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The Automation on controls in Banking Services

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Abstract

The globalization, the increase on the complexity of banking transactions and services as well as the increase of fraudulent activities on the economy sector have sharpened the need for banks to be over attentive on their intern control systems, being them the main forces on economies they have to make sure that they are sustaining an healthy economic environment.

Banks are forced to reinforce their internal control systems, which has become a legal obligation, since new banking laws were launched, new strategies were developed to keep the good management and to confirm that they are complying with every legal aspect as well as assuring the bank "good behaviour" and conduct with their clients and financial markets. So, being the internal controls something mandatory and with several banking regulators checking on it very often, banks are investing on the automation of it.

This study explored how this issue is being approached by banks and how will be this issue addressed on the future, since the automation of this controls are becoming more and more usual given that it removes the "human error" factor from the equation and gives the chance for things to be done faster and automatically.

As such on this study we are going to understand the case of an European bank based in Portugal, but also to see how the controls of banking services are being automatized on general, and which are the benefits and disadvantages of that, as well as how automation of controls is being currently used.

Resumo

A globalização, e o aumento na complexidade de transações bancárias e serviços prestados pelos mesmos, assim como o aumento de atividades fraudulentas no setor económico, aumentaram a necessidade das entidades bancárias de redobrarem as atenções relativamente aos seus sistemas de controlo internos, sendo elas, a principal força na economia é necessário assegurar que se encontram a sustentar um ambiente económico saudável.

Os bancos são obrigados a reforçar os seus sistemas de controlo interno, tendo isso sido considerado uma obrigação legal desde que novas leis a nível bancário foram emitidas, foram então desenvolvidas pelos mesmos novas estratégias de forma a manter uma boa gestão e confirmar que se encontram em sintonia e a cumprir com todos os aspetos legais e a assegurar o “bom comportamento” e conduta com os seus clientes e mercados financeiros. Sendo os controlos internos obrigatórios e bastante controlado por parte dos reguladores bancários, as entidades bancárias encontram-se a investir na sua automação.

Vai ser explorado como é que este problema está a ser abordado neste momento e como poderá ser também abordado no futuro, dado que a automação destes controlos está a tornar-se cada vez mais usual, dado que remove o fator do “erro humano” da equação e dá a oportunidade de as tarefas serem realizadas mais rapidamente e automaticamente.

Neste estudo iremos também olhar mais aprofundadamente para alguns casos de instituições bancárias, em especial de uma entidade bancária europeia também com escritórios em Portugal, mas também observar como os controlos em serviços bancários estão a ser automatizados em geral, e quais as vantagens e desvantagens, assim como a automatização de controlos se encontra a ser utilizada.

Acknowledgments

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Thanks to all my colleagues from FEUP, who have supported me and had to put up with my stresses and moans for the past years of study!

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1 Introduction

1.1 Project background

The globalization, the increase on the complexity of banking transactions and services as well as the increase of fraudulent activities on the economy sector have sharpened the need for banks to be over attentive on their intern control systems, being them the main forces on economies they have to make sure that they are sustaining an healthy economic environment, banks are forced to reinforce their internal control systems, which has become a legal obligation since new banking laws were launched and develop strategies to keep the good management and to confirm that they are complying with every legal aspect as well as assuring the bank "good behaviour" and conduct with their clients and financial markets (Hayali et al., 2013; Holt & Treacy, 2022).

Internal controls on banking services have become one of the main pillars for a good management, increasing the levels of efficiency and effectiveness on a company, Internal controls is a wide term that covers all range of services that banks provide.

Internal controls cover legal issues, policies, systems and procedures that banks are obligated to follow and comply, until simple conversations between employees via work internal communications that such big companies are constantly surveillant to make sure they are conducting themselves at a high level and following all bank internal rules (Federal Reserve Bank of Minneapolis, 2012).

Internal controls will cover all management systems so that the business of the banks may carry on efficiently, productively, professionally, and legally by having a series of internal controls that will be checked and used to produce reports so that problems that may appear can be immediately noticed and corrected. Although we are talking about the banking services, the controls can affect several levels of business, being them financial or non-financial, automated, or manual.

Having a good internal control is fundamental for a bank to have an efficient service, a well-designed network of operational and financial internal controls will help the enterprise to protect their resources, allowing to produce financial reports, reduce the odds regarding of significant errors and irregularities that may appear undetected, help on the detection of relevant and non-relevant errors and frauds, as well as make sure that the firm is complying with all regulations demanded either by law or internally (Office of the Comptroller of the Currency, 2001).

Following the "Internal Control Comptroller's Hand Book January 2001" if bankers and examiners in general follow an effective internal control it will give them higher assurances that human error and issues that may harm the bank are being reduced, which in banking world, the goals would be to have the following:

- Bank operations are efficient and effective.
- Recorded transactions are accurate.
- Financial reporting is reliable and accurate.

- Risk management systems are effective and with promptly reactions.
- Bank complies with banking laws and regulations as well as with their internal policies, and internal procedures (Office of the Comptroller of the Currency, 2001).

A good system of internal controls helps the firm to accomplish its own goals more effectively and there is the need to have internal control systems in the organizations, especially banks, even though they can be seen as unstable due to the macroeconomic instability this should reinforce the idea of controls so that they can detect and prevent the best way possible corruption and frauds (Central Bank of Ireland, 2022).

On this dissertation we are going to have a look on the internal controls that banking services are currently performing and explore more deeply an international bank that is also based on Portugal specific case but also to look at Bison Bank compliance department.

1.2 Problem description

Internal controls on banking services would include:

- Internal routine check-ups.
- Internal audits.
- Variety of devices of control.

Even though we are going to focus more on some routine check-ups than internal audits, since that's where the team where this dissertation took place is included, we must tell the difference between them:

Internal routine check-ups: These controls will cover systems, policies, procedures and processes affected by the board of directors, management and other personnel to safeguard the bank assets, limit or control risks, and achieve their objectives (Federal Deposit Insurance Corporation, 2022).

