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ABSTRACT

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Author(s)	Kyveli Lioliou	Number of pages	78 p + Appendices
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Supervisor(s)	Prof.dr.Anne-Francoise Rutkowski Prof.Patrick Rousseau Prof.Timo Leino		

Abstract

Robotic Process Automation (RPA) has become a significant tool for organizations to increase efficiency and to cut costs, especially in the banking sector. However, the adoption of RPA is not as extensive as it could be. Research shows that a potential cause for this can be attributed to the definition of Key Performance Indicators (KPIs) for RPA. According to the Instrumental Stakeholder Theory when it comes to making organizational decisions, management should consider all the relevant stakeholder interests. This exploratory research aims to determine whether the Instrumental Stakeholder Theory can be applied to RPA-related decisions such as the definition of KPIs and therefore questions what the impact of the RPA Center of Excellence (CoE) governance model is on the definition of KPIs for RPA. The focus of this paper is the Dutch banking sector and interviews were conducted with RPA stakeholders of two representative banks. The responders were divided according to the stakeholder group that they belonged to. The results of the analysis indicate that the CoE governance model indeed has an impact on the definition of RPA KPIs. Further research could be applied to determine the other influencing factors or two investigate the future potential of the combination of RPA with AI technology.

Key words	Center of Excellence (CoE), Robotic Process Automation (RPA), Key Performance Indicators (KPIs), financial services, banking, governance

THE IMPACT OF THE CENTER OF EXCELLENCE GOVERNANCE ON THE DEFINITION OF RPA KPIS.

An exploratory case-study of the Dutch banking sector

Master´s Thesis
in Information Systems Science

Author (s):
Kyveli Lioliou

Supervisors:
Prof. dr. Anne-Francoise Rutkowski
Prof. Patrick Rousseau
Prof.Timo Leino

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Aix-en-Provence-Turku-Tilburg

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1 INTRODUCTION

1.1 Problem indication

In any competitive environment, participants seek to find that which will make them overcome the competition and stand out of the mass. To achieve that, industry actors aim to increase their operational performance by attempting to follow a number of strategies including increasing speed, productivity and efficiency and optimizing processes, not however at an increased cost. For years, to acquire these benefits, organizations have turned towards automation as the means to that end (Groover, 2019a).

In the traditional sense, automation is the "controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human labor" (Merriam-Webster, n.d.). The term was first introduced around 1946 in the automobile sector, however the concept itself is much older and has survived till today, not always in the traditional sense. (Groover, 2019b). With the rise of digital transformation, some sectors, such as banking, are turning towards Intelligent Automation (IA), meaning the automation of "business processes through software robots and artificial intelligence-driven tools." (Bankova, Roehrig, & Weiss, 2019; Chas, 2020). Intelligent Automation is an umbrella term, including a number of technologies such as Machine Learning (ML), Natural Language Processing (NLP), Cognitive Computing (CC) and Robotic Process Automation (RPA) (KPMG, 2019). The technological advancement of the last few years has brought a new wave of investments in IA, with more 30% of organizations investing more than $50 million in the related technologies (KPMG, 2019).

From the group of technologies associated with Intelligent Automation, one of the most popular ones and fast-growing, is Robotic Process Automation (RPA) (Moore, 2019). Robotic Process Automation uses "bots" to complete usually repetitive tasks in a system or an application much like a human would. (What is RPA? What is Intelligent Automation? A complete list of automation terminology, 2020). RPA offers a number of benefits for organizations, including cost cutting and increased efficiency, especially for the banking sector. In fact, banking is identified as one of the major industries to benefit from RPA adoption (Hankiewicz, 2018; Finch, 2019). Due to its popularity, RPA has seen an increase in investments, with the RPA market predicted to reach $10.7 billion by 2027 (Grand View Research, 2020).

However, while organizations are in fact increasing their investments in RPA projects (Wright, Witherick & Gordeeva, 2017), at the same time experts are identifying some causes that are hindering the successful implementation of RPA projects. Among the common features identified in failed RPA projects, clear RPA KPI definition was determined as one of the top issues responsible for the unsuccessful implementation of RPA

(Rutaganda, Bergstrom, Jayashekhar, Jayasinghe & Ahmed, 2017). Key Performance Indicators (KPIs) are metrics used to estimate the level of success at achieving organizational goals and can be used at all levels of an organization (Velimirović, Velimirović, & Stanković, 2010).

1.2   Problem statement and research questions

While RPA KPI definition was determined as a possible cause for RPA adoption failure, the experts fail to identify the reason responsible behind the unsuccessful definition of the RPA KPIs. The question arises thus, what factors influence the definition of KPIs specifically for RPA? In literature there are conflicting opinions about the conditions that should exist for the proper definition of KPIs. One common component that is found throughout KPI literature is that for the definition of KPIs, all relevant stakeholders must be involved so there is no miscommunication about the expected results and all stakeholders are aware of the requirements (Warren, 2011; Parmenter, 2015; Kerzner, 2017). The idea of involving relevant stakeholders in managerial decisions is reflected in Stakeholder Theory.

Instrumental Stakeholder Theory supports that managers need to take into account the interests and inputs of all relevant stakeholders when making organizational decisions (Donaldson & Preston, 1995). Using the above theory as foundation, we support that for RPA KPI definition, all relevant stakeholders' interests are taken into account and therefore, RPA stakeholders have an impact on the definition of RPA KPIs.

However, we are unable to consider all RPA stakeholders within the confines of this paper. Therefore, we will focus specifically on the internal RPA stakeholders. The major internal stakeholder groups in any RPA project are the Customers, who are requesting or attempting to build the bots to in order to automate a process, and the Employees which, in banking organizations, are represented by the RPA Center of Excellence (CoE). The RPA CoE includes concentrated knowledge about RPA and is consisted of both Experts in the field and Engineers, responsible for the operation of the system and building robots (Joseph, 2019). In the case of RPA in banking, the Customers are the business units that are seeking to automate their processes using robots.

While there is some literature regarding RPA technology, there is barely any literature found that focuses on the RPA Center of Excellence. This and because of its interesting position in banking organizations, we chose to focus our paper on the RPA Center of Excellence as an RPA stakeholder. Anagnoste identifies that during the run phase of the CoE Operational model, CoEs need to develop KPIs (Anagnoste, 2013). However, the question arises, what element of the CoE impacts the development of these KPIs?

One of the key components to a CoE is its governance model (Anagnoste, 2013). A governance model is defined, by the international standard on social responsibility ISO 26000, as "a system by which an organization makes and implements decisions in pursuit of its objectives." (ASQ, n.d.). However, while the corporate governance might have an influence on the general organizational KPIs, we cannot assume the same influence will apply for the CoE governance model and the definition of RPA KPIs. Thus, we are led to our main research question and the focus of this research:

What is the impact of RPA CoE governance models on the definition of KPIs for RPA, in the Dutch banking sector?

The focal point of our research will be the Dutch banking industry because of the sector's competitiveness in the market as well as its relatively large size to GDP (Van Kempen, 2019). In order to better evaluate and answer our main research question, this paper we will also attempt to answer the following supplementary research questions, derived from the main research question:

What common KPIs can be identified in the Dutch banking sector regarding RPA projects?

How do the defined RPA KPIs between the business and the CoE compare to each other? and…

How does the level of experience of the CoE affect the definition of RPA KPIs?

The results for the above inquiries will be derived by conducting a qualitative research using exploratory case studies from the relevant sector focus. Furthermore, the desired data will be collected using semi-structured interviews with representatives of the selected sample organizations.

1.3   Study Relevance

1.3.1   *Theoretical Relevance*

RPA technology is a widely discussed topic in various outlets and its impact forecasts are described extensively. However, all the related information is distributed and scattered

among many sources. From these sources, only a very limited number are research papers that provide a comprehensive overview of the subject area. Furthermore, only a number of the above-mentioned sources mention the RPA Center of Excellence and its role in RPA implementations and only to a limited extend. In addition, there is barely any mention of the correlation of the RPA COE and the definition of KPIs for RPA, leaving a notable gap in literature. Therefore, the findings of this study will aid to cover this gap by providing not only a comprehensive overview of the related concepts but also by supplementing the literature with new and critical subject-related information.

Lastly, based on the extensive research conducted for this paper, the Instrumental Stakeholder Theory has never been applied in regard to RPA and KPI definition. As each theory provides a new scope to a subject, the Instrumental Stakeholder Theory will shed a new light on the concept of RPA implementation and the definition of RPA KPIs, providing interesting insights and enriching the related literature.

1.3.2 *Practical Relevance*

The findings of this study are not only of theoretical relevance, but they have a few practical applications for organizations. The choice of this topic was partially motivated by an internship opportunity with Accenture, a global professional services company that provides an array of services in consulting, strategy, technology, etc. (Accenture, 2020). During discussions with executives from the financial services department of Accenture, they expressed their desire to better understand the role of the CoE within RPA implementations in banking institutions. Trying to understand better the motivation behind this want, we collaboratively examined the areas of interest within RPA, when the topic of RPA KPI definition emerged. One executive identified that there was a trend of change in the RPA KPIs within banking organizations and he was interested to know what where the elements that were motivating the change and if the CoE had any role in it. After some research, we concluded that an investigation of the impact of the CoE governance model upon RPA KPI definition within the banking industry would be of interest to the department as well as the Accenture enterprise in general.

As a result, one of the major practical benefits that can be derived from the findings of this study, is the optimization of decision-making regarding RPA KPIs which will also lead to an increase of RPA project adoption success. Furthermore, the results of this research can be used by organizations as a foundation for future RPA projects which will increase the efficiency and speed of the process. In addition, organizations will be able to use the findings to understand the future changes in RPA KPIs and thus the future trends of RPA projects. Finally, this study will provide the desired understanding about the role of the RPA CoE in the banking industry which will lead to better strategic consultations.

A thing to note is that the above practical applications will benefit not only Accenture and its clients but other organizations as well, irrelevant of the sector

1.4   Thesis structure

The structure of the paper will follow the typical model for thesis writing. In the first part we will initially focus on the relevant literature and terminology surrounding our topic and our posed research questions in the literature review section. Following that, we will present in depth the theoretical framework upon which this paper is based. In the next part, we will describe the research methodology followed to conduct this research and explain the reasoning behind the methodological choices that were made. Next, we will answer our research questions by presenting the results of the research in the results discussion part. Last but not least, we will introduce the limitations of this research and we will end with the conclusions of the investigation and the future research that could be conducted.

2 LITERATURE REVIEW

2.1 Automation and Robotic Process Automation (RPA)

2.1.1 Automation, Intelligent Automation and Robotic Process Automation (RPA)

Nowadays, organizations are participants in a continuous competition to stay relevant and high performing in the market. As a result, organizations are constantly looking for new ways to improve their operations and become more efficient, for a smaller price. With the advances in technology and the general digitization of everyday life, companies are looking more and more into intelligent automation to deliver the efficiency and performance results they are looking for (Autor, 2015).

The concept of automation to enhance performance however is not a new and has been around for almost a century (Hitomi, 1994). On the other hand, intelligent automation emerged more recently due to the availability of new technologies and the possibilities that come with them regarding automation. A simple definition of Intelligent Automation describes it as "the combination of RPA, AI and other related automation technologies" (Deloitte, 2019, 10). However, this definition just makes reference to some of the technologies that are involved in Intelligent Automation and doesn't provide any clarity about what it's used for, which is the real value of Intelligent Automation.

Thus, we provide another definition where Intelligent Automation is described as an "umbrella of technologies that enable the transformation and automation of business processes by leveraging any combination of software robotics, cloud, artificial intelligence and smart machines. It is comprised of basic robotics process automation (RPA), enhanced RPA, cognitive automation and is enabled by rules-based macros, artificial intelligence and natural-language processing." (KPMG, 2019,3).

A common denominator in both definitions is the reference to a technology used for Intelligent Automation known as Robotic Process Automation (RPA). Robotic Process Automation (RPA) in simple terms is defined as "the deployment of software to perform actions previously done by humans" (Madakam, Holmukhe & Jaiswal, 2019, 4-5). This is basically an extension of the definition of automation but in the case of RPA, the automation is performed by a software (Madakam et al.,2019).

Having said that, RPA is slightly more complex. Rajesh, Ramesh and Rao define RPA as "the automation of repeatable and rule-based tasks by the use of non-invasive software called BOT which can mimic actions performed by human users on computers to complete various business processes" (2018, 10-14). And while this definition covers

some of the characteristics of RPA that we will see moving forward, the following definitions act as a supplement and give a rounded view of RPA.

Thus, according to the Institute for Robotic Process Automation and Artificial Intelligence (IRPAAI), RPA can also be defined as "the application of technology to configure software robots that capture and interpret existing applications for processing transactions, manipulating data and communicating with other software systems" (IRPAAI, n.d). Finally, RPA can be defined as "a software that operates as a virtual workforce and reduces or replaces the human intervention in repetitive and recurrent tasks" (Theyssens, 2017, 3).

Most of the definitions that we presented make reference to software or software robots (or simply called BOTs). This software bot is simply a trained algorithm that can not only imitate but also reproduce the actions of a human user when interacting with the interface (Theyssens, 2017). Right now, in the market, there are two types of RPA software robots: **unattended and attended**. Unattended software bots "are designed to stand alone and automatically execute tasks in the background". The integration and automation time for unattended bots is usually long and they run the risk of being stacked with other apps in the organization. On the other hand, attended software robots are designed to run, along with input provided by a human user. As a result, some parts of the process are executed by the RPA bot and others, usually the more complex ones, by the user, resulting in minimized implementation risk. (Trefler, 2018).

Thus, by combining all the above-mentioned definitions, we can compile a list of the characteristics that fully and holistically describe RPA. Therefore, RPA is the automation of repetitive and recurrent, rule-based tasks, that mimics the actions of human users by making use of software robots. It is non-invasive, meaning it can interact with and be applied to existing applications without requiring modifications to the current processes or systems, thus sitting on top of the existing infrastructure and being accessed by the robot similarly to a human. (Asatiani & Penttinen, 2016; Alberth & Mattern, 2017; Hosadurga, 2017; Theyssens, 2017; Leshob, Bourgouin & Renard, 2018; Madakam et al., 2019).

One characteristic that is not part of the above-referenced definitions but can be implied, is that due to its simplicity, RPA software does not need programming skills in order to be implemented.

Even though RPA application is still relatively new, and no universal framework has been developed for its adoption, when observing the different programs, certain common stages can be noted. Therefore, we can safely say that there are three common phases in every RPA implementation: the proof of concept (PoC) or planning phase, the pilot or implementation phase and the leverage phase. (Alberth & Mattern, 2017; Theyssens, 2017).

It must be noted that depending on the literature, the leverage phase can be exchanged or added with the monitoring phase. In the planning phase, the organization needs to decide the motivation behind the RPA implementation and determine use cases within the company that can potentially be automized. Following that, in the pilot phase, the organization chooses which RPA use case to focus on and they proceed with the necessary preparations for its implementation. Finally, in the leverage phase, the RPA robots need to be tested (meaning the initiation of the pilot use case). Of course, the process needs to afterwards be monitored in order to optimize the RPA program (Alberth & Mattern, 2017).

2.1.2   *RPA advantages and limitations*

As with every new technology, there are certain benefits and limitations that accompany the implementation of the technology. In the case of RPA, the benefits outweigh the limitations and that is one reason why organizations continue to automate their processes using RPA. The advantages of RPA found in literature can be summarized into the following table (Table 1) (Asatiani & Penttinen, 2016; Hosadurga, 2017; Theyssens, 2017; Willcocks & Lacity, 2018; Hofmann, Samp & Urbach. 2019; Mahashree, 2020; Syed et al., 2020):

Table 1 – Advantages of RPA

Advantages of RPA
Cost reduction or cost efficiency
Quick ROI
Minimal upfront investment
Increased processing speed
Enhanced process quality and accuracy and thus error decrease
Improved auditability and thus enhanced compliance
Short implementation time
No needed changes to the underlying legacy framework
Easily modifiable processes
No required IT programming skills for implementation
Interoperability with third-party software
Shift of focus to more value-adding work

Cost reduction or cost efficiency can be derived in two ways. The most prominent one and the one that most companies identify as a success factor, is the savings on FTE (full-time equivalent). It cannot be denied that robots can produce a lot more work than a human handler, in less time, thus leading in cost reduction. The second way refers to tasks being performed in-house rather than outsourced, which reduces complexity and thus costs (Fersht & Slaby, 2012; Asatiani & Penttinen, 2016; Theyssens, 2017).

Furthermore, the fact that for RPA implementation, no changes need to be made to the organization's legacy infrastructure leads to minimal initial investment for RPA on behalf of the organization (Asatiani & Penttinen, 2016; Hosadurga, 2017). The most obvious improvements due to RPA are the increased processing speed and process quality and accuracy, since the processes are now automized by optimized software robots that follow a standardized set of rules and can work 24/7 with no signs of slowing down. As a result, processes are also more accurate and therefore, less errors occur (Hosadurga, 2017; Theyssens, 2017; Hofmann et al., 2019; Mahashree, 2020; Syed et al., 2020;). Also, because of the automation of processes, all transactions are now recorded, which provides more transparency and increases auditability and compliance (Theyssens, 2017; Hofmann et al., 2019).

Another benefit of RPA is not only the fast implementation time but also the fast improvement of ROI (Return of Investment). According to Asatiani and Penttinen, RPA implementation time takes from 2 to 4 weeks, which compared to other software implementations, is minimal (2016). Once the implementation is finished, improvement in ROI can be observed within 3 to 6 months (Theyssens, 2017). Last but not least, since more processes are automized, that allows workers to focus on more strategic and value-adding tasks, which increases the value of the organization (Lacity & Willcocks, 2018; Mahashree, 2020).

However, as we mentioned, RPA does have certain limitations. Those can be observed in Table 2 (Willcocks, Lacity & Craig, 2015; Asatiani & Penttinen, 2016; Alberth & Mattern, 2017; Rutaganda et al., 2017; Mahashree, 2020):

Table 2 – Limitations of RPA

Limitations of RPA
Employee acceptance
Choice of candidate process
High expectations
Complexity difficulties
Temporary solution
Only structured inputs

During the implementation of RPA, there is the possibility that management will have to deal with caution and reluctancy to accept the new status quo, since some employees might feel threatened and fear losing their jobs (Teunissen, 2019; Mahashree, 2020). Furthermore, as we previously saw, one of the first steps of RPA implementation is the identification of the process cases that potentially will be automated. This is a complex step that if hurried or done wrong, will lead to wrong processes being automated which in turn, will increase the cost of implementation (Teunissen, 2019).

