



# Digitalization and Digital transformation in Finance Operations

A Master's Thesis submitted for the degree of "Master of Business Administration"

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Vienna, 23.07.2020





# Affidavit

## I, MIHAI-GABRIEL ALBERT, hereby declare

- 1. that I am the sole author of the present Master's Thesis, "DIGITALIZATION AND DIGITAL TRANSFORMATION IN FINANCE OPERATIONS", 64 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
- 2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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#### Abstract

The aim of the Master Thesis is to present the challenges companies face when going through a Digital Transformation, and how companies can utilize Digitalization tools to boost their transformation efforts in the Finance Operations. All companies that were not born in the Digitalization hype are going through a Digital Transformation in order to leverage new business models. Customer expectations are shifting, and companies have to change from the roots to fully benefit of the Digitalization advantages.

But Digital Transformation is not about the Digitalization tools and globally leaders agree that a successful transformation looks at the existing operations how can be improved and then what are the tools that can facilitate better performance. And, to succeed in the shift of operations, addressing the company culture is paramount.

However, many large companies are struggling with the transformation and very few can see exactly a Return on Investment for the big budgets the transformation needs. The present Thesis will present what are those areas where companies struggle.

This Thesis is looking at the Finance Operations a company has around their Receivables and Payables, and proposes a methodology how to improve the processes, starting with using Digitalization tools to analyze existing performance, combined with hands on activities and create a strategy that an entire organization can follow. The Thesis is showing how Digitalization tools act as an enabler for the Digital Transformation of the existing operations, and not the goal.

The research questions are looking to clarify what the terms Digitalization and Digital Transformation actually represent for a function that until recently was considered a back office activity, and how the transformation can improve their performance.

Based on participating in a transformation project in a traditional Oil and Gas company, the author is bringing feedback and hands on understanding about the effects and challenges of Digitalization.

It was observed that, besides a good training and corporate communication done at company level, participants in the transformation need upfront involvement, hands on training and clear strategy to which they participated and brought contributions. The most important feedback and opinions come from the people that are working on processes day-by-day. Also, key for the transformation is to take the time and deep dive in the operations so that accurate and personalized solutions are found and addressed. The transformation has to be specific to the organization and with a clear scope and purpose.

**Keywords** : Digital Transformation, Digitalization, Communication, Culture, Process Improvement methods, Trainings, Partnership To my lovely wife Sonia and my two boys, Eric and Victor, that gave me the strengths and power to accomplish one of my dreams, and to which I owe a lot of time. Also, a big thank you to my parents that encouraged me.

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List of Abbreviations

- 4IR Fourth Industrial Revolution
- AI Artificial Intelligence
- AR Accounts Receivable
- AP Accounts Payable
- CEO Chief Executive Officer
- CFO Chief Financial Officer
- FTE Full time equivalent
- GUI Graphic user interface
- OCR Optical Character Recognition
- O2C, OTC Order to Cash
- P2P Procure-to-Pay
- **RPA** Robotics Process Automation
- XML Extensible Markup Language

## 1 Introduction

In this chapter, an outline of the thesis is presented together with a brief description of the terms Digitalization and Digital transformation. A framework for understanding what Digitalization and Digital Transformation are and what companies are doing in order to drive the transformation of their Financial Operations

## 1.1 Context of the thesis

Digital transformation, digital enterprise, lean enterprise, Chief Digital Officer, these are terms that just made their space in the business literature in the last couple of years. Companies are seeking to understand if their digital strategy is in place and what are the results, and how it will contribute for their sustainable growth.

The term Forth Industrial Revolution(4IR), a hot topic in the academic and business environment, was presented by the founder of the World Economic Forum, Prof. Dr. Ing. Klaus Schwab in 2016. "It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres." It is considered that it is disrupting almost every industry in every country, and its main attributes are Velocity, Scope and System Impact.

Cloud infrastructure, 5G, Internet-of-things, Artificial Intelligence and 3-D printing are just a few of the technologies that are shaping our world. The 4IR is characterized by the digital transformation and organizations will be labeled as digital enterprises.

While previous industrial revolutions have led to the increasing automation of repetitive physical work, 4IR goes much further: it leads to the large-scale automation of entire groups of tasks, including repetitive intellectual tasks previously performed by human beings, according to Prof. Dr. Ing. Klaus Schwab.

Leveraging technology and creating new business models is important, but the digital transformation is not merely about that, it refers also to changing the company culture so that it can adapt quickly and evolve (Jim Highsmith). And change of culture will come with new ways of doing the existing operations.

Digitalization is changing many aspects on how companies act and work and existing business models have been changed or have been replaced (Alt&Pushmann,2018), and remains valid for the financial operations handled within the company. The work of the financial operations teams did not change very much over time, with just some incremental changes. Nevertheless, in order to deliver at their full potential, companies are looking to enhance them so that the output of the financial operations help companies drive better decisions.

Traditionally, the finance functions have been branded as slow to adapt, resistant to change and that they do not experiment with technologies that much.

CEOs nowadays say they want their CFOs and the finance functions to provide companies with real time data in order to enable decision support. Also, CFOs themselves say that they want to spend more time on digital initiatives and application of digital technologies to finance related tasks (Chandra,2018).

Hence, the finance function is at the center of the digital transformation, but coming from a tradition of manual, reliable and old-fashioned function that until now was not in the spotlight of new and disruptive technologies.

## 1.2 Challenges addressed in the current thesis

The objective of the current thesis is to address the challenges faced by driving the digitalization of the finance operations and how companies can digitally transform the finance functions. This is achieved by acknowledging what are the areas where digitalization can bring added value, look at the solutions that can facilitate the digital transformation and understand how the two can be put together. This results in the following questions that are being researched:

- 1. What digitalization and digital transformation represents for companies and what are the areas companies struggle with.
- 2. How can a company improve their finance operations using digitalization and what are the technical solutions companies can apply in order to drive the digital transformation.

### 1.3 Thesis structure

The thesis is following the below structure:

**Chapter 1** presents the background of the Digital Transformation together with the questions that this thesis will address.

**Chapter 2** introduces the Digitalization and Digital Transformations terminology together with the challenges faced by companies when transitioning towards a Digitally Transformed operating model

**Chapter 3** highlights what Finance Operations represents for a company, what processes are handled under the Finance Operations umbrella and what are the topic Digitalization and Digital Transformation can improve or change

**Chapter 4** discussed the Digital Transformation of the Finance Operation from the perspective of tools, process improvement, strategy and deliverables where the transformation can bring added benefits

**Chapter 5** presents a Digital Transformation project and how a traditional Oil and Gas company implemented it together with the results and achievements the transformation delivered.

## 2 Digitalization and Digital Transformation

The terms Digitization, Digitalization and Digital transformation are widely used nowadays, however there is a confusion between using the terms. The distinction is very significant and should be clarified before companies discuss what kind of changes they want to make.

## 2.1 Digitization, Digitalization and Digital transformation

**Digitization** is represented by nothing more than the shift from analog to digital. For example, we can think of switching from paper to digital documents. A company cannot think about digitalization and digital transformation without digitization of their processes, which means the automation of processes by digitizing information and utilizing technology for the purpose of automation.

The term **Digitalization**, which is widely confused with Digitization or Digital Transformation, it is represented by the use of digital technologies to change a business model to create new revenue and value production opportunities. Usually, multiple projects are interlinked to deliver a Digitalization output. An example - Using BPM (Business Process Modelling) to tie together a process with KPI's and a workflow (including human interaction as required). (Muro, et.al, 2017)

Digitalization has an impact on people as well, as it transforms the world of work, and the acquisitions of digital skills has become a prerequisite for any individual. Organizations adopt more digital technologies, which in this context represent computers and other information technologies, hence the people's jobs will change. Automation plays a key role in the digitalization story and transforms business processes generally. As digitalization increases process efficiency, it will deliver directly to the top line of the companies. "If you operate an online platform, then your company may already be 80 percent digitalized, and you can gain more efficiency or create more customer value by going the remaining 20 percent of the way." explains Georg Tacke, CEO, and Annette Ehrhardt, Global Head of Communications & Marketing Senior Director, Simon-Kucher & Partners.

A **Digital Transformation** involves rethinking the company's value proposition, not just the operations. A digitally transformed company innovates to deliver enhanced products, services, and customer engagement (Ross, 2017), and it uses technology to radically improve performance or reach of enterprises. Executives in all industries are using digital advances such as analytics, mobility, social media and smart embedded devices as well as improving their use of traditional technologies such as ERP to change customer relationships, internal processes and value propositions (Westerman et. al, 2014).

According to a report created by the North Carolina University together with Potriviti Consulting Company, where they surveyed boards of directors and C-suite executives about

risks on the horizon for the upcoming year, they indicated that for 2019 their biggest concern was their organizations ability to transform their operations and infrastructure so they can compete with organizations that are "born digital. In particular, respondents indicate a significant increase in concerns related to their organization's digital readiness, jumping from the number ten position in 2018 to number one in 2019.

There is no question why legacy organizations are tackling digital transformation now. Digital native upstarts are gutting traditional industries one at a time, leveraging scalable technology and participative networks. But shifting a firm's asset portfolio is a lengthy process and is fraught with uncertainty for leaders comfortable with older asset types. (Libert et.al, 2016)

If we would analyze the process of a simple document that a company receives, and think about moving the process through the three stages, it would look as follows:

**Digitization** would involve that the document is handled as a scanned pdf instead of a paper document;

**Digitalization**, which would mean making digitized information work for you, would involve that the document is already received as a pdf document and uploaded into the cloud so that many people would have access to analyze the document;

**Digital transformation**, which would involve doing the things all together in a new, digital way, would involve receiving the document in an electronic format, move to the cloud application that will analyze the data. The process would need very limited human intervention as the process is automated, and the output of the analysis would help the human with insights to offer new products or drive customer experience. As a result, it enhances efficiency, reduces costs and may lead to increased sales.

Along with developing and driving the digital transformation, companies utilize new technologies like Robotic Process Automation (RPA), Artificial Intelligence (AI), and real-time data analysis, making financial management not being a matter of looking in the past but to look in the future. Predictive insights developed using Machine Learning yield positive business outcomes to companies.

In the intelligent finance department, the operating model will integrate talent with applied intelligence, combine AI with data, analytics and automation in order to transform business across every function and process, eliminating silos. (Shroff, 2019)

But in a 2018 study done by McKinsey, only 13 percent of CFOs and other business leaders said that their finance organizations are using automation technologies like robotic process automation and artificial intelligence. The Survey also indicates that 64 percent of CFOs digitized less than a quarter of the finance function over the previous 12 months. Participants to the survey, when asked how much return on investment was generated from digitization and automation in the past 12 months, only 5% indicated that the return was substantial, most of the respondents indicating the return as being modest to minimal. (Eklund et. al 2018)

## 2.2 Digital transformation challenges

Digital transformations at any level and departments, comes with specific challenges, for which the finance department will have to find ways to overcome the obstacles in order to reach full potential. (Sastry, 2018)

One of the key challenges that CFOs face in digitizing the finance functions are represented by identifying the most important processes. The most fruitful development areas are laying in the value added services (Chandra et. al 2018), nevertheless the core processes are also a substantial operation to run and are considered of equal importance.

For the purpose of the paper, the challenges are split into three categories: Leadership challenges, technology and process challenges and organization and cultural challenges.

2.2.1 Leadership challenges

According to Baril et. al (2018), digital transformation is driven by strategy and not by the technology it is facilitated by. For the organization that undergoes through a transformation, the vision is much more important than the technological solutions that will be utilized. Nevertheless, that is one of the aspects companies struggle with, the CFOs and the Finance organization is unable to transmit the vision and have a common understanding. Chandra et. al(2018) also indicates that often the digital transformation is not linked to the business strategy of the organization, hence support is lost and cooperation is blocked, leaving existing initiatives blocked. Unsynchronized initiatives do not have enough resources to be carried on and are not supported efficiently. Also, Chandra et.al(2018), indicates that a blurry mandate to digitize financial processes is a big barrier in the success of the project. The corporate digital transformation many times brings extra workload and without a clear mandate from the leadership, it will not receive the necessary commitment.