Internal audit: This one will cover the provision of an objective, independent review of bank activities, internal controls, and management information systems to help the board and management monitor and evaluate internal control adequacy and effectiveness (Federal Deposit Insurance Corporation, 2022).

Since this study is going to focus on explore the possibilities of automation and it's benefits it's necessary to understand this context of internal controls to understand better how is this issue being approached right now and how can this issue be addressed in the future, since the automation of this controls became more and more usual given that it removes the "human error" factor from the equation and gives the chance for things to be done faster and automatically. This project has the purpose to study how these controls affect the business and the companies, and how can they be improved since they are becoming more and more automated.

1.3 Research questions

This dissertation has a few research questions that will be the goal to see answered on the end of the project, being them either from an internal perspective regarding the automation and internal controls of the bank where the project is going to happen.

These issues will be answered through the following research questions:

- How are internal controls affecting the business and decreasing risks and human errors on banking services and why do we regulate banks?
- How are banks dealing with these internal controls, and are they prepared to automate them?
- What needs to be changed to fulfil the automation?
- Which are the main operational factors and main technologies used? What are the advantages and disadvantages on the automation of those controls.

1.4 Study and project development at Bank X

This study took place in an international bank that will be referred to as Bank X. Bank X is present in more than 50 countries and is in the top-10 of largest banks worldwide by total assets, having this said they are a huge firm that needs constant surveillance.

Being this dissertation developed on their premises, more precisely into a surveillance team responsible for the surveillance of front office Conduct, a team called FOCS US (Front Office Conduct & Surveillance) which is a team that acts as first level of defense regarding the Operational Management.

FOCS is responsible for the surveillance of every employee of global markets on Americas to make sure they are acting accordingly on their top performance and the primary means to achieve this will be through the surveillance of trading and communications, which mostly nowadays is being made automated.

Their goals are to ensure compliance by front office staff for each specific business line through their procedures and guidelines, to develop intelligent product specific alerts and automate the maximum tasks as possible and make better use of data and analytics to produce intelligent alerts that provide an holistic view of risks

The team is composed of only 2 employees, yet they produce more than 100 reports per month, which is the proof that automation is critical in this team, otherwise it wouldn't be possible to produce as many reports, or it would be needed for the team to grow substantially. The number of reports that this team produces is only possible due to their ability to automate processes and the use of tools like Python, Power BI, SharePoint, Excel and Microsoft Access.

The team is constantly trying to automate more and more tasks so that it can be possible to absorb and develop new controls, giving to the bank more trust into the data obtained since the human error is disregarded, even though the automations processes need to be watched, because sometimes changing a simple column into one data source can ruin the full report, and even in terms of time and costs to the bank.

Being the controls a very sensitive topic on banking services, due to confidential information regarding client's private information, and even some market sensitive data, that can't be disclosed to public and needs to follow regulations defined due to banker's duty of secrecy being it the duty that a bank has to not disclosure to any unauthorized third party, information received while handling a client's account, which turns out to be control itself, this project had to be very careful regarding this (Tan, 2007)

An example of that are the interviews that were made which couldn't be taped.

On this dissertation we are going to take a look on the internal controls that the banking services are currently performing, and explore more deeply an international bank that is also based in Portugal specific case but also to look at Bison Bank compliance department, from where we can find several teams with this objective on the banks studied, on the company were we developed this research we could find 4 teams with the purpose to develop and execute different controls on the bank that where the following:

- FOCS (Front Office Conduct & Surveillance), where the main focus of this team is to assure that all employees in the bank are conducting at their highest level and behaving correctly on all their activities, having as main activities:
    - Daily monitoring of front office activity to ensure that all relevant rules, regulations, group policies and procedures are adequately followed. The scope of FOCS monitoring encompasses e-communications, voice calls and trades.
    - Investigation of alerts, clearing of false positives and timely processing of true positives for further analysis.
    - Escalation of potential breaches according to severity to the relevant management level and/or to Compliance (acting as 2nd line of defense (2LOD)).
    - Close coordination with compliance for the performance of calibration (BLT) and quality assurance (QA) reviews and permanent challenge.
    - Precise and accurate documentation of the investigation results and record in the case management tool for audit purposes; close coordination with internal or external audit teams in the context of reviews of the activity.
    - Provide expertise to business owners and 2LOD when required; provide support to business owners to ensure that managers have visibility on all relevant signals in relation to the conduct and control behaviour of their team members.
    - Periodic review of controls (logic & calibration) with the aim to continuously improve and adapt the set-up to activities and market environment.
    - Design, test and deploy new controls to address emerging risks.
    - Work in close collaboration with IT to design, test and deploy new surveillance tools and benefit from the addition of new technologies to improve the efficiency of the control framework.
    - Production of performance metrics and KPIs to continuously monitor the efficiency of the surveillance framework and produce activity reports to Senior management.
    - Documentation: assist with the drafting or periodic review of the policies and procedures.
    - Front office trainings: raise front office awareness on conduct risks, permanent control and policies through dedicated business-oriented training sessions.
- FOC (Front Office Controls), where their main activities are:
    - Perform the daily reconciliation of securities accounts.
    - Investigate and allocate the breaks in the reconciliation tool to the respective departments.