High expectations which are created partly by the organizations and partly by RPA vendors who spend more time on marketing and less on improvement of automation, can be another pitfall that leads to RPA failure. RPA right now is in the "peak of inflated expectations" in what is called the Hype Cycle. Unrealistic and overhyped expectations can only lead to failure when the RPA does not deliver (Willcocks et al., 2015; Van Der Aalst, Bichler & Heinzl, 2018, according to Kerremans, 2018; Mahashree, 2020). Also, at this moment, RPA encounters some difficulties when the automation use cases are too complex which is one of the mistakes that companies make; organizations start implementing RPA in highly complex processes which results in the RPA not functioning properly, which in turn dashes the expectations of the organization (EY, 2016; Van der Aalst et al., 2018).

In addition, another limitation of RPA is the fact that, at this point of development, RPA can only handle manual and repetitive tasks which have structured inputs. RPA cannot yet adapt to non-standard cases. However, we must mention that developments in Artificial Intelligence, Optimal Character Recognition and other technologies may lead in the future to a more adaptive RPA that can handle unstructured inputs (Alberth & Mattern, 2017; Mahashree, 2020). Finally, according to Asatiani and Penttinen, in its current form, RPA is a temporary solution that facilitates the gap that exists between "manual processes based on legacy IT systems and redesigned processes running on fully automated systems" (2016, 68).

In literature, there is a discussion on whether RPA technology is truly revolutionary or whether it is simply an extension of previously existing technologies. And the truth is that indeed, RPA is based on technologies like Artificial Intelligence and other forms of process automation. However, we can argue that RPA combined with technologies like AI, elevates both RPA and AI itself (Disys, 2016).

Despite the limitations and the little uncertainty that surrounds RPA, the technology has garnered a lot of attention from corporate organizations in the last few years. Only in 2018, Information Services Group predicted that by 2020, 54% of European companies were planning on automating at least 10 processes using RPA and it is predicted that by 2022, the global spending on RPA will reach $2.4 billion (Teunissen, 2019 according to Gartner).

2.2   Center of Excellence (CoE)

2.2.1   Definitions

In the previous section, we established that organizations are increasingly implementing RPA projects within their infrastructure. As more and more RPA projects are implemented, the importance of RPA in the organization grows and thus, there needs to be a unit that is responsible for the governance of the implementations. Literature as well as experience from the market has shown that, in order to deal with the increasing applications of RPA programs and any future RPA projects, a Center of Excellence (CoE) should be established within the organization (Willcocks & Lacity, 2018).

A Center of Excellence (CoE) is defined as "an organizational unit that embodies a set of capabilities that has been explicitly recognized by the firm as an important source of value creation, with the intention that these capabilities be leveraged by and/or disseminated to other parts of the firm." (Frost, Birkinshaw & Ensign, 2002, 997). Marciniak also adds that "Center of excellence consists of functional or cross-functional teams that endeavor to gain new knowledge or experience inside or outside of the company. Teams could be physical or virtual, but they exist mainly permanent rather like a project." (2012, 6).

From the above definitions, we can derive certain dimensions that characterize a CoE. First of all, CoEs typically have a physical presence, meaning that they belong to a particular subunit within the organization. Second, CoE are specialized in a set of superior capabilities within the organization. Another dimension that we can extract is that CoEs are "explicitly recognized by the firm", meaning that the organization declares them as such. Lastly, the declaration of a CoE implies that the unit will produce value in its specialized field for the rest of the organization (Frost et al., 2002). CoE are also known as "knowledge centers", due to the fact that they utilize the knowledge they acquire in order to improve the organization (Marciniak, 2012).

2.2.2   CoE Operating Model and Governance

To understand a little better how CoE operate, we will take a look at Anagnoste's CoE Target Operating Model. This model is comprised of three dimensions: maturity, scope and delivery model. The maturity dimension is further divided into two groups: built and run. According to the built dimension, the CoE needs to consider what processes need to be automated and prioritize them, set up the RPA inside the organization etc. This dimension is similar to the first step of the RPA implementation which makes sense since

CoE are usually the ones in charge of the RPA implementation. The second sub-dimension is the run dimension. It refers to the running of the CoE after it is built which includes the smooth operation of the robots, the identification of new processes etc. (Anagnoste, 2013).

Moving to the second dimension, the scope refers to the definition of the parameters that would describe the CoE like whether it would cover back-office or front-office functions, what and how many units it will include etc. Finally, the delivery model determines whether the RPA program will be insourced or outsourced and whether it will be fully or partially. (Anagnoste, 2013).

Once these parameters of CoE are determined, then the organization must make decisions on the key components of CoE, which according to Anagnoste, these are (Anagnoste, 2013):

a.	Skills for each role in the new organization

b.	Organizational Structure

c.	Governance

d.	Processes and KPIs

According to the international standard on social responsibility, ISO 26000, a governance system or model is "a system by which an organization makes and implements decisions in pursuit of its objectives" (ASQ, n.d.). Since KPI definition is one of the decisions regarding RPA, we can conclude that the CoE governance plays a significant role in the determination of KPIs (Beugelaar, Brouwer & Koetsier, 2018). Yet, CoEs may adopt a different governance model than the rest of the organization when it comes to handling RPA. For our research, we will focus on the relationship between the governance model of the CoE and the determination of KPIs for the adoption of RPA.

Current literature does not provide a universal governance model for RPA projects and thus for the CoE. RPA is identified as lightweight IT, thus it cannot follow the governance of heavyweight IT. However, literature argues that RPA should be based on or be similar to, the typical IT-governance model even though, RPA programs can be cross-functional and don't need heavy IT presence (Bygstad, 2015; Willcocks et al., 2015; Willcocks, Hindle, & Lacity, 2019). Therefore, we will base our CoE governance typology on the existing one for IT-governance. It must be noted however, that, according to Willcocks et al., only in 15% of the cases is the IT is responsible of the RPA implementation, usually due to the fact that business operations are not advanced enough to handle RPA (2019). Yet, in many publications, the authors support that RPA projects should actually be managed by the business Operations side of the organization but with strong support from the IT department. Therefore, the business side of the organization also has some influence upon the determination of the RPA KPIs (Willcocks et al., 2015; Rutaganda et al., 2017).

As it is a part of corporate governance, IT Governance focuses on the management and use of IT to achieve corporate performance goals (Weill & Ross, 2004). We identify

three types of IT Governance, which are: centralized, decentralized and federated (Sambamurthy & Zmud, 1999; Symons, 2005; Rychkova, Zdravkovic & Speckert, 2013, 3; Rychkova & Zdravkovic, 2017 according to Weill & Ross, 2004).

Centralized IT governance implies that all the decision-making power is concentrated on a single point in the organization. It is recommended for when high standardization and cost-efficiency are required. This model is much easier to manage and to organize due to the concentration of power. The limitations of the model lie in the danger of the IT turning into a monarchy, which excludes input from other business units (Sambamurthy & Zmud, 1999; Symons, 2005; Rychkova, Zdravkovic & Speckert, 2013, 3; Rychkova & Zdravkovic, 2017 according to Weill & Ross, 2004).

In the decentralized IT governance model, the decision-making power is dispersed among many points. This model is relevant for organizations focusing on innovation and TTM (time to market) goals. The decisions are delegated from the center to the rest of the divisions or units of the organization. This model runs the risk of duplication of infrastructure and applications and no knowledge exchange or systems-exchange between the units (Sambamurthy & Zmud, 1999; Symons, 2005; Rychkova, Zdravkovic & Speckert, 2013, 3; Rychkova & Zdravkovic, 2017 according to Weill & Ross, 2004).

Finally, the federated IT governance model is a combination of characteristics from the centralized and decentralized model. This model is more suited for organizations that seek to make a cost-efficient use of assets and are focused on IT innovation. In the federated model, infrastructure and enterprise-wide applications are centralized (centralized planning) whereas, the business units retain control over the business-unit specific applications and resources (local leadership). The difficulty of this model is the balance that needs to exist between the needs of the business unit and the conformity to the enterprise standards (Sambamurthy & Zmud, 1999; Symons, 2005; Rychkova, Zdravkovic & Speckert, 2013, 3; Rychkova & Zdravkovic, 2017 according to Weill & Ross, 2004).

As we mentioned previously, we will derive the CoE models based on the models for IT governance. Therefore, as with ITG, we have three models for CoE governance. These are (Willcocks et al., 2019; All you need to know before running a successful Center of Excellence, 2020):

- The centralized model
- The decentralized or divisional model and,
- The federated model (i.e. hybrid)

As we can observe, there is scant a difference between the classification of IT governance models and CoE governance models. The difference in the name of the second model is due to the fact that RPA providers as well as some consultants sometimes identify the decentralized model for CoE as 'divisional'. We also need to note that CoE governance is also referred to sometimes as organizational structure or organizational framework.

Therefore, similarly to the centralized IT governance, in the centralized CoE governance for RPA all the decisions from identification of potential process cases to deployment and managing a common pool of robots are concentrated in one place, the CoE, which deploys its efforts remotely for all business units. The benefits of this model include low implementing costs as well as potential for scalability of the RPA through all business units, since the RPA is centralized. However, centralized CoEs run the risk of a bottleneck in identification and development of robots since the organization's business units do not have a full picture of RPA capabilities (Deloitte, 2019; Willcocks et al., 2019; All you need to know before running a successful Center of Excellence, 2020; Accenture interviews).

Like the previous model, divisional or decentralized CoEs are akin to decentralized IT governance models. As the name indicates, in the divisional CoE governance model, RPA programs are lunched by the CoE of each business unit or division, independently of the other departments and where the RPA is most promising. Robots are handled by each business unit sometimes with minimal assistance from a central CoE. Its strength lies in the implementation of low-cost RPA projects in each department that may have future organizational potential. Having said that, divisional CoE solutions are not scalable and they tend to create an excess of hardware. In addition, due to its nature, this model has the downside of fragmented RPA standards throughout the organization which is not sustainable (Deloitte, 2019; Willcocks et al., 2019; All you need to know before running a successful Center of Excellence, 2020; Accenture interviews).

Finally, CoEs can take the form of a federated structure. As with the federated IT governance model, the federated CoE model is a hybrid model that combines characteristics from both the centralized and the divisional CoE. It consists of a number of divisional CoE units and one centralized CoE unit. Similarly to the divisional model, low-cost, scalable RPA projects run within each division, however in this case they are controlled by the centralized CoE unit. Like in the divisional model, this solution has a low-cost impact, yet it solves the scalability problem of the previous model (Deloitte, 2019; Willcocks et al., 2019; All you need to know before running a successful Center of Excellence, 2020; Accenture interviews). The above models are illustrated in Table 3:

Table 3 – CoE Governance Models (source: Deloitte, 2019)

Decentralized				Federated				Centralized			
				Centralized RPA CoE				Centralized RPA CoE			
Gov.	Gov.	Gov.		Governance				Governance			
						Intake				Intake	
						Build				Build	
						Operate				Operate	
Intake	Intake	Intake	Intake	Intake	Intake						
Build	Build	Build	Build	Build	Build						
Operate	Operate	Operate	Operate	Operate	Operate						
Business area 1	Business area 2	Business area 3	Business area 4	Business area 1	Business area 2	Business area 3	Business area 4	Business area 1	Business area 2	Business area 3	Business area 4

It must be noted that there is no "one ideal solution" when it comes to selecting the governance model for a CoE. Each organization has different needs, different goals and different capabilities and thus the choice of the model should adhere to these conditions. We also must note that the above models are general, indicative examples and variations based on the above models may exist. Nevertheless, for the purposes of this paper, our research will be focused on the decentralized and federated model. Centralized governance models for CoE are not really popular in the banking industry, on which we are focusing, since they are more suitable for organizations based on the delivery factory model (Ekren, 2018). However, consultants support that automation projects need some kind of decentralized control (Accenture, 2016). The question that arises in that case is, what happens if there is no centralized control like in the case of decentralized governance models? Therefore, we focus on the federated and decentralized models, to observe the effect of centralized control.

2.3   Key Performance Indicators (KPIs)

2.3.1   Definitions

As it is with all new technologies in the beginning, currently not all RPA adoption projects succeed. According to a survey conducted by Deloitte in 2017, out of 400 firms, 63% of the interviewed organizations did not meet their deadlines for delivery of the RPA projects, whereas based on an EY survey, "30 to 50 percent of initial RPA projects fail" (Trefler, 2018, 2).

The first assumption is that the failure of the implementation is due to technology itself. However, that is usually not the case, not in regard to RPA projects. Issues of failing

RPA projects are not usually associated with how the technology is adopted but they are identified at a more fundamental level (Rutaganda et al., 2017).

According to Rutaganda et al., by analyzing the conditions of the failed RPA projects, we can extract a set of common features that are present, or in other words, at fault, for the unsuccessful implementation of RPA projects. As we can see displayed in Figure 1, these features are:
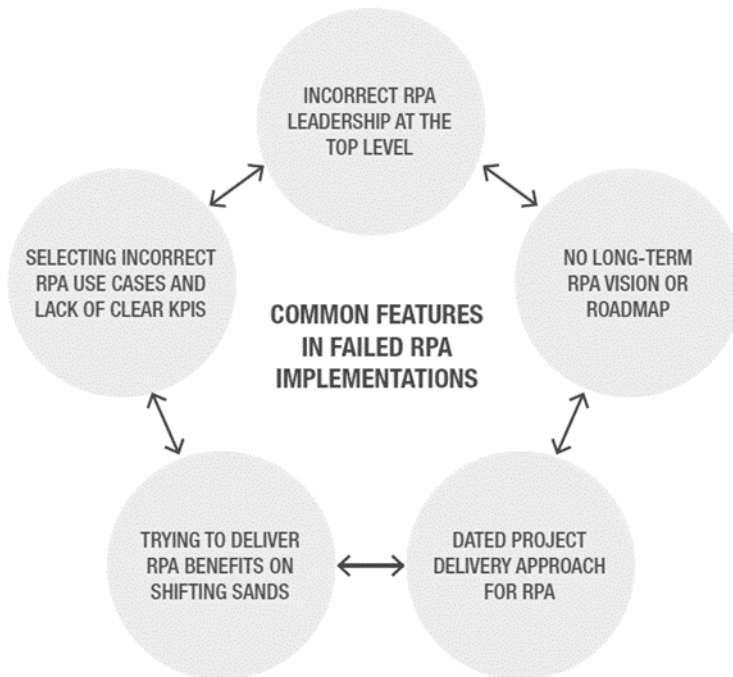
Figure 1 – Common themes found in unsuccessful RPA projects (source: Rutaganda et al, 2017)

According to Juttmann and van Doesburg, for a successful RPA adoption within the whole organization, it is important to establish measures of performance and visualize the realized benefits, which is accomplished by determining the RPA adoption Key Performance Indicators (KPIs) (2018). Therefore, the center of our research we will be based on the second cause for RPA adoption failure and specifically, we will focus on the choice of KPIs. Before we can continue though we first need to understand what a KPI is.

The strategy and governance of an organization define the goals that that organization will strive for. In order to make sure that those goals are achieved, organizations use performance measures so they can evaluate, control and improve on their progress. In other words, the organization needs to transform its business goals into measurable elements that can indicate the success of an outcome, usually known as Key Performance Indicators (KPIs). KPIs are an extremely important management decision-making tool and is used to measure the success in achieving outcomes (Masayna, Koronios & Gao, 2009).

Performance Indicators (PI) are non-financial and can be traced back to a team. The difference with KPIs is that KPIs are crucial to the organization's wellbeing, whereas PIs are complementary to KPIs. In simple terms, KPIs are numbers that are designed to summarize and convey meaningful information or data (Roubtsova & Michell, 2014; Parmenter, 2015). Roubtsova and Michell give a slightly more complex definition where KPIs are "cumulative measures of systems achievements during a given time period" (2014, 128). Consultancy firms give a more concrete approach to KPIs (rather than operational) where a KPI is "a measurement which evaluates how a company executes its strategic vision" (Warren, 2011, 5). Thus, we can say that KPIs are part of a measurable objective (Parmenter, 2015).

Though, one must not confuse KPIs with Critical Success Factors (CSFs). CSFs are the conditions that must be present for an objective to be fulfilled whereas KPIs may provide indications that the CSFs can be achieved. KPIs inform management about the organization's performance regarding its CSFs. By monitoring them, organizations can assess their current as well as their future performance and accordingly adjust (Parmenter, 2015).

KPIs can refer to two types of measurements: either long term measurements, that are associated with the crucial aspects of organizational performance and that need to be improved or on measurements that need to remain on certain levels for the continued success of the organization. The first type refers to more enterprise KPIs whereas the second refers to more process KPIs. The fulfillment of short-term process KPIs is crucial for the success of long-term enterprise KPIs (Gerry & Buckbee, 2005; Masayna et al., 2009).

2.3.2   *Properly defined KPI qualities*

According to literature, properly defined KPIs are characterized by certain qualities although, there is no consensus on what these qualities may be. However, we can observe some reoccurring characterizations. Therefore, according to literature, KPIs are not financial measures. As we mentioned previously, KPIs are numbers, however, they represent rates, ratios, averages or percentages (Peterson, 2006).

In addition, the definition of KPIs should include all the stakeholders that are impacted, from all the sides of the organization, so there are no false expectations and stakeholders have a clear idea of what is important. Furthermore, KPIs should follow the company's overall strategy otherwise they risk being irrelevant. One overlooked quality is that KPIs need to be simple and easy to understand. KPIs are used for communication between stakeholders, therefore a poor understanding of KPIs will lead to misunderstandings and misalignment of the KPIs with the overall organizational strategy. Finally, according to

research, the most important quality for a KPI is that it needs to drive valuable action, meaning that it should be able to be influenced, even indirectly (Warren, 2011; Parmenter, 2015; Kerzner, 2017).[1]

2.4 CoE and KPIs

As we mentioned previously, KPI definition should include all the stakeholders that are impacted. For RPA decisions such as KPI definition, there are two major stakeholders as we will see later in the research, the CoE and the Customers or Business side. This can be also validated by the operating model of the CoE. When we discussed the development of the Centers of Excellence, we gave an indication of the CoE operating model where we described its three dimension and provided a high-level overview of the key components of the CoE. As we mentioned before, these components are, according to Anagnoste, the following (Anagnoste,2013):

a.   Skills for each role in the new organization

b.   Organizational Structure

c.   Governance

d.   Processes and KPIs

As we previously mentioned, we will focus on the KPI part of the CoE. CoEs are part of the KPI definition process as they are a major stakeholder.

From our review of literature, while there may examples of some KPIs that could work for RPA, there is no specific overview of the KPIs for RPA adoption. Understandably, since each process that RPA is implemented on is different, the KPIs for each RPA adoption project will be different. However, we would like to investigate whether organizations have some common KPIs for RPA that can be applied to every project, to act as a steppingstone or a foundation, that companies can work from in order to determine the project specific KPIs.