Furness et. al(2019), notes that leadership will have to think about the skills people have today and map them to the specific outcomes in the finance transformation. People have underutilized skills and should be allowed to use them, during and after the transformation.

Organizational silos have to be broken in order to fully utilize automation tools and digitalization. Existing work habits hold people back from trusting each other and collaborating.(Chandra et.al(2018)

#### 2.2.2 Technology and process challenges

According to the survey "2018 CFO Insights on New Technologies" conducted by Grant Thornton, surveying 304 CFOs, the executives agreed that their organizations' top IT challenges were systems complexity, including systems integration across the enterprise, upkeep of legacy systems and IT talent. These foundational, urgent realities require significant investments, which possibly stall the pace of adoption of new technologies in other departments of the enterprise — e.g., the finance function — which could benefit from technology investments, but might be deprioritized in terms of budget, due to immediate technology needs. (Baril et. al 2018)

The survey suggests that only 12% of executives strongly agree that they have an effective system of measuring financial key performance indicators associated with the implementation of technology.

The survey highlights that the adoption of new technologies in the finance functions for the next years is correlated with the benefits that can bring immediate value to the company, such as better quality, optimized processes, minimize errors or reduce costs.

In the current state of the finance function, where new technology opportunities and risks have already started to influence the finance function, CFOs partnered with IT and in many cases the IT department reports directly to the CFO. The finance function can work with IT to ensure that they support each other and that they collectively make the best technology decisions for the enterprise. (Baril et. al 2018)

A subsequent technological challenge is the continuing decentralization of technology solutions (Owens, 2016). A contributing factor is the background of the solution implementations: solutions are procured by business in the company and cannot be fully integrated due to existing system complexity, reducing so the impact new technologies can have.

In another study done by CFO Research together with WNS in 2016 on 156 CFOs, finance leaders indicated clearly that large companies expect that the effort to reduce organizational and process complexity in finance activities will yield an overall improvement in business performance. When asked to describe the key barriers or impediments to improving the finance operating model at their companies, respondents primarily focused on difficulties related to organizational complexity (Owens, 2016):

- Structural complexity
- Growth through acquisitions, resulting in a collection of non-standardized processes, controls, and systems
- Lack of change management capability

#### 2.2.3 Organization and cultural challenges

In a study done by Capgemini in 2017, where 1700 people across 340 organization assessed the digital transformation in their organizations, brought up that 40% of senior-level executives believed that their company has a digital culture, and only 27% of the employees believed the same. Also, 62% of respondents see corporate culture as one of the biggest hurdles in becoming a digital organization.

Resistance to change is a cultural phenomenon and it is expected in any project, therefore for functions that do not encounter change very often, a transformation has a very big impact. Effective change management with clear visibility and transparency is essential for the success of any transformation. By nature, people like routine, because it makes us comfortable and it is called being in the comfort zone. Whenever our comfort zone is changing, we feel awkward, anxious and worried. On top of the changing of the status quo, many articles are indicating that digitalization and robotics will replicate human work and millions of jobs are at peril, and this only contributes to the stressful situation employees are faced with. Employees need constant update, understand in due time what is in front of them and understand why digitalization is important for the company. Good communication has to be combined with a skills enhancement program and employees need a clear catalogue of training to choose from to become up to date with the skills needed for the digital transformation.

The cultural challenges comes also from the perspective that the finance experts will have to discuss with IT employees about automations and projects, but their language is different and will lead to unclear requirements and limited support on the implementation. (Costello and Meulen (2018)

Costello and Meulen (2018), indicate that most organizations are stuck in a culture of change resistant silos and hierarchies. Boundaries are very clear between different areas of responsibility, and digital transformation requires the opposite.

## 3 Finance operations

As companies are going through their digital transformation journeys, CFOs are constantly under pressure to re-evaluate their finance delivery models to meet business imperatives. Doing more with less, improving controls, supporting growth, gaining better insights – all these imperatives call into question the way in which finance departments are structured. Therefore, keeping abreast of the latest thinking is critical.

Digital transformation is changing the traditional business models and processes in all functions and, it comes with rising customer expectations, increased competition and stricter regulatory impact, which makes adopting innovative digital-based processes imperative.

Large Corporations, due to the high number of customers, suppliers and business relations, need to employ teams of accountants, financial analysts and a CFO to focus strict attention to the numbers.

Many leading CFOs have adopted shared services or outsourcing models for 'finance delivery', which is generally defined as the rules-based transactional processes that underpin the finance function.

If a company only strives for efficiency, it will most likely choose to go towards a sourcing model through outsourcing (Kops and Lyon, 2014). Process efficiency, flexibility, scalability and continuous improvements deliver all the needed benefits that the company is pursuing. In case a company is looking for a broader transformation impact, it will use both shared service center and outsourcing, referred as hybrid structure(Kops and Lyon, 2014).

Innovations in technology and management practice are creating new opportunities for the finance function to add value to the business. The role of any Finance department has evolved to a comprehensive function at delivers finance technology solutions, corporate facilities, procurement services and transactional finance.

## 3.1 Challenges for the finance team

Regardless the sector one company is active in, finances teams are dealing with a growing number of entities, merges and acquisitions, spin-offs and demerges. Without automation, changes become manual tasks, take time and blocks all existing automation efforts. As finance has to cope with strict deadlines to perform period closes and consolidations, the result is error-prone that will take many weeks and staff members to prepare. Companies will end without a consolidated financial view of the entire health of the entire business. Manual efforts will as well increase the compliance risks or mistakes that can be very costly for the company.

## 3.2 Accounts receivable

3.2.1 General Accounts Receivable process

The management of the credit policy of a company is one of the first responsibilities of management.

The administrative part is very important since the degree of operating efficiency in the billing, record keeping and adjustment function have impact in the investments needed in managing the receivables.

Order to Cash represents the set of business processes for receiving and processing customer sales for goods and services and their payment.

The first step in the Order to Cash process is receiving orders from customers, which might be via email, internet, sales people or electronically. They can cover from simple purchase request to long term contracts. The company might conduct a credit review before accepting the order, if the company is selling on credit. The order is documented and company begins to fulfill the received order. Once the order was fulfilled and delivered, the process of invoicing the customer is triggered. Once the payment was made, the accountants add the note in the general ledger. If cash is not collected in due time, efforts are taken in that are(Corelli, 2016) Table 1 below is presenting graphically a general flow of the Order to Cash process.



## Order to Cash Cycle

Table 1 Order to Cash Process (Invensis)

Any step of the process has an impact in the smooth flow of the business, profitability and cash.

Especially when there are manual steps, the process is prone to error. Not accurate sales orders will put the production in peril, and might trigger invoices that will not be paid by the customers, adding additional costs from transportation, managing returns and impacting reputation. (Corelli, 2016)

Creating invoices manually and sending them by post prolongs the process, triggering late paid invoices but also the possibility of wrongly created invoices. Incorrectly managed information in the companies CRM system will trigger as well faulty invoices which customers will reject.

Logistics and production departments are under strict forecasted production planning and transportation schedules, and will struggle to meet demand for last minute received orders, as well to accommodate fixing errors that are coming from the process. (Corelli, 2016)

When customers are dissatisfied with the products or services, they could refuse payments or default on their payments, increasing the workload of the collections departments.

The policies all together pose a great risk on the process itself, as companies have to balance selling on credit and making sure enough cash is present in the treasury for covering payables.

Great efforts and investments go in all companies in managing the Order to Cash cycle considering that inefficiencies can trigger potential losses. Most of the steps will have a trigger in the customers willingness or ability to pay, hence a good management of the O2C cycle is paramount. (Corelli, 2016)

Digitalization is here to help companies manage the end-to-end process in a better way, by reducing some cycle times in part of the operations, improving the process all together and help companies improve their receivables position. Digitalization will not change the structure of the process but will help deliver in the process steps and improve it as a whole.

3.2.2 Improving the Order to Cash process

Most companies have an order to cash policy that indicates precisely when the billing should happen, credit limits and the collection process. Nevertheless, not all enforce the policies efficiently or adapt the best process. There are companies that look to increase sales and ignore payment terms and some companies do not have a focus on working capital, which will translate into a need of financing the day-to-day cash needs or would translate in less free capital to invest in growth opportunities.

Common risk that can arise from adopting a week accounts receivable policies, or following a process that does not give enough and timely insights on how receivables are performing, can result in unintended consequences.

Bryk 2 et.al (2016) indicates that most frequently, companies underperform in their accounts receivables when:

- They fail to follow up with customers in a timely manner when payments are due;
- The sales department had enough power to overrule credit limits, leading to increase bad debts;
- Employees do not have enough training and knowledge on how to deal with late paying customers;
- Billing accuracy, invoice compliancy and process sanity are not evaluated;
- Cash payments are not allocated correctly, and creating a blurred image of the outstanding invoices;

Improvements in the Order To Cash process would require that finance and sales teams would work together to develop processes and address improvements. Having a centralized accounts receivable processing, in a center of excellence, would help managing a standardized process with common practices. Introducing automation of processes will eliminate manual errors and reduce cycle times. (Bryk 2 et.al (2016)

Having a set of metrics and KPIs is important for steering the process and addressing in due time deviations that appear. Some basic metrics that would measure past due, percentage of overdue invoices, unreconciled payments and amounts, write-off percentages, collection

rates for the bad receivables and actions taken to solve bad debt are just a few of the metrics largely used. It is important to have a good monitoring of the disputed invoices, understanding why customers are rejecting or contesting received invoices reveal errors in the entire Order-To-Cash process.

According to Deloitte, there are five activities within accounts receivable function that, if optimized, can help free cash and strengthen working capital.

- <u>Customer credit approval</u> a thorough policy created together with sales that will clarify when a customer's account is placed on hold, situations when to override credit limits and how to calculate credit limits. Once policy is created, the finance team must enforce the policy and sales not authorized to change terms without pre-approval. Service Level Agreement should be agreed between the functions and indicate the time each team/department is granted to process any request in order not to impact customer satisfaction. As industries and risk profile change, credit approval and limits should be periodically reviewed.
- <u>Customer Master Data</u> in order to have a smooth running process, the billing and collection system should contain the credit limits, discounts, return policies, addresses and tax rates, and data should be accurate. If the Master Data is created wrongly in the billing system, it will reflect incorrect payment terms, issue incorrect invoices and trigger late paid invoices. Besides correctness of the data when setting customers, any update process should trigger updates in the Master Data as well. For a good running process, the Master data Management should be centralized, include regular audits for abnormal data and have a thorough approval process with controls in place that limit staff to override the data.
- <u>Invoicing/Billing</u> this is a process where many companies struggle with, from including wrong information in the invoice in the product side to incorrect master data. Some companies fail to send invoices in a timely manner, while some are changing between paper, email and electronic invoices creating confusion. The billing process should ensure correct invoices are sent to the customers in a timely manner. Companies can include automation of the billing process, have good reporting and process steering with KPIs, send electronic invoices and have Customer portals where customers can download invoices, deal with cash allocations, dispute incorrect invoices and solve collection issues.
- <u>Cash Application process</u> it is important that, once the customer pays its bills, the money are allocated as soon as possible to the correct account and to the correct invoice, ideally without any manual touch in the process. Without this step, it is impossible to know accurately which invoices are unpaid. Therefore, the Cash application process should supervise that received payments are allocated in the same day to the correct invoices, and post the entries in the ledger before cut-off dates.
- <u>Collection process this</u> is a process not all companies take a proactive approach towards ensuring receivables are collected in due time. Lack of reporting can make it impossible to have a clear view on aged receivables. For the collection teams it is important to have

updated and timely reports, with clear collection policies and guidelines. Companies here send dunning letters and utilize different communication channels, but it is important to have a clear guideline on how and when customers should be notified about their aged receivables. Adjusting the collection process periodically can improve the collections results.