- Ensure that the breaks are reported to the respective departments; perform the manual matching agreed/requested by internal client, ensuring that the write-off tolerance is respected; and prioritize the work and conduct investigation with due diligence on all the discrepancies
- Evaluate and update documented procedures to ensure they are complete and accurate
- Understand and get trained in all the tasks/activities related to the process; ensure the knowledge transfer between the team on a periodic basis; and participate on brain storming /cross knowledge sessions and share the best practices and ideas with the team members
- Interact with all needed internal and/or external entities to get additional information for unidentified entries; and maintain communication channels with internal business teams
- Escalate unresolved open items to the team leader; understand the risks inherent to the daily activity and the existing control framework to mitigate the risks identified; and take corrective measures/actions along with the team leader
- Seek for a constant automatization of the processes, to ensure that the auto-matching rate for all sites is maintained at a consistent level; while identifying exceptions and out of balance situations, liaising with internal departments to reach resolution in a timely manner

- OPC (Operations and Controls), having the following main activities:
    - Performing risk self-assessment.
    - Analysis of processes / organization (for instance, segregation of duties);
    - Risks and controls mapping.
    - Description and quantification of potential incident (PI);
    - Contribution to the setting up of corrective actions and formalization of the control plan.
    - Monitoring and analysis of historical incidents (HI) and related control plans.
    - Supervision and quality review: analysis of the incident, action plans and follow-up of the implementation.
    - Management reporting.
    - Back-testing IP/IH and validation of allocation keys used in all PI impacting CTTS & CCFA capital computation.
    - Permanent control.
    - Participation to the definition and implementation of control plans.
    - "Procedures Correspondent": follow up of the procedures updating process monitored by the relevant managers on a regular basis or when required.
    - Audit and regulatory recommendation follow-up.
    - Operational risk and permanent control awareness-raising actions.

    - Conducting of awareness, risk sensitization & knowledge sharing sessions on risks and controls.
    - Building and maintenance of the best practice, guidelines, policies, and related material.
    - Performing of preliminary risk assessment of the operational risk incurred by the new activity.
    - Ensure adherence to the applicable policies and procedures.
    - Co-ordination and secretariat of business lines internal control committees.
    - Definition of a common action plan.
- IG (Inspection Générale), having the following main activities:
    - Auditors and inspectors cover all the group's activities and geographies to ensure compliance with regulations.
    - Give the group the assurance on the degree of control of its operations.
    - Do recommendations following the audit missions to help to strengthen the effectiveness of its risk control systems and thus achieve its objectives.

It's important to highlight that these are transversal teams that despite being independent organizational units are constantly working together to ensure compliance.

After analysing the controls performed on a specific team (FOCS), and how they are affecting the company and their business, this report had a look into how they are made, since most of them are beginning to be automated by the reasons that it will exclude the human error and increase the productivity, further we are going to see if that is so, other possible advantages and disadvantages of the automation on such controls, and what is the opinion of directly involved people in this matter.

1.5 Report outline

Having the main topics of the dissertation been introduced, it will be structured as followed:

- Chapter 1 – Introduction – This present topic where the subject is being introduced.
- Chapter 2 - Literature review - Where it's showed the theoretical contribution that helped solving the problem under study.
- Chapter 3 - Methodology – The Methodology is where the methods and the approaches of this projects are described.
- Chapter 4 -Results – This phase is where we can find the real situations, and problems solved on this project.
- Chapter 5 – Conclusion – Final thoughts and observations regarding this study.

2 Literature review

2.1 Internal controls on banking services

When a bank fails, it can create problems for the wider economy. For that reason, it is very important to keep the surveillance on their process, not only the ones obligated by law, but also some own regulations and internal controls to ensure safety to their clients (Bank of England, 2019).

The law regulations can differ from country to country so, banks usually do a certain kind of homogenization so that their working processes are fitting every place where they are based.

Official central banks exist since 1668, but the true is that the idea of banks comes way over before that, people always trusted banks because their economy used to be sufficiently strong to get through frauds, corruption and inconsistencies that may happen (Bordo, 2007).

Being the world's economics so fragile, bank regulators started to need to have some more criteria do trust banks.

After so many crises that changed the world like for example in 2008 when Lehman's Brothers went bankrupt on September 15th, banks started to improve some Procedures and Processes to ensure their own safety but also the world's economy safety (History.com Editors, 2018).

Let's see the example of Bison Bank where they have their compliance department, that is characterized for being an independent, permanent and consultative function that have's the mission to promote and force compliance with legal, regulatory, operational, ethical, and conduct obligations and duties, that can be at any moment applicable to credit institutions and their corporate bodies and employees by competent regulatory entities and legal regulations to which Banks are subject (Bison Bank, 2022).

In Bison Bank this function is performed by Compliance Department (COD), being this department an autonomous organic unit, which compared to Bank X would be the equivalent to Inspection Générale, that reports hierarchically to executive committee through its executive director, but they also maintain a permanent communication line with the supervisory board and risk and compliance committee to ensure an adequate compliance function activity.

COD always operates independently from the board of directors and other organic units, having access to all information they might need to perform their duties, again, as Inspection Générale at Bank X (Bison Bank, 2022).

To ensure an adequate compliance function activity, COD department at Bison Bank as the following internal Procedures:

- Prevention, detection, and reporting of financial crimes.
- Coordination of the bank's internal control system.
- Conflict of interest and related parties management.
- Compliance with the code of conduct.
- Analysis of new legislation and regulations, assessment of its impacts and promotion of compliance.

- Analysis of situations and signs of violation or risk of non-compliance with legal obligations.
- Complaints management and handling.
- Compliance with the general data protection regulation.
- Responsible for the compliance of the norms.

Nowadays, bank managers have on their side control systems that can help them to make decisions, measure performance, evaluate processes and limit risks, besides being something that in the past wasn't so clear to everyone, after Lehman's Brothers went bankrupt, it flagged those issues, and right now we have the technology to support this control systems.

The use of technology to support control systems will always be supported by senior management in banks because a good internal control can help a bank achieve its objectives and mitigate risks, avoiding surprises that can harm the company, while at the same time they are giving the possibility to reduce the headcount of employees on those areas.

This control systems, if working effectively, can detect human error's caused by personal mistakes, distraction, carelessness, fatigue, errors in judgment, or unclear instructions and this is single on a point of view where we are not considering fraud or deliberate noncompliance with policies, because on those cases this control systems is essential to keep a company well seen at the clients eyes avoiding scandals and situations that could result in an crisis.

The automation of those systems doesn't mean that there is not the need to have humans, because human beings still must execute most control systems, which on one side guarantees that there is still an human presence to control the controls, but on other side, having an human means that an human error is still possible, through distraction, careless, tiredness or confusion, but overall the systems will be a lot more secured following this procedure (Office of the Comptroller of the Currency, 2001).