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[1] One other method that can be found in literature that defines the characteristics of metrics and KPIs is called the "SMART" rule. According to the "SMART" rule, metrics and KPIs need to be (Kerzner, 2017, 129):

S: Specific, where the KPI has a clear focus on performance targets or business purpose

M: Measurable, meaning that it can be quantified

A: Attainable, meaning that the set goals are reachable

R: Realistic or relevant, where the KPIs are directly connected with the work being done

T: Time-based, the measure of the KPIs has a defined time period

While this method of defining the KPIs is more standardized, it presents a weakness which is the fact that it's missing a very important aspect of KPI definition and that is that KPIs need to be actionable. Therefore, we discount the SMART method of KPI definition.

2.5 Financial services, banking and RPA

2.5.1 Financial services

The continuously evolving landscape in the market has organizations looking for new ways to boost productivity and efficiency as well as reduce cost in order to keep up with competition. One of those industries that has been affected the most is financial services and specifically banking (Hosadurga, 2017). RPA can offer a lot of benefits to financial institutions. Yet before we can move on to determine how RPA can affect financial services and banking, we first need to define what financial services are and more specifically, what banking is, since both terms are fluid. In the section ahead we will give a brief historical overview of the development of financial services and banking and then we'll proceed with defining both concepts. In the end, we will take a look at the benefits that RPA can offer to the field.

Thus, we will start with a brief historical evaluation of financial services. Financial services have been around in one form or another for centuries. During the 18th century, economic development due to the expansion of trade forced commercial banking to expand in substance and in scale. Ennew and Waite support that "Banks grew in response to the need for services such as loans, safe deposit and financing of consignments of exported and imported goods." Adjustments needed to be made in order to deal with the continuous changes of commerce. One century before, insurance made an appearance as the need for a more fitting form of insurance for nature-caused destruction arose. The concept of insurance as we know it today was developed also during the 18th century in the United States. (Ennew, Waite & Waite, 2007).

The question arises however about what can be defined as a financial service. The International Monetary Fund (IMF) makes a distinction between a good and a service, arguing that that a service is "a task that someone performs for you", whereas a good is "something tangible that lasts (…)". It continuous, clarifying that "A financial service is not the financial good itself—say a mortgage loan to buy a house or a car insurance policy—but something that is best described as the process of acquiring the financial good. In other words, it involves the transaction required to obtain the financial good". (Ennew et al., 2007; Asmundson, 2011;). On the other hand, the Office of the United States Trade Representative defines a financial service as "any service of a financial nature" (Office of the United States Trade Representative, n.d, 1).

Depending on the conditions of the environment, the structure of financial services will vary. A number of factors may affect the composition of the financial services marketplace, such as 'new entrants' , the stage of economic development, government policies, infrastructure etc. Furthermore, when once there used to be clear separation between

the domains of banking, insurance and mortgage lending, today things are more ambiguous and mixed due to the deregulation of markets, thus creating a more complex landscape of financial services. Nevertheless, there are still financial organizations with expertise in a narrow product area. (Ennew et al., 2007).

As a result, literature presents us with a number of classifications of financial services that are more inclusive and high-level. The landscape of financial services is somewhat challenging to map since depending on the perspective of the author, different classes can be added or removed from the structure. A little older and more generalized type of classification of financial services separates financial institutions based upon their nature (private or public), whether they are connected to the commercial or the investment field and finally based on their operations (Steiner, 1922). Taking one step deeper, the IMF groups financial services into two categories: insurance and related services, and banks and other financial service providers. It further gives a short description of what type of services are included in each category (Table 4) (Asmundson, 2011). However, this model too is not all inclusive.

Table 4 – Financial service (source: IMF,2011)

Insurance and related services
Direct insurers pool payments (premiums) from those seeking to cover risk and make payments to those who experience a covered personal or business-related event, such as an automobile accident or the sinking of a ship.
Reinsurers, which can be companies or wealthy individuals, agree, for a price, to cover some of the risks assumed by a direct insurer.
Insurance intermediaries, such as agencies and brokers, match up those seeking to pay to cover risk with those willing to assume it for a price.
Banks and other financial service providers
Accept deposits and repayable funds and make loans: Providers pay those who give them money, which they in turn lend or invest with the goal of making a profit on the difference between what they pay depositors and the amount they receive from borrowers.
Administer payment systems: Providers make it possible to transfer funds from payers to recipients and facilitate transactions and settlement of accounts through credit and debit cards, bank drafts such as checks, and electronic funds transfer.

<u>Trade</u>: Providers help companies buy and sell securities, foreign exchange, and derivatives.
<u>Issue securities</u>: Providers help borrowers raise funds by selling shares in businesses or issuing bonds.
<u>Manage assets</u>: Providers offer advice or invest funds on behalf of clients, who pay for their expertise.

The Office of the United States Trade Representative gives its own explanation, stating that "Financial services include all insurance and insurance-related services, and all banking and other financial services (excluding insurance), as well as services incidental or auxiliary to a service of a financial nature" (n.d). Thus, according to the Office, financial services include (Table 5):

Table 5 – Summarization of Financial Services (source: Office of the United States Trade Representative)

Insurance and insurance-related services
direct insurance (including co-insurance): life or non life
reinsurance and retrocession
insurance intermediation, such as brokerage and agency
services auxiliary to insurance, such as consultancy, actuarial, risk assessment and claim settlement services
Banking and other financial services (excluding insurance)
acceptance of deposits and other repayable funds from the public
lending of all types, including consumer credit, mortgage credit, factoring and financing of commercial transaction
financial leasing
all payment and money transmission services, including credit, charge and debit cards, travelers' cheques and bankers' drafts
guarantees and commitments
trading for own account or for account of customers, whether on an exchange, in an over-the-counter market or otherwise, the following: - money market instruments (including cheques, bills, certificates of deposits);   - foreign exchange;   - derivative products, including futures and options;   - exchange rate and interest rate instruments, including products such as swaps, forward rate agreements;   - transferable securities; and   - other negotiable instruments and financial assets, including bullion

Participation in issues of all kinds of securities including underwriting and placement as agent (whether publicly or privately) and provision of services related to such issues
Money broking
Asset management such as cash or portfolio management, all forms of collective investment management, pension fund management, custodial, depository and trust services
Settlement and clearing services for financial assets including securities, derivative products, and other negotiable instruments
Provision and transfer of financial information and financial data processing and related software by suppliers of other financial services
Advisory, intermediation and other auxiliary financial services on all the activities listed in subparagraphs, including credit reference and analysis, investment and portfolio research and advice, advice on acquisitions and on corporate restructuring and strategy

One last classification of financial services separates financial services according to the type of the activity that the organization involves itself with. Therefore, as we can see on Figure 2, according to the author there are four different types of activities, each of which has its own specific forms (this model is slightly influence by the British system) (Ennew et al., 2007).

Type of activity	Specific forms
Banking	Retail banks/Commercial banks
Savings and Loans	Building Societies (UK)
	Credit Unions
	National Savings
Insurance	Life Insurers
	General Insurers
	Friendly Societies (UK)
	Health Insurers
	Lloyd's syndicates
Investment companies	Mutual fund/Unit Trust Companies
	Investment Trusts
	Pensions providers

Figure 2 - Financial services classification (source: Ennew et al., 2007)

For our research, we will focus on the banking system. Specifically, we will take two cases of banks in the Netherlands and focus on their operations. Therefore, in the next section we will analyze the term "bank" and what it includes as well as describe briefly some of the types of banks.

2.5.2 Banking

As it is natural, along with the evolution of financial services, banking developed alongside during the end of the 19th century. Thus, two systems of banking emerged: "the market oriented financial system (Anglo Saxon) characterized by a division of functions and the bank oriented financial system (central European) characterized by universal banking." (Machiraju, 2008, 21). Today, banking occupies a central position in the economic world.

Consequently, a need arises to define what a bank is. In his book, Somashekar provides a list of definitions from different researchers for the term "bank". He ranges from Leaf's definition, where "A bank is a person or corporation which holds itself out to receive from the public, deposits payable on demand by cheque" to White's definition where a bank is "a manufacture of credit and a machine for facilitating exchange". Finally, he presents his own definition where a bank is "a financial institution which deals in debts and credits. It accepts deposits, lends money and also creates money. It bridges the gap between the savers and borrowers. Banks are not merely traders in money but also, in an important sense, manufacturers of money." (2009,1).

Ayadi presents her own definition, where "Banks accept deposits and utilise their comparative advantages to transform deposits into loans. The bank accepts the credit (default) risk, holds the asset on its own balance sheet, monitors its borrowing customers and holds appropriate levels of capital to cover unexpected risk. It also effectively "insures" its loans internally through the risk premia incorporated into the rate of interest on loans. In this process, the bank offers an integrated service in that it performs all the core functions in the financial intermediation process". (Ayadi, 2019, 6).

In their general form, banks have been "liquidity providers, maturity transformers, risk managers and financial innovators" (Ayadi, 2019, 6). In general, banks can be sorted into commercial banks and central banks. Somashekar distinguishes between the two, stating that "Commercial banks are those which provide banking services for profit. The central bank has the function of controlling commercial banks and various other economic activities.". Going one step further, commercial banks can be further sub-categorized into the following: deposit, industrial, savings, agricultural, exchange and other miscellaneous (2009).

In our days, with the evolution of technology and the increasing use of the internet and online applications, the role of banking has altered. According to Ayadi, traditionally, banks followed the intermediation approach to their services. Nowadays however, banks are a "a one-stop shop, (that) offer a wide range of financial services, enhanced by a widespread wave of financial innovations". And the banking landscape is shifting again with the emergence of Fintech organizations (financial technology) taking their share of the market. (Ayadi, 2019, 5) as well as the introduction of technologies such as Robotics,

IoT and Artificial Intelligence that are going to revolutionize the field of financial services (Scardovi, 2017).

This is where RPA enters the landscape. In order to match the fast evolving market conditions, banks needed to adapt and adopt new technologies that would allow them to be more efficient at a smaller price, creating an opening for RPA. RPA is especially applicable to highly regulated, data intensive industries like banking (Institute for Robotic Process Automation, 2015; Mahashree, 2020). According to a study, in 2018 banking and financial services where at that point one of the leading fields in RPA implementation (Juniper Research, 2018).

Theyssens provides an overview of the applications of RPA in the banking, financial services, and insurance industry (BFSI) in Figure 3 (2017). Obviously, this list is not exhaustive, but it includes a comprehensive overview of the possibilities.

Figure 3 - Applications of RPA in the BFSI sector (source: Theyssens, 2017)

2.5.3   Banking and RPA

RPA offers a lot of benefits to the banking industry such as increased productivity and customer experience, reduced processing time and operational cost, more execution accuracy and finally higher employee retention. (Mahashree, 2020).

As we mentioned before, for our research we are going to focus on the banking sector in the Netherlands. The reason that we're selecting to investigate banking in the Netherlands is because of the sector's competitiveness in the market as well as its relatively large size to GDP (Van Kempen, 2019). Furthermore, the Dutch banking sector has shown great interest and involvement in RPA technology, with banking giants like ING in the country investing millions of euros in automation projects using robots (Nelson, 2016; ING, 2018). Finally, in a survey done in 2017 among Dutch banking organizations, the majority of the respondents indicated that they would rather invest in RPA solutions than more advanced process automation solutions, showing a clear focus on RPA technology that would be interesting to investigate further (KPMG, 2018).

In the next section we will portray the theoretical framework upon which we will build our research. The theoretical framework of a thesis differs from the literature review. A theoretical framework is the cumulative concepts and their definitions along with the existing theory that is used for the research h (University of Southern California, n.d,a). In simpler terms, it is the existing theory that is used to support the researcher's claim. On the other hand, a literature review refers to the summary and synthesis of key conceptual terms, portrayed in an organizational pattern (University of Southern California, n.d.b). Therefore, the next section will exhibit the relevant theories used to construct our argument.

3 THEORETICAL FRAMEWORK

In this part of the paper, we will describe the key theoretical concepts upon which this research work is based. We will start with presenting the relative theories as well as the argumentation for choosing to use these specific theoretical premises. Furthermore, we will propose and exhibit the relations between them and discuss any further relevant theories that were disregarded. Lastly, we will exhibit the stakeholder model specific for RPA as well as the conceptual model upon which this paper is based.

3.1 Stakeholders and stakeholder theory

RPA is a relatively new technology, for some organizations, that can drive higher levels of scalability as well as performance while at the same time, cutting costs (Dua, 2020). To maximize the levels of RPA adoption, we support that organizations need to engage and take into account the interests of the RPA-related stakeholders (Ya & Rui, 2006; Ayuso et al., 2011; Postema, Groen & Krabbendam, 2012).

This idea is reflected by Freemans's Stakeholder Theory, upon which this paper is based. In 1984, Freeman stated that when it comes to organizational decisions, management needs to take into account the interest of its stakeholders (Freeman, 2001; Egels-Zanden & Sandberg, 2010; Ayuso et al., 2011). Since the adoption and implementation of RPA technology is a conscious decision that the organization needs to make, stakeholder theory applies. Therefore, we support that for decisions regarding RPA, the interests of the RPA stakeholders are taken into account. As a continuation of the previous statement, we support that specifically for decisions regarding RPA KPIs, the interests of the RPA stakeholders are taken into account. As we previously mentioned in the literature review, governance model is "a system by which an organization makes and implements decisions in pursuit of its objectives." (ASQ. n.d). Cosequently, we support that the governance model of the RPA CoE, one of the main stakeholders regarding RPA decisions, will have an impact on the definition of RPA KPIs.

Stakeholder Theory is one of the most prominent theories when it comes to stakeholder engagement (Egels-Zandén and Sandberg, 2010; Ayuso et al., 2011). De Colle summarized the essence of Stakeholder Theory, stating that (2005):

- stakeholder theory acknowledges that stakeholders have legitimate interests and claims towards the corporation
- stakeholder interests can be conflicting with each other
- the management's role is to govern the firm, which means taking decisions that represent a balance among conflicting stakeholder interests

But before we move on to building our theoretical framework, we first need to define what the term stakeholder entails. In his original 1984 work, Freeman does not present a clear definition of the concept of "stakeholder" but gives elements of definitions from other authors that he believes represent the term. In a summary of these definitions used by Freeman, De Colle supports that "In a narrow sense, the stakeholders are all those identifiable groups or individuals on which the organisation depends for its survival (…) On a broader level, however, a stakeholder is any identifiable groups or individual who can affect or is affected by organisational performance in terms of its products, policies and work processes." (2005, 300 according to Freeman, 1984, 34-46). In his work, Freeman also mentions that "any group or individual who can affect or is affected by the achievement of the organization's objective." can also be considered as a stakeholder (Postema et al., 2012, 4 according to Freeman, 1984, 142; Cutovoi, 2018, 1046).

Over the years, other authors have attempted to define the concept of stakeholders. For example, Rowley states that "the stakeholders are groups or individuals that affect the organizational context in search of meeting your goals" (Cutovoi, 2018, 1046 according to Rowley, 1998, 105-107). Also, in 2005, Bourne defines stakeholders as "individuals or groups who have an interest or some aspect of rights or ownership in the project, can contribute in the form of knowledge or support, or can impact or be impacted by, the project", a definition that is very similar to the one presented by Freeman and Rowley, with the added element of the offering of knowledge from the stakeholders' side (McGrath & Whitty, 2017, 728 according to Bourne, 2005, 2). Lastly, a slightly more recent definition is the one by Gaur where he defines stakeholders as "a person, group or organization that has interest or concern in an organization. Stakeholders can affect or be affected by the organization's actions, objectives and policies". (Gaur, 2013, 1). For the purposes of this work, we will consider stakeholders based on Freeman's definition but with the added element of Bourne's definition, thus creating our own definition:

A stakeholder is any group or individual who can affect or is affected by the achievement of the organization's objective and who can contribute in the form of knowledge or support.

3.2   Freeman's stakeholder map

There are many ways to categorize stakeholders, based on their power, based on their relevance to the objective etc. In this paper, we take one of the simplest categorizations, based on the stakeholder's position either in or out of the organization, so stakeholders can either be internal or external. According to Cutovoi, internal stakeholders have to do with "the decision-making process of an organization", for example, customers, employees etc., whereas external stakeholders are "affected by the activities of the

Organization" like competitors, government etc. (Reed, 1999, 476; Friedman & Miles, 2006, 25-26; Cutovoi, 2018, 1048). Postema et al. note that regarding the number of stakeholders, it is "context- and time dependent" whereas their views and opinions "may change over time" (Postema et al., 2012,4).

Freeman's stakeholder map is based on the above idea. In his original work, Freeman illustrates his concept of the firm or the organization, that has today become a representative symbol of the Stakeholder model. In his model (Figure 4), the stakeholder groups of the firm (internal and external) are represented by circles with double-direction arrows connecting the groups with the firm, indicating the reciprocal relationship between the two. Freeman himself has admitted that this is an "oversimplified" model and that each group can of course be more specified (Friedman and Miles, 2006).
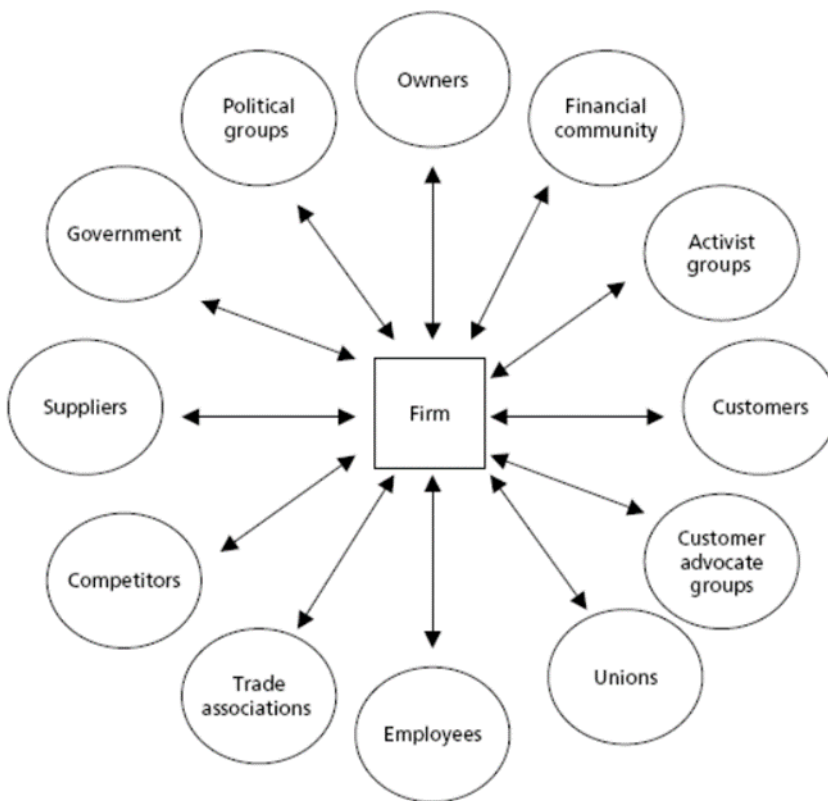
Figure 4 - Freeman's Stakeholder map (source: Freeman, 1984, 25;55)

Since the adoption and implementation of RPA technology is an internal decision, for this paper we will focus on the internal stakeholders of the firm. However, since we are focusing on decisions made about RPA, the above model is not representative of the stakeholder map that surrounds RPA decisions. Therefore, later in the paper, we will construct our own stakeholder model, using Freeman's model as a blueprint.