#### 3.2.3 Digitalization of the order to cash processes

As all companies strive to increase competitiveness and growth, from the Order-to-Cash process the leadership wants to reduce costs and help fund the working capital. All that companies want sis to maximize the business opportunity, close the sale, receive the money in due time and having a high customer satisfaction. Nevertheless in most companies it is a siloed process and split in different functions making it difficult to control and monitor. Customer satisfactions is at danger as the sales channels diversify to include the digital ones. Also managing the risk is critical for companies. The larger the organizations, the bigger the opportunity for risk is the areas of order-to-cash process.

Bosch and Faus (2016), indicate that digital technologies can improve the day-to-day activities of the order-to-cash space. Automating part of the process is the first thing companies look at. Achieving a +90% rate of untouched orders is a target that most companies strive to achieve. An untouched order is one that flows from the moment of entering the companies system to the moment of fulfillment without the need of any human touch. On this side, the key digital component supporting high automations are robotic process automations combined with artificial intelligence solutions that based on complex cases that happened in the past can solve existing issues. Hence, it does not help solve only reduce the operating costs but accelerates speed as well. Systems have to be interconnected in order to bring maximum values. Most efficient systems do not merely provide a digital substitute for what once was done by hand, but the process is transformed.

In the order management process step, companies have to ensure that the master data of their customer is kept updated and integrated with their Enterprise Resource Planning solution(ERP) so that personal touch with customers is maintained. A good ERP will help companies integrate order, pricing and other critical data throughout the process. (Mcdonald and Rowsell-Jones, 2017)

From the moment the sales team accepts and order and the order is delivered, a good system will generate immediately the invoice and sending it though a digital channel to ensure proper tracking and follow up. Whatever invoicing solutions is used, either from the ERP or an e-invoicing solution, speed and accuracy are necessary, as they will help in the cash collection and reduce DSO. The faster and more accurate a company can issue their invoices, without any manual touch needed, the faster payment can be received and progress tracked. (Mcdonald and Rowsell-Jones, 2017)

For improving the Credit Management and Collections, besides a good policy and a system to track deviations a good system will send customer statements at predefined times. Machine learning can help companies understand which invoices will be paid late based on the customer's history and adapt the collections strategy accordingly. The strategy can span from an intensified collections process to offering 1-2% discounts for early payments just to spark the interest of the customer to pay earlier. (Bosch and Faus, 2016)

Using predictive insights through robust analytics capabilities, companies can predict customer issues. Predictive analytics can help identify potential issues from stock levels to customer payments. Some companies extend the utilization and use predictive analytics combined with sales orders historical data and generate automatically new order.

Once credit management, invoicing and payments are solved, companies just need to allocate the cash received to correct invoices. But volumes come with complexity and confusion and even possibility of fraud. It is important to know how much cash came in, and where exactly to apply it. There are a number of cash application tools that can allocate touchless received payments, to a certain degree, and machine learning can help increase more the automation rates.

Overall, companies that improve their Order-to-cash processes, powered by digital solutions and using analytics, experience growth and cost reduction. 20% to 40% operational costs are spared by eliminating waste and driving automation and creating new roles that drive centralization. Also, 10-50% improvement in working capital can be achieved by increasing invoice accuracy, reduce claims and mitigating payment risk, reducing overdue debt. (Bosch and Faus, 2016)

### 3.3 Accounts payable process

3.3.1 General Accounts Payables process

The term accounts payables represents the money owed by a company towards it suppliers, and they appear in the balance sheet as liabilities.

The company receives an invoice for payment and the invoice is registered in the accounts payable. Subject to approval for payment, therefore makes it an official debt of the company towards its supplier.

Most common payables are the trade payables, which are booked for physical goods, which have the form of inventory. There are also expense payables, which include the purchase of goods, and services that are expensed. Common expenses are advertising costs, travel, entertainment, internally used supplies and materials and utilities. (Correlli, 2016)

AP is a credit that suppliers grant companies for the goods or services delivered, allowing them to pay at a later stage. There are various payment terms used, some of them trying to incentivize shorter payment terms, an example would be 2%, Net 30, which will mean the payer will deduct 2% if payment of the invoice will be done within 30 days. 1 day overdue will mean that the discount will not be applied anymore (Sorensen, 2016). In corporations, the process between the moment when the need of a product or service occurs and the moment the invoice is paid and registered in the accounts payables is called Procure-to-Pay (Corelli, 2016). Table 2 is highlighting a Procure to Pay process in its general terms.



## Procure to Pay Cycle

Table 2 Procure-to-Pay general process - Invensis

When the purchaser receives the invoice, usually it triggers an internal process. First the invoice must be read and entered into the accounting system by the accounts payable employee. Invoices are received into an organization in multiple ways from physical mail to supplier portals that ensure electronic processing of invoices. Many organizations rely on staff members to read the invoice and enter the information into an accounting software. Usually, organizations with higher volumes of invoices utilize OCR (optical character recognition) services to digitally read the invoice content and input the fields in the account system. (Corelli, 2016)

According to Needles et.al(2014), in a general Accounts Payables process, the invoice should match the receipt document done internally and the purchase order. The receipt document is indicating exactly the quantity of products received at the moment when the supplier shipped the goods. The Purchase Order will indicate what the purchaser ordered, the quantity and the agreed price for the ordered goods. Once the invoice will match what was received, remain in the limits of the ordered quantities from the Purchase order and match the negotiated prices, the invoice will be released for payment at due date. This process is called a three-way match and if not set up correctly will become a bottleneck in payment processing. In many companies, the process goes automatically for matching the three documents and only the

documents that will not pass the match will be flagged for follow up by accounts payables employees. Companies might set specific thresholds under which the process will not be interrupted.

In order to prevent fraudulent payments, a variety of control measures are put in place to prevent such cases. Frauds can come from internal employees, and most companies have a segregation of duties control, where invoice processing and payment processing reside in different functions. The accounting software will limit the employees to perform only the tasks assigned to them. Nevertheless, frauds can come also from outside of the purchaser's organization; therefore, it is important for the Accounts Payables employees to watch for fraudulent invoices.

3.3.2 Improving the Accounts Payable processes

Accounts payable is seldom perceived as a back-office function and in many companies it takes a back seat in the management's priorities. Nevertheless, Accounts payables is a core aspect in optimizing working capital and the general strategy is to pay suppliers later. Unfortunately, the approach is not the correct one, as it will erode the supplier goodwill, destroy partnerships, slow delivery times and pressure from the supplier side on the payment terms. Paying earlier on the other side can give access to discounts or rebates.

Streamlining the accounts payable process will give accuracy and contribute to higher visibility in cash flows.

Failing to have an efficient accounts payable process will hamper the ability to process and pay invoices in a timely manner, take cash discounts and increase the efforts in paying all together.

These consequences arise when companies face the following situations:

- The process is mostly manual for approving requisitions, scanning supplier invoices and paying suppliers;
- Fail to issue POs for new orders;
- Difficult to match invoices with contractual terms;
- Lose access to early payment discount by over-extending payment terms;
- Incorrect information in the Master Data for suppliers;
- Lack of systems that prevent late payments, under or over payments, duplicate payments or missed payments

Each industry might utilize the payables process to best serve their need and companies personalized it to better manage their set of operations. There are, though, a set of best practices that can guide the way and, apply unanimously.

Adopting a centralize accounts payable processing and reporting through a shared service environment will leverage common practices and measure performance against business metrics. Centralization help reduce cycle times for operations and utilize less resources, reducing in the end costs.

Transitioning to a paperless processing will foster automation of the accounts payable systems by enabling electronic communication with vendors and electronic data transmission. By utilizing an eProcurement system, companies can send automatically POs, match and accept invoices, pay invoices and give supplier full transparency to payments. (Bryk, et.al, 2016)

Platforms that integrate suppliers and customers create an environment for solving errors that can happen in the process and solve them before invoices are due, therefore increasing the number of invoices paid in time and leveraging savings through materializing available discounts. (Bryk, et.al, 2016)

Payables processes involve approvals on invoices and deliveries and utilizing tools for managing workflows will increase efficiency of the process. Utilizing workflows will be a starting point for resolving bottlenecks and streamlining processes.

Having a clear policy for approving purchases, where the level of management authority needed for approving based on a threshold matrix is stated will create clarity.

Some companies work with hundreds of suppliers; others might work with tens of thousands, and receive millions of invoices per year. Tracking each invoice and matching with each PO might be very challenging due to volumes and different legislations based on the countries the company operates in. Companies should issue POs for each new order in order to ensure that they receive invoices according to agreed terms. Materializing discounts and having mechanisms in place to track them and take them, if the cash available in the company permits to pay earlier. The accounts payables department should have clear goals and metrics that measure the accuracy of paying suppliers on time and invoice matching with POs, and the entire organizations should adhere to them (Bryk et.al 2016).The invoicing process is yet another process that can help improve liquidity in companies. Practices that will help to have an improved process, include:

- Companies should set a centralized department that receives and processes the invoices, ensuring a standardized approach;
- Inaccurate invoices should be refused and sent back to the suppliers (errors in the address, names of companies, quantitates, amounts, etc.);
- Process invoices in a timely manner and start calculating the due date of invoices from the moment a correct invoice was received;
- Pay invoices exactly at due date;
- Conduct periodical AP aging review to understand issues and follow-up actions;
- Create mechanism for managing and tracking exceptions;

• Implement electronic invoicing by facilitating EDI transmission and electronic invoices creation in supplier platforms, giving possibility to suppliers to have insights in the process.

#### 3.3.3 Digitalization of Accounts payable

According to Judy Bicking, AP veteran with 27 years exposure in top US multi-nationals, the first step into the digitalization of payables would be to break down the two silos existing in the same process, between payables and procurement teams. These two organizations usually report separately, nevertheless, they are part in the same process, Procure-to-pay. A chaotic purchasing process will create a chaotic AP process. By being under the same umbrella, the two teams would cooperate, share same goals and have a holistic view of the end-to-end process.

In many organization the AP teams are perceived as invoice processors, but in order to do their job successfully, they need extensive knowledge of internal controls, regulation, laws and operational approach. In many situations they are an interface to the supplier as well.

In the transformation of AP, the role of AP is shifting from invoice processing to accurate and timely data providers that facilitate decision taking. AP management focus should channel on the savings that can be brought from elimination of costs associated with handling paper and discrepancies.

AP managers, being under pressure to reduce costs to support the organizational growth, should focus on implementing solutions that reduce handling of papers and invoices manually, facilitate timely approvals of spent and ensure controllership. (Rhoads, 2018)

Receiving mail invoices (paper or digital) where employees have to open documents and key in specific data to enrich the content of invoices has to stop. Digital invoices, represented by scanned invoices received over email reduces time spent but cannot cover all received invoices. Combining OCR(optical character recognition) with RPA software will boost the volumes of invoices handled in less time. Once data from invoices is captured with OCR, RPA bots can trigger approval processes if the accuracy level of the OCR is over a specific accuracy, otherwise notify a human to intervene. Companies that implemented similar solutions experienced 67% reduction in manual average handling time. (Rhoads, 2018)

The matching of the invoice and purchase order is another process that requires manual intervention not only for the matching but for addressing the issues and discrepancies. The matching process should be done before invoice is due for payment to give enough time to solve discrepancies on time. That would mean that system would take one of the acknowledgements sent from supplier, Invoice or goods receipt and at first discrepancy start the correction process. (Rhoads, 2018)

Payment processing process, which is composed pay cycles, remittances and reconciliations all hold for potential for automation. Many companies still run their payment cycles manually, with employees setting up payments cycles, waiting for payments to load ad producing the files that they sent to treasury or bank. This is a repetitive task that can be easily automated. (Rhoads, 2018)

Other tasks that can be digitalized in the payables space are bank balances reconciliations or vendor statement reconciliations.

