

## **Impacts of Blockchain on the audit profession**

The Blockchain disruptive effect is widely recognized in the financial sector while the level of awareness in other sectors and their professions is still in its infancy. Elimination of intermediary activities (desintermediation) or transformation of these activities are expected to occur in all sectors of the economy<sup>1-3</sup>. This is particularly well illustrated in the audit field. The potential impact of the technology on audit practice and on the overall profession should be analyzed to help auditors to reflect on the change to come and acquire the proper skills in order to prepare for those changes.

### **Introduction**

Some people claim that Blockchain is a hot topic that is going to fade while others see it as a revolution comparable to Internet. New articles appear daily in the press or on social media explaining the disruptive effects that Blockchain will have on business models and the overall economy. Transparency, security, immutability and traceability are all features of Blockchain whose main applications are in the financial field with Bitcoin and Ether cryptocurrencies being the best known. Other applications are currently developing in other areas such as insurance, international trade, health and government services.

In today's debate about the disruptive effect of Blockchain technology, audit and control professions are not in the spotlight; however, some specialists anticipate profound changes in their profession. Changes that could be as significant as the changes that retail and travel professionals have experienced with internet<sup>4</sup>.

### **What is Blockchain?**

Blockchain technology is a distributed transactional database, a kind of general ledger or registry, in which transactions and details of these transactions (date, place, amount, anonymized participants and their encrypted signatures) are recorded and verified through consensus algorithms<sup>5</sup>. Each completed transaction is encrypted, the involved participants are identified by a string of characters, and after a certain amount of time, the transaction becomes part of the block. The block is then distributed to all parties associated with this network or chain hence the term Blockchain<sup>6</sup>. Once a transaction is recorded on Blockchain, it cannot be changed or even canceled, which makes this technology both accurate and secure. From an audit point of view, it provides a reliable audit trail where the authenticity and validity of transactions can be verified.

Unlike traditional databases, Blockchain also allows for the immutable encoding of rules and procedures related to specific transactions to standardize activities. This is for example the case of smart contracts. Those are stand-alone programs that, once started, automatically execute pre-defined conditions encoded within the Blockchain. They work just like any conditional statement of the "if - then" type (if such a condition is satisfied, then such a consequence runs)<sup>7</sup>. With smart contracts, for example, it is possible to create an automated and transparent insurance system that compensates insured passengers after the cancellation of their flight. No form or human intervention is needed to process those transactions.

Thus, Blockchain offers features - autonomy, decentralization, security and transparency – which are usually provided by "trusted third parties" such as notaries, financial intermediaries

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in international trade transactions, or auditors. Ultimately, the use of Blockchain could simplify the work of these trusted third parties, or even replace them. This phenomenon is known as disintermediation and is accompanied by cost savings and significant changes in the professions concerned. For example, using Blockchain in auditing would facilitate access to customer data, increase the efficiency and effectiveness of an audit and thus reduce its duration, complexity and cost. It is not surprising then to imagine a commoditization of financial audit, which is often perceived as a control dictated by law with no added value.

It is in this context that a team of researchers from the Geneva School of Business Administration (HEG Geneva) obtained in 2016 from the network of expertise of the University of Applied Sciences Western Switzerland (HES-SO) a research and impulse fund (RCSO) to conduct a study in Switzerland on the potential impacts of Blockchain on the audit profession. The research team interviewed 34 financial and IT auditors working in firms of different sizes (from small firms to Big Four international firms) with levels of responsibility ranging from Manager to Partner.

Table 1 below presents the categorization of interviewees.