And that's why internal controls must be well understood by all personnel and staff on a bank, and applied every day on their BAU's (business as usual), the main ideas of the controls will certainly be to limit accesses, limit authorizations, safeguard access to records and bank assets, decentralization of responsibilities, ensure regular and as well as unscheduled reviews to make sure that all protocols are being followed with the maximum care by all employees.

On for example, BNP Paribas similarly to Bank X, there is an organizational unit also called IG(Inspection Générale) that has the job to anytime request proof that a certain control has been made (BNP Paribas, 2018).

A proof of that banks are investing on IT defenses not also on controls and compliance is that in 2020 BNP Paribas invested in a IBM Cloud to improve security on their financial services framework, which indicates that IT companies and banks are working closely due to new technologic dangers (Faridi, 2020).

This are not only good things, because increasing the gains, it will also increase the risks that all banks have to manage, without a correct way to overcome these issues and poor management, this could lead to worldwide financial crisis (Caldwell & Proctor, 2009).

That's why risks must be very well analysed by the internal controls of a bank to make sure this doesn't happen because one of the main reasons of financial crises is due to banking failures which result in financial losses, is their high risks took, without the right internal control system which responsibility would be to control these risks and produce alerts (Hayali et al., 2013)

A lot of "research on the causes of bank failures mainly concluded that an efficient and effective internal control system might prevent financial cost" being this a sentence that says it all regarding the importance of these internal controls (Hayali et al., 2013)

2.2 Automation on controls

Even more a key focus for companies, regulators and shareholders are the internal controls as we were seeing, even more clients need to make sure that they are investing or buying a service from a company that is well regulated, not only externally, but also on their internal controls.

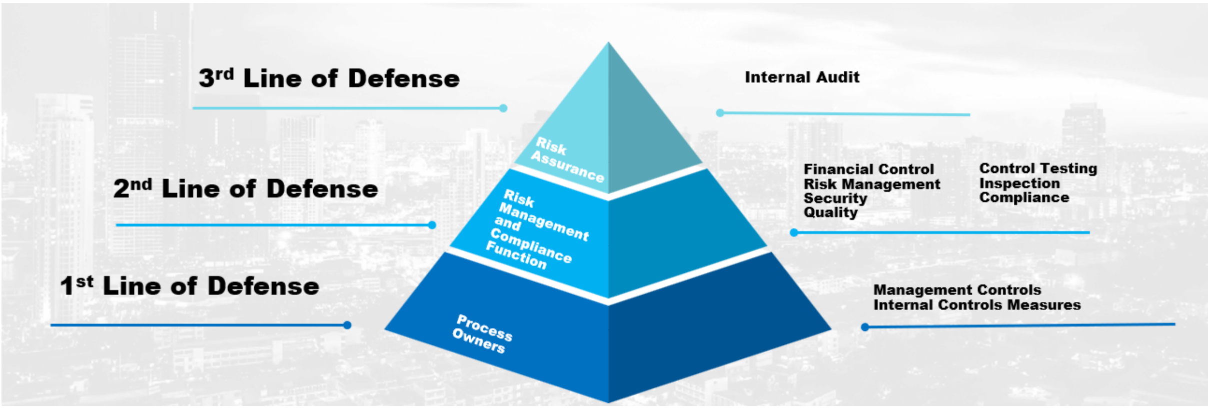

Image1: Lines of Defence on an Organization based on "The Future of IT Internal Controls – Automation: A Game Changer"(Seshadri & George, 2018)

For that reason, companies are investing a lot on compliance costs on their organizations and doing the controls through three lines of defense as we can see on Image1

- First line of defense: operational management;
- Second line of defense: risk management and compliance/controllership function;
- Third line of defense: internal audit.

The department FOCS, where the study will be more detailed, belongs to the first line of defense.

So having said this, it is important for companies to reduce costs and improve their controls quality, the way to do this it is the automation of these controls, by reducing costs on compliance departments because it will need less people to perform the controls by having them automated and increasing the quality of those check-ups.

This will include not only the controls itself, but also the monitoring of those controls, so that instead of having numerous departments on the same organization, this could all be more efficient and faster.

This theme has been broadly discussed between the corporate world and has lifted some questions as we can see on the following image that is based in a report of one of the biggest consultant companies of the world, Deloitte (Seshadri & George, 2018):

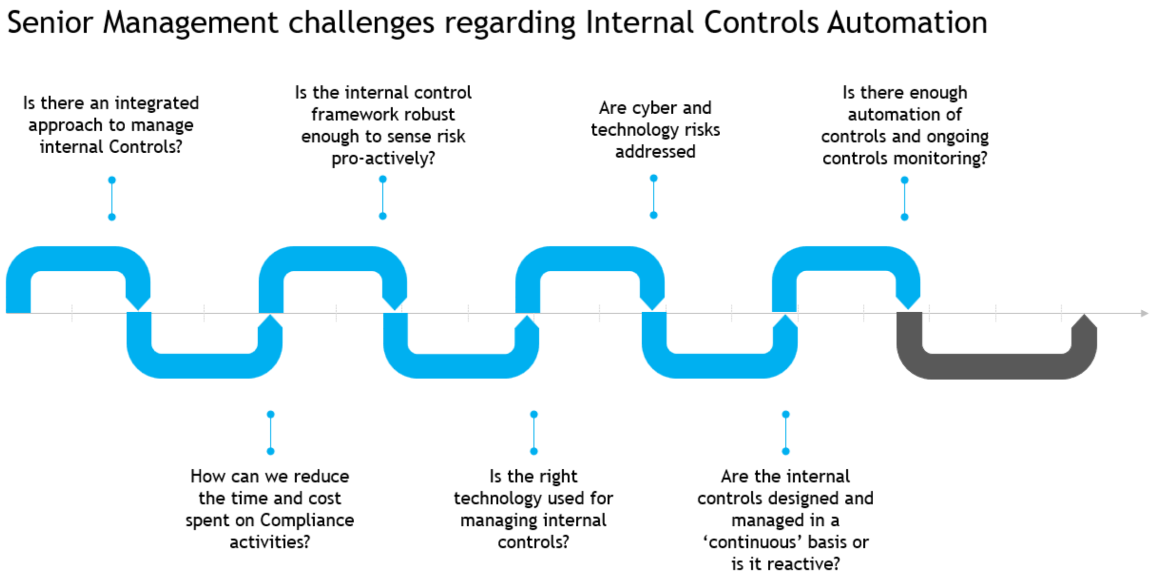

Image2: Senior Management challenges regarding Internal Controls Automation (Seshadri & George, 2018)