## 4 Digital Transformation in the Finance Function

As we saw in Chapter 2, Digitalization and Digital Transformation in the Finance Function includes more than the implementation of tools that automate tasks. It involves a clear strategy that is communicated well in the company and adopted by the company's leadership, which employees know about it and they are clear what is in front of the organization. The digital transformation should have clear commitment and to be linked with the organization's strategy, so that the results of the transformation are linked to the overall success. Initiatives have to be synchronized otherwise are not supported efficiently by involved parties. Peoples skills have to be enhanced and improved to contribute to the further success of the transformation, as people will have to take care of different type of tasks. A strong linkage with IT is necessary for having clear deliverables for the tools is a must. Complexity of existing legacy processes has to be reduced and streamlined. Communication at every level is paramount for limiting cultural challenges.

For the Finance Payables and Receivables Operations, as presented in Chapter 3, the steps companies take are more technical. Advanced analytics and reporting is utilized for giving rapid understanding of data and facilitate rapid decision taking. Companies look at increasing automation of tasks, by streamlining and reducing complexity first and implementing Robotics and Machine Learning solutions to replicate manual tasks. Artificial Intelligence is looking at patterns in the past and applies them so that human intervention is reduced. Optical Character recognition extracts data from documents and sends it to ERPs, combining with Machine Learning and Artificial Intelligence so that issues are prevented upfront.

### 4.1 Process Improvement techniques for the Finance Operations

Romero and Flores (2019), propose a "process-centric" approach, where a technology-pull initiated by the companies for a successful digital transformations , where processes and culture are strategically reengineered for a process-culture-technology alignment.

The five principles of Lean Thinking where first expanded by Womack and Jones in 1996, in their book "Lean Thinking: Banish Waste and Create Wealth in your corporation", presented

in Table 3. The principles are: a) specify value; b)identify the value stream; c)make a flow, by reducing waste and inefficiencies; d)pull value and e)strive for perfection with continuous improvement(Kaisen).



Table 3 Lean thinking methodology, Womack and Jones, 1996

Romero and Flores proposed that for achieving a successful Digital Transformation aligned with the Lean Thinking Philosophy, the five pillars are proposed to be applied. They have split the pillar into (Digital) Strategic Management; Process Re-engineering; (Digital) Technology Management; Change Management; and Risk Management. Furthermore, they have represented graphically the five pillars, and can be observed in Table 4, and indicates what are the general tools and techniques that can be utilized for each pillar. Specific techniques are highlighted in following chapters.



Table 4Five Pillars of Lean Thinking Philosophy, Romero and Flores, 2019

The methodology proposed by Romero and Flores (2019), is a complete approach that combines multiple views that should be considered for a successful Digital Transformation. It brings a clear framework that considers not only the process improvement opportunity but the change management as well. As presented in the current paper, the scope of the Digital transformation is not simply to digitalize processes, but to provide novel ways of working that can create efficiency gains, digital capabilities and value for the customer. Processes have to be standardized and engineered before being digitalized in order to exploit higher efficiency gains and effectiveness that digitalization cam provide. Existing problems cannot be solved just by using technologies, and trying to use technology to fix a bad process will act as an inhibitor instead of an "enabler".

Digitalization comes at any level, hence all employees should be entitled and empowered to drive change, and use methods and tools to continuously improve and drive digitalization initiatives.

4.1.1 Strategic Management

Romero and Flores (2019), indicate that the Digital Strategy is represented by the corporate strategy developed by companies in order to better serve the needs of their business by leveraging the capabilities of digital technologies. Furthermore, they indicate that the digital strategies go beyond implementing merely the technology and focus on reengineering

processes and organizational culture, and hence show true digital progress and deliver competitive advantages.

The effective Digital Strategy should provide a future direction to the digital business model or operating model by defining a holistic, long-term "Digital Journey" vision, which would take into account:

- involve a benchmark that would set the scene and break down the vision into targets by identifying the internal areas of improvement;
- evaluate and created goals and metrics for each process;
- select the right technologies and working methods that would enable people to do their work accordingly and use their skills;
- together with IT incorporate innovative and disruptive technologies that will create value;
- specify how resources will be utilized.

One successfully utilized methodology for strategy creation is the Hoshin Kanri framework, a strategic planning approach in 7 steps. The steps are:1) Establish the visions and Values of the organization; 2) Develop Breakthrough Objectives; 3) Develop Annual goals; 4)Deploy annual goals; 5)Implement Annual Objectives(Kaizen, Gemba); 6) Monthly performance review; 7) Annual performance review).

## 4.1.2 Process reengineering management

According to the Lean thinking principles presented by Romero and Flores (2019), processes always take precedence over technology and the technology is only the enabler of the process that helps increase efficiencies if the process was designed in an effective way. Hence, the impact of digitalization of existing inefficient processes is limited to the capacity of the existing process. Successful process digitalization requires a process centric approach with keeping in the radar a horizontal view that cuts through existing silos. Process reengineering requires inter-departmental collaborations and an end-to-end flow of value added activities from suppliers to end customers to achieve process performance.

Digital process innovation encompasses the envisioning of novel ways of working, of doing business, by leveraging the new digital technologies capabilities and transforming the actual process design into a hybrid or digital one with new value-added features for the process customer and efficiency gains (cost, time, service level, etc). Process reengineering is a complex process that includes technological, human and organizational dimensions to be considered since a good process should fit the organizational culture. (Romero and Flores, 2019)

Understanding the existing business objectives and processes before improving or designing the new ones is essential for the success in their implementation and adoption, as they will have to support the organization and departments in achieving their long-term goals. In order to reengineer a process towards a digitalization ready output, the process should match certain characteristics. The process should respond to a digital process vision consisting of a vision statement, key process characteristics, metrics and measures and potential barriers of implementation. Also, it should deliver an improved performance based on new digital capabilities, benchmarked against competitors existing processes. Current constraints and problems have to be considered and digitally enabled solutions utilized to fix them.

By applying in this pillar, the very well-known Lean tool of Value Stream Mapping (VSM), organizations will be able to discover what is the value for the customer and where is the waste to better select and align future processes to reduce the physical and digital inefficiency gaps focusing on making the digital value process flow more effective and efficient, which is one of the main principles of the Lean Thinking philosophy. (Romero and Flores, 2019)

Value Stream Mapping (VSM) is a method used to illustrate, analyze and improve the steps required in the process to deliver a product or service in the most efficient way. Value stream maps enable teams to identify the flow of process steps and information from its origin to the delivery of the product or service to its end-customer. VSM engages teams to identify the current-state and design a future-state of the value process flow. It uses a system of symbols to depict various work activities and information flows and it is very useful to include information such as cycle times and resources. Thus, VSM is especially useful to find and eliminate waste and non-value adding activities, as well as the value-adding activities. Items are mapped as adding value or not-adding value from the customer's standpoint.

While the approach proposed by (Romero and Flores, 2019) is very comprehensive in terms of tools and techniques, it misses one of the most novel approach for process management - process mining. Process mining is an emerging discipline providing comprehensive sets of tools to provide fact-based insights and to support process improvements. This new discipline builds on process model-driven approaches and data mining. However, process mining is much more than an amalgamation of existing approaches. For example, existing data mining techniques are too data-centric to provide a comprehensive understanding of the end-to-end processes in an organization. BI tools focus on simple dashboards and reporting rather than clear-cut business process insights. Process mining is not limited to process discovery. By tightly coupling event data and process models, it is possible to check conformance, detect deviations, predict delays, support decision-making, and recommend process redesigns. (Van der Aalst, 2016)

According to Will van der Aalst, there is now a clear trend in the process management community to focus more on the enactment/ monitoring, adjustment, and diagnosis/requirements phases. These phases are more data-driven and process mining techniques are frequently used in this part of the BPM life-cycle.

Process mining is a relative young research discipline that sits between machine learning and data mining on the one hand and process modeling and analysis on the other hand. The idea of process mining is to discover, monitor and improve real processes (i.e., not assumed

processes) by extracting knowledge from event logs readily available in today's systems. (Van der Aalst, 2016)

One of the key elements of process mining is the emphasis on establishing a strong relation between a process model and "reality" captured in the form of an event log.

In process mining, there are 3 modes on how it can be utilized. Play-out refers to the classical use of process model. Play-Out can be used both for the analysis and the enactment of business processes. Play-In is the opposite of Play-Out, i.e., example behavior is taken as input and the goal is to construct a model. Replay uses an event log and a process model as input. The event log is "replayed" on top of the process model (Van der Aalst, 2016). Table 5 below is presenting how the 3 process mining models are working.



Table 5 Process Mining use cases - Play-in, Play-Out, and Replay -Wil van der Aalst, 2016

In order to remove unnecessary steps and automate for efficiency, companies have to focus their efforts where it is needed and process mining is taking the existing logs that existing systems are recording for each activity that happens and displays graphically the traces of the process. Process mining is a very novel technique as it helps discover, monitor and improve processes. Bottlenecks can be easily located, highlight work where work is duplicated, and where improvements should be made.

#### 4.1.3 Technology Management

The adoption of new technologies should be very thoroughly assessed, as the scope of digitalization is not the new tools adoption but the process efficiency using digital tools. Hence, the new technologies and software has to be compared to a set of deliverables and evaluate whether they will provide competitive advantages.

For a good management of the digital transformation, the technology management is essential, for understanding their full potential and how they can deliver benefits across the company. Some of the technology management practices indicated by Romero and Flores (2019), are: a) the technology strategy should be a "pull" by the company based on the needs not a "push" from the supplier's end, since the company should have in mind a clear adoption plan, including objectives, plan and approach to deliver business goals. b) The company should keep scouting in order to be exposed to new technologies that could bring added value before competition. c) Clear technology roadmaps for implementation of the new solutions in alignment with the organization's plans. d) the technology portfolio pondering outcome over technology as new breakthrough innovations might not always deliver the promised "Return on Investment" even if the product seems interesting and cool.

The Lean Start-up Approach could be applied, with one of the frameworks "Build-Measure-Learn" cycle also known as the feedback-loop. The scope of the framework is to first understand the customer problems that need to be solved. Second step is to develop a Minimum Viable Product(MVP) that would enable the organization a fast and timely learning cyclic process. Last is to measure the success using actionable metrics and from the customer's requirements and improve the MVP.

#### 4.1.4 People Management

According to Romero and Flores (2019), an integral part of a digital transformation is the creation, development and cultivation of a Digital Culture – understood as a set of values and characteristic behaviors, at personal and organizational levels, driving new digitally enabled ways of thinking, working and interacting with the customer, among employees and business units, and with new digital tools.

A digital culture should be built with having in mind many factors. The organization should keep an Innovation spirit and bring disruptive and innovative new ideas, adapt quickly with agility and flexibility, stay customer centric and consider customer feedback as an opportunity for continuous improvement. Decision taking should be data based instead of intuition while

keeping a digital mindset by taking advantages of digital technologies and capabilities. (Buvat and Crummenerl, 2017)

The complexity of digital transformation can only be then handled by focusing on employees' mindset and skills, through which 'change' of processes, technologies and strategies should take place by means of training and development, organizational communication, reward systems and recognition. (Romero and Flores, 2019)

Developing a digital culture is a systematic process and program. PDCA or a Plan-Do-Check-Act using a Kanban board is a utilized solution on this area. (Russel, 2016)

The Plan phase is when targets, action plans, key metrics, and owners are defined. This step should not be shortchanged since it is the foundation for everything that comes after it. Within the context of Kanban, this is when Kanban data is gathered, solutions are calculated, and cards and boards are deployed. This is also when standard work should be written for all the associated Kanban processes or tasks. (Russel, 2016)

The "Do" or execution portion of PDCA is when defined action plans and processes are accomplished. Since most manufacturing and operational processes are repetitive, this phase of PDCA is performed over and over, which is one of the primary reasons why PDCA is considered a loop. Every time a process is repeated it should be viewed in the larger context of the overall plan along with any follow-up activity. (Russel, 2016)

In Kanban, execution revolves around the care and feeding of Kanban cards and boards; cards trigger replenishment orders and boards manage open orders.