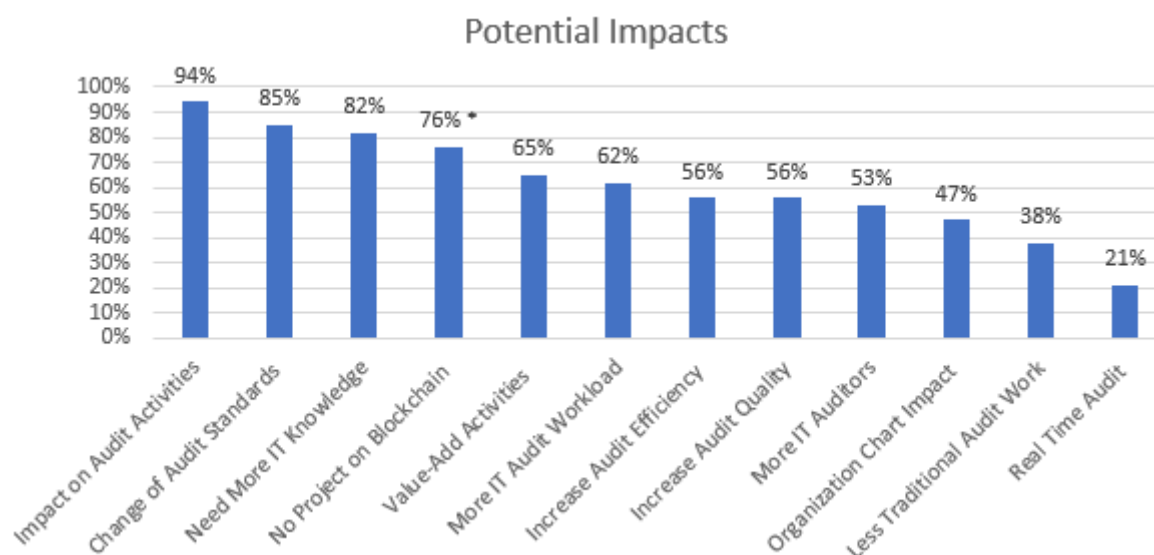
Specialists / categorization	% of interviewees
Partner	38
Non Partner (manager and senior manager)	62
IT (Audit, security)	25
Financial Audit	65
Advisory / Risk	9
Accounting Standards Specialist	1
Big 4 *	35
Non Big 4	65

\* Deloitte, Ernst and Young, KPMG, PricewaterhouseCoopers

Tab 1 – Categorization of interviewees

Findings show that 94% of the interviewees, regardless of their function (IT or financial) and their level of responsibility anticipate changes in their job and profession.

The histogram below (Graph 1) shows the potential impacts that were identified by the interviewees and presented in this article.



Graph 1 – Potential Impacts of Blockchain on auditing profession

### 1 - From Financial Audit to Blockchain Audit via information systems

62% of interviewees believe that the audit profession will be more and more IT oriented. They anticipate that the main objective of a financial audit will no longer be to ensure the regularity and sincerity of a company's financial statements, but rather to review the information system and in particular to ensure that the Blockchain technology is properly set up and deployed. Indeed, as controls can be encoded into the technology and automated, and as transactions' existence, accuracy and completeness can be guaranteed by the technology itself, some of the interviewees go even further and make the assumption that auditors' role will be to check the code, parameters and settings of Blockchain. As such, auditors would primarily be "IT engineer auditors" whose function will be to certify the Blockchain instead of being, as it is the case today, financial auditors whose role is to certify the financial statements of their clients.

### 2 - A growing need for technological skills

Unprecedented organizational and informational complexity are foreseen in the future, with corporate and business reporting evolving rapidly<sup>8</sup>, as well as increasingly more sophisticated technologies in use<sup>9, 10</sup>.

When the IT environment is not complex and even if financial auditors are not IT experts and are not trained in auditing information systems, they perform themselves IT audit work by following a predetermined audit program<sup>9</sup>, as explained by the interviewees. However, Blockchain technology with its two main technical features, asymmetric cryptography and distributed systems is a perfect example of a sophisticated technology. As a result, it is not well understood by most financial auditors and even by many IT auditors, as demonstrated by the answers obtained during our interviews. None of them has had any practical experience with Blockchain and none of them knows how to audit such technology. They point out that there is

currently no Blockchain specific auditing standard and report a lack of personal experience with this technology, suggesting the need for audit firms to incorporate new skills. It is in this context that 82% of audit respondents believe that financial auditors and IT auditors in practice or in training need more in-depth technical and technological knowledge. 53% of the interviewees even anticipate that to fully benefit from the advantages of new technologies and meet the needs of their clients, audit firms will have to hire more IT auditors as well as new profiles such as analytical specialists, data scientists, or even statisticians. This trend, if it is confirmed, will have two major impacts, first on the training of the auditors, and then on the configuration and organization of the audit teams.