3.3   Donaldson and Preston taxonomy

While stakeholder theory can be considered as is for the scope of a paper, many researchers go one step further in defining the elements of their theory using the Donaldson and Preston taxonomy (1995). According to Donaldson and Preston (1995), stakeholder theory can be considered through three different lenses: descriptive, instrumental and normative.

In the descriptive approach, the theory is concerned about the nature of interactions between managers, firms and stakeholders. That includes for example the managers' philosophy on their employees' interests, management behaviors etc. (Jones, 1995; De Colle, 2005; Friedman & Miles, 2006).

The instrumental approach studies the connections (if present) between the involvement of stakeholders and various organizational objectives. In other words, it assumes that for the achievement of goals and the maximization of profit, stakeholders need to be taken into consideration (Jones, 1995; De Colle, 2005; Friedman & Miles, 2006).

Finally, the normative stakeholder theory supports that because stakeholders have claims or, as the name suggests, stakes on the organization (therefore they are of intrinsic value), then there is an ethical obligation that their interests should be taken into account when making organizational decisions without taking into account the consequences of this practice to the firm (Jones, 1995; De Colle, 2005; Friedman & Miles, 2006).

There have been suggestions that Freeman actually included all three approaches into the stakeholder concept (Jones, 1995) and has been critical of the taxonomy. However, this categorization has been quite influential in research (Egels-Zandén & Sandberg, 2010).

In this paper, we will focus on the instrumental aspect of stakeholder theory. While the normative approach has been identified as the core of the stakeholder theory (Egels-Zandén & Sandberg, 2010; Jones, 1995), we support that looking into RPA decisions through the instrumental lens will offer equally interesting insights, since RPA decisions have not yet been studied through stakeholder theory and especially from an instrumental point of view. Furthermore, instrumental stakeholder theory offers the advantage of linking certain behaviors to certain outcomes without needing to make assumptions or to explain the underlying human behavior (Jones & Wicks, 1999).

3.4   RPA stakeholders and stakeholder conceptual model

In order to build our conceptual framework, we first need to design the related stakeholder map. To create our own stakeholder map that is specific to RPA in banking, we first need to identify the relevant stakeholders to RPA implementations in the banking industry. At

a high level, for banking RPA projects, stakeholders can be classified in Business stakeholders and in IT or Operations Stakeholders since, as we previously mentioned in our literature review, the Center of Excellence can be under the IT unit or the Operation's unit of an organization (Deckard, 2017). To relate it to Freeman's Stakeholder model, the Business stakeholders represent the Customers stakeholder group since the business side is responsible for requesting and driving the creation of robotic solutions (Deckard, 2017), whereas the IT or Operations stakeholders represent the Employees stakeholder group. Since we are focusing our research solely on RPA, in the center of our model, instead of the Firm or the Organization, RPA will take its place.

However, the IT or Operations stakeholder group is too general for our research and also includes stakeholders that have no experience or knowledge regarding RPA, therefore are irrelevant for our topic. As a result, we further specify that RPA stakeholders can be classified into Business stakeholders and Center of Excellence stakeholders, since most big organizations involved in robotics process automation as well as our case study subjects, have Centers of Excellence in order to manage RPA implementations (Willcocks et al, 2019; ISG, n.d.). However, since we are focusing on the RPA KPIs, not all members of the Center of Excellence are suitable for our research. Therefore, we further categorize the Center of Excellence stakeholder group into Experts, who are people like the Product Owner or the RPA Champion that have intimate knowledge of the KPIs, if those are present, and Engineers, who are responsible for the actual construction of the robots. It needs to be noted that for the purposes of this paper, we will not only consider the CoE as stakeholder, but we will also take into account the Business side point of view regarding the RPA KPIs.

Based on the previous analysis, we end up with the following RPA Stakeholder map (Figure 5). In the map, we can also observe the dual relationship between the Business stakeholders and the Experts.
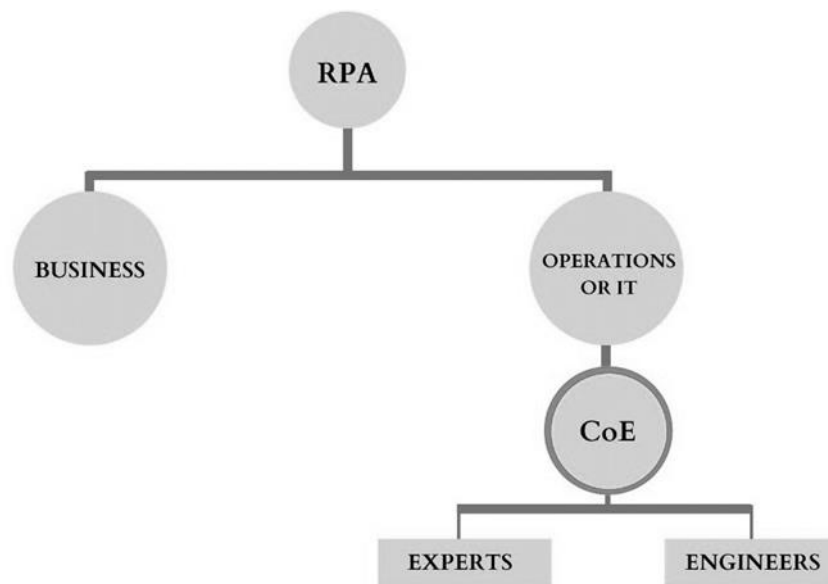
Figure 5 - RPA Stakeholder map

Now that we constructed our stakeholder map, we can continue to develop our conceptual framework. According to Camp, a conceptual framework is a structure that is built by the researcher that he or she believes explains the natural progression of the phenomenon that is being studied (Camp, 2001). If the conceptual framework visualizes a cause-effect relationship, then there is a dependent and an independent variable present (Swaen, 2015a).We support that, the governance of the CoE has an impact on the definition of RPA KPIs. Therefore, for our research, the independent variable is the CoE governance model and the dependent variable is the definition of RPA KPIs. However, since the governance is just an element of the CoE itself, we propose that the CoE is a mediator variable in the above relationship. A mediator variable comes in the middle of a dependent and an independent variable in cause-effect relationships (Swaen, 2015b). In addition to the above, we also acknowledge the impact that the business side has on the definition of RPA KPIs. Taking into account all of the above, we end up with the below framework (Figure 6):
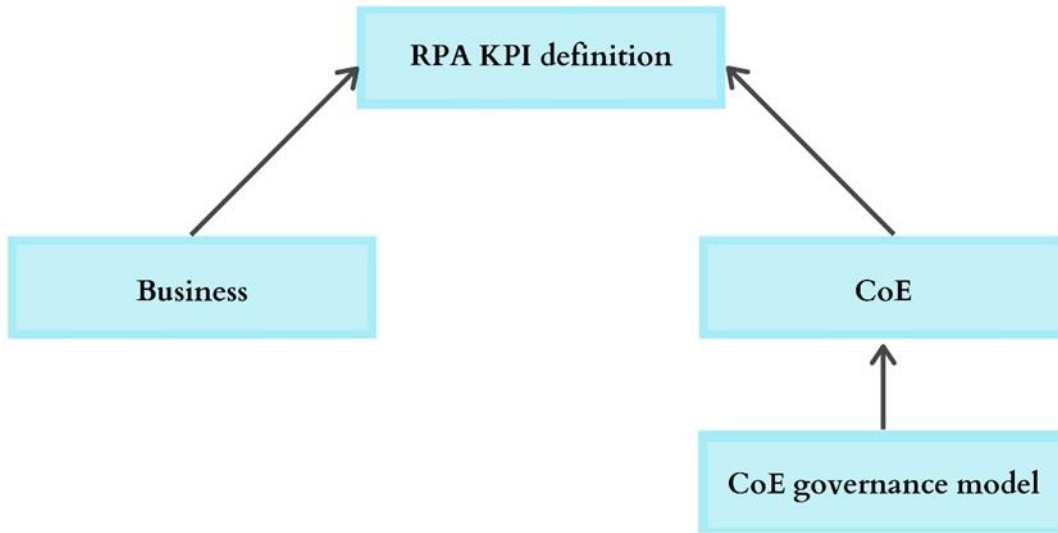
Figure 6 - RPA KPI definition conceptual framework

4 RESEARCH METHODOLOGY

This section will describe the research approach and the methodological choices made for this thesis as well as the method of data collection and analysis of the data chosen to be used.

4.1 Research method and methodological approaches

All the tools that a researcher uses during his or her research such as algorithms or procedures etc., can be defined as research methods. According to Chinnathambi et al., these tools are planned, scientific and value neutral. Research methods seek explanations to questions, based on evidence and not just on reasoning. (Rajasekar, Philominathan & Chinnathambi, 2006). Now, research methodology is the "systematic way to solve a problem" or to be led to the answer of the researcher's question. It is basically the plan that the researcher aims on using in order to gain knowledge about the topic and to get the answer to his or her question. (Rajasekar et al., 2006).

Based on the manner of the enquiry, research can be either quantitative or qualitative (Kumar, 2011). Quantitative research is concerned with measuring a quantity or amount. The object of research can be expressed in quantities or countable measures, as is the result of the research, which is a number or a set of numbers (Rajasekar et al., 2006; Mishra & Alok, 2017). On the other hand, qualitative research, as the name suggests, is concerned with a qualitative phenomenon related with a quality. In contrast with quantitative research, qualitative research is non-numerical, meaning that it uses data such as interviews and documents rather than numbers, and its aim is to explore the why of a situation, not the how. Finally, it's descriptive and cannot be graphed (Rajasekar et al., 2006; Mishra & Alok, 2017).

One of the unique qualities of qualitative research is its ability to provide textual context to a certain problem or question. It provides the beliefs, opinions, behaviors etc. of individuals that are connected to the issue, offering another perspective to the topic (Mack, Woodsong, Macqueen, Guest & Namey, 2005). For the purposes of our research, we require to explore the phenomenon of RPA adoption and the definition of RPA KPIs from the perspective of the individual within the organization and gather the related data that are associated with his or her experience, therefore qualitative research is the most appropriate method of research. Another reason for selecting to conduct qualitative research relates to the sensitivity of banking data but we will talk about this in the limitations part of our thesis. Therefore, we conclude that our study will be based upon the qualitative research perspective.

There are many methodologies related to qualitative research. One of the most popular ones, also in quantitative research, is the Case Study methodology (Topic 9; Tellis, 1997; Eshlaghy, Chitsaz, Karimian & Charkhchi, 2011). The term case study has been defined in multiple ways, making it difficult to have a consensus about its definition. One of the most prominent ones is the one by Yin, where a case study is an "an empirical inquiry that investigates a contemporary phenomenon (the 'case') in depth and within its real-world context" (Yin, 2014, 16). In other words, a case study is a research methodology where one or more cases of a phenomenon are investigated in order to determine the relationships among "phenomena, experiences or processes happening in a special sample" (Eshlaghy et al., 2011, 121). A thing to note is that, when conducting case study research, we can take either a single case study or conduct the research using multiple case studies. The purpose of the case study is to see whether the knowledge depicted in literature is actually applicable and present, in real-life conditions in order to simplify complex social phenomena and enhance understanding (Eshlaghy et al., 2011; Yin, 2014). In other words, it contributes to the knowledge about a phenomenon (Yin, 2014).

Based on Yin's perspective about research methods, case studies can be either exploratory, descriptive or explanatory (Yin, 2014). As their name suggests, each study has a different purpose, either to explore a previously under-investigated concept, or simply to describe or explain a concept (Kumar, 2011). In the case of our research, we will use the case study as an exploratory strategy. Exploratory case study is the best fit for our research topic as it aims to explore in-depth a contemporary phenomenon where the "relevant behaviors cannot be manipulated" (Yin, 2014, 4-12). Furthermore, due to the fact that there is not sufficient literature conducted to allow us to answer the research questions posed comprehensively, we will depend on multiple sources of evidence (observations, interviews) to prove our model, which is another indication that exploratory case study is best suited for our topic (Yin, 2014).

Because we are interested in learning more about the phenomenon of RPA KPI definition and its relationship with the CoE governance models and the business side of an organization, we chose to use one case study in the Dutch banking industry separated in two units (the two Dutch banks) in order to be able to extract valuable information about the experiences of the actual implementors of the technology and by comparing the two cases.

4.2   Data collection method

As we mentioned previously, qualitative research deals with qualitative and not numerical data, such as observations, interviews, documents etc. Interviews and discussions represent one of the four data types produces in qualitative data collection (Yin, 2014).

Interviews can be defined as a "data gathering technique involving verbal communication between the researcher and the subject" (Mathers, Fox & Hunn, 2000, 113). "…the interviewer, attempts to elicit information or expressions of opinion or belief from another person or persons." (Maccoby & Maccoby, 1954, 449). These interviews can be structured, semi-structured or completely unstructured (Adhabi & Anozie, 2017). For the purposes of this paper, the data collection will be conducted through individual, semi-structured, face-to-face interviews using Microsoft Teams. Face-to-face interviews is the preferred method of interviewing since it provides the most knowledge. This doesn't just refer to the answers of the interviewee but also the non-verbal information the researcher acquires by observation such as atmosphere and body language (Ryan, Coughlan & Cronin, 2009; Brinkmann, 2013; Adhabi & Anozie, 2017).

According to DiCicco-Bloom and Crabtree, semi-structured interviews are the most used method of data gathering in qualitative research since they are the easiest to use and offer the most flexibility (2006). Due to the complexity of the concept and the industry we are researching, we chose to conduct our interviews in a semi-structured manner, so we are able to adjust quickly if the conditions demand it. The use of the semi-structured method requires the researcher to have previously conducted a thorough literature review since the interviewer needs to have knowledge of the subject beforehand as the interview questions are based on the information about the topic (Kallio, Pietilä, Johnson & Kangasniemi, 2016, according to Wengraf 2001, RWJF 2008, Kelly 2010). Our literature review on the relevant topics can be found earlier in the paper.

4.3 Data sample

As we mentioned previously, this research paper will be based on one case study, separated in two units. The data was gathered from multiple sources, both from the CoE and the business side that are involved in RPA and the definition of RPA KPIs and that represent the two most prominent CoE governance models in the banking industry. What follows, is a short overview of the organizations involved and that the research is based upon. It must be noted that the names of the organizations and any other details have been anonymized due to the sensitivity of the subject for the banking industry.

4.3.1 Overview of Bank A

Bank A is a Dutch multinational bank, headquartered in one of the largest cities in the Netherlands. Their business portfolio is widespread and includes not only retail banking but also direct banking, commercial banking, investment banking, asset management and

finally, insurance services. They have large number of customers as well as many employees in different branches, worldwide. After discussion with executives from Accenture relevant to the subject and using internal reports on the subject, it was determined that the CoE of this organization follows the federated governance model.

4.3.2   Overview of Bank B

Bank B is also a Dutch multinational bank, headquartered in another one of Holland's largest cities. As with the previous organization, their portfolio includes multiple areas of banking as well as insurance, but they are also involved in leasing and real estate. They are a leader in their branch of banking, representing millions of customers worldwide. Their CoE governance model was again determined by consulting relevant executives within Accenture and using internal reports, and it was identified as decentralized governance model.

4.3.3   Number of interview participants

After conducting thorough research of online sources, the total number of employees working in the organizations' CoEs could not be determined and neither could the total number of employees working on RPA in the business sides of the organizations. The companies were also not forthcoming during the interview process about the total number of employees working on RPA. It is natural for banking organizations to desire anonymity and to divulge little information about their operational structures and their ideas since every little piece of information could be used by their competition to gain advantage over them, especially in a highly competitive sector such as banking (De Bel, 2017).

As a result of the limited information about the number of employees involved in RPA for both the CoE and the Business side, a convenience sample was taken. Convenience sampling is defined as "a type of nonprobability sampling in which people are sampled simply because they are "convenient" sources of data for researchers" (Lavrakas, 2008). Despite the convenience of the sample, all the respondents were experts on the topic and saturation was achieved.

4.4   Interview method

In total, 17 (seventeen) interviews were conducted during the research process of the thesis. The interviews were conducted with representatives of the Centers of Excellence

of each financial institution as well as representatives from the business side of the organizations in order to provide a comprehensive overview of the phenomenon and its implications. The duration of each interview was on average 00:25:16 with the total duration of the interviews amounting to 07:09:33. The interviews took place from the 24th of March to the 1st of May. The number of interviews conducted was sufficient to reach saturation and provide validity to the research. Consent was asked and granted for the sharing of the information provided by the interviews as long as confidentiality was established, by all of the interview participants. The interiew quide as well as the transcription of two sample interviews can be found in the Appendices of this paper. In the following section of the paper, we will provide a short overview of the participants that participated in the interview process and explain the rationale behind the selection of the specific participants.

4.4.1   Interview participants

The interview participants were chosen based on their suitability and relevance to the research topic. As we mentioned before, the participants were chosen from both the RPA CoE side and the business side.

For the interviewees from the CoE side, individuals with centric roles in the CoE Expert teams of both organizations were chosen. This choice was made due to the fact that the Expert Teams are the ones that have a part in defining RPA KPIs alongside the business side, as indicated by our stakeholder model previously, and have a more holistic view of the RPA implementation, whereas the Engineers team is more responsible for the actual building of the robots. In the organigram below (Figure 7), we can see the main roles involved in the RPA CoE Expert team. The organigram was created after discussion with RPA experts within Accenture that had collaborated with the organizations' CoEs. Titles and roles may vary, depending on the organization. Based on this organigram, the corresponding people were approached from participation in the interview process.
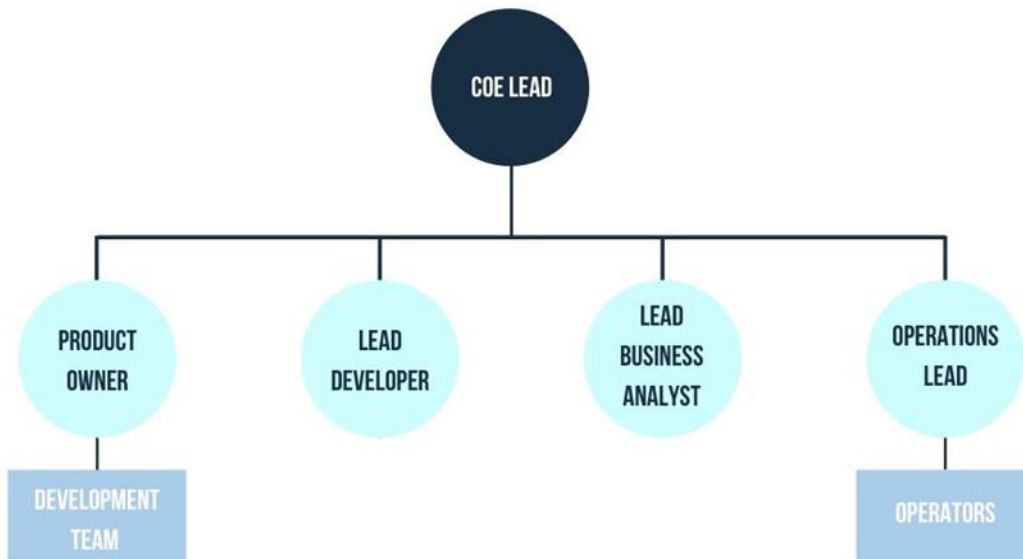
Figure 7 - CoE Expert Team Organigram (source: Accenture RPA experts)

For the participants from the business side, we chose individuals that had experience in implementing RPA projects in their business unit and thus could provide us with relevant and insightful content. Different role titles are involved with RPA implementation on the business side, so it is impossible to create an organigram for the business side.