The Check phase is the oversight portion, which is often overlooked or under-resourced, and the intent is to find shortcomings and areas for improvement. A discovery in this phase doesn't necessarily indicate failure, though that could be the case, but instead it is meant to maintain that desired focus of continuous and intentional improvement. Kanban audits are key to maintaining a healthy system. By its very nature, Kanban gets desynchronized over time if any of the underlying data changes, such as daily demands or lead times. (Russel, 2016)

The Act phase closes the loop on all the prior steps because it drives any action that came out of the prior steps. Whether something was missed in the plan, or the execution phase didn't quite meet the expectations, or the audit process discovered potential improvements, this is when those gaps are closed. It can also be appropriate to view this phase as the time to celebrate identified successes from any of the prior phases. Yes, continuous improvement focused much more attention on the next improvement than it does on the latest success, but associates deserve the chance to celebrate their wins. (Russel, 2016)

#### 4.1.5 Risk Management

When risk management is assessed, it is not visualized only from the perspective of the technology, but perceived as a business issue since the company drives digitalization of

business processes. All innovation projects are coming with a certain degree of risk but needs a proper management. A risk strategy implies establishing a framework to address the risks associated with implementation of new technologies. Risk can be technological, strategic or operations, depending on their root cause. A good risk framework aims to create awareness in the workforce about the digital risks as part of the new culture. (Romero and Flores, 2019)

4.2 Digitalization Solution for the Financial Function

Digital transformation came along with new technologies that received increased attention from C functions across many industries.

A list of technologies for the financial operations would be comprised of (Baril et. al, 2018):

- Advanced Analytics(AA)
- Artificial Intelligence(AI)
- Distributed Ledger Technology(DLT)
- Machine Learning(ML)
- Optical Character Recognition(OCR)
- Robotics process automation(RPA)

During 2018, Grant Thornton surveyed 304 CFOs and financial leaders and investigated what is the adoption rate of the new technologies, and came with the below distribution (Table 6):

	Today(2018)	Within 1 year	Within 2 years	Within 5 years	
ics	24%	24%	25%	11%	
nce	7%	11%	16%	20%	
Distributed Ledger		11%	16%	14%	
g	8%	11%	11%	16%	
Optical Character		14%	14%	13%	
Recognition					
Robotics process		11%	11%	15%	
automation					
	ics nce Ledger g Character process	Today(2018) ics 24% nce 7% Ledger 9% g 8% Character 20% process 7%	Today(2018) Within 1 year   ics 24%   nce 7%   Ledger 9%   g 8%   Character 20%   process 7%	Today(2018) Within 1 year Within 2 years   ics 24% 25%   nce 7% 11% 16%   Ledger 9% 11% 16%   g 8% 11% 11%   Character 20% 14% 14%   process 7% 11% 11%	

Table 6 Adoption rate of new technologies

There is a big distribution and prioritization for technologies, but we can see that companies concentrated first on OCR implementation together with AA and towards AI and ML for the future.

For the present thesis, it is not possible to investigate all the solutions and technologies, although all are very important and they are interconnected at some point. Further, I will focus the attention on OCR and RPA.

#### 4.2.1 Robotics process automation

Robotics process automations is a form of business process automation based on software robots or artificial intelligence. Based on a list of actions to automate, a software developer interferes with the back-end system using application programming interfaces or dedicated scripting language. The developer will take a look how the task is performed in the graphical user interface (GUI) and then perform the automation by programming to repeat the tasks directly in the GUI. (McCann, D. (2018)

The benefits of RPA are clear: it is rather inexpensive, easy to experiment with which makes it optimal for corporate functions to build MVPs and prototypes before expand-ing to fully functional tools.

According to AIMDek technologies, a full cycle enterprise software development company, specialized in deploying and creating robotics, there are four distinct phases of RPA. The Assisted RPA, or RPA 1.0 is where the RPA software automates various activities and applications running on the user's desktop. Here we can simply think about Copy and Paste activities between files of interfaces. Assisted RPA is effective in cutting down handling times and cost savings. It also meant that long, complex processes were conveniently replaced with single mouse clicks. This form of RPA is utilized only when the interaction between system and human is needed,

The unassisted RPA, or RPA 2.0 is when the RPA software is deployed on several machines to run without the need to attend the automation. This automation does not require an employee to go to a machine, log on and trigger any process to begin and observe performance. The unassisted RPA can be automated and simplified through dashboards that would allow users to assign tasks to machines , manage their queues and manage robots individually to tweak them. Robots can work permanently and replace the human need with a process. (McCann, D. 2018)

Autonomous RPA is combining AI and machine learning to deliver more through the RPA tool. This is the latest version of RPA but ton fully implemented.

Cognitive RPA uses algorithms, natural language processing, data mining and machine learning, combined with structured and unstructured data. Unstructured data can be analyzed and processes while cognitive RPA and take decisions and automate complex tasks. This is under development at this moment.

Table 7 is representing what is the business impact and differences between the four types of RPA.



Advances in RPA technogies



Gartner predicts that nearly 90% of corporate controllers will soon be using RPA in financial and management reports, accounting closes, technical accounting and cost-related activities. What's required for successful adoption is a candid assessment of RPA's pros and cons, and an action plan for change. But as with any new technology, risks exist. Automation raises the possibility of programming errors, and makes end-to-end processes (e.g., report-to-record, order-to-cash) instantaneous — forcing the controllership to look elsewhere to drive continuous improvement.

Although RPA is often regarded as a tool to automate the core financial processes it has a lot to offer for the value-added tasks of the financial functions. RPA can complete highly data intensive tasks quicker and with reduced error rates, combined with a 24/7 level of work is crucial for value added tasks. Many of the financial function's core processes can be automated. RPA can significantly speed up processing time for tasks such as payroll, travel and expense processing, vendor invoicing and payment generation, credit control, fixed assets and general ledger (Vanmali, 2017).Let's take for example the payment generation process. RPA can trigger the entire process of generating the payment file, error checking and sending the payment file to the bank, autonomous. RPA will not fix an entire finance function, like the payables process all together but there are parts of the process that can be automated and will facilitate FTE reduction and efficiencies. Other examples of tasks that RPA can automate are:

- Receivables management:
  - Automated monitoring of receivables;
  - Sending of reminders to customers for long outstanding balances
  - Calculations of provisions
  - Booking of transactions that come from upstream systems;
  - Reporting
  - Payables management:
    - Cross-checking between documents for accuracy;
    - Monitoring of different lists;
    - Preparation of posting;
    - Run different transactions in ERP based on inputs received from different systems that are not interconnected

Further utilizations can be created around different activity types, with an indicated reduction in headcount (Siddiqui, 2019):

- Data input:
  - Extract data from several applications and reading emails, files, folders 60-80%
- Data output:
  - Sending data obtained from the execution of the process with pre-defined format and distribution channels (email, file transfer, web-based, etc.) 50-70%
- Reconciliation:
  - Understanding and combining data retrieved from several applications(e.g., cash reconciliation, Profit and Loss reconciliation) 40-60%
- Data quality management
  - Measuring data quality and testing consistency (e.g., batch monitoring, availability and integrity check) 60-80%
- Reporting and dashboard
  - $\circ$   $\;$  Implementing dashboards and generating reports 30-60%  $\;$
- Business rules
  - Applying business rules (such as accounting bookkeeping principles, amortization themes and cost reallocation) on the basis of formalized principles and guidelines 20-40%

## 4.2.2 Optical character recognition (OCR)

OCR's best use cases in the financial function are its superb speed of automating rather mundane and rule-based tasks. From a technical point of view, OCR is a direct derivative of

machine learning: the processing engine receives training material of data and characters recognized in the data, and the algorithm applies the training material into practice. According to Baril et. al (2018), two of the most widely adapted technologies are advanced analytics and OCR due to their relatively painless implementation and quick payout. (Otto-Oskari, 2018)

OCR enables fast and extensive absorption of data, automation of otherwise slow processes and subsequently better coverage and accuracy. Optical character recognition (OCR) can scan documents and images, converting them to files in different formats. The technology lets accountants and financial analysts focus on the more specialized aspects of their jobs, leaving the routine tasks of deciphering old receipts and statements to computers. (Otto-Oskari, 2018)

Human beings are prone to error. It takes time and practice before one can thoroughly manually enter data for records. The task itself is repetitive and tired eyes or hands will lead to more errors. If employees need to input massive amounts of data, the company ends up spending more on overtime and overhead. OCR technology introduces improved efficiency by doing these things faster and with greater precision and accuracy. .(Otto-Oskari, 2018)

At the same time, the business spends less on operational costs and labor expenses on employees. Streamlining invoice processes for payables records is the first step to better accounting. The OCR would work by going through a volume of invoices from several suppliers or vendors. From here, they can configure the invoice formats and establish relevant data. Otto-Oskari, 2018)

Other OCR technologies have a thorough step-by-step process. A good program can have the invoices from different sources move towards one destination, regardless of the form. Automated classification algorithms are used to recognize the information and organize them accordingly. Data can be extracted rapidly from each field indicated; numbers are validated in a faster process based on calculations and database. All information can be verified using an intuitive operator interface to assure accuracy. Gathered data is stored as searchable PDFs staff can easily refer to in the future. (McCann, 2018)

#### 4.2.3 Other digitalization tools

The other tools used by the finance functions are Artificial intelligence, Advanced analytics, Distributed ledger technology and Machine Learning.

Artificial intelligence, sometimes called machine intelligence, is intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals. Alternatively, Gartner's (2018) definition for AI incorporates the technology's ability to emulate human performance by coming to its own conclusions, appearing to understand complex con-tent and engaging in dialogue even to the extent of replacing people on execution of nonroutine tasks.

Artificial intelligence puts the CFO in a position to predict which customers will pay, be late in paying, or will not pay at all. A multivariate analysis of B2B customer data such as industry type, credit rating, product purchase and sales person can provide a forecast of the probability that a business will pay its bills – and should be extended credit (Climas, 2019). For managing the expenses claimed by employees, artificial intelligence can analyze and interpret expense data and detect suspicious claims. Finance can explore spending patterns and behaviors and machine learning can predict common behaviors of employees who falsify or exaggerate claims. (Climas, 2019)

According to Sisense, a business analytics leading provider, advanced analytics is a general term for several subfields of analytics that work together using predictive capabilities. Advanced analytics uses tools to project future trends and behaviors. Advanced analytics are composed of different areas such as Predictive data analytics, bug data and data mining. Data mining provides the raw data that will be used in the process. Big data will find existing insights and create connections between data points and clean the data. Predictive analytics will use the cleaned data to extrapolate and make predictions and projections about future activity trends. Big Data and Cloud, together with business intelligence software help companies have actionable insights and better outcomes. Advanced analytics help companies not look only in the past but understand based on the existing data what would be a possible future.

World Bank indicated that blockchain is one type of distributed ledger. Distributed ledgers use independent computers to record, share and synchronize transactions in their respective electronic ledgers.

Machine learning(ML) is a subset of artificial intelligence and it has two forms. Supervised learning is when finance teams will train the algorithm by putting in the model historical data, together with the expected outcome. Unsupervised learning will involve feeding the data without the expected result, leaving the algorithm to find patterns and correlations (Freedman, 2020). Today, ML is mainly used to increase efficiencies in basic finance and accounting functions to set up touch-free processes for any rule based operation that involves a lot of repetition, like payables and receivables operations.ML algorithms can help my spotting errors and highlighting them, which could go overlooked by people.

