.

Unfortunately, each country is developing own rules regarding to digitalization and automation of accounting. One of the pillars of EEA is free movement of goods and services. By not setting internationally applicable standards for automatic business correspondence exchange, digitalization of accounting/taxation there rises a risk of legal obstacles in cross-border business transitions due to different legal requirements in each country. Some attempt is made by Directive 2014/55/EU (THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION, 2014), but it needs to be updated to current digital development achievements and practices.

Automation of accounting processes might, at first glance, give intention that human accountants will be needed no more. The problem that global economy faces in recent years is lack of personnel in many industrial fields. This is just a result of natural society development and a natural evolving of a population curve in developed world what results in ongoing decrease of workforce supply also in Slovakian labor market (Vaňo, 2019). Therefore, there is need to fulfil the gap of missing available personnel by automatic solutions that are capable to perform the tasks independently. It is not expected that the role of an accountant diaper at all. Instead of, the role evolves to become even more educated and honored professional who performs bookkeeping no more, but only accounting.

## 2.1 Automatic information exchange

When we discuss automation, probably the easiest part, at least in theory, is automatic information exchange, both business to government (further as B2G) and business to business (further as B2B). While there are already several B2G automatic information flows in place, for example, online cash register reporting and online invoice reporting, which is now getting prepared to be implemented in Slovakia (Ministerstvo financií Slovenskej republiky, 2021) and is already implemented in Italy (eInvoicing in Italy, 2021). There is still lack of unified standards which could be used internationally. In most cases the government aims to decrease tax revenue outflows, so their required automatic B2G information flows are designed to provide only information to meet this goal. However, due to different approach and different B2G information flows in every EU country, companies and software/hardware manufacturers need to adapt to each specific country. If we theoretically consider use of international accounting standards in a group of consolidated companies who share ERP, the need to different B2G automatic flow in each country rise costs + specific country B2G requirements may require adjustments in accounting to be able to properly report correct information. Therefore, there is space for further (academic) R&D to aim unified B2G information flows standards, which could be implemented internationally.

In the other hand, B2B automatic information flows are getting spread especially between long-term business relationships, such as in a supply chain. While there are not standardized data flow solutions, several ERP software companies have developed solutions which are in use. But these automatic information flows need to be contractually backed between each business partners and such solutions are usually tailor-made, what outsides smaller companies, for whom such solution might be out of their financial possibilities. Online invoice reporting to Tax authorities might be one of solutions. The idea is that the supplier online reports each issued invoice to the tax authority. Tax authority then sends the invoice to the customer. Both, supplier,

and customer could be sure that the transaction is tax recorded, and it also decrease legal risk in case of further disputes. Such solution is getting prepared in Slovakia. (Ministerstvo financií Slovenskej republiky, 2021).

As both B2G and B2B automatic information flows are performed automatically there is no longer needed to use paper documents and therefore there is no more work for a bookkeeper occupancy and as the information flow is standardized, there is also no more need for an accountant as automatically received and exported information could be automatically accounted.

## 2.2 Automatic information detection

As mentioned before, B2B information flow is not standardized, nor is business correspondence (invoices, orders, delivery notes, credit notes, transportation documents, etc.) are not standardized. Despite of some attempts to use standardized automatically detectable information flow solutions, such as invoice by square, unless such solution will be standardized and legally required it may not get widely used. Instead of it a use of artificial intelligence and data recognition solutions are getting developed. The idea is that an artificial intelligence is capable to recognize, read and process business documents such as invoices, delivery notes, receipts etc. Business correspondence is not standardized, but due to its use for centuries it contains mostly common information even thou it is not standardized. For example: In Slovakia Invoice is defined only in the VAT act (Národná rada Slovenskej republiky, 2004), but invoices are widely used not only in VAT – related transactions (Národná rada Slovenskej Republiky, 1991); content of an invoice is almost the same in any country despite of lack of international standard for invoicing. The same is applied for credit notes, delivery notes, etc. Therefore, AI shall be capable to process read and record information from invoices no matter from which country/jurisdiction and invoice is issued; it shall contain required information.

Once an artificial intelligence is capable to recognize, book and account invoices, receipts, delivery notes, etc. the occupancy of accountant needs to get changed from an accountant to an accounting process evaluator. An accountant who is aware of legal requirements, company information needs, and reporting needs must be also aware of automatic accounting processes and might be able to verify whether the automatic processes are performed accurately. When automatic booking and accounting is implemented, it must be clear who takes responsibilities for risks of an artificial intelligence work and how potential errors can be corrected to aim fairly financial statement presentation (THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION, 2013). We must distinguish between process risks and operational risks. While both results in incorrect accounting, process risk is a repeatedly incorrect performance of accounting. Operational risk is a risk that may likely happens, for example, incorrectly recognized information or incorrectly evaluated information by artificial intelligence. Company must have implemented processes to detect and mitigate both kinds of risks.