4.4.2 Interview remarks

As previously mentioned, the interview process took place over a period of 1,5 months. For retention purposes as well as for understanding the topic in a more holistic manner, the transcription of the interviews was performed right after the end of the interviews. All the interviews provided equally valuable insights and data and there is little discrepancy between them regarding the scope of the talks. The difference in the duration of some of the interviews can be attributed to the participants ability to answer to the questions posed. Nevertheless, the participants answered to the best of their ability and knowledge of the topic based on their understanding of the questions. Added information was provided occasionally which was helpful to the participants to specify the scope of the question. The opening questions gave us a better understanding of the participants' expertise and suitability to be questioned while the last question allowed the participants to express freely any additional information they wished to share about the topic. As was mentioned

previously, consent was asked and granted for the sharing of the information derived from the interviews by all the interview participants. Confidentiality of personal and organizational information will be kept throughout this paper.

4.5   Data Analysis

After the collection of our data, in order to derive useful conclusions about our research question, the next step is to conduct data analysis on the collected information. Data analysis is the summarization and grouping of collected data with the purpose of identifying patterns and themes which can later be linked to produce conclusions about the data (Kawulich, 2009). In our case, we conducted data analysis on the performed interviews.

As we mentioned before, the interviews were transcribed manually and then sent to the corresponding interviewees for verification. After receiving verification, any corrections were taken into account. Following that, we started performing our content analysis. For the content analysis, we followed Kumar's four step method of qualitative data processing as he identified it in his book (Kumar, 2011).

First, we reviewed all the transcriptions of the interviews carefully, highlighted broad themes and assigned descriptions to them, taking into account different wording of the same concept. Then, we manually coded the main produced themes. The manual coding was done inductively. The coding process originally produced 29 codes. The number of mentions for each code in each interview was totaled to assess whether further grouping could be performed. Codes with less than 3 mentions were reassigned to other codes. After reassigning, we were left with 21 codes.

The remaining codes were reassessed, and thematic similarities were noticed between some of the assigned codes, therefore further grouping was performed. After combining the similar codes, 15 codes were produced. Out of the 15 codes, we continued our analysis with the 13 codes that were the most relevant to our research. The coding process can be reviewed on the following table (Table 6).

Table 6 – Interview Coding

CODES	Organization A									Organization B									
	Int. 1	Int. 2	Int. 3	Int. 4	Int. 5	Int. 6	Int. 7	Int. 8	TOTAL	Int. 1	Int. 2	Int. 3	Int. 4	Int. 5	Int. 6	Int. 7	Int. 8	Int. 9	TOTAL
Robotics attendance	1	1	1	3	1	1	1	1	10	1	1	2	1	1	1		1		8
Reasons for unsuccessful RPA projects	1	2	2		1	2		2	10		1	1	1	1		1	1	1	7
Description of CoE	5	2		7	2	1		1	17	4	3	1	2	7	4	2	1	5	29
Identification of CoE governance model	1			3					4		1			1					2
Description of CoE governance model	3	1		4	2	1			11	4		1	2	6	4	2	1	5	25
Description of CoE functionality	1	1						1	3		2								2
Influence of CoE	1			5	5	3			14	1	3			2			1		7
FTE saved	1	3	2	3	4	5		3	21		1	1		1	1	1			5
KPIs used	8	8	3	8	7	7	4	4	49	5	1	4	1	6	3	2	4	4	30
Use of KPIs	5	6	3	6	5	5	3	3	36	5	1	4	1	6	3	1	4	4	29
Standard KPIs for RPA projects	1			1	1	1			4										0
Critical KPIs from business POV	1	2					1	1	5							1			1
Critical KPIs from a CoE POV	1		1	1	1	1			4										0
Change of KPIs over time	1	1		2	2	1	2	3	12	1	1	1		2			2	3	9
Criteria for RPA case selection	3	1		1	1	2	2	1	11	1	1	1	2	1	2	3	2	4	18
Difficulties of RPA implementation		1	3	3	2	1		1	11		1	1			1	1	1	2	7
Difficulties of RPA implementation		1	2	2	2				7		1				1	1			2
Difficulties identifying RPA cases / Difficulties picking RPA processes			1	1		1		1	4		1	1					1	2	5
Process Prioritization Criteria	1	1	2	1	1	1		2	9		1	1			1	1	1	1	6
Indentification of responsibility over RPA	1	1	1	2	1		1	2	9			1				1	2	4	8
Stakeholder model	2	3		2	4		1		10	2			1	1				1	5
Performance monitoring			1			2			3	2	1	2	1	1	2	2			11
Ending remarks	1	1		1	2	1	1	1	7	1	1	1	1	1	1	1	1	1	7
RPA areas	1	1		1	2	1	1	1	6	2	1	1	1	1	2	1	1	1	11

After the coding process was finalized, we classified the excerpts of the interviews under the corresponding code. Following that, we re-read the excerpts, now thematically grouped, and derived our conclusions and answers for our research questions as well as other observations. The last step of the Kumar's method will be displayed in the results discussion part of this research.

5   RESULTS DISCUSSION

In this part of the paper we will present the key findings corresponding to the main research question and the additional research questions posed in the beginning of the research. The results will be organized as collective answers to the posed research questions and not presented based on the performed coding so that we get a holistic view of the answer. The results will be supported by quotes from the performed interviews. In the end, we will present general observations that were derived from the research process.

5.1   Impact of CoE on the definition of RPA KPIs

As we mentioned in the previous sections, the driving force behind this research was the need to explore whether the governance model of the RPA Centers of Excellence in the Dutch banking sector had an impact on the definition of RPA KPIs since we established that RPA KPI definition is one of the problems impeding RPA project adoption, the foundation of which query was based on the Instrumental Stakeholder theory. This led us to our main research question, which was:

What is the impact of RPA CoE governance models on the definition of KPIs for RPA, in the Dutch banking sector?

The purpose of this research question was first to confirm our hypothesis based on the Instrumental Stakeholder model, that the RPA CoE governance model has an impact on the KPIs defined for RPA projects, but also to determine what that impact is. As we previously noted, we chose to focus on only two of the RPA CoE governance models since the centralized model is rarely seen in the banking sector and it is also, in a sense, included in the federated model.

During the interview process, we asked both the CoE and business RPA interview participants from the two representative organizations about the influence of the CoE in the RPA KPI definition process as well as more generally about the influence of the CoE in the RPA process. We further tried to identify the unit responsible over RPA decisions. In addition, we asked our participants to try to identify the most critical KPIs as RPA stakeholders, if they indeed were part of the RPA KPI definition, trying to determine an influence of the CoE on the RPA KPIs.

As a result of our research, we concluded that the RPA CoE governance model does indeed have an impact on the KPIs defined for RPA projects. More specifically, we determined that the CoE governance model determines and influences the role of the CoE. Therefore, the Instrumental Stakeholder Theory is applicable for RPA KPI decisions.

As supported by our interviewees' responses, in the federated model, the Expert Team and the Delivery team are included in the term "Center of Excellence". Thus, the CoE has a more active role in the RPA implementation process and therefore impacts the RPA KPIs more substantially. In the federated model, the CoE has a more holistic, consulting role and offers both business-related and technical KPIs.

> *"So what we did is we created a business plan and then we organized a brainstorm session also to kick-off the project and to determine together with the stakeholders, yeah, we just reviewed basically the business case (...)". (Organization A – Project Lead)*

> *"Speaking generally, it's the CoE that drives the KPI. But the business also has a say on what KPI they would want for their own robot". (Organization A – Operations Lead)*

> *"So that's, for instance, if, if the expectation or the objective of the beneficiary sponsor is that, yeah 'we need more stability and more consistent performance of the process', then we as a robotics team, we as the development team have to ensure, these operations of the robots have to ensure our robots are indeed always up and running and then they are delivering the job unattended, secured. So we are kind of the enablers.". (Organization A – CoE Lead)*
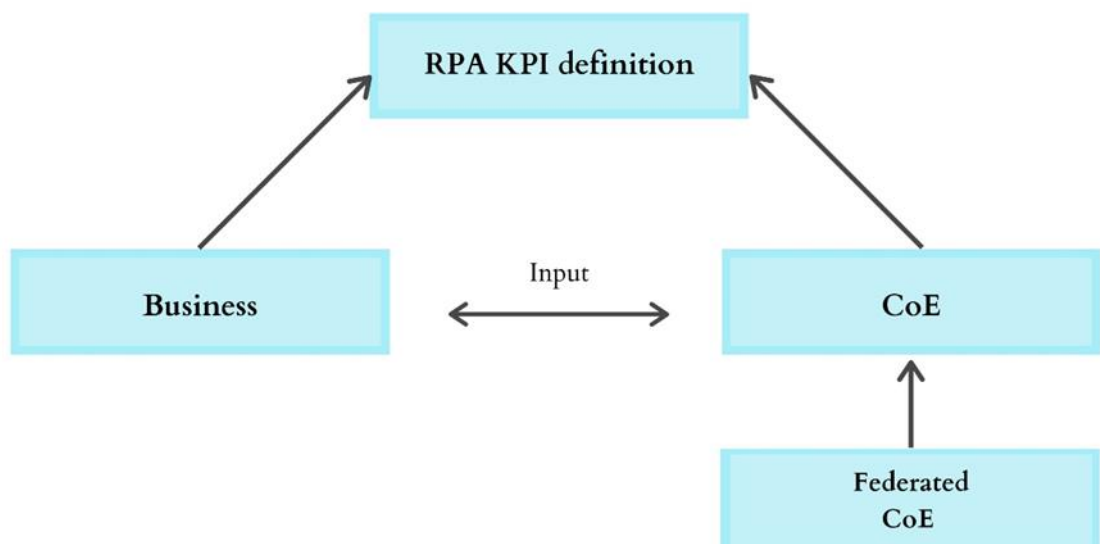

Figure 8 - Impact of federated CoE governance

The CoE is as much of an equal shareholder in the RPA project as the business customer. In this case, the RPA KPI definition is a more collaborative process. While anyone in the organization can build a robot, since the CoE does provide the infrastructure

for that, it is usually done with the collaboration of the CoE, as it can be observed in Figure 8.

> *"We have still people who are, we each got our KPIs and our goals (...) We look at the impact, we look at what we can do together so yeah, it already became, I'm not gonna say social but it's already, yeah, it's a bit nicer to work together with the business.". (Organization A – CoE Product Owner:)*

> *"I mean that's, it's, it's embedded in the process which is the, the intake process, the discovery process in which we identify the, assess the robotic initiative in the beginning so it's like an intake session that we do with the requester or a discovery session in which we go after the different business lines and do a discovery so it's both ways, either they come or we go and that's when we assess different aspects of the implementation in different aspects of the initiative". (Organization A – CoE Lead)*

> *"...we do built bots centrally, operational work for us is centralized so anybody across the organization can built a bot, we provide the infrastructure, we provide the tools and techniques, we provide the consulting, we provide the supervision centrally from the CoE but anybody can built a bot themselves, anybody can yeah, it can be a business person as well. But then eventually because we want to run all the bots unattended and in virtual Cloud then we do this operations part of it, run and maintain part of it centrally.". (Organization A – CoE Lead)*

On the other hand, in the decentralized model, the term "Center of Excellence" refers solely to the Delivery team, whereas the Expert team is part of another group, named "Expertise Center". While they might work together, their roles differ, and the business representatives can work separately with the two groups. The Center of Excellence provides the infrastructure (e.g. the environment where RPA robots can be deployed) and perhaps offers some input but their main purpose is more technical and supportive.

> *"So how we look at it at the moment is that the Center of Excellence provides the infrastructure so the environment where we can deploy our RPAs and the team that we have in our department is actually building those RPAs solutions on top of that infrastructure that they provide.". (Organization B – RPA Team Manager)*

"Alright, because, the Center of Excellence, that are the engineers, they build the robots, and we're the Expertise Center and we're on the business side. So we, we have, we're close to the business and we translate business, business wishes in functional descriptions for them.". (Organization B – CoE Product Owner)

That of course does not mean that they do not define any RPA KPIs but their KPIs are more technical and robot related. They provide the knowledge to the business units but the responsibility of actually building the robots falls with the business units themselves. The difference in the role of the CoE can be observed in Figure 9.

"(…) our way of working is that we really believe that it's better to give our business people the right tooling to build the robots themselves instead of third parties or IT departments who are building the robots for them. So, our main way of working is that we educate our business teams and they build the virtual employees themselves…So, we use, we rather integrate robotics knowledge into all the operational domains and instead of outsourcing your request to another party, that can be an IT department or an external partner…we convince the operational domains to do it themselves.". (Organization B – CoE Lead)

"So, the Center of Excellence kind of is, some sort of a central department which provides both knowledge support as well as infrastructure support to all of these different RPA teams, in all of those IT departments so that they can build the robots. So, the idea is that the Center of Excellence themselves, they don't build the robots necessarily, they just help other robotics teams build robots.". (Organization B – Product Owner in RPA team)
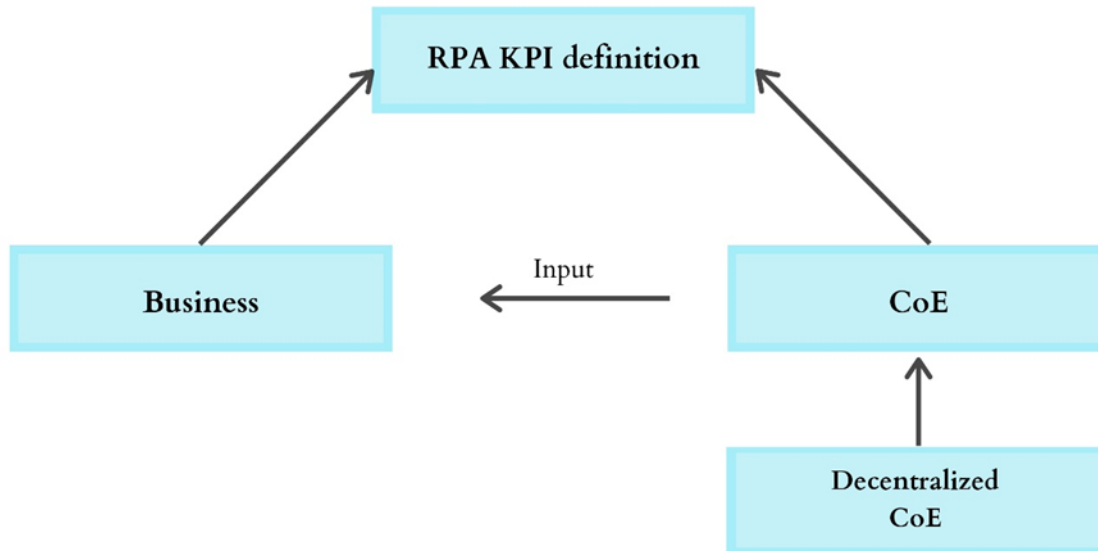
Figure 9 - Impact of decentralized CoE governance

Another impact of the RPA CoE governance model that was observed was that in the federated model, the RPA KPIs were better communicated across the different stakeholders than in the decentralized model. During the interview, while many of the representatives of the decentralized organization stated that their group did not define KPIs for RPA, later in the interview they identify certain performance indicators that they use to define RPA. A reason for that effect of the RPA CoE governance model could be that because in the decentralized CoE model, the expertise about RPA is distributed, so is the knowledge about RPA specific KPIs. This can be indicated in the segregation of roles between the CoE and the Expertise Center.

> *"...we have this kind of distributed expertise because within Organization B we use several solutions and the solutions expertise is not concentrated in one place". (Organization B – Senior RPA Team Manager)*

5.2   Common RPA KPIs

From our main research question, it is only natural to wonder whether, despite the impact that the RPA CoE governance model has on the definition of RPA KPIs, there are some common KPIs that banks in the Netherlands use that are common between them, irrelevant of their CoE governance model. As a result, we were led to ask:

What common KPIs can be identified in the Dutch banking sector regarding RPA projects?

While conducting the interviews, the participants were asked to share some of the KPIs that they used for RPA projects. In addition to that, they were asked to determine what were the most critical KPIs, in their opinion, regarding RPA projects.

From the discussion, the one metric that was mentioned by almost all the asked participants as a metric used for RPA projects, was predictably FTE savings. According to the Eurostat Glossary, FTE stands for Full – Time Equivalent, referring to the total of hours that a single employee worked during a full-time work week (Eurostat Glossary, n.d.; What Is FTE?, n.d.). In RPA projects, FTE savings refers to the amount of manual work hours that can be saved by the robotic automation of the process. In simpler terms, it calculates the number of hours that the process would take if it was done manually, that are saved by the use of a robot.

"Just comparing it then, how many times, how long does it take for us to do the same work comparing with the help of the robot, robotics". (Organization B – BU Head)

"It depends on the business case I think, ultimately. I think the, the, the obvious one would always be an FTE efficiency if you were, if you are performing a repetitive human activity then indeed, there would be an FTE efficiency.". (Organization A – BU Product Owner)

"So we see from a robotics angle, we see that about FTE efficiency (…)". (Organization A – Project Lead)

As we mentioned, almost all the participants identified FTE savings as a metric to measure the performance of RPA projects. After reviewing the conversations, it was also determined that FTE savings is one KPI that is standard for all RPA projects.

"Well, now there are pretty much standards for all process so we don't do it per robot. So is a standard, FTE saving formula where the BA is calculate how much the FTE saving or the FTE impact would be based on the time taken to, to do this process.". (Organization A – CoE Lead Developer)

"So we, the very common indicator is basically number of hours that can be saved by implementing, robotic implementation, by implementing robotic process, automated process. And then yeah, you can translate it into FTE equivalent". (Organization A – CoE Lead)

"...is just hours. So, is just the hours that a robot, that this robot's work would save. So, if a human would need to do this work, how much hours would that take.". (Organization B – BU Product Owner)

From analyzing the data, we concluded that, other than the FTE savings, "robot performance related KPIs" are also common between banking organizations. While the terminology might differ from one organization to the other, both banking groups individually identified KPIs that they use to determine the performance of their robots. These include robot coverage or robot correctness, robot uptime and robot incidents.