Indeed, today the courses that are offered to candidates who want to become CPAs are either related to accounting, financial analysis and tax, or to IT audit. However, if the role of the auditors shift from auditing the financial data to auditing Blockchain and to certifying that it is correctly implemented, they will have to be able to understand the two main functions of Blockchain (cryptography asymmetric and distributed system). They will have not only to broaden their technical skills to master computer coding, hashing, and cryptography but also to keep working on their soft skills such as communication. Indeed, let's take an example, if smart contracts that automatically execute predefined conditions in Blockchain are used by the auditees, auditors will first need to understand the underlying code and then be able to communicate clearly with lawyers to ensure that these contracts are legally valid. Moreover, as audit firms, especially large and medium-sized ones, use more and more intensively computer-based tools capable of processing and analyzing large volumes of data, they will have to recruit data scientists or train their auditors to properly analyze and interpret the data to meet auditing requirements. Therefore, it seems essential to review education programs to meet evolving needs.

In addition, the configuration of the audit teams will change. In the future, teams will be composed of an auditor in charge of the audit with solid accounting and financial knowledge but also computer skills, and who will work closely with IT auditors as well as with other kinds of specialists (accounting, tax, data visualization, blockchain, big data...). Yet, scientific literature shows that the value of the IT auditor role in the audit is often poorly communicated and indirect<sup>9, 11</sup> and, in practice, the level of engagement between auditors and IS auditors is low<sup>12</sup> whereas IT environments become more sophisticated<sup>13</sup> and more complex. Would audit firms hire people with a wider range of skills, including more IT auditors, then the composition of audit teams will change. According to research conducted in the audit field, it seems important that the functioning of the teams evolves towards a greater interaction, a better integration of IT audit work and a smoother communication between financial and IT auditors on the one hand, and other specialists on the other hand to ensure that audits are as efficient, effective and of higher quality as the use of new technology seems to imply.

### **3 - Productivity and quality gains ...**

Thanks to its characteristics the use of Blockchain will make it possible to automate audit tests or at least facilitate them, thus reducing the duration of audits. For now, auditors are confirming the accuracy of their clients' data by reconciling the different sources of these data. The implementation of Blockchain will make these reconciliations no longer necessary since all transactions will be recorded on this single transactional distributed database. Let's take another example. Banks' balances, customers' balances, suppliers' balances, will no longer need to be confirmed since the auditor, and possibly even the regulator, will have access to auditees' data and data of other participants to the Blockchain in real time. Traceability and continuous monitoring can therefore be guaranteed. As a result, some audit-related tasks that are time-consuming, discontinuous and that do not require any specific technical expertise will

disappear, generating productivity gains. As such, 65% of interviewees think that they will be able to devote more time to value-added activities such as complex fair value analyses or risk analyses for which they will need to use their professional judgment, experience, expertise and particular knowledge (of an industry for example). Auditors will thus be able to provide better insights to their audit clients and even become their strategic business partners.

In addition, the use of other technologies such as data mining and data visualization allows auditors to analyze all of their customers' data instead of performing sample-based tests, which increases the level of assurance achieved and thereby improves the quality of the audit. This will be reinforced by the use of Blockchain as auditors will have access to their customers' data in real time. Auditors' checks and reviews can therefore be done on a continuous basis using authenticated, traceable and immutable information. Real time audit has the potential to enable auditors to be more effective, proactive, adaptive and forward-looking<sup>14</sup>, meeting the expectations of investors and other stakeholders who would like for the auditors to go beyond the "pass / fail" evaluation of the traditional financial audit report and make more meaningful recommendations<sup>15</sup> and more sophisticated analyses. To date, auditing is a past-oriented activity that is intended to provide reasonable assurance that "the audited entity's financial statements have been prepared in all material respects in accordance with a set of applicable accounting standards"<sup>16</sup> in order to issue an audit opinion<sup>16</sup> for a specified period of time. Through the use of Blockchain and data analysis, auditors will be able to make new types of forward-looking analysis. Audit clients could then expect from their CPAs recommendations and strategic advices that are currently not authorized by the US-based Public Accounting Accounting Oversight Board (PCAOB) and limited by other national bodies such as Expert Suisse in Switzerland. This situation could represent an ethical challenge for the profession, perhaps involving a complete redefinition of the role and the profession of auditors.