#### 4.3 Digital Transformation Impact to date

In a 2018 global survey done by McKinsey in 2018, it was observed that 8 out of 10 respondents indicated that their company is going through a digital transformation to capture the benefits of the trend or simply to keep up with competitors. Motivation for transformation is tied to addressing real operational needs: 60% of respondents had a business need that required digital transformation; 40% wanted to develop talent and skills of their employees and 39% felt competitive pressure to pursue. Yet, success is proven to be elusive, and only one-third of the organizations succeed at improving the company's performance and sustaining those gains. Even digital savvy industries, such as high tech, media and telecom are struggling, with a success rate of 26%. Success rates also vary by company size. At organizations with fewer than 100 employees, respondents are 2.7 times more likely to report a successful digital transformation than are those from organizations with more than 50,000 employees. Nevertheless, there are many success stories that managed to undertake and drive digitalization projects. (Boutetière et.al, 2018)

M&A is a very good opportunity to make drastic changes and digital transformation is a way forward. M&A requires companies to harmonize processes to unsure efficient operations. One successful project is Nokia, when after finalizing the acquisition of Alcatel-Lucent experienced misalignment in Order to Cash and Procure to Pay processes. With the help of process mining, Nokia analyzed and improved the processes, and reduced the lead-time. Nokia performed a data driven analysis of their operation, and made the visualization of the processes much more efficient and less time consuming. With the help of process mining, Nokia has improved both Order to Cash and Procure to Pay by using the transactional timestamp of each action, understanding what are the deviations and areas that could have been improved. One decision taken by Nokia was to redesign the entire Procure to Pay process in SAP Ariba and limit the approval process for orders.(Khan, 2018)

When it comes to RPA, 53% of organization have embarked in a RPA implementation journey, forecasted to receive universal adoption in the next 5 years. Payback of the investment was reported at less than 12 months, with an average 20% fulltime equivalent capacity provided by robots. RPA continues to meet and exceed expectation across multiple dimensions including: improved compliancy 92%; improved quality and accuracy 90%; improved productivity 86% and cost reduction 59%. (Watson and Wright, 2018)

There is an expectation that robots could deliver a significant portion of current transactional activities. The expectation is that robots could provide 20% FTE capacity and the expectation is matching the reality of those that already implemented RPA. The ones that have scaled RPA appear to have had such a positive experience that their expectations are even more ambitious, they believe that 52% of FTE capacity could be provided by robots. Yet, scaling RPA is clearly more difficult than anticipated, only 3% of organizations have scaled their digital workforce. (Watson and Wright, 2018)

For a mid-table Fortune 1000 organization with around \$20 billion revenue and 50,000 employees, automating 20% of estimated addressable activity through RPA could result in over \$30 million of bottom-line impact each year. (Watson and Wright, 2018)

## 5 Case study

In the previous chapters, the thesis presented what digitalization and digital transformation represent, how companies should approach the transformation and what are the areas were they struggle with. Further, the digital transformation was transposed to the finance operations of companies, how the finance operations and companies can benefit from the transformation and what are the technologies at hand. Based on these theoretical model, this case study will represent how the digital transformation is managed in a company, how finance operations is dealing with the change and what are the delivered benefits. The case study will present from strategy generation to implementation and results in a traditional Oil and Gas company in Austria and present what are the results delivered by the transformation so far.

### 5.1 Selection of industry

The Oil and Gas company selected is OMV because the author is working in the company in a newly created department named Digital Finance Transformation in the Finance organization. Additionally, the Oil and Gas companies are traditional companies that exist for many years, OMV being an active company since 1956, hence the challenge to drive a transformation is bigger and in the operations and culture there are many typologies that were embedded for a long period of time.

Digital transformation is a complex transition and, as presented in the previous chapters, it requires a strategy that does not look on a process or output but aims the entire organization, and involves every business process from the value proposition for the customer to how the operations are being made while training and shifting the organization to be ready for the new disruptive future. It requires close cooperation of multiple departments, silos have to be broken and not technology is the scope but the enabler of the new strategy.

OMV Group is an integrated Oil and Gas company, meaning it engages in the exploration, production, refinement, and distribution of oil and gas, as opposed to companies that specialize in just one segment. This makes the environment even more complicated for OMV as it covers different types of businesses under one umbrella, therefore the Digital transformation will have to embed different strategies that cover all businesses. OMV is divided into 3 main categories, specific for the industry: upstream, which includes all exploration and production endeavors, downstream, which is confined to refinement and

marketing activities and Corporate where all corporate functions are centralized, mainly finance functions and support together with the Group's Leadership.

In the case study, the author will present what are the general measures taken to drive the digital transformation for the entire group, specific for each division and then will drill down on what is the strategy for the finance function. Furthermore, the author created strategies and drives projects that aim to digitalize the finance function and will represent what was the status quo and what was the impact of implementing them. The case study will present how the strategy was developed, implemented, what tools and solutions where used in creating the strategy and some of its outputs. As the Digital Transformation is an ongoing project that started in 2019, and will span over a 5 year period, benefits are not yet fully materialized and strategy might shift over time.

## 5.2 Digital Transformation strategy for OMV Group

As global geopolitical activities drive uncertainty and volatility in commodity prices, for the oil and gas industry the transformation is essential to enable the business to deliver at potentially depressed prices with ongoing reductions to operational costs. Oil and gas companies remain more focused on cost cutting and operational efficiency than other industries and the data indicates a strong desire to improve business processes via, or in conjunction with, technology. Cost savings are delivered through operational efficiencies and automation, but a digital transformation repositions companies to be more flexible and adjust in an uncertain longterm future for the Oil and Gas industry. With increasing pressure to reduce carbon emissions and drive renewables, the critical role of technology in Oil and Gas is only getting bigger. According to a study conducted in October 2019 by Rystad Energy, up to \$100 billion can be saved from Exploration and Production in Upstream budgets through automation and digitalization.

For OMV, Digital Transformation represent an opportunity to harvest value from connecting data sources across the company and even beyond the company. This, in turn, helps OMV deal with the higher business complexity and increased expectation levels of customers and other stakeholders. Data centralization and advanced analytics help make sense of production and logistical data to steer production to higher yields, higher quality, and reduced losses. Customer data helps offer the best possible service to OMV customers. Both digital and technical innovation are vital for reducing both the environmental impact of the business and carbon intensity, as innovation often means better asset utilization and process efficiencies as well as improved maintenance and early anomaly detection. It leads to optimized workloads and better business results and improves environmental and social performance. For OMV, Digital Journey is the program to achieve these goals and pave the way toward digital leadership. It is composed of synergetic and orchestrated initiatives across the entire Group: Upstream, Downstream, and Corporate. OMV's digital ambition is to become a digital leader

in core areas by adopting the latest digital technologies, such as the Industrial Internet of Things (IIoT), intelligent automation, machine learning, and video analytics.

OMV Group started its Digital Transformation with a very ambitious goal, to become the "Digital Leader" in the oil and gas industry. OMV wants to innovate at speed and scale and adapt the organization, skills and mindset to the digital world. The group aims to enable building unified digital platforms to become a data driven company. OMV committed more than 500 million euro in dedicated initiatives and projects to become a digital leader in its field. From the very beginning OMV highlighted that the Digital Journey is about the people as well and creating a digital mindset by reshaping the talent landscape.

OMV embarked in a Digital Journey where innovation and technology are a powerful engine that drives and enables sustainability. Hence, the company started to find ways to harvest value from connecting data sources across the organization, helping deal with higher business complexity and increased expectations from the customer side. Data centralization and advanced analytics help the company to make sense of production and logistics data for a better production. Initiatives are started synergetic across the entire group: Upstream, Downstream and Corporate.

Creating a digital mindset and building digital skills was a topic that OMV touched from the moment the digital transformation was started.

Agile ways of working are utilized across the implementation deliverables for fast results.

From a strategic perspective, the OMV Digital journey has three signposts, which are presented in Table 8.

#### Three signposts guide OMV's Digital Journey:



Table 8 OMV Three Signposts for the Digital Journey

Digitalize means creating business agility through smart investment choices that focus on highest impact on business and HSSE priorities.

Act stands for the company being committed to develop an empowered, collaborative learning culture that enables each employee to contribute in the Digital Journey.

Enable aims that the common digital platforms that form the backbone of the digital core enable to break down data silos and start utilizing data across the group, by implementing the new SAP S/4HANA, analytics and data platform.

For the Upstream division, the aim of the digitalization is to optimize operation and processes for higher efficiency, improve HSSE performance and increase profitability. The digital roadmap consists of file lighthouse projects: Digital Twins, Digital Oilfield, Digital Rig, Digital ways of Working and Digital Office of the Future. The Roadmap of the Upstream division consists of more than 70 projects. An example of a project would be regarding the real-time digital oilfield. This program aims to expand the options for safer, greener, and more efficient operations through strategic integrated digital technology deployment. A recent example is a robotic drone that conducted routine condition inspections of the largest crude oil storage tanks in a fraction of the time and at lower costs, while completely eliminating the risk to human life when working at height and entering confined spaces. In addition, robotic crawlers with magnetic pads are currently being tested to perform paint blasting and reconditioning of external corrosion protection, thus eliminating the extreme risks linked to having humans perform this work.

Digitalization initiatives in Downstream will generate new value in the selected focus areas of operational excellence, value chain integration, and customer experience. The Downstream Digitalization Roadmap for 2025 consists of 60+ initiatives to achieve process optimization, simplify work, extend digital capabilities, lower costs, embrace new business opportunities, and further contribute to an innovative corporate culture.

An example of a digitalization project implemented in the Downstream Division would be around implementing algorithms that support gas traders. OMV GAS, which is authorized to trade in twelve EU gas markets, implemented an algorithmic trading tool to simultaneously monitor constantly changing order book activities related to the trading of gas contracts. Every event in the order books is read and stored in real time in a high-performance database, comprising around 400,000 data records. Data analytics tools combine other market information to search for patterns and optimize trading decisions. The system also helps close trades in milliseconds, while balancing fluctuations in gas supply and demand and optimizing gas transportation as well as gas storage capacities. Such automation reduces the workload, while optimizing the OMV GAS portfolio all day, every day.

The Corporate Division started Digitalization with the Finance division with the launch of Finance 4.0 in 2018 toward a future-oriented, digitalized process and system landscape enabling integrated growth.

A strong midterm strategic focus for Finance is the implementation of the new SAP S/4HANA enterprise resource planning software. OMV is running on different versions and instances of SAP in each of its divisions and business lines, hence one of the most important goals is to align systems across the organization and migrate all of them to the new S/4HANA. The goal is to increase business value by providing real-time digital and analytics functionalities based on harmonized data and processes. The implementation of SAP Ariba – the cloud-based solution covering all processes related to source-to-contract and purchase-to-pay - enables digital transformation in Procurement. One project started by one of the Groups companies, OMV Petrom is the paperless initiative. As presented in the previous chapters, the first step of Digitalization is to digitize the content, hence moving away from paper documents is mandatory. OMV Petrom started the rollout of the Paperless initiative to minimize the use of paper for daily work activities. Goals of the initiative are twofold: to establish the culture of digital working as well as giving employees the necessary tools and skills to go paperless. Workshops and masterclasses informed employees about the value of digitalization and its environmental benefits. Numerous other tools in the initiatives help reduce the use of paper, including the rollout of digital signatures and digital documentation storage. In addition to environmental benefits, implementation of the Paperless initiative enhances work efficiency as it builds the basis for automation and digitalization of administrative processes and reduces the risk of document loss.

## 5.3 Training and Cultural Strategy

Digital transformation comes with different ways of working and a workforce that is prepared for the future. OMV first found what are the areas and strategy they need to focus on. The indicators OMV focusses on when considering the digital transformation include:

- <u>Developing leadership with a digital mindset</u>: During a transformation, change occurs on every level. One of the indicators of a successful digital transformation is having the leaders with the right digital mindset and a clear vision and strategy, who are committed to the transformation.
- Adjusting the roles and responsibilities of the workforce in line with digital capabilities: One of the indicators of a successful digital transformation is an empowered workforce that embraces change and innovation and can adapt to new ways of working.
- <u>Empowering the workforce to handle day-to-day change and innovation</u>: One of the major outcomes of a digital transformation should be developing skills and talents across the organization. The workforce must not only acquire digital skills and adapt to new ways of working, but employee roles and responsibilities must also be transformed as a result of digital transformation.
- <u>Establishing digital as the new norm in the organization</u>: Digital should be established as the new norm in the organization including digital tools, processes, and communication channels as well as technology in operations and data-driven decision-making. Digital tools

are needed for new working methods and are an important way to spread information and data across the organization and make it accessible for everyone.

In order to sustain the organization to build digital capabilities, OMV created a Digital Academy

The Digital Academy (Table 9) enables OMV staff to develop skills through learning and helps them embrace new ways of working and new technologies. It offers training courses to help OMV employees take part in lifelong learning and build strengths in capabilities needed to deliver OMV's Digital Journey.