"And another KPI I think is very import for me is that there are no more than two incidents on 100 activities for instance.". (Organization B – CoE Product Owner)

"When it comes to generic it's just the uptime. So how much time, so basically we just, we just count how many times the robot was down for the entire month and we report that". (Organization A – Operations Lead)

".... we have to take waiting time into account for, before we can finish a task so that's what, that has been our main KPI to focus on to reduce the processing time of the robots…". (Organization B – Business Analyst)

During our analysis, we identified another group of RPA KPIs that are common for all banking organizations. These KPIs can be classified as "risk related KPIs" or more specifically as "non-financial risk related KPIs" and include metrics like risk gaps and risk reduction.

"Second, I think also a couple of things which are a bit harder to measure around risk and error reduction. (…)". (Organization B – BU Product Owner)

"(…) it can happen for example in some processes they do not have any attraction based on the FTE numbers that we are saving or impacting but are others items such as risk, risk gaps when there are risk controls that they need to be closed." . (Organization A – CoE Lead Developer)

"Yeah, so, I have to be sure that, that we report the, the correct amounts and yeah, risk indictors for our global business line towards risk.". (Organization B – BU Portfolio Manager)

Finally, one RPA KPI, that is derived from the FTE savings, has to do with value created. Both organizations defined that what they actually want as a measure of RPA, is not just the hours saved by implementing robots but the business impact that the implementation will have. In other words, they are trying to measure what added value the robotic automation of processes will bring to the organization. It needs to be noted however that as of now, that measure is arbitrary. There is no clearly defined value KPI, more of an unspecified goal. Nevertheless, it is identified as an RPA KPI.

> *"So, it's the value realization of the bot. So, the most important KPI according to me and according to the center of expertise should be the value realization part of the bots…". (Organization A – CoE Lead)*

> *"Yeah, yeah, we've got a, one KPI is that we've got the goal to reach one million hours of business value created by the robot each year.". (Organization B – CoE Lead)*

> *"So up front we define or try to define a business case so what is the expected value or savings or risk reduction that we can achieve with, with the RPA.". (Organization B – RPA Team Manager)*

The above identified common RPA KPIs can be summarized in the below table (Table 7):

Table 7 - Common RPA KPIs in the Dutch banking sector

Common RPA KPIs
FTE saved
Robot performance related KPIs (*robot coverage/robot uptime/robot incidents etc.*)
Risk related KPIs (non-financial) (*risk gap/risk reduction etc.*)
Value – Business Impact

One thing that needs to be noted is that, in the organization with the decentralized CoE, a big part of the interview participants originally stated that they do not define KPIs for RPA projects or that if they did define some, it was only during the business case phase. However, after discussing a little more with them, they identified a number of RPA KPIs,

without defining them as such but more as metrics they used for performance monitoring. This could be an indication that the communication of RPA KPIs in the decentralized CoE model, is not as effective as in the federated model but that is just conjecture.

> *"I don't use any KPIs.".*

> *"I think the KPI is that we…actually during the business case we say that "it will save us so much time..". So we calculate that so many people so, in across the globe, so much time, spent per day on that activity. So…and afterwards I don't think we measure.". (Organization B – Senior RPA Team Manager)*

5.3   Comparison of business and CoE RPA KPIs

The previous question aimed at identifying the collectively defined RPA KPIs, without making any distinction on the origin of the KPI. Looking into the RPA implementation however and taking into account the stakeholders surrounding RPA decisions, we decided to take a closer look at the RPA KPIs and determine from which unit or stakeholder these KPIs were determined from. The purpose of this was to establish what the business stakeholder side defines as RPA KPIs and what the CoE side defines as a RPA KPIs and determine whether there is an overlap or whether the two stakeholders define completely different KPIs for RPA projects. Therefore, the question that emerged was:

How do the defined RPA KPIs between the business and the CoE compare to each other?

To answer the question, after our original analysis, we reclassified the recorded answers about the KPIs used for RPA projects according to the stakeholder group that the responder belonged to. We also separated the answers between the two organizations to see whether we could also observe some similarities and differences between the units of each organization. After gathering the data, we summarized the information and created a matrix (Table 8) including all the identified RPA KPIs.

Table 8 – RPA KPIs Matrix

	FEDERATED CoE	DECENTRALIZED CoE
RPA CoE	- FTE SAVED - EMPLOYEE SATISFACTION/ENGAGEMENT - VALUE – BUSINESS IMPACT - RISK RELATED KPIS (NON-FINANCIAL) - ROBOT PERFORMANCE RELATED KPIS (DIGITALIZATION)	- FTE SAVED - ROBOT PERFORMANCE RELATED KPIS - RISK RELATED KPIS (NON-FINANCIAL) - VALUE - BUSINESS IMPACT - BUDGET (WAITING TIME)
BUSINESS	- FTE SAVED - EMPLOYEE SATISFACTION - ROBOT PERFORMANCE RELATED KPIS - REDUCTION OF FIRST-TIME RIGHTS - THROUGH-PUT TIME - CYCLE TIME - PERCENTAGE OF AUTOMATION	- FTE SAVED - ROBOT PERFORMANCE RELATED KPIS - RISK RELATED KPIS (NON-FINANCIAL) - VALUE – BUSINESS IMPACT

Using the above table, we can summarize our results. First of all, confirming our results for the main research question, we see that the RPA KPIs defined by the decentralized CoE are more technical in nature, whereas the federated CoE includes some more qualitative KPIs. On the other hand, between the two business sides we see quite a few different KPIs. We cannot conclusively state the reason why this occurs; however, it is interesting to note.

Now, taking the combined business-defined KPIs and comparing them to the CoE-defined KPIs we can observe that there aren't that many differences in the KPIs that they define. The most differences can be attributed to the business side from the federated CoE organization. The lack of differences is an interesting conclusion on its own, since the original assumption was that due to the different roles in the RPA implementation process, there would be some obvious differences in the defined KPIs. However, as we can see, other than a few more process related KPIs, there is no real difference in the KPIs defined for RPA projects. One guess as to the reason behind this would be that because of the close collaborative relation between the two groups, there is a level of assimilation of the KPIs from one group to the other.

5.4 Level of CoE experience and RPA KPIs

While RPA technology can be considered as relatively new, the truth is that it has been present in the banking industry at least since 2016. As a result, it has had some time to evolve and develop from its original form. And while it would be really interesting to see how the KPIs for RPA projects have evolved over time, this kind of research is much more extensive and time-consuming. However, it was worth to note that not all banking organizations rushed to adopt RPA technology or create Centers of Excellence to manage exclusively RPA implementations. Some organizations have just recently devoted resources to focus and develop RPA projects. While researching our selected organization, we realized that the CoE of one of the organizations was much newer than the other. Taking this into account and viewing it from the perspective of our main research question, we were naturally led to ask whether the level of experience of the CoE had any role in the definition of RPA KPIs. Therefore, we aimed to discover:

How does the level of experience of the CoE affect the definition of RPA KPIs?

During the interview process, we asked our participants whether the KPIs for RPA projects had changed over time and if so, what was the change. From those questions, along with information during other parts of the conversations, we were able to determine that indeed the level of experience of the CoE affects the definition of RPA KPIs.

More specifically, we observed that the newer Center of Excellence was focused more on FTE savings and technical KPIs. On the other hand, the older Center of Excellence is experiencing a shift in the KPIs that are defined for RPA. From focusing on FTE savings and technical KPIs, we see that more qualitative metrics are starting to be used as KPIs for RPA from the CoE such as employee satisfaction and engagement.

> *"Yeah! So for the past year it was, main target was FTE saving. Now, eventually we are looking at other aspect because also I feel like is the, the way of a CoE is being built in the beginning is very much related to getting a project and saying that we are making an impact in the bank by using robotics… then now we look to other factories of what makes robotics attractive rather than FTE satisfaction". (Organization A – CoE Lead Developer)*

> *"What's happened though over time is we demonstrated that we have learned, we demonstrated that there is value so as such the maturity, the maturity on the KPIs need to naturally evolve with that". (Organization A – BU Product Owner)*

"And whether that money is actually returned by savings or risk reduction or improved income then that's just not often really measured very well. It might change, by the way in the coming years because there's more and more, more reason to look whether the investments are actually well- spent and whether they have been successful but at the moment it's, it's rather limited.". (Organization B – RPA Team Manager)

"No, not really. We have, we have worked together quite extensively when developing these robots. I had to answer a lot of questions and ...yeah, when they were delivered, if I can say it like that...well, we had to make a few improvements but over, over time, no they, they are working very well, yep.". (Organization B – BU Portfolio Manager)

The reasoning behind this is the goal of value creation with robotics for the organization.

"So you identify some of those and for the robotics world, universally an FTE equivalent was one of the most common indicator in the beginning. And now, more and more, companies are moving away from only FTE indicator to other objectives to gain from it. The employee engagement as I said, low human risk basically, so less human errors, more compliancy, how do you say, leaving the audit trail because bots leave the audit trail so you can easily trace back what the bot has done...But what we are seeing more and more, recipients of the robotic solutions are not caring so much about the hours saved, but they are caring about the digitalization for instance". (Organization A – CoE Lead)

Therefore, we can say that due to the level of experience of the CoE, RPA is now turning from a cost-cutting tool to a value-creating tool for the banking organizations in the Netherlands. This is a reasonable conclusion since it is only natural for new initiatives to be evaluated based on what they offer to the organization quantitatively. However, with experience, organizations realize that projects can also offer qualitative advantages, which are sometimes harder to measure.

5.5   Additional remarks and observations

During our research, other aspects of the phenomenon were attempted to be investigated. However, in the end deemed some were irrelevant to the research and others were discarded due to insufficient data. Nevertheless, we were able to derive some additional observations regarding the topic.

First of all, we are able to confirm that, at least for the decisions regarding RPA KPIs, the Instrumental Stakeholder Model is valid and applicable. The interview participants confirmed that when reviewing RPA cases, all the stakeholders' perspectives are taken into account and therefore have a level of impact.

> *"But we always look at the stakeholders because some part of process are more used by one business line so for RPA , we always look, okay, who's gonna have the most advantage with this improvement.". (Organization B – Business Analyst)*

> *"(...) what factors are important so we just did like a mutual agreement just define them together with the different stakeholders. (...) We see that we are now with different parties that are involved and each party has its own KPI.". (Organization A – Project Lead)*

Furthermore, through our research we were able to confirm the descriptions of the CoEs' governance models. Indeed, our initial classification of the organizations' CoE into federated and decentralized were accurate and can be corroborated by the interviewees' statements. The initial classification was based on online research and discussion with Accenture experts, and while accurate, the validation of the descriptions gives this research another level of validity.

> *"In fact we have Center of Excellence, Expertise and they are, we have this kind of distributed expertise because within Organization B we use several solutions and the solutions expertise is not concentrated in one place.". (Organization B – Senior RPA Team Manager)*

> *"(...) and this is kind of a downside to this decentralized model, it is unavailability of important stakeholders and subject-matter experts, right?". (Organization B – BU Product Owner)*

> *"I mean it's federated, right? So, centralized to some extent because yeah, we do built bots centrally, operational work for us is centralized so*

anybody across the organization can built a bot, we provide the infrastructure, we provide the tools and techniques, we provide the consulting, we provide the supervision centrally from the CoE but anybody can built a bot themselves". (Organization A – CoE Lead)

In addition, while reviewing the defined KPIs for RPA, we observed another possible influence factor into the definition of RPA KPIs. This factor can be collectively defined as External Conditions or External Factors. By External Factors, we consider the conditions that are present in the external environment of the organization. Some of the interviewees indicated that the current conditions of a global pandemic and the subsequent consequences of social distancing have affected not only which RPA KPIs are critical but also the process prioritization criteria of robotic automation.

"Now, let's give an example with the Corona virus. Now, cost cutting doesn't do anything during this particular situation in that sense. Digitalization does. Digitalization takes time, robotics can be a lifeline towards saving upon that time. So it's not always straight about the costing, it depends on the environment which you're actually working on in this moment.".

[Speaking for the time of COVID-19] "We have customer service team members which are having to go into the office in order to collect mail and validate signatures. That, that's something which needs to change. It's a, one you can classify this as a fundamental based on our current environment. Now, if you took this two weeks, two months ago, three months ago, this is something which would be innovative then…". (Organization A – BU Product Owner)

While we cannot conclusively confirm or deny this effect with our research, we note that there are indications that the external environment of an organization may have at least a short-term effect on the definition of RPA KPIs and other decision areas of RPA projects.

Last but not least, in the beginning of this paper, we mentioned that RPA robots can be either attended or unattended based on the level of human input that is required. During the interview process, we asked our participants to identify what type of robots their organizations used for their RPA projects. Most of the respondents stated that they use both attended and unattended robots, based on the requirements of the process.

"Preferably unattended, that's at least the strategic direction for RPAs but in case that's not achievable at the moment, then we might have an attended robot.". (Organization B – RPA Team Manager)

"Oh, I think is depends on the process, is depend on the process. If there is a critical…there's one of the principle guidelines we were not allowed to implement robot for the critical processes.". (Organization B – Senior RPA Team Manager)

"They are unattended. Well, in the whole (organization), we have both forms, attended and unattended. In our team specifically, we have chosen to mainly work with unattended robots.". (Organization A – CoE Lead Developer)

"Technically, both attended and unattended (…) we say we support only unattended but technically for some robots, for some reasons we need to have a supervision because, because of technical reasons.". (Organization A – CoE Lead)

However, while the participants supported that they use unattended robots in their operations, they further added that they provided some manual support even to the unattended robots such as starting and turning off the robot on a daily basis.

"Well, they are unattended but we do attend them on a daily basis to see if everything goes well.". (Organization B – CoE Product Owner)

"I think unattended but what…because I can start them myself… Yeah, I have to start them myself, I have to, to do a few actions before they do what they are intended to do, yep.". (Organization B – BU Portfolio Manager)

"That for instance sometimes we need to have, say in the morning we need to start the robot, let it run for the whole day and stop the robot right? That's something that we have to do manually…. we support unattended and that's our primary objective but for technical reasons we still have to do attended automation for some of the bots.". (Organization A – CoE Lead)

"Right, I would say it's mostly unattended. What is required from a human perspective is that someone needs to log on the robot in the system.

Unfortunately, this is not possible without human intervention. And yeah, since we are still developing the robot there's still some tweaks that are required to make sure that it's working as desired. But in the end, I would say it's unattended, yeah.". (Organization A – BU Blackbelt)

What we can conclude from this is that, while unattended robots exist for the most part and are desirable, it is still not fully possible to have fully unattended robots in an organization. A minimal amount of human input is still required for the unattended robots to perform. However, it seems like full robotic unattendance is within reach.

6   CONCLUSIONS

6.1   Limitations

Despite the best efforts, most research efforts are liable to be affected by the conditions present during the research process. Therefore, the results of the research need to be viewed with a mind to the existing limitations. As a result, the findings of this research must also be considered under the light of its possible limitations.

Due to the confidentiality concerns of the banking sector, a limitation of this research is the availability to the relevant data. While the interviews provided sufficient evidence to support our hypothesis, a more concrete and specific result would have been reached if the interviewees' claims had been substantiated by evidence from the organization such as their process evaluation framework etc. However, due to the sensitivity of the data of this particular sector, this was not possible. Nevertheless, the desired result was reached despite the confidentiality constraint.

Another possible limitation of the research is the geographical focus on the country of the Netherlands. The research focuses on two organizations within the Netherlands so there is the danger that the results might differ or not be applicable at all for countries outside the Netherlands. For similar countries to the Netherlands, the results might still apply but that is a made assumption and cannot be corroborated at this moment.

In addition to the above, this paper is also liable to be affected by researcher bias. Researcher bias is the intentional or unintentional influence of the researcher's beliefs, opinions, and assumptions on the research process (Farnsworth, 2020). Because of the experience level of the researcher, it is likely that this paper might be influenced by unconscious research bias. It needs to be noted however, that there are ways to combat research bias where its influence becomes insignificant.

Yet, research bias is not the only force that might influence this and other papers of the same nature. Because of the method of data collection, this study is also liable to be affected by participant bias. Participant bias is the intentional or unintentional influence of the interviewee's answers based on their opinions, social, perception about the right answer, etc. (Shah, 2019). Thus, simply because of the human nature of the interview participants but also because of their expertise on the field, this paper might be influenced by this bias.

To add to the above limitations, another possible limitation of the research is the number of case studies. While the choice of organizations was purposeful and representative of the chosen CoE governance models, the results of this research could be influenced by the number of chosen organizations. A more established answer could be achieved if more banking organizations with RPA experience were questioned. However, due to time

constraints as well as the fact that not all banking organizations have the resources to establish a CoE for RPA, a conscious decision was made to take a representative sample without risking the validity of the research, knowing the research could later be expanded.

Finally, we need to point out the lack of available literature regarding Centers of Excellence, specifically for RPA, as well as regarding RPA KPIs. While there were some available articles relevant to the topic, the topic is not very widely researched and therefore sources outside of the academic spectrum had to be included.

6.2   Concluding remarks

While RPA technology is growing, the adoption of RPA projects is still facing certain obstacles. One of these obstacles has been identified as the definition of proper KPIs for RPA. The question arises however about the factors that impact the definition of RPA KPIs. In the relevant literature about KPIs, researchers support that for the proper definition of KPIs, all the associated stakeholders need to be involved.

This research paper aimed to investigate whether the above claim could be carried out for RPA KPIs as well. Specifically, this thesis set out to explore the impact of the CoE governance model, a main stakeholder in RPA implementation, upon the definition of RPA KPIs in the Dutch banking industry. The choice of the sector was based on the fact that banking is one of the heavier investors in RPA technology and will be one of the most benefited ones. The focus on the country of the Netherlands is due to the fact that the Dutch banking sector is market competitive and represents a relatively large size to the GDP.

Based on the qualitative analysis, of the collected data from interviews conducted with representatives from the case study organizations, we concluded that the governance model of the RPA CoE does in fact have an influence on the definition of RPA KPIs. Specifically, the governance model of the RPA CoE impacts the role that the CoE has in regards to the Customers of RPA projects. Depending on the governance model, the role of the CoE changes and thus the nature of the RPA KPIs that they define changes as well. The role could vary from purely consulting to strictly technical and with it, the relevant KPIs.