#### **4 - ... that will impact the organizational structure of audit firms**

As explained above, some tests and tasks that do not require specific technical skills and that are today performed by junior auditors will disappear in favor of analyses that require expertise and experience. Audit firms will therefore need more experienced professionals instead of juniors. The very pyramidal organizational structure of those entities where there are fewer and fewer employees climbing up the hierarchy (junior, senior, manager, senior manager, partner) will be strongly impacted. Young accountants and other young graduates currently start their careers as external auditors to gain exposure to a wide range of clients in terms of business sectors or company size. They continue their training in the field under the coaching of more experienced auditors. Then, after a few years, they often leave the audit sector to take on new roles in the industry. However, it seems that this model is likely to diminish or even be reversed if instead of recruiting juniors accounting firms recruit more experienced profiles. In the future, young graduates will first work in the industry to develop some expertise and then join an audit firm. This change in trend will encourage these firms to review their human resources policy marked by a high turn-over.

#### **5 - More adequate audit standards**

It is important to note that 85% of audit respondents believe that auditing standards must evolve at two levels to better take into account new technologies, especially Blockchain technology. First, more and more audit firms are using big data-based IT tools, which allows them to analyze all transactions and all accounting records of a company instead of sample-based tests as recommended by current audit standards. As a result, when audit firms use their

capacity of analyzing large volumes of data instead of doing sample-based tests, they get a higher level of assurance on the financial data (and not on the quality of the internal control system), but they do not meet the requirements of current auditing standards. Audit companies therefore end up in a paradoxical situation where compliance with the auditing standard in place reduces the level of assurance that could be achieved through the full use of technology.

Second, to date, no audit standard describes how to conduct an audit of Blockchain. The extent and rate at which international rules are changing relative to the growth of Blockchain usage and other technologies such as data analysis and artificial intelligence remain unknown at this stage. We can only point out that the International Auditing and Assurance Standards Board (IAASB) initiated a working group called the Data Analytics Working Group (DAWG) to explore the growing use of technology in auditing, with a focus on data analytics. DAWG's Request for Comments to Audit Professionals highlights the need for the IAASB to reflect the digital era in the application guidance and recommends DAWG Members to consider other technologies such as Blockchain whose impact on auditing deserves further consideration<sup>17</sup>.

It is important to note that, to the best of our knowledge, the International Auditing Standards (IAS) do not remedy the lack of standards on new technologies, especially Blockchain. However, financial auditors already face the challenge of auditing companies active on Blockchain or companies that have set up Blockchain platforms to execute some of their business processes. This situation forces them to use their professional judgment when auditing standards are silent or inadequate.

## Conclusion

With the increasing use of new technologies, and in particular Blockchain, it is in the interest of audit firms to think about what the audit of tomorrow will look like. The deployment of Blockchain involves a paradigm shift of the audit profession at two levels. Firstly, the scope of the audit mission will shift from certifying the financial statements to testing the information systems and more particularly certifying the proper implementation of Blockchain.

As Andrea Toggwyler, Partner, EMEIA Financial Services Advisory, Ernst & Young Ltd, pointed out, certifying the Blockchain would allow us to stop performing any tests that seek to confirm the existence, completeness and accuracy of the transactions. However it is important to keep in mind that Blockchain would not replace the auditor's professional judgment.

Secondly, audit which has always been a "back-looking" activity, could if authorized by the law and regulations, become a "forward-looking" strategic analysis and consulting activity based on the study of large volumes of data.

Finally, audit firms have to identify whether their audit teams have the skills needed to deal with the potential changes in the profession. To date, the four largest international audit firms (Big Four) have already invested in technologies such as data analysis software and all of them have engaged Blockchain-related projects. However, it appears that smaller audit firms have not begun to adopt these new technologies. In fact, 76% of the auditors interviewed who are not part of a Big Four work for audit firms that have not started to investigate the subject. They are in a wait-and-see mode and hope that they will be able to catch up on any new developments when the time comes, which could be too late.

Research on the evaluation of the disruptive potential of the Blockchain on the auditing and control professions must continue. With this in mind, Nathalie Brender, professor at the Geneva School of Business Administration (HEG-Geneva) and Jean-Henry Morin, professor at the the University of Geneva, obtained a three-year funding from the Swiss National Research Fund in 2017. The main objective of this project is to design an experimental prototype in the form of a technical platform to demonstrate the results obtained and the potential impact on the profession.

## Endnotes

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