As we can see on Image2, senior management will have to face a path of challenges regarding internal controls automation:

- Check if on their current situation they already have an integrated approach to manage integrated controls, and if not, find a solution for it.
- Find the answer for the question: How can we reduce the time and cost spent on compliance activities?
- Check if the company already haves an internal framework robust enough to sense risk pro-actively or if it's needed actions on the framework.
- Verify the technology used for internal controls management, and see if it's the right one to be used.
- With IT, new risks will appear, check if all cyber and technology risks are addressed.
- Verify if the internal controls are designed and managed in a continuous basis or if it's reactive for the possible risk.
- And finally verify if there is enough automation on the current situation and adapt if not.

The future of controls will not be very distant from this future operation's model prediction from Delloite:

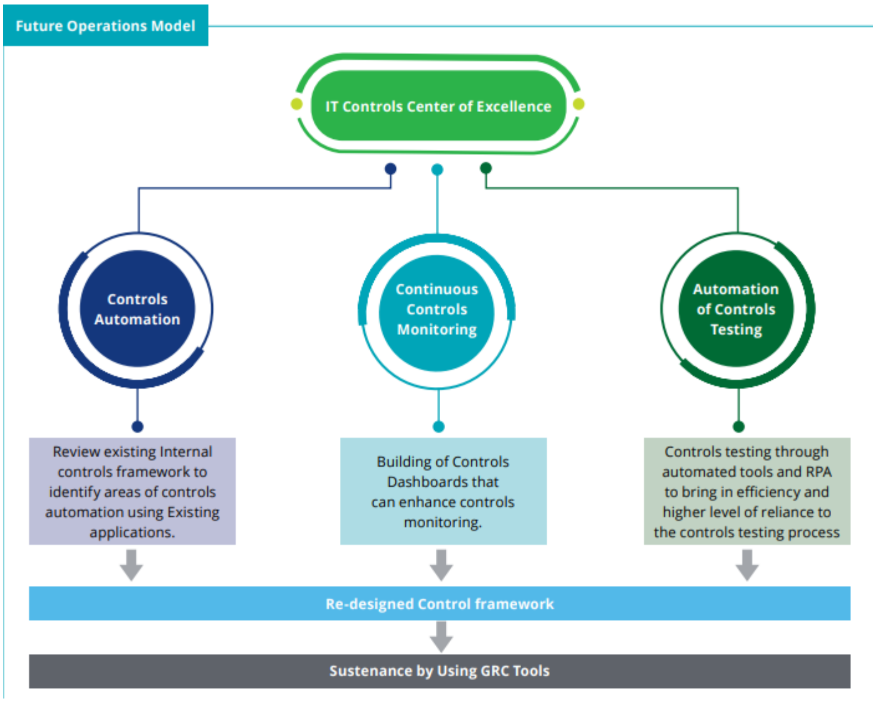

Image3: Future operations model retrieved from "The Future of IT Internal Controls – Automation: A Game Changer" (Seshadri & George, 2018)

Having this said, the future will pass by this, combining the need for banks to have very strict internal controls, and the enormous benefits that the automation of these controls will bring such as:

- The reduction of the operator's workload.
- With automated systems, operator's attentional resources can be allocated to other tasks executed concurrently.
- The reduction of the stress factor induced by the stakes of the situation.
- The reduction of the fatigue factor.
- Automated systems provide a certain level of stability in the execution of a task.
- Automated systems eliminate human errors. (Breton & Bosse, 2003)

Of course, that this approach as some disadvantages that the firm must weight on their balance to see if it is worth it to invest on this such as:

- Cost of investment on these automated IT tools.
- Reconciliations processes are needed to get together the needed data.
- For big companies like banks present in some countries, this is a long process.

3 Methodology

3.1 Comparative analysis of existing approaches and reasons for the choice of adopted approach

Being the objective of this research to show a practical overview of how things are currently happening on banking services firms and compare to what is our perspective towards the future on banking services on this topic, this will happen by following a case study methodology, that was developed on Bank X, and there will be a theoretical explanation and interpretation of them, following a comparison on what is already happening on other firms, as well as what can the future bring on this.

3.2 Method used in the project

The method used on the project will follow a case study methodology which is a type of qualitative search design used in a detailed study of a specific subject, in this case automation on banking services.

In the case study method, researchers pose a specific question about an individual or group to test their theories or hypothesis. This can be done by gathering data from interviews with key informants. So, it was considered most suitable having into account that most of data access and even the understanding about the practical issues couldn't be possible if there wasn't a real participation and contact with the key stakeholders of each project.

Being this report built not only with a theorical overview on the topics, but also with the understanding of the topic by participating into developing and automating controls in Bank X, which gave the possibility to reach and contact stakeholders to produce interviews.

Having this said the plan will be the following:

- General study of how the market is, how are other banks dealing with automation and external rules regarding internal controls.
- Once the market analysis is made, it was time to define some objectives to do as a project on Bank X and start with implementing automation of controls.
- Those implementations will be executed and their old and new KPI's will be measured.
- Classification of each control in types, regarding their data source.
- On the end there will be made an analysis of these implementations, and their advantages and disadvantages through qualitative data and interviews as well.
- Explore what can be possible on the future, what can be hard to achieve, and which will be the gains by achieving it.
- Schedule interviews with the main stakeholders of the projects developed to understand the importance of them on the workflow of the bank.
- Analysis obtained through the gained knowledge to understand how this can be improved, and what is the future of automation on internal controls in banking services.