# 3 Risk assessment and risk mitigation

As automation of accounting is just getting developed, there is lack of real data. Therefore, this paper discloses only theoretical assumption, which need to be considered and are subject to further research, and development of legal requirements which also need further adjustments.

When evaluating of risk management, the starting point could be ISO 31000 – Risk management: ’The risk management process involves the systematic application of policies, procedures and practices to the activities of communicating and consulting, establishing the context and assessing, treating, monitoring, reviewing, recording and reporting risk.’’ (the

International Organization for Standardization, 2018) ISO 31000 – Risk Management sets up Risk assessment as follows: Risk identification → Risk analysis → Risk evaluation. (the International Organization for Standardization, 2018) Once risk is assessed, it can be treated.

There are several risk assessment methods and techniques out of which we discuss two most used in practice due to their simplicity and easy interpretation: Process chart and Risk matrix. Both are not separated one from each other and shall be used together.

Risk mitigation shall be performed by either:

- No action, if the risk is too low or a mitigation costs are much higher than potential loss.
- Additional checks, double checks or cross checks implementation.
- Verification of accounting data.
- Stochastic model. Model highlight transactions or data that are suspicious of an error.
- External certification, verification or audit.
- Independent automatic solution that is working independently to original source.

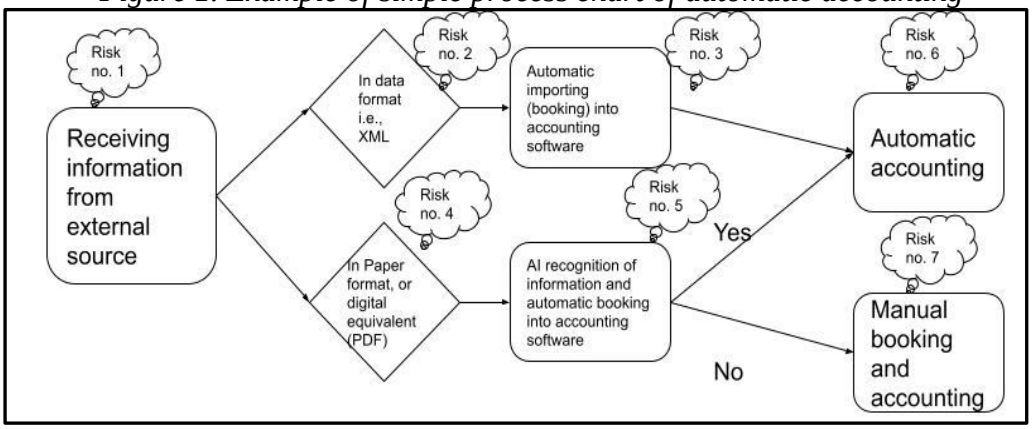
There are also other risk assessment methods than process chart and risk matrix, for example, surveys. Proper mitigation of risks may reduce company's expenses in case of an emergency.

Separate topic, which is not covered in this paper, but is necessary to consider is Business continuity management (in short BCM). BCM is mandatory for important companies whose fail would affect entire market, such as banks, financial institutions, national transportation carriers, telecommunication operators, etc. BCM is a set of rules and scenarios which are followed in case of an emergency situations to ensure company will continue its operations. BCM of performing accountancy is necessary especially in the event of an emergency, when the company needs proper information of its position, status and performance.

### 3.1 Process chart

It is necessary do properly describe end-to-end processes, starting at the point of receiving information and ending by verifying properly accounted information. The process chart can look like, but is not limited to, in Figure 1.

*Figure 1. Example of simple process chart of automatic accounting*




Source: own processing

Process chart is a useful tool used in Risk assessment. It provides clear visual process description. Process chart is capable to show not only process itself, but it can be used to point out specific description notes, decision flows, information flows and possible result handling. Example shown in this paper is just a brief process. In reality, the process chart is much more

complex and cover also internal information flows, evaluations, approvals, and reporting. In case the process chart is too complex, it can be divided into several partial process charts, but it must be ensured each partial process chart is fully connected without any process failures.

### 3.2 Risk matrix

Risk matrix is a table assessing potential risks. Unlike process chart it is capable to provide not only identification of risks, but also their evaluation and treatment. Example of Risk matrix can be seen in Table 1.