Table 9 OMV Digital Academy

As presented above, the Digital content was split into 4 categories:

- <u>Digital skills we all need</u> trainings and materials aimed to help employees at any level to ramp up its digital skills needed for the day-to-day work. This pillar is centered on making employees familiar with new ways of communication, how to make sense of data and how to use the new technologies;
- <u>Digital skill for leaders</u>- with the scope to improve the innovation leadership, change management and enabling accountability;

- <u>Digital skills for IT&Project managers</u>, a more technical part that help professional on how to become an Agile PM, Machine Learning, and Project Management;
- <u>Digital skills in your function</u> materials and trainings that help employees become proficient into Robotic Process Automation, and Agile ways of working.

The Digital Academy is accessed through the internal Learning Management System. It contains over 250 validated courses, the majority of which are online and available globally to every employee at every level. The Academy helps find relevant trainings by identifying various topic areas depending on the employee's core role and knowledge needs at OMV. The content was developed by a cross-functional team from Upstream, Downstream, and Corporate. In the first two weeks of operation, OMV employees around the globe watched 7,400 learning videos.

5.4 Strategic partnerships for Digital Solutions

For driving the Digital Transformation, OMV partnered with industry leaders for steering and strategy creation.

OMV entered into a long-term agreement with Cognite. For the past two years, Cognite has pushed a powerful message: data liberation. Data liberation is about breaking data free from silo systems and empowering humans and machines to make better and more informed decisions, and to seamlessly exchange data between companies across an industrial value chain for improved efficiency. OMV will deploy Cognite Data Fusion (CDF), a software package that empowers industrial companies to extract value from their wealth of existing data by transforming it into useful information. CDF will enable OMV to operationalize data analytics and machine learning and to roll it out across their operations, integrating seamlessly with existing infrastructure to make all relevant data instantly available as a comprehensive set in the cloud.

OMV partners with Microsoft to accelerate its digitalization strategy. OMV will implement Microsoft cloud technologies such as the hybrid cloud platform Azure, which will allow scalability and ubiquity in both data storage and processing. In the next three years, OMV expects a significant part of its processing capacity to be located on intelligent cloud platforms, and will also adopt Office 365 as the communication, collaboration and productivity solution for its employees. With this agreement in place, OMV will be able to accelerate the building of skills required for the digital age. This will be accompanied by the implementation of LinkedIn Learning, which will enable OMV to develop talent and keep skills current with a personalized eLearning approach.

## 5.5 Digital Finance Transformation in the Finance Function at OMV

In line with the goal to be the Digital Leader in the oil and gas industry, OMV aims to be have World Class Finance Operations in the industry as well. The Finance operations have four main pillars around Efficiency, Quality, Evolution and People. The Finance function strives to increase the efficiency and performance of finance processed via a higher degree of standardization, simplification and automation.

In order to drive the Digital Finance Transformation, the finance function was structured for best performance. Hence, the company has adopted an outlay of 2 service centers, on in Bucharest, Romania and one in Vienna, Austria that split the workload management geographically. Each Service Center has in their structure teams dedicated for managing the cycle between the moment an invoice is received until payment for Accounts Payable Operations. Also, each Service Center comprises teams that manage the Accounts Receivable by issuing invoices, managing reporting, bookings and cash allocation. Besides the transactional teams that handle the day-to-day operations, a dedicated function for the Digital Transformation was created. Therefore the Digital Finance Transformation Team was created with the following mandates:

- Simplify and harmonize the finance processes to achieve increased efficiency;
- Support the transition from legacy SAP systems to the new SAP S/4HANA by leveraging improved functionalities that reduce complexity in the future systems;
- Improve the day-to-day operations to achieve World Class Finance;
- Support the Receivables and Payables team in their daily operations through improved operations and lean system outset.

The Digital Finance Transformation Team is composed of four different teams. The Finance Process Management team has the scope to look at existing processes and act as Process Managers, by challenging, improving and enhancing the existing operations and prepare them for digitalization, ensuring that the output of the processes brings OMV towards the World Class Finance.

The Digital Finance Team has members with IT background, specialized in sourcing new solutions but at improving the existing ones as well. The team is composed of SAP experts, Machine Learning enthusiasts and Robotics Process Automation experts. Their role is to sustain the Process Management team with solutions and IT support.

The Finance Systems team looks at improving the existing tools and keep the operations going by handling the support for the existing tools.

The Master Data team is handling all the data existing in the SAP systems, which is the foundation of a correct backbone for existing and future operations.

## 5.6 Strategy creation for Accounts Payables operations – use case for Process Mining

For driving OMV Group towards World Class Finance Operations and Digital Transformation, the Finance Process Management team created the road map for the following 5 years that would bring the organization towards the desired goal. As presented in the previous chapters, in driving the assessment of what changes and improvements have to be driven, the Process management team assessed the process performance and not what technologies have to be implemented.

The author of the thesis created the strategy for the Accounts Payable operations and, when creating the strategy, followed to achieve the best practice indications presented in previous chapters.

First, in order to understand what World Class Operations represent, the author met with the consultancy company Gartner that highlighted what World Class represent in terms of operations. Mapping to existing operations, the assessment was divided into 4 quadrants, underlying the degree of matching the maturity level compared to other companies, as presented in Table 10:



Table 10 The 4 phases journey of the World class Payables operations

After the assessment, it was observed that OMV was at the borderline between Achieving and Leading in terms of strategy, indicating that there were still some developments to be made, which were identified.

Second step was to benchmark the performance of OMV compared to peers based on benchmark information received from other consultancy companies.

For assessing the status quo, Process Management utilizes Celonis platform for process mining the payables operations. All data about the existing performance was extracted from Celonis.

A set of KPIs that are largely utilized in the payables operations and represent the end-to-end operations were selected to be benchmarked. In the assessment phase, part of the metrics considered to investigate are represented further in the paper together with the results of benchmarking versus other companies in Europe, from Energy sector or from similar revenues.

• The invoice channels and the distribution between paper document together with PDF versus Electronic invoices Pay-on-receipts versus Electronic Invoices EDI. Below it can be observed the results of the benchmark and the OMV assessment:



## Invoices Processed by ingestion Type

 Invoices paid on time – meaning the percentage of invoices the payables department is paying at due date, benchmark compared to OMV metrics;



## Accounts Payable Invoices Paid on Time

• Average cycle time – represented by the time Accounts Payable team needs to process an invoice, from the moment an invoice is received until the invoice is ready to be paid;

## Accounts Payable Average Invoice Cycle Time



Invoice cycle teams refers to the time between invoice receipt and ready for payment.

## OMV = 6 days

Example of view in Celonis of cycle time calculation for processing invoices is presented below in Table 11:



Table 11 Celonis view of cycle time calculation for processing invoices

• The touchless rate, represented by number of invoices that flow from receiving, ingestion in the companies ERP, matching and having the invoice paid is done without human touch, as a comparison benchmark with OMV.



Accounts Payable Invoices Electronically Matched (PO-Receiving-Invoice)

An electronic match is a match that is achieved without any manual effort (such as a person looking at the PO, invoice and receiver to ensure that they all agree). If these documents are online, it would still be considered an electronic match only if a person does not have to look at them.

In order to have a comprehensive view of the process, finally, feedback from the teams involved in the process was collected, based on what are the areas that should be improved. Part of their indications included improvements of the invoicing channels and migration to digital solutions that would reduce data ingestion efforts, increase the number of invoices paid on time and, increase the end-to-end touchless automated process.

Further, together with the payables, finance and procurement leadership, a comprehensive process enhancement strategy was created that would take into consideration the internal feedback, benchmarked data and best in class indications.

Looking on the data, it was observed that, although the payables department manages to process invoices in a short time (6 days), many of these invoice are received as paper or PDF. Paper or PDF invoices require manual input of data as there was no largely used Optical Character Recognition solution in place. Only a very low percentage of these invoices (6%) went. from receiving to payment without a payables manual touch.

For the payables operations, the main pillars that were considered are:

- The supplier onboarding, master data management and invoice creation/invoice sent to be managed through a supplier platform where supplier is empowered to own its finance journey;
- For any on-off invoices suppliers should have access to create their own invoices in a digital platform that would allow end to end automation;
- 90% of invoices to be received digital;
- 90% touchless transactions in the payables between receiving and paying;
- More than 75% of suppliers to be able to self solve their finance queries

Based on discussions with all stakeholders and process participants, it was agreed that the pillars indicated were to bring OMV to World class operations and deliver great efficiency for the Payables teams.

The metrics and pillars were divided into actionable projects that would consider different parts of the payables process. A total of more than 25 projects and initiatives were selected to be driven in the next 5 years. Some of the initiatives are presented below, and prioritized based on the impact they would have in the daily operations, and the effort needed to deliver the project. Each project was rated for Impact in the process and Effort into implementation, with a rating from 1 to 10 (1 representing low, 10 high).

Area	Name	Impact	Effort	Project Type
	Invoice channel strategy & Tools -			
Strategy	Implementation of Strategy (Ariba, EDI,etc)	9	9	Major Projects
PR	Purchase Request correctness check	1	3	Fill In
Receive Invoice	Supplier Collaboration Platform	9	9	Major Projects
Receive Invoice	OCR strategy and tool	5	5	Quick Win
Record invoice	Bank guarantees	2	7	Thankless tasks
Payment	Payment on time measures	9	8	Major Projects
Governance & Steering	Process mining & data analytics	7	4	Quick Win

Projects with high impact and high effort to implement are considered Major projects, high impact and low effort are quick wins, low impact and low effort are fill in projects and low impact and high effort are thankless projects. The methodology is presented in following graph.



At the end, all metrics and projects were split on yearly goals and they are followed up monthly with updates being sent to all stakeholders. Project managers were assigned to each project and they send monthly updates on the progress and future deliverables.

The final strategy was presented to the Group's CFO and became the strategy followed for the entire Payables operations.

The strategy was communicated and sent to all Payables process participants and stakeholders.

#### Observations

Process mining helped in assessing the sanity and metrics of the existing process and, combined with benchmarks on KPIs, and together with feedback received from best in class Consultancy Company, helped created a thorough visions. Key in creating the strategy was to involve all stakeholders early in the process of creating the strategy and capture their feedback upfront, and have a common strategy that takes into account the voice of all participants. Communicating periodically the updates on developments gave a clear understanding of the progress and what changes will happen in the future.

#### 5.7 Improving Payment on time rate using Process Mining

One of the projects nailed down in creating the strategy for the payables department was to increase the rate of invoices paid at due date.

Process mining helped create the strategy for improving the payment on time metric. First, process mining helped in having a clear understanding of when the invoices are getting paid and separated the volumes of invoices paid based on the aging of the paying date, and it can be observed in the following graph.



The graph above represents the number of invoices paid at due date, 0 day is the due date when invoice should have been paid, 1 represents invoices paid 1 day after due date, and all other slots correspond to the number of days invoices paid after due date. It can be observed that the biggest majority of paid late invoices were paid between 3-7 days after due date and after more than 14 days.

Diving deep into the operations, it was observed that part of the suppliers were paid weekly and part paid daily. Hence, part of suppliers paid weekly were paid late with 3-7 days delay. Switching all suppliers to daily payments required further discussions with stakeholders and post agreement, all suppliers started to be paid daily. For the suppliers paid with more than 7 days late, two actions were taken. A sampling was chosen of random invoices and root cause analysis investigated, aggregated and findings reported. Also, Process mining helped once again investigate whether there are any internal departments that are late with their approvals in the Procure to Pay process or if suppliers sent their invoices late.