3.3 Interviews

On this project it took place a total of 22 controls developed, which involved a total of 8 stakeholders, that were interviewed to understand how much the automation of controls helped them regarding the automation on controls that were already being made or even the controls that were implemented by scratch, and why they were important to the bank.

Due to confidentiality issues and data protection, the interviews couldn't be taped, and it won't be possible to disclosure them in total, but it will be presented on the results area some highlighted appointments will give an important overview on the internal stakeholder's side.

The script of the interviews can be found as Appendix A.

4 Results

4.1 Context

As said, this dissertation is taking place inside an international bank also based in Portugal, which increases the necessity of compliance with every internal and external regulations, so that the bank can secure that every employee is working accordingly with the bank's expectations, avoiding issues both at the image level for the bank, since being a bank one of the main aspects the bank must ensure is to provide trust for the client; and also at the operational level, so that there are not any problems among employees that could harm the operations.

Having this said and considering the enormous number of controls that an entity with this size should have, it's necessary to automate it so that costs can be reduced, and controls can be more reliable.

This is where this project takes place, developing new automated controls or automating the ones already existing through tools like Python, PowerBi, Excel and SharePoint.

4.2 External analysis

This research question was answered through step 1 of methodology: "General study of how the market is, how are other banks dealing with automation and external rules regarding internal controls" and, as analysed before in **2.1** and **2.2** with Bison Bank, BNP Paribas and Delloite, it was possible to understand how, in general, things are being made regarding internal controls in banking services, but also to understand the future of automation with Delloite case.

While the answer to "Why do we regulate banks?" was able to be answered looking at the background of banking services, so it could be answered on **1.1** already where it's explained the need for banks do comply with legal and mandatory internal controls.

After the understanding of how it was working externally, it was necessary an approach on the bank where this project is being made. So, after that, we decided to look inside Bank X.

Following what was already researched and having this project the goal to compare what is happening in the banking corporate world, and what the future might be, and as well it's advantages and disadvantages. Having this said, this project haves his own practical goals regarding the developing of controls automation, but also the theoretical approach of analyzing the importance of them on the company's workflow as well as the scientific contribution through measuring the KPI's (key performance indicators) from before the automation and after the automation, but also measuring through interviews with the stakeholders of each control.

The department where this project is going to take place is called FOCS (Front Office Conduct & Surveillance) in Bank X, and it's a transversal GBL (Global Business Line), which means that it's not incorporated into a specific area, but it works through all those areas.

FOCS is into guarantee that the bank's employees maintain their conduct and commitment with the bank always at the highest level, and at the moment, surveillance officers have to deal with alerts that get flagged through an already automated system through lexicon, which means that certain words immediately flag an alert that will be after reviewed by a surveillance officer, this could be trough ecomms (electronic communications) such as email, Skype, Microsoft Teams and all other communications channels that the bank provides but also voice surveillance including company's phones, Skype, Microsoft teams, and all communications channels with voice.

The issue with this automated flagging of the alerts is that there are too many alerts and not so many of them are escalated to level 2, but from the management perspective the best possible is to get the most alerts as possible and if possible 0 escalations.

Having this said, FOCS has access to a lot of sensitive because of his transversality and is not a good thing to have a lot of people dealing with sensitive data such as conversations between employees and clients, Trading related issues, client's information's, and even daily banking services

4.3 Automation of controls in Bank X

After analyzing the market of automation on internal controls externally, it is time to look at Bank X.

For that, there were developed a total of 22 projects to automate controls, being 4 of them, 4 controls completely new, that were implemented and already automated, through tools like Python, PowerBi and SharePoint. The KPI's of those controls were measured before and after to have a comparison, and interviews to the main stakeholders of those controls were made. With this, it was planned to answer the following research questions:

"How are banks dealing with these internal controls, and are they prepared to automate them?"

"What needs to be changed to fulfil the automation?"

"Which are the main operational factors and main technologies used? What are the advantages and disadvantages on the automation of those controls."

"What are the advantages and disadvantages on the automation of those controls"

After the understanding the department (FOCS) on the beginning of this project had a series of controls as demonstrated below, that won't be revealed on their fully description, because of disclosure terms, but we will give an overview regarding types of control, which is based on the data source as demonstrated below:

A – These controls are overviews over other employee's controls, in easy words, these are controls over controls.

Example: Control 1 consists in check if the supervisor of another team, approved the daily metrics that his team performed. There is no need to look on the metrics, only to grab the overall metrics and check if all have been approved.

B – These controls consist of perform a report with data that the team itself already possesses.

Example: Control 4 consists of sending a daily report resuming a specific information MTD (month to date).

C – These controls consist of perform a report with data given by other teams.

Example: Control 6 consists of sending a daily report with data coming from other teams, which needs to be related between, treated, and build the report after getting the metrics.

D – These controls consist of perform a report with a large amount of data, being some in the possession of the team performing the report itself and other coming from other teams or departments.

Example: Control 15 consists of sending a monthly report resuming the last month regarding the conduct of each GBL (Global Business Line), which will include several analysis and different datasets.