*Table 1. Example of simple risk matrix*

| **Risk identification** | | | **Risk analysis** | | | **Risk evaluation** | | | | **Treatment** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Process descri-ption | Risk descri-ption | Type of risk | Risk occurre nce/pro bability | Risk signi-ficance | Respon -sibility | Risk impor-tance | Possi-ble loss | Action needed | Risk miti-gation | Risk treat-ment | Treatm ent follow up |

Source: own processing

Data in Risk matrix shall strictly follow the given methodology. Data in risk analysis could be gathered either by:

- Stochastic model (Wimmer & Wimmerová, 2007). This is considered as the most accurate data used in risk assessment. Creating a stochastic model is not an easy task and require knowledge of probability and statistics, what is not a common skill among accountants. Therefore, stochastic models are not widely used in accounting risk assessment practice.
- Expertise opinion of an evaluator. Evaluator is a person responsible for Risk assessment. Based on his/her experience, he/she is capable to evaluate and analyze risks. Better results could be gathered if several evaluators are involved, or a team or committee is appointed. In practice a sort of scorecard is used for risk assessment. Methodology set up a score range and evaluator give score measure based on its expertise opinion. The simplest score card is called "traffic light" – evaluator provides green color when risk measurement is ok, orange color when risk is neither ok, both critical and red color when risk is critical or unacceptable.
- Risk standards. This is not used in accounting practice as there are not General Risk assessment standards in accounting yet. Risk assessment standards are used in other industries such as dangerous substances handling, aviation, and transportation in general, etc.

Risk matrix assessment shall have form easily usable and understandable. Too complex or too brief matrix may not fulfil its goal. Ideally the matrix follows the process chart or data flow.

### 3.3 Whistleblowing

Accounting (and taxing) is heavily regulated by laws, regulations, and standards. Whistleblowing in accountancy is, in general, not welcome as any whistleblowing will most likely result in a penalty of a company; no matter whether whistle blower pointed out on an intentional or unintentional error. However, if the company tend to pretend accountancy correctly, at least internal whistleblowing shall be welcome as it naturally reveals imperfection in processes. This could be achieved by assigning a special department, for example internal audit. Such solution is, however, feasible only in larger companies.

### 3.4 Verification

Verification of Financial statements, in general, is task given to auditors. Spread of IFRS and its complexity rise expectations on Auditors as investigators of potential frauds and errors. International Audit standards clearly states role of auditors. "Audit expectation gap" (Astolf, 2021) can rise with the rise of digitalization and automation of accounting. Audit therefore must adapt to this trend.

Company cannot rely only on audit regarding to verification of automatically performed accounting. Internal verification procedures and processes have to be implemented what is not only a desired practice, but also legal requirement. (Národná rada Slovenskej republiky, 2002). Verification can be implemented by several ways such as, but not only:

- Stiltedly figures. Automatic detection system shall point out any unnatural figures, results, or data. This does not mean that the figure is incorrect. The idea is that anything what is not within the scope of average boundaries is suspicious and must be assessed manually. Such attitude may detect incorrect data in accounting. Because such system evolves based on evaluated data, it must be assessed on regular bases. Such automatic evaluation system may be developed as a stochastic model which highlight anything out of its accepted range or scope.
- Random sample evaluation. The idea is that a dedicated person or a team takes a random sample and verifies whether accountancy has been performed correctly. Based on error rate the results can be derived whether the error rate is significant or not and whether any action is needed or not. This task can be performed either by an accountant or by internal audit.
- Artificial intelligence and neural networks. Such system is under development. However, there is a potential for such system. It would be welcome if the legislation outrun the development of such systems and set up direction, rules, boundaries, and standards. As neural networks and AI in general tend to pretend better and faster than a human, it has strong potential to make accountancy more accurate with less error rate. Implementation of such system might get certified and standardized to assure users of financial statements. When company's accountancy is being verified by AI and therefore might be considered as fair presentation of financial statements.

Verification of process performance is not only welcome, but mandatory to ensure performance of autonomous accountancy in legal and accurate way. Even the verification is performed by independent system, the question is what role human hold shall. Currently this question exceeds accounting industry and shall be answered in general for all industries.

## 4 Management strategies and some non-operational risks

Management strategies are getting widely implemented across companies in any business field (Trakulsunti, et al., 2021). So do policies (Kerschberg, 2011). Automatic accounting implementation in a company shall not only comply with management strategy, but accounting automation might be a result of such strategy. Therefore, when disclosing automation of accounting one must have a broad picture of the company's operations and industry. In the other words, accountancy is not a remote island within a company, it is its integral neural part which must work all together. Corporations have implemented ERP systems of which accountancy is only a part (Král, a další, 2012). ERP systems are crucial for automation of accounting as many transactions which shall be recorded in accountancy are made by automated or semi-automated processes (Teplická, 2008) within a company. For example, an automatic machine produce products. Machine automatically counts numbers of produced products and records it into accountancy – no human is needed. In such cases Risk management of automatic accounting must cover wider area then just accounting itself; it has to cover also company's

operations which results to automatic accounting. For example, when a company applies Six sigma (Kiran, 2017) or lean management (Krafcik, 1988) strategy, there has to be assurance that lean management strategy (Scheller, Sousa-Zomer, & Cauchick-Miguel, 2021) would not negatively affect accounting by cutting out necessary information flow or records. For taxation purpose a tax payer must be able to provide evidence of transactions, therefore in accountancy broader records are better. Implementation of automatic accounting regarding to management strategy shall be consulted with experienced accountant so ensure not only figures are recorded, but also formal requirements are met. Management strategies are proven over the years and therefore implementation of automatic accounting shall take this advantage by taking benefit from process experiences gained in other fields.