Example of Process Mining report that highlights the cycle time of invoices in each process step, where it can be observed that cycle times vary invoice by invoice(each line represents a distinct invoice) :

A	в	C	D	E	F	U			J	N
Documen t Number	Vendor No.	Round_Day(Document Date)	Amount	Currency	Invoice Date -> Received	Received > Parked	Parked -> Start Approval	Start/End Approval	End Approval - > Posting	Posting - > Payment
05271261	00200597	Nov 28 2019 12:00 AM	300	EUR	5	8	7	2	7	11
50000201	00001268	Nov 29 2019 12:00 AM	4863.05	EUR	5	1	6	7	0	16
500001874	002005582	Nov 12 2019 12:00 AM	437	EUR	1	5	0	24	0	33
05271268	00200586	Jan 7 2020 12:00 AM	159.24	EUR	7	2	1	3	3	5
05271268	00200586	Jan 7 2020 12:00 AM	159.24	EUR	7	2	1	3	3	5
052712690	002000456	Jan 14 2020 12:00 AM	455	EUR	6	1	0	2	1	4
052712622	L1000261	Dec 2 2019 12:00 AM	2153.33	EUR	7	8	0	21	0	2
05271260	00001311(	Nov 14 2019 12:00 AM	8383.42	EUR	25	1	0	1	1	33
05271266	002000240	Jan 7 2020 12:00 AM	2005.89	EUR	2	5	0	1	5	2

With the help of Process Mining, the Process Management team together with Payables team were able to investigate and understand where are the situations and departments were invoices take longer than agreed timeframe to be processed or approved. Some of the solutions that were found from sampling the root causes combined with Process mining indications were around raising awareness on the process, creating Robotic Process Automation task that would remind employees to approve invoices and educate suppliers to send invoices in due time.

After switching to daily payments together with implementing part of the process mining and deep dive indications, a great progress was observed in terms of payment on time, as presented below, viewed by analyzing the number of invoices paid after due date. As it is observed further, the number of invoices paid after due date reduced considerably, to only a few missed payments in the first week after deadlines. Payables aging before improving the process



The first graph presents the number of invoices paid at due date (0) and after due date(1, 2,3-7,7-14, more than 14 days) before process changes, while the second graph presents the metric after process change.

In this situation Process Mining helped the Process Management teams find the root causes easily and assess their impact, and understand what are the developments of the analyzed process.

#### Observations

Process mining helped understand the process performance and what are the areas of improvement. Nevertheless, a deep dive and root cause analysis has to be done for understanding what are the exact causes.

#### 5.8 Invoice processing solutions - a use case for OCR

Suppliers send invoices to OMV under different formats. Invoices can be sent by paper, paper invoices scanned and sent via email, structured PDF document generated by the suppliers' tools and send via email, Electronic invoices or Invoices created by Suppliers in the Beneficiaries platform.

Paper invoices will always have to be manually processed hence it is a big limitation in any automation.

OCR can be utilized for extracting data from invoices received on email. For the invoices scanned and sent via email, which is also called unstructured PDF, data extraction does not have an accuracy level that allows the payables team to be confident that extraction was 100% correct, therefore manual verification is being done. For the PDF invoices generated by suppliers, called structured PDF, OCR has a very high accuracy when combined with Machine Learning and Artificial Intelligence. Nevertheless, invoices are required to state the amount due, payment due date, date of invoice, description of goods or services purchased, and the payee identification information, such as address, tax identification or phone number. However, the format of the invoice will differ among payees. Some vendors use invoice software to generate invoices while others make their own with a word processing program. The different invoice formats present a challenge: while OCR can extract data from a digital file, OCR does not intuitively know what the data means. When combined with Machine Learning, OCR extracts the data while machine learning analyzes the structure of an invoice for patterns; together, they are able to discern the data, such as knowing the difference between an address number and the amount due. The technologies enable an AP software platform to place the invoice data into the correct fields for processing within the system. In time, formats of invoice can change and the OCR tool needs a mechanism that detects the change and signals it to the payables team to analyze and readjust the OCR engine. OMV utilized an OCR engine that has Machine Learning capabilities which was implemented for part of the invoice volumes.

Electronic invoices are invoices that are issued, transmitted and received in a structured electronic format and the format enables the invoice to be processed automatically and electronically. There are structured and hybrid invoice formats. Structured invoice formats in their pure form, so-called EDI data (Electronic Data Interchange), are not readable by humans. The recipients must therefore first visualize the structured electronic invoices for internal invoice verification, release and subsequent archiving. Hybrid invoice formats (XML) combine the machine-readable structured format and the human-readable visual representation. Technically, this can be achieved by embedding an XML structure in a PDF file. For example, a ZUGFeRD invoice, which is the German standard, contains a human-readable PDF with structured invoice data in an XML format. This way, companies of any size and needs can benefit from the format that best suits them, from multinationals to SMEs or freelancers. The recipient can choose between processing the embedded XML or using the invoice in PDF. For the Hybrid Electronic Invoices, the same OCR platform has the capacity to parse the data from the XML and deliver it to the AP software.



Table 12 Artificial Intelligence Engine using unstructured data from invoices and compare with structured data from the ERP

Artificial Intelligence is used to take unstructured data from invoices and compare them with structured data from the ERP environment without templating as Table 12 above is presenting above.

Supplier platform have the benefit that suppliers can created their invoices directly in the beneficiaries platform and send it to them instantly, having 100% accuracy and traceability. OMV implements Ariba for Supplier Management and suppliers have the possibility there to create and send their invoices.

When creating the strategy for invoicing channels for OMV, all these aspects had to be considered.

In creating the strategy, first OMV investigated through a survey on what are the capabilities of its suppliers. OMV is offering a multi-channel approach, combining structured PDF, Electronic Invoicing and Supplier Platform and lets suppliers choose on what is the best solution for them. Based on the screening of suppliers, 20% will create their invoices in the Ariba platform, 15% will send Electronic XML documents and the rest will send structured PDF documents. After finalizing the implementation, it is estimated a 15% headcount reduction for the payables operations, headcount that will be utilized for more complex AP tasks like improving payment on time or other projects.

OMV implemented OCR for all paper and PDF invoices received, and the project came with an impact of reduction of number of Accounts Payables employees. After implementation, it was observed that the OCR solution that utilized Artificial Intelligence did not fully produced the promised benefits and impact was limited due to some incorrectly maintained master data elements. As presented in the infrastructure model above, OCR engine uses Artificial intelligence and looks in the master data to enrich or validate information. Any missing data or incorrectly maintained it will limit its impact.

#### Observations

OCR together with Artificial Intelligence can help automate part of the invoice processing steps, but all the pre-requisites for a smooth process have to be understood. A thorough analysis of all combined data sources for the artificial intelligence engine should be done as the OCR engine will do as much automation as the existing data will allow.

### 5.9 Receivables process automation steps – a use case for RPA

OMV utilizes RPA solutions for automating steps in the processes. Although RPA experts are located in the Digital Finance Team, all Accounts Receivables and Accounts Payables team received a training on RPA so that they can understand and assess potential of development and find new process steps that can be automated. Ideas are collected through a form that can be accessed by every employee and ideas are submitted for prioritization.

Example of ideas that were submitted for RPA automation:

Automation idea name	Idea description					
List of accruing goods issue and invoices	Automation - closing task					
	Report out of SAP Transaction ID 5500					
	edited according to template and sent to					
	distribution list					
Report Open contracts from previous month	Closing task automation					
	Run report ZFKCC, export to excel, edited					
	according to template and distirbute via e-					
	mail to variable distribution list according					
	to the report outcome					
Automation of daily report ( Tbl-> SAP )	Payables team is receiving on daily basis a					
	report (.csv format) from Tblox via email					
	at a dedicated functional mailbox (					
	Reporting ) . Based on this report it has to					
	be cross-checked if all invoices have been					
	exported to SAP.					

18 different RPA have been delivered to date freeing up hundreds of hours of work from the Receivables team, giving them more time to invest in added value tasks and concentrate on customer impact. An enabler in finding the RPA ideas was that the Receivables team received an RPA training and understood what are the instances when technology can help. An example of cross utilization of resources is represented by a demerger of one OMV company into 3 and Receivables team did not need to add new headcount to cope with extended workload.

## Observations

RPA can help automate repetitive tasks that do not require decision taking, but it is important that the people that work in the process receive a training to understand when RPA can be the enabler.

## 5.10 Digital transformation delivered benefits and observations

The Digital Transformation in OMV was started in 2019. OMV embarked on a journey the involves all commercial and administrative operations, and the group is going through an end-to-end transformation. OMV created an overall strategy that is well communicated in the company, transmitted on all communication channels and is present in everybody's goals and KPIs. Along with the transformation, OMV is transitioning to new systems and tools in a integrated manner, like switching the entire organization to a new ERP S/4HANA from SAP and moving the entire procurement to SAP Ariba platform just to name a few on the finance

part. But Digital transformation is not about the processes at OMV and it came of a change of mentality and culture as well. The transition goes together with a well defined training structure in the Digital Academy where everybody can access trainings and is guided by management what are the trainings needed to cope with the future operating model.

For the Finance function, Digital transformation came with the transitioning to the new S/4HANA, SAP Ariba, RPA, Machine Learning, Process Management Systems, Process Mining and OCR, and this is just a part of the future technologies.

OMV also created before starting a good internal structure to manage the Digital Transformation. Dedicated teams were created with the scope to manage, improve and change the existing process, having in mind not the solution that has to be deployed but the efficiency and performance of processes.

To date, it was observed that most solutions can bring added value and help in the daily operations, especially if a good communication exists and synergies are found. Process Mining is helping creating accurate strategies, investigate process deviations and measure impact real time, but has to be accompanied by deep dive session for a clear view . Also it shows exactly how the process is performing and what are the deviations from the process. RPA is taking the burden of doing non added value tasks and key finding was that people are the best auditors in pointing automation ideas. OCR can free up time for the Payables teams but has to be in synchronization with the ways suppliers can invoice, hence a common strategy based on their capabilities has to be created.

And the results are being observed by digitalization forums, OMV ranked first in digital transparency in Austria. Lundquist's web ranking has been carried out internationally for the 23rd time and Austria has already participated for the 14th time with the current edition. This time 28 Austrian companies were evaluated. The report sees the OMV Group as the leading Austrian company in terms of digital transparency, followed by Erste Group and Wienerberger.

## 5.11 Conclusions

Both the theoretical and case study are following on what are the main pillars and strategic steps of a digital transformation. Organizations that are going through a Digital Transformation are rethinking the value proposition and use technology as an enabler of improving performance, leveraging digitalization advances such as analytics, machine learning, and artificial intelligence as well as improving their use of traditional technologies such as ERP to change customer relationships, internal processes and value propositions.

Digital transformation is driven by strategy and not by the technology it is facilitated by, the vision is much more important than the technological solutions that will be utilized.

It was observed that the strategy has to consider multiple facets to manage challenges that appear in transformations. A clear mandate, where leadership is on board and employees have visibility to, is an advantage of success. Employee skills have to be mapped to specific outcomes in the finance transformation, with a clear training path to upskill for the new ways of working. The adoption of new technologies in the finance functions for the next years should be correlated with the benefits that can bring immediate value to the company, such as better quality, optimized processes, minimize errors or reduce costs. Effective change management with clear visibility and transparency is essential for the success of any transformation.

For the digital transformation of the Finance Payables and Receivables Operations, the companies should take a "process-centric" approach, where a technology-pull is initiated where processes and culture are strategically reengineered for a process-culture-technology alignment. Processes always take precedence over technology and the technology is only the enabler of the process that helps increase efficiencies if the process was designed in an effective way.

The Digital transformation will provide novel ways of working that can create efficiency gains, digital capabilities and value for the customer. Processes have to be standardized and engineered before being digitalized in order to exploit higher efficiency gains and effectiveness that digitalization can provide. Digitalization methods can be utilized to illustrate, analyze and improve the steps required in the process to deliver in the most efficient way. Further, for digitalization of the processes, companies have at hand a multitude of tools that involve Artificial Intelligence, Machine Learning, Optical Character Recognition and Advanced Analytics.

In sum, Digital Transformation is essential for all companies that are not born with a digital mindset from the beginning, and keeping a digital mindset is important for all companies. A clear strategy, good communication and employee centric approach, where employees are trained and embedded in the implementation and strategy creation, is the clear path for a successful transformation. Moreover, companies have to be clear why they embarked in the transformation journey, to deliver better outputs and not just to adopt new technologies.

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