However, this paper aimed to also investigate some supplementary elements of the phenomenon. Despite the differences in the CoE governance model, we wondered whether there were some common KPIs between the two organizations and between the two major RPA stakeholders, that were being used for RPA projects. We discovered that indeed, despite the difference in the governance of the CoE, the two organizations shared some common KPIs. The majority of the interviewers identified FTE savings as the main KPI used for RPA. Other than that, the research analysis also revealed that robot

performance related and (non-financial) risk related KPIs were also commonly used in RPA projects. Finally, the analysis identified value creation as a common KPI between the organizations, even though the term was slightly arbitrary.

However, after identifying the commonly used KPIs, we were interested in identifying the KPIs defined by the Customer/business stakeholders and the KPIs defined by the CoE stakeholders and observing where they converged and where they deviate from each other. The results indicated that, despite our expectations that the KPIs between the two stakeholders would show the difference in the roles of the stakeholder, surprisingly they did not differ that much from each other.

During our research, there was also one other element that described the CoE that was also different between the two units of the case study. While one organization had a few years of experience in RPA implementations, the other organization had recently made a concentrated effort in RPA. This led us to our last research question regarding the correlation between the experience level of the CoE and the definition of RPA KPIs. The analysis of the qualitative data led us to the conclusion that the level of experience of the RPA CoE does indeed have an impact on the definition of RPA KPIs. In fact, we concluded that when an RPA CoE is first starting out, its KPIs are more focused on FTEs and technical KPIs which is an initial instinct for many innovative projects. However, as the level of experience increased, more qualitative measurements are being included with the purpose of defining the real value of RPA technology. In other words, as the level of experience of the CoE increases, RPA turns from a cost-cutting tool to a value-creating tool.

This thesis is of practical relevance since it does not only cover a gap in literature regarding CoEs and RPA KPIs but it is also useful for all organizations that are implementing or are planning to implement RPA technology, not just for the banking industry. Using the results of this study, organizations can optimize their decision-making process regarding RPA KPIs leading to a higher success rate of RPA adoption.

RPA has a lot of potential for the future. Future research could study the influence that AI will have on RPA technology and the possibilities of RPA when combined with AI and other innovative technologies like Natural Language Processing and Optical Character Recognition. Already, organizations are looking into integrating AI solutions with RPA and it would be interesting to investigate since it would help RPA overcome the disadvantage of being only applicable for standardized, repetitive processes. Furthermore, future research could also focus on the possibility of an AI CoE and based on the existing literature, create a framework for building the future AI CoEs. In addition, another useful research avenue would be to observe the impact of the level of CoE experience on the RPA KPIs on a more long-term basis. Our research only spanned a few months so it would be interesting to see the impact of the experience level after a couple of years.

RPA technology is as controversial as any innovative technology. There are those that think that it is just a short-term solution or that it is not really an innovation but based on other technologies. However, there are also those that believe that RPA has a lot of potential and that it is the first step to a different reality that it is fast coming. What we know is that RPA technology is already changing the way organizations deliver value and whether short-term or long-term, it is here to stay.

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APPENDICES

Appendix 1 – Interview guide

General Introductory Questions

1. How do you know about RPA implementation? What is your experience with RPA?
2. Is the RPA technology used, attended or unattended?
3. Could you give me any examples of RPA implementation cases?

Governance of CoE and KPIs

1. Could you describe to me the structure of the Center of Excellence/ Expertise (Expertise Center)? Where does it fit within the organization?
2. How would you describe the governance model of the CoE?
3. Would you say that the governance model of the CoE has any influence on the RPA implementation?
4. How do you measure the performance/success of an RPA implementation (KPIs)?
5. Do you use any KPIs?
6. What are some reasons that RPA projects fail?

RPA KPIs definition process

1. Could you describe to me what process you follow to determine the RPA KPIs?
2. Is it the same KPIs for each automated process/among RPA cases?
3. (Do you use any standardized KPIs among RPA cases?)
4. Would you say that the governance model of the CoE has any influence on the definition of the RPA KPIs?
5. What unit is responsible for the RPA implementation?

CoE defined KPIs for RPA

1. What are the most critical KPIs for RPA implementation from the CoE point of view/from the business point of view?
2. What other KPIs are used when evaluating RPA implementation?
3. Are these KPIs different than when you first started implementing RPA projects?

RPA Cases

1. Could you describe to me how you pick which processes to automate?
2. What are the criteria?

3. What difficulties do you encounter when picking an automation case?
4. How do you prioritize which cases to implement RPA to?

General ending question

1. Is there any last thing you would like to add?

Appendix 2 – Interview transcript 1 – Bank A

Start of recording

[Interviewer]: Okay, great. So, well, I didn't introduce myself but I did introduce myself in the email. I'm Kyveli and this interview is part of my thesis research. So I would like to ask you a few questions if that's alright.

[Bank A - Product Owner]: Yeah, alright, perfect.

[Interviewer]: Okay, then…I know you're the Product Owner in the Center of Excellence for Bank A but could you just briefly tell me what is your experience with RPA, how long you've been involved in automation of processes using robotics?

[Bank A - Product Owner]: Yeah, then a short background. I think I did study more within Bank A on operational excellence so with becoming a Blackbelt and then I had to bring some teams aboard to one of GSO, one of the GS Service Center in [country] and we're collecting a lot of people from different nationalities there all using the same mailbox. So at one moment I thought, three years ago I think, three and a half years ago, like 'I'm sure there are smarter ways that just adding more people with different language skills' and I started to look into Natural Language Processing and RPA. That brought me in contact with some people within Accenture, [male name] for example was already there, [female name], she is in Barcelona now with Accenture and with a small group of people, we started to build an RPA robot with a developer from Romania. Was all new and got a lot of attention within the bank after time as apparently it was the first time they did an NLP project and even successful with this four, five people group. So that was my start, just based upon luck and interest, I though there should be something better. And that's very agile as we are within the bank, I created my own new job which I currently have within the Robotics team. Yeah, which was then just starting, I think it was the first year it started and half-way the year I just moved into the team, yeah, alright the end of the first year. Yeah, that was my introduction. So three years ago, I think.

[Interviewer]: And in all your experience that you've had in this process, is the RPA technology that you use attended or unattended?

[Bank A - Product Owner]: It's both indeed. I mean, our desire is of course to have it unattended but what you see now is that the RPA can move fast, or the idea behind robotics can move fast but we still work within a big company, we still have a legacy within our IT systems like every big company has, so not everything is ready. So the expectations sometimes are way beyond what we can actually offer as robotics. People suddenly think AI is everywhere and you don't have to do anything anymore and then we have an ideal system which we also need to adapt to. So the goal is unattended but we're, we're not there yet. And also the trust within ourselves is also not there yet so we really want to see if we have the right outcome.

[Interviewer]: Could you give me any examples of RPA implementation cases that you've been involved with? So some processes that you've automated with robots for example.

[Bank A - Product Owner]: Yeah, well, one of the most popular, popular processes pluses and minus of course is the whole world regarding the KYC, know your customer. Yeah, I think everyone knows that the Bank A was one of the ones with the, let's say, some short of fine we had there. I think it could have been any bank in the world for that matter and it still can be any bank in the world but now it was the Bank A. So here, within Bank A, we're building up a whole new team of people actually, like a whole army of people, doing the controls and this is a good opportunity to use RPA. We're building whole teams to do name screening, just check if the names, if there are company names or people names, if they have background to take into account etc. and in some of these processes especially the name screenings, we put up robots also. So instead of a whole team of people doing the name screening, you have the robots doing the name screening. And then you have the false positives and the positives and the false-false, I don't know all type of combination. So you still need some check ups by people, that's the control but yeah, all the first steps can be done by robots. So that's one of the biggest ones we rolled out. Another one now is so called Associated-Party screening, it's where we have to check the companies which are part, sorry, which are dealing with the companies that are clients of Bank A. Again, this is a prerequisite for KYC so you see a lot of controls on names and on companies and on natural-person names that we have to do, on global scale so here on global scale, we can actually build the same type of robots that are doing similar type of work, which is what we love in the end. We build a robot and then copy-paste it a few times. And that's really one of the majority ones that we do. Yeah, we keep checking names, account numbers, company names. There is also nicer ones. Nice ones

some that we have with Natural Language Processing, that we do on a global scale. First we started in the Netherlands, now Belgium and Bratislava, checking all incoming emails from clients and then create a sort of service request for it. So we take over the majority of the work from the front-office people so they can not have, they don't have to read the email boxes anymore, they can just look at the workload that they get via the NLP robots, which saves them at least a few minutes per case. That doesn't sound like a lot but if you have 4,000 emails or 3,000 emails per day and you save three minutes, then it really adds up into a lot of minutes.

[Interviewer]: So what I'm guessing is that all these cases are successful cases. Do you have any examples of unsuccessful cases, where you started implementing robots..?
[Bank A - Product Owner]: Yes, of course we do. I mean you can only built successful cases if you have unsuccessful cases I think. Again here I think we started with KYC, one of the first robots to check, have a simplistic check for one country which we built successful. That was even before my time but then they wanted to make it do more and more and more and be part of more applications and at that time we also had no knowledge about the limitations of robotics itself. And in the end you saw that if we're trying to build the perfect robot it will never be brought live. So more and more functionalities were added and it became way too depended from external factors and in the end we just had to pull the plug there. And even last year we had another project where we noticed that the robot was, had a dependency on, I don't know, let's say between five and ten, external applications and here you see that you can never have a successful robot since, any change on one of those applications needs a change on the robot. So you can never have it unattended and that you actually need a tendent presence and an operator and a developer and a BA there on daily base to tweak the robot. Yeah, so here, even after a year, we said 'okay, fine, this is it', we pulled the plug. So especially robots where too much is expected to be done, where there's multiple applications that come into consideration that are all fragile or having changes within them, these are not the processes where robotics is currently strong enough to stay alive.

[Interviewer]: Okay, very interesting. Okay, we'll change a little bit the topic and we'll go on..so you're an inside source from the Center of Excellence so how would you describe the governance model of the Center of Excellence? Would you describe it centralized, decentralized, federated, hybrid for example?

[Bank A - Product Owner]: Yeah, no, it is, well, let's say, I work for the Wholesale Banking part which is a global organization. We are centralized as we are based in Amsterdam but the work we do is for, for, for the whole world that we built the same robots. Of course, the majority of work within Bank A is within a few countries to start with. I

mean, we are by origin a Dutch bank so most work is within a Dutch bank, most clients also but it's very nice to see that solutions we can build in the Netherlands we can use on a smaller scale in multiple other countries. And that's our strength, that we actually know or learn that we see that there is a global model growing within Bank A so it's not only us but also client-wise and market-wise and client-usage-wise. The more global models we roll out as an Bank A, the easier it is to build let's say this one robot who rules them all or at least that can do the same type of work allover the world. Doesn't mean that it has to be the same type of numbers but it can be beneficial on a global scale. And the CoE that we have, the robotics is still new within Bank A, so I think we're now busy for three years, which means that we have several parties where robotic teams pop-up, that's how it goes, you know? Not saying that we're each other's competitors but sometimes it still feels like it in the beginning. People want to prove their value, even within a company and they either share something or they share not something on purpose. That's a bit weird for me. So at least I'm in good relation with the Domestic robotics teams and we try to share the ideas that we have but there is still some learning here indeed. We have still people who are, we each got our KPIs and our goals and we really focus on achieving them, which might not always be the best benefit within Bank A, I have to admit. So we should help each other a little bit more there.

[Interviewer]: And would you say that the governance model of the Center of Excellence has any influence on the RPA implementation? So when RPA processes are implemented, what metrics are used for example for the RPA implementation?

[Bank A - Product Owner]: Yeah, it has impact based on the fact that a lot is still measured on financial impact. So I mean a lot is still done based on the impact on FTEs. And this something from the robotics perspective we don't necessarily want. You're there to improve a process, to help the teams that are having some issues and to make the time free for people. For senior management that changed a little bit, if you look at the KPIs but they're still, they still don't just see this impact of the robots we roll out to have an FTE impact. For example, this year we have 100 FTE impact which is achieved by rolling out robots. Which means that the processes we can roll out need to have this kind of impact or at least the majority needs to have an impact. Once we've reached 100 we can actually, we have processes which will make people happy. I mean that's a bit dubious world that still live in.

[Interviewer]: Okay. And we mentioned for example FTE impact but what, what do you, how do you measure the performance or the success of RPA, of an RPA project?

[Bank A - Product Owner]: For me that's a good question. When I entered, so two and a half, three years ago, I think then the KPI was let's say, 'let's build fifty robots', that was the KPI. And at the end of the year, I was new on the team asking to my manager, 'okay, how did we do?', 'okay, we build a robot', 'what was the goal of the FTE savings? Six? Alright, then we saved six'. But yeah, but did we actually run it, was the robot running or was something happening? And he said, well 'I don't care, we built a robot'. So then, yeah, my six-year old daughter can actually do this exercise. And now it changed. So now, what I want as a product owner also is that during the intake with the BA, we come to an agreement on how we measure the performance of the robot. So we should be able, together with the business to show that we are either dealing the amount of input that they are expecting us or we can see that there is less input that they promised so the saving will also be less. But we have to guarantee that the robot is actually performing on what we agreed on during the intake. So this way we have a monthly or weekly update that depends on what we come to an agreement and we report like 'okay, this week we had so many emails or we did so many name screenings or we did so many, so many etc. etc.' So it's really based on input and on agreements. But I can either show them that we really did this or more every month or every, whatever, week or I can tell them 'okay, you told me I was expecting 100 name screenings and I see that I only have five name screenings a week so the saving that you had envisioned, yeah, you will never achieve it so since we don't progress the work. I mean that's the control I would like to have on our performance.

[Interviewer]: Could you describe to me, you mentioned it briefly right now but could you describe to me what process you follow to determine the RPA KPIs?

[Bank A - Product Owner]: Yeah, well, it's not me who makes the KPIs. That's our board of directors who come with the KPIs and they get cascaded into, on tribe level, even a bit broader. And then it's the tribe, I'm in it's more an IT delivery tribe and robotics is not necessarily IT delivery. We're a lot closer, working together with the business. So again here I still have to personally or with my manager, translate it into our own KPIs and on IT level, a lot is related to, every IT implementation needs to be successful or we can only have a few risks findings a year which is fine with the robotics also but we have a lot smaller projects and we work a lot closer with the business. I mean the only one we get every year since I'm here is that we have to have a certain impact on the FTE. That's the only one that is purely related to robotics and the other one I would put in on a bit higher level, which we have to relate to robotics ourselves. Yeah, it's not purely for our team that we make the KPIs. That's unfortunate but that's how it is.

[Interviewer]: Okay. So the KPIs that are cascaded to you, are there some that are, that are the same for each, for all RPA processes or does it depend on the RPA process?

[Bank A - Product Owner]: Yeah, they are the same for all our RPA processes. It could be that if you would go within a different area of Bank A that they have different KPIs on their broad level. I was trying to actually find some indeed that I looked up. So that can be a different impact on them. But you can make sure that the majority is the saving impact or the FTE impact. If I go to other team meetings or other tribe meetings, other robotics teams, there is always this big number that they have to save by using RPA within the Bank A bank. Yeah, I mean, in the end that's, when I had the same thing with Blackbelt, everybody was really happy that you were there to improve the process but at the end of every Blackbelt project it meant that you could point to the people that could go because the process was improved. Yeah, we're having a bit the same idea now with RPA and with robotics. Everyone is now still really happy. By the time they find out that robotics is there to maybe get rid of some people, that's not really something I like but this is the situation now. Things change a little bit, the feeling towards RPA. Yeah, but that's something as a team we say that what was our logo, our moto again? Yeah , that we're trying to get the labor out of our work. That was sort of the sentence. So we're trying to make the redundant work, work you don't like and make up your mind or your free time that you can actually spend to those things you're good at. That's our moto.

[Interviewer]: Okay. And on average, let's say from your experience, how many KPIs does it usually, do you usually define for an RPA process?

[Bank A - Product Owner]: Well, we have a few ourselves of course. It's the correctness we have for ourselves. So on KPI level it's just a few unsuccessful implementations on saving and on the successful controls that we do but for ourselves we are a bit stricter of course. So, we have one on reporting, we have one operating, on attended or on unattended, we have the risks ones. Implementing robots still means also a culture change within risk with IT. So those are the KPIs we have for ourselves to be more successful and to be more act as one.

[Interviewer]: Okay. Let's see, let's see. Yeah, we discussed that previously. So, again, from a Center of Excellence point of view, cause we mentioned it a little bit before, what would be the most critical KPIs for RPA?

[Bank A - Product Owner]: Yeah. In the situation as it is that would be the savings, so the FTE impact on annual basis.

[Interviewer]: And other than the FTE savings what other KPIs are used for example? Could you give me some other examples of KPIs that are used for RPA evaluation?

[Bank A - Product Owner]: For RPA evaluation is the number of implementations which do not lead to incidents so, the indeed the robot is performing as promised. That's a very important one. Well, I think those are the most important ones. They deliver on promise, not only for me but that's, our survival as robotics teams is to prove that the robots we built are actually doing the things that are promised in the beginning or are expected by the business. I mean for me this is the most important one. Of course we have the other ones where we have to live up to all the risk ratings but that's something that you have within any Bank A project anyway. Of course when it comes to risk ratings, robots are dealt with stricter by every risk party or CRM party than human being. So we have to be even more precise than anyone else within the bank at this moment.

[Interviewer]: And since you first started working with robots and automation processes, you mentioned it I think briefly but did you notice a change, a change in the KPIs that were first defined when you were, when you started and then, what is defined as a KPI now for the process?

[Bank A - Product Owner]: Yeah, I mean, we're still not there to my opinion. There is still too much emphasis on the saving part...which I understand. In the end that's what we want to achieve within the bank ourselves. But there should also be a room to explore more and to making things better within the bank. We are not there yet but they already gave us a little bit more freedom to explore and to redefine some gaps, within, yeah, within the Bank A itself where we can make, like, easier for our employees or better for our clients. In the beginning, the first KPI, as I said, was just delivery of robots which in a way is very silly KPI and now, and then it was delivery of successful robots and now it's an FTE saving at first, now it's FTE impacted which already is better since impacted is a lot easier to guess and you can, you have more freedom in the processes you choose than the actual FTE saving. So then at that moment, also managers had to sign off the saving that they would get which gives a very negative sense into the robotic processes and projects to get them approved and now it is something we do together with the business. We look at the impact, we look at what we can do together so yeah, it already became, I'm not gonna say social but it's already, yeah, it's a bit nicer to work together with the business, a bit less strict. We still need to achieve the impact which is fine. But impact can be achieved easier than pure savings. I'm very happy with that one.

[Interviewer]: Okay. So, we'll move away from the KPIs. How, how, could you describe to me how you pick which processes to automate? What are some of the criteria?