Controls	Type Of Control	Periodicity	Complexity 1 Very Easy – 5 Very Hard	Old KPI ~ in Minutes	New KPI ~ in Minutes	Productivity Gains in Minutes
Control 1	A	Daily	1	30	30	0
Control 2	A	Daily	1	10	5	5
Control 3	C	Daily	3	30	30	0
Control 4	B	Daily	2	Didn't Exist	5	-5
Control 5	C	Daily	3	30	10	20
Control 6	C	Daily	4	60	10	50
Control 7	C	Daily	4	60	10	50
Control 8	C	Daily	4	60	10	50
Control 9	A	Daily	1	10	5	5
Control 10	A	Daily	1	10	5	5
Control 11	C	Weekly	3	60	5	55
Control 12	B	Weekly	3	60	5	55
Control 13	C	Weekly	3	60	5	55
Control 14	C	Weekly	4	60	5	55
Control 15	D	Monthly	5	2400	1920	480
Control 16	C	Monhtly	4	Didn't Exist	5	-5
Control 17	C	Monthly	4	Didn't Exist	10	-10
Control 18	D	Monthly	4	90	5	85

Control 19	C	Monthly	4	60	5	55
Control 20	C	Monthly	3	Didn't Exist	5	-5
Control 21	D	Quarterly	4	120	60	60
Control 22	D	Quarterly	5	120	60	60

As we can see, previously the automation, 7710 minutes per month (in a month where there isn't the need of producing quarterly controls, on one of these months it increases to 7950 minutes) are being occupied by this team with controls which are approximately 132 hours per month, since this a team with only 2 members and there is also the need to produce reports, being produced more than 100 reports per month, and other kinds of projects, it is unsustainable to continue to have this controls without being automated (even though some of them already had some parts automated), mostly because the amount of people necessary would represent a lot of costs.

Having this project, the objective to show how are the banks dealing with this problem. First it is necessary to understand that most of these controls are not owned by the team, which means that FOCS isn't responsible for the full process, as you can see trough column "Type of Control". To understand this better this project will describe control 2 as example:

Control 2 is based in 4 metrics that come daily from Brazil, and where the FOCS role in this control is simply to see if the control has been made on those 4 already pre-defined time ranges, and if the same person that did the control was not the same that approved or validated it.

It's a simple job but that still will require time to analyse the metrics and to insert this in SharePoint, that works as repository to check if controls are being made, so that whenever IG (Inspéction Generale) comes and asks for proofs that the control is being made, it's just a simple export of SharePoint.

At the time that this project began this project was manual, having this said, FOCS employee had to check by himself the data and insert it manually.

Right now, after the automation of the processes, this control is being made by simply running the developed python script, which will check the data and insert it on SharePoint, this small project had the help of SharePoint team in Bank X because only them have access and authorization to allow these automations using SharePoint. Being this a very important acquired knowledge in this project, every team despite how much automated or independent they are, are always dependent on other teams for their job to be done, transversality in big companies is more and more relevant so that every team could get the right support and always have a different perspective and options regarding an issue.

As we can see, during the timeframe of this project, even though there were added 4 new controls (control 4, control 16, control 17 and control 20), the time spent was reduced significantly.

Right now, the team is spending a total of 4670 minutes in controls (4790 with quarterly controls) which equals to 79 hours, a reduction of almost 40% in time spent in controls and considering that they are performing more 4 controls that what they were doing, this will give the team time and opportunity to produce more reports and help the bank in other type of requests that may occur.

One interesting fact we can retrieve by comparing both columns of KPI's is that there is one specific thing that affect the time reducing process, and that thing is the complexity of the task itself, that by itself is affected by the type of control (regarding the data sources).

This can be explained easily: as most difficult it is to a human to produce something manually, more gains we will obtain from the automation of it.

More than the time spent, right now the team will produce much more accurate reports, since higher the complexity of a task, more likely will be for the reports to have mistakes, and with the help of tools like PowerBi trough the PowerBi server, managers and stakeholders will have the opportunity to check the data whenever they want.

For example control 20 was being done monthly and manually in Excel by another team and by transferring it to FOCS team, since both employees have the skills to automate it right now this a control that can be automatically checked in PowerBi server at any time, being only necessary to check once per month if some data source was updated or if some changes were made that cause the script to be incorrect.

And this was mentioned by one of the interviewed stakeholders saying that the idea to transfer the control to FOCS was precisely the notion that the team could take advantage of their skills and produce a much more practical solution so that the bank can use the other team to produce other also necessary tasks.

From what has been collected and observed through not only there are not only advantages on automating controls in banking services, but there are also some disadvantages such as:

- Demotivation of employees with no IT background, because for employees with a background in Finance or Economy it might be a real struggle to adapt to this new "World" of IT.
- Trust issues in IT with some "old school" employees might cause some friction while trying to incorporate automation solutions.
- Mistakes and issues might take longer to solve.
- It might be a leverage in terms of budget because it will cause a reduction of costs regarding personnel in compliance teams, but automations require an investment in tools, licenses, and IT personnel.

While the found advantages are the following:

- Costs reduction, due to the need of less personnel doing tasks.
- Time saving.
- Reduction of the operator's workload.
- More accurate reports.

As we can see from the table above, the time spent on control 2 was only 10 minutes, that changed to 5 min, so it might be questioned if it was worth to automate.

The answer on this topic will vary from control to control, because sometimes even though the time saving is not a lot, it will guarantee the removal of the human error of the equation, which doesn't mean that there was lack of professionalism on the part of the employee, but that a human being will always be susceptible to errors, considering that there are a lot of factors that might influence this: sickness, tiredness, lack of experience, simple distraction, etc..

As one of the stakeholders interviewed answered to the question: "How much do you trust in automation? Would you trust it more than an employee?"

He said: "Here in this bank we already have a culture that accepts the error of the employee, we must understand that the solution won't be more trainings, more demands on contracting personnel, or even to having a talk with the employee about his error, we must find a way to really understand why the error happened and find a way that it doesn't happen again. Nowadays we have this solution called automation, it's not a matter to trust more automation, because I trust all employees, errors are natural, but automation brings a enormous reduction on them."

But even though this stakeholder has this opinion regarding the reduction of errors, there are some stakeholders that despite also agreeing that this brings reduction on errors, it will bring other necessities on contracting personnel, while in the past it was enough someone with a background on finance or economy, nowadays they need to understand a little of programming so that they can follow the processes, as has been said by one stakeholder answering to the question "How efficient do you think we could be with more automation? How do you think the future will be regarding the automation in controls?"