### 4.1 Cyber security risks

Use of computers for processing accountancy is here for more than 30 years now. Till now computers were used by humans who made sure data are correct, while computer processed the data. Automation of accounting means, that computer will make sure data are correct. Stored data are crown jewels of a company and therefore company has to manage risks of not only processing data but also storing data. There must be distinguished between managing internal cyber risks and external risks. Internal risks are included in management of operational risks and include risk such as: hardware failure, software failure, electricity failure, unintentional data loss, human error, etc. External cyber risks cannot be included as operational risks as they are intentional attacks on the company and in most of the cases they might be classified as crimes. When managing operational cyber risks, company may use Risk management assessment.

Automatic information exchange is made through internet. When managing risk company must include also cyber risk such as:

- Hidden software errors, which might be used as security threats. Most of the companies use licensed software available on the market. Companies rely on software supplier, but in case of a problem, software supplier may not guarantee data recovery. Or data recovery may not be available on time what may disable company's operation.
- Malware, ransomware, viruses, and similar attacks.
- Human error while working on connected computer. Humans may act careless, ingenuous, or clumsy. Humans tend to facilitate threats and circumvent given processes to facilitate their duties.
- Unauthorized data access. Accounting data contain company trade secrets including sensitive data of its operations and personal data. There is still temptation to misuse such data. There must be a process not only logging data access, but also process of evaluation of such logging to prevent unwanted or suspicious behavior of employees.

The easiest way to mitigate cyber risk is regular data backup made on separate storage not connected to internet. In case of an error or a failure, there is always a hard copy which can be restored. Restoration of data is not careless, therefore there is strong need to continuously assess cyber processes and to educate employees. Another way is making sure all software are updated, computers are shaped of unnecessary software such as games, internet behavior is monitored, such as visiting undesired websites on company's computers. Cyber risk rises also by accessing company data from the outside networks, such as working from home through internet. Trend of home office work is getting spread more than any time before due to Coronavirus outreach.

### 4.2 Legal risk

As mentioned before, legislation nor standards do not reflect to the trend of accounting automation. Like in autonomous cars, responsibility for driving rely on a driver who actively do no drive, also responsibility for autonomously processed accounting rely on human who is responsible for accounting, even human do not actively account. If there is not such person dedicated in a company CEO or official head representative takes responsibility.

When managing risk of automation, company must consider and access also legal risk as legislation is based on human accountant and not on autonomous computer accountants. Examples of legal risks could be, for example:

- Fulfilment of formal requirements such as signatures, approvals, formalities for tax-acceptance autonomously, not by a human,
- Legal responsibility of software supplier in case of software failure,
- Responsibility insurance coverage for autonomous operations,
- Intellectual property. Autonomously performed accountancy creates outputs. Intellectual property of such autonomously created outputs needs to be legally covered.
- Evidence in case of court hearings. It is questionable whether autonomously performed accounting, logging and service outputs could be accepted as evidence in a court hearing.
- Errors and failures in performance of autonomous accounting may be considered by a regulator as performing accountancy not according to the law. For example, in Slovakia such delict can be penalized up to 2% of assets value.

In case of a human failure or a human error, company may claim loss from a human employee, based on labor law or union agreement. There is nothing like AI labor law or AI union agreement. One of the solutions to mitigate such risk shall be provision creation, at least for the period of implementation of autonomous accounting. Evaluation of autonomous solution and decrease of error rate of autonomous solution might be a reason to decrease provisions.

## 5 Conclusion

Automation of accounting is the trend of accounting for the near future. Unfortunately, legislation and standards do not reflect to this trend and do not lead the trend development. Instead of, companies and market develop own solutions which have to also cover some outdated and unjustified legal requirements, for example signatures on accounting documents. Automation of accounting rises several questions and issues which must be solved, for example responsibility for performance of automatic accounting. Helping hand could be implementing Risk management into automatically performed accounting. When set up correctly, automatically performed accounting may provide less error rate and better assurance of a company results shown in financial statements. Currently used management strategies, such as lean management or six-sigma management may be also implemented to the field of accountancy within a company all together within company's ERP system. When implementing automatic accounting, a company may still consider other legal requirements, such as tax laws as those still strongly influence accounting not only in Slovakia.

Automation as an unstoppable trend which must be considered, and company's activities must be adjusted accordingly. Further research is needed to fully cover the topic.

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