[Bank A - Product Owner]: Yeah, as I mentioned if you look at our failures then you also know at our success rate. A part of it is still always based on volume. You know, if you wanna have the impact or the FTE impact or business impact, then you need a certain amount of volumes. So we need a type of work where there is enough volume in it. In most cases is indeed what I said, checking names, checking emails, uploading forms, handling big amount of data. So that's always going to be a source or it's repetitive work that people need to do, put things from one Excel sheet to the computer then it's extracted to another Excel sheet then it goes to the next string. It sounds silly but we have hundreds of processes which are still following these models. So, then, we look 'okay, what's the complication for us of building a robot? How much time is it taking us compared to the possible saving or help that we can offer?'. So that in the end gives certain scoring, we have a scoring system here, it's with the BAs that they always have the intakes and then you see the complexity, you see the risk and you see at the business impact. So, if you measure those three and it depends on the scoring it gets then you, either they gonna get a positive outcome to build a robot or you get a negative outcome. If there is too many risk dependencies or too many application dependencies, then it's chance of being successful robots is very minimum and we will not pick It up. Not saying we're not going for any challenge, sometimes we get them for free of course. But yeah, we did grow in the last two years, I would say in recognizing processes which you already know are not going to be successful.

[Interviewer]: Okay. And what difficulties do you encounter when picking an automation case?

[Bank A - Product Owner]: It is..a big part is for the, for the business to understand that..I mean, we are not miracle workers. I forget the sentence that I once wrote on the board, yeah, that we can do logic but we cannot do wonders, you know, as a robot? If you have a shitty process and you build a robot around it, it's still gonna be a shitty process. So, we're not gonna solve issues within teams who are not working into a correct way. You can built whatever robot but that's not gonna solve it. So, explaining that a robot doesn't solve everything, that's really important for us. And if you are depended of an application, and of course we have some in the bank also, which is very slow, the robot is not gonna make the application slower. So people think that 'yeah, but the robot takes too long'. Yeah but the robot cannot...I mean some things that can work faster as a human being, I mean it can read an Excel sheet and put from A to B s lot faster than a human being but if be a system which only is allowed to upload one line every minute, then the same is for the robot. So, this is always very important to explain to people that, I mean, we're not improving your IT environment and we're not improving your process. We're

still acting as a human being and we can help the same way. Sometimes we can do it a lot faster but we still have to work with the same systems as the team itself already has. I think that's always the big one. And the other part, which is half my job, is to talk to all the involved risk parties who when suddenly encounters a robot, have a lot more demands and questions about safety and how does it go with the data, does it leave the Bank A and who's working with it and what's open, even though we are working from so called IPC, IG private Cloud, and it's way more secure than natural people are working with the data..yeah, it's just showing you that this is new for so many people still within the bank and that's why I always say that a lot of the choices that are being made by risk are based on personal choices and not on Bank A choices or risk choices. And this is something that I struggle with and I still would like to see changed within, as a global robotics team, so me together with other robotics teams have some label global risk approvals that I can just show to any other involved risk party within Bank A, like 'okay, this is the saving, this is what we listen to'. It gets even worse when you have to work within multiple countries but in every country someone is going to ask you the same questions. Yeah, and that's, that's the stuff we struggle with at this time. A nice challenge let's call it that.

[Interviewer]: Okay, yeah. Okay. After you choose some of the cases, you've identified some cases to automate with robots, how do you prioritize which case gets to go first, gets to be automated first?

[Bank A - Product Owner]: Yeah. Well, part of the answer you already know. That's the impact. So it's either two ways: or is this sprint that we can build a robot that's really gonna help if we'd see that it only takes us like one sprint, I don't know if you know the sprint but it's an agile way, like two weeks of working and I can see that this is helping teams and it can even have a minimized impact than I am very much in favor of to put one of the developers aside with a, with a, with a Business Analyst and get something done. So, speed of implementation together with usefulness, that's a really important factor for us. In the end I have to reach my KPI which is the 100 FTE impact so I always need to look at projects which have a big impact since in the end I have to make sure that I reach that target. Yeah. So those are the two things for me, yeah.

[Interviewer]: Well, we're actually done with most of my questions. Is there any last thing you would like to add? Anything that you think I should know about RPA, about the governance model, the Center of Excellence?

[Bank A - Product Owner]: Yeah, I mean, I don't know how many, how much you traveled to RPA shows and listened to other companies and what they are doing. I think it suddenly became like really trendy or hip is the word, is the whole RPA part. And in

the beginning it was new and people were expecting nothing, now they might over-expect and this is not something that we can always deliver. As I said, we cannot do wonders suddenly. We can do a lot of logic and very nice things and we can make it look like wonders but, but we're not magicians here. In the end, we build something on logic and build something on the systems we have. And you have to make people aware that something like AI is actually almost non-existing. So when they ask me like, 'okay, so now I sent you one word and then you understand the other thousand', that's never the case. People need to understand we cannot make robots by ourselves, we need help from the teams themselves who are doing the actual work right now. And I would very much like to see, as I said that, we get a company understanding or global understanding on the risks and benefits of robots and now I have to fight fights, some personal battles still between a person if he is agreeing, if he is not agreeing that a robot is taking over part of the work. So, that's, I think even for the upcoming years that's still something that we have to grow into as a company. But, I can still see even within Bank A where we're going pretty fast but there's a lot of work that can be really beneficial if we move further with RPA. Yeah, so I'm still very happy with the team and the people and yeah…It mostly makes me smile.

[Interviewer]: Okay. That's good, that's good. Okay, actually that's the end. I'll stop the recording.
End of recording

Appendix 3 - Interview transcript 2 – Bank B

Start of recording

[Interviewer]: Okay, great. So, as you know or, I'll introduce myself anyway, my name is Kyveli and I'm conducting this interview for the purposes of my thesis. So, the first question I would like to ask you is how do you know about RPA? What is your experience with RPA?

[Bank B – CoE Lead]: Yeah. Well, actually I got with RPA…I work for Bank B for over thirteen, just over thirteen years now. Always been in Operations departments so I've got more business like background, operations payments mainly. Four years ago I started with an investigation on becoming more efficient within our operational department and I had already seen something about robotics and the potential of robotics but it wasn't really the time, that moment. But four years ago, times had changed, overhead changed and we saw in the summer of 2016 that there is great potential on this, on this, this new

way of working. And that's where we got started and I, got into contact with some guy from IT, [unidentified person's name], who's my companion, still is my companion from an IT point of view. We started our journey which has evolved into a full-time job for me, as of the 1st of January 2017. Bart and I got completely freed from capacity to make robotics great and to really make it an important factor in the operational department. So, that was really the…I presented the firsts results of a POC, June, summer 2016 to the senior management at Operations and they told us, "well, this sounds very interesting, we really believe in new innovation and this is one of it and let's get started and let's do it also in a professional way so please"…I had a background in operational finance and in, in operational departments but I was completely freed to start as of the 1st of January 2017 and I'm still doing that so…with great success.

[Interviewer]: And could you give me some examples of RPA implementation cases that you've involved yourself with?

[Bank B – CoE Lead]: Yeah, I've got…once we started, our way of working is that we really believe that it's better to give our business people the right tooling to build the robots themselves instead of third parties or IT departments who are building the robots for them. So, our main way of working is that we educate our business teams and they build the virtual employees themselves. And at this moment over twenty-five operational domains within Bank B are working in that, in that way. So, we got over like 300 robots in production at this moment with the biggest robots around the CDD departments, so KYC, Know Your Customer processes which are really the biggest ones. Next to that the lending departments, so mortgages, helping in the operational processes in that, in that department or that branch. So, big, big robots over there. And we've great, diverse types of robot. A lot of robots are gathering information for highly educated people who had to do that first themselves and now the robot is doing that, they're doing the pre-work actually. So, the robot does the pre-work and the, the employee now only does the analysis and the final verdict, for instance. But in Finance we help in providing, especially now in the Corona crisis for instance, extension of payments of our clients which has all been addressed in our application and our complicated application landscape of course. And regular change is quite hard to fix in, within the week and robot we can, we can build in a week. So, a robot is really functional at the moment but we also do like mail-bots so converting, redirecting email, incoming emails from clients but also, within the company itself. Creating letters, printing letters but also risk avoidance. One of our big, one of our interesting robots, not the biggest one, is a robot who scans one of our applications in outdated ratings, loans, and when it sees an outdated rating or a load which is nearly outdated, then it sends an email to the account manager and his manager that action needs to be done to, to prevent a possible penalty from the regulation. Or in the other part when

you've got a loan which is outdated, it can mean that we're having too much capital in our books or, too little, that's also a possibility. So that also can help the bank in becoming more efficient. So, I can continue because there are also like examples in more client, client focused. So we use a robot in our mortgage project which sense in the time consuming process of getting a mortgage so about 21, 22 days within the bank. It send in five moments in that process a text message, What'sUp message or an email to the client which part of the process he is in, at this moment to present our client to call our help desk and asking where, where in the process he is in this moment because he is visiting the real-estate agent next week or something like that. So a lot of different…actually we, we really use it all over where we see that there is a lot of operational repetitive manual work.

[Interviewer]: Okay. How would you describe the governance model of the Center of Excellence?

[Bank B – CoE Lead]: We use the moto that we completely believe in our own people. So, we use, we rather integrate robotics knowledge into all the operational domains and instead of outsourcing your request to another party, that can be an IT department or an external partner like Accenture or Deloitte or KPMG, name it, there are a lot of parties of course who deliver that potential, that capacity. We really believe the opposite. So we really do convince, in our way of working, we convince the operational domains to do it themselves. Take your own responsibility when you want to realize a change. I think it's crucial in becoming successful in what kind of change you're in. And it's exactly the same with robotics. So starting with, starting with taking responsibility and freeing capacity, making choices which process you want to use and our Center of Excellence which contains about 25 people at this moment within the bank helps all those operational domains to become successful. So, we're helping and we are not taking over the job. That's really a crucial difference between a lot of other examples in the market which we see quite often. Is that you say in the business domain "Well, actually, I've got a problem, please fix it, create a robot for me" well, that's not our way of working. I say "Well, this is our way of working and create the robot yourself".

[Interviewer]: Okay. And would you say that the governance model of the Center of Excellence has any influence on the RPA implementation?

[Bank B – CoE Lead]: It certainly has because there are, of the 25 domains we are facilitating, there are several domains who are not really making the progress as they expected or wanted and when that happens and they come to me, they say "well, robotics isn't working at all" and I always have a quite nice conversation with them because when you

do a deep dive then you for sure see that they aren't taking the right responsibilities to make this change happen. So when you don't free capacity to build robots, yeah, don't expect that the robot will run or will be built. So, that's, it's quite easy and it's a couple of easy principles which you really have to follow closely and when you do that you can become successful and when you're not then don't be surprised that you're not.

[Interviewer]: Okay. How do you measure the performance or the success of an RPA implementation from a Center of Excellence point of view?

[Bank B – CoE Lead]: Yeah, we all…perhaps I can share you, that's always nice, then you can see something…wait a minute I'm gonna open…. So we use a dashboard, pardon, we use a dashboard and transparency in your results, in the results in my point of view are crucial in becoming successful. So, every robot, which runs on our platform is obliged to be part of the dashboard. So, when a robot is going to production you've got to make a forecast and what number of runs you expect it to run every month.

[Interviewer]: While it's loading, can I ask you, do you use any KPIs for example?

[Bank B – CoE Lead]: Yeah, yeah, we've got a, one KPI is that we've got the goal to reach one million hours of business value created by the robot each year. Last year it was 200.000 but we realized 500.000 and for this year the goal is one million hours…I can share you it right now because it's loaded…do you see something?

[Interviewer]: Yeah, yeah.

[Bank B – CoE Lead]: (Showing of the dashboard) Yeah? I think so. So, we use just a regular Power BI dashboard, it's plain and simple but these are all connected operational domains. There are some more but they are not visible in this overview. And this is the current realization this month which has a goal of 84,000. So, we did our forecast and we thought that with the robots currently in production we expect 84,000 hours of business value to be realized. So, where normally 84,000 hours of manual labor was needed, now the robot does it. That, that's the way we report. And what, that's also my goal. So, one million hours of manual labor done by robots. And the only responsibility I've got is make, make this visible. So, all the operational domains are responsible for the results. So, CDD, KYC department, they're responsible for their own robots and their own results, not, that's not me. I'm responsible for the fact that the dashboard is running and that the platform is doing okay and that they, that we keep on developing so they can do their work. But it's their responsibility towards their senior management to, to organize and to, to, to use their responsibility. In the beginning they wanted to put all the responsibility at

my department. Well, I said "I can't, I can't manage all those departments for myself so you've got to do that yourself" and that's, that was a crucial choice that, that became very successful because now, when a department isn't progressing like…they've got to look to, at themselves, not to me. And we can help but we certainly aren't taking the responsibility. So, you've got actually quite a good moment today because this is real time dashboard, so we just passed the 400,000 hours of added value this year. So, when you do that, times three (x3)….so we're way, way on schedule to realize our one million hours. So, this is the way we report. This is all senior management positions have authorization in this dashboard and for me, it's really easy to enter aboard with senior management with this, with this dashboarding. So, becoming as transparent as possible is one of our key elements.

[Interviewer]: Okay. Going back to the KPIs, what are the most critical KPIs for RPA, from your point of view, for a Center of Excellence point of view?

[Bank B – CoE Lead]: Well, actually, we've got one central KPI and that's the number of hours of business value and I've got a cost focus of course. So I've got to, I've got a budget and I've got to stay within that budget and that is easily done because actually our costs are quite low and good manageable because it's only about licensing, robotic RPA licensing which is quite good manageable. We can really see a forecast of what we need. And on the other hand we, I've got the employee cost of my Center of Excellence and that's, that's also quite easily manageable. And the other things are done by the different operational departments. So, for me that's quite easy. So we don't use like processing time of a robot or…things like that are no KPIs for us.

[Interviewer]: Okay. And who defines, what unit defines these KPIs? Is it the Center of Excellence, is it the operational department? Like, each operational department has each own KPIs let's say, with, like always using the central one as the basis?

[Bank B – CoE Lead]: They use our information and our predictions but they eventually set their own goals together with their senior management. So for instance, again, HRS is also one of the departments, it's HR services, our operational department at HR, they've got a goal with their senior management about the number of hours, let's see…I don't know if that's completely filled already properly but…yeah, it's filled so they've got a total forecast to be delivered, it's actually quite a small department so 24,000 hours to be delivered on a year base. Each month they have to realize 2,000 hours and currently they're on 1.300 hours, yeah, so they're slightly behind schedule. And this is not really realistic because they started only one month ago with reporting. So everybody, every team does, is doing that in it's own way.

[Interviewer]: And would you say that the governance model of the Center of Excellence has any influence on the definition of RPA KPIs?

[Bank B – CoE Lead]: Yeah, I think so because we are really pushing it in this way. So, we've really developed this model, more efficient ways, that everything is my responsibility and I have to set and get all the goals and reach them. But actually we have chosen to not to do that and our complete model is organized in that way. So, I think we've got quite some influence on that, yeah. I really like it because it's also different compared to a lot of other goals and ways of working and we are so transparent therefore it's really interesting that we have, have a lot of attention therefore there are not that many teams who can deliver their results so realistic as we do

[Interviewer]: Okay. Have these KPIs or let's say, measurements that you use now, have they changed over time from when you first started implementing RPA projects?

[Bank B – CoE Lead]: Yeah. Yeah. Well, actually, we first started measuring on the number of robots which was when you first start with robotics, it's, that's really logical way of reporting. So we had a KPI to deliver the first year, in 2017, 40 robots. But actually when you take a closer look to that KPI you will immediately see that the number of robots isn't, isn't really saying it all. It's about the value you create. So about one and a half year we thought "Well, actually we're not gonna measure on the number of robots" because you can influence it quite easily, it's about, it's all about the value that you contribute to the organization. So, slightly, within one and a half year, we started measuring the actual value with the report. This reporting is quite easily. We see the number of runs of a robot, we know what the savings of each run is, we oblige the, the, the operational domains to make that visible and to clear, to clarify what, what the saving is of each run and then you can easily organize a dashboard like this. That was always like, some kind of dream, perhaps too big to say, but it was really interesting that when we started measuring like this that, that the dashboard, a real-time dashboard is really a good next step. So we really made that, made that sure. So, first starting with number of robots then value and now value by dashboard.

[Interviewer]: I'm gonna change a little bit the subject and I just wanted to clarify. You said that the operational departments are the one that are picking the processes basically that they want to implement robots on.

[Bank B – CoE Lead]: Yeah.

[Interviewer]: Okay. Do you have any, do you provide any help on the process of how to pick which processes to automate?

[Bank B – CoE Lead]: [technical difficulties] Well, actually, we've got guidelines provided by the Center of Excellence on how to find the best potential on use cases, that's one thing. On the other hand, I've got like a couple of people of the 25 employees in my team who are helping teams to find the right use cases. So, not only delivering guidelines but also doing some extra help with people who have knowledge realizing robots. And the last thing is that we really focus and push on LEAN, in combination with robotics. Is that we've got in our company a lot of LEAN Blackbelts and all kinds of interactions with those kinds of departments who are specialized of course in searching for problems within the organizations, sharpening that and perhaps finding a good solution which can be a robot. I'm definitely not saying that a robot is always the solution. It's kind of a struggle within our company that a lot of people think that I'm always looking for robots. But I'm always looking for a solution for a problem within the company and when it's no robot, it's no robot. So, no hard feelings on that.

[Interviewer]: And how do you prioritize which cases to implement RPA to?

[Bank B – CoE Lead]: Well, actually because of the fact that we're more or less, decentralized in our organization, I don't have really issues on prioritizing. So, it will happen once in a while, especially in these Corona times that, that there are several real urgent issues and that we need to give some extra help to the operational domains to realize the robot quickly. And that's where some prioritization helps and eventually I'm the head responsible and when we can't fix it then I can make a choice in that. Mainly, they do that themselves.

[Interviewer]: Okay. And one last question, what are some reasons that RPA projects might fail, for example, that you've encountered?

[Bank B – CoE Lead]: Well, I always say that it's about change management, what we do. So, there is no…you've got to think big, start small. You've got to take the right responsibility, you've got to have senior attention. So, you really have got to have the capacity and the senior attention doesn't mean that senior management says "It's important" but also acts like it. So, when you face problems, that they help you with, with these problems. Not that they help solve everything but they help you opening doors. And that's what I see a lot, is that a lot of teams don't manage the stakeholders and the environment in a proper way and then, then it's hard to change anything, also a robot. So, it's,

the biggest, the biggest thing to give attention to is your change of management way of working.

[Interviewer]: Okay. Alright. We're actually done. Is there any last thing you would like to add, something that you think I should know about RPA, about robotics in general?

[Bank B – CoE Lead]: [He doesn't respond to the question but sends a file that should answer the question] And that gives a good overview of what we're doing with some examples. So, perhaps there are still some questions so don't mind asking them by email or something like that. I just sent it to you.

[Interviewer]: Okay. Great. Thank you so much. Let me just stop the recording…

End of recording