He said that "Automation is creating new issues in the banking area, 30 years ago we were just finance guys, while actually, we all needed to adapt to this new technologies that even tough are helping our job a lot, it brings the necessity to adapt to this new era", which brings an alert that even though it is good, and considering that this tendency will grow, people from the area need to adapt to this new "world" that the banking sector is becoming, people with 30 or 40 years of banking experience might find this difficult to adapt but it is a necessary change.

At this point, there is the need to show a summary regarding the thoughts of these stakeholders (S1 to S8), for that, below there is a table with a superficial interpretation regarding the answers on each interview, with the following denomination:

Pro - Meaning that in the answer to this question, the stakeholder showed himself in favor of Automation.

Neutral - Meaning that in the answer to this question, the stakeholder showed himself neutral regarding Automation.

Against - Meaning that in the answer to this question, the stakeholder showed himself against Automation.

Not related - Question not related to the benefits or disadvantages of automation.

Questions	S1	S2	S3	S4	S5	S6	S7	S8
How important do you think that automation of controls is for the Bank future?	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Pro
Regarding the controls you know, or you work with, how is the bank in terms of automation of controls? How efficient do you think the bank is regarding controls?	Not Related	Not Related	Not Related	Not Related	Not Related	Not Related	Not Related	Not Related
How efficient do you think we could be with more automation? How do you think the future will be regarding the automation in controls?	Pro	Pro	Pro	Pro	Neutral	Pro	Pro	Neutral
How much do you trust in automation? Would you trust it more than an employee?	Against	Neutral	Against	Neutral	Against	Neutral	Pro	Against
Do you think that the automation of controls is reducing the error? Is it more reliable than humans?	Pro	Pro	Pro	Pro	Neutral	Pro	Pro	Neutral

From the table above, there are a few things worth to mention:

Note: All stakeholders have leadership positions on the bank, being it head or team leader.

- All 8 interviewed stakeholders have demonstrated on their answer that Automation on Controls is important for the future of the bank.
- We can identify different profiles on the stakeholders, for example stakeholders 6 and 8, have a position on the bank more related to financial affairs, which can justify their opinion regarding automation, mostly because despite they can recognize that automation helps them a lot, they are still holding a position in the bank where human ability is still key.

- 6 in 8 have a positive opinion, when asked if they think that automation is more reliable than humans
- Despite this last point, only 1 in 8 have a positive opinion, when asked if automation is more trustworthy than a human, this can make us thing regarding the need of human interactions to perform well a job.

Regarding the following question: "Regarding the controls you know, or you work with, how is the bank in terms of automation of controls? How efficient do you think the bank is regarding controls?", opinions where all indicating that the bank should be more proactive with projects regarding automation so that they don't fall in the risk of having some controls not in order to present to regulators.

4.4 Final analysis

All interviews contributed a lot to comprehend how the human side is adapting to these changes in the banking sector, as shown, opinions can depend on the profile of each interviewed stakeholder but at the same time gave to this study some important overviews regarding this topic, in some important unanimous points, such as the importance of automation in the future of Bank X but despite these opinions, that are very important, since it's given from people very experienced in this area, there's one thing that doesn't lie, and those are the numbers.

And numbers say that automation is reducing ETA (Estimated Time Arrivals), the proof is the column "Productivity gains in minutes" of the table of the controls, comparing the KPI's. In overall, automation is being achieved in banking services, the need to be compliance with legal aspects is forcing banks to automate procedures, and as noticed by the interviews, in general everyone in the organization understands that as a good thing, but one thing to keep a note is that the main operational factor will never be the technologies or tools used such as Python, PowerBi or SharePoint, on the stakeholders general opinion the main operational factor will ever be the people.

5 Conclusion

In this paper, it has been shown why internal controls in banking services are important, how they work, and what is their present and their future regarding automation.

It has been demonstrated the position of some banks and companies in case studies specifically the bank where the projects were made, Bank X, and a total of 22 projects, plus interviews with stakeholders were developed. With this it has been possible to retrieve as much information as possible to identify possible advantages and disadvantages regarding automation on internal controls in banking services.

The world is changing, and it is necessary that people follow this change, in the history of the world it was always necessary to evolve when the world is evolving, in all industries and in every era this happened.

Internal controls in banking services took their time, but at the point where banking sector stands, with regulators from around the world demanding new controls and new proofs that all necessary controls are being made to avoid problems such as corruption and to keep clients' money and investments safe. This is a necessary regulation, because as said, banks have a very important role securing the world's economy, and there's an extreme importance in keeping banks safe for all clients, avoiding corruption and crisis that could be very harmful for the economy.

What can be get retrieved from this paper is that, as shown, automation can help banking services internal controls, as expected, to reduce costs because it will give the chance to banks to hire less employees for each task and mainly it will give more accurate outputs and with less time spent on each one, despite this, this evolution of service might bring some obstacles, specially being it in the field where it is, with employees with an huge experience on financial matters, but with no IT background that might bring some resistance to change, and even banks might not be very receptive to the idea that this IT step comes with an initial cost due to the investment needed to give employees the correct tools, platforms and trainings to automate all necessary tasks.

To conclude, a very important appointment that should be kept from this report is that even though technologies and automation is taking an important role in this industry, there is one main factor that should not be ever disregarded, and those are the people , the ones that are behind the Python scripts, the PowerBi Server automated dashboards and so on, are the real reason why this industry is growing, and should be the main focus in every company, not the platform or tool itself because a skilled, motivated and happy employee will for sure adapt to any kind of circumstances.

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APPENDIX A: Interviews

The script of the interviews was the following:

- How important do you think that automation of controls is for the bank future?
- Regarding the controls you know, or you work with, how is the bank in terms of automation of controls? How efficient do you think the bank is regarding controls?
- How efficient do you think we could be with more automation? How do you think the future will be regarding the automation in controls?
- How much do you trust in automation? Would you trust it more than an employee?
- Do you think that the automation of controls is reducing the error? Is it more reliable than humans?